

ILLUSTRATIONS OF THE IPA

Huangyan Taizhou

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Huangyan dialect (黄岩话, local name: [wonjɛ̃wa]) is a variety of Taizhou dialect (台州话) as spoken in Zhejiang Province in China¹ (see Figure 1).² Huangyan District had a population of 616,000 people in 2019.³ The Zhejiang Taizhou dialect belongs to the Wu dialect group, which forms the second largest dialect group in China (after Mandarin). The language genealogy of Huangyan is presented in Figure 2. Wu dialects are spoken in the city of Shanghai, Zhejiang Province, southern Jiangsu Province and bordering areas (see Figure 3), an area with an estimated population of 80 million people in 2013 (Lewis 2009). The Wu dialects are not mutually intelligible with (Standard) Mandarin and often not even with each other (Norman 2003, Wang 2014).

The Taizhou dialect consists of a number of varieties (see Figure 2), of which Huangyan has attracted the most attention – perhaps due the fact that Chao (1928), in his influential overview of Wu dialects, observed that Huangyan 'has a sort of dyssyllabic [sic] *Shaangsheng*, that is, syllables of that tone class have a glottal stop in the middle of the vowel or between the vowel and a final nasal, thus giving the impression of two syllables. In connected phrases, the glottal stop is usually not present' (Chao 1928: xiv). This 'glottal stop' was reinterpreted as creaky phonation by Zhu (2004). In our investigation, we also occasionally found such syllables in our data (see the section on tone below).

The examples in this Illustration are accompanied by recordings of a 24-year-old male Huangyan speaker from Ningxi Town in Huangyan District, where he lived until half a year before the recordings, when he moved to Shanghai. Huangyan is this speaker's mother tongue; he speaks the dialect on a daily basis with his parents, other family members and friends. He has a strong positive attitude towards the dialect and uses it for all daily conversations, including study-related topics.

In this contribution, we aim to provide a phonetic description of present-day Huangyan Taizhou. We also draw attention to one particular characteristic of the dialect, namely co-articulation of consonant and the following vowel for the entire duration of the syllable,

¹ Not to be confused with Taizhou (泰州) in Jiangsu Province.

² https://en.wikipedia.org/wiki/Taizhou,_Zhejiang#Administration

³ 2019 Statistical Communiqué on the National Economic and Social Development of Huangyan District, issued on 9 April 2020 (http://www.zjhy.gov.cn/art/2020/4/9/art_1591188_42536224.html).



Figure 1 (Colour online) The county of Taizhou (Zhejiang Province, China). The arrow indicates Huangyan.

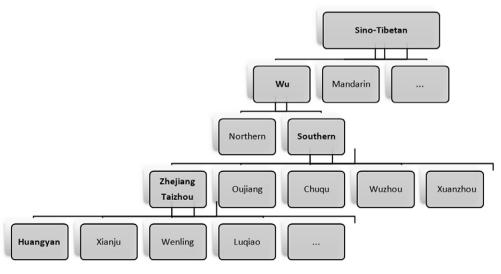


Figure 2 Language genealogy of Huangyan.

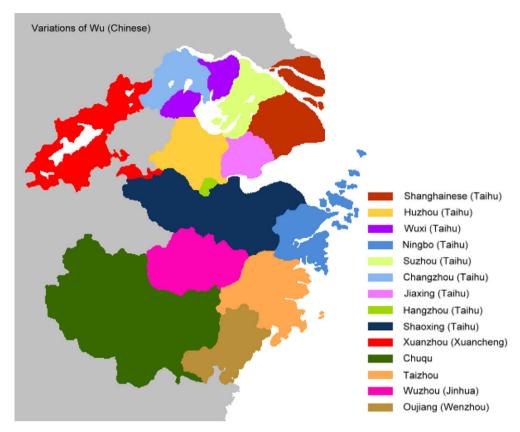


Figure 3 (Colour online) Variations of Wu (ASDFGH at English Wikipedia; public domain, via Wikimedia Commons).

resulting in high, fricativized vowels /i y u/. Extreme consonant–vowel co-articulation of the type encountered in Huangyan is rare cross-linguistically. A comparable process, namely extreme nasal–vowel co-articulation, results in the syllabic nasals /m n $\dot{\eta}$ /. We will discuss these processes in the final section of this article.

