

A Contrastive Analysis of Mandarin Chinese and Thai: Suggestions for Second Language Pronunciation

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Abstract—This study investigates the differences between consonants and vowels of Mandarin Chinese and Thai sound systems which are considered to create the difficulties in L2 pronunciation, according to the contrastive analysis hypothesis. As well, this research aims to re-check the accuracy of contrastive analysis's predictive power by comparing the differences of Mandarin Chinese pronunciation performance by native Thai speakers. Research findings show that, first, it is possible to find out the similarity and difference between L1 and L2 by contrastive analysis. Second, L2 pronunciations are influenced by L1. Third, some differences between L1 and L2 do not cause difficulty in L2 learning, while some similarities do. In other words, the difficulty of L2 learning is not merely the sum of its differences. Fourth, there are other factors influencing the pronunciation of a L2 learner. As a result, the accuracy of a contrastive analysis's predictive power is not as high as it has been claimed.

Index Terms—Mandarin Chinese, Thai, contrastive analysis, second language learning, second language pronunciation

I. INTRODUCTION

Contrastive Analysis (henceforth CA) is one of the compelling and controversial issues in theory and practice of language studies. It was initially mentioned by Lado (1957) in his influential book, *Linguistics across cultures*. It was accepted by numerous linguists in 1950s and 1960s. However, by the end of '60s, its heyday had passed. CA began to be attacked by criticism particularly from the perspectives of feasibility and usefulness. Notwithstanding, these criticisms did not make the proponents of CA relinquish their efforts and CA still developed gradually over the subsequent several decades. In fact, it returned to the linguistic stage and is back in the contemporary spotlight.

It was widely accepted that one of the major contributions of CA is in second language (L2) pedagogy. According to the contrastive analysis hypothesis, the difficulties that learners would confront during L2 learning could be predicted by the differences between the native language and the target language of the learners. In other words, the central issue that determines CA's practical application in the language teaching field is the predictive power of CA. With the purpose of re-examining the accuracy of CA's predictive power, this paper compares the sound systems of Mandarin Chinese and Thai to find out the differences between these two aforementioned languages. The results of this comparison are checked with the actual pronunciation performance of five native Thai-speaking participants who have learned Mandarin Chinese for several years and have different proficiency levels.

A. Research Questions

The researcher pursues answers of the following questions:

- 1). What are the differences between Mandarin Chinese and Thai consonants and vowels?
- 2). Do the differences predict the difficulties in the Mandarin Chinese learning of native Thai speakers who learn the Mandarin Chinese as a second language?

B. Objective of the Study

This study re-examines the accuracy of CA's predictive power and explores its contribution to language pedagogy.

C. Scope of the Study

The researcher examines the differences between consonants and vowels of Mandarin Chinese and Thai sound systems, and re-checks these differences with the Mandarin Chinese pronunciation performances of five native Thai speakers who learn the Mandarin Chinese as L2.

II. LITERATURE REVIEW

A. First Language Interference

Commonly, when one learns a L2, s/he has already learned the same meanings in his/her L1. The fact that learners have learned these meanings in their L1 already assures that the elements of L1 are likely to be grafted on to L2 (Beebe 1988). The learner's L2 could reflect traces of the learner's L1. Errors that occur frequently in L2 because of the distinctly different structures of L1 and L2 indicate an interference of L1 on L2 (Dechert, 1983 and Ellis, 1997).

L1 interference is defined by Weinreich (1953) as 'instances of deviation from the norms of either language.' Lado (1957) took Weinreich's descriptions and developed a contrastive analysis which is considered to be one of the utilitarian research methods in language studies. This method connects interference from L1 with difficulties learners have in learning L2. Due to Lado's consideration that language learning is a habit formation issue, he takes it for granted that mastering a language needs extensively repetitive drills (Geroge, 1972). Within the behavioristic theoretical framework, Lado (1964) provides definition to interference as 'added difficulty in learning a sound, word, or construction in a second language as a result of differences with the habits of the native language' (p. 217). He regards language interference as the transferred L1 habits which are incompatible in L2.

Numerous studies in language interference exerted on L2 learning have been conducted since Lado. Linguists have posited various definitions of the notion of language interference. Dulay et al. (1982) define language interference as the process of automatic transfer from the surface linguistic features of L1 to the surface features of L2. Lott (1983) defines it as errors that occur in the learner's production of L2, which can reflect the characteristics of learner's L1. On the other hand, Skiba (1997) defines it as the transfer of elements, such as phonological elements, grammatical elements, and lexical elements and so on, in specific language(s) to L2 learning. Ellis (1997) defines language interference as transfer. In other words, it is the influence of L1 exerted over an L2 acquisition. Besides, Ellis believes that learners are able to perceive which elements are transferable and which are not on the basis of their L2 developmental stage. Namely, the transfer is ruled by an L2 learner's inner perceptions.

