# On Phonetic Negative Transfer from Dialect to Mandarin--A Case Study of Vowels in Mandarin with Hengshan Accent

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**Abstract**

It is a popular belief that second language acquisition is strongly influenced by learner's first language. This study makes a tentative research on phonetic negative transfer from Hengshan dialect to standard Mandarin based on the analysis of errors of vowel pronunciation in Mandarin with Hengshan accent by virtue of Praat. The result suggests that pronunciation of simple vowels, compound vowels as well as nasal vowels are more or less influenced by Hengshan dialect.

**Keywords:** Phonetic negative transfer, Hengshan dialect, Mandarin with Hengshan accent, Errors, Vowels

## 1. Introduction

Dialect and standard language arise from the needs of the society and then develop as the society advances. In China, Mandarin is generally used in a formal situation while dialect is usually used in informal situation. Dialect, as one's first native language, is naturally ingrained and fairly proficient for the language user. Odlin (1989) confirms that there is little doubt that native language phonetics and phonology are powerful influences on second language pronunciation. For people who live in dialect region, second language pronunciation will be surely influenced by their native language and thus produce certain accent in second language speech. The interference of the previous knowledge with new learning is called negative transfer, which result in errors in second language speech. Phonological transfer is probably the most common of all in non-native speech, and the least controversial in the literature (Johnson&Johnson, 1999).

This paper intends to study the negative phonetic transfer from Hengshan dialect to Mandarin based on the analysis and comparison of vowels between Mandarin and Mandarin with Hengshan accent, with the purpose of figuring out the features of the latter and how Hengshan dialect influences the Mandarin pronunciation of Hengshan natives.

## 2. Hengshan Dialect and Mandarin

Hengshan is a county of Hengyang City, located in the Southeast part of Hunan Province. In history, Hengshan is composed of Hengshan county, Hengdong county and Nanyue district. The dialect spoken in this area is called Hengshan dialect. Before, the study of Hengshan dialect didn't draw enough attention from the researchers for it was considered as a transitional dialect between Changsha dialect and Hengyang dialect. However, Hengshan dialect is actually distinct and deserves close attention. There are all together 39 vowels in Hengshan dialect (Liu, 2014; Mao, 1995), which can be shown in the picture below.



Figure 1. Vowels in Hengshan Dialect

In Mandarin, there also contain 39 vowels. Through a comparison between the two, some prominent vowel differences can be discovered. Firstly, Hengshan dialect possesses more vowels starting with [y] than those in Mandarin. Secondly, there are no retroflex finals in Hengshan dialect while it's not the case in Mandarin. Thirdly, all the nasal finals in Hengshan dialect are -ŋ while nasal finals in Mandarin are –n and –ŋ. Fourthly, there are many nasalized vowels in Hengshan dialect such as [ĩ], [ã] etc. However, no nasalized vowels exist

in Mandarin. Fifthly, there are two vowels mʾand ŋʾ, which can form syllables all by itself without any consonant.

In 1999, Wang Yade made a comprehensive study of the relationship between Hengshan dialect and Mandarin and concluded the correspondence rules between the two from the perspective of initial consonants, vowels and tone. On account of Wang's analysis, each vowel in Mandarin corresponds to more than one pronunciation in Hengshan dialect. Also many Mandarin pronunciations correspond to the same sound in Hengshan dialect. For example, both *o* and *uo* can produce the sound of [u], like "婆火"; *en*，*eng*，*ong* and *un* are both produced as [əŋ], like "分丰同屯"; *ang*，*uang* and *iang* all produce the sound [oŋ], like "当王央".

Because of the different vowel system between Mandarin and Hengshan dialect, Hengshan natives will be more or less influenced by their own dialect when learning to speak Mandarin, thus creating some errors. The influence reflected in vowels is usually most obvious and hardest to eliminate (Cao, 2012). It's exactly the differences and also the correspondence rules that make the phonetic contact between vowels of the two complicated but traceable.