Two registers

Wu dialects belong to the Chinese dialect groups which have two tonal registers, upper and lower (see e.g. Chao 1928; Chen 2000: 10; Yip 2002; Duanmu 2007: 229–232). In Wu dialects, register not only involves tone but also consonant and vowel phonation (see Table 1). Because register affects consonants, vowels, and tones, we start the Illustration by discussing register first. Plosives and affricates are distinguished by a three-way contrast, viz. aspirated, voiceless unaspirated, and breathy-voiced, while fricatives have a two-way phonation contrast (Chao 1928). In the upper register, initial plosives and affricates may be voiceless unaspirated or voiceless aspirated; initial fricatives are voiceless; and the vowels have modal phonation. In the lower register, initial plosives and affricates may be breathy-voiced but are not aspirated or voiceless unaspirated, and fricatives also have breathy phonation (sometimes referred to as 'murmured', see e.g. Yip 1993). Breathy-voiced consonants only occur in initial position and are often only truly voiced in intervocalic position or between a nasal and a vowel. Initial sonorants usually do not occur in the upper register, but there are exceptions (Chang 1971:

Segment type	Upper register	Lower register
Tones	High	Low
Plosives	Aspirated Unaspirated voiceless	Breathy-voiced in initial position Voiced in intervocalic position or between a nasal and a vowel
Fricatives	Voiceless	Breathy-voiced in initial position Voiced in intervocalic position or between a nasal and a vowel
Sonorants	Generally not allowed in initial position	Allowed in initial position
Vowels	Modal voicing	Breathy

Table 1 Tones and segments that are typically allowed in upper and lower register in Wu dialects.

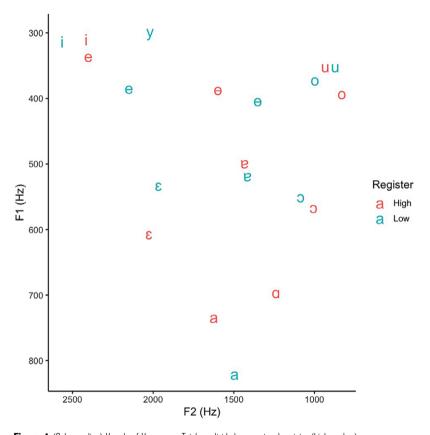
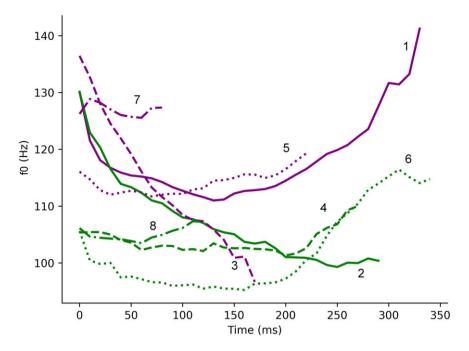


Figure 4 (Colour online) Vowels of Huangyuan Taizhou, divided across tonal register (high vs. low).

194), such as Shanghainese (Sherard 1983: 193) and also Huangyan, in which initial sonorants may occur with a high falling tone, as in $\mathbb{Z}[niŋ^3]$ 'to tolerate' (tones will be discussed in the next section).

Vowels do not differ consistently in vowel quality in the different registers. This is shown in Figure 4, which shows F1 and F2 formant values for all available vowels tokens divided across register (see further below on vowels), disregarding fricative vowels (see below) and heavily coarticulated vowels such as nasalized vowels.



Tone 1 High dipping - [pu1] 'cloth' 布

Tone 2 Low Falling - [u²] 'military' 武

Tone 3 High Falling - [foŋ³] 'wind' 风

Tone 4 Low Level - [dzi4] 'the most' 最

Tone 5 High Level - [fu⁵] 'husband' 夫

Tone 6 Low Dipping - [dzy⁶] 'help' 助

Tone 7 High Checked - [pe⁷] 'give' 拨

Tone 8 Low Checked - [be8] 'thus' 便

Figure 5 (Colour online) The eight lexical tones exemplified by the f0 tracks. The contours in red represent high-register tones and the contours in green represent the low-register tones.

Breathiness is typically realized on the vowel more than on the initial consonant (Ladefoged & Maddieson 1996: 64; Chen 2000: 21; Chen 2010,). In other words, breathiness is predictable from the initial consonant, but we will indicate it in the allophonic transcriptions in this paper because this 'overspecification' is phonetically informative. In this sense, Huangyan is a typical Wu dialect in which the low register is regularly accompanied by perceptible breathy voice.

Unlike most Chinese dialects with a register distinction, Huangyan Taizhou has a remarkably symmetrical tone system of four tonal contours that occur in both registers, to which we turn next.

