

Mandarin Loanwords in Yanbian Korean II: Tones*

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The paper documents and then discusses the motivation for the loanword adaptation of the four Mandarin tones and their 16 disyllabic combinations with respect to the Yanbian High-Low (penultimate) vs. Low-High (final) pitch-accent distinction. It is concluded that the trans-syllabic F0 contour in the Mandarin loanword source plays a crucial role.

Keywords: F0 coarticulation, loanwords, tonal adaptation, phonetic approximation

1. Introduction

Like most other East Asian languages, Korean has borrowed words extensively from Chinese. Most of the learned vocabulary is Sino based. Sino-Korean (SK) morphemes comprise a substantial proportion of the everyday vocabulary. For example, among the most frequent 10,000 words the ratio of native and SK lexical items is roughly the same while for the most frequent 59,000 the proportion of SK lexical items increases to c. 70% (N Cho 2003). Most of the SK morphemes were borrowed during the Tang dynasty of Middle Chinese (Kōno 1968, Ito 2007). Middle Korean (MK) had a contrast between high (H), low (L), and rising (R) pitches which reflected the four Middle Chinese (MC) tonal categories as follows: MC level > MK L, MC rising and departing > MK H or R, and MC entering > MK H (Kōno 1968, Ito 2007, 2008b).

In this study we examine the ways in which the four tones of Modern Mandarin (Ma) and their 16 disyllabic combinations are adapted with respect to the binary HL (penultimate) vs. LH (final) pitch pattern in the Yanbian (YB) dialect of Korean. YB is spoken in the Yanbian Autonomous Prefecture of China.

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See Ito (2008a, 2008b) and cited references for earlier studies of YB accent as well as Ramsey (1978) for the closely related Hamkyeng dialect. This paper complements our earlier investigation of the adaptation of the Ma binary plain vs. aspirated contrast with respect to the Korean ternary lax-tense-aspirated opposition in Ito and Kenstowicz (2009). Our corpus consists of c. 250 recent loans (see appendix) reflecting the lexical fields of modern material and cultural life. The data were elicited, verified, and recorded by our principal consultant (a bilingual YB-Ma speaker in her thirties).

We begin by reviewing the phonological contrasts in the Ma and YB tonal systems. We then briefly review the findings from earlier studies of accentual and tonal adaptations for the better studied Kyungsang Korean dialects and survey the theoretically possible scenarios that might be expected to obtain for the Ma > YB case. The next section presents a summary of the actual correspondences in our corpus followed by our interpretation of their basis. The paper concludes with a brief mention of the implications of our findings.

2. Mandarin and Yanbian Tones

Ma has a four-way tonal contrast in full (stressed) syllables, represented by the well-known suite of words in (1). In disyllabic compounds all combinations are possible except for 3+3, which is altered to 2+3 by tone sandhi.

(1) Mandarin Tones

Tone 1	high	[55]	H	mā	‘mother’
Tone 2	rising	[35]	LH	má	‘hemp’
Tone 3	concave	[21(4)]	L(H)	mǎ	‘horse’
Tone 4	falling	[51]	HL	mà	‘scold’

The tones show considerable adjustments in their F0 realizations as a result of articulation with the tones of both the preceding and following syllables (Xu 1997). We return to this point in section 5.2.

YB has many of the properties of a classic pitch-accent system. Every word has a single, obligatory pitch peak; stems contrast in the location of the peak. For the vast majority of the vocabulary the peak falls unpredictably either on the final or the penultimate syllable. The former are transcribed here as L.H and the latter as H.L. A smaller number of trisyllables have an initial peak (H.L.L). There is also a small class of “unaccented” stems that have a final H that shows up on the inflectional suffix and in bare forms on the final syllable of the stem. See Ito (2008a, 2008b) for more details. A few examples appear in (2).

(2) Yanbian Accent System (the parentheses indicate the accent of the following suffix; -i/-ka is the nominative suffix)

o	Antepenultimate	Penultimate	Final	Unaccented
1			H.(L) mál ‘speech’ má.l-í	L.(H) mál ‘horse’ mà.l-í
2		H.L.(L) kú.lǎm ‘cloud’ kú.lǎ.m-í	L.H.(L) kì.lǎm ‘oil’ kì.lǎ.m-í	L.L.(H) kì.túŋ ‘pillar’ kì.tùŋ-í
3	H.L.L.(L) í.jà.kì ‘talk’ í.jà.kì-kà	L.H.L.(L) ò.só.lì ‘badger’ ò.só.lì-kà	L.L.H.(L) òl.c ^h èŋ.í ‘tadpole’ òl.c ^h èŋ.í-kà	L.L.L.(H) jè.tǎ.lǎm ‘pimple’ jè.tǎ.lǎ.m-í
4		L.L.H.L.(L) tù.lù.má.kì ‘overcoat’ tù.lù.má.kì-kà	L.L.L.H.(L) tù.tǎ.lè.kí ‘nettle rash’ tù.tǎ.lè.kí-kà	

3. Precedents

While the loanword adaptation of phonological segments (phonemes) and prosodic structures has been studied in considerable detail for a variety of languages (including Korean) in the generative literature, our knowledge of tonal and accentual adaptation is much more underdetermined and presents some puzzling inconsistencies. The location of the main stress in loans from English and French is quite regularly reflected with a high tone on the corresponding syllable in various African tonal languages such as Yoruba and numerous Bantu languages (Kenstowicz 2006). On the other hand, the pitch accent systems of Japanese and Kyungsang Korean largely fail to directly reflect the stress of the source word on the corresponding syllable. Since every word must be assigned an accentual specification, accent is assigned by default (McCawley 1968 and many later studies for Japanese, Kenstowicz & H Sohn 2001 and earlier cited references for Kyungsang).¹ Interestingly, the same thing seems to be true for Japanese loans into Kyungsang (and YB) Korean (Ito in progress). While this might indicate that most loans are transmitted through an orthographic medium where the accent is typically not marked, it is unclear why the same is not true for the African situation. One possibility is that the African loans are transmitted by bilinguals who actively control both languages and where the borrowing language lacks a well-established written form. Another

¹ Kubozono (2008) finds that the statistical proportion of unaccented vs. accented lexical items in Japanese differs between the native (unaccented > accented) and western loanword vocabulary (accented > unaccented) and attributes the predominance of the accented category in loans to a reflection of the pitch fall that normally accompanies the main stressed syllable of the source word in English and other western languages.

possibility is more structural in nature. In the African tonal languages the high vs. low tonal opposition is a contrast over individual syllables while in a pitch accent system such as Japanese or Korean the high tone is a property of the word as a whole and identifies the lexical item as a member of a phonological word class: accented vs. unaccented, penultimate vs. final, etc.

As far as loans from Modern Mandarin are concerned, Hsieh and Kenstowicz (2008) show that the Ma F0 contours are disregarded in loans into Lhasa Tibetan (LT), a language which contrasts high (H) vs. low (L) pitch on the initial syllable. Rather, they find that tone is assigned as a function of the laryngeal character of the onset consonant, a form of synchronic tonogenesis. For the majority of its vocabulary, YB is the mirror image of LT: The pitch pattern for the entire word is predictable from the tonal specification of its final syllable: L*.L.H vs. L*.H.L. There is thus precedent for the Ma F0 contours to be ignored and assignment to the YB L.H vs. H.L categories to be determined on some default basis. For the YB lexicon the majority of native words take the L.H pattern while earlier Sino-Korean stems fall predominantly into the penultimate H.L category (Ito 2008b). Depending on which property is salient in the speaker's consciousness, we might expect adaptation to one or the other class as a general rule or on a word-by-word basis. It thus comes as something of a surprise that the modern Ma loans are adapted into YB based on the tonal category of the Ma source word. This is our first and major result. Given this finding we can then ask whether the tonal adaptation is based on the phonological categories of the Ma word or whether the adaptation process also pays attention to their phonetic realization. And if the latter is relevant, then what aspects of the F0 contour are taken into account? For disyllabic noun stems (the majority of our corpus and the majority of nominal words in the modern lexicon where compounding is the chief means of creating new words), the Ma matrix of $4 \times 4 - 1$ presents 15 possible F0 contours while YB has just H.L and L.H. There will thus be a considerable reduction in the tonal combinatorics as lexical items pass from Ma to YB. Is the choice between YB H.L and L.H based on the tones of the first or the last syllable of the Ma source or both? Which Ma tones fall together and which remain distinct? These are the questions that are posed and answered in the next section.