Beardsmore (1982) states that in L2 learning, the phonological difficulties, vocabulary difficulties, and grammatical difficulties (that L1 interference has troubled L2 learners) stems from the differences between the structures of L1 and L2. Furthermore, since language interference seems inevitable, it is valuable to research the differences between specific languages to find out the interference points. Hence it can be stated that CA, as developed by Lado, is a utilitarian research tool to map out possible interference between languages. Researchers have conducted extensive studies on the differences between specific languages with the help of CA.

B. Contrastive Analysis

CA is one of the intriguing and controversial issues in theory and practice of language studies. The assumption it raises, namely that difficulties in L2 learning could be predicted by a comparison of the similarities and differences between L1 and L2, has been initially bolstered by numerous linguists and attacked by language teachers (Altenberg and Granger, 2002). CA has been surrounded by long-term and complex debates throughout its history in linguistics. Indeed, a good number of conflicting points of view on the feasibility and usefulness of CA have been made.

Benjamin Whorf (1941) was the first to utter the term 'contrastive linguistics' in his article '*Language and logic.*' After that, the term has been gradually inducted into a new dimension, foreign language teaching pedagogy, particularly through the works of Charles Fries (1945), Uriel Weinreich (1953) and Robert Lado (1957). It has played a significant role on the stage of applied linguistics since 1950s.

Fries (1945) argues in his book, *Teaching and learning English as a foreign language*, that efficient teaching materials stem from a cautious comparison and contrast between the scientifically described target language and the native language of the learner.

In his influential work, *Linguistics across cultures*, Lado (1957) writes on the assumption that difficulties in learning L2 could be predicted by systematically comparing the target language and culture and the native language and culture of the learners. He claims that difficulties could be avoided in mature teaching situations and teaching materials should be developed based on this kind of comparison.

At the time these classical works were published, the facilitative function of CA in the L2 learning is taken for granted by numerous linguists. In 1960s, several contrastive studies were published under the initiative of the Center for Applied Linguistics in Washington. These studies were conducted with the conviction, developed by Fries and Lado, that the difficulties met by learners in L2 learning derive from the interference caused by the differences between the target language and the native language of learner (Aarts, 1982).

Rahimpour and Dovaise (2011) hold that the phonological difficulties Kurdish native speakers meet in learning English can be predicted by a contrast between Kurdish and English phonological elements. They suggest that the results could be applied in the preparation of English teaching materials for Kurdish people. However, they emphasize 'neither all differences cause problems, nor all problems happen because of the differences.'

C. Assumptions of the Contrastive Analysis Hypothesis

Aarts (1982) distinguishes 10 assumptions underlying the contrastive analysis hypothesis held until the middle of 1960s. The details of these assumptions follow:

1. Language learning is a habit formation issue.
2. L1 transfer phenomena means learner's old habits obstruct their L2 learning.

3. Interference occurs at each aspect of linguistic structure (phonological, syntactic and semantic) and influences both language production and perception.

4. Both similarities and dissimilarities between the target language and the native language of the learner could be pinpointed by comparison.

5. A systematic comparison could not be reached unless the target language and the native language of the learner are scientifically described within the same theoretical framework.

6. Only equivalent sub-systems can be compared.

7. Dissimilarities between the native language and the target language cause difficulty in L2 learning, while similarities do not. The difficulty is the sum of the dissimilarities.

8. With the results of CA, L2 learning difficulties could be predicted.

9. Difficulties could be positioned in hierarchies according to how divergent the two languages are.

10. To discover dissimilarities is the task of linguists, and to develop efficient teaching materials is the task of textbook writers.

Jansen van Rensburg (1983) summarizes that the principle of L2 learning is built on an assumption that 'the major problem was caused by inter-lingual identification and that the differences between the source language and the target language once they had been predicted could be diminished by exposing the learner to drills specifically designed to change his linguistic behavior at the relevant points.'

During a later development period of CA, these assumptions were attacked by numerous linguists, applied linguists and language teachers.

Before the emergence of a mentalist theory of L1 acquisition in 1960s, proponents of behaviorism considered language learning as a habit formation issue. However, mentalists believe that there is a preprogrammed language acquisition device in the human mind which is a determinant of language acquisition (Ellis, 1997). For example, Ritchie (1967) claims that 'the only way for a learner to gain a fruitful, simple, revealing intuition of the structure of a given foreign language is to rely on his innate knowledge of general linguistic structure' (p. 129), instead of doing an impossible comparison between languages. Newmark and Reibel (1968) state that the solution of a language interference problem is to receive more training in L2, instead of drills at points which are summarized from a contrast between the languages.

Mentalists criticize the second assumption of CA, which is based on behavioristic theories. This assumption considers a language as a unity comprised of a number of habits, and considers the difficulties as the unmatchable points between the habits of L1 and those of the L2. As a result, CA mainly focuses on a comparison of the surface linguistic features between the languages (Aarts, 1982).

As to the third assumption regarding the influence of interference, Whitman and Jackson (1972) state that CA does not play an important role in language learning due to that the influence of language interference is so small. In other words, it is not worthy of much attention.