Lexical tone

Huangyan has eight lexical tones, divided across two registers, of which two are checked tones (T7 and T8), which have a shorter duration than the other syllables. These sometimes give the impression of a glottal ending, but the waveforms show no trace of this. Like the other tones, the two checked tones appear in either the high or the low register. Figure 5

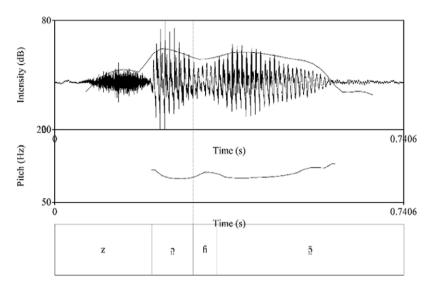


Figure 6 Waveform, intensity contour, and pitch contour of $\pm /z_2\eta^6/[z_2h_2^6]$ 'on, upon'.

shows a high and a low falling tone, a high and a low dipping tone, and a high and a low long level tone. These representations are consistent with the phonetic variation in our data, in which the so-called level tones may be phonetically realized as slightly dipping, rising or falling.

The tones that cooccur with breathy-voiced onsets and vowels are T2, T4, T6, T8 (low register) and the other tones (T1, T3, T5, T7) cooccur with aspirated onsets and voiceless unaspirated onsets (high register). Since representing the exact contours of these tones by IPA diacritics is cumbersome, we indicate the tones by superscript numbers, following Chen & Gussenhoven (2015). Thus, the tone numbers in the present article are motivated by the convenience of a synchronic description and do not match the traditional numbering of the tones. See Chao (1928), Qian (1992), and Zhu (2004) for previous descriptions of the tonal system of Huangyan.

As noted in our introduction above, Chao (1928) described some syllables as pronounced with a glottal stop in between. His impression was 'that the vowel is disyllabic'. Zhu (2004) reinterpreted this as creakiness, which is common in Chinese dialects, but he hardly observed any creaky phonation in Huangyan. In our data, we find some syllables (all with the low dipping tone) that fit the original description by Chao (1928). This kind of pronunciation is optional, and the word can also be realized as unambiguously monosyllabic (without any dip in amplitude). However, the waveforms do show a dip in the amplitude just after the turning point of the dipping tone, leading to two sonority peaks. This indeed gives the impression of a disyllabic sequence, like Chao (1928) observed. The drop of amplitude between the sonority peaks acoustically results in a voiced glottal fricative [fi]. In nasalized vowels, nasalization of the vowel coincides with the part after the amplitude dip. Moreover, a low dipping pitch contour is followed by a peak. These aspects are illustrated in the forms below and in Figure 6.

占 /处
$$\epsilon^6$$
/ [使 ϵ^6] 'take up' 上 / ϵ^6 / [ϵ^6] 'on, upon'

Consonants

	Bilabial	Labio- dental	Labial- palatal	Alveolar	Alveolo- palatal	Palatal	Velar	Glottal
Plosive	p ^h p b			t ^h t d		с ј	k ^h k g	
Affricate				tsh ts dz	tçh tç dz			
Nasal	m			n			ŋ	
Fricative	β	f		s z	ç z		х	ĥ
Approximant			Ч			j	w	
Lateral approximant				1				

$\mathbf{p}^{\mathbf{h}}$	碰 p ^h oŋ ⁵	'meet'	p包 po¹	'bag'	b 就 be ⁸	'at once'
-	酌 t ^h oŋ¹	'pour wine'	t 多tu³	'many'	d 得 dɐ ⁸	'get'
	块 k ^h e ⁵	'lump'	k 甲 ka ⁷	'armour'	g 葵 gy²	'sunflower'
	,,(R 0	iump	c 敢 cεŋ³	'dare'	յ 佢 յ ε²	'he'
ts^h	出 ts ^h o ⁷	'out'	ts寸tswen ⁵	'inch'	$dz \notin dze^2$	'expert'
t¢ ^h	超tcho3	'surpass'	tç汁 tçe ⁷	'juice'	dz助dzy ⁶	'help'
			f 法 fe ⁷	'law'	β坟βen⁴	'grave'
			s 试 si ⁵	'try'	z 是zi ⁴	'to be'
			ç靴çɔ ⁷	'boots'	z 徐zy⁴	'slowly'
			x 豁 xwe ⁷	'exempt'	fi 梧 fiu ⁴	'Chinese
						parasol'
m	米 mi²	'rice'	n 乃 na²	'to be'	ŋ 咬 ŋɔ³	'bite'
1	览 lε⁴	'view'				
Ч	浴 qө ⁸	'shower'	j 绒 joŋ²	'fine hair'	w 横 waŋ²	'sidelong'

Obstruents

In initial position, breathy-voiced obstruents have the same voice onset time (VOT) as their voiceless unaspirated counterparts. That is, the vocal cords do not vibrate; breathiness occurs during the release (not during the closure), and this breathy release is co-articulated with the following vowel (see Ladefoged & Maddieson 1996: 64). Articulatorily, breathiness is a result of slack vocal cords, which results in less energy in the formants. In Huangyan dialect, breathy-voiced obstruents are only fully voiced in connected speech, as often occurs in the story 'The North Wind and the Sun' at the end of this Illustration. Voiceless unaspirated obstruents optionally undergo voicing in connected speech as well, as in the following example.