4. Results

As mentioned earlier, our corpus consists of c. 250 modern Ma loans. The majority are multi-syllabic (particularly disyllabic) compounds. Monosyllables typically combine with the dummy verb *hata* 'do, be'. The adaptation as YB H.L or L.H is determined by the tonal combination in the Ma source word found in the last two syllables. The correspondences are tabulated in (3) below.

- (3) Ma > YB Tonal Adaptations. The figures indicate the number of correspondences for each type. Ma tone [3+3] is realized as [2+3] by sandhi. Tone 0 indicates a toneless syllable.²

Penult/Final	Tone 1	Tone 2	Tone 3	Tone 4	Tone 0
Tone 1	L.H (11) H.L (4)	H.L (12)	H.L (12)	L.H (18) H.L (1)	H.L (1) L.L (1)
Tone 2	L.H (6)	H.L (5) L.L (1)	H.L (15) L.H (5)	L.H (18) H.L (2)	H.L (2)
Tone 3	L.H (10)	L.H (4) L.L (2)		L.H (17)	[L.H (1)] ³
Tone 4	L.H (21) H.L (3)	H.L (6) L.H (1)	H.L (19) L.L (1)	L.H (27)	H.L (12)

We see that for the majority of Ma tonal combinations the YB adaptations are quite systematic. Some examples of the correspondences appear in (4) below. See the appendix for a larger sample.

- (4) Examples of Ma > YB Loans Illustrating Various Tonal Combinations

Ma		YB	YB accent	Gloss
jia ¹ banr ¹	加班儿	cja.pal	L.H	overtime work
feng ¹ tian ²	丰田	fəŋ.t ^h en	H.L	TOYOTA
ji ¹ chang ³	机场	ci.c ^h aŋ	H.L	airport
bing ¹ gunr ⁴	冰棍儿	p*iŋ.kol	L.H	popsicle
mei ² chu ¹ xi ⁰	没出息	me-i.c ^h u.si.ha.da ⁴	L.H.L.L.L ⁵	be not promising
bai ² ganr ¹	白干儿	p*ɛ.kal	L.H	spirits; liquor
cun ² zhe ²	存折	c ^h un.cə	H.L	bankbook
pi ² jiu ³	啤酒	p ^h i.cju	H.L	beer
guo ² mao ⁴	国贸	kwə.mo	L.H	International trade building
man ² tou ⁰	馒头	man.t ^h u	H.L	Chinese-style steamed bread
er ³ ji ¹	耳机	əl.ci	L.H	earphone
lao ³ tour ²	老头儿	no.t ^h ol	L.H	old male person

² When Ma tone 3 is followed a toneless syllable, a H appears on the toneless syllable by a well known sandhi rule.

³ The example of [3+0] was not found in our major consultant. L.H is based on the data taken from other consultants.

⁴ ‘.’ as in ‘me-i.c^hu.si.ha.da’ joins the two parts of a falling sonority diphthong, a novel structure imported from Ma since native Korean lacks such diphthongs.

⁵ Tonal adaptation is only applied to the loanword part (me-i.c^hu.si, c^hi.ma) while the dummy verb *hata* ‘do, be’ or the suffix *-lla* is not counted as part of the disyllabic window. Thus we can say that this word adapted the Ma tone with penultimate accent, not with pre-antepenultimate accent.

qi ³ ma ³	起码	c ^h i.mal.lə	H.L.L	at least
duan ³ ku ⁴	短裤	twan.ku	L.H	short pants
ling ³ zi ⁰	领子	liŋ.ci	L.H	collar
da ⁴ yi ¹	大衣	t [*] a.i	L.H	overcoat
bing ⁴ du ²	病毒	p [*] iŋ.tu	H.L	virus
di ⁴ nuan ³	地暖	t [*] i.nwan	H.L	floor heating
dian ⁴ shi ⁴	电视	t [*] ɛn.s [*] i	L.H	television
ci ⁴ :j ⁰	刺激	c ^h i.ci.ha.da	H.L.L.L	stimulate

The regular tonal correspondences are tabulated in (5).

- (5) Ma Tones of Penultimate and Final Syllables and Their YB H.L, L.H Correspondences.

Penult/Final	Tone 1	Tone 2	Tone 3	Tone 4	Tone 0
Tone 1	L.H	H.L	H.L	L.H	H.L
Tone 2	L.H	H.L	H.L	L.H	H.L
Tone 3	L.H	L.H		L.H	L.H
Tone 4	L.H	H.L	H.L	L.H	H.L

We see that contrary to the situation with Mandarin loans into Lhasa Tibetan, where the Ma tones play no role, in YB the choice between the H.L vs. L.H accent classes is predictable on the basis of the tones that occupy the final two syllables of the Ma source word. The fact that in trisyllabic and longer words the Ma tones lying outside the right-edge two-syllable window are ignored (e.g., *xin⁴yong⁴ka³* ‘credit card’ > *s^{*}in.juŋ.k^ha* L.H.L) indicates that the adaptation involves a genuine correspondence of Ma and YB linguistic categories rather than a simple transposition of the Ma F0 contours onto YB syllables in a type of code-switching.⁶

5. Analysis and Interpretation

We now turn to the analysis of the tonal correspondences seen in (5). We first offer an OT interpretation of the adaptations in which faithfulness to the first mora of the final syllable plays a crucial role. We then consider the phonetic motivation standing behind this faithfulness.

⁶ In fact, our YB consultants can pronounce the Ma loans with YB segmental adaptations but Ma tones in a type of code-switching. Interestingly, the opposite combination is completely impossible.

5.1. Phonological Adaptation

Our OT analysis takes as input Ma tones represented with the system proposed by Yip (2002) in which tones 1, 2, 3, and 4 are specified as H, LH, L, and HL, respectively. The 15 possible Ma combinations for disyllables must be compressed to the YB H.L and L.H pitch accents since on the receiving end of the transmission YB deploys just a single [\pm high pitch] distinction. The Obligatory Contour Principle (Leben 1973) blocks L.L and H.H outputs with identical tones and a ban on contour tones (*Complex) penalizes completely faithful transmission of Ma tones 2 and 4. The OCP and *Complex thus restrict the YB output candidates to H.L and L.H. But given that every Ma syllable has a H or a L component, each of the Ma syllables in the 4x4–1 tonal matrix has a possible YB counterpart. What principle determines the outcome of the competition for a spot in the YB loan? Table (6) below shows the actual input-output mappings for all combinations. It suggests that the Ma final syllable determines the adaptation patterns.

(6) Ma > YB Adaptations: H, LH, L, HL Representations (Yip 2002)

Penult/Final	Tone 1 = H	Tone 2 = LH	Tone 3 = L	Tone 4 = HL	Tone 0
Tone 1 = H	L.H	H.L	H.L	L.H	H.L
Tone 2 = LH	L.H	H.L	H.L	L.H	H.L
Tone 3 = L	L.H	L.H	/	L.H	L.H
Tone 4 = HL	L.H	H.L		L.H	H.L

In the column headed by Ma tones 1 and 3, the final syllable H and L tones, respectively, are always faithfully transmitted to YB. And when the final syllable Ma tone is complex (tone 2 or 4) then it is the tone occupying the initial mora that largely survives. The [3+2] combination is the only exception. In left-dominant tone sandhi systems like Shanghai the initial syllable is commonly regarded as stressed (Duanmu 1995), while in right-dominant Taiwanese the final syllable is prominent. The status of Mandarin with regard to this prominence correlation is murky (see Zhang 2007 for recent discussion) and so it is unclear if the special status of the final syllable in the loan transmissions receives independent prosodic motivation or must simply be stipulated.⁷ For concreteness, we will assume that the final syllable is prosodically prominent in comparison to the penult and that the first mora in a syllable is prominent compared to the second.

