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Northern Min Tone Values and the Reconstruction of "Softened Initials"*

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This paper demonstrates that Northern Min tonal splits which correlate with the "softened initials" of Norman's Proto-Min reconstruction follow a consistent pattern in terms of the pitch of the tonal contours involved. It is argued that this pitch pattern, which cannot be explained as the result of borrowing or layering, constitutes strong evidence in favor of Norman's reconstruction, while also providing grounds for specifying the phonetic nature of the "softened initials".

This study references data from eight Northern Min dialects, including one described here for the first time. It is argued that a subset of these dialects forms a genetically related subgroup, for which the proto-tone system (including absolute pitch values) can be reconstructed with considerable confidence. Through additional comparison, the reconstruction of the tone system of Proto-Northern Min [PNM] as a whole is also achieved. PNM is reconstructed with eight tones and a three-way manner distinction in obstruent initials. Based on pitch patterns and universal phonetic principles, the PNM initials corresponding to Norman's Proto-Min "softened initials" are reconstructed as voiced initials with breathy release.

Key words: tonal splits, pitch pattern, Proto-Northern Min, Proto-Min, softened initials

1. Introduction

A peculiar feature of some Northern Min dialects is the presence of voiced sonorants (or the zero initial) corresponding to initial obstruents both in other Chinese dialects and in the traditional framework of medieval Chinese phonology.[1] These

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[1] By "traditional framework" I am referring to the phonological system inferred from textual

initials are found corresponding to both the medieval *qing* 清 (voiceless unaspirated) and *quanzhuo* 全濁 (voiced) obstruent initials. For example, compare the pronunciations of the following words in the Northern Min dialect Jianyang 建陽 and the Eastern Min dialect Fuzhou 福州:[2]

Word	Ancient Initial		Jianyang[3]	Fuzhou	Mandarin	
賭 'gamble'	t-	(*duanmu* 端母)	lo	tu	*du*	[tu]
銅 'copper'	d-	(*dingmu* 定母)	loŋ	tøyŋ	*tong*	[tʰuŋ]
早 'early'	ts-	(*jingmu* 精母)	lau	tsa	*zao*	[tsau]
字 'character'	dz-	(*congmu* 從母)	lɔi	tsei	*zi*	[tsɿ]
飛 'fly (v)'	f-	(*feimu* 非母)	ye	pui	*fei*	[fei]
盆 'basin'	b-	(*bingmu* 並母)	wuŋ	puoŋ	*pen*	[pʰən]
飢 'hungry'	k-	(*jianmu* 見母)	ue	kui	*ji*	[tɕi]
球 'ball'	g-	(*qunmu* 群母)	iu	kiu	*qiu*	[tɕʰiou]

These unusual initials are not found in all words. Compare the first two examples above with the words 'short' and 'tube':

Word	Ancient Initial		Jianyang	Fuzhou	Mandarin	
賭 'gamble'	t-	(*duanmu* 端母)	lo	tu	*du*	[tu]
短 'short'	t-	(*duanmu* 端母)	tui	tøy	*duan*	[tuan]
銅 'copper'	d-	(*dingmu* 定母)	loŋ	tøyŋ	*tong*	[tʰuŋ]
筒 'tube'	d-	(*dingmu* 定母)	toŋ	tøyŋ	*tong*	[tʰuŋ]

analysis of the medieval rhyme books and rhyme tables. This system is often referred to as Ancient Chinese, Middle Chinese, or *Qieyun* 切韻 System (QYS). Scholars are still in disagreement as to whether this system represents an actual spoken language, a compromise or hybrid of several spoken dialects, or a reading tradition which does not directly reflect spoken forms of Chinese. The sound systems of most modern Chinese dialects (with the notable exception of the Min dialects) can be largely correlated with the traditional framework, which thus provides a useful point of reference in dialect studies.

[2] The Min dialects are traditionally, and popularly, classified into two subgroups, "Northern Min" (閩北) and "Southern Min" (閩南), with Fuzhou speech representative of the former and Xiamen 廈門 speech representative of the latter. Min dialectologists use a more detailed classification. Here I follow the five-way classification of Chen and Li 1991: Eastern Min (閩東), Puxian (莆仙), Southern Min (閩南), Central Min (閩中), Northern Min (閩北). In this classification scheme, Fuzhou is an Eastern Min dialect. This paper is concerned with Northern Min dialects in the narrow sense: those spoken in the counties of Jian'ou 建甌, Jianyang 建陽, Wuyishan 武夷山, Songxi 松溪 and Zhenghe 政和 (as well as part of Pucheng 浦城, which Chen and Li do not include in Northern Min) in northwest Fujian province.

[3] Jianyang and Fuzhou forms are from Norman 1996. Tones are omitted for simplicity.

銅 'copper' and 筒 'tube' are homophonous in the traditional framework, and in most Chinese dialects (including Fuzhou).[4] In Jianyang they differ in initial (and, as we shall see below, in tone).

As far as I know, to date only three dialects have been reported in the literature which possess these peculiar initials: Chong'an 崇安, Jianyang, and Wufu 五夫. Below, I will introduce a fourth dialect of this type.

In a series of articles, Jerry Norman (1973, 1974, 1981, 1986a, 1986b, 1996) has proposed a reconstruction of Proto-Min, the putative common ancestor of the modern Min dialects. A controversial feature of his proto-system is the reconstruction of "softened initials" as the source of these Northern Min voiced sonorants. In Norman's formulation, these softened initials not only led to the developments found in the three Northern Min dialects just mentioned, they also conditioned certain tonal reflexes in all the dialects of the Northern Min area. In the Shibei dialect, the softened initials are realized as fully voiced obstruents (Norman 2000). As for the phonetic nature of these proto-initials, Norman (1986a) has suggested that some may have their origin in earlier prenasalized or prefixed initials.

Norman's reconstructions are illustrated below. The softened initials are distinguished notationally from other initials by a preceding dash. Voiceless softened initials are reconstructed when dialects such as Fuzhou have upper register tonal reflexes; voiced softened initials when they have lower register tonal reflexes.[5]

[4] As far as I am aware, these two words are homophonous in *all* southern varieties of Chinese outside of the Northern Min area. This homophony includes tone. In Mandarin dialects, a *shang* 上-tone reading (irregular from the point of view of the traditional framework) is found for 筒 'tube', while 銅 'copper' is in the expected *yangping* 陽平 tone.

[5] "Upper register" refers to those tones traditionally termed *yin* 陰, and "lower register" to those tones traditionally termed *yang* 陽. Upper register tones correlate with the voiceless initials of the traditional framework, while lower register tones correlate with the voiced initials. The terms "upper" and "lower" are used as category labels; there is no implication that upper register tones are higher in pitch than lower register tones, although such a correlation may have existed historically.

Word	Norman's Proto-Min initial	Jianyang	Fuzhou
賭 'gamble'	*-t	lo	tu
銅 'copper'	*-d	loŋ	tøyŋ
早 'early'	*-ts	lau	tsa
字 'character'	*-dz	lɔi	tsei
飛 'fly (v)'	*-p	ye	pui
盆 'basin'	*-b	wuŋ	puoŋ
飢 'hungry'	*-k	ue	kui
球 'ball'	*-g	iu	kiu
短 'short'	*t	tui	tøy
筒 'tube'	*d	toŋ	tøyŋ

Norman's reconstruction has been challenged on a number of grounds (see for example Yue-Hashimoto 1976, Li 1985, Hirata 1988, Chen 1993, Wang 1999). It has been argued that some of the patterns of tonal correspondence and initial development which do not correlate with the medieval framework are better explained as the result of dialect mixture. Neighboring Wu, Gan and Hakka dialects are suggested sources for strata in Northern Min which can explain the phenomena that led Norman to his reconstruction.

Despite these criticisms, in my opinion no scholar to date has provided a convincing and comprehensive alternative which accounts for all the observed facts, although some intriguing suggestions have been offered.

In this paper, I take a new approach to the question of the Proto-Min softened initials, by looking at the actual tone values of the Northern Min dialects. I will demonstrate that there is a consistent pattern found across these dialects, in which tones associated with softened initials uniformly reflect pitch depression. Because this general phenomenon is found in all tone categories and in all Northern Min dialects, yet is manifested distinctly in each dialect, it is not possible that it could be due to convergence within the dialect group or to influence from neighboring dialect groups. This serves as strong evidence in support of Norman's reconstruction, and also provides clues to the phonetic nature of the reconstructed softened initials, at least for Proto-Northern Min.

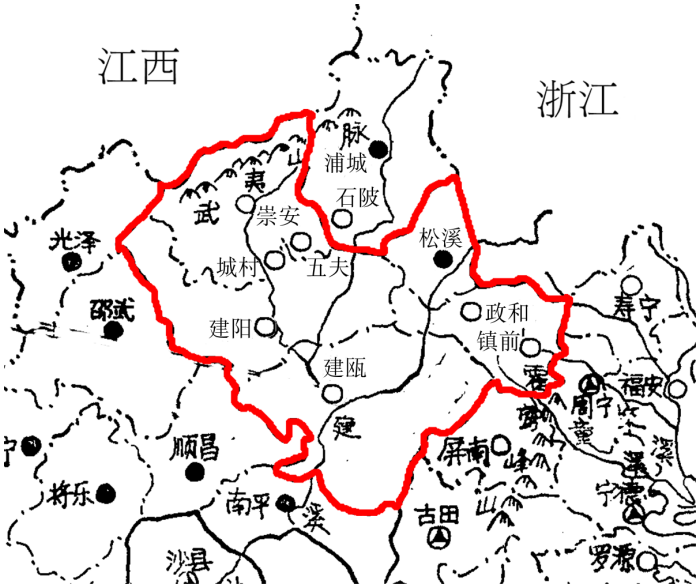
2. Data and methodology

In this study I limit myself to Northern Min, and to the reconstruction of Proto-Northern Min [PNM]. A working hypothesis is that the Northern Min dialects form a

distinct genetic subgroup within Min. The proto-tone system of this subgroup can be reconstructed with some confidence. It is probable that certain aspects of Proto-Northern Min differ from Proto-Min [PM] as reconstructed by Norman. As I will demonstrate, however, the tonal evidence strongly supports the reconstruction of Norman's softened initials at the Proto-Northern Min level, and this in turn supports their reconstruction for Proto-Min as well.

