Proceedings of the 3rd International Conference on Art, Design and Social Sciences
DOI: 10.54254/2753-7064/44/20240027

Comparison Between English and Mandarin Vowel Systems and the Challenges for Chinese Learners of English

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Abstract: In contemporary China, learning English has been considered as a must for almost all students, with the pronunciation acquisition usually being the initial focus. Among the phonetic elements, the mastery of vowel pronunciation is particularly crucial in that vowels are an essential element of language. Due to its great importance, numerous studies have comparatively analyzed the English and Mandarin vowel systems and experimentally listed the challenges Chinese English learners may face. Based on these analysis, feasible measures to handle the problems posed for Chinese learners are proposed. This paper collects and concludes logically the main discoveries and theories that have been raised by former scholars, with the aim of clearly presenting the disparities between the vowel systems of the two languages, illustrating the difficulties those differences may bring about, and sharing some approaches in which teachers can help their students to get out of the way. Despite the similarities and differences between the two vowel systems, which can lead to pronunciation errors, strategies such as meticulous comparison and immediate correction can aid students in getting rid of these obstacles. Therefore, this paper is of significant value in elucidating the difficulties encountered by Chinese students in learning English pronunciation and in outlining effective pedagogical strategies for teaching pronunciation.

Keywords: English Vowel System, Mandarin Vowel System, English Teaching, Second Language Acquisition

1. Introduction

The vowel system, an irreplaceable part of a language, is usually regarded as the foundation in the process of second language acquisition. For a great number of Chinese people, English represents the second language they learn. Therefore, the vowel systems in English and Mandarin are of prime importance for Chinese learners of English. In this paper, the first part intends to show the readers a general map of English and Mandarin vowel systems by dividing vowels into monophthongs and diphthongs and classifying them with certain criteria. Mandarin was chosen for this paper since there are many dialects in China and Mandarin is the common language in China. Similarly, there are many accents in English-speaking regions, of which Southern Standard British English (SSBE) is often chosen by previous scholars, and is therefore chosen for this paper. The second part deals with the differences between the two systems. The following part presents the challenges faced by Chinese learners of English, with the support of a series of experiments conducted by other scholars and a number of illustrative examples. From the former data, it can be found that the mother tongue

DOI: 10.54254/2753-7064/44/20240027

inevitably influences the learning of a second language,, indicating that Chinese learners tend to pronounce English vowels like Mandarin vowels. Lastly, some solutions are recommended. This paper is a relatively comprehensive collection of experts' discussions on English and Mandarin vowels' distinctions and the problems caused by the distinctions. More profoundly, it sheds lights on the intrinsic logic on this issue and functions to illuminate English teachers as well as students who have intention to learn English.

2. Overview of the English and Mandarin Vowel Systems

Vowel sounds are produced on a pulmonic egressive airstream that is not significantly obstructed compared to consonants [1]. All the vowel sounds in one language constitute its vowel system.

2.1. English Vowel System

In the description of phonological system, the basic unit of English is phoneme which divides into consonant phonemes and vowel phonemes [2]. The English vowel system is composed of two main categories of vowels, namely monophthongs and diphthongs.

2.1.1. English Monophthong

Monophthongs are a kind of vowel in which the tongue stays in one position, therefore the quality of a vowel remaining fairly consistent from beginning of it's production to the end [3]. There are various criteria to describe monophthongs including frontness, height, rounding and length dimensions. The frontness and height dimensions are concerned with the tongue position. And the rounding dimension is used to describe the lip shape. The length dimension, obviously is for the length of the sound. Based on these standards, the 12 monophthongs in English can be divided into different groups and the English monophthongs are shown in Table 1:

Table 1: SSBE Monophthong

		Front		Central		Back	
		Rounded	Non-rounded	Rounded	Non-rounded	Rounded	Non-rounded
Long	High		iː			uː	
	Mid				ɜː	ɔː	
	Low						ɑː
Short	High		ɪ			ʊ	
	Mid		ɛ		ə	ɒ	
	Low		a		ʌ		