The tableau below in (7) illustrates how faithfulness to the first mora of the

⁷ The fact that the first tone in the 3+3 > 2+3 sandhi rule changes could be seen as independent support for the prominence of the second syllable.

final syllable sorts among the various candidates in the loanword grammar. The [ɿ] denotes the presumed prominence of the final syllable's initial mora. Ma tones [1+1] (= H.H) translate to YB L.H; Ma [1+2] (= H.LH) translate to YB H.L; Ma [4+4] (= HL.HL) translate to YB L.H; and finally Ma [4+2] (= HL.LH) translate to YB H.L. In the case of a complex Ma tone LH or HL, we mark a single violation for Max-Tone depending on which tone is left out.

(7) Ma [1+1], [1+2], [4+4], [4+2] > YB L.H, H.L, L.H, H.L

[1+1] = /H.H/	OCP	Max-Tone/[ɿ]	Max-Tone
H.H	*!		
H.L		*!	*
⇒ L.H			*
L.L	*!	*	**
[1+2] = /H.LH/			
H.H	*!	*	*
⇒ H.L			*
L.H		*!	**
L.L	*!		**
[4+4] = /HL.HL/			
H.H	*!		**
H.L		*!	**
⇒ L.H			**
L.L	*!	*	**
[4+2] = /HL.LH/			
H.H	*!	*	**
⇒ H.L			**
L.H		*!	**
L.L	*!		**

The one case in which the prominent mora's tone in the Ma source word is not passed on to YB is the [3+2] combination, as shown in the tableau below. The current analysis predicts YB H.L while the actual output is L.H.

(8) Ma [3+2] > YB H.L

[3+2] = /L.LH/	OCP	Max-Tone/[ɿ]	Max-Tone
H.H	*!	*	**
⇒ H.L			**
L.H		*!	*
L.L	*!		*

We can block this outcome by invoking a constraint banning the insertion of H: Dep-H. Since Ma tones 1, 2, and 4 have a H component, the effect of this constraint is limited to tone 3; and since Ma compounds with second-syllable tone 3 are adapted with L in the majority of cases anyway, the effect of Dep-H will only be evident in the [3+2] case. A modicum of independent motivation for this constraint comes from the observation of de Lacy (2002) that cross-linguistically the prominent (stressed) syllable and H tone have an affinity for one another. Given that the final syllable is assumed to be the prominent one in our analysis, a restriction against inserting a H on the nonprominent syllable makes sense. The tableau in (9) shows the effect of Dep-H, which must be ranked above Max-Tone/[\acute{u}].

(9) Ma [3+2] > YB L.H

[3+2] = /L.LH/	OCP	Dep-H	Max-Tone/[\acute{u}]	Max-Tone
H.H	*!	*	*	**
H.L		*!		**
<i>L.H</i>			*	*
L.L	*!			*
[2+3] = /LH.L/				
H.H	*!	*	*	**
<i>H.L</i>				*
L.H		*!	*	**
L.L	*!			*

5.2. Phonetic Motivation

The phonological analysis proposed in 5.1 depends crucially on the special status of the initial mora of the second syllable in the disyllabic compound. What is so special about this position? A hint is suggested in the analysis of the Ma > YB tonal transmissions in Chi (2008), who notices that the majority of the adaptation patterns can be predicted on the basis of the tonal relation between the final mora of the penultimate syllable and the first mora of the final syllable in the Ma source word. If the former is lower than the latter then a L.H adaptation will be chosen while if it is higher then a H.L pattern tends to be selected instead. Chi (2008) adopts the traditional Chao numeric representation for the Ma tones, indicated in the table below. As she herself notes, her rule fails to account for several cases (shaded).

(10) Disyllabic Ma Tonal Matrix (Chao Notation)

Penult/Final	Tone 1	Tone 2	Tone 3	Tone 4
Tone 1	55-55	55-35	55-214	55-51
Tone 2	35-55	35-35	35-214	35-51
Tone 3	21-55	21-35		21-51
Tone 4	51-55	51-35	51-214	51-51

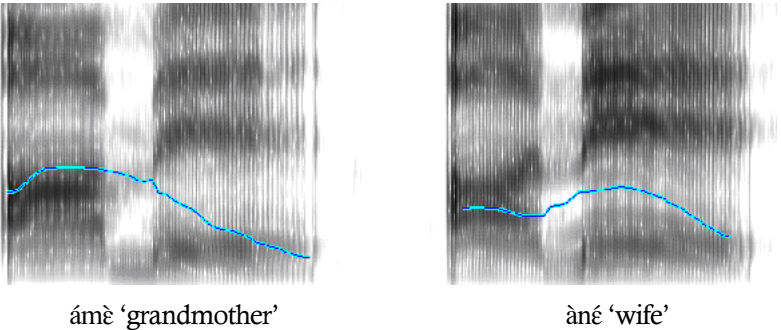
Either the transition is level (X5-5X) or goes in the wrong direction, as in [4+2] (51-35) and [4+3] (51-214) where L.H is predicted but the actual adaptation is H.L. Substituting the more abstract H, LH, L, HL representations from Yip (2002) misses more cases (shaded) since this system collapses together some distinctions that the Chao numeric scale preserves. This is shown in (11) below.

(11) Disyllabic Ma Tonal Matrix (Yip Notation)

Penult/Final	Tone 1	Tone 2	Tone 3	Tone 4
Tone 1	H-H	H-LH	H-L	H-HL
Tone 2	LH-HH	LH-LH	LH-L	LH-HL
Tone 3	L-HH	L-LH		L-HL
Tone 4	HL-HH	HL-LH	HL-L	HL-HL

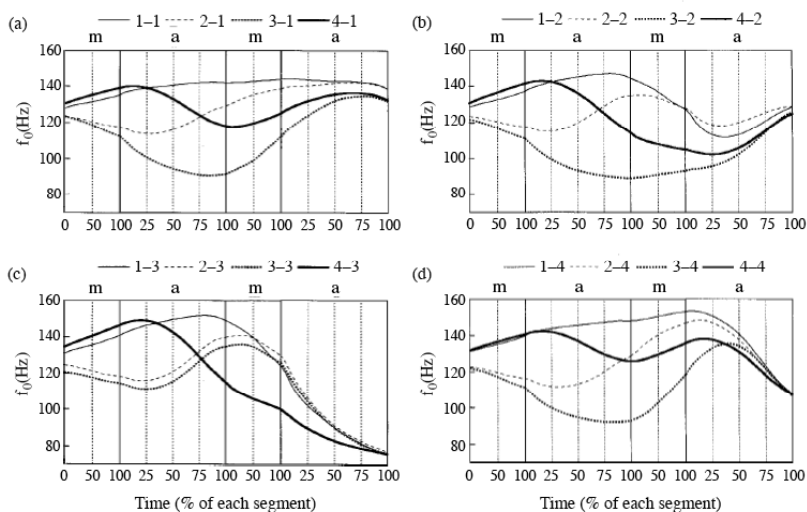
Nevertheless, Chi’s (2008) idea that the adaptation depends on the tonal transition between the syllables has considerable merit. Since YB has just two options (H.L and L.H) for the isolation form, the F0 contour across the disyllabic window is either basically falling or rising. This is evident in the pitch tracks of two sample words taken from our principal consultant shown in (12) below. As we will see, matching one of these two gross pitch shapes with the F0 contour occurring in the transition from one syllable to the next in the Ma source word provides a sensible basis for deciding the adaptation. It just needs to take into account the actual phonetic realization of the F0 contour.

