The interaction of stress, tonal alignment and phrasal position in Singapore English

Adam J. Chong¹ & James Sneed German²

¹ Dept. of Linguistics, Queen Mary University of London
² Aix-Marseille Univ. LPL, CNRS, Aix-en-Provence

a.chong@qmul.ac.uk | james.german@lpl-aix.fr

I. Introduction

- Previous work on SgE intonation:
  - Series of rises [1, 2]
  - Domain of rise: Accentual Phrase [2, 3] – content word + preceding function words
  - In initial APs (largest f0 range): no clear tonal target on stressed syllables [4], but initial stress → higher F0 scaling
  - Possible L* [2]:
    - Consistent L target at left edge of AP
    - Additional L optionally aligned to a lexically stressed syllable
  - Previous analysis [5]: stressed σ → M tone, preceding unstressed σ → L tone, final σ → H tone

![Figure 1](image)

**Question:** Is tonal alignment in non-initial utterance position sensitive to the location of lexical stress?

- What is the target/anchor of L tones in the AP? (e.g. Fig. 1.)
- Is it consistently a stressed σ?

II. Methods

- **Participants**
  - 8 ethnic Chinese native speakers of Singapore English (4M, 4F; mean age: 22)
- **Procedure**
  - Produced sentences displayed on a screen using Experigen [6]
  - 12 trisyllabic targets:
    i. Stress position: 6 initial (1), 6 medial (2)
    ii. AP position: utterance-medial vs. final
    iii. Distance from left edge of AP: +/- preceding function word

1. **Initial stress:** e.g. minerals
   - a. They explain **minerals** to the tourists. (Medial AP)
   - b. They explain the **minerals** to the tourists. (Medial AP + Fn wd)
   - c. They explain **minerals**. (Final AP)
   - d. They explain the **minerals**. (Final AP + Fn wd)

2. **Medial stress:** e.g. memorials
   - a. They explain **memorials** to the tourists. (Medial AP)
   - b. They explain the **memorials** to the tourists. (Medial AP + Fn wd)
   - c. They explain **memorials**. (Final AP)
   - d. They explain the **memorials**. (Final AP + Fn wd)

III. Results

**Initial inspection:** Variety of global intonation patterns, even for the same item/condition. Here, we focus on:
- What are the observable qualitative patterns?
- How do differences in stress lead to broad differences in tonal alignment and scaling for each prosodic position?

**Preliminary qualitative analysis - abstract, phonological coding; labeling of turning points in contour:**
- Contour/Tone type (rise/rise-fall or plateau)
- Syllable-level alignment of L and H tones in each AP (e.g., stressed syllable or left/right edge of AP) – reporting L alignment here

**IIIa. Utterance-medial**

<table>
<thead>
<tr>
<th>Rise</th>
<th>Plateau</th>
</tr>
</thead>
<tbody>
<tr>
<td>σ σ σ</td>
<td>σ σ σ</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No function word</th>
<th>Preceding function word</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a)</td>
<td>(a)</td>
</tr>
</tbody>
</table>

**Summary:**
- Rises preferred (B-D)
- Except when stress is on initial σ and is at the left edge of the AP (A)
- L tends to align to the stressed σ (A-C)
- But aligns closer to left edge if stressed σ is further inside the AP (D)

**IIIb. Utterance-final**

<table>
<thead>
<tr>
<th>Rise-fall</th>
<th>Plateau</th>
</tr>
</thead>
<tbody>
<tr>
<td>σ σ σ</td>
<td>σ σ σ</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No function word</th>
<th>Preceding function word</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a)</td>
<td>(a)</td>
</tr>
</tbody>
</table>

**Summary:**
- Plateaus preferred (F-H)
- Except when stress is on initial σ and is at the left edge of the AP
- L tends to align to the stressed σ (E-G)
- But aligns closer to left edge if stressed σ is further inside the AP (H)

IV. Discussion/Conclusion

- High variability of L tone alignment in non-initial position (c.f. [5]):
  - Which factors condition/predict the choice of global contour type?
  - Different contours preferred in different phrasal positions
  - L tone target possibly depend on distance of stressed σ from left edge of AP
  - Future quantitative analysis of alignment (within each global contour type)
- Relation between lexical stress and f0 differs by phrasal position in perception:
  - Do SgE listeners perceive stress differences for all positions/patterns?
  - Do cues to stress differ by position/pattern?
- Stress sensitivity in SgE requires consideration of phrasal structure and position, not simply word prominence (variety-specific ecology of stress realization, c.f. [5])

Selected References


Acknowledgements

This study was made possible through support by the A*MIDST project (n° ANR-11-IDEX-0001/02) funded by the Investments d’Avenir French Government program, managed by the French National Research Agency (ANR), by a grant from the Singapore Ministry of Education Academic Research Fund Tier 2 (2013-T2-1352-16G), and by research funds from the UCLA Department of Linguistics. Thank you to Dina Hamzah for help recruiting and recording participants at NTU, Singapore.