The Phonetic Realization of Final Engma in Taipei Mandarin[1]

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1. The Linguistic Situation in Taiwan

Taiwan has been an immigrant society for the past 400 years since Chinese from Hokien and Canton provinces began to immigrate to this island across the South China Sea. They soon outnumbered the aboriginal Austronesian peoples. Since Taiwan is only a small island with limited natural resources, it was gradually transformed into a Chinese-dominant society, where people gradually perceived themselves to be Taiwanese. Owing to its convenient geographical location, it soon attracted the attention of numerous powerful countries. Before 1945 when the Nationalist Party of China took over Taiwan from Japan, Taiwanese people had been ruled by 4 different alien regimes: Spain, the Ming dynasty, the Tsing dynasty and Japan. Then, in 1949, the Nationalist Chinese fled to Taiwan after being defeated by Communist Chinese. They brought along with them their government and their official language. As a result, Mandarin entered the linguistic repertoire of Taiwan, replacing the then official language, Japanese.

In 1945, before the 5th regime took over Taiwan, there were 6 million people in Taiwan (Chen 1979: 18, as quoted by Huang 1993: 20). At least 80% of the population spoke Taiwanese,[2] and 15% spoke Hakka,[3] though Japanese was still the language of the elite. With the Nationalist Chinese came one million Chinese mainlanders (from various provinces, speaking different Chinese languages) who spoke Mandarin as a lingua franca. After 51 years of promotion, Mandarin is now widely spoken. Nowadays, people under the age of 50 should be able to speak Mandarin. However, Taiwanese is still widely used by Taiwanese (and even by most Hakka), especially in domains such as business, family, etc.. The use of minority languages, such as Hakka and the indigenous Austronesian languages, gradually receded over time. A recent estimate of the population structure in Taiwan is as follows: 73.3% Taiwanese, 13% mainlanders, 12% Hakka, 1.7% aborignes (see Huang 1993, chap. 2 for more detailed discussion).

2. Taipei Mandarin

As a result of contact with languages in Taiwan (mainly Taiwanese), as well as of the separation from Peking Mandarin for over two decades, the Mandarin which has developed in Taiwan is different from Peking Mandarin, particularly due to the substantial substratum influence of Taiwanese (Kubler 1985, though see footnote 4) as well as to autonomous linguistic drift (as will be shown in this paper). This langauge does not appear homogeneous though. Except for the capital, Taipei, where many people are exposed to a mainly Mandarin-speaking speech community in various domains, most people in other parts of Taiwan learn Mandarin after the age of 6 when they enter elementary school. Mandarin being the only language of education and government, non-native speakers have to master it in order to be competitive in social mobility. For those of the lower social strata, for whom Mandarin is not a native language, mastery of Mandarin is not that essential. A common prejudice is to say that their lower status is the result of having failed to succeed in education, hence having failed to master Mandarin. These people speak a version of Mandarin

[1] My thanks goes to Sharon Harris, Alan Lee and Professor G. Sankoff who read an earlier version of this paper. All the remaining errors are my responsibility.

[2] When Chinese first immigrated to Taiwan, they were speaking the Changchou and Chuanchou dialects of Southern Min Chinese, which are mutually intelligible except for minor phonological and lexical differences. Since they have been the dominant population for hundreds of years, and since the somewhat latecomers (Hakka from Canton) were outnumbered, they began to identify themselves as Taiwanese, and called the Southern Min dialect they spoke Taiwanese.

[3] *Hakka* means "guest", a reflection of the fact that they have been moving about several provinces in China throughout history. Alongside these two Chinese languages, there were dozens of Austronesian languages spoken by various tribes of aborigines which constituted 2% of the population.

that has long been referred to as Taiwan Mandarin (as described in Kubler 1985[4]) that is farther away from that spoken by native speakers (especially in Taipei), and this will be referred to as Taipei Mandarin.[5] Taiwan Mandarin, however, can only be regarded as an imperfect L2, as it is only used as a lingua franca when needed, and its speakers never reach the level of native-like competence.

Having made this distinction, it should be pointed out that the scope of the data in this paper is Taipei Mandarin spoken in Taiwan.

