Humanities, Arts and Social Sciences Studies

Research Article

Humanities, Arts and Social Sciences Studies
https://so02.tci-thaijo.org/index.php/hasss
ISSN (Online): 2630-0079

THE INVESTIGATION OF CHINESE TFL LEARNERS' ABILITIES TO DISTINGUISH THAI INITIAL CONSONANT SOUNDS

Orrathip Geerativudhipong[*], *Songsri Soranasataporn and Vannaporn Phongpheng*

Faculty of Liberal Arts, Mahidol University, Thailand

ABSTRACT

This study investigates the ability of Chinese learners of Thai as a Foreign Language, (TFL), to distinguish between pairs of Thai initial consonant sounds. There were two groups of participants: (i) Chinese undergraduate students and Thai language instructors participated in a survey and; (ii) Chinese undergraduate students took part in listening experiments to explore these potential challenges. Research instruments included: (i) needs analysis questionnaires, one for Chinese TFL undergraduate students and another for Thai language instructors, to assess perception of difficulty, and; (ii) a minimal pair listening task. The results identified the Thai initial consonant sound pairs /ŋ/ and /ʔ/, /d/ and /t/, /b/ and /p/, and /r/ and /l/ as being difficult for Chinese TFL learners to be distinguished, whereas /t/ and /tʰ/, /k/ and /kʰ/, and /p/ and /pʰ/ did not present serious problems for this group of Chinese students. In terms of underlying causes of Chinese TFL learners' listening and speaking errors, the interference from Chinese phonology and the irregular learning of Thai phonology are the two main causes for their listening and speaking errors. These findings may prove useful for teaching the Thai language to Chinese TFL learners, especially in the design of learning materials to improve understanding of Thai initial consonant sounds.

Keywords: Thai initial consonant sounds; Thai language; listening perception; Chinese TFL learners

[*]***Corresponding author:***
Orrathip Geerativudhipong
orrathip@hotmail.com

Received: *30 April 2021*
Revised: *22 June 2021*
Accepted: *6 August 2020*
Published: *26 October 2022*

Citation:
Geerativudhipong, O., Soranasataporn, S. and Phongpheng, V. (2022) The investigation of Chinese TFL learners' abilities to distinguish Thai initial consonant sounds. Humanities, Arts and Social Sciences Studies 22(3): 579-588.

1. INTRODUCTION

The popularity of the Thai language in the global context has contributed to the development of teaching and learning Thai as a Foreign Language (TFL). There is an increasing number of foreigners learning Thai for several reasons, such as travelling, working, studying, and/or living in Thailand (Pimpuang, 2015; Lapyai, 2016; Plangsorn, 2017). The main purpose of learning the Thai language for foreigners is to communicate with Thai people. There are many educational institutions, both in Thailand and in foreign countries such as China, South Korea, Australia, England, and America, which have opened Thai language programs for foreign learners. In Thailand, there are a number of foreign university students studying in TFL programs, and many have also chosen Thai language as their major subject. Chinese-speaking university students are the largest number of foreigners who study Thai language as their major subject in universities in Thailand, according to the latest recorded information from the Office of the Higher Education Commission of

Thailand (2018). As Thai and Chinese are both tonal and isolating languages, many people may assume that Chinese people may be able to learn Thai language more easily than other foreign learners. However, languages of the world are spoken in many different varieties (Lightbown and Spada, 2013). Therefore, there are many things to study when learning a target language besides vocabulary, grammar, and pragmatics, including listening, speaking, reading, and writing skills.

Previous studies have highlighted listening and speaking skills as the major challenges experienced by Chinese TFL learners and other Chinese-speaking learners of Thai (Permkesorn, 2008; Kupongsak, 2012; Sheng, 2012; Leelapornpinit, 2016; Damrongrojsakul and Phunphon, 2017). Unfamiliar sounds that exist in a target language, but which do not exist in a learner's native language, lead to the difficulties in listening comprehension, and contribute to problems in subsequent speech (Garrett and Johnson, 2013; Yildirim and Yildirim, 2016). In other words, native Chinese speakers who are unable to adequately recognize Thai language sounds tend to be unable to produce those sounds correctly in speech. The major problems for Chinese TFL learners listening and speaking the Thai language are presented by consonant sounds, initial consonant sounds in particular.

