

# Tone Sandhi in Shanghai Wu and Tianjin Mandarin

Here, I will attempt to offer logical characterizations of tone sandhi patterns in two dialects of Chinese: Shanghai (Wu) and Tianjin (Mandarin).

For the Shanghai data, I would like to focus on more recent phonetic evidence from Chen (2008) that simplifies characterizations of tone sandhi. Her results suggest a mapping in which all non-initial (initial  $\sigma$ ) tone-to-TBU associations delete, associating instead to a [L] target throughout the rest of the domain, crucially even as early as the first non-initial syllable.

	$\sigma 1$	$\sigma 2$	$\sigma 3$	$\sigma 4$	$\sigma 5$
underlying form	HL	LH	LH	MH	HL
sandhi form	HL	<b>L</b>	<b>L</b>	<b>L</b>	<b>L</b>

Table 1: Shanghai tone sandhi over a pentasyllabic domain

Therefore, regardless of the specification of the lexical tone, non-initial syllables always default to [L]. The domain-initial syllable retains its underlying melodic realization, but the melody does not spread over the entire domain as previously thought.

Adopting the autosegmental representational formalism employed by Jardine (2016) to characterize tonal mappings in Zigula and Shambaa, there are a variety of alternatives available for representing Shanghai tone sandhi. A crucial choice to consider concerns underlying specifications of associations between tones and TBUs. Figure 1 assumes no underlying specification.

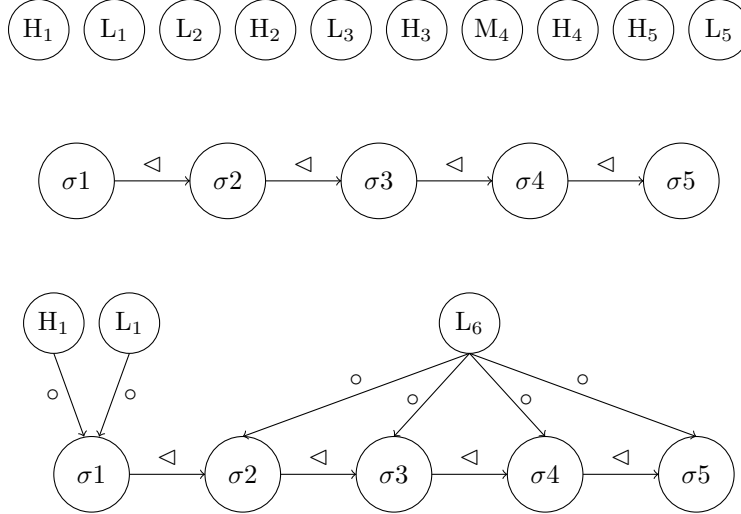


Figure 1: Autosegmental representation for Shanghai tone sandhi (no associations)

There are good reasons, however, to posit underlying associations. Dealing solely with a system in which [H] and [L] are tonal primitives (that is, excluding [R] rising and [F] falling contours from our set of melodic atoms), it is difficult to formalize a grammar that would associate both [H] and [L] in domains whose initial syllables have contour tones but associate only one of [H] or [L] in words whose domain-initial syllables are a high or low level tone. Without associations specified underlyingly, the choice between the two is arbitrary.

Therefore, we will posit a model in which each syllable is specified for tone, and associations are present underlyingly, as in Figure 2.

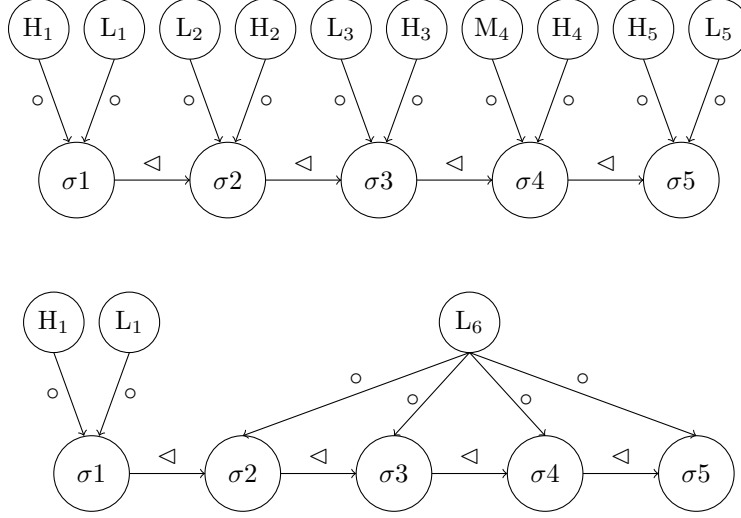


Figure 2: Autosegmental representation for Shanghai tone sandhi (associations specified)

We will adopt Jardine’s (2016) framework (unary relations for tone, the binary successor and association relations, tonal wellformedness conditions, etc.) but with minor alterations, namely that TBUs are just defined as syllabic elements in the model.

$$\varphi_{\text{TBU}}(x) \stackrel{\text{def}}{=} \sigma(x)$$

We also want to define a predicate that identifies the first syllable on the syllabic tier. This will be similar to Jardine’s (2016)  $\varphi_{\text{finalIV}}(x)$ :

$$\varphi_{\text{initial}\sigma}(x) \stackrel{\text{def}}{=} \sigma(x) \wedge (\forall y)[\neg(y \triangleleft x)]$$

That is, it is a syllable succeeded by every other syllable.

The next step is to define the association relation for the output. This will require more than one predicate. First, we will define a predicate which preserves the association present on the first syllable in the input:

$$\varphi_{\sigma}^{1,1}(x, y) \stackrel{\text{def}}{=} \varphi_T^1(x) \wedge \varphi_{\text{initial}\sigma}(y)$$

Next, we define a predicate which creates a [L] tone segment in the copy set and default associates all non-initial syllables to it.

$$\varphi_{\sigma}^{2,1}(x, y) \stackrel{\text{def}}{=} \varphi_L^2(x) \wedge \neg\varphi_{\text{initial}\sigma}(y)$$

A number of issues remain with this characterization. Among them is how to deal with the remainder of melodic tier segments which associate to non-initial syllables. Are they deleted? What reference should the association predicate make to these tonal segments? The latter question also applies to the epenthesized [L] segment.

Tianjin is a Mandarin dialect...

## References

- Chen, Yiya. 2008. Revisiting the phonetics and phonology of Shanghai tone sandhi. *Proceedings of the Fourth Conference on Speech Prosody*: 253-256.
- Jardine, Adam. 2016. Autosegmental representations in Zigula and Shambaa. Ms, Rutgers.