

The Phonological Variation of Mandarin Chinese and English Among Children of Immigrants from China in Singapore

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Abstract In order to evaluate the extent to which the children of immigrants from China acquire features of Singapore Mandarin and Singapore English, the present study focuses on the phonological variation of Mandarin Chinese in light of retroflex fronting (merger of retroflex and dental sibilant initials from /tʂ, tʂ^h, ʂ/ to [ts, ts^h, s]) and depalatalization (/ç/ → [s]), and English in terms of th-stopping (initial /θ/ is replaced by [t]), final consonant cluster simplification (syllable-final [t] and [d] deletion when they occur with another consonant before) and merger of /æ/ and /e/. A total number of 16 children whose parent(s) is from China were involved in the research to complete Mandarin and English picture-card elicitation task, semi-structured interview and Expressive Vocabulary Test (EVT2). They were found to use more features of Singapore English and fewer features of Singapore Mandarin.

Keywords children, China, Singapore Mandarin, Singapore English, phonological variation

1 Introduction

With the increased social and population mobility, individuals and households tend to move from one region to another more frequently to seek opportunities of employment, education and living environment. This international movement in turn creates sociolinguistic situation in which people acquire features of the new language or dialect. The linguistic acquisition is considered to be dependent on speakers' social circumstances and interactions with otherness. Concerning potential influences on the acquisition of phonemes, Payne's (1980) study in a place called King of Prussia in Philadelphia indicates that it is children's parents who had a strong influence on children's acquisition of the [e:ə] vowel from /æ/. Similarly, Chamber (1992) also claims that age (early and late acquirers) is one of the important indicators that determine the rate of acquisition of a new dialect. Therefore, the investigation among children of immigrants can be significant to understand the linguistic variation occurring in the interdialectal processes.

It is also worth noting that Singapore tends to be an ideal place for linguists to expand energy on discovering the mechanisms of change in terms of linguistic variations among immigrants. As a multiracial and multicultural country in the world, Singapore is made up of different ethnic groups, with 76.2% of the citizen population being ethnic Chinese, 15.0% of the population being indigenous Malays, and 7.4% being ethnic Indians (Demographics of Singapore, n.d.). More significantly, the

growth of population in Singapore is fueled by immigration. That is, Singapore is sculptured by continuous influx of immigrants from China, Malaysia and India, particularly Chinese migrants, which in turn has a deep impact on Singapore's racial profile. In this scenario, the language policy in Singapore also reflects its multiracial and multicultural features by introducing bilingual education in schools. All students are instructed and tested in English and at the same time, they are required to acquire their Mother Tongue (based on their ethnicity) as a single subject (Dixon, 2005). For example, the ethnic group of Chinese take Mandarin Chinese course in schools as their mother tongue.

In addition, unlike Britain, America, and Australia as "inner circle" nations and China as an "expanding circle", Singapore is recognized as an "outer circle" nation (Kachru, 2006) where English is the medium of all instruction in local institutions and is widely acquired as a non-native language with particular linguistic features.

Therefore, when children of immigrants from China start to study in Singapore, they acquire English as a second language and Mandarin Chinese as a second dialect. In this way, it is interesting to investigate the linguistic variation in Mandarin Chinese and English among children of immigrants from China in Singapore.

In this paper, I examine the extent to which the children of immigrants from China adopt features of Singapore Mandarin and Singapore English. I primarily focus on the phonological variation of Mandarin Chinese in light of retroflex fronting (merger of retroflex and dental sibilant initials from /ʈʂ, ʈʂʰ, ʂ/ to [ts, tsʰ, s]) and depalatalization (/ç/ → [s]), and English in terms of th-stopping (initial /θ/ is replaced by [t]), final consonant cluster simplification (syllable-final [t] and [d] deletion when they occur with another consonant before) and merger of /æ/ and /e/. Quantitative methods and acoustic analysis are employed to provide informative evidence of the phonological changes among the young acquirers.

1.1 Singapore Mandarin

Mandarin Chinese is one of the four official languages in Singapore. However, the one spoken by people in Singapore is a variety of Mandarin Chinese, Singapore Mandarin (SM). It involves linguistic borrowing from Chinese southern dialects Hokkien, Teochew, Cantonese, Hakka and Hainanese due to the influx of Chinese settlers from Fujian, Guangdong and Hainan during the 19th century (Singaporean Mandarin, n.d.).

Phonologically speaking, SM is distinct from Mainland variety, Standard Mandarin Putonghua, particularly with respect to retroflex fronting (merger of retroflex and dental sibilant initials from /ʈʂ, ʈʂʰ, ʂ/ → [ts, tsʰ, s]), dental backing (hypercorrection of dental sibilant initials to retroflex /ts, tsʰ, s/ → [ʈʂ, ʈʂʰ, ʂ]) and depalatalization (/ç/ → [s]). Morphologically speaking, lexical items used in SM are also largely different from Putonghua such as 德士 (SM) /出租车 (Putonghua) 'taxi', 乐龄 (SM) /老龄 (Putonghua) 'old people', etc.

By interviewing 46 Singapore Huayu (Mandarin) speakers, Graham's (1989) research tracks the patterns of variation in nonstandard SM with respect to 3 phonological features (lack of initial retroflexion, change from [y] with rounding to [i] without rounding, (ng) variable being realized with final [ŋ] instead of [ŋ]) and 1 grammatical feature (有 'have' +verb). According to this study, 25 out of 46 informants did not show syllable initial retroflexion, and some speakers who occasionally used initial retroflexion showed hypercorrection.

However, little investigation has been done of children's variation in Mandarin Chinese in Singapore, in particular the expatriate children from China.

1.2 Singapore English

In addition to SM, Singapore English (SE) is also observed to go through similar processes. It is primarily influenced by British English (Received Pronunciation); however, it also borrows features from Malay, Indian and Chinese in terms of lexical choices and syntactic structures. More prominently, SE has a variety of phonetic and phonological features including th-stopping (/θ/ is sometimes replaced by [t] and /ð/ by [d]), final consonant cluster simplification (syllable-final [t] and [d] deletion when they occur with another consonant before), insertion of extra [t] and [d] at the end of the words, merger of /æ/ and /e/, non-aspirated initial voiceless stops and non-prevocalic /r/, etc. (Deterding, 2007).