2.1.2. English Diphthong

Diphthongs are defined as a type of vowel in which the tongue changes position to produce the sound of two vowels. Similar to monophthongs, diphthongs are equipped with numerous features and thus can be divided based on different standards of classification. On account of the length and intensity of the two phonemes in the diphthong, English diphthongs can be divided into falling diphthong and rising diphthong. Additionally, they can also be classified based on speaker's tongue movement, which results in three types of diphthongs--the centering diphthong, the closing diphthong and the open diphthong. In the light of the aforementioned dimensions, the 8 English diphthongs belong to different kinds and the English diphthongs are shown in Table 2:

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Table 2: SSBE Diphthong

	Centering	Closing
Falling	/ɪə/, /ɛə/, /ʊə/	/eɪ/, /aɪ/, /ɔɪ/, /oʊ/,/aʊ/

2.2. Mandarin Vowel System

In Mandarin, the basic phonetic description unit is the syllable and each syllable is made up of an initial consonant and a final. For the convenience of comparison, finals only containing vowel sounds will be transformed into vowels in this paper [4]. Consequently, they are converted to monophthongs and diphthongs [5].

2.2.1. Mandarin Monophthong

The 7 monophthongs in Mandarin can also be grouped in the way like English monophthong--frontness, height and rounding perspectives. The Mandarin monophthongs are shown in Table 3:

Table 3: Mandarin Monophthong

	Front		Central		Back	
	Rounded	Non-rounded	Rounded	Non-rounded	Rounded	Non-rounded
High	/y/	/i/			/u/	
Mid				/ɤ/	/o/	
Low						/a/

2.2.2. Mandarin Diphthong

The classification dimensions of English diphthongs can also be applied to Mandarin diphthongs, that is the length and intensity of the two phonemes in a diphthong as well as the tongue movement. The Mandarin diphthongs are shown in Table 4:

Table 4: Mandarin Diphthong

	Closing	Open
Falling	/aɪ/, /eɪ/, /aʊ/, /əʊ/	
Rising		/iɛ/, /yɛ/, /ia/, /ua/, /uo/

3. Comparison between English and Mandarin Vowel Systems

3.1. Monophthong

Firstly, monophthongs in English and Mandarin vowel systems differ in number, with 12 basic monophthongs in English and 7 in Mandarin. As the basic phonetic unit, monophthongs in a language never fail to satisfy the need for practical purposes with the help of allophone. In general, the smaller the monophthongs in a language are, the more allophones are needed. Therefore, monophthongs in Mandarin have richer functions and more allophones than those in English [6].

In addition, the length of monophthongs and the way they are pronounced are very different in the two languages. There are both long and short monophthongs in English like /iː/ /uː/ /ɪ/ /ʊ/ etc., while in Mandarin all monophthongs are nearly equal in length, which is similar to the length of long monophthongs in English. For example, the lengths of /i/ in Mandarin and /iː/ in English are close and their acoustic descriptions are approximate. Despite this, the essences of some similar monophthongs vary especially in the aspects of peripherality and positions of the tongue. The Mandarin /i/ sound is pronounced with the tongue positioned higher than the /iː/ in English, the shape

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of the lip flatter and the tongue more lax. Finally, both languages have some monophthongs that are not involved in the other language. For instance, /ɜ/, /ʌ/, /ə/ in English don't exist in Mandarin and /ɤ/, /y/ in Mandarin cannot be found in English.

3.2. Diphthong

In the perspective of length and intensity, Mandarin has falling diphthongs and rising diphthongs while English only has falling diphthongs. The length of English diphthongs is equal to that of long vowels, with the first phoneme being longer than the second, where there is a clear transitional connection. The change of tongue position and lip shape in English is also more evident. While the duration of Chinese diphthongs is relatively short with a rapid transition. Because the boundary between the two phonemes in Mandarin is not as clear as that of English diphthong, Mandarin diphthong gives the impression that it is a sound between the two phonemes. What's more, there is no distinct disparity between the loudness of two phonemes in Mandarin diphthong. On the contrary, in English diphthongs, the first phoneme is much louder than the second and the loudness of its first phoneme is louder than that of Mandarin diphthong and the loudness of its second phoneme is more vague.

