The contradictory nature of fricative vowels in Chinese languages and beyond

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Paper presented at the 50th Poznań Linguistic Meeting

Keywords: *fricative vowels*, *Chinese* / *Sinitic*, *Syllable structure*

Fricative vowels (FVs) cannot straightforwardly be classified as consonants or vowels. They appear in the nucleus but nevertheless typically involve frication. FVs are reported in Miyako (Jarosz, 2014), Lendu (Kutsch Lojenga, 1989), Niger-Congo (Kelly, 1974; Connell, 2007; Boutwell, 2020), and possibly in Swedish (Faytak & Merrill, 2014). However, FVs are most well-attested in Chinese.

Among Chinese languages, The FVs in Standard Mandarin Chinese (SMC) have received the most attention. But it is important to note that, even within SMC, studies have shown a tremendous amount of interspeaker variation in the realisation of FVs; there is significant variation in frication and tongue posture (Lee-Kim, 2014; Faytak & Lin, 2015). It is therefore debated which acoustic cues encode phonological contrasts and how. Furthermore, it remains undecided whether FVs are truly vowels or rather syllabic consonants. Some linguists consider them allophones of /i/ (Wang, 1980) while others treat them as underlyingly empty (Duanmu, 2007). Our research on Guishan Mandarin (GSM) and Zhushan Mandarin (ZSM) suggests further complications in the phonetics and phonology of FVs.

SMC, GSM, and ZSM all have two FVs that can be transcribed as /ɹ ɻ/ despite articulatory differences. These transcriptions approximate their pronunciation and reflect the fact that they do not phonotactically behave as fricatives or vowels. The FVs in SMC and ZSM are comparable to those in non-Chinese languages in that their onsets are limited to homorganic obstruents. However, some onsets before /ɻ/ in GSM have undergone changes and now resemble /f/ or /k$^{(h)}$/, although we have yet to confirm their phonemic representation. Consider the cognates below (numerals indicate tonal pitch).

Standard Mandarin (SMC)	**Guishan Mandarin (GSM)**	**Zhushan Mandarin (ZSM)**	**Meaning**
/tɕy^{55}/	/kɻ^{31}/	/tʃɻ^{324}/	‘(in chess) rook’
/tɕ^{h}y^{35}/	/k^{h}ɻ^{41}/	/tʃ^{h}ɻ^{54}/	‘canal’
/ʂu^{55}/	/fɻ^{31}/	/ʃɻ^{324}/	‘book’

Where GSM has non-homorganic onsets preceding /ɻ/, SMC and ZSM have “regular” vowels or homorganic onsets. Due to the homorganicity constraint, proposed representations of FVs in SMC depend on their onsets for structure, but those analyses cannot possibly be applied to GSM. Meanwhile, the FVs of ZSM have different properties yet again. Unlike both SMC and GSM, ZSM /ɹ/ can be an onset as well and its /ɻ/ can be part of a complex onset.

Standard Mandarin (SMC)	Guishan Mandarin (GSM)	Zhushan Mandarin (ZSM)	Meaning
/ɻɛn^{35}/	/ɻɛn^{41}/	/ɹɛn^{54}/	‘person’
/ʈʂwan^{55}/	/ʈʂan^{31}/	/tʃɻan^{324}/	‘brick’

There are also more fine-grained differences. Onset-/ɻ/ has lip protrusion in all three varieties, but in GSM and ZSM, nuclear /ɻ/ has lip compression. Furthermore, the FVs in these varieties differ in the amounts of frication they exhibit. Clearly, FVs have wildly different phonetic and phonological properties even within closely related languages. This is illustrated further by recent research from non-Mandarin Chinese languages such as Suzhou Wu (Faytak, 2018) and Jixi Hui (Shao, 2020). Their FVs have more frication and are shown with ultrasound to differ minimally from actual fricatives in terms of tongue configuration.

The significance of FVs to linguistic theory is indisputable given their contradictory nature of consonantal and vocalic characteristics. They are difficult to represent within frameworks of subsegmental phonology, problematic for sonority hierarchies in which they are ignored (Parker, 2011), and valuable in understanding language change (Faytak & Merrill, 2014). Our data from Guishan- and Zhushan Mandarin offer new insights into FVs that have interesting crosslinguistic implications.

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