## 3. Research Method

### 3.1 Research Object and Data Collection

This research randomly took twenty-four primary school students from Grade Four to Grade Six as the studying object, including fourteen girls and ten boys aged from ten to fourteen. All of them are Hengshan natives who acquire Hengshan dialect as the first language and learn Mandarin as the second language. In order to collect the needed corpus and to get authentic pronunciation from the objects, each of them was asked to read the same article "火烧云". It is a required text for every fourth grade primary student to learn and contains 547 words. Before reading the article, the object would skim the text and make sure there is no unfamiliar word for them.

The reason to take article reading as the method to collect data in the present study is that the sounds in flow of speech are natural to a certain degree and can thus present a full picture of objects' pronunciation. During the whole recording process, the author tried to create an undisturbed condition for the object to finish the reading, with the purpose of obtaining the most authentic pronunciation of each word.

### 3.2 Research Tool and Data Analysis

Twenty-four recordings with Hengshan accent and one standard recording are collected. The data processing of the present study is realized by virtue of speech analysis software—Praat, through which the parameters of each sound can be measured in an accurate and scientific way, such as formant, intensity, pitch, duration etc. According to Lin and Wang (1992), formant frequency is the acoustic characteristic of vowels. Hence, pronunciation of vowels is mainly related to formant.

### 3.3 Relationship between Formant and Vowels

Gunnar Fant (1960) defines formants as "the spectral peaks of the sound spectrum". In each sound spectrum, the three lowest formants are the most important factors in the distinction of vowels. Ordered from the lowest frequency to the highest, they are respectively the first formant (F1), the second formant (F2) and the third formant (F3). Having little relationship with speech sounds, both F4 and F5 are not considered in the present study. F1 and F2 can basically decide the tone color of a certain vowel. As for the relationship among vocal cavity, formant frequency and vowel features, Lin and Wang (1992) make a summary as follows.

Firstly, F1 is closely related to high or low position of the tongue. High position and small mouth opening lead to low F1; low position and large mouth opening produce high F2. For example, in single vowels of Mandarin, the F1 of [i], [y] and [u] are the lowest for their tongue position is the highest; on the contrary, F1 of [a] is the highest.

Secondly, F2 is bound up with front or back position of the tongue. Front tongue position brings about high F2 while back tongue position results in low F2. For instance, [i] and [u] are both high vowels, however, F2 of [i] is much higher than that of [u] for [i] is front vowel while [u] is back vowel.

Thirdly, F2 is also relevant to whether the mouth is rounded or unrounded. F2 tends to be lowered a little if the mouth is rounded. For example, the tongue position of [y] and [i] is the same, but F2 of [y] is somewhat lower than that of [i] due to the lip-rounding of [y]. In a similar mode, F2 of [o] is lower than that of [ɤ].

Fourthly, F3 is closely associated with tongue tip. When the tongue tip rolls up, F3 will be lowered obviously.

It is worth mentioning that although the speakers are different and their formant frequencies will definitely be changed accordingly, the pattern of the formants are always unchangeable. Hence, it's possible to compare the sounds of different speakers based on formants.

## 4. Phonetic problems of Vowels in Mandarin with Hengshan Accent

Through a thorough identification of the pronunciation errors of vowels in each recording, the main errors are thus summarized in the table below.

Table1 Main Errors in Vowel Pronunciation

| Words/Word Group | Mandarin | Mandarin with Hengshan Accent | Error Ratio |
|---|---|---|---|
| 那么 | me[mɤ] | [mo] | 50% |
| 茄子紫 | qie[qiɛ] | [qyɛ] | 42% |
| 凶猛 | meng[məŋ] | [mən] | 54% |
| 庙门前 | men[mən] | [məŋ] | 21% |
| 西边/东边 | bian[biɛn] | [bĩ] | 37.5% |

According to the classification of vowels of Chinese syllables, the analysis of the above errors is carried out from the perspective of simple vowels, compound vowels and nasal vowels.

*4.1 Simple Vowels*

There are seven simple vowels in Mandarin: [a], [i], [u], [y], [ɿ], [ɿ], [ɤ]. The pronunciation errors of simple vowels in "火烧云"mainly fall on [ɤ], thus the analysis of this part will center on these two vowels.