Additionally, some diphthongs look alike or even identical but are pronounced differently such as /aɪ/, /eɪ/, /aʊ/, /əʊ/ in Mandarin and /aɪ/, /eɪ/, /aʊ/, /oʊ/ in English. The tongue position of the first phoneme of the English diphthong is lower than that in Mandarin and the second phoneme is generally in the semi-closed state while the state of the Mandarin diphthong second phoneme is between the semi-closed and fully closed state. In particular, although /aɪ/, /eɪ/ in English and /aɪ/, /eɪ/ in Mandarin look identical, the difference is still obvious. /eɪ/ in English moves back and /eɪ/ in Chinese moves forward. In English, the tongue moves from /a/ only about to/e/ when producing /aɪ/ sound while in Mandarin, the tongue moves to a higher position nearly to /i/ [2]. It's also something deserves attention that there are no centering diphthongs like /ɪə/, /ɛə/, /ʊə/ in Mandarin.

3.3. Stress and Tone

It is widely recognized that one of the most common units with meanings in English is the word and the fundamental element with meanings in Mandarin is the syllable. There is something closely related to vowel phonemes in words: stress. A different placement of the stress will make a different part of speech for the word. "Permit", for example, can be a verb with the stress on /ə/, pronounced /'pəmɪt/, or a noun, pronounced /pə'mɪt/. Tone is very important in a syllable. Both the meaning and the graphy of a syllable change as the tone changes. For instance, /ma/ when pronounced as mā can mean "mother" in Mandarin, and when pronounced as má can mean "hemp". In the two languages, tone is a unique feature for Mandarin while stress only appears in English.

4. Challenges for Chinese Learners of English

4.1. Challenges Posed by Monophthong

From the contrast between English and Mandarin monophthongs, it's obvious that there are monophthongs whose characters like manners of articulation, lip shape and peripherality are hugely distinct. Due to the enormous variation, it may become difficult for Chinese learners to grasp the pronunciation points of some English monophthongs that are absent from Mandarin quickly. But to some degree, this big difference makes it easier to distinguish the monophthongs.

Additionally, there are also some monophthongs that are quite similar in these two languages. According to the negative transfer theory from Flege, when two phonemes are alike, it will pose challenges to learners to distinguish them both in sound production and acoustic perception [7]. And

DOI: 10.54254/2753-7064/44/20240027

many Chinese learners tend to learn new pronunciation with their fixed mindsets that have been constructed during their acquisition of Mandarin. It's a frequent case for Chinese learners to mistakenly regard some English monophthongs as the monophthongs in their native language because it's a way to master the general pronunciation in the other language quicker and easier. However, there actually exist some differences between the similar monophthongs: manners of articulation. Take /ʌ/ in English and /a/ in Mandarin for example, /ʌ/ is a central and low monophthong with the mouth opening smaller while /a/ is a back and low monophthong. Despite the difference, many Chinese learners still fail to distinguish them and unconsciously pronounce /ʌ/ as /a/. In daily life, Chinese students may pronounce cut /kʌt/ as cart /kɑːt/ because /ɑː/ in English is similar to /a/ in Mandarin.

More importantly, Chinese learners are unable to distinguish and correctly produce long and short monophthongs in English. Since there is no such thing as long and short monophthongs in Mandarin, many Chinese learners simply assume that the difference between them is only in length. Therefore, they they pause and lengthen when pronouncing long monophthongs, and quickly pronounce short monophthongs, but the other characteristics of the two monophthongs remain the same [8]. For instance, Chinese learners think that to pronounce /iː/ they only need to lengthen /ɪ/. However, these two sounds do not only differ in length but also in tongue position and tone quality.