生劲 /zan² tçiŋ¹/ [zan² dziŋ¹] 'health'

In the upper register, fricatives are voiceless. In the lower register, fricatives lack voicing. The bilabial fricatives are currently undergoing change to labiodental fricatives, e.g. $\stackrel{\text{\tiny H}}{=}$ [f5 7] 'blessing' (Qian 1992: 6). As for our speaker, we observed voiceless labiodental fricatives but breathy-voiced bilabial fricatives. The palatal plosives [c $\mathfrak F$] are in free variation with their palatalized velar counterparts [k^j g^j], respectively (see Qian 1992: 62).

Nasals

Nasals are the only consonants that occur in the coda. Coda nasals are often deleted with concomitant vowel nasalization – a pattern that is commonly observed in Chinese dialects (Chen 1975). Four degrees of nasal deletion are distinguished: (i) nasal merger $m > n > \eta$, (ii) nasalization of the vowel, (iii) nasal deletion, (iv) denasalization of the vowel (Chen 1975). All patterns are observed in Huangyan (and also in the neighbouring Taizhou dialect Wenling, see Hess & He 1990). In these dialects, most nasals have merged into the velar nasal. However, retention of the original alveolar nasal occasionally occurs, as in $\mathbb{E}[non^2]$ 'warm'. In some words a bilabial coda nasal occurs as a result of syllable contraction when the second syllable is $\Delta /ma^2 / ma^2 / ma^$

Second, vowel nasalization sometimes occurs and the coda is retained, as in Ξ [$z\tilde{g}^2$] 'taste'. Third, nasal deletion with nasalized vowels occurs frequently, as in Ξ guaŋ \rightarrow [gug^2] 'crazy'.

Nasalization and nasal deletion cross-linguistically tend to affect low back vowels most and high front vowels less so (Schourup 1972, Chen 1975). This is expected because of the tendency to lower the velum in low vowels, inducing nasal airflow (see Hess & He 1990 for Wenling Taizhou; see also Beddor (1993: 185), Johnson et al. 2019 and references cited there). Huangyan vowels show the same pattern. The low back vowel is almost always nasalized [\tilde{a}]. High and central vowels are rarely nasalized, whereas much variation occurs in the low vowel /a/ and the back high vowels /o u/. Finally, denasalization occurs in e.g. \mathfrak{P} [$w_{\mathfrak{p}}^2$] 'bend'.

Nasals are subject to regressive place assimilation, which is a variable process. First, nasals in onset position may undergo palatalization before palatals, like in [njg²] 'colour'. Furthermore, as we observed just above, nasals may be deleted phrase-finally with accompanying vowel nasalization; however, before plosives, the nasal is usually realized and undergoes assimilation to the place of articulation of the following consonant, as shown in the following examples:

'the North Wind and the Sun'

北风 就 勿得勿 承认 $/po^7fon^3be^8fe^7de^8fe^7dein^2nin^6/ \rightarrow [po^7fom^3be^8fe^7dein^2nie^6]$

'the North Wind was therefore obliged to admit'

Syllable structure and glides

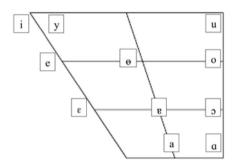
Syllables consist of (C)(G)V(N), where G is a glide /j w ψ / and N is a nasal /n η /. Like in other Chinese varieties, the co-occurrence of consonants and glides is severely restricted. The glide /j/ occurs after labial consonants and after alveolar consonants:

The glide /w/ occurs after labials, alveolars and velars:

The glide /u/ only occurs after alveolars and alveolo-palatals:

Vowel-initial words often start with a glottal stop, especially in hiatus.

Vowels



i	米mi ²	'rice'	e 酸ze ⁴	'acid'	u 多tu³	'many'
iε	念nie ⁶					
у	虚 zy ²	'empty'	e 给pe ⁷	'give'	o 茶dzo ²	'tea'
e	在ze ²	'located'			o 秒mjo ²	'second'
ε	反 fe^3	'opposite'	a 乃na²	'to be',4	o 秒mjo ² a 好xa ²	'good'

The vowel plot in Figure 7 is based on all available vowel tokens, i.e. it combines the vowels in the low and high register (recall Figure 4 above).