With regard to sociolinguistic perception of SE among expatriate children in Singapore, Starr, et al (2017) investigates the acquisition of sociolinguistic knowledge among local and expatriate children in Singapore and the extent to which they share sociolinguistic knowledge and norms. By inviting 114 children to engage in a region identification task and occupation judgment task, the research aims to examine their perception of various English dialects, ranging from Australian English, Northern-China-accented English, Filipino English and SE. Interestingly, children who attend Singapore local schools tend to be more familiar with local norms than those in international schools.

However, insufficient examinations of the extent to which the expatriate children adopt more features of SE have been conducted, in particular the phonological variation.

1.3 Contemporary migration from China

As People's Republic of China (PRC) becomes the major source of new migrants in Singapore, varied characteristics of modern Chinese migrants and social tensions are being brought into spot. The paper by Yeoh (2013) also provides a sketch of different classes of migrants in depth.

Low-skilled migrant workers from China such as construction workers, manufacturing workers and cleaners, etc. have been found consistently in Singapore

since 1980s. These “work permit holders” earn low and irregular income and live away from families. From the 1990s on, educated and skilled Chinese expatriates have immigrated to Singapore for a better living and wealth. They are employed in the fields such as banking, retail industry, law and public relations. They are more financially able to bring families to Singapore. Apart from low-skilled workers and educated talents, in the early 2000s, a sizable number of Chinese students with “study mothers” have moved to Singapore to take advantage of Singapore’s high-quality English-medium education system. In this light, these students from China strengthen Singapore’s position as “a global talent hub and repository for skilled workers” (Yeoh, 2013: 39).

Therefore, with more immigrants from China moving to Singapore with different socio-economic backgrounds from low-skilled, to educated and to students, they tend to have children in Singapore or bring their children to Singapore as well to provide opportunities for their kids to receive highly ranked education, to study in a bilingual education environment, to “plot a personal transitional journey to more popular destinations” (Yeoh, 2013: 40) and to live in a wealthier and more developed environment compared to China.

Thus, it is reasonable and feasible to investigate the language variation among these children of immigrants from China.

1.4 Sociophonetic approaches

Methodologically, the work is quantitatively based in terms of data collection. Reading-aloud task and interviews are commonly used by sociolinguistic researchers. Specifically, picture-card elicitations and phrase-list readings are utilized in the research of children’s dialect acquisition by Chambers (1992). Interviews with children and parents are used in Payne’s (1980) research to examine the extent to which children acquire the phonological features of a new dialect after migrating from one dialect region to another.

Alongside with audio recording of those tasks, the acoustic analysis is commonly seen in the sociophonetic domain. Specifically, when vowel variations are involved, the analysis of first and second formants (F1 and F2) is necessary. As is known, F1 is closely associated with the height of tongue position and F2 is inextricably linked up with the front/back dimension.

For example, Hay and Drager (2007) review the significance of acoustic phonetic analysis, in particular the investigation of acoustic vowel quality. By referring to many other studies in sociophonetic area, they emphasize the tradition that researchers prefer to measure F1 and F2 of vowels to place them in a two-dimensional vowel space. This technology allows for the measurement of gradient differences.

In the present study, the sociophonetic approaches mentioned above are applied to explore the phonological variation in Mandarin Chinese and English among

children of immigrants from China in Singapore.

2 Methodology

2.1 Data Collection

The present language variation study involved four tasks: A Mandarin picture-naming task, an English picture-naming task, a semi-structured interview and an expressive vocabulary assessment. Prior to the session, parents of the participants were encouraged to complete a child's language background questionnaire indicating their child's migration information, education background and languages spoken at home, etc.

The present study was administered on a computer and an H4n Zoom recorder was used to take audio-recording of the participants. The tasks were conducted in the experimental linguistics laboratory at the National University of Singapore.

To encourage participants and engage their attention, positive feedback was given after each picture-naming regardless of their response. Stickers were awards for all the participants when they completed the tasks. In terms of the expressive vocabulary assessment, it was based on the Pearson Expressive Vocabulary Test, Second Edition (Pearson EVT2). A guided picture description task was involved in this evaluation tool to provide standardized expressive vocabulary scores. According to the overall performance of a sample group of American speakers, the standardized scores have been normalized by Pearson (Pearson, 2016)

2.2 Participants

A total of 16 children ages 3-6 participated in the present investigation. All these children were of immigrants from China, meaning they had at least one parent born in China and they were born in Singapore, or moved to Singapore and lived in Singapore for at least one year. 87.50% of the participants were born in Singapore, while only 2 participants who were born in China but lived in Singapore for more than 4 years. Among the participants, 9 of them were boys (56.25%) and 7 were girls (43.75%). All participants were attending pre-schools or other educational institutions in Singapore where English was a major medium of instruction. In addition, all the participants are able to speak and understand both Mandarin Chinese and English. Table 1 lists the basic information of the 16 participants in this study.

#	Gender	Age	Place of Birth	Parents are from ...		EVT2 Normalized Score
				Mother	Father	
1	male	4:09	Singapore	China	China	94
2	male	4:11	Singapore	China	China	92

3	female	3:00	Singapore	China	China	94
4	male	4:04	Singapore	China	China	123
5	female	3:07	Singapore	China	Philippines	113
6	male	6:11	China	China	China	100
7	female	5:09	Singapore	China	Malaysia	92
8	female	4:04	Singapore	China	China	88
9	male	5:00	Singapore	China	China	110
10	male	3:01	Singapore	China	China	98
11	female	3:05	Singapore	China	China	95
12	female	6:06	Singapore	China	Malaysia	109
13	male	5:07	China	China	Singapore	118
14	male	6:09	Singapore	China	Singapore	93
15	female	5:11	Singapore	China	China	96
16	male	5:02	Singapore	China	Singapore	104

Table 1: Basic information of the 16 participants with EVT2 scores

EVT2 scores are provided for the reference to their English vocabulary levels. A normalized score of 100 corresponds to the 50th percentile, meaning that they scored better than 50% of children the same age. The higher the normalized score is, the better they performed in the test. Table 1 also illustrates that 9 of the children's scores were below 100, while 7 of them were above 100.