3. Engma Realization

Like all other Chinese languages, Mandarin is a monosyllabic language with a syllable structure as in (1). Initial consonants can be any segment from (2) except /ŋ/. Medial segments can be either /i/, /ü/ or /u/; the nucleus draws from the vowel inventory;[6] vocalic endings can be either /i/ or /u/; consonantal endings can only be /n/ or /ŋ/. All possible rimes are shown in (3). The interest here is on the phonetic realization of final engma in a Taipei Mandarin rime. As will be seen from the data, the actual realization shows variation (ŋ ~ n or ∅) that is conditioned by certain factors.

(1) Mandarin Syllable Structure (Cheng 1973: 11)

<table>
<tr><td colspan="5">tone</td></tr>
<tr><td rowspan="3">initial</td><td colspan="4">final</td></tr>
<tr><td rowspan="2">medial</td><td colspan="3">rime</td></tr>
<tr><td>nucleus</td><td>ending</td><td></td></tr>
<tr><td></td><td></td><td>vocalic ending</td><td>consonantal ending</td></tr>
</table>

[4] It should be pointed out that what Kubler refers to as "Mandarin in Taiwan" should be Taiwan Mandarin.

[5] It should be borne in mind, however, that Taipei Mandarin is not just spoken in Taipei, but in Taiwan in general.

[6] The question of how many phonemic vowels there are in Mandarin is left open here. See Cheng (1973), Lin (1989) and Wang (1993) for proposals of a vowel system of 6, 5 and 2 respectively.

(2) Consonants of Taipei Mandarin

p	p'	m	f	ts	tʂ	tɕ
t	t'	n	l	ts'	tʂ'	tɕ'
k	k'	ŋ	h	s	ʂ	ɕ
					ʐ	

(3) Taipei Mandarin rimes

ɨ	a	ɤ	ai	ei	au	ou	an	ɤn	aŋ	ɤŋ
i	ia	ie	iai		iau	iou	iɛn	in	iaŋ	iŋ
u	ua	uo	uai	uei			uan	uɤn	uaŋ	uoŋ
ü		üe					üɛn	ün		üoŋ

As mentioned above, Taipei Mandarin is rich in substratum influences from Taiwanese. Kubler (1985: 93-4) maintains that the absence of syllable final -iŋ and -ɤŋ in Taiwan Mandarin and, by implication, in Taipei Mandarin as well, is among these. This is incorrect, however, for the following reasons. Firstly, Taiwanese does have the -iŋ ending (Cheng & Cheng 1977: chap. 2), and although it does not have -ɤŋ, it has syllabic -ŋ, which, when combining with initial consonants, does have phonetic realizations similar enough to -ɤŋ. Secondly, Taiwanese never has the -ɤn ending; therefore, at least the realization of -ɤŋ or -ɤn in Taipei Mandarin should have nothing to do with Taiwanese phonological structure. Thirdly, as the data in *Hanyu Fangyan Gaiyao* (*Outline of Chinese Dialects*, 2nd. ed. 1983) show, the loss of the -ŋ rime (and a subsequent loss of the -n rime) has been very common among other dialects of Mandarin as well (Chen 1991), suggesting that Taipei Mandarin could be undergoing the same pattern of sound change. Unless evidence suggests otherwise, the variation of final engma in Taipei Mandarin should therefore be considered a stable variable rule, or a potential sound change in progress, independent of Peking Mandarin or Taiwanese influence.

4. The Data

One of the contributions of sociolinguistics is the resolution of the perennially vexing question of the implementation of sound change, a question that has bewildered historical linguists for

decades. The claim that sound change can be observed is supported by, among other things, the notion of variable rules (Labov 1969), which can be seen as sound change in progress. A classical variable rule that is well studied is the /t,d/ deletion rule in English[7], where the application of the rule is conditioned by all possible, related factors. With the help of a computer analysis program based on probability theory[8] developed by Cedergren and Sankoff in 1972, one can easily estimate from data the probabilistic effects of constraints on the operation of a variable rule.