(1) e [ɤ]

From the above statistics, there are fifty percent of Hengshan natives making errors when pronouncing the simple vowel e [ɤ]. First, let's have a look at the spectrum of "么" in standard Mandarin and accented Mandarin.
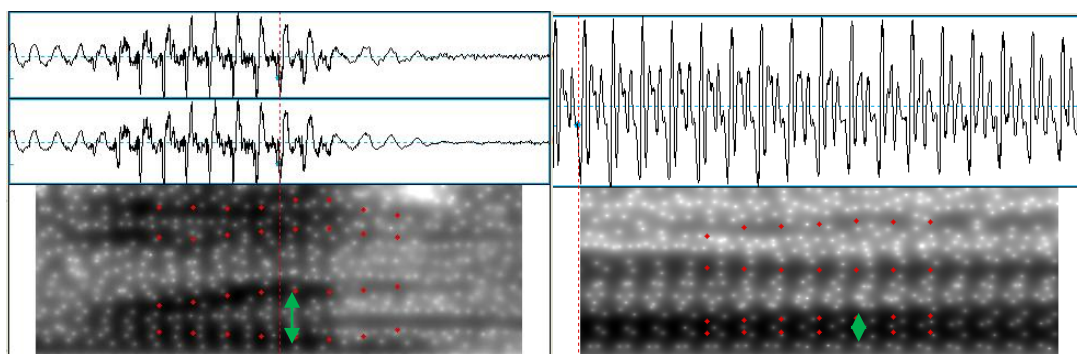


Figure 2. "么" in standard Mandarin          Figure 3. "么" in accented Mandarin

As mentioned above, F1 and F2 are the most important in distinguishing vowels. From the above spectrums, it can be clearly shown that F2 of the right picture is much closer to F1 than the condition on the left. As stated, lower F2 is caused by back tongue position or round lips, which means that when speakers with Hengshan accent pronounce "么", they will round their

lips or shrink back the tongue a little. It's because of the influence from Hengshan dialect, the first language of Hengshan natives. When Hengshan natives pronounce "么" in dialect, they will round their lips and pronounce the sound [mo]. According to behaviorist, a habit was formed when a particular stimulus became regularly linked with a particular response. Behaviorist learning theory predicts that transfer will take place from the first to the second language. Transfer will be negative when there is proactive inhibition. In this case errors will result (Ellis, 2013). Therefore, transfer occurs from Hengshan dialect to Mandarin in the pronunciation of simple vowel e [ɤ].

*4.2 Compound Vowels*

Compound vowels are usually structured as VV or VVV. There are altogether thirteen compound vowels in Mandarin. The pronunciation errors of compound vowels in the recordings mainly appear in the pronunciation of word "茄", hence qie[qiɛ] is the main concern of this part.

(2)  qie[qiɛ]

From Table 1, Hengshan natives who make errors in the pronunciation of [qiɛ] in the present study account for forty-two percent, which is a large proportion. The spectrums of standard Mandarin and accented Mandarin are shown in the below.
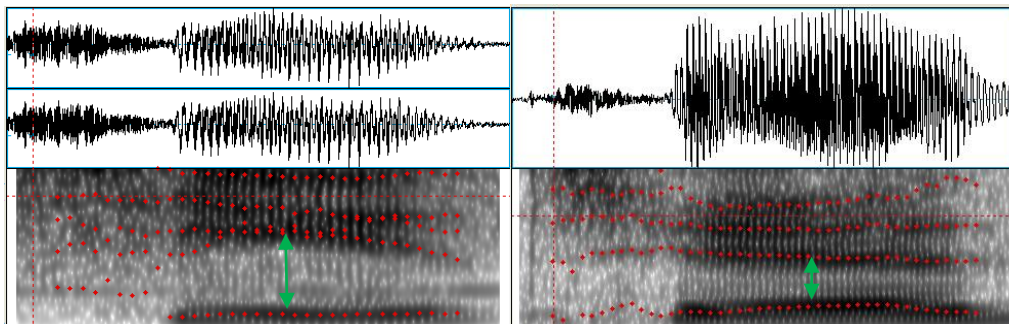


Figure 4. "茄" in standard Mandarin      Figure 5. "茄" in accented Mandarin

From the above pictures, it's obvious that F2 in accented Mandarin is much closer to F1 than the situation in the left. In standard Mandarin, the vowel part of qie is pronounced as [iɛ], which is a compound vowel. When producing a compound vowel, the speech sound begins with one vowel and gradually changes to another vowel within the same syllable (San, 2007). That is to say, [i] is firstly pronounced and then gradually changes to [ɛ]. The pronunciation of [i] can be shown in the mid part of the spectrum.