2.3 Task Description

In the Mandarin picture-naming section, participants were firstly told to read the word or phrase on the screen aloud in Mandarin as accurately as they could. All the words and phrases were written at the top of the slides and there was a picture and an English translation to go with each slide (see Figure 2).



Figure 2: Mandarin picture-naming: test the voiceless alveolar-palatal sibilant/ç/.

Each Mandarin word targeted at one phonological feature to be tested. Table 3 lists the 14 words that include initial retroflex /ʈʂ, ʈʂʰ, ʂ/ and voiceless alveolar-palatal sibilant/ç/.

#	Word	Meaning	IPA of the bolded word	Targeted phoneme
1	香蕉	Banana	[ɕian]	/ɕ/
2	照片	Photograph	[ʈʂau]	/ʈʂ/
3	火车	Train	[ʈʂʰɤ]	/ʈʂʰ/
4	手	Hand	[ʂou]	/ʂ/
5	长颈鹿	Giraffe	[ʈʂʰaŋ]	/ʈʂʰ/
6	知道	Know	[ʈʂi]	/ʈʂ/
7	生气	Angry	[ʂəŋ]	/ʂ/
8	猪	Pig	[ʈʂu]	/ʈʂ/
9	书	Book	[ʂu]	/ʂ/
10	身体	Body	[ʂən]	/ʂ/
11	西瓜	Watermelon	[ɕi]	/ɕ/
12	中国	China	[ʈʂoŋ]	/ʈʂ/
13	出门	Go out	[ʈʂʰu]	/ʈʂʰ/
14	船	Boat	[ʈʂʰan]	/ʈʂʰ/

Table 3: 14 words with IPA and targeted phonemes.

After which, 7 another images were shown to the children of things they might see in their daily life. Participants were then encouraged to tell the researcher what they called the thing in each picture in Mandarin, and if they knew any other Mandarin words that people used for the item (see Figure 4). This aims to evaluate their lexical variety in Mandarin: whether they have the linguistic knowledge of lexis from SM or Putonghua.



Figure 4: Identify picture in Mandarin: how participants call “bus” in Mandarin.

The 7 English words are listed in Table 5 with both SM translation and Putonghua translation.

#	English word	Translations	
		SM	Putonghua
1	Potato	马铃薯	土豆
2	Bus	巴士	公交车/公共汽车
3	Taxi	德士	出租车/的士
4	Pineapple	黄梨	菠萝
5	Broccoli	花(椰)菜	西蓝花
6	Bedroom	房间/睡房	卧室
7	Spoon	汤匙	勺子/调羹

Table 5: English words with translations in SM and Putonghua.

Similarly, in the following English picture-naming section, participants were told to read the English words aloud as accurately as they could. There were 18 images showing English words at the top of the slides and pictures related to the words went with each slide (see Figure 4).



Figure 6: English picture-naming task: test the pronunciation of /æ/.

The 18 words were used to test the 3 phonological features in SE in terms of th-stopping, syllable-final [t] and [d] deletion, and merger of /æ/ and /e/. Table 7 illustrates the detail of the words tested.

#	Word	IPA	Targeted phoneme	#	Word	IPA	Targeted phoneme
1	throw	[θrəu]	/θ/	10	plant	[plant]	[t] deletion
2	bat	[bæt]	/æ/	11	hat	[hæt]	/æ/
3	hand	[hænd]	[d] deletion	12	tent	[tent]	[t] deletion
4	bed	[bed]	/e/	13	sand	[sænd]	[d] deletion
5	three	[θri]	/θ/	14	thumb	[θʌm]	/θ/
6	nest	[nest]	[t] deletion	15	cat	[kæt]	/æ/
7	think	[θɪnk]	/θ/	16	head	[hed]	/e/
8	ten	[ten]	/e/	17	fast	[fast]	[t] deletion
9	bag	[bæg]	/æ/	18	pet	[pet]	/e/

Table 7: 18 words with IPA and targeted phonemes.

Prior to the EVT2 test, a semi-structured interview took place. Questions about participants' hobby, schooling, family and the like were asked. Table 8 indicates the detailed information of the interview questions.

#	Interview questions
1	How many people are in your family?
2	What do you like to do with your family?
3	Do you go to school?
4	What is your favorite part of your school?
5	What do you do after school?
6	What is your favorite place to go? Why?
7	Do you play games?
8	What is your favorite game? How to play it?

Table 8: Interview questions.

3 Findings

In this section, the findings are presented in terms of the phonological variation in Mandarin, lexical ranges of Mandarin expressions, and the phonological variation in English. With regard to this, the extent to which the children of immigrants from China adopt features of Singapore Mandarin and Singapore English is centrally examined and discussed.

3.1 Phonological variation in Mandarin

In light of the phonological variation in Mandarin, two main linguistic features were examined, namely the merger of retroflex and dental sibilant initials from /ʈʂ, ʈʂʰ, ʂ/ to [ts, tsʰ, s] and depalatalization from /ɕ/ to [s]. Overall, participants show significant changes in these two processes.

3.1.1 Merger of retroflex and dental sibilant initials from /ʈʂ, ʈʂʰ, ʂ/ to [ts, tsʰ, s]

Figure 9 illustrates the participant performance in pronouncing the Mandarin words with initial retroflex /ʈʂ, ʈʂʰ, ʂ/. There are 12 words involving the linguistic feature initial retroflex with 4 instances for each form. It is clear to notice that the majority of the words have been used with initial retroflex /ʈʂ, ʈʂʰ, ʂ/, which is in the standard way compared to the way in SM. However, fewer than 8 participants sound Singaporean when uttering each word. Particularly, “手”, “长颈鹿”, “书” are the most frequently non-retroflexed words in the Mandarin picture-naming task.