Previous studies (See Permkesorn (2008); Sheng (2012); Leelapornpinit (2016); Damrongrojsakul and Phunphon (2017)) have identified a list of Thai initial consonant sounds which are difficult for Chinese TFL learners to distinguish. Some of these "phonological problems" do not exist in the Chinese language, e.g., the sound /b/ (voiced unaspirated bilabial stop) and /d/ (voiced unaspirated alveolar stop). While others in the list are similar to sounds present in Chinese, but which are pronounced differently, with differences in place of articulation and manner of articulation. These differences between the two languages consequently cause difficulties in distinguishing between certain Thai initial consonant sounds for Chinese TFL learners. However, there remain other Thai initial consonant sounds which are linguistically different in pronunciation, and which may also cause problems in the listening comprehension of Chinese TFL learners, but which have thus far not been examined.

The purpose of this study is therefore to investigate the ability of Chinese TFL learners to distinguish between these other potentially problematic Thai initial consonant sounds and compare their difficulty relative to the previously identified "common list" of Thai initial consonant sounds challenging for these learners. The study aims to find the answers of the Thai initial consonant sounds which are the most likely to cause problems for Chinese TFL learners with the following research questions:

1. To what extent do the common list and additional list of Thai initial consonant sounds cause problems in listening of Chinese TFL learners?

2. To what extent do the Chinese TFL learners' problems in listening Thai initial consonant sounds gathered from survey questionnaires make the differences from minimal pair task?

2. BACKGROUND OF THE STUDY

Although Thai and Chinese languages are both classified as tonal languages, in which single words or syllables are spoken in different tones to distinguish the meaning of words (Trask, 1996; Yip, 2002), there are also differences between the two languages which may cause problems for Chinese TFL learners. Differences in the writing systems employed by the two languages is one of the major difficulties, because Thai uses an alphabetical writing system in which there is a symbol (letter) for each consonant and vowel intended to indicate individual phonemes (Panthumetha, 2011; Thonglor, 2011; Treiman and Kessler, 2013), whereas Chinese is a logographic writing system in which each Chinese character is one syllable and denotes a single word (Norman, 1988; Hobbs, 2019). This difficulty leads to spelling errors by Chinese TFL learners writing the Thai language (Hou, 2019). Another major difficulty for Chinese TFL learners is pronunciation, because there are sounds in the Thai language which are linguistically different in pronunciation to similar sounds in Chinese, and other sounds which exist in the Thai language have no similar counterpart in Chinese (Permkesorn, 2008; Sheng, 2010; 2012; Kupongsak, 2012; Leelapornpinit, 2016; Damrongrojsakul and Phunphon, 2017).

Unlike the Chinese logographic characters, which are used morphemically, the Thai alphabet allows it to be used at the phoneme level (Dow, 1972; Třísková, 2008) where words can be divided into the sound elements of initial consonant sound, vowel sound, final consonant sound, and tone. In contrast, Chinese words cannot be similarly divided into the elements of sound from the Chinese characters. However, a transcription system for Chinese characters called "pinyin" (拼音), which are like English alphabets and are used to represent the sounds, including the consonants, vowels, and tones of Chinese characters (Paton, 2008), may be used to specify the sound elements of Chinese words. This point is therefore important to the popularity of Pinyin, while Thai phonetic symbols are not.

This study focuses on the initial consonant sounds of the Thai language. Chinese initial consonant sounds are classified into 23 phonemes according to the "pinyin" transcription method (Defense Language Institute, 1974; Suen, 1982; Paton, 2008), while Thai initial consonant sounds are classified into 21 phonemes, although there are 44 consonant alphabet letters because some of Thai letters represent identical sounds, for example, both "พ" - "ภ" are used for the /p^h/ sound, and "ท" - "ธ" are both pronounced as the /t^h/ sound (Jaroonroj, 2009; Yooyen, 2013; Piyapasuntra, 2018). Some of these Thai initial consonant sounds are similar to Chinese initial consonant sounds, but they are linguistically different in pronunciation (Permkesorn, 2008; Sheng, 2010; 2012; Kupongsak, 2012; Leelapornpinit, 2016; Damrongrojsakul and Phunphon, 2017; Lianghiranthaworn and Chapoo, 2019).