All vowels are monophthongs, except for /ie/. The unrounded front high vowel /i/ has two allophones. The high front vowel /i/ becomes retracted if it occurs before coda / η /,

⁴ We use /a/ to indicate a low central vowel for typographical convenience.

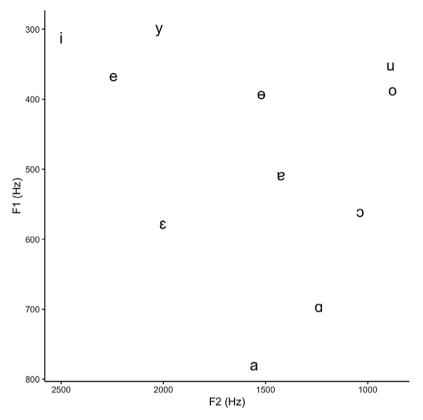


Figure 7 Vowel plot (F1 and F2 formant values) of all Huangyan Taizhou vowels (monophthongs).

irrespective of the onset, as in \widehat{m} [miŋ⁶] 'life'. Retraction of /i/ also occurs before an (assimilated) palatal nasal, like in $\cancel{\bowtie}$ [$\operatorname{cip}^3 + \operatorname{ja}^7$] 'interest, desire to +yi'. After the alveolar sibilants /s z ts ck /, the /i/ is realized as 'apical', which is not uncommon in Chinese dialects (e.g. Zhang 2006: 53). This apical vowel has the same tongue position as the preceding consonant and is commonly transcribed as / η ' in Chinese linguistics (Lee & Zee 2003: fn. 6). This symbol is not a standard IPA symbol, and its exact phonetic realization and phonological status is subject to ongoing debate (Zhang 2006; Faytak 2018: 45–46). Based on the acoustic properties, Lee-Kim (2014) suggested to transcribe the apical vowel as the consonant [I]. We will return to this in the next section. The mid-high front vowel /e/ is sometimes diphthongized to [eI], which in our data only occurs with the low dipping tone, as is \rightleftharpoons [wei⁶] 'meeting'.

A restricted number of vowels occur with the checked tones: $/\theta$ θ a i ϵ o σ , and the mid central vowel $/\theta$ occurs remarkably frequently with the checked tones and infrequently with other tones. A restriction like this, on the number of vowels that have a checked tone, is also observed for Shanghainese (Chen & Gussenhoven 2015).

Consonant-vowel co-articulation

Huangyan Taizhou shows extreme co-articulation, resulting in fricative vowels (Sloos, Ran & van de Weijer 2018), and also like a recent description of another Wu dialect, Lili (Shi & Chen, published online 29 September 2020). We also regard syllabic nasals as involving extreme co-articulation, since in both cases vowel features are compressed, resulting in a consonant with syllabic characteristics. We discuss both cases in turn.

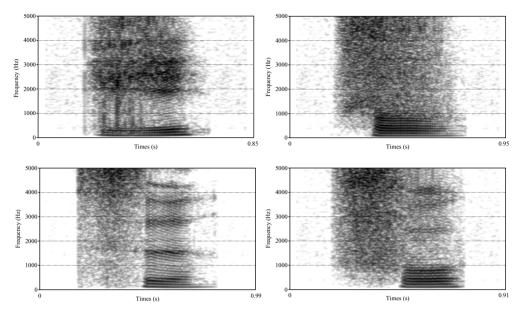


Figure 8 Narrow-band spectrograms of the fricative vowels 为 [호y 6] 'for' and 浮 [βu 4] 'float' (left panels) compared to their modal non-fricative counterparts 诗 [si 3] 'poem' and 夫 [fu 5] 'husband' (right panels). The harmonics are clearer in the modal vowels than in the fricative vowels.