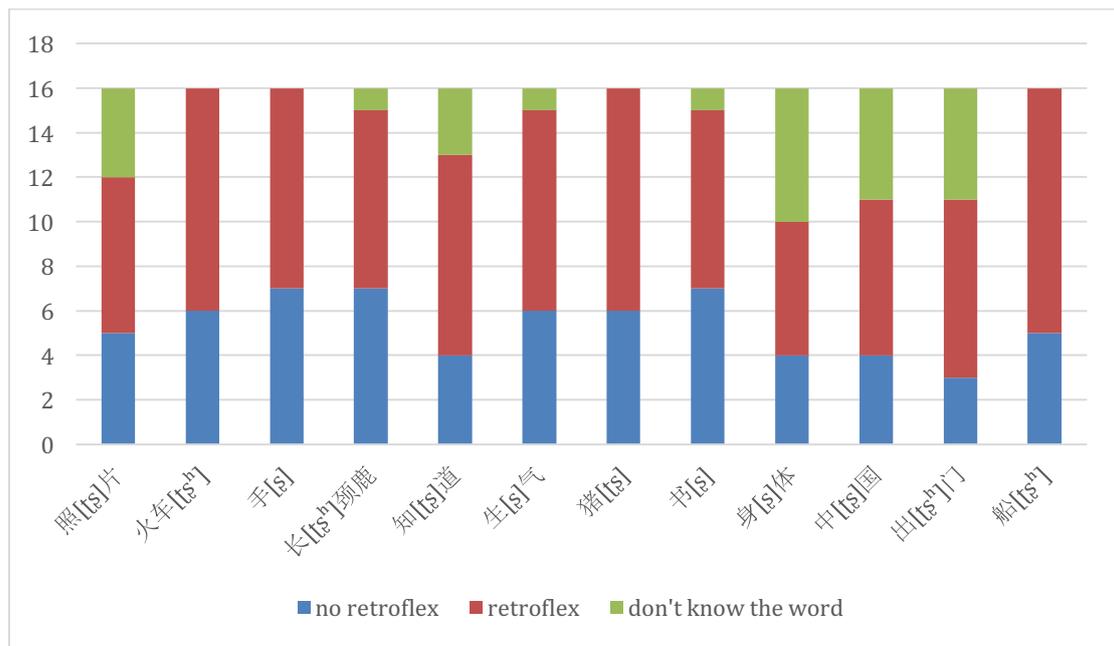


Figure 9: Participant linguistic performance in pronouncing words with /ʈʂ, ʈʂʰ, ʂ/.

In the interest of the merger of retroflex and dental sibilant initials from /ʈʂ, ʈʂʰ, ʂ/ to [ts, tsʰ, s], 37 out of 64 /ʈʂʰ/ tokens are produced with retroflex [ʈʂʰ], which tends to be the most prominent feature among the participants. /ʈʂ / and /ʂ/ tokens have 33 and 32 instances respectively with retroflex. On the other hand, only about 20 tokens for each sound show SM phonological feature. (see Figure 10)

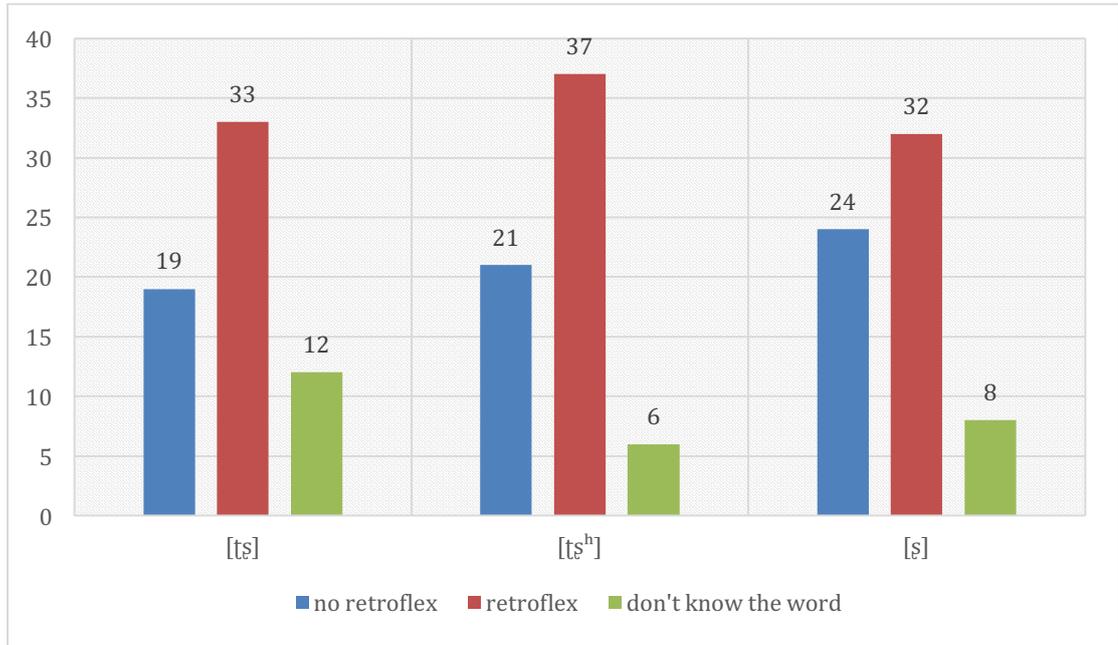


Figure 10: The distribution of the 64 tokens of each sound.

Interestingly, participants whose fathers are from Singapore exhibit significantly high percentage of using non-retroflex pattern. That is, they tend to utilize SM phonological features in terms of the merger of retroflex and dental sibilant initials from /ʈʂ, ʈʂʰ, ʂ/ to [ts, tsʰ, s], lacking initial retroflex. Figure 11 illustrates that 83.33% of the words are pronounced with non-retroflex feature by children whose fathers are from Singapore, while only 23.61% of the expressions are used with non-retroflex form in the speech of children whose fathers are from China, Malaysia and Philippines.