Data from eight Northern Min dialects is used. These are:

SB: Shibei 石陂 (spoken in Pucheng 浦城 County)
CA: Chong'an 崇安 (spoken in Wuyishan 武夷山 County)[6]
CC: Xingtian 興田 [Chengcun 城村 variety] (spoken in Wuyishan County)
JY: Jianyang 建陽 (spoken in Jianyang County)
WF: Wufu 五夫 (spoken in Wuyishan County)
ZH: Zhenghe 政和 (spoken in Zhenghe County)
ZQ: Zhenqian 鎮前 (spoken in Zhenghe County)
JO: Jian'ou 建甌 (spoken in Jian'ou County)



Map of the Northern Min area of Fujian (adapted from Chen and Li 1991)
the dialects used in this study are marked by open circles

[6] Chong'an is the former name of the Wuyishan County seat, now called Wuyishan City. In this list I have labeled as "counties" what are technically county-level municipalities (*xian ji shi* 縣級市).

The data sources are Li 1991 and Norman 1986a, 1996, 2000, with the exception of the Xingtian [Chengcun] data, which is from my field notes.

Since the Chengcun dialect of Xingtian Township has not previously been described, I will do so briefly here, and make some comments about its relationship with nearby dialects, before proceeding to the main question.

Chengcun is a small farming village with a population of approximately 2,700, located three kilometers off the main road not far north of Xingtian Town. Xingtian itself is at the southern edge of Wuyishan County, at the border with Jianyang County. Residents of Chengcun claim that their speech is identical to that of Xingtian Town. It is possible, however, that the relative isolation of Chengcun has insulated it from some of the linguistic influences which have worked on Xingtian speech.[7] My principle language consultant was a fifty-five-year-old resident of Chengcun village. He was born and raised there, speaking the local dialect as his first language. He studied Mandarin in elementary school, and attended two and a half years of middle school in Chong'an from age 16, before returning to Chengcun at the start of the Cultural Revolution.

The phonological inventory of the Chengcun variety of Xingtian dialect is given below, in a phonemic notation suitable for citation, along with a more narrow phonetic transcription.

Initials - phonemic

p	(ph)	m		w
t	th	n		l
ts	tsh		s	j
k	kh	ŋ	x	
			h	zero

Initials - broad phonetic

p	(pʰ)	m		ʋ
t	tʰ	n		l
ts/tɕ	tɕʰ		s/ɕ	j/ɥ
k	kʰ	ŋ	x	
			h	ʔ

[7] To my knowledge, the speech of Xingtian Town has not been described.

- *ph-* is rare; when it does occur there is often an alternate pronunciation with initial *h-*.
- Zero-initial syllables are articulated with initial glottal closure.
- Sibilant initials *ts- tsh- s-* are palatalized [tɕ tɕʰ ɕ] before front vowels *i, y, e*.
- *tsh-* does not occur before non-front vowels, and is therefore always pronounced [tɕʰ].
- *w-* is generally articulated as a labiodental approximant [ʋ].
- The smooth onset before main vowel or medial *y* can be considered an allophone of either *j-* or *w-*; it is in fact articulated as [ɥ], often with slight labiodental frication. I have transcribed it in all cases as *j*.

Finals - phonemic

	a	ai	au	e	eu	o	oi		ui	aŋ	aiŋ	oŋ	oiŋ	iŋ	uŋ
i	ia					io		iu		iaŋ		ioŋ			
u	ua					uo	uoi			uaŋ		uoŋ	uoiŋ		
y				ye										yeŋ	

Finals - broad phonetic

	a	aj	aw	ʲe	ew	ɔ	ɔj		uj	aŋ	ajŋ	oŋ	ɔjŋ	iŋ	uŋ
i	ja					jɔ		ju		jaŋ		joŋ			
u	wa					wɔ	wɔj			waŋ		woŋ	wɔjŋ		
y				ɥe										ɥeŋ	

- *-uoŋ* occurs only after velar initials; I have only elicited examples with initials *x-* and *k-*. It contrasts with *-uŋ* only after *x-*.
- Velar initials never occur with *-oiŋ*, and most non-velars never occur with *-uoiŋ*. However, the two finals do contrast after *n-* and *l-*.
- *-uŋ* contrasts with *-uoŋ* only after *x-*. It contrasts with *-oŋ* after *n-*, *l-*.
- *-e* is often pronounced with a slight on-glide [ʲe].
- The nasal ending in finals with offglide *-i* (*-oiŋ -aiŋ -uoiŋ*) is often realized as simple nasalization of the vowel.
- When preceded by zero initial or *h-* initial, medial *-i-* is somewhat longer and lower, sounding closer to [e].

Tones[8]

Tone 1	[52]
Tone 2	[45]
Tone 3	[21]
Tone 5	[22]
Tone 6	[44]
Tone 7	[24]
Tone 8	[5]

There is one sandhi rule which applies in rapid speech: in first elements of compounds, Tone 7 becomes short and high, identical to Tone 8. For example, the morpheme *to*^{24} 'table' is pronounced with Tone 7 in *yeŋ*^{45}*to*^{24} 'round table', but is pronounced in Tone 8 when compounded with the diminutive suffix in *to*^{5}*tse* 'table'.

Since Xingtian is located roughly halfway between Chong'an and Jianyang, and all three lie along a major waterway and principle highway, one might expect that Xingtian dialect would be similar to both Chong'an and Jianyang, and this is in fact the case. It is also clear, however, that Xingtian is structurally distinct from both, and therefore provides useful additional evidence for comparative work. Consider this chart of the tone values of the three dialects:

Table 1: The tone values of Chong'an, Chengcun and Jianyang

Etymological Tone	Chong'an		Xingtian [Chengcun]	Jianyang	
1	51	53	52	53	53
2	33	334	45	334	33
3	21	31	21	21	21ʔ
4	--	--	--	--	--
5	22	22	22	332	21
6	55	55	44	43	43
7	35	24	24	214	35
8	5	53ʔ	5ʔ	4	43ʔ
9	--	--	--	41	31

[8] The tones are numbered etymologically. This system will be explained in more detail below.

The Chong'an and Jianyang data are taken from Li 1991 and Norman 1986a. The tone values according to Li are listed first, followed by those given by Norman.[9] The tone numbers 1 through 8 are etymological, according to the general scheme which can be applied to all Chinese dialects. They largely correspond to the traditional *yinping* 陰平, *yangping* 陽平, *yinshang* 陰上, *yangshang* 陽上, *yinqu* 陰去, *yangqu* 陽去, *yinru* 陰入, and *yangru* 陽入 categories respectively, with differences that will be made clear below. Note that what is here labeled Tone 9 is referred to as "*yangping yi* 陽平乙" by Li. Norman explains this category as "of a heterogeneous origin" (1986a), "outside the common etymological framework employed in Chinese dialectology in that its origin is not traceable to a single traditional tonal category, nor does it represent a split or merger of any of these categories that is conditioned by any feature of the traditional framework" (1996)[10].

The similarities between the three tone systems are apparent. All three share the following phonetic features:

Tone 1 is high falling.
Tone 2 is mid to high, level or rising.
Tone 3 is low falling.
Tone 5 is low.
Tone 6 is high.
Tone 7 is mid rising.
Tone 8 is high and abrupt.

As we shall see, these features are shared by the Wufu dialect as well.

There are some differences between the three:

In Chong'an and Chengcun, Tone 5 is level, while in Jianyang it has a slight fall. In Jianyang, it is distinguished from Tone 3 by its longer duration.

In Chong'an and Chengcun, Tone 6 is level, while in Jianyang it has a slight fall.

Our comparison of Tone 2 in each dialect depends on which data source we use. According to Li, Chengcun and Jianyang both have a mid-high rising tone while Chong'an differs in being level, while according to Norman it is Chong'an which, like Chengcun, has a rising tone while Jianyang has a level tone.

Structurally, one can also note differences. Chong'an and Chengcun do not have a distinct Tone 9 category, but Jianyang does. In none of the dialects is there a distinct

[9] In Norman 1986b, Jianyang Tone 8 is given as [54].

[10] This statement is actually made in reference to Tone 9 of Zhenqian dialect, but is equally applicable to the other Northern Min dialects that have such a tone category, such as Jianyang, Wufu and Shibei.

Tone 4 (*yangshang*) category. In Jianyang, this category has merged with *yinqu* (Tone 5), while in Chong'an it has merged with *yangqu* (Tone 6). In this respect Xingtian [Chengcun] is identical to Jianyang, and differs from Chong'an. Jianyang and Chengcun share a tone sandhi feature which is absent from Chong'an. In these two dialects, when a Tone 7 syllable occurs in close juncture with a following syllable in rapid speech, it becomes indistinguishable from Tone 8.

Having introduced the Chengcun dialect, we can now return to the main issue at hand, the reconstruction of Proto-Northern Min tones and initials.

3. Subclassification of the Northern Min dialects

We can classify the eight Northern Min dialects in this study into three groups, based on the reflexes of Norman's softened initials.[11] The first group, consisting of Chong'an, Xingtian [Chengcun], Jianyang, and Wufu, has voiced sonorants (or the zero initial). I will refer to these dialects as "softening dialects". The second group consists of only one dialect, Shibei, which has voiced initials (Norman 2000). Zhenghe, Zhenqian and Jian'ou comprise the third group, which have obstruent initials similar to those found in other Min dialects. These differences are illustrated by the following cognate set:

	CA	CC	JY	WF	SB	ZH	ZQ	JO
發 'emit'	wai	woi	woi	wai	buai	pue	pua	puɛ

If we consider the pitch values of the tones in all eight dialects, we notice immediately a general similarity across the dialects, and a closer similarity among the softening dialects. This correlation gives us confidence that these proposed subgroups may in fact reflect patterns of historical divergence. In the chart below, data on all dialects except Xingtian [Chengcun] is taken from Norman. The four letters A, B, C, D represent the four tones of Norman's Proto-Min, essentially equivalent to the four tones *ping*, *shang*, *qu* and *ru* of the medieval tradition. (As we shall see later, we will not posit these four tones for Proto-Northern Min. They are provided here for convenience of reference.)