(12) Pitch Tracks of YB *ámè* ‘grandmother’ and *àné* ‘wife’



Earlier we indicated that in their actual phonetic implementations, the Ma tones are subject to considerable coarticulatory “smoothing”. If this factor is taken into account then can we maintain that it is the F0 transition between the two syllables that the YB adapter is attempting to match to the native H.L and L.H contours? The figure in (13) below taken from Xu’s (1997) investigation of Ma tonal coarticulation shows the normalized contours for all 16 tonal combinations over a dummy disyllabic [mama] string based on an averaging over 48 utterances (eight subjects and six repetitions) per combination.

(13) Normalized Mandarin Carry-over Tonal Coarticulation (Xu 1997)⁸



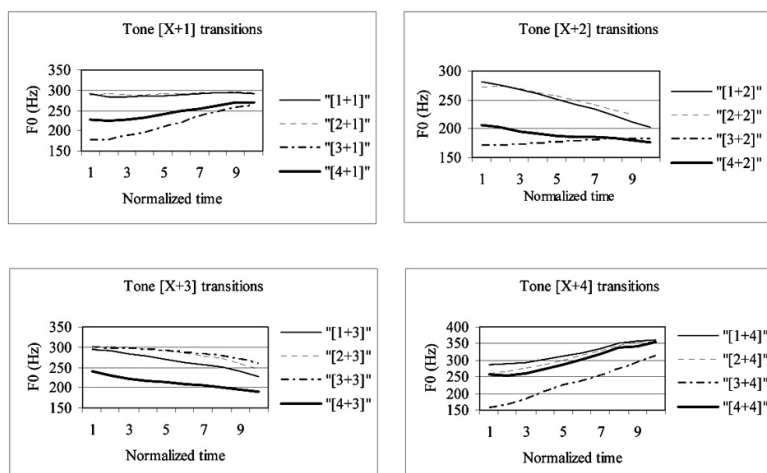
Xu (1997) finds that the tonal targets for the second syllable—high vs. low in panels (a) vs. (c) and rise vs. fall for panels (b) vs. (d)—are only reached in the second mora. The first mora including the onset is a zone of carryover articulation from the target of the preceding syllable. Focusing on this transition zone, we see that in the first panel (a) where the second syllable is Ma tone 1, all of the transitions have a rising configuration that corresponds to the YB L.H adaptation. For the [1+1] case the rise is admittedly minimal; but it becomes somewhat more evident if the window is expanded a few milliseconds backwards into the preceding syllable. In any case, it is not falling and so YB L.H remains the better option. Moreover, we recall from (3) that the Ma [1+1] > YB L.H adaptation rate was lower than some of the other ones. This may reflect the more ambiguous status of the relatively flat F0 transition with respect to the YB L.H vs. H.L contrast.

⁸ The figures appear with the permission of the publisher.

Let us survey the other tonal combinations with respect to the Ma > YB loanword adaptations. In the (d) panel [X+4], all the transitions are rising and hence are best matched by YB L.H. In panel (b) [X+2] all the contours are falling except for [3+2], which is rising. This was the case that required special treatment in (9) above. We now see the motivation for this exception. All [X+2] combinations are adapted as YB H.L except for [3+2] which is L.H (or its morphophonemic variant, the “unaccented” L.L). Finally, panel (c) [X+3] shows a falling contour for the [1+3] and [4+3] combinations that matches the YB H.L adaptation. The Ma [2+3] (and [3+3]) case is more ambiguous in that the onset zone shows a slightly rising contour followed by a sharp fall. But we recall from (3) that the Ma [2+3] > YB H.L had one of the lower rates of adaptation: H.L (15) vs. L.H (5). This may also reflect the more ambiguous character of the F0 transition with respect to the YB H.L and L.H pitch curves, which itself may derive from varying amounts of peak delay in the Ma source words.

Thus, the coarticulatory configurations documented by Xu (1997) for his Beijing Mandarin subjects offer striking support for the hypothesis that the Ma > YB tonal adaptations are based on the trans-syllabic F0 contour. We were curious to see to what extent the F0 contours found in Xu’s (1997) subjects would be reproduced in the speech of our bilingual consultants which can be plausibly taken as representative of the original Ma > YB loanword adapters. Accordingly, we constructed a set of disyllabic nonsense syllables varying the initial consonant in a [CaCa] template. They were placed in a sentential frame and recorded by our principal YB consultant to give a corpus of 5 samples /m, n, b, d, g/ per tonal combination. We employed the Praat script devised by Xu (2007) to plot the F0 pitch tracks over normalized time periods. We divided the [CaCa] structure into three zones: (A) from start of the first vowel up until two pitch points (c. 20 ms) prior to the onset of the second syllable; (B) from the end of zone (A) until one or two pitch points into the second vowel (c. 10-20 ms); (C) from the end of zone (B) until the end of the second vowel. The charts in (14) show the F0 transitions across the zone (B) medial nasal onsets in [mama] and [nana] syllabic frames.

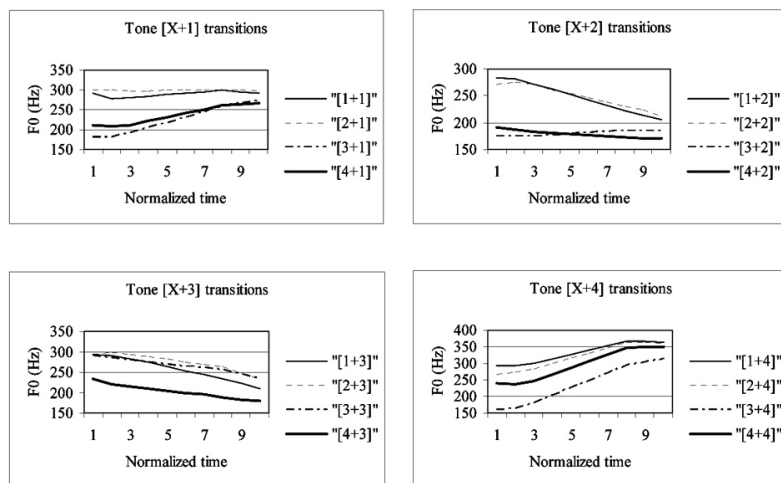
(14) Normalized F0 Contours for Mandarin Tonal Transitions (Nasal Onsets)



Essentially the same contours as those reported by Xu (1997) for his Beijing subjects are found. [X+1] structures all have a rising contour that is consistent with the YB L.H adaptation. For [1+1] the curve bends the least and so is a plausible source for the lower level of certainty in this adaptation compared to the others. The [X+2] structures are all falling except for the [3+2] case. This is the same asymmetry that Xu (1997) found for his subjects and helps to explain the YB L.H adaptation. Finally, the [X+3] and [X+4] structures are uniformly falling and rising, respectively, and thus provide a plausible basis for the H.L. vs. L.H adaptations.

One might wonder what the transitions would look like when the onset contains a stop consonant (voiceless in Mandarin) that lacks any F0 traces during the closure. To measure these cases we increased the medial (B) zone to c. four pitch points (c. 40 ms.) before and after the stop closure interval. As the following graphs for CaCa structures where C = voiceless unaspirated /b, d, g/ show, the F0 transitions are essentially the same as in the case of nasal onsets and hence still provide a sensible basis for choosing between the falling H.L. and rising L.H. YB pitch patterns. Evidently to the YB speaker the trans-syllabic F0 gestalt suffices to decide between the H.L. and L.H. adaptations even if the wave has a substantial gap in the middle much the way in which the visual system completes a geometric figure that is interrupted or otherwise obscured.

(15) Normalized F0 Contours for Mandarin Tonal Transitions (Unaspirated Stop Onsets)



An alternative way of expressing the trans-syllabic F0 contour that does not rely on Xu's time-normalizing algorithm for the case of voiceless stops is simply to consider the F0 difference between the beginning of the final syllable's initial mora (just after the intervocalic stop) and the end of the penultimate syllable (just before the intervocalic stop). If this difference is positive then the transition is rising while if it is negative then the transition is falling. The table below in (16) shows the results.