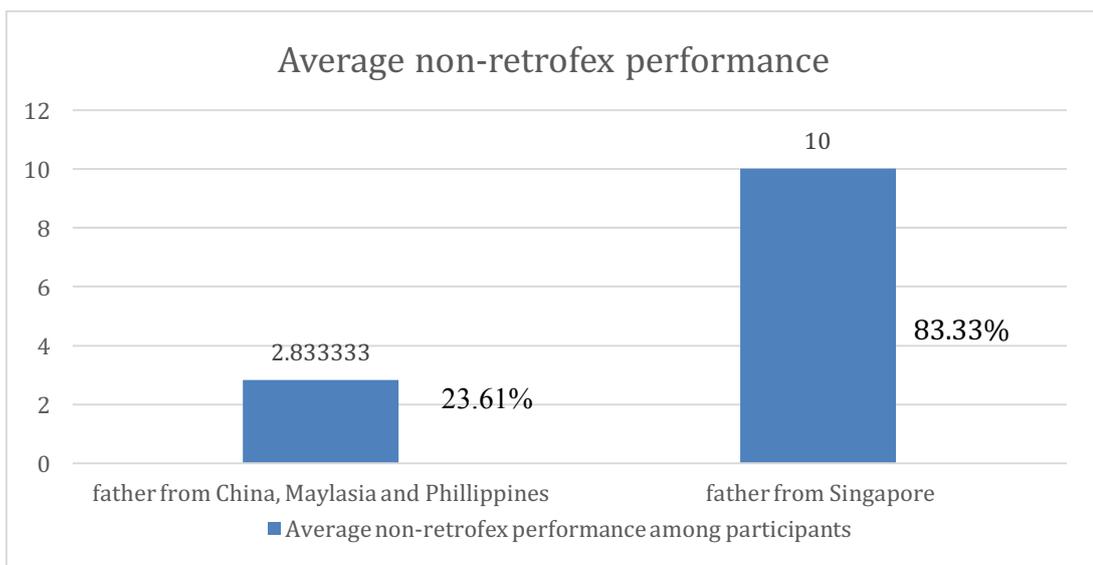


Figure 11: Average non-retroflex performance based on the origins of fathers.

3.1.2 Depalatalization from /ɛ/ to [s]

In terms of another SM phonological feature, depalatalization from /ɛ/ to [s], there is no prominent and significant finding to support that children of immigrant from China show the pattern from /ɛ/ to [s] in the pronunciation of “香蕉” and “西瓜”. Only 2 participants, at the age of 4 years old and 5 years old, tend to show depalatalization. The rest of the informants are able to use [ɛ] as initial consonant in the given words.

3.2 Lexical ranges of Mandarin expression

Table 12 presents the lexical variety of Mandarin expressions including naming “potato”, “bus”, “taxi”, “pineapple”, “broccoli”, “bedroom” and “spoon”. Surprisingly, children participants have limited or even inaccurate Mandarin lexical choices for items they see and use in their everyday life.

#	English word	Performance			
		SM	Occurrences	Putonghua	Occurrences
1	Potato	马铃薯	2	土豆	3
2	Bus	巴士	11	公交车/公共汽车	公交车: 1; 公共汽车: 2
3	Taxi	德士	3	出租车	6
4	Pineapple	黄梨	0	菠萝	6
5	Broccoli	花(椰)菜	1	西蓝花	1
6	Bedroom	房间	6	卧室	0
7	Spoon	汤匙	3	勺子/调羹	勺子: 14; 调羹: 1

Table 12: Lexical variety of Mandarin expressions

To be more specific, only 2 participants know the name of “broccoli” in Mandarin, with 1 child using “西蓝花” in Putonghua and another using “花(椰)菜” in SM. “Pineapple” is also limitedly utilized in Mandarin among the participants, with only 6 children have the knowledge of its name “菠萝” in Putonghua. None of the 6 informants uses SM “黄梨” to express the same meaning. Furthermore, there are only 6 participants identify “bedroom” as “房间” in SM. Another similar pattern can be seen from the use of “potato” in Mandarin. 5 children use “土豆/马铃薯” (with 3 of them use “土豆”, 2 use “马铃薯”), while there are 5 children uttering an incorrect name “番薯/土瓜” (usually used for “sweet potato”). In light of the Mandarin name of “taxi”, interestingly, 5 children use “出租车”, and 1 child knows both versions of “出租车/德士”, compared to 2 participants who only use SM “德士”. However, in the interest of “bus”, a total number of 10 participants are able to utter either “巴士” (with 9 children) or “公交车” (with 1 child), and 2 informants know both “巴士” and

“公交车”。 There are 2 participants using both “巴士” and “公共汽车” to name a “bus”. In terms of the identification of “spoon”, all the 16 children succeed in uttering “勺子/汤匙”, with 13 informants knowing “勺子” in Putonghua and 3 knowing SM “汤匙”. There is only 1 participant using both “勺子” and “调羹” in Putonghua.

Therefore, in terms of the lexical choices of “bus” and “bedroom”, more participants tend to use words in SM to express the idea. Overall, however, children have more knowledge of lexical items in Putonghua.

Figure 13 also illustrates the information about how many kinds of lexical items each child knows. Specifically, participants NO. 4, NO. 7, NO. 9, NO. 13 and NO. 14 are those who could utter 2 words for each picture to identify “spoon”, “bus” and “taxi”. Participant NO. 14, whose father is from Singapore, performed the best in this section due to his successful identification of “bus” as “巴士/公交车” and “taxi” as “德士/出租车”. Participant NO. 4 was able to identify “spoon” as “勺子/调羹” in Putonghua, which shows he had little knowledge of the expression of this item in SM. Speakers NO. 7, NO. 9 and NO. 13 were all able to identify “bus” as “巴士/公交车” or “公共汽车”. The rest of the participants failed to give more than 1 lexis to identify the given picture.