According to the arrows which show the distance difference between F1 and F2 in the two spectrums, the most significant different appear in the mid part of the spectrum, which suggests the pronunciation of [i]. In the right spectrum, lower F2 suggests that tongue position is shrinking back or lips are rounded a little. In Hengshan dialect, "茄" is pronounced as [qya]. Due to lip rounding, F2 of [y] is lower than that of [i]. It proves that Hengshan natives are influenced by Hengshan dialect and tend to round the lips when produce [i].

*4.3 Nasal Vowels*

In the phonetic system of Mandarin, there are altogether sixteen nasal vowels, among which eight end with front nasal –n and the rest end with back nasal –ŋ. According to the statistics shown in the table above, Hengshan natives tend to produce more errors in pronouncing nasal vowels than the former two kinds of vowels. This part will focus three nasal vowels: [əŋ], [ən] and [iɛn].

(3)　[əŋ] and [ən]

Statistics show that 54 percent of Hengshan natives make errors in pronouncing "猛", whose standard pronunciation is [məŋ]. Below are the two spectrums of sound "猛" in standard Mandarin and Mandarin with Hengshan accent.
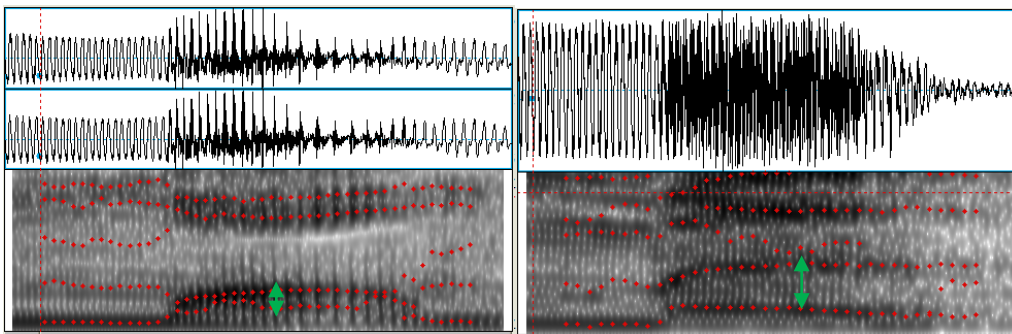


Figure 6. "猛" in standard Mandarin　　　　Figure 7. "猛" in accented Mandarin

In the two spectrums, the formant patterns are different, especially the distance between F1 and F2. In standard Mandarin, F2 is closer to F1 than the condition in accented Mandarin. The pronunciation of major vowel in nasal vowels is influenced to a certain degree by the nasal finals like –n and –ŋ. Wu and Lin (1989) stated that the articulation place of vowels ended with –ŋ usually move backward because of the influence of [ŋ] whose articulation place is the soft palate. On the contrary, articulation place of vowels ended with –n usually move forward for [n] is produced is an alveolar sound. Therefore, under the influence of –n and – ŋ, F2 of vowels followed by –n is higher than that of vowels followed by – ŋ.

From the above pictures, [məŋ] tend to change to [mən] in Mandarin with Hengshan dialect. Also, there is another case when [mən] changes to [məŋ].
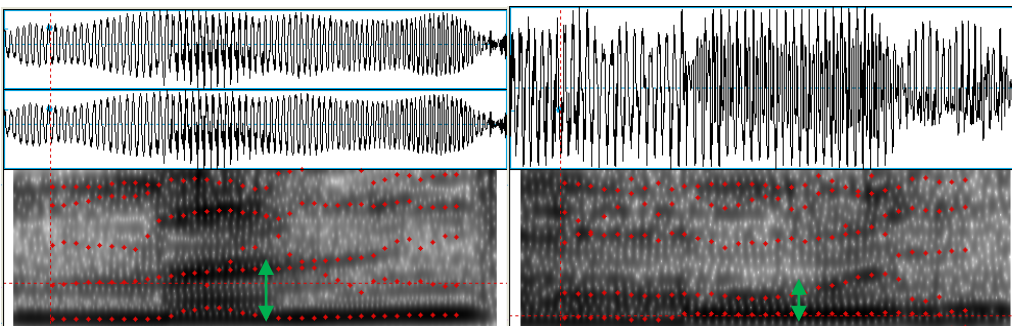


