Phonological Features of China English: An Acoustic Investigation on Segmental Features of Educated China English Speakers

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Abstract

The present study provides a detailed analysis of the English pronunciation of 12 postgraduate students from northern parts of the China (PRC), based on recording data from two task types: word-list reading and passage reading. The research identifies key segmental features of CE spoken by Chinese Mandarin speakers with the help of acoustic measurement instrument (Praat software, version 5.2.05) as well as "subjective hearing".

The findings showed that apart from the differences in articulation position of CE's vowels, absence of contrast between long and short vowels is another salient feature in CE. For diphthongs, shortening of diphthong into monophthong is very common among the 12 participants.

In terms of consonants, the features of CE speakers mainly lie on the sounds without equivalence in Chinese, like /v/, /θ/, /ð/, /ʒ/ and /l/ in middle and final position. However, some pairs with similar sounds in Chinese and English would also cause some negative transfers of CE pronunciation, like /h/ and /x/.

In pronunciation of consonant clusters, unnecessary aspiration of plosives after /s/, vowel epenthesis, and substitution were found to have been the most salient features used by the 12 subjects. Other types of features, like the mispronunciation of consonants and the over-stress of the first consonant of the onset were also found.

Detailed information about the possible reasons of these distinctive features was also explored in the present study.

Keywords

China English, phonological features, English variety, acoustic analysis

1. Introduction

As the globalization prevails in the international world, an increasing number of new English varieties are widely accepted in various types of international cultural and business contacts. A great number of scholars argue that the English spoken by Chinese speakers-China English (CE) will inevitably become a new English variety with the largest number of speakers in the world(Bolton, 2003; Kirkpatrick, 2007; Jenkins, 2009; Xu, 2010). In this context, research on identifying the linguistic features on CE is of great significance. Some extensive research on linguistic features of CE, including pragmatic features, lexical features, and syntactic features of CE have been conducted during recent years, but the studies on phonological features of CE has received little research attention. The present study provides an in-depth instrumental investigation on segmental features of educated CE production in terms of vowels, consonants, and consonants clusters, based on voice recordings of wordlist and passage reading from 12 Chinese educated speakers.

2. Methodology

12 postgraduate students in different majors from mainland China were recruited to participate in the study. A native speaker of British English (BE) was also invited to be the control group when making comparison between the CE pronunciation and native English production. Instrumental measurement (Praat software, version 5.2.05) was used to do acoustic analysis of the recordings. Besides, subjective hearing and phonetic IPA transcription were also used as supplementary. In addition, two raters who have received formal training in phonetics and phonology were invited to help me transcribe the voice

recordings into IPA. Both of them are English-major postgraduate students from the Hong Kong Institute of Education.

Two types of tasks, including wordlist reading and passage reading were conducted so as to investigate the segmental features of CE in both separated words and connected speech.

3. Findings

As the most important parameter to describe vowel quality, the formants were also used as the indicators to explain the segmental features of CE in current study. In Ladefoged (2005), F1(first formant frequency) was described as an indicator of the height of the vowel, and it is inversely related to vowel height; while F2(second formant frequency) indicates the degree of backness of vowel position.

In the following analysis, acoustic vowel qualities of F1 and F2 values were measured and analysed. One point that needs to be clarified here is the British English sounds are used here only for a point of comparison when describing the features of CE, there was no intention to set the native English production as the standard.

3.1 Long vowels of CE

The average formants and duration of 12 participants were used as the representative tokens of CE vowels when making comparison with BE. As presented in Table 1 and Figure 1, almost every pair of long vowels shows some differences in F1 and F2 values, among which, the most salient features include the following ones. Firstly, the average F1 of /iː/ in CE is lower than that of native speaker, which indicates the higher position of tongue when CE speakers pronounce/iː/. Secondly, F2 of /əː/ in CE is lower than that of native speaker, which suggests that CE speakers put their tongue backer when they pronounce /əː/. On the contrary, F2 of/ɔː/ in CE is much higher than that in native English production, in other words, the position of CE speaker's tongue is in front of that of native English speaker when pronouncing /ɔː/, so does it to /ɑː/in CE.

The following Figure 1 provides us a clearer picture of the differences between long vowels of CE and BE in terms of its F1 and F2, indicating differences in articulation position and manner of CE speakers. It is these differences that provide the main reasons of distinctive features of CE.