(16) Final Syllable F0 Onset - Penultimate Syllable F0 Offset

Penult/Final	Tone 1	Tone 2	Tone 3	Tone 4
Tone 1	7.7	-49.5	-56.5	82.3
Tone 2	11.0	-39.5	-9.0	113.7
Tone 3	107.7	24.3	/	
Tone 4	49.8	-9.2		
			-16.2	100.0

For Ma final syllable tone 1 and 4 the difference is positive indicating a rising transition and hence calling for the L.H adaptation while for final syllable tone 3 the difference is negative and hence calls for a falling H.L adaptation. For final syllable tone 2 the difference is negative and hence implicates H.L except in the crucial [3+2] case where the difference is positive and thus correctly predicts a L.H rising adaptation. Thus, this method as well predicts all of the adaptations. Both methods rely on information drawn from either side of the voiceless stop and the F0 ratio between the two. See Hsieh (2007) for other examples of tonal faithfulness that depend crucially on the relation between

two successive tones—a phenomenon he terms “relational correspondence” following Steriade (2006).

As an alternative phonetic interpretation, we might compare the F0 maximum in the final two-syllable window of Ma and expect that if the peak in the penultimate syllable is higher than the peak in the final syllable, then the word will be adapted with H.L, whereas if the peak in the penultimate syllable is lower than the peak in the final syllable, it will be adapted with L.H. (17) shows the results of “Peak-F0 (final) minus Peak-F0 (penultimate)” for each tonal combination in CaCa structures where C is /b/, /d/, /g/, /p/, /t/, /k/, taken from our consultant.

(17) Peak-F0 (final) Minus Peak-F0 (Penultimate)

Penult/Final	Tone 1	Tone 2	Tone 3	Tone 4
Tone 1	0.8	-49.5	-65.0	77.5
Tone 2	14.2	-13.7	-8.8	119.0
Tone 3	82.2	32.2		125.7
Tone 4	-72.8	-106.3	-163.8	0.5

Assuming that a positive number results in L.H and that negative number results in H.L, most cases are explained by peak differences between the penultimate and final syllables, except for [4+1], which primarily corresponds with L.H. Thus this interpretation does not work consistently and our hypothesis based on the trans-syllabic F0 contours remains the better solution.

6. Conclusions

We conclude that Chi (2008) is correct in basing the Ma > YB tonal adaptations on the relation between the end of the penultimate syllable and the start of the final. But they must be based on the actual trans-syllabic F0 contours that are the product of articulatory “smoothing” rather than the abstract phonological categories seen in (10) and (11). In the model of tone proposed by Xu (1997, 1999) the Ma tonal targets are realized towards the end of the syllable while the initial portion is a zone of carryover transitions that the Mandarin speaker-listener must learn to disregard in order to properly identify the syllable’s lexical tone. But from the perspective of the YB loanword adapter, the trans-syllabic contour is the best approximation to the YB H.L and L.H pitch contours that classify the large majority of the YB vocabulary. Thus the same phonetic object can be interpreted quite differently depending on the grammar involved. The recent theoretical literature on borrowing has discovered a number of other cases where phonologically redundant phonetic infor-

mation plays a crucial role in shaping the loan (e.g., Hsieh et al. 2009), suggesting that phonetic approximation (cf. LaCharité and Paradis 2005) is an alternative dimension of faithfulness that speakers may pay attention to in deciding how to adapt a loanword.

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Appendix

The corpus contains a few words in which a nonnative diphthong or hiatus is created from the Mandarin bimoraic syllable and the tones are preserved to create a tonal shape that stands outside the Yanbian penultimate H.L and final L.H structures. For example, Ma dao⁴ban³ ‘pirate edition’ > YB t*o-o.pan (H-L.L).

Ma		YB		YB accent	Gloss
bai ² gan ¹	白干儿	빼갈	p*ɛ.kal	LH	spirits; liquor
bai ² ju ³	白酒	빼주	p*ɛ.cju	LH	spirits; liquor
bai ² ju ³	白酒	빼주	p*ɛ.cu	LH	spirits; liquor
bai ² ju ³	白酒	빼이주	p*a-i.cju	HL	spirits; liquor
bai ² ling ³	白领	빼이링	p*a-i.lin	HL	white collar
bai ² shan ¹ da ⁴ sha ⁴	白山大厦	빼이싼다샤	p*a-i.s*an.t*a.s*a	LLH	Baishan hotel
ban ⁴	办	판하다	p*an.ha.ta	HLL	do
bao ³ xian ³	保险	뵈오쎌	p*o-o.s*ɛn	L-HL	insurance
bao ³ xiao ¹	报销	뵈쇼	p*o.sjo	LH	cost sharing
bao ³ xiao ¹	报销	뵈쏘	p*o.s*jo	LH	cost sharing
ben ³ tian ²	本田	뵈텐	p*ɔn.tʰɛn	LL	HONDA
bian ³ wu ³	编舞	뵈우	p*ɛn.u	HL	choreography
bin ¹ guan ³	宾馆	뵈관	p*in.k*wan	HL	hotel
bin ¹ guan ³	宾馆	뵈관	p*in.kwan	HL	hotel
bin ¹ guan ³	宾馆	뵈관	p*in.k*wan	HL	hotel
bin ¹ guan ³	宾馆	뵈관	p*in.kwan	HL	hotel
bing ¹ gun ⁴	冰棍儿	뵈글	p*in.kol	LH	popsicle
bing ¹ gun ⁴	冰棍儿	뵈글	p*in.kwəl	LH	popsicle
bing ¹ xiang ⁴	冰箱	뵈샹	p*in.s*jaŋ	HL	refrigerator
bing ¹ xiang ⁴	冰箱	뵈샹	p*in.sjaŋ	HL	refrigerator
bing ¹ du ²	病毒	뵈두	p*in.tu	HL	virus
bu ² gou ⁴ yi ³ si ⁰	不够意思	뵈꾸우이쓰	p*u.k*ə-u.i.s*i	LLHL	cruel; harsh; reserved
bu ² gou ⁴ yi ³ si ⁰	不够意思	뵈꾸우이쓰	p.u.k*ə-u.i.s*i	LLHL	cruel; harsh; reserved
cai ³ piao ⁴	彩票	차이표	c ^h a-i.p ^h jo	LH	lottery ticket
cai ³ dan ¹	菜单	차이단	c ^h a-i.tan	LH	menu
cai ³ dan ¹	菜单	차이판	c ^h a-i.t*an	LH	menu
cai ³ pu ³	菜谱	차이푸	c ^h a-i.p ^h u	HL	menu
chang ³ zhang ³	厂长	창자이	c ^h an.ca-i	HL	factory manager
cheng ² bao ³	成宝	청보	c ^h əŋ.po	HL	Chengbao Department Store
cheng ² xu ⁴ she ⁴ ji ⁰	程序设计	청췌써지	c ^h əŋ.s*wi.s*ə.ci	LLHL	programming
chong ¹ dian ⁴	充电	충덴하다	c ^h uŋ.ten.ha.ta	LHLL	charge (a battery)
chong ¹ dian ⁴	充电	충덴하다	c ^h uŋ.t*en.ha.ta	LHLL	charge (a battery)