These different sounds are an obvious candidate source of problems for Chinese TFL learners' pronunciation of Thai words and sentences. Chinese TFL learners have more difficulty with pronunciation than with any other TFL listening or speaking skills (Permkesorn, 2008; Sheng, 2012), and this may be due to the influence of the different sound units from their first language (Damrongrojsakul and Phunphon, 2017; Hou, 2019). A comparison of initial consonant sounds between Thai and Chinese languages is shown in Table 1.

Table 1: Comparison of Initial Consonant Sounds between Thai and Chinese

Thai alphabet consonant letters	**Thai initial consonant sounds (Phonetic Alphabet)**	**Chinese initial consonant sounds (Pinyin)**
ก	k	g
ข ฃ ค ฅ ฆ	k^h	k
ง	ŋ	- (exist in Chinese final consonant sounds, e.g. *ang, eng, ong, iang, uang*)
จ	c	z, zh, j* *z unaspirated voiceless frontal-alveolar affricate *zh unaspirated voiceless post-alveolar affricate *j unaspirated voiceless palatal affricate
ฉ ช ฌ	c^h	c, ch, q* *c aspirated voiceless frontal-alveolar affricate *ch aspirated voiceless post-alveolar affricate *q aspirated voiceless palatal affricate
ซ ศ ษ ส	s	s, x, sh* *s = aspirated frontal-alveolar affricate *x = voiceless palatal fricative *sh = voiceless post-alveolar affricate
ญ ย	j	y (Semi-vowel with the same function as /ʔ/ in Thai)
ฎ ด	d	-
ฏ ต	t	d
ฐ ฑ ฒ ถ ท ธ	t^h	t
ณ น	n	n
บ	b	-
ป	p	b
ผ พ ภ	p^h	p
ฝ ฟ	f	f
ม	m	m
ร	r	r* *voiced post-alveolar affricate
ล ฬ	l	l
ว	w	w (Semi-vowel with the same function as /ʔ/ in Thai)
ห ฮ	h	h* *voiceless velar fricative
อ	ʔ	- (exist in Chinese vowel sounds, *e.g. a, ai, an*)

Note: *The linguistic descriptions of Chinese initial consonant sounds were derived from Yang (2006)

This comparison of initial consonant sounds highlights four Thai initial consonant sounds which do not appear in the Chinese language, and seventeen initial consonant sounds with varying degrees of similarity between the two languages. These include the Thai initial consonant sounds which have been previously identified as causing pronunciation problems for Chinese TFL learners, i.e. the sound pairs /b/ and /p/, /d/ and /t/, /k/ and /kʰ/, and /r/ and /l/ (Permkesorn, 2008; Sheng, 2012; Leelapornpinit, 2016; Damrongrojsakul and Phunphon, 2017). Gilakjani (2011) claims that learners' utterances of the target language will not be comprehensible to listeners if the pronunciation is unacceptable, and their communication will be unsuccessful if they have poor listening perception in the target language. This is related to Nunan (2002)'s argument that listening is fundamental to speaking because learning cannot begin without understanding input, and it is also related to Rost (1990)'s further assertion that this input must be understood at the right level.

The previously examined "common list" of Thai initial consonant sounds can be used as a starting point for investigating potential problem sounds for Chinese TFL learners to distinguish. Nonetheless, there are other initial consonant sounds of Thai and Chinese languages which are similar, but they are linguistically different in pronunciation, and therefore potential sources of difficulty for Chinese TFL learners' listening comprehension and subsequent speeches. The "common list" of problematic Thai initial consonant sounds contains the unaspirated bilabial stop pair (/b/ and /p/) and the unaspirated alveolar stop pair (/d/ and /t/) which Chinese TFL learners find difficult to pronounce. However, the ability to distinguish between unaspirated and aspirated forms of bilabial stop consonants (/p/ and /pʰ/) or of alveolar stop consonants (/t/ and /tʰ/) by Chinese TFL learners has yet to be investigated, despite listening comprehension difficulties being reported with another unaspirated and aspirated sound pair (/k/ and /kʰ/) in the "common list".