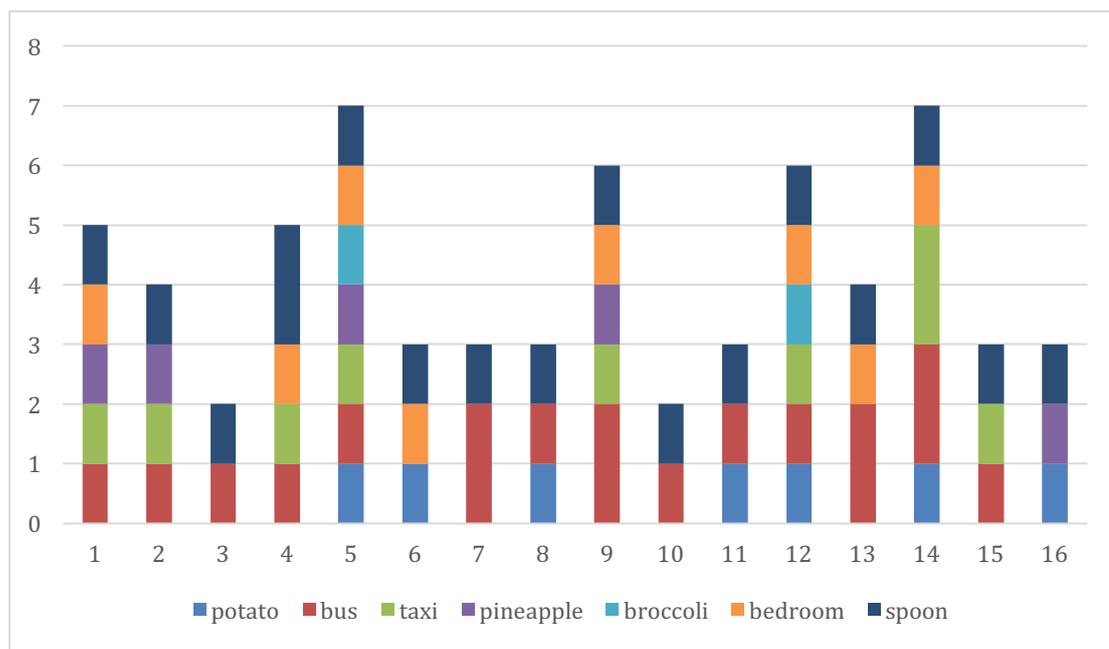


Figure 13: The number of lexical items each child knows.

3.3 Phonological variation in English

The phonological variation in English can be realized in 3 different aspects according to the phonological features in SE: th-stopping ([θ] is sometimes replaced by [t]), final consonant cluster simplification (syllable-final [t] and [d] deletion when they occur with another consonant before) and merger of /æ/ and /e/.

3.3.1 th-stopping

Figure 14 illustrates the overall participant performance in the pronunciation of initial “th /θ/” as in “throw”, “three”, “think” and “thumb”. Over the 64 tokens of /θ/, with only 6 of them (9%) failing to include sporadic occurrences of dental fricative from /θ/ to [t], there are 48 instances (75%) where /θ/ becomes [t]. In this way, a prominent SE phonological feature has been displayed.

With respect to this, it seems that children of immigrants from China commonly acquire the simple feature of a new language. For example, according to Figure 15, in terms of the pronunciation of “throw”, among 14 speakers who can recognize the word, all of them show the pattern from /θ/ to [t]. Simultaneously, 14 participants use the variant [t] when uttering the word “three”, and 10 children also show similar pattern in the word “think” and “thumb” respectively.

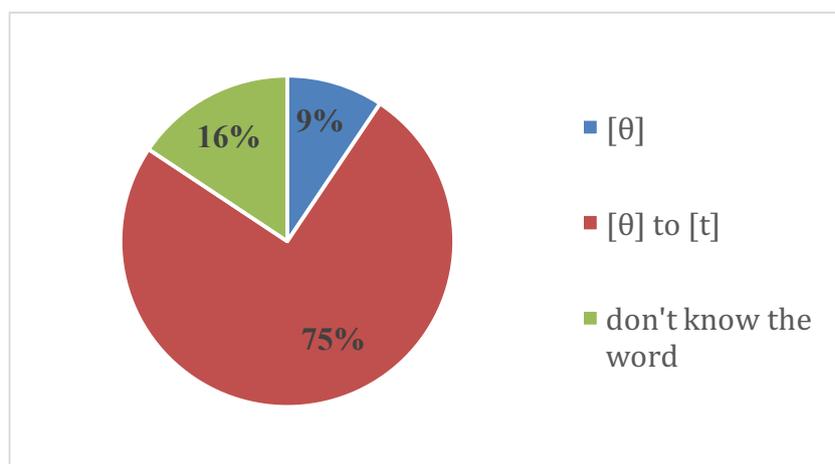


Figure 14: Overall participant performance in the pronunciation of initial “th [θ]”.

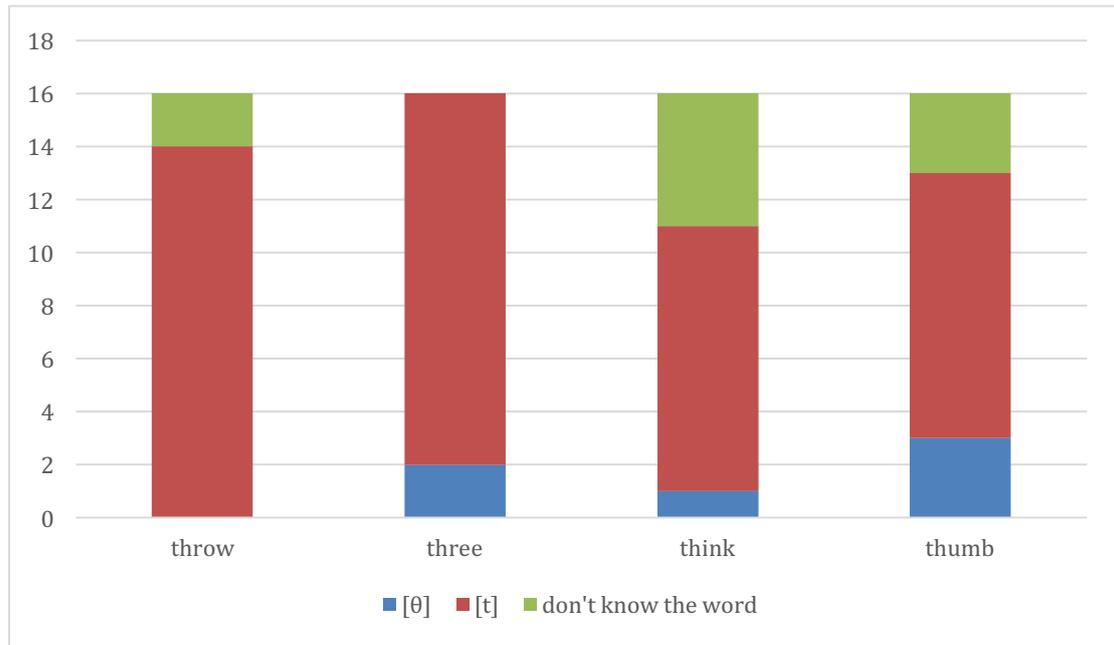


Figure 15: Participant linguistic performance in pronouncing words with [θ].