[11] Note that this classification scheme remains valid even if one does not accept Norman's reconstruction, as it can be easily formulated in synchronic terms.

Table 2: The tone values of eight Northern Min dialects

		Pitch Values							
		Voiced	Softening				Other		
	Tone	***SB***	**CA**	**CC**	**JY**	**WF**	ZH	ZQ	JO
A	1	53	53	52	53	53	52	53	54
	2	--	334	45	33	34	33	33	--
B	3	21	31	21	21ʔ	11	12	213	21ʔ
	4	--	--	--	--	--	--	--	42ʔ
C	5	33	22	22	21	22	31	31	22
	6	45	55	44	43	43	45	45	44
D	7	214~24	24	24	35	24	--	--	35
	8	23ʔ~43ʔ	53ʔ	5ʔ	43ʔ	43ʔ	--	--	--
--	9	31	--	--	31	31	21ʔ	21ʔ	--

Data for JO, ZH, JY, CA are from Norman 1986a.
Data for CC is from my field notes.
Data for SB is from Norman 2000.
Data for WF is from Norman (personal communication).
Data for ZQ is from Norman 1996.

The data in Table 2 does not provide the whole picture. In fact, it can be somewhat misleading, since tone category membership is not equivalent across dialects due to different patterns of split and merger which have occurred in the development of each dialect. For example, the word for 'heavy' (重) is in Tone 5 in Xingtian (*toŋ*^{22}) and Jianyang (*toŋ*^{21}), but is in Tone 6 in Jian'ou (*toŋ*^{44}) and Wufu (*tuŋ*^{43}). This fact is not discernible from Table 2.

The actual correspondences are made clear in Table 3 below, in which dialect reflexes are given in terms of four categories of initial in Norman's Proto-Min system: (I) voiceless unaspirated and voiceless aspirated stops; (II) voiceless softened stops; (III) voiced unaspirated and voiced aspirated stops; (IV) voiced softened stops.[12] (For

[12] Note that although the voiced unaspirates and voiced aspirates are here grouped together, they do condition different tonal developments in some Min dialects, such as Fuzhou. For an example, see Norman 1974:31.

simplicity, tonal developments after fricatives and nasals are not included.)[13] The four categories can be illustrated by labial stops as follows in Norman's notation:

I	*p, *ph
II	*-p
III	*b, *bh
IV	*-b

Note that even if one does not accept Norman's reconstruction, the notations I, II, III, IV are still useful labels for real correspondence patterns of initial and tone which hold across the dialects.

Shibei is listed first, followed by the four softening dialects, and then the remaining three dialects.[14] Example words illustrating each correspondence are given in the last row.

[13] Evidence for Norman's Proto-Min reconstructions of distinct voiced and voiceless sonorants is not as strong as for his reconstruction of obstruents. Not only are examples fewer, but some of the best examples have been challenged (see for example Chen 1993).

[14] Both the tone values given in Table 2 and the pattern of tone splits given in Table 3 differ in some significant respects from the data provided by Li 1991. For example, according to Norman there are mergers (into his "Tone 9") of *yangping*, *yinshang*, *yinqu*, *yangqu* and *yinru* words in Zhenghe. Li (1991:144) instead has only *yangping* words in a distinct tonal category, with additional mergers taking place in the *yangqu* and *yinru* categories. Unfortunately, there is not enough overlapping data in the publications of Li and Norman to allow me to reconcile the two researchers' descriptions. I have chosen to use Norman as the primary source of data because his descriptions of tonal correspondence patterns are more complete, and because they show a greater degree of agreement with the type of pattern I found in Chengcun. Unfortunately, this means it has proven impossible to include data from some Northern Min dialects (such as Songxi 松溪) in this study, even though they have been described by Li.

Table 3: Tone category correspondences in eight Northern Min dialects[15]

	A				B				C				D			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
SB	1	9	5	9	3	3	1	5	5	9	6	6	7	3	8	8
CA	1	1	2	5	3	3	6	5	5	5	6	6	7	3	8	8
CC	1	5	2	5	3	3	5	5	5	5	6	6	7	3	8	8
JY	1	9	2	9	3	3	5	5	5	9	6	6	7	3	8	8
WF	1	9	2	9	3	3	6	5	5	9	6	6	7	3	8	8
ZH	1	5	2	9	3	9	6	5	5	9	6	9	2	9	6	5
ZQ	1	5	2	9	3	9	6	5	5	9	6	9	3	9	6	5
JO	1	3	5	3	3	3	6	4	5	3	6	6	7	3	6	4
Ex	支	高	平	長	短	轉	重	厚	戍	戴	鼻	字	八	發	石	薄

To illustrate the distinct tonal reflexes associated with initial types II and IV, compare these cognate sets, which exemplify the A I/II and B III/IV distinctions:

			SB	CA	CC	JY	WF	ZH	ZQ	JO
A I	支	'branch'	--[16]	ki^{1}	ki^{1}	ki^{1}	ki^{1}	ki^{1}	ki^{1}	ki^{1}
A I	分	'share'	--	--	puŋ^{1}	puŋ^{1}	puiŋ^{1}	--	pueŋ^{1}	pueŋ^{1}
A II	高	'tall'	ɦɔ^{9}	au^{1}	au^{5}	au^{9}	au^{9}	ho^{5}	ho^{5}	au^{3}
A II	飛	'fly'	ɦye^{9}	y^{1}	jye^{5}	ye^{9}	wye^{9}	ye^{5}	--	yɛ^{3}
B III	重	'heavy'	toŋ^{1}	təŋ^{6}	toŋ^{5}	toŋ^{5}	tuŋ^{6}	toŋ^{6}	toŋ^{6}	toŋ^{6}
B III	臼	'mortar'	--	khiu^{6}	khiu^{5}	khiu^{5}	khiu^{6}	khiu^{6}	khiu^{6}	khiu^{6}
B IV	趙	(surname)	diau^{5}	--	liu^{5}	liu^{5}	liu^{5}	--	tio^{5}	tiau^{4}
B IV	厚	'thick'	gɐu^{5}	jieu^{5}	jieu^{5}	eu^{5}	jieu^{5}	keu^{5}	keu^{5}	ke^{4}

The A I and A II words listed (支, 分, 高, 飛) are all *yinping* words with voiceless initials in the traditional framework. Yet the tonal and initial reflexes are distinct in the Northern Min dialects.

[15] Because of gaps in the data available to me, I do not have direct evidence for the pronunciation of each of the listed words in each of the eight dialects. In the Shibei data, there are no examples of any words in the A I or D I categories. The words 平, 短, 戍, 石 do not appear in the Shibei data, but the words 蟲, 古, 怪, 白 do appear as examples of the same categories, namely A III, B I, C I, and D III, respectively. In the Zhenghe data, there are no examples of words in the C IV category. In the remaining dialects, all words are attested as indicated.

[16] Dashes indicate that a cognate form is unavailable.

The B III and B IV words listed (重, 臼, 趙, 厚) are all *yangshang* words with voiced initials in the traditional framework. Yet the tonal and initial reflexes are distinct in the Northern Min dialects.

4. The reconstruction of Northern Min proto-tone systems

In order to investigate the historical developments which have led to the tonal phenomena described above, it will be necessary to reconstruct the pitch values of the Proto-Northern Min tone system. In section 5, I will undertake a detailed synchronic analysis of Northern Min tones. In section 6, the results of sections 4 and 5 will be considered together, in order to arrive at an understanding of the nature of the Proto-Northern Min initials.

Let us first confine our discussion to the four softening dialects Chong'an, Xingtian [Chengcun], Jianyang and Wufu, since these share an innovation (the development of sonorants for certain obstruent initials) and appear to constitute a genetic subgroup within Northern Min.[17] The fact that the lexical membership of the various tone categories across these four dialects is not identical (recall the example of 重 'heavy' given above), while tone correspondences are nevertheless regular, suggests that these dialects are in fact derived from a common ancestor and have not acquired their similarities through areal convergence.

We will first direct our attention to the eight traditional split-register tones (those listed under initial categories I and III in Table 3), for the moment ignoring tonal reflexes associated with the softened initials. Refer to Table 3a below. The tone categories which are identical for all four of the softening dialects are bolded in the chart. Note that the softening dialects all retain distinct categories for seven of the eight traditional split-register tones, and furthermore are in complete agreement as to the reflexes of those categories. Tone 4 (*yangshang*) correspondents do not form a distinct category, these words having merged with either Tone 5 (*yinqu*) or Tone 6 (*yangqu*) depending on dialect. Yet, because the Tone 4 category words exemplify a distinct tonal correspondence across the four dialects, the comparative method requires that we reconstruct eight proto-tone categories to account for all eight tonal correspondence sets.[18]

[17] They share other features as well. For example, the words for 簪 'hairpin' and 菇 'mushroom' show the same irregular tonal reflexes in all four dialects (see Norman 1996:24 and compare Xingtian [Chengcun] laŋ^{3} 'hairpin', wu^{3} 'mushroom').

[18] Alternatively, we could reconstruct four proto-tones, with subsequent register splits conditioned by an initial feature (such as voicing), a phenomenon seen in other dialect groups. Within the Northern Min dialects, however, there is no evidence compelling us to do so. None

Table 3a: Tone category correspondences in four Northern Min softening dialects

	A				B				C				D			
	1		2		3		4		5		6		7		8	
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
CA	**1**	1	**2**	5	**3**	*3*	6	*5*	**5**	5	**6**	*6*	**7**	*3*	**8**	*8*
CC	**1**	5	**2**	5	**3**	*3*	5	*5*	**5**	5	**6**	*6*	**7**	*3*	**8**	*8*
JY	**1**	9	**2**	9	**3**	*3*	5	*5*	**5**	9	**6**	*6*	**7**	*3*	**8**	*8*
WF	**1**	9	**2**	9	**3**	*3*	6	*5*	**5**	9	**6**	*6*	**7**	*3*	**8**	*8*

The pattern of the relationships which hold between these eight categories in each dialect and the tonal reflexes of softened initial words (those listed under initial categories II and IV) is complex. For convenience, we can refer to the latter tonal reflexes as "softened tones". In the softened tone reflexes labeled B II, B IV, C IV, D II and D IV, the dialects all agree. (These are in italics in Table 3a.) But in the remaining four, there is disagreement. Can these patterns be explained, and how should our tonal reconstruction account for them? If we were to choose not to follow Norman in reconstructing softened initials as a conditioning factor in each of the eight tones, we would in fact have to reconstruct at least ten distinct proto-tones to account for all of the tonal reflexes observed here. Therefore, it seems more sensible to reconstruct no more than eight proto-tones, and to account for additional splits by reconstructing a conditioning factor at the proto-level.