Fricative vowels

In Chinese languages, the apical and retroflex vowels typically share their place and manner of articulation with the consonant that precedes them. Through co-articulation of the consonant and vowel, the frication of the consonant may spread to the apical vowel (Ladefoged & Maddieson 1996: 313; Wiese 1997; Lee-Kim 2014). The duration of the frication on the vowel varies considerably across different languages and dialects; in fact, in Mandarin no inherent frication noise occurs during the vowel (Lee-Kim 2014), but it is sometimes observed in dialects. Real fricative vowels are characterized by co-occurrence of frication and clear formant structure (Connell 2007).⁵ In addition, the place of articulation of fricative vowels is slightly different from their non-fricative counterparts (Connell 2007, Lee-Kim 2014, Hu & Ling 2015). Vowels that are subject to fricativization are often apical, but in Suzhou (also a Wu dialect), a front rounded (non-apical) fricative vowel is observed (Chao 1928; Ling 2007; Faytak 2014, 2021); see also Shi & Chen (published online 29 September 2020), who transcribe the Lili Wu fricative vowels as advanced (see their Figures 9 and 10). In Huangyan, both the front unrounded and front rounded vowel appear as fricative vowels after /z/; remarkably, the back rounded vowel /u/ also undergoes fricativization. Thus (unlike in Lili Wu) all high vowels can be realized as fricative vowels but only if they follow a homorganic and breathy-voiced consonant, i.e. the voiced alveolar fricative /z/ or the breathy-voiced labial fricative β , respectively. To capture this phonological relationship, we transcribe these fricative vowels as $\sqrt{2}$ $\sqrt{2}$ $\sqrt{2}$ $\sqrt{2}$ $\sqrt{2}$ fig., indicating that the place of articulation of the fricative vowels is slightly advanced compared to their non-fricative counterparts, as also noted for Lili Wu. Like in Lili Wu (see again Shi & Chen (published online 29 September 2020), page 10), these fricated vowels have a lowered F2, which leads to a retracted quality in perception. Figure 8

⁵ Full fricative vowels are also found in the African language Mambila, which also involves voiced consonants that are homorganic with the following vowel (Connell 2007). See also Faytak (2016).

Table 2 Hambolio to holde fath	os di ilibaliye alla iliba	iai vuwois.
Gloss of example (Figure 6)	Mean HNR	SD HNR
$[\widehat{zy}^6]$ 'for' (fricative)	12.1	2.93
$[si^3]$ 'poem' (modal)	17.1	1.38
$[\beta \widehat{u}^4]$ 'float' (fricative)	14.7	1.90
[fu ⁵] 'husband' (modal)	17.6	3.43

Table 2 Harmonic-to-noise ratios of fricative and modal vowels.

presents narrow-band spectrograms for the pairs 'for' vs. 'poem' and 'float' vs. 'husband', 6 which show that the frication of the vowel is clearly retained for the entire duration of the vowel; by contrast, a clear boundary between consonant and vowel occurs if the fricative is voiceless.

The harmonic-to-noise ratios (HNRs) for these two pairs of vowels are presented in Table 2 (computed by Praat script; Feinberg 2018 and checked manually) and confirm the difference between fricative and modal vowels. As can be seen in the table, fricative vowels have lower HNRs than their modal counterparts, as expected.

Syllabic nasals

Huangyan nasals can be syllabic, resulting in monosyllabic lexical words – a pattern that occurs in different southern Chinese languages (Shen 2006). Syllabic nasals may also derive from extreme consonant–vowel co-articulation. The context in which this happens is similar to that of fricative vowels: a sequence in which the consonant (here: a nasal) is followed by a high vowel with the same place of articulation (Shen 2006: 83). Huangyan has three syllabic nasals:

亩m³ 'a unit of area' 二n6 'two' 面n² 'while'

Transcription: 'The North Wind and the Sun'

Orthographic version

The following Chinese version of 'The North Wind and the Sun' is based on Qian (1992: 1086), adapted in consultation with the native speaker. It is longer than the traditional version.

北风搭太阳葛故事

有一趟,北风搭太阳凑好在达争论,敢儿葛本事大,凑在达讲啊葛时候,来勒一个走路葛人。 身上崔着一件候厚葛丝袄。葛两个就在达讲:"敢儿先叫葛走路葛人把葛丝袄脱,白算敢儿本事大。"葛几风用足气力吹,街无晓得吹得越生劲,葛人白不葛丝袄裹葛越紧。到后晚,北风 呒办法,只好算号。过勒一机,太阳白出来辣焦焦一晒,葛走路葛人白不葛丝袄脱,所以北风就勿得勿承认到底还是太阳比渠葛本事大。

⁶ For the front fricative vowel (e.g. in 事 [z̄i ⁴] 'affair'), the frication is limited to the first part of the vowel (compare modal vowel in 试 [si ⁵] 'try, test').

