

What's in a name? Phonetic and phonological conditioning of personal names in Taiwan Mandarin

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Introduction & background Naming in Mandarin enjoys high liberty where any character can be used (cf. Wang & Holmberg, 2023). The structures of Mandarin personal names thus offer insight into speakers' linguistic preferences/knowledge. Previous studies mainly focus on the morphosyntactic (Wang & Holmberg) or semantic/sociolinguistic (Kauyska, 2016) aspects of Mandarin names, and those that do touch upon the lower-level processing of phonetic-phonological conditioning mainly focus on sound symbolism (Hsiao, 2005; Chen & Kenstowicz, 2021). Although Hsiao also investigated one non-sound-symbolic phonetic condition, avoidance of tonal coarticulation (TC) (i.e., the preference for the preceding tonal offset to match the following tonal onset), this condition was dismissed due to the small percentage difference in the collected data. It has been shown, however, that the different levels of linguistic domains are unlikely to be entirely autonomous, and past studies have found examples of phonologically-conditioned morphosyntax (Shih & Zuraw, 2017, Breiss & Hayes, 2020). Therefore, the conditioning of names in Mandarin is unlikely to be entirely blind to the lower-level phonetic/phonological processing. This paper investigates phonetic-phonological conditioning in Taiwan Mandarin (TM) names. Crucially, we revisit the avoidance of tonal coarticulation. In Huang's (2024) corpus study, Taiwan Southern Min speakers were found to avoid TC for more informative tone pairs, while TM speakers did not. Huang stipulates that the fewer tonal contrasts (4 tones) in TM allow for a lower perceptual cost, which means TM speakers do not need to constrain TC for informativeness. It is possible, however, that while it may be the case for word production, the high liberty of name composition in TM may invite conditions that could not be taken care of in words. Also revisited are the effects of the sound-symbolic constraints from Hsiao, where only descriptive percentages were calculated, and several phonological-phonotactic conditions suggested to potentially condition morphosyntax in Shih & Zuraw (cf. Table 2 for the list of investigated conditions). **Methodology** A corpus of TM names was used to investigate the phonetic-phonological conditioning in TM names. Linear-mixed effects models (LMM) were fitted to observe the significance of the conditions. **Corpus** The Chinese Name List Corpus (Tsai, 2017) was used, composed of the names of Taiwanese high school graduates from 1994 to 2012. **Preprocessing** Since the conditions involved the interaction of syllable pairs, only two-character names were included, leading to 780,736 tokens/443,153 types. *pinyin-to-ipa* (Taubert, 2024) were used to determine the tones and segments of the names. **Conditions** The status of each of the conditions for each unique name was then coded as 0 (non-conforming) or 1 (conforming) and then centered around the means. The criteria for each condition were: *TC: Tones with a tone-level difference smaller than 1 (55+55, 55+51, 35+55, 35+51, 51+21) were classified as not inducing TC. HW#: The weight of a syllable was taken as the number of segments. A heavier or equal weight of the second syllable versus the first syllable was labeled as conforming. *NC_o: A syllable-final nasal followed by a syllable-initial voiceless was taken as non-conforming. NOCP/VOCP/*V.V: Adjacent nasals/velars/vowels at the syllable boundary were taken as non-conforming. HT#: High-level (55) and the rising (35) tones were classified as high tones. HY#: Syllables without the /j, ɥ/ glides were classified as *hongyin*'s. **LMM** The log frequency of each unique name was calculated and taken as the predicted variable; the conditions were taken as the predictors; the first and second characters were taken as the random slopes. Following Shih & Zuraw, stepwise backward elimination was used to extract the final model. **Results** Significant conditions are listed in Table 1.

Two conditions were found to have main effects on naming frequency: *V.V and HT#. Both promoted the likelihood of a name in TM. HT# was also found to have a stronger effect together with *NC_o. *TC, while not having a main effect per se, was also found to promote the naming likelihood together with HY#

Table 1: LMM results.