Our reasoning to this point is no different from that of Norman, who based his reconstruction of Proto-Min softened initials in part on the tonal patterns illustrated in Table 3a. We will now, however, take an additional step and reconstruct the actual pitch values of the ancestor of the Northern Min dialects. After reconstructing the pitch values of the eight proto-tones, we will then analyze the relationships between these proto-pitch values, their dialectal reflexes, and the associated softened tone values. We will then observe that the pitch patterns of the softened tone reflexes can be regularly derived, by one simple rule, from the proto-tones.

The methodology of the reconstruction of tonal values has been described in Ting 1984. Ting devotes considerable space to the problem of determining the fundamental tone (*jidiao* 基調) in tone sandhi systems. We are fortunate that tonal alternations are nearly absent from Northern Min, simplifying our task a great deal.[19] We begin with a

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of the dialects retains a voicing distinction correlating with the register splits, nor is there any evidence for the original unity of any of the upper-lower register pairs.

[19] In fact, some Northern Min dialects do have a single tone sandhi rule. (The Jianyang and Xingtian [Chengcun] rules have been described above.) Because the sandhi tone in these cases

subgroup, the four softening dialects, whose ancestor we refer to as Proto-Softening Northern Min [PSNM]. Let's look now at the actual pitch values of the tones involved. Reconstructed tone values appear in the last row.

Table 4: Tone value correspondences and the reconstructed PSNM tones

	A				B				C				D			
	1		2		3		4		5		6		7		8	
	I		III		I		III		I		III		I		III	
CA	53		334		31		>55		22		55		24		53ʔ	
CC	52		45		21		>22		22		44		24		5ʔ	
JY	53		33		21ʔ		>21		21		43		35		43ʔ	
WF	53		34		11		>43		22		43		24		43ʔ	
	***53**		***34**		***21**		***33**		***22**		***44**		***24**		***4ʔ**	

The tones are reconstructed as follows:

Tone 1 High falling *53. All the dialects agree on a high falling tone. Other possible reconstructions are *52 and *51 (the latter is Li's description of Tone 1 in Chong'an). Here I simply choose *53 by majority rule.

Tone 2 High rising *34. The dialects all agree on a mid to high tone, either level or slightly rising. I reconstruct a rising tone rather than a level tone because it is more appropriate to reconstruct a level tone for Tone 4 (see below).

Tone 3 Low falling *21. The dialects are all in agreement, except Wufu which has a low level tone.

Tone 4 Mid level *33. None of the dialects have a distinct Tone 4. (The ">" symbols in the chart indicate a merger.) It is therefore not possible to reconstruct the value of this tone based on pitch contours alone, which reflect the tones into which original Tone 4 has merged. Instead, we observe that this tone has merged with Tone 5 (*22) or Tone 6 (*44). It is therefore likely that Tone 4 was similar to both, and we reconstruct *33. It is unlikely that a dialect could long tolerate three mid level tones;

represents a merger with another category, we can be confident that the isolation tones are in fact the "fundamental tones" of Ting's formulation.

presumably the merger of Tone 4 with other tones occurred not long after the period of unity reconstructed here.[20]

Tone 5 Low level *22. Tone 5 is low and level in all the dialects except Jianyang. Presumably the falling contour in Jianyang developed only after glottalization occurred in Jianyang Tone 3, otherwise a merger would have occurred.

Tone 6 High level *44. Chong'an and Xingtian [Chengcun] have high level tones; Jianyang and Wufu are both slightly falling. A level tone reconstruction seems the best choice, although *43 would also be possible.

Tone 7 Mid rising *24. All the dialects are in agreement.

Tone 8 High level *4ʔ. All of the dialects have a short checked tone, but there is considerable disagreement as to its pitch and whether it is level or oblique. Phonemically, the contrast between this tone and the others can be accounted for simply by virtue of its abruptness. I reconstruct a mid-high pitch somewhat arbitrarily.[21]

Next, we turn our attention to those Northern Min dialects which do not have special reflexes of softened initials: Zhenghe, Zhenqian and Jian'ou. In fact, we do not have sufficient data to conclude that these dialects form a genetic subgroup. Zhenghe and Zhenqian are geographically close and have similar phonological systems. They are therefore likely to be closely related. Jian'ou, however, is geographically distant from these two dialects, and its phonology is noticeably distinct in several respects. The three dialects do not obviously share any innovations. It seems likely, then, that Zhenghe and Zhenqian belong to one regional subgroup (which perhaps includes the Songxi 松溪 dialect, spoken in Songxi County not too far north of Zhenghe), while Jian'ou belongs to another. Without sufficient data from other nearby dialects, it is not possible to draw more concrete conclusions. I will therefore reconstruct only Proto-Zhenghe-Zhenqian (PZhM), while recognizing that these two dialects are probably part of a broader Northeastern Northern Min group.

[20] It is also possible that Tones 5 and 6 were originally *11 and *55 respectively, so that the three level tones were high, mid, and low. It was perhaps the movement of these tones toward the middle of the pitch range which led to the loss of a distinct Tone 4.

[21] I have chosen to represent this tone with a glottal stop, even though the single number 4 is sufficient to indicate the short duration of the tone, so that notation of the pitch value of this tone will not be confused with the etymological tone category also labeled with a superscript 4.

Table 5: Tone value correspondences and the reconstructed PZhM tones

	A		B		C		D	
	1	2	3	4	5	6	7	8
	I	III	I	III	I	III	I	III
ZH	52	33	12	>45	31	45	>33	>45
ZQ	53	33	213	>45	31	45	>213	>45
	***53**	***33**	***212**	**--**	***31**	***45**	***24**	**--**

We reconstruct only six tones for PZhM, since traditional tone categories 4, 6 and 8 are merged in both dialects.

Tone 1 High falling *53. Both dialects agree on a high falling tone.
Tone 2 Mid level *33.
Tone 3 Low falling-rising *212. The initial falling component has been lost in Zhenghe.
Tone 5 Mid falling *31.
Tone 6 High rising *45.
Tone 7 Mid rising *24. This reconstruction accounts for the pitch of the Zhenghe level tone and for the rising contour of the Zhenqian tone.

We can now compare the remaining two dialects, Shibei and Jian'ou, directly with our PSNM and PZhM reconstructions, to arrive at a reconstruction of Proto-Northern Min tones.

Table 6: Tone value correspondences and the reconstructed PNM tones

	A		B		C		D	
	1	2	3	4	5	6	7	8
	I	III	I	III	I	III	I	III
SB	53	>33	21	>53	33	45	214~24	43ʔ
PSNM	*53	*34	*21	*33	*22	*44	*24	*4ʔ
PZhM	*53	*33	*212	>*45	*31	*45	*24	>*45
JO	54	>22	21ʔ	>44	22	44	35	>44
PNM	***53**	***34**	***21**	***44**	***22**	***45**	***24**	***4ʔ**

The tones are reconstructed as follows:

Tone 1 High falling *53.

Tone 2 Mid-high rising *34. This tone is level in PZhM. We reconstruct as rising rather than level in PNM because we reconstruct Tone 4 as a level tone.

Tone 3 Low falling *21.

Tone 4 Mid level *33. We construct a high level tone to account for the high pitch of Tone 1 (with which it has merged) in Shibei, and of Tone 6 in PZhM. A reconstruction of *55 would also be possible.

Tone 5 Low level *22. The tone has become falling in PZhM.

Tone 6 High rising *45. The tone is high level in PSNM and Jian'ou; reconstructions of *44 or *55 might also be possible.

Tone 7 Mid rising *24. According to Norman, in Shibei [214] is the isolation tone and [24] occurs before other syllables. We may assume that the latter sandhi form is the fundamental tone (*jidiao*).[22]

Tone 8 High checked *4ʔ. In PZhM and Jian'ou this tone has merged with Tone 6 following loss of the glottal stop and subsequent lengthening of the tone.

Some uncertainties remain in this reconstruction, but the general similarities across the Northern Min dialects give us confidence that our reconstruction is reasonably accurate. In those cases where we can propose alternative reconstructed tone values, the alternatives do not adversely impact the main hypothesis of this paper, to be presented in the next section.

This reconstructed Proto-Northern Min tone system looks quite natural for a Chinese dialect with eight tones. There are two level tones, three rising tones, two falling tones, and one short tone. A comparison with the eight-tone system of Wenzhou 溫州 shows obvious similarities. The tones have been arranged by similarity of pitch.

The tones of Proto-Northern Min compared to those of Wenzhou

PNM	*44	*22	*45	*34	*24	*53	*21	*4ʔ
WZ	44	22	45	34	212	42	31	323

One might also suppose that some of these tones were further distinguished from each other by differences in length or phonation, but there is not enough evidence to include such features in the reconstruction.

[22] We may speculate that at an earlier stage in history, PNM Tone 7 was *2ʔ, a low checked tone. The rising intonation may have developed under the influence of the glottal stop. At the PNM stage, however, there is no evidence for a checked tone.

5. The derivation of the softened tone contours

Before applying our proto-tone system to the problem of the development of the softened tones, let us first return to a synchronic evaluation of the pitch values of those softened tones in our eight dialects. In section 6 to follow, the results gained from the synchronic analysis of the current section will be combined with the results of section 4 and applied to the broader historical problem.

In Tables 7a and 7b, the tone categories A, B, C, D are retained for reference, although they are not relevant to the issue at hand. The eight proto-tone categories established for PNM are labeled 1 through 8, according to the standard etymological scheme, with the odd-numbered tones co-occurring with Norman's Type I proto-initials, and the even-numbered tones co-occurring with Norman's Type III proto-initials. I have labeled the softened tones by adding a plus sign (denoting derivation) to the tone number for the associated standard tone.