The sounds /ŋ/ and /ʔ/ are also suspected to cause pronunciation problems for Chinese TFL learners based on the authors' experience of teaching Thai to Chinese TFL learners. Although they are similar in place of articulation and manner of articulation, these two sounds do not exist as initial consonant sounds in Chinese, and may therefore present problems for Chinese TFL learners. As this study focuses on investigating the problems in understanding Thai initial consonant sounds by Chinese TFL learners, the authors propose examining an "additional list" of Thai initial consonant sounds composed of /p/ and /pʰ/, /t/ and /tʰ/, and /ŋ/ and /ʔ/. Therefore, the final list of Thai initial consonant sound pairs used as research tools in this study consists of the "common list" together with the "additional list", i.e /b/ and /p/, /p/ and /pʰ/, /d/ and /t/, /t/ and /tʰ/, /k/ and /kʰ/, /r/ and /l/, and /ŋ/ and /ʔ/. These seven pairs of Thai initial consonant sounds have been linguistically described in terms of their place and manner of articulation (International Phonetic Association, 1999), as follows:

1.	/p/	voiceless unaspirated bilabial stop
	/b/	voiced unaspirated bilabial stop
2.	/p/	voiceless unaspirated bilabial stop
	/pʰ/	voiceless aspirated bilabial stop
3.	/k/	voiceless unaspirated velar stop
	/kʰ/	voiceless aspirated velar stop
4.	/d/	voiced unaspirated alveolar stop
	/t/	voiceless unaspirated alveolar stop
5.	/t/	voiceless unaspirated alveolar stop
	/tʰ/	voiceless aspirated alveolar stop
6.	/l/	voiced alveolar lateral
	/r/	voiced alveolar trill
7.	/ŋ/	voiced velar nasal
	/ʔ/	voiceless glottal stop

3. METHOD

3.1 Participants

3.1.1 Survey participants

Group I: One hundred and eight Chinese undergraduate students, first-, second-, third-, and fourth-year, studying in the course of Thai as a Foreign Language in the second semester of the academic year 2018 at a public university in Thailand, were selected to complete the survey part of the study.

Group II: Seventeen Thai language instructors who taught Thai language to Chinese undergraduate students in the second semester of the academic year 2018 at a public university in Thailand were selected to complete a separate survey.

Sampling technique

Group I: The sample size was derived from the sample size determination table of Krejcie and Morgan (1970) since the number of population was one hundred and fifty Chinese undergraduate students. Individuals were recruited to this group by means of a purposive sampling method in which the entire Chinese undergraduate students were chosen based on the inclusion and exclusion criteria.

Inclusion criteria:

1. Chinese undergraduate students of first-, second-, third-, and fourth-year TFL who were studying in the course of Thai as a Foreign Language in the second semester of the academic year 2018.

2. Chinese undergraduate students who were willing to do the needs analysis questionnaire.

Exclusion criterion:

Chinese undergraduate students who were unable to do the needs analysis questionnaire.

Group II: The sample size was derived by using purposive sampling based on the inclusion and exclusion criteria because the number of instructors eligible for this sample group (only those who teach Thai language to Chinese TFL undergraduate students) was low.

Inclusion criteria:

1. Instructors who taught Thai language to TFL university students.

2. Instructors who have experiences in teaching Thai as a foreign language to foreign university students for more than three years.

3. Instructors who were willing to do the needs analysis questionnaire.

Exclusion criterion:

Instructors who were unable to do the needs analysis questionnaire.

3.1.2 Experimental participants

A further seventy-eight Chinese undergraduate students, separate from the survey group, who were studying in the course of Thai as a Foreign Language in the first semester of the academic year 2019 at a public university in Thailand, participated in the experiment.