Ma		YB		YB accent	Gloss
chong ¹ dian ¹ qi ⁴	充电器	충덴치	ch ¹ uŋ.t*en.c ⁴ i	LLH	battery charger
chong ¹ dian ¹ qi ⁴	充电器	충덴치	ch ¹ uŋ.ten.c ⁴ i	LLH	battery charger
chong ¹ ji ¹ bo ¹	冲击波	충지버	ch ¹ uŋ.ci.pə	LLH	shock wave
chou ⁴	臭	처우하다	ch ⁴ ə-u.ha.ta	H-L-L-L	smell nasty
chu ² fang ²	厨房	추방	ch ² u.fan ⁹	HL	kitchen
chuan ² dan ¹	传单	촐단	ch ² wan.tan	LH	bill, flier
chuan ² zhen ¹	传真	촐전	ch ² wan.c*ən	LHLL	fax
chuan ² zhen ¹	传真	촐전	ch ² wan.cən	LHLL	fax
ci ¹ ji ⁰	刺激	츠지하다	ch ¹ i.ci.ha.ta	HLL-L	stimulate; be exciting, be thrilling
cun ²	存	춘하다	ch ² un.ha.ta	HLL	save money
cun ² kuan ³	存款	존관	con.k ³ wan	LH	saving money
cun ² kuan ³	存款	춘관	ch ² un.k ³ wan	HL	saving money
cun ² kuan ³	存款	중관	conj.k ³ wan	LH	saving money
cun ² zhe ²	存折	춘저	ch ² un.cə	HL	bankbook
da ¹ che ¹	搭车	따치	t*a.c ¹ ə	LH	taking a car
da ¹ che ¹	打车	따쳐하다	t*a.c ¹ ə.ha.ta	LHLL	take a taxi
da ³ yin ¹ ji ¹	打印机	따인지	t*a.in.ci	LLH	printer
da ³ zi ⁴	打字	따즈	t*a.ci	LH	typewriting, typing
da ³ yi ¹	大衣	따이	t*a.i	LH	overcoat
dai ¹ kuan ³	贷款	대관	te.k ³ wan	LH/LL	lending, loan
dao ⁰ ban ³	盗版	또오반	t*o-o.pan	HL/H-L-L	pirate edition
di ¹ nuan ³	地暖	띠난	t*i.nwan	HL	floor heating
di ¹ tan ³	地毯	띠탄	t*i.t'an	HL	carpet
dian ¹ chi ²	电池	덴츠	t*en.c ² i	HL	battery
dian ¹ fan ¹ guo ¹	电饭锅	덴판귀	t*en.fan.kwə	LLH	rice cooker
dian ¹ nao ³	电脑	덴노	t*en.no	HL	computer
dian ¹ shi ⁴	电视	덴쓰	t*en.s*i	LH	television
dian ¹ shi ¹ tai ²	电视台	덴쓰타이	t*en.s*i.t'a-i	LHL	television station
diao ⁴	调	뒀오하다	t*jo-o.ha.ta	HLL	be transferred to another branch
diao ⁴	调儿	뒀	t*jol	H	accent, rhythm
ding ⁴	定	땡하다	t*in.ha.ta	HLL	decide
ding ⁴ qi ¹	定期	땡치	t*in.c ¹ i	LH	fixed deposit
dong ² zhi ¹	东芝	땡즈	t*uŋ.ci	LH	TOSHIBA
dong ² zhi ¹ pair ²	东芝牌儿	땡즈팔	t*uŋ.ci.p'al	LH	TOSHIBA brand
duan ¹ ku ⁴	短裤	땡꾸	t*wan.k ⁴ u	LH	short pants
dui ¹ fu ⁰	对付	땡이후	t*u-i.fu	HL	coping with, treatment
er ¹ ji ¹	耳机	얼지	əl.ci	LH	earphone
er ¹ shou ¹ huo ⁴	二手货	얼써우회	əl.s*ə-u.hwə	LLH	secondhand article

⁹ Hangul character 땡 indicates /f/ in this table.

Ma		YB		YB accent	Gloss
fan'gui ¹	犯规	반 구이	fan.ku-i	LH	breaking the rules
fang'shai ¹	防晒	광싸이	p ^h an.s [*] a-i	LH	blocking sunburn
fang'shai'y ²	防晒油	광 싸이유	fan.s [*] a-i.ju	LH-L.L	oil for blocking sunburn
fen'shou ³	分手	번 써우	fən.s [*] ə-u	HL	separate
feng'tian ²	丰田	뽕 텐	fəŋ.t'ɛn	HL	TOYOTA
fu'wo'cheng ¹	俯卧撑	푸 워창	fū.wə.c ^h əŋ	LHL	push-up
fū'yin ¹	复印	투 인	fū.in	LH	copy, photocopy
gan'bei ¹	干杯	간베이	k [*] an.pe-i	LHLL	drinking a toast
gu'dong ¹	股东	꾸똥	k [*] u.t [*] uŋ	LH	stockholder
gu'dong ¹	股东	꾸둥	k [*] u.tuŋ	LH	stockholder
gua'hao ¹	挂号	과호	k [*] wa.ho	LH	apply for medical examination
gua'hao'fei ¹	挂号费	과호페	k [*] wa.ho.fe	LLH	doctor's fee
guang'bo ¹	广播	광버	k [*] waŋ.pə	LH	broadcast, radio
guang'bo ¹	广播	광보	k [*] waŋ.po	LH	broadcast, radio
guang ¹	逛	광하다	k [*] waŋ.ha.ta	HLL	take a walk
guo'mao ¹	国贸	귀모	kwə.mo	LH	International trade building
guo'min ³	过敏	귀민	k [*] wə.min	HL	allergy
hao'ma ³	号码	호마	ho.ma	HL	number
he'fan ¹	盒饭	허반	hə.fan	LH	packed lunch
he'nian'ka ³	贺年卡	허넨카	hə.nen.k ^h a	LHL	New Year's card
he'nian'pian ¹	贺年片儿	허넨펠	hə.nen.p ^h ɛl	LLH	New Year's card
he'nian'pian ¹	贺年片儿	허넨팔	hə.nen.p ^h jal	LLH	New Year's card
he'fan ¹	盒儿饭	혈반	həl.fan	LH	packed lunch
hu'zhao ¹	护照	후조	hu.c [*] o	LH	passport
hu'zhao ¹	护照	후조	hu.co	LH	passport
hui'kou ¹	回扣	후이커우	hu-i.k ^h ə.u	LH	rebate
jī'chang ³	机场	지창	ci.c ^h əŋ	HL	airport
jī'zī'lou ²	集资楼	지즈러우	ci.ci.lə-u	LHL	a building which is built with the money from people who are planning to live there
jiā'banr ¹	加班儿	자발	cja.pal	LH	overtime work
jiā'jiao ¹	家教	자조	cja.cjo	LH	private teacher
jiā'jiao ¹	家教	자조	cja.c [*] jo	LH	private teacher
jiān'piao ¹	剪票	젠표	c [*] en.p ^h jo	LH	ticket examiner
jiāng'yìqì ⁰	讲义气	쟝이치하다	c [*] jan.i.c ^h i.ha.ta	LHLL	have a keen sense of duty
jiē ¹	接	제하다	ce.ha.ta	HLL	meet; welcome
jīn'kuair ¹	金块儿	전칼	c [*] in.k ^h wal	LH	a lump of gold
jīn'ling ³	金领	전링	c [*] in.liŋ	HL	gold collar
ka'pian ¹	卡片	카팔	k ^h a.p ^h jal	LH	card; postcard
ka'pian ¹	卡片	카펠	k ^h a.p ^h ɛl	LH	card; postcard