Table 7a: Tone values for Northern Min "standard tones" and associated "softened tones"[23]

	A				B				C				D			
	1	1+	2	2+	3	3+	4	4+	5	5+	6	6+	7	7+	8	8+
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
SB	53	31	33	31	21	21	53	33	33	31	45	45	214	21	43ʔ	23ʔ
CA	53	53	334	22	31	31	55	22	22	22	55	55	24	31	53ʔ	53ʔ
CC	52	22	45	22	21	21	22	22	22	22	44	44	24	21	5ʔ	5ʔ
JY	53	31	33	31	21ʔ	21ʔ	21	21	21	31	43	43	35	21ʔ	43ʔ	43ʔ
WF	53	31	34	31	11	11	43	22	22	31	43	43	24	11	43ʔ	43ʔ
ZH	52	31	33	21ʔ	12	21ʔ	45	31	31	21ʔ	45	21ʔ	33	21ʔ	45	31
ZQ	53	31	33	21ʔ	213	21ʔ	45	31	31	21ʔ	45	21ʔ	213	21ʔ	45	31
JO	54	21ʔ	22	21ʔ	21ʔ	21ʔ	44	42ʔ	22	21ʔ	44	44	35	21ʔ	44	42ʔ

Table 7b contains the same information as Table 7a, but merged tone pairs have been removed. By "merged tone pair" I refer to a situation where two tones *with their associated derived tones* have merged in a given dialect. For example, in Shibei tone pair 2/2+ has merged with tone pair 5/5+, and therefore tones 2 and 2+ have been

[23] Note that although Norman 2000:273-274 categorizes syllable types D III and D IV of Shibei as both being in Tone 8 (which is how I have represented them in Table 3), in his description of this tone (p.273) Norman makes clear that the pitch contour is distinct for voiceless (type III) and voiced (type IV) initials.

removed in Table 7b. In Zhenghe, although Tones 4 and 6 have merged, nevertheless Tones 4+ and 6+ are distinct, and therefore both pairs are retained in Table 7b.

Table 7b: The same chart, with merged tone pairs removed

	A				B				C				D			
	1	1+	2	2+	3	3+	4	4+	5	5+	6	6+	7	7+	8	8+
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
SB	*53*	*31*			21	21	*53*	*33*	*33*	*31*	45	45	*214*	*21*	*43ʔ*	*23ʔ*
CA	53	53	*334*	*22*	31	31	*55*	*22*	22	22	55	55	*24*	*31*	53ʔ	53ʔ
CC	*52*	*22*	*45*	*22*	21	21			22	22	44	44	*24*	*21*	5ʔ	5ʔ
JY	*53*	*31*	*33*	*31*	21ʔ	21ʔ	21	21	**21**	**31**	43	43	*35*	*21ʔ*	43ʔ	43ʔ
WF	*53*	*31*	*34*	*31*	11	11	*43*	*22*	***22***	***31***	43	43	*24*	*11*	43ʔ	43ʔ
ZH	*52*	*31*	*33*	*21ʔ*	***12***	***21ʔ***	*45*	*31*	*31*	*21ʔ*	*45*	*21ʔ*				
ZQ	*53*	*31*	*33*	*21ʔ*	*213*	*21ʔ*	*45*	*31*	*31*	*21ʔ*	*45*	*21ʔ*				
JO	*54*	*21ʔ*			21ʔ	21ʔ	*44*	*42ʔ*	*22*	*21ʔ*	44	44	*35*	*21ʔ*		

There is a striking pattern observable in the relationship between each softened tone and its associated standard tone. The tonal reflexes listed under initial types II and IV are in almost all cases equal to or lower in pitch than the corresponding type I and III reflexes.[24] Most are lower. There are only three exceptions.

- Twenty pairs have equal tone value, for example: Chong'an 1/1+, Xingtian [Chengcun] 3/3+, Jian'ou 6/6+
- Thirty-three pairs have *lower tone value* (italicized in Table 7b), for example: Shibei 5/5+, Wufu 2/2+, Jian'ou 7/7+
- One pair has **higher tone value** (bolded in Table 7b): Jianyang 5/5+
- Two pairs are ***uncategorized*** (bolded italicized in Table 7b): Zhenghe 3/3+, Wufu 5/5+[25]

[24] Note that among these dialects, this is a more consistent relationship than that between the so-called "upper register" (odd-numbered) and "lower register" (even-numbered) tones. In quite a few cases the "lower register" tones are higher in pitch than their corresponding "upper register" tones. This suggests that if the eight tones of these Northern Min dialects were derived from four earlier tones, with splits conditioned by initial voicing, then those splits (and accompanying loss of distinctive voicing) occurred longer ago than the derivation of softened tones.

[25] In both cases it is unclear whether one tone of the pair can be considered higher or lower in pitch. It may be noted, however, that in both cases the second tone of the pair has a falling contour, while the first does not. As we shall see below, this is consistent with the conclusions of this study.

It is also worth noting that sometimes the softened tones are glottalized.[26] This happens in cases where the corresponding standard tone is glottalized (e.g. Shibei 8/8+), and in cases where it is not (e.g. Wufu 1/1+). But there are no examples where a standard tone is glottalized and the corresponding softened tone is not glottalized. In other words, derivation of a softened tone can add glottalization but never removes it. Finally, note that most softened tones have a falling contour, some are level, and only two (Shibei 6+ and 8+) are rising.

All of this suggests that there has been a *predictable tonal effect*, which has uniformly affected all the syllables listed under initials types II and IV in the chart. We can characterize this effect generally as a lowering of the tone. Quite often, it would appear to also involve a falling contour, with some degree of associated glottal constriction or other glottalic phonation type. Because the phonetic effect is so consistent, it is best explained as resulting from a single conditioning factor which was at one time characteristic of the syllables involved. The nature of this factor will be discussed in the following two sections.

This simple hypothesis explains a number of features of the tone systems of the Northern Min dialects. For example, it becomes obvious why most dialects show no distinction between Tone 3 (*yinshang*) and Tone 3+ (the derived softened tone): Tone 3 is a falling tone at the very bottom of the voice register, leaving no room for further depression. It is only in the two dialects with rising *yinshang* tones, Zhenghe and Zhenqian, that we find a distinct Tone 3+.

The only synchronic tonal phenomena that are not obviously explained by this hypothesis are the lack of distinction in many of the dialects between Tones 6 and 6+ (*yangqu*) and between Tones 8 and 8+ (*yangru*). We will take up this question again below from a historical perspective.

6. From proto-tones to modern reflexes, and the nature of "Tone 9"

As just noted, we can explain almost all of the synchronic tonal phenomena described here by making one simple assumption about historical development: that some feature of certain syllables of Proto-Northern Min had a depressing effect on pitch. This feature correlates exactly with the softened initials of Norman's reconstruction. If

[26] There are various means of indicating glottalized tones, including appending the symbol *ʔ* to the tone letters (as in Table 7) or underlining the tone letters. However, neither method provides a precise indication of the phonetic nature of the "glottalization". There is not enough information in most of the sources at my disposal to determine whether these notations indicate abruptness, creaky voice, breathy voice, or the actual presence of a glottal stop segment. We can only be certain that the phonation is in some way marked.

we do not accept Norman's hypothesis that a distinct proto-initial type is responsible for the tone splits observable in Northern Min, the tonal pitch patterns I have described are not easy to account for. In this section I will look more carefully at the historical developments of Northern Min associated with this hypothesis.

We may assume that softened tones created by the pitch-depressing effect were in existence allophonically at the time of Proto-Northern Min unity, but became phonemicized at different times early in the history of the daughter dialects as the distinctive feature responsible for them was neutralized. Even within a single dialect, this process may have occurred at different times in different tones.

If the pitch-depressing effect had been fully transphonologized into phonemic tonal distinctions, this would have resulted in a 16-tone system. As far as I know, a tonal system of such complexity has never been documented for any human language. Assuming that such a system is impossible, we would expect the eight theoretically possible tone splits to be reduced through mergers which either occurred at the time of phonologization or shortly afterward. Presumably, these mergers would occur based on phonetic similarity of pitch contour and phonation type. Some of the new tones merged with existing tones in the system, while other new tones merged with each other but remained distinct from the original eight. In the case of Tone 3, in most dialects it was not even possible for a new tone to be created, since Tone 3 was already a falling tone at the low end of the vocal register.

It should now be apparent that the term "Tone 9" has no meaning in an etymological sense.[27] There are in theory eight distinct softened tones which might have developed in each dialect. Many of these potential softened tones failed to develop distinctly, or quickly merged with other extant tones, or merged with each other. As it happens, in all but one of the dialects for which we have data, at most only one new tone category, distinct from the original eight, has survived. But this category—"Tone 9"—represents the merger of a different subset of the eight softened tones in each dialect, and is not comparable across dialects.[28]

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[27] In many dialects which have a Tone 9, this tone contains mostly *yangping* words. This is the reason that Tone 9 was designated as "*yangping yi* 陽平乙" by Li Rulong (1991).

[28] This is one reason that, in my view, critics of Norman's reconstruction have failed to provide convincing alternative explanations for the Northern Min tonal patterns. Some scholars have attempted to explain Tone 9 (or "*yangping yi*") as the result of contact with nearby dialects, noting that the contour of Tone 9 in Northern Min is similar to the contour of the *yangping* tones of nearby Wu dialects. For example, Wang (1999:91-92) points out that Tone 9 is a low falling tone in Northern Min dialects Shibei, Jianyang, Jian'ou, Chong'an, Zhenghe and Songxi. He then notes that the ordinary *yangping* tone of neighboring Wu dialects like Longquan 龍泉, Yunhe 雲和, Songyang 松陽, Suichang 遂昌 and Qingfeng 慶豐 is low falling as well. He therefore explains Tone 9 as an artifact of a layer of Wu borrowings,

Put in other terms, there exist for each dialect the following potentially distinct softened tones: 1+, 2+, 3+, 4+, 5+, 6+, 7+, 8+. In Jianyang, Tone 9 represents a merger of 1+, 2+, and 5+. In Zhenghe, Tone 9 is a merger of 2+, 3+, 5+, 6+ and 7+. And so on for all the other dialects. In each of these dialects, the remaining "softened tones"—those that did not form a Tone 9—merged in various patterns with the original eight tones. In the case of Jian'ou, it appears that this merger encompassed all the softened tones: no distinct Tone 9 category remains. In fact, however, what Norman has labeled "Tone 4" in Jian'ou occurs only as a softened tone, representing a merger of Tone 4+ with Tone 8+. To label it "Tone 4" is somewhat misleading, since the most we can say is that it is derived in part from the original Tone 4, which no longer exists, having merged with Tone 6. Norman's Jian'ou Tone 4 could just as accurately have been labeled Tone 9, since it is a derived tone which has not merged with any other basic tone categories.