Sampling technique

Chinese undergraduate students were recruited to this group by means of a purposive sampling method based on the inclusion and exclusion criteria.

Inclusion criterion:

Chinese undergraduate students who were studying in the course of Thai as a Foreign Language in the first semester of the academic year 2019 and were willing to participate throughout this research project.

Exclusion criterion:

Chinese undergraduate students who were unable to participate throughout this research project.

3.2 Research instruments

1. Self-administered needs analysis questionnaires, one for Chinese TFL undergraduate students and another for Thai language instructors, were used to survey the perceived ability of Chinese TFL learners to distinguish between pairs of Thai initial consonant sounds by, using a five-point Likert scale in which "5" indicated the perception of greatest difficulty.

2. A minimal pair task containing selected pairs of Thai initial consonant sounds was administered to Chinese TFL learners to test their listening ability to distinguish between the sound pairs.

Validity and reliability:

The two needs analysis questionnaire and the minimal pair task were validated using the IOC value for validity, Cronbach's Alpha Coefficient method was used to determine reliability of questionnaires, and KR-20 was used to determine reliability of minimal pair task. The validity value was 0.86 for the questionnaires, and 0.96 for the minimal pair task. The reliability value was 0.98 for the questionnaires, and 0.71 for the minimal pair task.

3.3 Procedure

3.3.1 Survey

1. After the research project was approved under Research Ethics guidelines, permission was obtained from the dean of the Faculty of Humanities at the selected public university to collect the research data.

2. The participants were informed of the objectives of the research project and gave their consent.

3. The authors distributed the first needs analysis questionnaire to Chinese TFL undergraduate students for individual self-administration.

4. The authors distributed the second needs analysis questionnaire to Thai language instructors for individual self-administration.

3.3.2 Experiment

1. After the research project was approved under Research Ethics guidelines, permission was obtained from the dean of the Faculty of Humanities at the selected public university to collect the research data.
2. The participants were informed of the objectives of the research project and gave their consent.
3. The minimal pair task was administered to Chinese TFL undergraduate students by the authors.

3.4 Data analysis

The data collected from questionnaires and minimal pair tasks were statistically analyzed to identify the Thai initial consonant sounds which were difficult for Chinese TFL learners to distinguish. The data was analyzed using descriptive statistics, and presented as arithmetic mean and Standard Deviation.

4. RESULTS

The two needs analysis questionnaires asked Chinese TFL undergraduate students and Thai language instructors to indicate their perception of the degree of difficulty they encountered in distinguishing between specified pairs of Thai initial consonant sound. The results are shown in Table 2.

Table 2: The Degree of Difficulty Experienced by Chinese TFL Learners' in Distinguishing between Initial Thai Consonant Sounds, as Independently Perceived by Themselves and by Their Instructors

Problems	TFL learners (n = 108)		Instructors (n = 17)	
	M	*SD*	*M*	*SD*
1. Difficulty in distinguishing between the initial sounds /b/ and /p/	4.00	.79	3.88	.92
2. Difficulty in distinguishing between the initial sounds /p/ and /ph/	3.82	.75	3.18	.72
3. Difficulty in distinguishing between the initial sounds /k/ and /kh/	3.79	.73	3.24	.75
4. Difficulty in distinguishing between the initial sounds /d/ and /t/	4.05	.70	4.06	1.08
5. Difficulty in distinguishing between the initial sounds /t/ and /th/	3.80	.78	3.35	1.11
6. Difficulty in distinguishing between the initial sounds /r/ and /l/	3.88	.87	3.88	1.21
7. Difficulty in distinguishing between the initial sounds /ŋ/ and /ʔ/	3.83	.81	4.12	.99
8. Others				

As shown in Table 2, Chinese TFL learners rated /d/ and /t/ as the most difficult consonants to be distinguished, whereas their Thai language instructors rated the initial sounds /ŋ/ and /ʔ/ as the most challenging for their Chinese TFL students. Noticeably, being able to distinguish between the initial sounds /k/ and /kʰ/ was rated as least difficult by Chinese TFL undergraduate students, whereas the learners' ability to discriminate between /p/ and /pʰ/ was rated the least problematic of these pairs for Chinese TFL learners by the Thai language instructors. However, Chinese TFL undergraduate students and Thai language instructors did not have substantially different views towards the problem of being able to distinguish between the initial sounds /b/ and /p/, /p/ and /pʰ/, /k/ and /kʰ/, /d/ and /t/, /t/ and /tʰ/, /r/ and /l/ and /ŋ/ and /ʔ/.