4.2. Challenges Posed by Diphthong

The differences between English and Mandarin diphthongs make it difficult for Chinese students to accurately pronounce English diphthongs. According to the above, the length and loudness distinctions between the two phonemes in Mandarin diphthongs are less obvious than English diphthongs. As a result, many Chinese students may pronounce the two phoneme sounds in English with equal time duration and intensity and the transition is also quicker than that actually in English. At the same time, due to the shorter length of diphthongs in Mandarin, Chinese students tend to use a shorter duration when producing English diphthongs, which makes the sounds sound like monophthongs [5]. Particularly, /aɪ/ is mistakenly replaced by /ɑː/ so Kite /kaɪt/ is often confused with cart /kɑːt/. And /eɪ/ sound is more like /iː/ when Chinese learners pronounce words such as fail /feɪl/ (pronounced like feel /fiːl/) and mail /meɪl/ (pronounced like meal /miːl/). Given the vacancy of centered diphthongs in Mandarin, Chinese students tend to pronounce /ɪə/ and /ʊə/ as /iɛ/ and /uo/ in Mandarin, which, however, are rising diphthongs with the first phoneme lower than the second while /ɪə/ and /ʊə/ in English are falling diphthongs. What's more, the tongue position of the second phonemes in Mandarin /ɪə/ and /ʊə/ are further back than schwa /ə/ in English [2].

4.3. Challenges Posed by Stress and Tone

Stress, a special character in English, does not exist in Mandarin syllables, which is closely related with root, prefix and suffix which are also nonexistent in Mandarin. Due to the absence of stress and the elementsrelated to stress in their mother tongue, Chinese learners have little knowledge about the rhythm of English words and thus have a blunt English language sense. Therefore, it is difficult for Chinese learners to grasp which part of a word should be stressed. And it is difficult for Chinese students to figure out the rules of stress and some exceptions need to be memorized.

5. Solutions for English Teachers

From the aforesaid analysis, there are many differences between English and Mandarin vowel systems and for Chinese learners the gap between their native language (L1) Mandarin and the second foreign language (L2) English can impede students' learning process which is called negative transfer [9]. To minimize the adverse impact, here are several solutions for teachers.

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Firstly, it's advisable for teachers to encourage students to find out the similarities and differences between these two languages. On this basis, teachers can illustrate the specific differences in producing vowel sounds in the two languages such as the tongue position, peripherality and intensity, and demonstrate pictures of the movement of articulator. Secondly, teachers can make full use of minimal pairs, famous saying and idioms to help students better understand the pronunciation rules and distinguish similar vowel sounds. For example, sayings like "No pains, no gains." and "You must hit the nail on the head." enable students distinguish English vowels /eɪ/ and /e/ [10]. And minial pairs like "beat" /biːt/ and "bit" /bɪt/ are also effective in clarifying similar vowel sounds. Last but not least, pronunciation correction is of great importance. Teachers can show video clips in class, which not only help students practice listening, but also identify their mispronunciations. With the assistance of these methods, Chinese students can overcome some difficulties in articulating English vowels.

6. Conclusion

Through the general introduction to English and Mandarin vowel systems and the comparison between them, this paper reveals some challenges for Chinese learners of English and also presents some corresponding solutions. To sum up, English and Mandarin vowels share something in common which enables students to learn English faster but the similarity may also hinder students from articulating English vowels like native speakers because they tend to apply the Mandarin vowel system to the pronunciation of English vowels and use the vowel in Mandarin to replace the one in English. What's more, both languages have vowels that are not included in the other language, which may cause difficulties in acquiring English vowels quickly and correctly. To solve these problems, solutions like helping students recognize the differences with the help of pictures, minimal pairs, idioms and video clips are suggested.

Nevertheless, there are some limitations of this paper. It only discusses the vowels in a word but it doesn't take the sentence or paragraph into consideration. In fact, vowel sounds may change when it is positioned close to some words or in a certain context. So statements and experiments related to this should be looked into. Furthermore, vowels haven't been analyzed diachronically in this paper. Over time, changes have occurred in the pronunciation of some vowels so the comparison between the two languages' vowel systems and challenges for Chinese students may change. In conclusion, this paper has summarized the previous theories and plays an important role in the comparison between the English and Mandarin vowel systems and the analysis of possible troubles for Chinese learners of English. However, further refinement and research are needed.

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