

## Tone sandhi behavior of syllable in Suzhou Chinese: a prosodic account

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**Overview:** This paper zooms in on the tone sandhi (TS) behavior of syllables in the Suzhou dialect of Wu Chinese. The investigation of transliterations shows that the tonal behavior of a syllable correlates with its syllable type and position within the TS domain. I propose that Suzhou TS is governed by prosody. Empirically, this paper adds new data of transliterations; theoretically, it complements the study of Chinese prosody and sheds light on the nature of domains for phonological phenomena.

**Background:** The seven citation tones in Suzhou fall into two classes: the five long tones are carried by the smooth syllables, i.e., those without glottalized vowels; the two short tones cooccur with the checked syllables, i.e., those with glottalized vowels<sup>[1][2]</sup>. The long tones are different in tone shape, while the short tones are different in tone height. As given in (1), the seven citation tones are represented by the features of pitch height, high [H] and low [L].

(1)	σ type	Smooth					Checked	
	Tone	<b>HH</b>	<b>HL</b>	<b>HLH</b>	<b>LH</b>	<b>LHL</b>	<b>H</b>	<b>L</b>
	Example	[ia <sup>HH</sup> ] 'coconut'	[ia <sup>HL</sup> ] 'elegant'	[ia <sup>HLH</sup> ] 'night'	[ia <sup>LH</sup> ] 'dad'	[ia <sup>LHL</sup> ] 'wild'	[ia <sup>2H</sup> ] 'date'	[ia <sup>2L</sup> ] 'pill'

Like other Northern Wu dialects, Suzhou has the domain-bounded left-dominant TS. Specifically, the non-initial syllables are reduced or merged in tonal distinctions<sup>[3]</sup>. While most of the previous studies have paid attention to the TS with initial long tones, little literature focuses on the TS with initial short tones. Thus, this paper aims at exploring and explaining the TS behavior of syllables within the TS domain beginning with short tones.

**Observations and questions:** Transliterations were selected, because they are polysyllabic morphemes without any internal morphosyntactic relation. Each transliteration forms one TS domain, the domain-initial syllable is a checked syllable of which the citation tone is a short tone. The TS patterns are summarized in (2) and (3): the leftmost column gives the citation tone of the domain-initial syllable, and the following columns list the TS patterns of disyllabic, trisyllabic and quadrisyllabic transliterations. “T” stands for any citation tone, “T<sub>L</sub>” stands for a long tone, and “T<sub>s</sub>” stands for a short tone. Firstly, a three-way distinction of TS behavior is observed: the first syllable retains its citation tone, the second syllable shows tonal dependency on the first syllable, and the remaining syllable (if any) always carries a low tone. Namely, only the first two syllables constitute the domain for tonal dependency. Secondly, the sandhi tone of the second syllable varies: the long tones in the smooth syllables are neutralized to polar contours, as in (2), while the short tones in the checked syllables become a short high tone, as in (3). In short, only a smooth syllable is able to carry a long tone.

(2)	<b>T<sub>s</sub></b>	<b>T<sub>s</sub>+T<sub>L</sub></b>	<b>T<sub>s</sub>+T<sub>L</sub>+T</b>	<b>T<sub>s</sub>+T<sub>L</sub>+T+T</b>	(3)	<b>T<sub>s</sub></b>	<b>T<sub>s</sub>+T<sub>s</sub></b>	<b>T<sub>s</sub>+T<sub>s</sub>+T</b>	<b>T<sub>s</sub>+T<sub>s</sub>+T+T</b>
	<b>H</b>	H+LH	H+LH+L	H+LH+L+L		<b>H</b>	H+H	H+H+L	H+H+L+L
	<b>L</b>	L+HL	L+HL+L	L+HL+L+L		<b>L</b>	L+H	L+H+L	L+H+L+L

The syllable-tone cooccurrence restriction and the three-way sandhi raise three questions: (i) why is it possible for tone length to correlate with syllable type? (ii) why is it the syllable position that correlates with the syllable’s TS behavior? (iii) how are the relation between tone length and syllable type, and the relation between syllable position and TS behavior regulated?