Chinese TFL undergraduate students considered being able to distinguish between the initial sounds /p/ and /pʰ/, /k/ and /kʰ/, and /t/ and /tʰ/ as an extensive problem, the next most challenging initial consonant pairs for them, whereas Thai language instructors felt that their Chinese TFL undergraduate students had only a moderate problem with these sounds. Interestingly, being able to distinguish between the initial sounds /b/ and /p/, /p/ and /pʰ/, /k/ and /kʰ/, /d/ and /t/, /t/ and /tʰ/, /r/ and /l/, and /ŋ/ and /ʔ/ were all rated as an extensive listening problems by Chinese TFL undergraduate students. The results gathered from questionnaires confirmed the results of previous studies, i.e. that the "common list" of Thai initial consonant sound pairs, /b/ and /p/, d/ and /t/, /k/ and /kʰ/, and /r/ and /l/, are difficult to distinguish between for Chinese TFL learners. However, the "additional list" of Thai initial consonant sound pairs suspected of being problematic, /p/ and /pʰ/, / /t/ and /tʰ/, and /ŋ/ and /ʔ/, were also perceived as causing difficulties in listening comprehension for Chinese TFL learners.

The findings obtained from questionnaires were relevant to the results gathered from the minimal pair task with Chinese TFL undergraduate students. As shown in Table 3, less than 50% of Chinese TFL learners were able to distinguish between the Thai initial consonant sound pairs /ŋ/ and /ʔ/ (43.08%), and /d/ and /t/ (45.9%), whereas 62.56% and 75.38% of Chinese TFL learners were able to distinguish between the initial consonant sounds /b/ vs. /p,/ and /r/ vs. /l/, respectively. However, it was considered that the remaining three sound pairs, which differed between unaspirated and aspirated sounds, did not present problems for Chinese TFL learners because greater than 80% of the student sample was able to discriminate between the consonant sounds in each of these pairs: /t/ and /tʰ/ (80.5%), /k/ and /kʰ/ (85.66%), and /p/ and /pʰ/ (87.94%). When comparing the Thai initial consonant sound pairs from the "common list" to the "additional list", the minimal pair task results confirmed that /b/ and /p/, /d/ and /t/, and /r/ and /l/ from the "common list" caused difficulties, but, in contrast to previous studies, /k/ and /kʰ/ did not. With regard to the "additional list" of Thai

initial consonant sound pairs, /ŋ/ and /ʔ/ are hard to be differentiated for Chinese TFL learners, whereas /p/ and /pʰ/ and /t/ and /tʰ/ did not.