To realize whether final engma in Taipei Mandarin is implemented as a variable rule, a pilot study was conducted, in which some 300 tokens (i.e., phonetic realizations of engma) were coded from a speaker of Taipei Mandarin.[9] In determining factors that condition rule application, the following 5 factors are considered: preceding vowel, following segment, position in the word, position in the intonational phrase and its tone value. As briefly mentioned in (1), a Mandarin syllable is roughly of the structure: (C)(G)V(G)(N), where G stands for glide and N nasal. Since our interest centers around the nasal ending, the preceding vocalic element and its following segment are the most plausible factors to examine. As can be seen from (3), preceding vowels of engma-ending rimes can only be /i, ɤ, o, u/. Following segments can theoretically be either any consonant except for engma, vowels of /ɨ, i, e, ɤ, a, o, u, ü/, or a pause (or filled pause). The 21 initial consonants are grouped into 2 groups: coronal and non-coronal.

Among the 8 potential following vowels, however, /ɨ, e/ would be virtually impossible to come by, since there is only one word (and an exclamation word to boot) in the whole

[7] See eg. Labov (1967), Labov & Cohen (1967), Labov, Cohen, Robins & Lewis (1968), Wolfram (1969, 1971), Fasold (1972), Guy (1980), etc.

[8] See Cedergren & Sankoff (1974) for discussions of probability theory.

[9] The data are taken from the recoding of an interview I carriedout on March 16, 1996. The informant, HC Wei, is a female MA student at the University of Pennsylvania in her mid 20's who is a bilingual speaker of Taipei Mandarin and Taiwanese. 300 tokens are to be considered a fair size for a relatively accurate input to Cedergren & Sankoff's Goldvarb program.

Mandarin lexicon that begins with /e/, while /ɨ/ has to be preceded by retroflex initials. /i/ is singled out as a factor as opposed to all the other 5 vowels, as suggested by the outcome of the preceding vowel factor group that front vowels (as opposed to back vowels) have a very high percentage of rule application. Of all the other 5 vowels, the most frequent vowels are the back vowels /o, u/. Frequencies of /ɤ, a, ü/ are relatively low, as none of them exceeds 5 in our complete data of 901 tokens. As such, it would be not too misleading to put together all these 5 vowels as a conditioning factor. Position in the word, position in the intonational phrase and tone value are also possible factors, as Mandarin is a tone language with no consonant clusters in the syllable, and thus prosodic considerations could outweigh grammatical ones in cases like this. We therefore have the following 5 factor groups:

(4) Factor Groups
- (i) Preceding vowel: i, ɤ, a, o.
- (ii) Following segment: t(coronal consonant), c(non-coronal consonant), /i/, v(vowel other than /i/), q(pause or filled pause).
- (iii) Position in the word: f(word-final), i(word-internal).
- (iv) Position in the intonational phrase: f(phrase-final), i(phrase-internal).
- (v) Tone value of the syllable: 1 (55), 2 (35), 3 (324), 4 (53).

Having defined the factor groups, we need to give a definition of the variable in question in (5). As should be pointed out, the variation in most cases, where nasal realization is found, lies in the linking of the feature [coronal].

(5) Definition of the variable: the phonetic realization of engma in a Taipei Mandarin rime. In Goldvarb application, 1 represents /ŋ/ realization, while 0 represents /n/ realization, or in a few cases total deletion ∅.

A first run of Goldvarb clearly indicates that engma realization is a variable rule, as it is especially strongly correlated with preceding vowels, with diversified degrees of

rule application: ɤ 79%, i 57%, a 11%, o 2%, with a total application of 24%. Encouraged by the result, more tokens (300 from Cheng and 301 from Lin) are coded from two more informants,[10] and similar results are obtained: ɤ 81%, i 70%, a 2%, o 0%, with a total application of 27% for Lin and ɤ 45%, i 45%,a 11%, o 7%, with a total application of 21% for Cheng. Cheng apparently has a slightly different behavior toward this rule,[11] however, the general ordered tendency (i.e., ɤ > i > a > o) for preceding vowel factors with regard to rule application is well supported. Below, the application outcome of the the combined set of data will be discussed.

As Cedergren & Sankoff (1974) demonstrate, the relationship between actual application of a variable rule and the application weight (that is calculated according to the input) is analogous to that of performance and competence. What really counts is therefore the weight that is determined by the input data. (6) shows the results of the variable analysis of our data. Note that since /a/ and /o/ in factor group 1 show relatively low application, these two back vowels are combined.