Figure 8. "门" in standard Mandarin　　　　Figure 9. "门" in accented Mandarin

There are 21 percent of speakers with Hengshan accent make the error when pronouncing [mən]. The lowering of F1 in the left spectrums shows that [ən] tends to turn to [əŋ] when pronounced in Mandarin with Hengshan accent.

From the above two cases, it is obvious that Hengshan natives don't distinguish the pronunciation of –n from that of –ŋ, which is a prominent phonetic problems in accented Mandarin caused by Hengshan dialect. As mentioned above, all the nasal finals in Hengshan dialect are –ŋ while in Mandarin there are both –n and –ŋ. Hence, it becomes rather difficult for Hengshan natives to distinguish the pronunciation of front nasal vowels and back nasal vowels, thus leading to the confusion of nasal vowels.

(4) [iɛn]

From the above statistics, there are thirty-seven point five percent of Hengshan natives making errors when pronouncing the nasal vowels [iɛn].
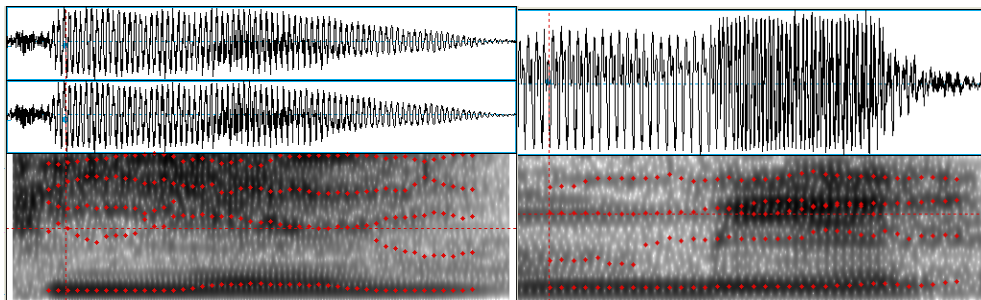


Figure 10. "边" in standard Mandarin      Figure 11. "边" in accented Mandarin

The pronunciation of [iɛn] is correctly shown in the left spectrum. F1 in standard Mandarin presents a small form of arch, showing the transition from [i] to [ɛ] and then [n] for the tongue position of [ɛ] is higher than [i] and [n]. However, F1 and F2 in the right spectrum almost remain flat without any signs of sliding from the first beginning, which suggest the sound in accented Mandarin continues to be the same [i]. Nasal vowel [iɛn] thus turns to be nasalized [ĩ] in Mandarin with Hengshan dialect, which is a negative transfer from Hengshan dialect to Mandarin for Hengshan natives. For in Hengshan dialect,"边"is pronounced as [bĩ].

## 5. Conclusion

Based on a thorough analysis of the errors of vowels made by Hengshan natives in speaking Mandarin, we can figure out ~~the~~ how Hengshan dialect interferes the learning and speaking of vowels in Mandarin. For example, it's rather hard for Hengshan natives to distinguish front nasals from back nasals for there is no need to make such distinction in Hengshan dialect. Also, both simple vowels and compound vowels are influenced by dialect or even the same with dialect. As for the practical pronunciation teaching of Mandarin in Hengshan region, it's necessary for the primary Chinese teachers in this area to focus on the differences between Hengshan dialect and standard Mandarin, thus helping students reduce the learning difficulty which may result in errors.

Due to the limited length of the recording material and small scale of empirical research, only

several errors of vowel pronunciation are found out in the present study. A more comprehensive and large-scale research is needed for future study on phonetic negative transfer from dialect to Mandarin.

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