The Articulatory TBU: Gestural Coordination of Tone in Thai

Robin Karlin (rpk83@cornell.edu) and Sam Tilsen
Department of Linguistics, Cornell University
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Overview
- The autosegmental theory of phonology has proposed a tone-bearing unit (TBU) to describe how tone languages represent lexical tone.
- Articulatory Phonology (AP) has promoted the idea that tone is an articulatory gesture, and as such can be coordinated with C(onsonant) and V(owel) gestures.
- I present evidence from an articulatory and acoustic study on Thai, a tonal language that uses the mora as its TBU.
- I argue that the TBU is an articulatory gesture that T gestures coordinate with, and that in languages that use the mora as their TBU, this level of abstract organization is reflected in mora-sized co-selection sets.

Hypothesis: Articulatory TBU
- Tilsen (2014) proposes that there are co-selection sets of various sizes, which reflect hierarchical phonological structures such as the segment and the mora.
- In a language like Thai, the moraic co-selection set consists of the gesture that corresponds to the mora (a V or moraic C gesture), the non-moraic C gestures, and the T gesture.

Methodology
- Electromagnetic articulograph (EMA) study with four native speakers of Central Thai.
- Target words were bimoraic words with the falling tone, with a H(igh)-L(ow) contour.

Tone gestures as consonant-like gestures
- In the first mora (T1)
  - In the first mora, T1 is a non-moraic gesture, and coordinates with V1 like the second gesture of a CC cluster.
  - T1 shows a C-center effect with V1 and C, similarly to Gao’s 2008 findings.
- In the second mora (T2)
  - In the second mora, T2 is still a non-moraic gesture, but coordinates like a coda consonant, as opposed to an onset consonant.
  - When a non-moraic coda is present, T2 behaves like the second member of a complex coda (Marin & Pouplier, 2010).

Moraic groupings of gestures
- Tighter timing correlations (lower standard deviations) between gestures that share a mora than those that are in different moras.

<table>
<thead>
<tr>
<th>Relationship</th>
<th>St. Dev.</th>
<th>Relationship</th>
<th>St. Dev.</th>
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</thead>
<tbody>
<tr>
<td>V1 - m</td>
<td>15.5 ms</td>
<td>T2 - m</td>
<td>31.2 ms</td>
</tr>
<tr>
<td>T1 - V1</td>
<td>19.3 ms</td>
<td>V2 - V1</td>
<td>31.2 ms</td>
</tr>
<tr>
<td>T1 - m</td>
<td>22.9 ms</td>
<td>T1 - V2</td>
<td>33.2 ms</td>
</tr>
<tr>
<td>T2 - V1</td>
<td>25.5 ms</td>
<td>V2 - m</td>
<td>35.3 ms</td>
</tr>
<tr>
<td>T2 - V2</td>
<td>27.7 ms</td>
<td>T1 - n</td>
<td>42.1 ms</td>
</tr>
<tr>
<td>T2 - m</td>
<td>28.4 ms</td>
<td>n - m</td>
<td>42.6 ms</td>
</tr>
<tr>
<td>T2 - T1</td>
<td>29.4 ms</td>
<td>Within Across</td>
<td>42.6 ms</td>
</tr>
</tbody>
</table>

Patterns most visible in target words with diphthongs, where each moraic segment has a distinct gesture.

Discussion
- Evidence that T gestures coordinate with C and V gestures in a way that is reminiscent of autosegmental tonal association.
- However, there is a degree of T1-T2 stability that suggests that tone may be coordinated with each other in addition to being coordinated with their tone-bearing gestures.

Selected references

"The Articulatory TBU: Gestural Coordination of Tone in Thai" presentation by Robin Karlin and Sam Tilsen.