过勒几日儿,风搭太阳又碰潮,太阳搭风讲:"你今日,还要搭我比本事伐?"风讲:"呒高,我等再来比一比,你望,河搭是伐有一只船啊?敢儿葛船晒得快,白算敢儿葛本事大。"太阳白拼命葛晒,葛船老大用力摇船,但是太阳光越大,葛船老大越呒气力,船也摇得越来越慢慢。等着风来试号,佢胡胡兴一吹,就听得船老大在达叫:"顺风号,可以张帆号。"船上白帆升巧,风推帆,帆带船,船晒得快得猛。葛时候,太阳只好讲:"风先生,你葛本领比我大啊。"到末将,风讲:"我搭你督有本事,伐用争号!"

English translation

One day, the North Wind and the Sun were disputing which was the stronger, when a traveler came along wrapped in a warm cloak. They agreed that the first who succeeded in making the traveler take his cloak off should be considered stronger than the other. Then the North Wind blew as hard as he could, but the more he blew the tighter the traveler folded his cloak around him; and at last the North Wind gave up the attempt. Then the Sun shone out warmly, and immediately the traveler took off his cloak. And so the North Wind was obliged to confess that the Sun was the stronger of the two.

A few days later, the North Wind and the Sun met again. The Sun said to the North Wind, 'dare you challenge me again today?' The North Wind replied, 'Let's compete again. Look over there. Do you see the boat on the river? Whoever races the boat faster is the stronger.' So the Sun spared no efforts to shine heatedly, so that the boatman put all his strength in rowing. But the more furiously it shone, the weaker the boatman became. Then it was the North Wind's turn. The North Wind gusted, and the boatman shouted, 'It's tailwind. It's high time to put the sails up!' The white sails were put up, which put the boat into motion as the wind drove it. The harder the wind blew, the faster the boat raced. At this time, the Sun had to say, 'Mr. Wind, you are stronger than me.' Finally, the North Wind said, 'We both have our strong points. There's no need to argue who is stronger!'

Phonetic transcription (with allophonic details)

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po<sup>7</sup> foŋ<sup>3</sup> te<sup>7</sup> tha<sup>5</sup> jã<sup>2</sup> e<sup>7</sup> gụ<sup>4</sup> zĩ<sup>4</sup> || ju<sup>3</sup> we<sup>8</sup> th<sup>5</sup> | po<sup>7</sup> foŋ<sup>3</sup> te<sup>7</sup> tha<sup>5</sup> jã<sup>2</sup> tcho<sup>1</sup> họ<sup>2</sup> ze<sup>2</sup> da<sup>4</sup> cặã<sup>4</sup> lạn<sup>6</sup> |
ce<sup>3</sup> ŋ<sup>2</sup> ge<sup>7</sup> bẽ<sup>2</sup> zĩ<sup>4</sup> dụ<sup>6</sup> | tcho<sup>1</sup> ạe<sup>2</sup> de<sup>4</sup> gã<sup>2</sup> ạ<sup>4</sup> ge<sup>7</sup> zĩ<sup>4</sup> jo<sup>5</sup> | lạ <sup>2</sup> je<sup>8</sup> ja<sup>8</sup> gg<sup>8</sup> cặọ<sup>2</sup> lụ<sup>6</sup> e<sup>7</sup> nịn<sup>2</sup> ||
cēn<sup>2</sup> zan<sup>1</sup> tce<sup>7</sup> cặc<sup>7</sup> ja<sup>7</sup> cặi<sup>2</sup> jo<sup>5</sup> cặu<sup>2</sup> e<sup>7</sup> zĩ<sup>2</sup> ?o<sup>3</sup> || ke<sup>7</sup> ljaŋ<sup>2</sup> ge<sup>8</sup> bg<sup>8</sup> ze<sup>2</sup> de<sup>4</sup> gã<sup>2</sup> ||
ce<sup>3</sup> ya<sup>2</sup> zii<sup>2</sup> cặc<sup>4</sup> ge<sup>7</sup> cặc<sup>2</sup> lụ<sup>6</sup> e<sup>7</sup> nịn<sup>2</sup> bạ<sup>8</sup> ge<sup>7</sup> zĩ<sup>2</sup> o<sup>3</sup> tho<sup>7</sup> | bg<sup>8</sup> se<sup>5</sup> jen<sup>3</sup> n<sup>2</sup> bã<sup>2</sup> zĩ<sup>4</sup> dụ<sup>6</sup> ||
ka<sup>7</sup> cặi<sup>2</sup> foŋ<sup>3</sup> jạŋ<sup>6</sup> tso<sup>7</sup> tci<sup>1</sup> ljg<sup>8</sup> cặy<sup>4</sup> | ka<sup>1</sup> ụ<sup>6</sup> co<sup>3</sup> de<sup>8</sup> qg<sup>8</sup> cặy<sup>4</sup> de<sup>8</sup> qg<sup>8</sup> zạn<sup>2</sup> cặiŋ<sup>1</sup> |
kg<sup>7</sup> nịn<sup>2</sup> bg<sup>8</sup> bg<sup>8</sup> gg<sup>7</sup> zĩ<sup>2</sup> o<sup>3</sup> gu<sup>4</sup> gg<sup>7</sup> qe<sup>8</sup> tciŋ<sup>3</sup>|| to<sup>1</sup> ju<sup>2</sup> mg<sup>2</sup> | po<sup>7</sup> fo<sup>3</sup> m<sup>3</sup> be<sup>6</sup> fe<sup>2</sup> | tsi<sup>5</sup> họ<sup>2</sup> se<sup>5</sup> jo<sup>1</sup> || ku<sup>5</sup> lg<sup>8</sup> ja<sup>7</sup> cặi<sup>3</sup> | tha<sup>5</sup> jam<sup>2</sup> be<sup>8</sup> tsho<sup>7</sup> lại<sup>2</sup> lg<sup>2</sup> cặc<sup>3</sup> cặc<sup>3</sup> dặc<sup>3</sup> ja<sup>7</sup> so<sup>5</sup> || ke<sup>7</sup> cặc<sup>2</sup> lu6 e<sup>7</sup> nịn<sup>2</sup> bg<sup>8</sup> be<sup>8</sup> ge<sup>7</sup> zĩ<sup>2</sup> ?o<sup>3</sup> tho<sup>7</sup> | so<sup>3</sup> i<sup>3</sup> po<sup>7</sup> fom<sup>3</sup> bg<sup>8</sup> fe<sup>7</sup> dg<sup>8</sup> fe<sup>7</sup> cặc<sup>2</sup> nin<sup>6</sup> to<sup>1</sup> ti<sup>3</sup> e<sup>5</sup> zĩ<sup>4</sup> tha<sup>5</sup> jã<sup>2</sup> pi<sup>3</sup> ke<sup>3</sup> gg<sup>7</sup> bẽ<sup>2</sup> zĩ<sup>5</sup> du<sup>6</sup> ||
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ku⁵ wg⁸ ¢k½ ni⁶ η² | fon³ de⁷ tha⁵ ja² ju⁶ paŋ⁵ ¢kɔ² | tha⁵ jan² de⁷ fon³ gã² ||