In Shibei there are two distinct softened tones. In addition to that labeled Tone 9 by Norman (a merger of Tones 1+, 2+, and 5+), Shibei maintains a distinct Tone 8+. This tone, [23ʔ], is different from Tone 8 [43ʔ], and distinct from all of the other Shibei tones. Norman could just as easily have labeled it "Tone 10", rather than describing it as a "variant" of Tone 8.

We are now ready to apply the central hypothesis of this paper to the proto-tones reconstructed earlier. Table 8 contains the same tone data as Table 7a, but I have added several rows containing values for the tones reconstructed in section 4. For the corresponding softened tones of the reconstructed tones, I have provided derived pitch values by lowering the pitch of the tone and in some cases adding a falling contour. The underlining represents glottalic phonation. (The nature of this phonation will be discussed in the next section.) These "reconstructed" softened tones should be thought of as purely allophonic at the time of the proto-language, as I do not mean to suggest that there ever was a 16-tone system at any time in the history of these dialects. It can

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arguing that the "softened" reflexes developed from the Wu voiced initials that are found in this tone. It is clear from the data presented here, however, that the so-called Tone 9 phenomenon is more systematic and widespread; the identification of Tone 9 as a variant *yangping* tone is misguided. Any attempt to explain the tone patterns of Northern Min as being the result of contact with other dialects needs to simultaneously account for the tone splits found across all eight traditional tone categories and for the unique "softened" initial reflexes of the softening dialects, which are not limited to the *quanzhuo* category of the traditional framework and therefore do not correlate with the voiced initials of Wu. Moreover, any argument supporting a Wu layer should address the final part of the syllable as well. The Northern Min finals of Tone 9 syllables are not distinct from those of syllables in other tones, showing no particular similarity to Wu finals.

be readily seen how most of the individual values in the daughter dialects were derived from these allotones once phonemicization took place.

In the chart, I have italicized those derived tones which did not split from their original tones.

Table 8: Reconstructed Proto-Northern Min tones and dialectal reflexes

	A				B				C				D			
	1	1+	2	2+	3	3+	4	4+	5	5+	6	6+	7	7+	8	8+
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
PNM	**53**	**31**	**34**	**11**	**21**	**21**	**44**	**22**	**22**	**11**	**45**	**23**	**24**	**21**	**4ʔ**	**2ʔ**
SB	53	31	33	31	21	*21*	53	33	33	31	45	*45*	214	21	43ʔ	23ʔ
PSNM	**53**	**31**	**34**	**11**	**21**	***21***	**33**	**22**	**22**	**11**	**44**	***44***	**24**	**21**	**4ʔ**	***4ʔ***
CA	53	*53*	334	22	31	*31*	55	22	22	*22*	55	*55*	24	31	53ʔ	*53ʔ*
CC	52	22	45	22	21	*21*	22	*22*	22	*22*	44	*44*	24	21	5ʔ	*5ʔ*
JY	53	31	33	31	21ʔ	*21ʔ*	21	*21*	21	31	43	*43*	35	21ʔ	43ʔ	*43ʔ*
WF	53	31	34	31	11	*11*	43	22	22	31	43	*43*	24	11	43ʔ	*43ʔ*
PZhM	**53**	**31**	**33**	**21**	**212**	**21**	**45**	**31**	**31**	**21**	**45**	**21**	**24**	**21**	**45**	**31**
ZH	52	31	33	21ʔ	12	21ʔ	45	31	31	21ʔ	45	21ʔ	33	21ʔ	45	31
ZQ	53	31	33	21ʔ	213	21ʔ	45	31	31	21ʔ	45	21ʔ	213	21ʔ	45	31
JO	54	21ʔ	22	21ʔ	21ʔ	*21ʔ*	44	42ʔ	22	21ʔ	44	*44*	35	21ʔ	44	42ʔ

In PSNM, the distinct phonation associated with the softened tones has been completely lost. Moreover, the allophonic distinction in pairs 6/6+ and 8/8+ was never phonologized.[29] The remaining allophonic distinctions were all phonologized, but many of the resulting "softened tones" merged with each other and/or with other existing tones.

In PZhM, the softened tones underwent mergers in the process of phonologization, to the degree that only two softened tones remained: a mid falling tone [31] and a low falling tone [21] also marked by a distinct phonation. The former is derived from high tones and has merged with original Tone 5; the latter is derived from low tones and has remained distinct as "Tone 9".

I have already mentioned the reason that most dialects show no distinction between Tone 3 (*yinshang*) and Tone 3+ (its derived softened tone), namely that Tone 3

[29] It could be argued that the kind of contour-lowering, glottalic effect associated with softened initials was simply neutralized under Tone 8, a tone that was already short and glottalic. In other words, the pitch-depressing effect may have been less pronounced in a high, short, abrupt syllable. As for Tone 6, see the discussion below.

is already low falling, and there is no room for further derivation in this direction.[30] From the historical reconstruction and correspondence data in Table 8, it is also clear why Tones 2+ and 5+ have merged in all dialects (even though Tones 2 and 5 have not). Proto-Tones 2 and 5 are reconstructed as *34 and *22 respectively. Because they are both mid tones, their lowered falling counterparts must inevitably have the same pitch value. For similar reasons, Tones 3+ and 7+ have merged in all dialects.[31]

In Zhenghe, Zhenqian, and Jian'ou, Tones 4, 6 and 8 have all merged. However, in these dialects Tone 6+ is distinct from Tones 4+ and 8+. From this fact we can conclude that the phonemicization of the softened tones in these dialects occurred before Tone 6 merged with Tones 4 and 8, but after Tone 8 had merged with Tone 4.[32]

Finally, we note that in Shibei, Jian'ou, and all four softening dialects, Tone 6 and Tone 6+ are not distinct. At first glance this seems odd, since Tone 6 is a high tone and one would expect that there would be plenty of pitch room below it for a distinct softened tone to develop. One explanation might be that the feature associated with softened initials may have been lost early in Tone 6 in these dialects—before the phonemicization of softened tones took place. This would be nothing more than speculation, except that we have a startling piece of corroborating evidence in Norman's description of Shibei. He notes (2000:272) that: "In tones five, eight and nine, Shyrbei voiced initials have a murmured articulation and sound like the voiced stops of Wu. In tone six, however, *no such murmur is evident* to my ear; in this tone the initials in question are fully voiced like the stops of French or Russian" [emphasis added]. This is highly suggestive. It may have been murmur—or the PNM precursor of Shibei murmur—which caused the development of softened tones. If this murmur were lost in Tone 6 in the softening dialects, as it seems to have been in Shibei, this would account for the lack of a distinct Tone 6+ in those dialects.[33] (The next section will take up the question of the phonetic nature of the feature that conditioned softened tones.)

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[30] Zhenghe and Zhenqian are exceptions, because the phonemicization of the "softened tones" took place after Tone 3 acquired a rising contour.

[31] If, as suggested in an earlier footnote, PNM Tone 7 is derived from an earlier low checked tone *2ʔ or *21ʔ, then it was most likely the checked counterpart of Tone 3. This would be consistent with the merger of the softened variants Tone 3+ and Tone 7+.

[32] I noted in an earlier footnote that the clipped articulation of Tone 8 in PSNM may explain why no distinct softened tone developed from it. In Zhenghe, Zhenqian, and Jian'ou, Tone 8 must have lost its clipped, short articulation in order to have merged with Tone 4. This explains why it was possible for a distinct Tone 8+ to develop in these dialects.

[33] The presence or absence of a Tone 6/6+ distinction might therefore by a useful classificatory diagnostic. If so, Jian'ou and Shibei would be grouped closer to the softening dialects, and Zhenghe and Zhenqian would be placed in an outlying group.

We cannot precisely explain the development of every individual tone, but the overall pattern is quite clear. Presumably, the small number of exceptions are due to individual dialectal variation, or to other factors of which we do not have any knowledge yet.

7. The phonetic nature of "softened initials" in Proto-Northern Min

I have argued above that the only reasonable explanation for the consistent tonal pitch patterns found in the Northern Min dialects is that they were conditioned by a particular syllabic feature which corresponds to the "softened initials" of Norman's Proto-Min reconstruction. This feature simultaneously affected the development of initials (leading to the voiced initials of Shibei and the resonant initials of the softening dialects) and of tones (leading to the tone category correspondence patterns of Table 3). Norman felt that the correspondence patterns of initials and tones alone were sufficient grounds for establishing a distinct initial series in Proto-Min. The tone value data presented here clearly supports Norman's hypothesis, by demonstrating that a particular *phonetic* tonal feature can be correlated with the *phonological* structures involved.

Norman was uncertain about the phonetic nature of the distinct initial series he reconstructed. At first (Norman 1973:224-225), all that could be said was that these initials conditioned tone splits and in some dialects led to the development of sonorant initials. In other dialects, they simply merged with other obstruent initials. These observations would be consistent with a reconstruction of these distinct initials as voiced obstruents, but Norman had already reconstructed voiced obstruents corresponding to voiced initials in the traditional framework (as well as in other dialect groups such as Wu) to condition a different set of tone splits. For this reason, Norman's distinct series was noncommittally labeled "softened".

Norman later (1986a) found some evidence that these softened initials might in part be derived from prenasalized initials. A further clue to their phonetic nature surfaced with the discovery of corresponding voiced initials in the Shibei dialect.