The fifth assumption holds that contrast cannot be conducted unless languages are described within the same theoretical framework. Twaddel (1968) notes that there are two issues which are not addressed herein. The first issue is, 'What do we understand by the scientific description of a language?' The second issue is 'How do we carry out a systematic comparison of two languages?' (p. 197). Besides, Di Pietro (1978) claims that the theoretical framework on which languages are described should be able to be adopted to integrate the difference between the surface structures and the deep structures of the languages. However, in existing linguistic theories, the notion of deep structure is controversial. It holds that it is considerably difficult to explain similarities and dissimilarities between languages. Therefore, the establishment of comparability or equivalence between languages is a complicated issue.

The seventh assumption underlying contrastive analysis hypothesis, that different features between specific languages are difficult and the similarities are easy for language learners, is under attack as well. Corder (1973) refutes this view with two statements. The first is that no connection should exist between differences and difficulties in language learning. He claims that difficulty is a psycholinguistic issue. In other words, it is hard to measure a degree of difficulty. The second statement Corder makes is that not only the dissimilarities between languages should be known by learners, but also the similarities (Chapter 10). According to the research results of some linguists, a situation of this assumption could be more complex. Albert and Obler (1978) find that languages with more similarity in linguistic features have more difficulty in lexical learning, while languages with fewer similarities have fewer problems. However, on the overall performance of L2 learning, languages with less similarity have much more difficulties in learning. By and large, learners would rely on their knowledge of L1 to help L2 learning due to the reason that L2 is a completely new system for them. Mackey (1966) criticizes the seventh assumption that is wrong to claim that all the mistakes and errors made by L2 learners are caused by his/her L1. Furthermore, according to Mackey, predictions summarized by experienced language teachers are much more reliable than linguist's predictions that are verified through CA method. Aarts (1982) claims that some interlinguistic differences have never created any problems, while some similarities frequently create problems for learners. Besides, there has been much criticism that CA focuses only on the difference between the target language and the native language of the learners. In other words, the difference focuses on interlingual interference. However, there are many other factors influencing a language learner's performance, but CA does not pay attention to them.

The eighth assumption is premised on the predictive power of CA. It believes that the difficulties learners will have in L2 learning can be predicted. However, it is found that linguists cannot predict many mistakes or errors with which language teachers are familiar (Corder, 1967). Without a doubt, after they conducted a study with a group of Japanese students, Whitman and Jackson (1972) claim that CA cannot precisely predict difficulties learners would have in learning an L2. According to the results of extensive studies on CA, some linguists have reached the conclusion that errors are not only caused by a learner's L1 interference, but also from other factors. In other words, not all the mistakes or errors in L2 learning are predictable with the CA method (Aarts 1982). Additionally, Lee (1972) states that developmental errors which are common in the production of learners' L2 do not stem from the L1 interference but depend on the learners' degree of mastery of L2 and their learning strategies. Richards (1974) studied developmental errors and found that many errors are caused by extralinguistic influences which have nothing to do with L1 interference. Since the errors in L2 learning are caused by various factors, it becomes obvious that CA cannot cover all difficulty-making sources, let alone predict all possible errors.

Lastly, the tenth assumption underlying contrastive analysis hypothesis states that the main purpose of CA has been that it facilitates L2 teaching and learning; for example, improving L2 teaching materials, and highlighting focal points in L2 teaching and learning. However, this major contribution has been questioned by many linguists and language teachers, as well. Saporta (1967) claims that linguists have no idea how to convert the results of contrastive studies into efficient teaching methods. As well, Corder (1967) notes that teachers well understand what are the difficult points in language teaching and learning from their teaching experiences. In other words, what teachers essentially need is effective ways to cope with these difficulties, not merely identifying them. Nemser (1971) states that CA has little practical value in language teaching. Widdowson (1979) writes that an appropriate teaching model should derive from the language users instead of linguistics with the reason that language teaching is a participant orientated activity.

In spite of these criticisms, proponents of CA, particularly those in European countries, do not relinquish this utilitarian tool. They still have confidence in the application and future development of CA, albeit they have an increasing worry about whether CA contributes to language teaching (Aarts, 1982). Pietro (1978) recommends that it is necessary to continue utilizing CA for the reason that it makes contributions to pedagogy. The proponents of CA feel impelled to optimize CA continuously. They pay more attention to the theoretical and methodological aspects of CA, instead of devoting all efforts to the comparisons between specific languages (Aarts, 1982).

Moreover, CA proponents continue to defend it with more cautious claims. For instance, Politzer (1972) notes that performance in L2 may sometimes reflect competence in L1 and that 'The interference in performance in L2 which can be associated with competence in L1 can be counteracted by exercises which are specially designed to reduce the influence of competence of L1 on performance in L2.' It is compelling to note that these statements are much more moderate than earlier ones.

The fact that CA has been primarily targeted as language pedagogy makes it suffer due to that it has no clear supporting theoretical framework. To resolve this problem, River (1968) divides CA into two aspects, theoretical CA and applied CA. Theoretical CA works along general linguistic theories and language universals to provide descriptions of similarities and dissimilarities between languages. Meanwhile, applied CA induces research results of theoretical CA into a pedagogical field. Its proponents believe that CA could make contributions to various fields of linguistics, not only to the language pedagogy of applied linguistics, but also to translation theory, language typology, and language universals in theoretical linguistics (Altenberg and Granger, 2002). However, this division raises a difficult question for CA: how can a research result of the theoretical CA be converted into a pedagogical language method?