It appears from (6) that factor group 1, preceding vowel, is the most important factor in deciding the realization of engma. The two non-back vowels /ɤ, i/ strongly favor rule application (i.e., -n realization or total deletion), while the two back vowels /a, o/ disfavor it. Among the factors in factor group 2, coronal consonants and non-conoral ones show a similar (though less acute) pattern as non-back vs. back vowels. The other 3 factors have some fluctuation which might be due to the fact that these three factors have far lower frequencies,

[10] Both informants, CL Lin & CR Cheng, are also female MA students at the University of Pennsylvania who are in their mid-20's. The interview carried out on April 5, 1996 & March 26, 1996 respectively. Lin is a native monolingual speaker of Taipei Mandarin, and so is Cheng, except that Cheng, having bilingual parents, has some passive knowledge of Hakka and Taiwanese.

[11] Of her 64 out of 300 applications, 15 involve a total drop of the nasal ending. Specifically, 10 out of 12 applications for factor /a/ belong to this kind of total deletion, which is to some extent quite different from the other two. Whether this behavior is correlated with social factors or any other internal ones awaits more data and further research.

suggesting that more than 300 tokens are desirable in cases like this in order to overcome the problem of unbalanced distribution of available data. These together suggest strongly that in a variable rule where the feature [coronal] accounts for the degree of rule application, its constraining factors could be tied to this single feature too.[12]

(6) Factor Weight for Rule Application

Informant		CR Cheng	CL Lin	HC Wei	Combined
No.of Tokens		300	301	300	901
Group	Factor	Weight	Weight	Weight	Weight
1:	ɤ	**0.918**	**0.993**	**0.949**	**0.947**
	i	**0.869**	**0.967**	**0.895**	**0.907**
	a	0.254	0.107	0.275	0.231
2:	t	**0.582**	**0.653**	**0.607**	**0.603**
	q	0.570	0.462	0.504	0.553
	i	0.346	0.820	0.572	0.429
	v	0.267	0.545	0.179	0.366
	c	0.342	0.088	0.325	0.267
3:	f	0.471	0.523	0.535	0.511
	i	0.544	0.462	0.433	0.482
4:	f	0.769	0.480	0.529	0.622
	i	0.440	0.504	0.490	0.470
5:	4	0.685	0.568	0.509	0.607
	1	0.471	0.644	0.461	0.510
	3	0.340	0.364	0.541	0.455
	2	0.315	0.388	0.482	0.371

[12] Note /ɤ/ has even heavier weight than a coronal vowel /i/. The question of how many phonemic vowels (and what are they?) there are in Mandarin may still be left open, behavior of /ɤ/, however, strongly suggests that it patterns with coronal vowel, and not back vowels, at least in cases like this.

Other than these two immediately neighboring factors, all other prosodic factors (i.e., position in the word, position in the intonational phrase and tone value of the syllable in question) do not seem to correlate significantly with the rule application. Thus the entire outcome appears to suggest that [coronal] is the deciding factor in the application of the variable rule of engma realization in Taipei Mandarin.

5. Concluding Remarks

The phonetic realization of final engma in a Taipei Mandarin rime is illuminated by a variable rule analysis. The application of the rule centers around the single feature [coronal], and the results show that significant constraining factors (viz., preceding vowels and following segments) are tied to the feature [coronal] as well, with the ambiguous exception of /ʅ/, which could arguably be related to a coronal vowel /i/. In the preceding vowel factor group, a strongly ordered pattern (ɤ > i > a > o) is found. In the following segment factor group, the fluctuation suggests that more data are needed before a more accurate picture can be delineated. However, coronal consonants always have heavier weight than non-coronal ones, which is another parallel finding. Other factors are not found to be significant, suggesting that in a mono-syllabic language with a predominantly CV structure like Mandarin, fewer factors are involved in sound change. Here, even tone is not playing a role. However, since the data are still limited, this observation should only be suggestive, not final.

The analysis also suggests that more tokens are necessary for a better analysis on factors that have lower frequency from the same informant. Due to practical considerations, social factors (such as age, sex, class, etc.) as well as other possible factors (such as style, speech rate) are not considered here. The three speakers considered here are too similar in social class and educational background to allow us to specualte on the possible effects of social factors. In further work, a consideration of speakers from different age groups may also make possible the assessment of whether engma-variation is a stable, internally-conditioned process, or whether it is in fact a change in progress.

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