With the tonal data presented here, we are now in a position to say more about the phonetic nature of the "softened initials", at least in the reconstruction of Proto-Northern Min. It is well known that tonal splits can be conditioned by the manner of articulation of initial consonants, or by the phonation type of the syllable, or by a combination of both. Furthermore, there are universal principles at work in this process, involving pitch changes determined by the physical characteristics of the human speech organs.

In two important papers published in the late 1970s, pitch differences associated with phonation types and manner of articulation of consonants were measured and

hypotheses were advanced to explain the resulting observations. Hombert (1978:80-81) reported that average fundamental frequencies of vowels following voiced and voiceless American English stops differ to a statistically significant degree up to 100 milliseconds after vowel onset. The difference is greatest at vowel onset, and diminishes thereafter. The effect is found at all places of articulation. Hombert summarizes the effect as "F_0 [fundamental frequency, or pitch] raising after voiceless consonants versus F_0 lowering after voiced consonants." Hombert also notes (1978:90) that there is evidence from several languages that breathy voiced consonants lower pitch even more than do plain voiced consonants. He points out that studies have shown that in Hindi "the onset frequency of a vowel after a breathy voiced consonant is markedly lower than that after any other consonant type." Hombert, Ohala and Ewan (1979) report the same conclusions regarding pitch effects of voiced and breathy consonants. In other words, these phoneticians found that voiced stops lower the pitch of following vowels, and that after breathy voiced stops the effect is more pronounced.

In both of these papers, the authors propose and evaluate several hypotheses to explain what appear to be universal correlations between pitch and consonant articulation. They come to no final conclusions about the physical mechanisms involved. Over twenty years later, the exact cause of these correlations is still unclear (John Ohala, personal communication), but the existence of the correlations is not in doubt.

Matisoff (1973) observes that, universally, there exists in languages a general two-way contrast of "laryngeal attitudes", bundles of related articulatory features of which pitch is a prominent element. He labels these two attitudes as "tense" and "lax". Thurgood (2002:18-19) lists three "register complexes", equivalent to Matisoff's "laryngeal attitudes", which are based on the work of a number of scholars (see Thurgood 2002 for references).[34] [35] These are:

[34] The word "register" as used by Thurgood refers to a laryngeal voice quality. It should not be confused with "register" as used elsewhere in this paper to refer to notional pitch in the terms "upper register" and "lower register". The polysemy of the word is unfortunately already established in the literature and cannot be avoided. ("Register" has other meanings in linguistics as well, for example in indicating degrees of formality of speech.)

[35] At the time of this writing, Thurgood 2002 has not yet appeared in print. Quotations are taken from a draft in Portable Document Format available on the Internet as of February, 2003 at http://www.csuchico.edu/~gt18/Papers/Vietnamese&tonogenesis.pdf.

	Tense Register	Unmarked	Breathy Register
original initials:	proto-voiceless		proto-voiced
voice quality:	tense (creaky)	modal (clear)	breathy
vowel quality:	lower (open); more fronted vowels; tendency to diphthongization; often shorter		higher (closed); more backed vowels; tendency to centralization; often longer
pitch distinctions:	higher pitch; associated with *-ʔ*		lower pitch; associated with *-h*
state of larynx:	larynx tense and/or raised (= reduced supraglottal cavity)		larynx lax and/or lowered (= increased supraglottal cavity)

Thurgood observes that the most frequent register contrast found in languages is a two-way contrast between the unmarked modal voice and one of the other registers. (In such cases the unmarked register is often misleadingly labeled "tense" or "lax" so as to contrast with the name of the marked register.)

Synchronically, features in the same register are often found to co-occur. Diachronically, the existence of one feature in a bundle may engender or be replaced by other features in the same bundle. Thus the presence of a final glottal stop in a syllable may engender a rising tone, while the presence of a final *-h* may engender a falling tone. (This is in fact a widely held hypothesis for the Old Chinese origin of the Middle Chinese *shang* 上 and *qu* 去 tones, respectively.) Transphonologization of this sort is common, which is to say that one pair of contrasting features (such as voicing) can be replaced by a phonemic distinction in another pair (such as phonation type or pitch). A tone split of this type, engendered by an initial voiceless/voiced contrast, and phonologized through subsequent loss of the voicing distinction, is widely presumed to underlie tonal developments in most modern Chinese dialects.

Thurgood believes that the usual mechanism by which voiced initial consonants engender phonemic low tones is through the intermediate stage of breathy voice quality. He says (2002:11): "[I]t is distinctive laryngeal gestures associated with the particular classes of consonants that is the crucial factor in pitch assignment …. For instance, voiced obstruent onsets may result in breathy voice, with the resultant lower pitch being a phonetic product of the laryngeal gesture that caused the breathiness produced."

The reason that voiced obstruents often lead to breathy voice quality, according to Thurgood, is that obstruents block the flow of air out of the supraglottal cavity. This makes it difficult to maintain the pressure difference necessary to force air through the

vocal cords and thus maintain voicing. One compensatory mechanism is to lower the larynx, increasing the size of the supraglottal cavity. Lowering of the larynx is a characteristic gesture of breathy-voiced consonants. It is thus easy for breathy voicing to develop and spread to the following vowel. This in turn will produce a noticeable decrease in pitch.[36] Another explanation that might be offered for the tendency for voiced initial consonants to be articulated with breathy phonation is that it improves perceptual distinctiveness. Because full voicing is difficult to maintain during the articulation of a stop, and therefore the distinction between voiced and voiceless unaspirated obstruents may be difficult to perceive in initial position, the superimposition of a second marked feature on the articulation of voiced obstruents may serve to keep them distinct and thus to preserve an important phonemic contrast. Breathy phonation is compatible with voicing and may be employed in this way.[37]

Given the pitch patterns outlined above for Northern Min softened tones, we can ask whether universal principles of articulatory phonetics point to any particular phonetic qualities of the syllables which Norman reconstructed with softened initials. In the softened tones of Northern Min, we find both lower pitch and, quite often, marked laryngeal features. (In the case of Shibei, this laryngeal feature is clearly described by Norman as "murmur", i.e. breathiness. In the case of the other dialects, the nature of the glottalic phonation is not clear from the descriptive literature.) These syllables belong to Matisoff's lax laryngeal attitude or Thurgood's breathy register. Based on the theoretical framework outlined above, the most likely scenario to account for this, and for the idiosyncratic initial development found in the softening dialects, is that these features derive from earlier voiced initials articulated with some degree of breathiness. We can therefore confidently reconstruct the Proto-Northern Min "softened" initials as voiced breathy obstruents.[38] It is worth repeating again here Norman's (2000:272) description of the voiced initials of Shibei: "In tones five, eight and nine, Shyrbei voiced initials have a murmured articulation and sound like the voiced stops of Wu. In tone six, however, no such murmur is evident to my ear; in this tone the initials in question are fully voiced like the stops of French or Russian". Our conclusion is that the PNM "softened" initials were likely quite similar to the voiced stops of modern Shibei. The lack of murmur in Shibei Tone 6 is peculiar, but as outlined in section 6, it correlates with the lack of a Tone 6/6+ tone split not only in Shibei but also in Chong'an, Xingtian [Chengcun], Wufu, Jianyang, and Jian'ou. This constitutes strong

[36] Thurgood's summary is based on experiments conducted by Westbury and others. See Thurgood for references.

[37] I am grateful to Richard Wright (personal communication) for offering this second explanation.

[38] What I refer to as "breathy" voiced consonants are sometimes called "murmured" or "aspirated" voiced consonants.

circumstantial evidence that breathiness was a key factor in the lowering of pitch. We can suppose that the glottalic phonation associated with softened tones in some of the dialects, although in many cases we are unsure of its phonetic nature, reflects breathy articulation in the proto-language.

One further point bears noting. The articulatory process outlined above by which voicing develops into breathiness is not set into motion by nasals or voiced fricatives, since it is easier to maintain airflow across the vocal cords, and thus to maintain voicing, during the articulation of these sounds. For this reason, in many languages the lower pitch associated with breathiness is not found in syllables with nasal and voiced fricative initials.[39] The fact that all of Norman's "softened" initials are obstruents is therefore fully consistent with the hypothesis that they were in fact voiced breathy consonants.

8. Conclusion

In this paper, a number of tonal phenomena associated with Northern Min dialects have been described in some detail. In addition to patterns of tonal correspondence which Norman has already noted, the pitch contours of eight Northern Min dialects have been analyzed. Synchronically and diachronically, the interrelationships of tone category correspondences and tone pitch contours present a complex pattern which can be fully accounted for by positing the existence of a special class of initials at the Proto-Northern Min level, corresponding to Norman's Proto-Min "softened initials". The existence of these initials not only explains the phonological developments in the tonal systems of the Northern Min dialects, it also explains the phonetic developments of those systems. It is unclear to me how any alternative hypothesis could simultaneously account for all these observed phenomena.

The comparative evidence leads to the reconstruction of a Proto-Northern Min ancestor with eight tones and a three-way manner contrast of obstruent initials: plain, aspirated, and voiced. The voiced series corresponds to Norman's Proto-Min softened initials and should be reconstructed with breathy phonation. Each of the Proto-Northern Min tones, with the exception of Tone 3, had a lower allotone co-occurring with these voiced initials.

This Proto-Northern Min system might have been derived from an earlier four-tone system with a three-way manner distinction, one more similar to the traditional

[39] This is most likely the reason that the Middle Chinese nasals sometimes pattern with voiceless rather than voiced initials in the tonal developments of many Chinese dialects, for example in the Mandarin split of the Middle Chinese *shang* tone.

framework of Middle Chinese. If this were the case, then it is most likely that the PNM voiced series which I have reconstructed here arose after the devoicing of the older voiced series. However, it should be emphasized that there is no evidence to be found in the Northern Min dialects themselves to corroborate such a hypothesis.