Currently, with increasing theoretical and methodological discussions, CA has revived as an active field in linguistics. It has also expanded into other disciplines, particularly in areas concerned with computer science. However, the predictive power of CA is still a center issue that attracts intense debate among scholars from different fields. The present research aims to determine the accuracy of the prediction function of CA by contrasting the sound systems of Mandarin Chinese and Thai, and checking the contrast results with the authentic performance of native Thai speakers who learn Mandarin Chinese as a second language.

According to James (1992), it is impossible to do an all-around contrast between two languages. This paper focuses on the phonetic transfer between Mandarin Chinese and Thai sound systems. Despite there are various output channels in communication, such as writing, body language, sign language, and so on, speech is a basic and natural medium of communication. As a result, phonetic transfer is considered the most obvious in language transfer studies. One example is that people could easily point out where a speaker comes from by listening to his/her speech accent.

III. METHODOLOGY

The sounds in Mandarin Chinese and Thai derive from different phonetic systems. Thai native speakers as learners of Mandarin Chinese are likely to embed unconsciously their mother tongue in their Mandarin Chinese pronunciation. This paper examines the different elements between Mandarin Chinese and Thai adopting the CA method, and checks the different elements against authentic performances of Mandarin Chinese pronunciation by five native Thai speakers who learn Mandarin Chinese as L2. The aim of this exercise is to retest the accuracy of the predictive power of CA. To conduct a parallel contrast, Thai and Mandarin Chinese sounds are described and transliterated utilizing the same model of sound description which is referred to as the international phonetic alphabetic (IPA) system.

To examine the accuracy of the predictive power of CA, two steps are employed. In the first step, Mandarin Chinese and Thai sound systems are described by the IPA system to fulfill the requirement of equivalence. Next, both sound systems are carefully contrasted. The purpose of the first step is to explore which Chinese sounds are different from Thai sounds and which ones do not exist in the Thai sound system. According to the contrastive analysis hypothesis, those different and nonexistent sounds are the difficult points for native Thai speakers when they are learning Mandarin Chinese pronunciation.

In the second step, five Thai participants were required to read out loud a piece of Mandarin Chinese material. The researcher recorded their reading of this material. All the participants are native Thai speakers who learn Mandarin Chinese as a second language, but with different years of learning and proficiency levels in Mandarin Chinese. The contrastive results of the first step were adopted as a check list to examine the pronunciation of each participant. This step distinguished whether the predicted difficulties in fact exist in the pronunciation by each participant; hence, the accuracy of predictive power could be ascertained.

A. Recording Material

The recording material is comprised of three parts: Pinyin (Mandarin Chinese phonetic system) reading, individual word reading, and short story reading. The first and second parts include every sound that exists in the Mandarin Chinese sound system, while the short story is selected from a question bank of the Putonghua (Mandarin Chinese) Proficiency Test, an official oral test held by the State Education Commission of the People's Republic of China. It is modified slightly to cover every sound that exists in the Mandarin Chinese sound system.

B. Participants

The participants recruited are five native Thai speakers who learn Mandarin Chinese as L2 (they differ in their respective proficiency levels of Mandarin Chinese). All participants come from central Thailand. In other words, there is no obvious difference in speech accents of their native language (note that Central-Thai accented speech is distinctive from Northern Thai-, Northeastern Thai- and Southern-Thai accented speeches). They were required to read aloud the Mandarin Chinese material. The researcher recorded their pronunciation and compared this with the results stemming from the first step of the research. An individual Chinese language teacher at a Chinese university was invited to listen to the recording once again to recheck the correctness of the comparison.

Each participant received the recording material a week in advance to familiarize with the contents. There was no presence of others except the individual participant in the recording room, in order to reduce anxiety of the participants and to assist in the naturalness of the reading. All participants finished the recording alone by themselves respectively.

TABLE 1.
PROFILES OF FIVE PARTICIPANTS

	Age	Gender	Place of Residence	Majored in Mandarin Chinese	Years of Learning	Frequency of Use
A	29	Female	Nontaburi (Central-Thai Speaking Region)	Yes	8	1-2 hours per week
B	36	Male	Bangkok (Central-Thai Speaking Region)	No	9	1 hour per week
C	24	Female	Bangkok	Yes	9	Everyday
D	39	Male	Bangkok	Yes	15	Weekdays
E	44	Female	Bangkok	Yes	25	Everyday

IV. FINDINGS

A. Consonants

There are 22 consonants in the Mandarin Chinese sound system. They are divided into two groups, 21 initial consonants and two final consonants. The sound [n] could be utilized as both an initial consonant and a final consonant.