Most interestingly, among the 3 participants who maintain the standard phonological feature of /θ/, there is 1 child whose father comes from Singapore compared to those two whose fathers are both from China. Specifically, the participant uses [t] rather than [θ] in the words “throw” and “three”, while maintains /θ/ in the pronunciations of “think” and “thumb”.

3.3.2 Final consonant cluster simplification

Final consonant cluster simplification refers to syllable-final [t] and [d] deletion when they occur with another consonant before. In this study, 3 sorts of clusters were involved, namely /-st/, /-nd/ and /-nt/. For each cluster, there are 2 instances to be tested as can be seen from the Table 12.

Figure 16 demonstrates that final consonant cluster simplification is not the dominant variation among children of immigrants from China in Singapore. In other words, the majority of the participants maintain the final consonants [t] and [d] when they appear with another consonant, such as [s] or [n], before. To be more precise, clusters /-nd/ and /-nt/ have equal number of participants (17 children) who fail to acquire the SE phonological feature of final consonant cluster simplification. Although more informants delete [t] in the words “nest” and “fast”, there are 12 children still clearly pronounce the final consonant [t].

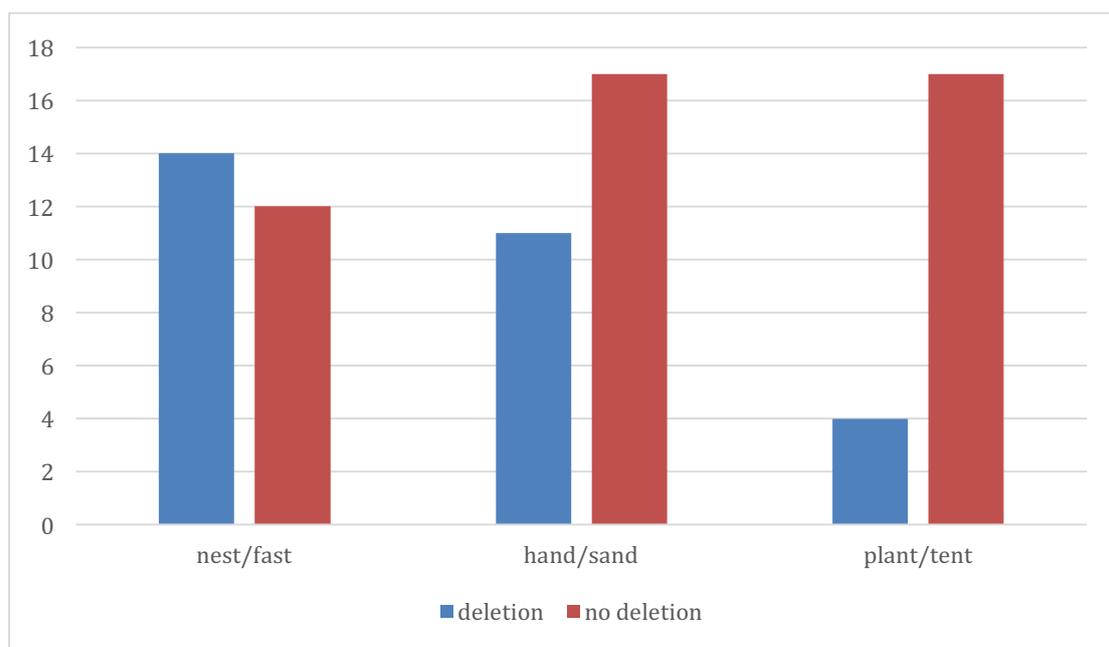


Figure 16: Final consonant cluster simplification.

3.3.3 Merger of vowel /æ/ and vowel /e/

The vowel /æ/ and /e/ can be merged into either /æ/ or /e/. In SE, the merger tends to become /e/ with lower F1 and higher F2, while in China English it has more tendency to become /æ/ with higher F1 and lower F2 due to the influence of Mandarin Chinese features.

Initially, an independent-samples t-test was conducted to compare the variation of the formants of /æ/ and /e/ among 16 participants when they pronounce the words with phonemes /æ/ and /e/. In terms of F1, the difference is considered to be not statistically significant in the scores for the F1 of /æ/ (M=932.80152598, SD=163.29351878) and the F1 of /e/ (M=859.387365507, SD=245.700470351) conditions; $t(53)=1.2890$, $p=0.2030$. These results suggest that there is a potential for vowel /æ/ and /e/ to be merged among the participants. According to the statistics above, the F1 frequencies of /æ/ (932 Hz) and /e/ (859 Hz) are higher than the normal average F1 values for children where 564 Hz for the F1 of /e/ and 717 Hz for the F1 of /æ/ (James Hillenbrand, Laura A. Getty, Michael J. Clark, and Kimberlee Wheeler, 1995). In this sense, the tongue positions for the vowels /æ/ and /e/ are lower in the mouth, tending to become vowel /a/.

In light of F2, there is also no significant difference in the scores for the F2 of /æ/ (M=1493.159938885, SD=427.86514580) and the F2 of /e/ (M=1532.066125876, SD=559.604286813) conditions; $t(53)=0.2871$, $p=0.7752$. These statistics show that the merger of vowel /æ/ and /e/ occurs when F2 values are evaluated. Precisely, compared to the average F2 frequencies of /æ/ and /e/ for children (2656 Hz for /æ/ and 2501 Hz for /e/), the results indicate that the F2 values of /æ/ and /e/ for

participants who are children of immigrants from China are lower and the tongue positions are more at the back of the mouth, tending to become /a/.