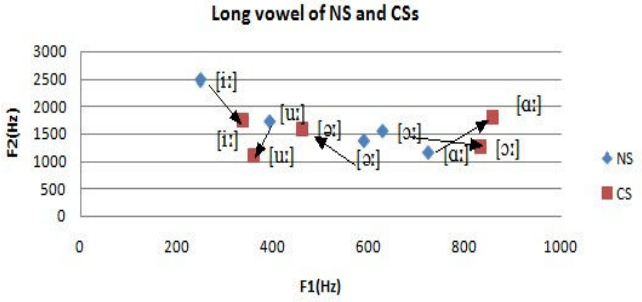
Table 1:The contrast between vowels of BS and CS

Long Vowel		[ɑː]	[ɔː]	[əː]	[iː]	[uː]
Duration(ms)	NS	224	220	270	753	259
	CS	165	239	347	150	340
F1(Hz)	NS	724	629	590	250	394
	CS	858	833	462	338	360
F2(Hz)	NS	1159	1557	1376	2485	1735
	CS	1806	1268	1597	1755	1112

Short Vowel		[ʌ]	[ɒ]	[ə]	[ɪ]	[ʊ]	[e]	[æ]
Duration(ms)	NS	110	152	193	107	190	220	124
	CS	138	184	182	124	260	239	77
F1(Hz)	NS	624	750	589	506	519	734	839
	CS	960	835	591	348	406	825	802
F2(Hz)	NS	1348	1130	1539	2042	1199	1823	1850
	CS	1836	1135	1786	1461	1305	1656	2072

Note: NS=native English speaker
CS=Chinese English speaker

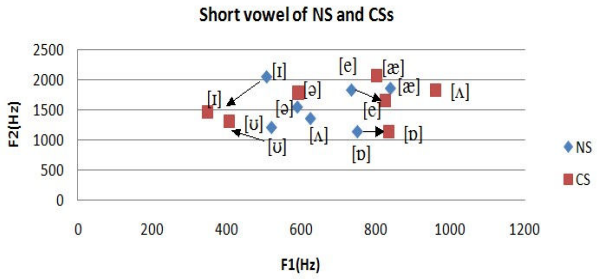
Figure 1: Long vowels of NS and CSs



3.2 The short vowels of CE

Compared with British English, CE demonstrates more distinctive features in short vowels, among which, the pronunciations of /ɪ/ and /ʌ/ in CE are especially different from native English, as seen in Table 1. /ɪ/ produced by CE speakers is lower both in F1 and F2 than that of native speaker, which shares a very similar position of long vowel /iː/ in CE. It indicates that CE speakers have higher and backer position of tongue when they pronounced /ɪ/ than the BE speaker also seen in Figure 2. Apart from that, CE speakers have much higher value of /ʌ/ both in F1 and F2, indicating the lower and fronter position of /ʌ/. In Figure 3 we can find that the position of /ʌ/ is close to long vowel /ɑː/. More details about the contrast between short and long vowels are discussed in the following part.