Initial consonants: [p], [ph], [m], [f], [t], [th], [n], [l], [k], [kh], [x], [tʂ], [tʂ h], [ʂ], [ts], [tsh], [s], [tʂʅ], [tʂ h], [ʂ h], [ʅ]

Final consonants: [n], [ŋ]

The Thai language is consisted of 44 basic consonant characters, but only 21 sounds. Besides, there are 11 complex consonants in the Thai sound system, which would not be considered in this research due to the reason that complex consonants do not exist in the Mandarin Chinese sound system. As a result, 21 consonant sounds are divided into two groups as well, 21 initial consonants and six final consonants. Sounds [k], [p], [t], [m], [n], and [ŋ] could be utilized as both initial consonants and final consonants in the Thai sound system.

Initial consonants: [p], [ph], [b], [t], [th], [d], [k], [kh], [ʔ], [m], [n], [ŋ], [f], [s], [h], [ts], [tsh], [r], [j], [w], [l]

Final consonants: [k], [p], [t], [m], [n], [ŋ]

Drawing on a comparison table of Mandarin Chinese and Thai single consonants, summarized by Chen and Li (2008), the researchers compared all the above-mentioned consonants in Table 2 outlined below.

According to the contrastive analysis hypothesis, the difficulty that learners would meet in L2 learning is the sum of the dissimilarities between the native language and the target language. It could be predicted that native Thai speakers would not have any difficulty in pronouncing the two final consonants of Mandarin Chinese due largely to the fact that there are same final consonants in the Thai sound system, as well. There are eight Mandarin Chinese initial consonants which are non-existent in the Thai sound system. These are [tʂ], [tʂʰ], [ʂ], [tʂʰ], [ʂʰ], [z], [x]. In other words, these initial consonants are supposed to be the difficult points in the learning of Mandarin Chinese for native Thai speakers, for the reason that there is no corresponding sound in the Thai sound system to help the pronunciation.

TABLE 2.
COMPARISON BETWEEN MANDARIN AND THAI CONSONANTS

		Plosive			Nasal	Fricative		Affricate		Lateral	Trill	Approximate
		voiced	Voiceless		voiced	voiced	voiceless	voiceless		voiced	voiced	voiced
			un-aspirated	aspirated				un-aspirated	aspirated			
Bilabial	MC		p	p ^h	m							
	T	b	p	p ^h	m							
Labiodental	MC						f					
	T						f					
Dental	MC						s	ts	ts ^h			
	T						s	ts	ts ^h			
Alveolar	MC		t	t ^h	n					l		
	T	d	t	t ^h	n					l	r	
Retroflex	MC					ʒ	ʂ ^h	tʂ	tʂ ^h			
	T						ʂ ^h	tʂ	tʂ ^h			
Palatal	MC						ɕ	tɕ	tɕ ^h			j
	T							tɕ	tɕ ^h			
Velar	MC		k	k ^h	ŋ		x					w
	T		k	k ^h	ŋ							
Glottal	MC			ʔ								
	T						h					

B. Vowels

There are 35 vowels in the Mandarin Chinese sound system. These comprise eight monophthongs, nine diphthongs, and four triphthongs.

Monophthongs: [A], [o], [ɣ], [ɛ], [i], [u], [y], [ə]

Diphthongs: [ai], [ei], [au], [ou], [iɛ], [yɛ], [iA], [uA], [uo]

Triphthongs: [uei], [iou], [iau], [uai]

The Thai phonetic system is consisted of 41 vowels. These include 18 monophthongs, 20 diphthongs, and 3 triphthongs. Thai is one among the group of languages in which the duration of a vowel could change the meaning of a word. As a result, there are short vowels and their corresponding long vowels in the Thai sound system.

Monophthongs: [a], [a:], [i], [i:], [u], [u:], [e], [e:], [ɛ], [ɛ:], [o], [o:], [ɔ], [ɔ:], [ə], [ə:]

Diphthongs: [ia], [i:a], [ua], [u:a], [ua], [u:a], [ai], [a:i], [ɔi], [ɔ:i], [əi], [o:i], [ui], [au], [a:u], [ɛu], [ɛ:u], [iu]

Triphthongs: [i:au], [u:ai], [u:ai]

The above-mentioned monophthongs of both Mandarin Chinese and Thai are compared by distinguishing the places of articulation (tongue and lips) in Table 3 below:

TABLE 3.
A COMPARISON BETWEEN MANDARIN CHINESE AND THAI MONOPHTHONG

		Front		Central		Near Back	Back
		round	unrounded	rounded	unrounded	unrounded	rounded
							unrounded
High	MC	y	i				u
	T		i, i:			u, u:	u, u:
Mid	MC						o
	T		e, e:			ə, ə:	o, o:
Mid-low	MC		ɛ				ɔ, ɔ:
	T		ɛ, ɛ:				
Low	MC				A		
	T			a, a:			

According to the comparison, Table 3, there are four Mandarin Chinese monophthongs corresponding to Thai monophthongs which have the same position of articulation. These are the sounds of [i], [u], [o], and [ɛ], while the

remaining three Mandarin Chinese monophthongs are non-existent in the Thai sound system. These are the sounds of [y], [A], and [ɣ].