Condition	Estimate	Std. Error	df	t value	p-value	
Intercept	-0.287	0.011	6463	-25.281	< 0.001	***
*V.V	0.016	0.002	162400	6.506	< 0.001	***
HT#	0.044	0.008	3644	5.760	< 0.001	***
*TC:HY#	0.009	0.002	164600	3.819	< 0.001	***
HW#:HY#	-0.009	0.002	156700	-3.879	< 0.001	***
*TC:HT#	-0.022	0.002	165300	-9.853	< 0.001	***
HT#:*NC _o	0.017	0.002	161400	6.985	< 0.001	***
*TC:HY#:HT#	0.005	0.002	164800	2.351	0.0187	*
*TC:HY#:*NC _o	0.006	0.002	165400	2.737	0.0062	**
NOCP:HY#:*NC _o :VOCP	-0.205	0.052	164900	-3.898	< 0.001	***
*V.V:NOCP:HY#:*NC _o :VOCP	1.301	0.309	164800	4.212	< 0.001	***

and the interactions between HY# vs. HT# and HY# vs. *NC_o. All other conditions also contributed to the conditioning of naming through multi-way interactions. Three interaction effects were, however, inhibitory. This might be due to the incompatible nature of some of the conditions. *Hongyin*'s, for example, exclude syllables

with the /j, ɥ/ glides, which will be heavier-weight than syllables without glides, thus contradicting HW#. Another possible cause may be the innate incompatibility of the conditioned probabilities among characters preferred for naming. In the corpus, for example, a pair has a 74.1% chance of having a high last tone if they combine freely, while among pairs that avoid TC, it is only 42.30%, and they have a 23.9% chance of avoiding TC in free conditions, as compared to 13.9% among those with a high last tone. **Discussion & conclusion** The results support the hypothesis that lower-level processing of phonetic-phonological conditions other than sound symbolism is present in personal names in TM. Specifically, TM naming has been attested to avoid adjacent vowels, a preference also found in English noun ordering (Wright et al., 2005). Several other crosslinguistic phonological preferences were also found to further facilitate naming likelihood through interactions with other conditions. This suggests that TM naming accesses not only higher-level morphosyntax but also low-level phonological knowledge. In terms of phonetic conditioning, a trend was found where TM names, in interaction with other facilitatory effects, avoided tonal coarticulation caused by discrepant tonal offset-onset pairs. Such a finding compensates for the lack of TC avoidance for informativeness attested in Huang. While TM speakers would not actively seek to manipulate TC during word production, when higher liberty is given, as in naming, TM speakers would still be inclined to avoid perceptual confusion in certain conditions. Our results also partially conform with Hsiao's consideration of sound symbolism. Names ending with high tones were preferred, and *hongyin*'s in final syllables were also found to interact in a facilitory direction with other conditions. This confirms that sound symbolism also plays a role in conditioning TM names. Overall, this study examined phonetic-phonological factors that were largely overlooked in past studies of Mandarin naming and showed that the structures of personal names in Taiwan Mandarin are not only subject to high-level morphosyntax/sociolinguistic drives but are also conditioned by lower-level phonetic and phonological constraints.

Table 2: Conditions included in this study.

Condition	Type	Reason of inclusion	Past studies
TC AVOIDANCE (*TC)	Phonetic	Reduction of perceptual pressure	Hsiao; Huang
HEAVY WEIGHT LAST (HW#)	Phonological; phonetic	Crosslinguistic preference; reduction of working memory	Shih & Zuraw
NASAL-VOICELESS AVOIDANCE (*N _C)	Phonological	Crosslinguistic preference	Shih & Zuraw
NASAL OCP (NOCP)	Phonological	Crosslinguistic preference	Shih & Zuraw
VELAR OCP (VOCP)	Phonological	Crosslinguistic preference	Shih & Zuraw
HIATUS AVOIDANCE (*V.V)	Phonological	Crosslinguistic preference	Shih & Zuraw
HIGH TONE LAST (HT#)	Sound-symbolic	The “good is up” metaphor (Lakoff & Johnson, 1980)	Hsiao
HONGYIN LAST (HY#) (<i>Hongyin</i> : syllables without the /j, ɥ/ glides)	Sound-symbolic	<i>Hongyin</i> 's' related “strength”	Hsiao

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