Ma		YB		YB accent	Gloss
kai ¹ guan ¹	开关儿	캐팔	k ^h ɛ.kwal	LH	switch
kong ¹ tiao ²	空调	콩뎐	k ^h uŋ.t ^h jo	HL	air-conditioner
kuai ¹ ban ³	快板儿	콰이발	k ^h wa-i.pal	HL	a kind of mass entertainment
kuai ¹ di ⁴	快递	콰이디	k ^h wa-i.t ^h i	LH	express delivery
kuai ¹ di ⁴	快递	콰이디	k ^h wa-i.ti	LH	express delivery
kuang ¹ ke ⁴	旷课	광커	k ^h wan.k ^h ə	LH	skipping a class, being absent from a class
kun ⁴	困	쿤하다	k ^h un.ha.ta	HLL	be sleepy
lan ¹ ling ³	蓝领	란링	lan.liŋ	HL	blue collar
lao ¹ baixing ⁴	老百姓	로바이씽	lo.pa-i.s [*] iŋ	LLH	the people
lao ¹ baixing ⁴	老百姓	로빠이씽	lo.p [*] a-i.s [*] iŋ	LLH	the people
lao ¹ ban ³	老板	로오반	lo-o.pan	HL	boss, the responsible supervisor
lao ¹ tou ²	老头儿	노톨	no.t ^h ol	LH	old male person
lian ² jie ¹	连接	랜제	len.ce	LH	connect
lian ² yi ¹ qun ²	连衣裙	랜이퀸	len.i.c ^h win	LHL	one-piece
lu ¹ yin ¹ dai ⁴	录音带	록음파이	lo.kim.t [*] a-i	LLH-L	recording tape
lu ¹ yin ¹ dai ⁴	录音带	루인파이	lu.in.t [*] a-i	LLH-L	recording tape
lu ¹ yin ¹ dai ⁴ zi ⁰	录音带子	록음파이즈	lo.kim.t [*] a-i.ci	LLHL	recording tape
lu ¹ yin ¹ dai ⁴ zi ⁰	录音带子	루인파이즈	lu.in.t [*] a-i.ci	LLHL	recording tape
lu ¹ yin ¹ dai ⁴ zi ⁰	录音带子	록음페즈	lo.kim.t [*] ɛ.ci	LLHL	recording tape
lu ¹ yin ¹ dai ⁴ zi ⁰	录音带子	루인페즈	lu.in.t [*] ɛ.ci	LLHL	recording tape
ma ² jiang ⁴	麻将	마장	ma.caŋ	HL/LH	mah-jongg
ma ² jiang ⁴	麻将	마쟝	ma.cjaŋ	HL/LH	mah-jongg
man ² tou ⁰	馒头	만티	man.t ^h i	HL	Chinese-style steamed bread
man ² tou ⁰	馒头	만투	man.t ^h u	HL	Chinese-style steamed bread
me ² chu ¹ xi ⁰	没出息	메이추시하다	me-i.c ^h u.si.ha.ta	LHLLL	be not promising; be spineless
me ² qi ¹	煤气	메치	me.c ^h i	LH	gas, gas fittings
mi ¹ ma ³	密码	미마	mi.ma	HL	code; cipher; password
mian ¹ bao ¹	面包	멘보	men.po	LH	bread
mian ¹ bao ¹	面包	멘보	men.po	LH	bread
mian ¹ bao ¹ che ¹	面包车	멘보차	men.po.c ^h a	LLH	city bus, car (wagon type)
mian ¹ bao ¹ che ¹	面包车	멘보치	men.po.c ^h ə	LLH	city bus, car (wagon type)
mian ¹ bao ¹ che ¹	面包车	멘보차	men.po.c ^h a	LLH	city bus, car (wagon type)
mian ¹ shi ¹	面试	멘쓰	men.s [*] i	LH	having an interview
mian ¹ zi ⁰	面子	멘즈	men.ci	HL	honor; face
mian ¹ zi ⁰	面子	멘즈	men.ci	HL	honor; face
ming ² pai ²	名牌儿	밍팔	min.p ^h al	HL	Brand
ming ² xin ¹ pian ¹	明信片儿	밍신편	min.s [*] in.p ^h ɛl	LLH	postcard
ming ² xin ¹ pian ¹	明信片儿	밍신편	min.s [*] in.p ^h jal	LLH	postcard
niu ² zai ¹ ku ¹	牛仔裤	뉴자이쿠	nju.ca-i.k ^h u	LLH	jeans

Ma		YB		YB accent	Gloss
nir ² zaf ¹ ku ⁴	牛仔裤	뉴짜이쿠	nju.c*a-i.k ⁴ u	LLH	jeans
nuan ³ qi ⁴	暖气	난치	nan.c ⁴ i	LH	heating
nuan ³ qi ⁴ lou ²	暖气楼	난치러우	nan.c ⁴ i.lə-u	LHL	apartment with heating
nuan ³ qi ⁴ pianr ⁴	暖气片儿	난치펄	nan.c ⁴ i.p ⁴ el	LLH	heating apparatus, steam heating, a part of steam heating
ou ³ xiang ⁴	偶像	어우샹	ə-u.s [*] jaŋ	LH	(pop) idol
ou ³ xiang ⁴	偶像	어우샤이	ə-u.s [*] ja-i	LH-L	(pop) idol
pao ³ che ¹	跑车	포우치	p ⁴ o-u.c ⁴ ə	LH	sport car
pei ³ yin ⁴	配音	페이인	p ⁴ ē-i.in	LH	voice artist, voice dubbing
pi ³ ju ³	啤酒	피주	p ⁴ i.cju	HL	beer
pi ³ ju ³	啤酒	피주	p ⁴ i.cu	HL	beer
pin ³ ming ⁴	拼命	핀밍하다	p ⁴ in.ming.ha.ta	LHLL	try as hard as one can; do one's best
pu ³ ke ⁴	扑克	부커	pu.k ⁴ ə	LH	playing cards
qi ³ ma ³	起码	치말러	c ⁴ i.mal.lə	HLL	at least, at best
qian ³ zheng ⁴	签证	첸정	c ⁴ en.cəŋ	LH	visa
qian ³ zheng ⁴	签证	첸정	c ⁴ en.c [*] əŋ	LH	visa
qian ³ zi ⁴	签字	첸즈	c ⁴ en.ci	LH	sign; putting one's signature
qian ³ zi ⁴	签字	첸쯔	c ⁴ en.c [*] i	LH	sign; putting one's signature
qiao ³ ke ⁴ li ⁴	巧克力	초컬리	c ⁴ jo.k ⁴ əl.li	LLH	chocolate
qing ⁴ chang ⁴	清唱	칭창	c ⁴ in.c ⁴ əŋ	LH	a cappella
qing ³ fu ⁴	情妇	칭투	c ⁴ in.fu	LH	one's lover
qing ³ ren ³ jie ²	情人节	칭런제	c ⁴ in.lən.ce	LHL	St. Valentine's Day
qing ³ tie ³	请贴	칭테	c ⁴ in.t ⁴ ē	LH	letter of invitation
ri ³ li ⁴	日立	르리	li.li	LH	HITACHI
san ³ xing ³ ji ²	三星级	싼싱지	s [*] an.s [*] in.ci	LHL	three stars
san ³ xing ³ ji ²	三星级	싼싱지	s [*] an.sin.ci	LHL	three stars
shang ³ pin ³ fang ²	商品房	쌍핀방	s [*] əŋ.p ⁴ in.fəŋ	LLH	a building which is built with the investment of a real-estate agent
shang ⁴	上	쌍하다	s [*] əŋ.ha.ta	HLL	be put on; get on; challenge
shang ⁴ banr ⁴	上班儿	쌍발	s [*] əŋ.pal	LH	attendance at work
shang ⁴ wang ³	上网	쌍왕하다	s [*] əŋ.wəŋ.ha.ta	HLLL	use an internet, connect to the internet, do net surfing
shao ³ lin ² si ⁴	少林寺	쏘우린쓰	s [*] o-u.lin.s [*] i	LLH	Shaolin temple; the Chinese martial art of pugilism
sheng ⁴ dan ³ jie ²	圣诞节	쌍단제	s [*] əŋ.tan.ce	LHL	Christmas Day
sheng ⁴ dan ³ jie ²	圣诞节	쌍만제	s [*] əŋ.t [*] an.ce	LHL	Christmas Day
sheng ⁴ dan ³ ka ³	圣诞卡	쌍단카	s [*] əŋ.tan.k ⁴ a	LHL	Christmas card
sheng ⁴ dan ³ ka ³	圣诞卡	쌍만카	s [*] əŋ.t [*] an.k ⁴ a	LHL	Christmas card
sheng ⁴ qian ²	剩钱	승천	siŋ.c ⁴ ən	LH	change
shou ³ ji ⁴	手机	썬우지	s [*] ə-u.ci	LH	cell phone