The contrast between diphthongs in the Mandarin Chinese and Thai sound systems is more complex than that of monophthongs. This complexity is summarized below:

1. There are two similar diphthongs in Mandarin Chinese and Thai. They are sounds of [ai] and [au].
2. There is no corresponding sound in the Thai sound system for the other Mandarin Chinese diphthongs, namely [ei], [ou], [iɛ], [ye], [iA], [uA], and [uo].
3. There are two triphthongs in the Thai sound system, [i:au] and [u:ai]. These are similar to the two Mandarin Chinese triphthongs [iau] and [uai]. However, the first sound of the Thai triphthongs is a long vowel sound. In the Mandarin Chinese sound system, there is no long vowel sound.
4. The other two triphthongs of Mandarin Chinese, [uei] and [iou], do not have corresponding triphthong in the Thai sound system.

All the discrepancies between the Mandarin Chinese and Thai sound systems are summarized as below:

Eight consonants: [tə], [tə^h], [ə], [ʃ^h], [tʃ], [tʃ^h], [z], [x]

Twelve vowels: [y], [ɣ], [A], [ei], [ou], [iɛ], [ye], [iA], [uA], [uo], [uei], [iou]

With the contrastive analysis hypothesis, it is predictable that Thai L1 speakers who learn Mandarin Chinese as L2 will have difficulties to learn the consonants and vowels mentioned above. To check the accuracy of CA's predictive power, the researcher listened to the recorded pronunciation of the participants. The results were checked by a Chinese language teacher at a university in PRC.

As mentioned earlier, participant A, who majors in Mandarin Chinese, has been learning it for eight years. She utilizes it for 1-2 hours per week to sing songs and to teach it for Thai children. It was found that participant A clearly pronounces [tʃ], [tʃ^h], [ʃ^h], and [z]. However, she cannot pronounce [tə], [tə^h], and [ə] well. Instead, she pronounces these three sounds employing a dental voice which renders the sound the same as [ts], [tsh], and [s] in Mandarin Chinese. She pronounces [x] as [h], a glottal voice in the Thai sound system.

TABLE 4.
PRONUNCIATION PERFORMANCE OF FIVE PARTICIPANTS

	A	B	C	D	E	
Consonants	tə	Dental voice	Dental voice	Dental voice	√	Dental voice
	tə ^h	Dental voice	Dental voice	Dental voice	√	Dental voice
	ə	Dental voice	Dental voice	Dental voice	Dental voice	Dental voice
	tʃ	√	Dental voice	√	Dental voice	√
	tʃ ^h	√	Dental voice	√	Dental voice	√
	ʃ ^h	√	Dental voice	√	Dental voice	√
	z	√	Alveolar voice	Alveolar voice	√	√
	x	Glottal voice	Glottal voice	Glottal voice	Glottal voice	√
	y	√	√	√	√	√
	ɣ	√	Near back sound ə:	Near back sound ə:	Near back sound ə:	Near back sound ə:
Vowels	A	Central rounded a	Central rounded a	Central rounded a	Central rounded a	√
	ei	Long near back ə:	Long near back ə:	Long near back ə:	√	√
	ou	√	Mid-low back rounded ə:	√	Mid-low back rounded ə:	√
	iɛ	i is pronounced as i:	i is pronounced as i:	i is pronounced as i:	i is pronounced as i:, ε is pronounced as a	√
	ye	√	√	√	√	√
	iA	i is pronounced as i:, central rounded a	i is pronounced as i:, central rounded a	i is pronounced as i:, central rounded a	Central rounded a	√ (sometimes)
	uA	u is pronounced as u:, central rounded a	u is pronounced as u:, central rounded a	u is pronounced as u:, central rounded a	Central rounded a	u is pronounced as u:, central rounded a
	uo	u is pronounced as u:	u is pronounced as u:	u is pronounced as u:, o is pronounced as a occasionally	Back rounded ə	√
	uei	√	u is pronounced as u:, near back ə	u is pronounced as u:, e is missing	√	√
	iou	i is pronounced as i:	i is pronounced as i:, ou as u	i is pronounced as i:	i is pronounced as i:, Mid-low back rounded ə	√

On the other hand, participant A can correctly pronounce [y], [ɣ], [ou], [ye], and [uei].

However, the sound [A] is pronounced as sound [a], a central rounded sound in the Thai sound system. Regarding the diphthong [ei], its first part is pronounced as [ə:], a near back unrounded long sound in the Thai sound system. The first part of the sound [i] in Mandarin Chinese sounds like [iɛ], but [iou] is pronounced by participant A as a long vowel [i:]. For [iA], the first part of the sound [i] is pronounced as a long vowel [i:] as well, while the second part of the sound [A] is pronounced as [a], a central rounded sound in the Thai sound system. A similar problem happens with the pronunciation of [uA]. The first sound [u] is pronounced as a long vowel [u:], while the second [A] is pronounced as [a], a central rounded sound in the Thai sound system. The first part [u] in the diphthong [uo] is pronounced as a long vowel [u:] by participant A.