η³ фұн¬³ niã⁶ η² we⁵ ju6 de³ ηο² pi³ bg̃² zi⁴ e⁵ || fon³ gã² | m³ gg² | wg² deŋ³ dze⁵ le½² pi³ ja³ pi³ |

m³ mwã⁶ | wo² de⁷ zi⁴ wg² ju³ je⁷ tsi⁵ ze³ a⁴ || ceŋ³ η² ge⁷ ze³ se⁵ de⁸ khwa¹ ||

bg⁸ se⁵ ceŋ³ η² ga⁷ bg̃² zi⁴ du⁶ || tha⁵ jam² phjɨŋ⁵ miŋ² ge⁷ so⁵ | ke⁷ ze³ lg² da⁶ joŋ⁶ ljg⁸ jg² ze³ |

dg̃⁶ zi⁴ tha⁵ jaŋ² gwa² qg⁸ du⁶ | ke ⁷ ze³ lg² da⁶ qe⁸ m³ tçi¹ ljg⁸ | ze³ ja² jg² de⁸ qg⁸ li² qg⁸ mg⁶ ||

taŋ⁵ ge⁷ foŋ³ le½² si⁵ ɔ¹ | jg² β u⁴ β u⁴ çɨŋ⁵ ja² dxy⁴ | bg⁸ thɨŋ⁵ dg⁸ ze³ lg² da⁶ ze² da⁴ dzɔ⁴ ||

zeŋ⁶ foŋ³ ɔ¹ | kho¹ i³ dzaŋ² fɛ³ ɔ¹ || ze³ zam¹ bg⁸ fɛ³ caŋ³ tcɔ³ | fɔn³ the³ fɛ³ | fɛ³ da⁵ ze³ |

ze³ se⁵ de⁸ khwa¹ de⁸ mã³ || ke⁷ zi⁴ jɔ⁵ | tha⁵ jan² dzi⁵ hɔ² gã² || foŋ³ ze² zaŋ² |

nġ³ ge⁷ bg̃n² lim³ pi³ nu² du⁶ a⁴ || tɔ¹ mg⁴ dzã³ || foŋ³ gã² | wg² de⁷ nġ³ tɔ² ju³ bg̃² zi⁴ ||

fe² joŋ⁶ dzã⁴ ɔ¹ ||

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Supplementary material

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