Ma		YB		YB accent	Gloss
shu ¹ ma ² xiang ¹ jī ¹	数码相机	쑤마샹지	s [*] u.ma.s [*] jan.ci	L.L.LH	digital camera
sī ¹ xing ¹ jī ²	四星级	쓰싱지	s [*] i.sin.ci	L.H.L	four stars
sī ¹ xing ¹ jī ²	四星级	쓰씽지	s [*] i.s [*] ij.ci	L.H.L	four stars
song ¹ xia ⁴	松下	송샤	s [*] un.s [*] ja	L.H	Matsushita (Panasonic)
suan ¹ cai ⁴	酸菜	싼채	s [*] wan.c ^h ɛ	H.L	pickles
suan ¹ zhang ⁴	算帐	싼장	s [*] wan.caŋ	L.H	counting
suo ¹ ni ²	索尼	쑤니	s [*] wə.ni	L.H	SONY
suo ¹ liao ⁴	塑料	쑤료	s [*] ə.ljo	L.H	vinyl
suo ¹ liao ⁴	塑料	썰료	s [*] əl.ljo	L.H	vinyl
tai ¹ jiao ⁴	胎教	타이조	t ^h a-i.cjo	L.H	womb training
tai ¹ jiao ⁴	胎教	타이쑤	t ^h a-i.c [*] jo	L.H	womb training
tao ¹ tai ⁴	淘汰	토타되다	t ^h o.t ^h ɛ.tō.ta	L.H	throw away old things
tī ¹ yú ⁴ cǎi ³ piao ⁴	体育彩票	티위차이표	t ^h i.wi.c ^h a-i.p ^h jo	L.L.LH	football pools
tiao ²	调	토후하다	t ^h jo-u.ha.ta	L-H.L.L	adjust
tíng ² dian ⁴	停电	팅덴	t ^h ij.ten	L.H	blackout
tíng ² dian ⁴	停电	팅덴	t ^h ij.t [*] en	L.H	blackout
tíng ² shuǐ ³	停水	팅쑤	t ^h ij.s [*] wi	H.L	suspension of water supply
tíng ² shuǐ ³	停水	팅쑤	t ^h ij.swi	H.L	suspension of water supply
tíng ² shuǐ ³	停水	팅쑤이하다	t ^h ij.s [*] u-i.ha.ta	H.L.L.L	suspend water supply
tíng ² xue ²	停学	팅쑤	t ^h ij.s [*] we	H.L	suspension from school
tíng ² ye ⁴	停业	팅예	t ^h ij.je	L.H	suspension of business
tong ¹ xiao ¹	通宵	통쑤	t ^h un.s [*] jo	L.H	staying up all night
tong ² ju ¹	同居	통쑤	t ^h un.cwi	L.H	living together
tuan ²	团	탄	t ^h wan	L	regiment, a class of troops
tuan ² yuan ²	团员	탄원	t ^h an.wən	L.L	succeeding member of the Communist Party
tuī ⁴	退	투이하다	t ^h u-i.ha.ta	H.L.L	return (goods)
tuī ⁴ huo ⁴	退货	투이훤	t ^h u-i.hwə	L.H	returning goods
wai ⁴ tao ⁴	外套儿	와이톨	wa-i.t ^h ol	L.H	overcoat, jacket
wang ² qiu ²	网球儿	왕츨	waŋ.c ^h jul	L.L	tennis
wang ² ye ⁴	网页	왕예	waŋ.je	L.H	web site
wei ¹ bo ¹ lu ²	微波炉	위이버루	wə-i.pə.lu	L.H.L	microwave
wei ²	喂	위이	wə-i	H-L/L-H	Hello (phone)
wu ¹ xing ¹ jī ²	五星级	우싱지	u.sin.ci	L.H.L	five stars
wu ¹ xing ¹ jī ²	五星级	우씽지	u.s [*] ij.ci	L.H.L	five stars
xi ¹ fu ²	西服	씨루	s [*] i.fu	H.L	suit
xi ¹ ku ⁴	西裤	씨쿠	s [*] i.k ^h u	L.H	pants of a suit
xia ⁴ ban ⁴	下班儿	샤발	s [*] ja.pal	L.H	coming home from work
xia ⁴ ke ⁴	下课	샤커	s [*] ja.k ^h ə	L.H	(a class) ending, leaving school

Ma		YB		YB accent	Gloss
xia ⁴ xiang ¹	下乡	싸양	s*ja.s*jan	LH	(a young person) being sent to a farm village and trained as a policy of the Communist Party
xia ⁴ xiang ¹	下乡	싸양	s*ja.sjan	LH	(a young person) being sent to a farm village and trained as a policy of the Communist Party
xia ⁴ zai ³	下载	싸자이	s*ja.ca-i	HL	downloading
xian ⁴ xie ³	献血	센웨	s*en.s*we	HL	blood donation
xiang ¹	香	쌍하다	s*jan.ha.ta	HLL	be sweet-smelling, pleasant-smelling
xiang ¹ ji ¹	相机	쌍지	s*jan.ci	LH	camera
xin ¹ xian ¹	新鲜	신센하다	s*in.s*en.ha.ta	HLLL	be fresh; be rare
xin ¹ xian ¹	新鲜	신센하다	s*in.sen.ha.ta	HLLL	be fresh; be rare
xin ¹ xiang ¹	信箱	신싸이	s*in.s*ja-i	HL	mailbox
xin ¹ xiang ¹	信箱	신쌍	s*in.s*jan	HL	mailbox
xin ¹ yong ¹ ka ³	信用卡	신용카	s*in.jun.k ³ a	LHL	credit card
xing ¹ ji ¹ bin ¹ guan ³	星级宾馆	쌍지뽕관	s*in.ci.p*in.k ³ wan	LLHL	hotel which is ranked with stars
xing ¹ ji ¹ bin ¹ guan ³	星级宾馆	쌍지뽕관	s*in.ci.p*in.kwan	LLHL	hotel which is ranked with stars
xing ¹ ji ¹ bin ¹ guan ³	星级宾馆	쌍지뽕관	s*in.ci.p*in.k ³ wan	LLHL	hotel which is ranked with stars
xing ¹ ji ¹ bin ¹ guan ³	星级宾馆	쌍지뽕관	s*in.ci.p*in.kwan	LLHL	hotel which is ranked with stars
xue ³ gao ¹	雪糕	웨고	s*we.ko	LH	ice cream
yang ¹ ge ¹	秧歌儿	양걸	jan.kəl	LL	Chinese traditional dance
yang ¹ rour ¹ chuan ¹	羊肉串儿	양러우찰	jan.lə-u.c ³ wal	LLH	lamb kabob
yao ¹ kong ¹ ji ¹	遥控机	요콩지	jo.k ³ un.ci	LLH	remote control
ye ¹ jing ³	夜景	예징	je.cin	HL	night view
ye ¹ xiao ¹	夜宵	예쑤	je.s*jo	LH	midnight snack
ye ¹ xiao ¹	夜校	예쑤	je.s*jo	LH	evening class
yin ¹ ling ³	银领	인링	in.lin	HL	silver collar
yin ¹ xing ³ yan ¹ jing ⁴	隐形眼镜	인싱옌징	in.sin.jen.cin	LLH	contact lens
yin ¹ xing ³ yan ¹ jing ⁴	隐形眼镜	인싱옌징	in.s*in.jen.cin	LLH	contact lens
you ¹ xi ¹	游戏	유씨	ju.s*1	LH	game
you ¹ xi ¹ ting ¹	游戏厅	유씨팅	ju.s*1.t ¹ in	LLH	game arcade
zao ¹ can ¹	早餐	조오찬	c*o-o.c ³ an	LH	breakfast
zha ¹ pian ¹	诈骗	짜편	c*a.p ³ en	LH	fraud
zhan ¹ zhang ³	站长	짬장	c*am.caŋ	HL	stationmaster
zhao ¹ pin ¹	招聘	조핀	c*o.p ³ in	LH	recruitment
zhao ¹ gu ¹ /zhao ¹ gu ¹	照顾	조구	c*o.ku	HL	paying attention to
zheng ¹ ban ³	正版	정반	c*en.pan	HL	official version (opposite of pirate edition)
zhong ¹ liu ²	肿瘤	중류	c*un.lju	LH	tumor
zi ¹ fei ¹	自费	쯔페이	c*1.fe-i	LH	one's own expense

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