Participant B, who has not majored in Mandarin Chinese, has learned it for nine years. He commonly utilizes it for 1 hour per week to sing songs. In his consonant demonstration, participant B pronounces [tɕ], [tɕ h], [ʃ], [tʃ], [tʃ h], and [ʂ] as dental voices which sound the same as [ts], [tsh], and [s]. He pronounces [z] as an alveolar sound [l]. Similar to participant A, participant B pronounces [x] as [h], a glottal voice in the Thai sound system. In the vowel demonstration, participant B correctly pronounces [y] and [yɛ]. However, the vowel [ɣ] is pronounced as [ə:], a near back unrounded long sound in the Thai sound system. Participant B pronounces [A] as a central rounded [a], which is a Thai vowel. The first sound in the diphthong [ei] is pronounced as a near back unrounded long sound [ə:]. The diphthong [ou] is pronounced as a monophthong [ɔ :]. Participant B pronounces [iɛ] as [i:ɛ]. He pronounces the first sound [i] as a long vowel [i:]. The first parts of the sounds of [iA] and [uA] are pronounced as long vowels [i:] and [u:], while the second part of [A] is pronounced as a Thai vowel [a]. In addition, the [u] in [uo] is pronounced as the long vowel [u:]. The first sound [u] in [uei] is pronounced as the long vowel [u:] as well, and [ei] is pronounced as [əi]. As to the triphthong [iou], participant B pronounces it as the diphthong [i:u] which has a long vowel [i:].

Participant C who majors in Mandarin Chinese has been learning it for nine years (note that both participant B and C spent nine years to learn Mandarin Chinese). She has the opportunity to speak it with her Chinese boyfriend. In her consonant demonstration, participant C pronounces [tʃ], [tʃ h], and [ʃ] perfectly. However, she pronounces [tɕ], [tɕ h], and [ʃ] as dental voices which sounds the same as [ts], [tsh], and [s]. The consonant [z] is pronounced as an alveolar voice [l], while [x] is pronounced as a glottal voice [h] in the Thai sound system. In the vowel demonstration, participant C clearly pronounces [y], [ou], and [yɛ]. However, [ɣ] is pronounced as [ə:], a near back unrounded long sound in the Thai sound system. The vowel [A] is pronounced as the central rounded [a] in the Thai sound system. The diphthong [ei] is pronounced as [ə:i]. The [i] sound in [iɛ] and [iou] is pronounced as the long vowel [i:]. In addition, [iA] is pronounced by participant C as [i:a] which has a long vowel [i:] and a central rounded [a]. The same problem exists in the pronunciation of the diphthong [uA] which is pronounced as [u:a] by participant C. As to the diphthong [uo], occasionally participant C pronounces it as [u:o], and at times pronounces it as [u:a]. The triphthong [uei] is pronounced as the diphthong [u:i].

Participant D who majors in Mandarin Chinese has been learning it for fifteen years. He utilizes it during the weekdays when he contacts with Chinese-speaking people and Chinese documents in his workplace. In the consonant demonstration, participant D pronounces [tɕ], [tɕ h], and [z] correctly. However, [ʃ] is pronounced as a dental voice [s]. Consonants [tʃ], [tʃ h], and [ʂ h] are pronounced as dental voices [ts], [tsh], and [s]. Participant D pronounces [x] as the glottal voice [h] in the Thai sound system. In the vowel demonstration, participant D pronounces [y], [ei], [yɛ], and [uei] perfectly. However, he pronounces [ɣ] as the near back long sound [ə:], a Thai vowel. [A] is pronounced as the Thai central rounded vowel [a]. The diphthong [ou] is pronounced by participant D as the monophthong [ɔ :]. The diphthong [iɛ] is pronounced as [i:a] which has a Thai long vowel [i:] and the Thai central rounded vowel [a]. In the pronunciation of [iA] and [uA], its second part [A] is pronounced as the Thai central rounded vowel [a]. The diphthong [uo] is pronounced as the monophthong [ɔ]. The triphthong [iou] is pronounced as the diphthong [i:ɔ].

Participant E who majors in Mandarin Chinese has learned it for twenty-five years. Similar to participant C, she utilizes it everyday as her work duties include editing Chinese-Thai books and she constantly watches Chinese TV series on the weekends. In her consonant demonstration, participant E pronounces [tʃ], [tʃ h], [ʃ h], [z], and [x] perfectly. However, [tɕ], [tɕ h], and [ʃ] are pronounced as dental voices [ts], [tsh], and [s], the same difficulty demonstrated by participants A, B, and C. In the vowel demonstration, participant E clearly pronounces [y], [A], [ei], [ou], [iɛ], [yɛ], [uo], [uei], [iou], and from time to time [iA]. [ɣ] is pronounced as the near back sound [ə:] which is a Thai vowel. The diphthong [uA] is pronounced as [u:a] which has the Thai long vowel [u:] and the Thai central rounded vowel [a]. Participant E occasionally pronounces [iA] correctly, while at times pronouncing it as [i:A].