The reconstructed Proto-Northern Min initial and tone systems can be compared with Norman's Proto-Min systems as follows:

Norman Proto-Min		Handel Proto-Northern Min	
*p, *ph	(Tones A, B, C, D)	*p, *p^{h}	(Tones 1, 3, 5, 7)
*-p	(Tones A, B, C, D)	*b^{ɦ}	(Tones 1, 3, 5, 7)
*b, *bh	(Tones A, B, C, D)	*p, *p^{h}	(Tones 2, 4, 6, 8)
*-b	(Tones A, B, C, D)	*b^{ɦ}	(Tones 2, 4, 5, 8)

The following table provides some examples illustrating the development of the Proto-Northern Min initials and tones in two softening dialects (Xingtian [Chengcun], Jianyang), two non-softening dialects (Jian'ou and Zhenqian), and in Shibei. The initial and tone of these characters in the traditional framework and in Norman's Proto-Min are given for comparison. In Chengcun and Jianyang, the voiced PNM initials are reflected in distinct tones and "softened" initials. In Jian'ou and Zhenqian, there are distinct tones, but the initials have merged with their voiceless counterparts. In Shibei, the PNM voiced initials have remained voiced (but still condition tone splits). Note that Norman (2000:273) says that the voiced initials in Shibei Tone 9 are "pronounced with breathy voice".

Table 9: Examples of Proto-Northern Min development[40]

Word	Ancient	PM	PNM	**CC**	**JY**	JO	ZQ	***SB***
雞 'chicken'	**k-** 平	***k A**	***k- 1**	kai^{1}	kai^{1}	kai^{1}	kai^{1}	kai^{1}
開 'open'	**k^{h}-** 平	***kh A**	***k^{h}- 1**	khye^{1}	khue^{1}	khuɛ^{1}	khye^{1}	khye^{1}
膏 'lard'	**k-** 平	***-k A**	***g^{ɦ}- 1**	au^{5}	au^{9}	kau^{3}	ko^{5}	gɔ^{9}
筒 'tube'	**d-** 平	***d A**	***t- 2**	toŋ^{2}	toŋ^{2}	toŋ^{5}	toŋ^{2}	toŋ^{2}
糖 'sugar'	**d-** 平	***dh A**	***t^{h}- 2**	haŋ^{2}	hoŋ^{2}	thoŋ^{5}	thauŋ^{2}	thɔŋ^{2}
銅 'copper'	**d-** 平	***-d A**	***d^{ɦ}- 2**	loŋ^{5}	loŋ^{9}	toŋ^{3}	toŋ^{9}	doŋ^{9}

The evidence presented in this study, and the conclusions drawn from it, are summarized below.

[40] The Shibei form for 'lard' is found in Norman 2000. The other five Shibei forms are from Norman (personal communication).

• It is possible to reconstruct the values of the tone system of Proto-Softened Northern Min with some confidence, and for all of Proto-Northern Min with only slightly less confidence. The reconstructed system has eight tones.

• The dialectal patterns of tone split and merger point to the existence of a PNM syllabic feature, found in syllables of each tone, which conditioned further tone splits (and subsequent mergers). This feature can be further correlated with the existence of special initial reflexes in the "softening dialects". The feature was reconstructed as the softened initial series by Norman.

• In all cases, tonal reflexes associated with these softened initials are *lower* in pitch value than the tones in corresponding syllables with other initials.[41] This fact supports the hypothesis that a common syllabic feature was responsible for the tone splits by means of the depression of tone values. Such a depression is frequently found in tone languages under the influence of voiced or breathy initials.

• Based on the evidence, the special series of Proto-Northern Min initials could be reconstructed as voiced obstruents. A more likely possibility, however, is that they should actually be reconstructed as a syllabic phonation type such as breathiness or murmur (in conjunction with initial voicing), which simultaneously affected both tonal and initial development. This would explain the glottalic phonation (murmur in Shibei) associated with many of the "softened" tones and, as shown in the previous section, this reconstruction is the most consistent with what is currently known about interactions between consonant type and pitch.

• My proposed reconstruction of Norman's "softened" initials as breathy at the PNM stage is not necessarily incompatible with Norman's (1986a) suggestion that they derive from prenasalized consonants. Norman's suggestion is based on external comparison, and if his conclusions are correct they would likely apply to a stage of the language no later than, but possibly earlier than, Proto-Min. My conclusions are based on internal comparison, and apply to the PNM stage, which is later than Proto-Min. The two hypotheses are compatible if one supposes that prenasalized consonants could develop into breathy consonants.[42]

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[41] A single exception has been noted in Jianyang Tone 5. See Table 7.

[42] The most likely scenario for such a development is *mp, *mb > *b > *b$^{\text{fi}}$. The first change, of prenasalized initials to voiced initials, would have occurred after an earlier devoicing *b > *p, *p$^{\text{h}}$. (This is under the assumption that Min inherited an earlier series of plain voiced initials, corresponding to the *quanzhuo* initials of the traditional framework or the voiced series commonly reconstructed for Old Chinese.) The second change, of voiced obstruents to voiced breathy obstruents, would have occurred as a result of articulatory mechanisms described in section 7.

• At the Proto-Northern Min level, there is no evidence for the existence of voiced initials corresponding to the *quanzhuo* initials of the traditional medieval framework; neither is there any direct evidence for reconstructing four rather than eight tones at this level. The reconstruction of a voiced breathy initial at the PNM level corresponding to Norman's "softened initials" both explains tonal developments and provides for a balanced initial system with a three-way manner distinction. Whether such an eight-tone system is also appropriate for Proto-Min as a whole is a separate question, but it should be noted that Norman himself is now revising his reconstruction along these lines.[43]

At this point it is appropriate to address the issue of alternative explanations which scholars in the field have offered to account for the initial and tone correspondence patterns which have been the subject of this paper, especially the notion that they can be accounted for in terms of layers resulting from dialect mixture. It is certainly true that the Min dialects contain multiple layers, even if we restrict our attention to colloquial strata. It is not my intention to argue otherwise. The argument I am making here is that the phenomena found in the Northern Min dialects cannot be accounted for by dialect mixture after the time of Proto-Northern Min unity. I have clearly demonstrated that, while among the Northern Min dialects there is no isomorphy in terms of tone categories or initial consonant phonemes, they show patterns of correspondence that are compatible with regularly conditioned development from a common ancestor. This means that any apparent similarities found between a neighboring dialect group (such as Wu) and any one of the Northern Min dialects cannot explain all of the Northern Min correspondences in a satisfactory way. "Softened initials" must have been present in the ancestor of the Northern Min dialects.

That being said, it is perfectly reasonable to raise the logical next question, namely: How can we explain the presence of these unusual initials in Proto-Northern Min? There are a number of possible hypotheses that are worth exploring. One is that Proto-Northern Min is itself the product of dialect mixture. Another is that the softened initials resulted from some sort of morphological process productive in Proto-Northern Min. A third is that they originate in a non-Chinese substratum. Finally, it is possible

[43] Norman (personal communication) has recently significantly revised his views on Proto-Min tones and initials. He now reconstructs eight tones for Proto-Min rather than four, and three series of initials rather than six. Voiced initials are reconstructed where formerly "softened" initials were reconstructed; these correspond to the voiced initials of Shibei dialect (see Norman 2000). The voiced initials of the older reconstruction system are replaced by voiceless initials in lower-register (even-numbered) proto-tones. These changes bring Norman's Proto-Min reconstruction into closer alignment with the Proto-Northern Min reconstruction proposed here.

that they were inherited directly from an earlier stage of Chinese.[44] These hypotheses are all worth pursuing, but they are beyond the scope of this study, since they all involve linguistic developments that must have predated the split of Proto-Northern Min. It is important that we first clarify the history of the Min dialects and the nature of their common ancestor, as I have attempted to do here. After that task has been accomplished, our attention can be redirected to the problem of reconciling the features of the proto-language with the history of Chinese as a whole.

I hypothesized at the beginning of this paper that the four dialects Chong'an, Xingtian [Chengcun], Jianyang, and Wufu, which I labeled softening dialects, constitute a genetic subgroup within Northern Min. The comparison made in this study suggests that this hypothesis is valid. I also grouped Zhenghe and Zhenqian together, supposing they form a part of a Northeastern Northern Min group. The relation of Shibei and Jian'ou to these two groups remains unclear. Jian'ou, although it lacks softened initial reflexes, shares with the softening dialects the interesting lack of a Tone 6/6+ split, and may therefore be closer to those dialects than to the Northeastern Northern Min dialects. More comparative work, involving analysis of Pucheng and Songxi (which are also spoken in the northeastern part of the Northern Min dialect area) will be needed to progress on the subgrouping problem.

The hypotheses advanced in this study should be tested against additional data. Many varieties of Northern Min, especially those spoken outside of the larger towns, remain to be adequately described. Moreover, phonation types associated with tones have not been rigorously described even for those dialects which have been well studied. As this paper demonstrates, precise knowledge of such phonetic features may be crucial to the work of historical reconstruction. Further description and analysis of the linguistic features of all dialects and sub-dialects of Northern Min is vital to improving our understanding of the history of Min in particular and of Chinese in general.

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[44] It is not surprising that the initial systems of Northern Min dialects are incompatible with the initial system of the traditional framework, since it has long been recognized that the Min dialects cannot have descended from Middle Chinese. But scholars have also argued that incompatibility with the three-way manner distinction of obstruent initials reconstructed for Old Chinese poses problems for the "softened initial" hypothesis. It must be remembered, however, that there is no direct evidence for a three-way manner distinction in Old Chinese. Three distinct manner types are the minimum required to account for Middle Chinese, but the linguistic evidence used to reconstruct Old Chinese does not militate against a larger number. Indeed, much recent scholarship on Old Chinese has suggested that it possessed a rich inventory of consonant clusters and morphological prefixes. Clusters of this type might easily give rise to the development of additional manners of articulation.

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從調值再論閩北方言“第三套”聲母的擬測

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本篇論文從歷史演變的角度探討閩北方言的特別聲母、聲調系統之來源。文中指出，與羅杰瑞所擬測的原始閩語“第三套”聲母伴隨的閩北方言的調值均是較低的。這個現象不可能是周圍方言所引起的，並且也不可能是閩北方言裡層次的表現。本文的分析不但能證明羅氏的擬測是可靠的，而且能進一步確定在原始閩北時期“第三套”塞音和塞擦音該是送氣的濁聲母。

關鍵詞：聲調分化，音高類型，原始閩北語，原始閩語，軟化聲母