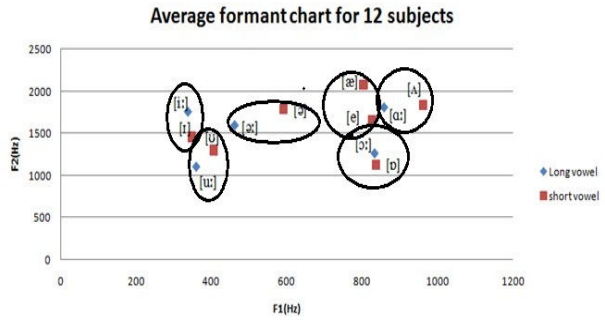
Figure 2: Short vowels of NS and CSs



3.3 Absence of contrast between pairs of long and short vowels.

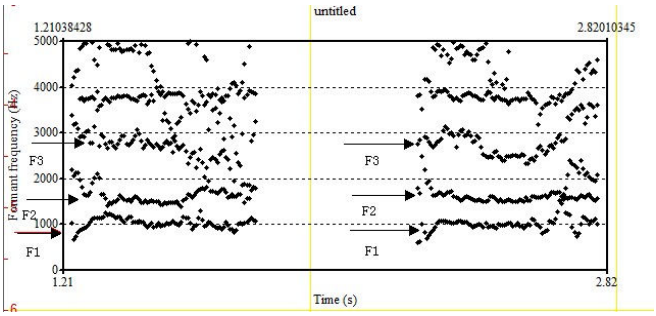
As shown in Figure 3, the positions of a pair of long and short vowels are close to each other, which indicates that there are less contrasts in the pair of short and long vowels sound in CE compared to BE, for instance, /ɪ/ and /iː/ in *did* and *deed* are normally pronounced as the same sound-long vowel /iː/, and /ʊ/ and /uː/ in *pull* and *pool* are normally pronounced as long vowels sound/uː/. Chinese speakers of English have a tendency to pronounce short vowel sound as long vowel sound. Some subjects even did not present any differences between a pair of short and long vowels when reading passage. The possible reason is that their attention to pronunciation accuracy would be distracted when they conducted less formal language tasks.

Figure 3: Average formant chart for 12 subjects



From the point of view of BE, the differences between the short and long vowels are not only in the duration of vowels, but also in the articulation position and manner. However, CE speakers showed few differences in 3 formant frequency of a pair of vowels, such as /ɑː/ in *dark* and /ʌ / in *duck*, as shown in Figure 4.

*Figure 4: S*ubject 10's pronunciation of the words *dark* and *duck*



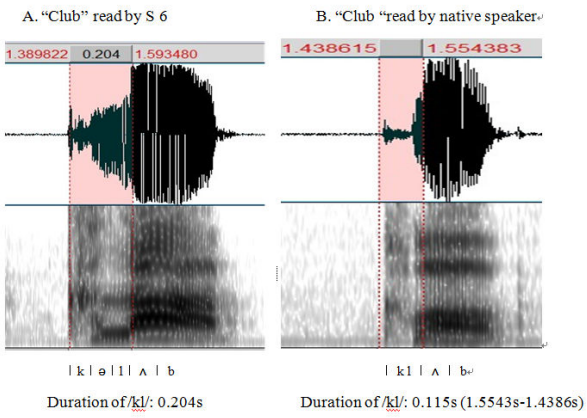
3.4 Consonant

According to previous research, some English sounds without counterpart in Chinese would cause considerable difficulties for CE speakers. According to present study, the features mainly lie on the sound of /v/, /θ/, /ð/, and /ʒ/, because they have no equivalence in Chinese. In addition, some pairs with similar sounds in Chinese and English would cause some negative transfer of CE pronunciation, like/h/and/x/. In Chinese pinyin, /x/ is a velar fricative, while /h/ in English is a glottal fricative. Even though they share some similar sound property, there are still big differences between them. However, CE speakers tend to replace/h/ with/x/ in most cases.

3.5 Consonant clusters

This part comprises two parts: initial consonant cluster and final consonant cluster. For initial consonant clusters, unnecessary aspiration of plosives after /s/, vowel epenthesis (see an example in Figure 5), and substitution were found to have been the most salient features of 12 CE speakers. In terms of final consonant clusters, insertion of extra vowel and deletion of plural form /s/ after the fricative /ð/ and /θ/ are most frequent features manipulated by CE participants.

Figure 5: The spectrum pictures showing vowel epenthesis: club/klʌ b/→/ kəlʌb/(Subject 6)



4. Conclusion and Implication

After the current research of phonology of CE, the following conclusions can be drawn.

CE, as an emerging outer circle variety of English, has its distinctive and systematic features of its own. But the features here we discussed are a "tendency" in phonological, I have no intention to declare that all CE speakers share the same characteristics. According to current study, CE has been influenced by Chinese pinyin system to a great extent. Besides, the tendency to simplify the difficult sounds would be another explanation for some discovered features.

Further explorations are needed to investigate whether the segmental features of CE would affect the intelligibility and effectiveness of communication. As far as I am concerned, the phonological patterns of CE which could achieve international intelligibility could be identified and kept as features of CE, but if the special patterns of CE speakers affect the intelligibility of Chinese learners' English production, they should be considered as "pronunciation errors" which need to be corrected and avoided. The findings of the study provide empirical evidence to support a number of earlier claims about the phonological features of China-accent English, and also explore segmental features of China English with acoustic approach.

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