To summarize the performances of the participants, participant B revealed the most pronunciation problem, while participant E, the least. There is no significant difference among the pronunciation performances of participants A, C, and D.

V. CONCLUSION

A. Summary

Numerous noteworthy observations are reflected in the research findings of the earlier outlined demonstrations conducted for the pronunciation of both the consonants and vowels of Mandarin Chinese and Thai sound systems.

1. It is possible to discern similarities and dissimilarities between Mandarin Chinese and Thai sound systems with the help of CA. This result confirms the fourth assumption of the contrastive analysis hypothesis, both similarities and dissimilarities between L1 and L2 of the L2 learner could be pointed out by a comparison exercise.

2. The compound vowels [iA], [uA], [iɛ], [uo], and [iou] are pronounced differently by the pronunciation of Chinese L1 speakers. A Thai L1 speaker is likely to pronounce the first sound much longer than the second sound, while a Chinese L1 speaker's pronunciation of compound vowels is quite short and pronounced quickly. This aforementioned phenomenon shows that the Chinese pronunciation of Thai L1 speakers is influenced by their L1 due to that commonly the first sound in Thai compound vowels is much longer than the second (and third) sound. This indicates that interference occurs at the phonological aspect of linguistics, and influences language production. Again, this observation is in accord with the third assumption of the contrastive analysis hypothesis, that interference occurs at each aspect of linguistic structure (phonological, syntactic and semantic) and influences both language production and perception.

3. However, not every difference between the Mandarin Chinese and Thai sound systems causes a learning difficulty. E.g., all participants pronounce the vowels [y] and [yɛ] correctly. In other words, with regard to the aforementioned aspect of phonological learning and at least for the learning of Mandarin Chinese by Thai L1 speakers, the difficulty is not merely the sum of differences. The vowel [y], as well as [yɛ], does not have any similar sound in the Thai sound system. According to the contrastive analysis hypothesis, these are supposed to be obstacles in Chinese pronunciation for Thai L1 speakers. However, both of these vowels of Mandarin Chinese were pronounced perfectly by five participants who are Thai L1 speakers, while other Mandarin Chinese vowels that have similar sounds in the Thai sound system were pronounced inaccurately. It is thus evident that dissimilarities between L1 and L2 do not always cause difficulty for L2 learning, while similarities may cause difficulty. These results are contrary to the seventh assumption of contrastive analysis hypothesis, that dissimilarities between L1 and L2 cause difficulty in L2 learning while similarities do not, and the difficulty is the sum of the dissimilarities.

4. Since the results of this research show that the dissimilarities between L1 and L2 do not always cause difficulty in L2 learning and similarities occasionally do cause difficulty, the eighth assumption of the contrastive analysis hypothesis, that the difficulties which the learners will have in L2 learning could be predicted, is accordingly refuted.

5. This research finds that different Thai L1 speakers have different difficulties in regard to Mandarin Chinese pronunciation. E.g., participant D pronounce [tɕ] and [tɕ h] correctly, while participant E who performed the best in the Mandarin Chinese pronunciation demonstration exercise cannot pronounce these two consonants correctly. Hence, it is evident that pronunciation difficulty is a psycholinguistic issue in which individual difference plays an role. As a result, the ninth assumption, that difficulties could be positioned in hierarchies according to the divergence of two languages, is refuted by the research results of the present study.

With the abovementioned observations of the contrast between Mandarin Chinese and Thai sound systems, the predictive power of CA has been re-examined and findings of the present study question the practical application and contribution of CA in language pedagogy. The results of the present research show that the predictive power of CA is not as accurate as its proponents claim.

B. Discussions

According to the contrastive analysis hypothesis, the learning difficulty is the sum of the differences between the learner's L1 and L2. To examine the accuracy of CA's predictive power, this paper compares Mandarin Chinese and Thai sound systems. The differences between these two systems are outlined and the supposition made that these differences pose difficulties during L2 learning. A check of these predicted difficulties was then made with the Mandarin Chinese pronunciation performance of five native Thai speakers who have different levels of proficiency in Mandarin Chinese.

The results of the present research are contrary to a number of assumptions of the contrastive analysis hypothesis and they question the accuracy of CA's predictive power. The results show that, at least for the five participants involved in this research, some differences may not cause any difficulty in the Mandarin Chinese pronunciation of native Thai speakers, while some sounds with similar pronunciation may cause great difficulty during the learning process of the Mandarin Chinese sound system. As a result, the accuracy of CA's predictive power is not as efficient as has been strongly held by the proponents of CA.

C. Recommendations

All participants in the present research have been learning Mandarin Chinese for longer than eight years. The longer they have in their learning, the more external factors may have influenced their Chinese pronunciation. To explore the contribution of CA to L2 learning, the performance of a beginner who has recently learned a L2 is recommended as one future research focus. Besides this, the pronunciation data collected and analyzed in the present research were not of natural speech. Such may not reflect the authentic pronunciation performance in natural conversations carried out by participants studied. It is, therefore, recommended that future researchers adopt recordings of the language from natural speech settings (whereby spontaneous and conversational speeches are naturally carried out) as data.

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