

## An articulatory study of word-level prominence in two Mandarin dialects

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**Introduction:** The existence of word-level prominence/lexical stress in Mandarin Chinese is controversial. In this study, we investigated whether word-level prominence is attested in two relatively understudied dialects of Mandarin, Southwestern Mandarin (SWM) and Taiwanese Mandarin (TWM). Unlike Beijing Mandarin, SWM and TWM do not have “unstressed” (neutral tone) syllables in lexical words, meaning that no apparent strong-weak patterns have been reported for them, at least impressionistically. Nevertheless, little is known if there is any articulatory difference between the syllables in a word. Given that stressed syllables may involve longer, larger, and faster gestures than their counterparts in unstressed positions (e.g., Katsika and Tsai 2021), we set out to assess the supralaryngeal kinematic correlates of word-level prominence/lexical stress in these two Mandarin dialects, using electromagnetic articulography (EMA).

**Method:** We analyzed and reported data from four SWM speakers (1 female) and two TWM speakers (1 male) in their twenties. The stimuli are personal names with two or three identical syllables (note that these are *not* reduplicated forms): {papa, pepe, tutu, titi} in SWM (all with the mid tone) and {pi, pai, tai, two/papapa, tatata, kakaka} in TWM (all with the high-level tone). Seven repetitions for each token were collected for SWM and ten repetitions for TWM. For SWM, the target words were embedded in the carrier phrase, “*p<sup>h</sup>e A, pu p<sup>h</sup>e B*”, meaning “(Please) pat A! not B.” The tokens in the unfocused position B were analyzed. For TWM, the target words were embedded in X in the carrier phrase “*wǒ xiǎng X bèi Y*”, meaning “I think X memorizes Y.” The target words were produced in a position with the *least* higher-level prominence (i.e., phrasal/sentential stress) and without the well-established effect of domain-initial strengthening (Keating et al. 2003) to highlight the word-level prominence.

**Results:** In disyllables, the initial syllables are significantly longer in duration ( $p < .05$ ) in SWM, while the final syllables are significantly longer ( $p < .05$ ) in TWM. See (1). Note that the raw data are presented here for ease of interpretation only.

(1) SWM-Initial $\sigma$	SWM-Final $\sigma$	TWM-Initial $\sigma$	TWM-Final $\sigma$
<b>209 ms</b> (SD: 56)	172 ms (SD: 55)	135 ms (SD: 22)	<b>153 ms</b> (SD: 25)

Regarding gesture duration, the onset gestures (i.e., Lip Aperture and Tongue Tip along the vertical dimension) are significantly longer ( $p < .05$ ) in initial position than in final position in TWM. In contrast, no significant difference is found for SWM. See (2).

(2) SWM-Initial $\sigma$	SWM-Final $\sigma$	TWM-Initial $\sigma$	TWM-Final $\sigma$
55 mm (SD: 29)	51 mm (SD: 27)	<b>78 mm</b> (SD: 39)	42 mm (SD: 16)

Regarding the peak velocities of the onset gestures, our results reveal that there is no significant difference between the initial and final syllables in SWM and TWM (3).

(3) SWM-Initial $\sigma$	SWM-Final $\sigma$	TWM-Initial $\sigma$	TWM-Final $\sigma$
13 cm/s (SD: 7)	12 cm/s (SD: 8)	15 cm/s (SD: 7)	15 cm/s (SD: 6)