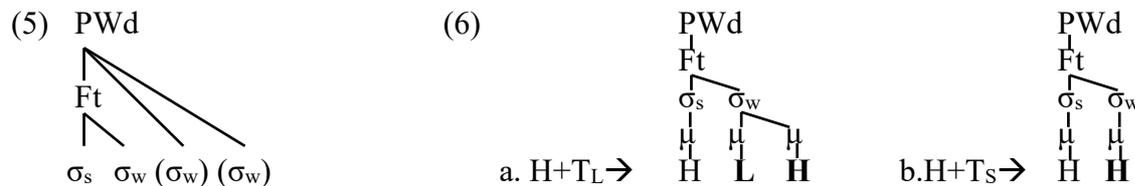
**Proposal and analysis:** I propose that Suzhou TS is governed by prosody. Specifically, the hierarchically organized prosodic constituents serve as phonological domains. I assume the version of the prosodic hierarchy in which the mora is the lowest constituent<sup>[4]</sup>.

Firstly, I adopt the views that the mora is the prosodic anchor for tonal features and that the syllable is the association domain of lexical tones<sup>[5]</sup>. First, the smooth syllable is heavy and contains two moras, while the checked syllable is light and contains one mora. Second, one mora is ideally associated with one tone height, which is enforced by constraint  $U_{NIFORMITY}^{[5]}$ , while the head mora has the capacity to bear two tone heights, which is enforced by constraint  $H_{D}B_{IN}^{[5]}$ . The seven Suzhou tones are represented as in (4): the long tone links to two moras in the smooth syllable, while the short tone links to one mora in the checked syllable.

(4) $\sigma$ weight	Heavy (smooth)					Light (checked)	
Tone	$[\mu \mu]_{\sigma}$	$[\mu]_{\sigma}$	$[\mu]_{\sigma}$				
							

Secondly, I propose that the TS domain corresponds to the prosodic word (PWd). The internal structure of PWd is given in (5): the PWd dominates a left-headed disyllabic foot at its left edge, and it directly dominates the unfooted syllable (if any). The disyllabic foot functions as the domain for tonal dependency, and the PWd is the domain for low tone assignment.

Thirdly, the TS behavior of a syllable is captured by its prosodic status, and syllable weight plays a role in the determination of TS pattern. First, the strong status in the disyllabic foot ensures tonal stability, which is enforced by constraint  $M_{AX}(T_{ONE})/\sigma_S^{[6]}$ . Second, the weak status in the foot guarantees the tonal dependency on the strong syllable; meanwhile, only the heavy syllable is able to carry a long tone. I propose a constraint  $H/\sigma_2$  to capture the occurrence of high tone in the second syllable, and this constraint outranks  $P_{OLARITY}^{[7]}$  that requires an initial tone to be followed by an opposite tone. Third, the unfooted weak status leads to low tone assignment. As exemplified in (6), the strong syllable is light and retains its citation tone [H], and hence it determines that the sandhi tone of the weak syllable is [LH] or [H]; meanwhile, only the heavy syllable is able to carry the polar contour tone. Thus, the TS pattern is [H+LH] in (6a), while it is [H+H] in (6b).



**Summary:** The syllable-tone cooccurrence restriction and the three-way distinction of TS behavior emerge from the current investigation of transliterations. I offer a prosodic account of the tonal behavior of syllables. Firstly, the mora is the prosodic anchor for tonal features, and hence the syllable-tone cooccurrence restriction is captured by syllable weight. Secondly, the TS domain corresponds to the PWd, and the prosodic status of a syllable determines its TS behavior: the strong syllable, the weak syllable within the foot, and the unfooted syllable lead to the three-way sandhi.

**Selected references** [1]Ye, Xianglin. 1979. Suzhou fangyan de liandu biandiao [Tone sandhi in Suzhou dialect]. *Fangyan* 1: 30-46. [2]. Duanmu, San. 1993. Rime length, stress and association domains. *Journal of East Asian Linguistics* 2:1-44. [3]. Yue-Hashimoto, Anne. 1987. Tone sandhi across Chinese dialects. In *Chinese Language Society of Hong Kong. Wang Li Memorial Volumes, English Volume*. Hong Kong: Joint Publishing Co. Pp. 445–74. [4]. Zec, Draga. 1988. *Sonority Constraints on Prosodic Structure*, Doctoral dissertation, Stanford University. [5]. Jiang-King, Ping. 1996. *An Optimality Account of Tone-Vowel Interaction in Northern Min*, Doctoral dissertation, University of British Columbia. [6]. Li, Zhiqiang. 2003. *The Phonetic and Phonology of Tone Mapping in a Constraint-based Approach*, Doctoral dissertation, MIT. [7]. Duanmu, San. 1999. Metrical structure and tone: evidence from Mandarin and Shanghai. *Journal of East Asian Linguistics* 8(1): 1-38.