Collectively considered, the comparison between the formant frequencies of /æ/ and /e/ sets out the prominent linguistic innovation among the participants that the merger of vowel /æ/ and vowel /e/ appears in the speech of children whose parent(s) is from China. Surprisingly, the merger leads to a tendency of pronouncing /æ/ and /e/ as /a/. That is, the merger results in a higher F1 and lower F2, which shows consistency with the merger of /æ/ and /e/ in China English, rather than SE.

More surprisingly, a similar pattern has also been found in the speech of participants whose fathers are from Singapore. In terms of F1, the difference is considered to be not statistically significant in the scores for the F1 of /æ/ (M= 910.05083900, SD= 203.23551940) and the F1 of /e/ (M= 718.93849600, SD= 351.90363848) conditions; $t(10)= 1.1520$, $p = 0.2761$. In light of F2, there is also no significant difference in the scores for the F2 of /æ/ (M= 1605.14046033, SD= 522.82970346) and the F2 of /e/ (M= 1342.89312650, SD= 682.18971789) conditions; $t(10)= 0.7474$, $p = 0.4720$. Most importantly, their pronunciations present a higher F1 and lower F2, which tends to be a phonological feature in China English in terms of the merger of /æ/ and /e/.

When EVT2 scores are considered, the results of independent-samples t-test also suggest that there is no big difference in the merger of vowel /æ/ and vowel /e/ between participants with scores above 100 and those with scores below 100. The conditions are explained as follows: in the group of participants whose EVT2 scores are above 100, the F1 of /æ/ (M= 934.349456079, SD= 144.296568908) and the F1 of /æ/ in the group of children whose EVT2 scores are below 100 (M= 930.995607542, SD= 189.704831311); $t(24)= 0.0512$, $p = 0.9596$. Similarly, the difference is considered to be not statistically significant in the scores for the F1 of /e/ among children who perform better in the EVT2 test (M= 873.308613636, SD= 264.138026088) and the F1 of /e/ among those who perform worse (M= 846.394200587, SD= 235.748501254) conditions; $t(27)= 0.2899$, $p = 0.7741$. Therefore, the phonological variation with respect to the merger of vowel /æ/ and vowel /e/ does not vary between two groups of participants with different EVT2 scores.

4 Discussion

The two picture-naming tasks presented above have investigated the extent to which the children of immigrants from China acquire features of Singapore Mandarin and Singapore English. According to the phonological features found in SM and SE, several particular features have been examined. In the Mandarin picture-naming task, a dramatic maintenance of standard retroflex when pronouncing /tʂ, tʂʰ, ʂ /was observed among the participants. Furthermore, in terms of the depalatalization, they also tend to use the standard [ç] as initial consonant in the given words. The main

factor contributing to the standardness is that all participants' mothers are from China, who spend the most of time taking care of the children and speaking Mandarin Chinese to the children. However, the findings also suggest that participants whose fathers are from Singapore exhibit significantly high percentage of using non-retroflex pattern. That is, children's acquisition of a new dialect will be largely affected by who they are interacting with.

In the English picture-naming task, participants acquire SE as a new language, widely using the patterns in speech. The most dramatic variation is the th-stopping from /θ/ to [t]. Since they all attend pre-schools or other educational institutions in Singapore where English is a major medium of instruction, their acquisition of SE occurs mainly in schools. However, they tend to involve the merger of vowel /æ/ and vowel /e/ in their utterances, but the merger tends to become /a/, which shows their acquisition is influenced by Mandarin Chinese features. One potential reason may be the influence of their mothers' phonological performances with Chinese features. In addition, the acquisition of final consonant cluster simplification is not that prominent and dramatic. The possible factor contributing to the result of final consonant cluster simplification might be the nature of the picture-naming task where participants tend to pronounce the single word more clearly by uttering the final consonant, unlike in their usual speech

5 Conclusion

This present study has centrally examined the extent to which the children of immigrants from China adopt features of Singapore Mandarin and Singapore English. The phonological variation of Mandarin Chinese in light of retroflex fronting (merger of retroflex and dental sibilant initials from /tʂ, tʂʰ, ʂ/ to [ts, tsʰ, s]) and depalatalization (/ç/ → [s]) were initially evaluated, and variation of English in terms of th-stopping ([θ] is sometimes replaced by [t]), final consonant cluster simplification (syllable-final [t] and [d] deletion when they occur with another consonant before) and merger of /æ/ and /e/ were also investigated in this study.

The 16 participants (ages 3-6) were asked to complete picture-naming tasks and EVT2 test. Participants were found to acquire more features in Putonghua instead of SM. However, their lexical variety in Mandarin Chinese is limited. Children whose father from Singapore had more opportunities to speak SM, hence they acquired the phonological feature such as lack of initial retroflex in their speech.

Unlike the performance in SM, Children of immigrants from China in Singapore adopt more phonological features in SE, in particular the acquisition of th-stopping. The most compelling reason is that th-stopping, as a simple phonological rule in SE, is faster acquired than complex ones among children, according to Chamber's (1992) second principle of dialect acquisition. The other two features, syllable-final [t] and [d] deletion and merger of vowel /æ/ and /e/, are less likely to be adopted among the participants due to their complexity. A surprising finding of the merger of /æ/ and /e/

shows they maintain the feature of China English (influenced by Mandarin Chinese features).

I acknowledge that the sample size of the present study was small but given to its significant findings I suggest that the future research investigate the variation of Mandarin Chinese and English among children of immigrants from China in a larger scale. Another limitation is that the tokens in the reading task were inadequate; only 14 words in Mandarin Chinese and 18 words in English were involved. Furthermore, the types of phonological features considered in this study was also limited. Therefore, a wider range of features with more tokens should be involved in the future research in order to discover more detailed patterns in children's speech. Additionally, since the age range in the present study only covers from 3 years old to 6 years old, it should also be expanded to engage more children of immigrants of China in Singapore in the future studies.

Despite these limitations, this study gives a close look at the phonological variation of Mandarin Chinese and English among children of immigrants from China in Singapore, which contributes to the existing literature and allows researchers to probe areas of the linguistic variation among children of immigrants.

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