

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

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How stressed syllables in a given language are marked by F0 can depend on phrasal position. This has often been discussed in terms of pre-nuclear vs. nuclear pitch accents [1, 2, 3] whereby the same pitch accent type (e.g., L+H*) is realized differently on whether it is final in the phrase. In this study, we explore how the relationship between tonal alignment and stress in Singapore English differs as a function of position in an utterance.

Singapore English intonation has previously been described as a series of rising melodies across an utterance [4]. [5, 6] argue that the domain of each rising melody is the Accentual Phrase (AP), which typically comprises a content word and preceding function words. [5] show that for initial APs, there is no clear tonal target on stressed syllables. Instead, words with different stress patterns have an overall higher scaling of F0 for words with initial stress (Fig. 1a). Extending [5], this study examines if tonal alignment in non-initial APs is sensitive to differences in lexical stress.

Preliminary data from 8 ethnically Chinese native speakers of Standard Singapore English (mean age: 22) were analyzed. Participants were instructed to read sentences out loud as naturally as possible. The materials involved trisyllabic target words with either initial or medial stress, which occurred in APs that were either utterance-medial or utterance-final. The presence of a preceding function word was also varied, resulting in a total of four contexts for each target word, as shown in (1). Sentence productions (n = 361) were then analyzed and annotated in Praat. Initial examination of our data revealed that speakers produced a variety of distinct global intonation patterns in IP-medial and -final APs. As such, a detailed phonetic analysis that collapses over cases would lead to inappropriate generalizations regarding the types of pattern observed regarding, especially with regards to variation within the same phrasal and lexical stress environments. Here, we explore this variation by characterizing how differences in stress lead to broad differences in tonal alignment and scaling for each prosodic position, which will form the basis of a more in-depth quantitative analysis. We annotated key tonal events in each target word using the model of SgE intonational phonology in [7], identifying the syllable-level alignment of L and H in each target AP, as well as noting whether the AP-level tune was rising, rising-falling, or level.

Tonal patterns for each position are schematized in Fig 1. In utterance-medial APs, we identified two major types of tonal patterns, which differ from those in utterance-initial APs (counts in Table 1). In one, a low F0 valley/elbow (L) occurs near the left edge of the phrase, and is followed by a rise to a high target (H) at the end of the phrase-final syllable. The alignment of this L varies: it aligns either close to the left edge of the AP or to the stressed syllable of the content word (Fig. 2L). The second major pattern involves a fall from the end of the initial AP to a high tonal plateau that spans the remainder of the medial AP (Fig. 2R). We provisionally analyze this in terms of leftward spreading of the final H tone of the medial AP to the landing site of the AP-initial L.

A similar pattern occurs in utterance-final APs. In one pattern, AP-initial L tones variably align either to the left edge of the AP, or seek the stressed syllable of the content word. Likely due to the presence of an utterance-final L%, which results in a sharp fall on the final syllable often with strong laryngealization, the H of the final AP shifts leftward, typically seeking out the stressed syllable of the content word. In case L also aligns to the stressed syllable, this results in a short but marked rise on that syllable, followed by a fall to the end of the utterance. In a second pattern, the final H is realized as plateau that extends from an elbow near the left edge of the phrase to a fall in the final syllable. As with medial cases, we provisionally analyze final plateau-type contours in terms of leftward spreading of the final H tone to the landing site of the AP-initial L.

Taken together, the sensitivity of F0 movement to stressed syllable position in both utterance-medial and utterance-final APs contrasts with the lack of such sensitivity in utterance-initial APs [5]. If our results are confirmed by further quantitative analysis, and further perception studies reveal that stress is equally recoverable across utterance positions, this would suggest that cues to prominence in Singapore English occur in a complex trading relation.

(1) Example target words: Initial stress: *minerals*; Non-initial stress: *memorials*

- a. Medial AP: They explain *minerals/memorials* to the tourists.
- b. Medial AP + Function word: They explain *the minerals/memorials* to the tourists.
- c. Final AP: They explain *minerals/memorials*.
- d. Final AP + Function word: They explain *the minerals/memorials*.

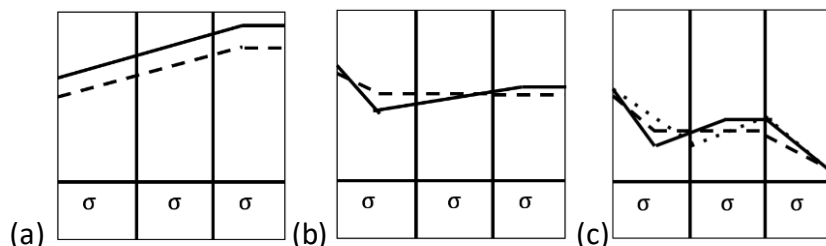


Figure 1. Tonal schemas: (a) Initial: solid: initial stress; dashed: medial stress; (b) Medial: solid: rising (initial & medial stress); dashed: plateau (initial & medial stress); (c) Final: solid: rising (initial stress); dotted: rising (medial stress); dashed: plateau (initial & medial stress).

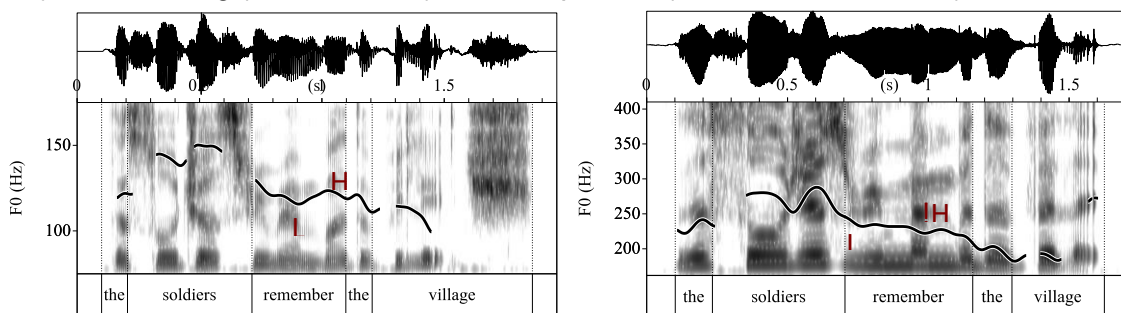


Figure 2. IP-medial targets - (L): L tone aligned to stressed syllable followed by small rise on final syllable. (R): L tone aligned to AP-initial syllable followed by tonal plateau.

	Melody	Rise (Rise-Fall)		Plateau		Fall	Other	Total
		L alignment	Stressed σ	Left	Stressed σ			
Phrasal position	Medial		31% (56)	14% (26)	19% (35)	12% (22)	23% (42)	181
	Final		7% (12)	14% (26)	28% (51)	19% (35)	22% (39)	180

Table 1. Summary of frequency of tonal patterns by phrasal position. Gray cells indicate the most frequent pattern for each position.

References:

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