Table 3: Chinese TFL Learners' Performance in a Minimal Pair Task

Target Sound Pairs	Word List			TFL learners (n = 78)	
				f	*%*
/b/ - /p/	บ้า /bâː/ (be crazy)	-	ป้า /pâː/ (aunt)	57	73.10
	บีบ /bìːp/ (to squeeze)	-	ปีบ /pìːp/ (a kind of Thai flowers)	30	38.50
	บูด /bùːt/ (be spoiled/ be rancid)	-	ปูด /pùːt/ (be swollen)	27	34.60
	ใบ /baj/ (classifier for tree leaves)	-	ไป /paj/ (to go)	59	75.60
	บ้าน /bâːn/ (house)	-	ป้าน /pâːn/ (be obtuse)	71	91.00
			Total		**62.56**
/p/ - /pʰ/	ปา /paː/ (to throw)	-	พา /pʰaː/ (to bring someone to somewhere)	66	84.60
	ปู /puː/ (crab)	-	พู /pʰuː/ (segment)	76	97.40
	ไป /paj/ (to go)	-	ไพ /pʰaj/ (a kind of ancient Thai currency)	70	89.70
	ปาน /paːn/ (birthmark)	-	พาน /pʰaːn/ (Thai traditional tray)	67	85.90
	ปัด /pàt/ (to brush away)	-	ผัด /pʰàt/ (to fry)	64	82.10
			Total		**87.94**
/k/ - /kʰ/	กา /kaː/ (crow / to mark)	-	คา /kʰaː/ (to stuck)	67	85.90
	กู /kuː/ (Thai impolite pronoun)	-	คู /kʰuː/ (gutter)	52	66.70
	ไก่ /kàj/ (chicken)	-	ไข่ /kʰàj/ (egg)	68	87.20
	กาน /kaːn/ (to prune)	-	คาน /kʰaːn/ (shoulder pole)	72	92.30
	กัด /kàt/ (to bite)	-	ขัด /kʰàt/ (to rub)	75	96.20
			Total		**85.66**
/d/ - /t/	ดี /diː/ (be good)	-	ตี /tiː/ (to hit)	21	26.90
	ใด /daj/ (which)	-	ไต /taj/ (kidney)	42	53.80
	แดง /dɛːŋ/ (red)	-	แตง /tɛːŋ/ (melon)	29	37.20
	ดัด /dàt/ (to bend)	-	ตัด /tàt/ (to cut)	29	37.20
	ดม /dom/ (to sniff)	-	ตม /tom/ (mud)	58	74.40
			Total		**45.90**
/t/ - /tʰ/	ตา /taː/ (eye)	-	ทา /tʰaː/ (to paint)	75	96.20
	ตี /tiː/ (to hit)	-	ที /tʰiː/ (classifier for time)	66	84.60
	ตาล /taːn/ (Toddy palm)	-	ทาน /tʰaːn/ (to eat/ charity)	59	75.60
	แตง /tɛːŋ/ (melon)	-	แทง /tʰɛːŋ/ (to stab)	49	62.80
	ตัด /tàt/ (to cut)	-	ถัด /tʰàt/ (to move forward)	65	83.30
			Total		**80.50**
/r/ - /l/	รา /raː/ (fungus)	-	ลา /laː/ (donkey)	77	98.70
	ไร่ /râj/ (farm)	-	ไล่ /lâj/ (to chase)	65	83.3**0**
	แร้ง /rɛ́ːŋ/ (vulture)	-	แล้ง /lɛ́ːŋ/ (drought)	62	79.50
	รัด /rát/ (to fasten)	-	ลัด /lát/ (to cut across)	47	60.30
	รม /rom/ (to smoke)	-	ลม /lom/ (wind)	43	55.10
			Total		**75.38**
/ŋ/ - /ʔ/	งา /ŋaː/ (sesame / elephant trunk)	-	อา /ʔaː/ (uncle/aunt)	10	12.8**0**
	งู /ŋuː/ (snake)	-	อู /ʔuː/ (a kind of chicken)	46	59.00
	ไง /ŋaj/ (how)	-	ไอ /ʔaj/ (cough)	42	53.80
	งาน /ŋaːn/ (job / work)	-	อาน /ʔaːn/ (saddle)	36	46.20
	งม /ŋom/ (to grope)	-	อม /ʔom/ (keep in the mouth)	34	43.60
			Total		**43.08**

In summary, the findings obtained from the questionnaires and minimal pair task indicate that the Thai initial consonant sound pairs which were hardest for Chinese TFL learners to be differentiated are /ŋ/

and /ʔ/, /d/ and /t/, /b/ and /p/, and /r/ and /l/, whereas /t/ and /th/, /k/ and /kh/, and /p/ and /ph/ did not present serious difficulties.

5. DISCUSSION

Thai initial consonant sounds have been reported to present a major problem in Chinese TFL learners' pronunciation (Permkesorn, 2008; Sheng, 2012; Leelapornpinit, 2016; Damrongrojsakul and Phunphon, 2017). As speaking relies heavily on listening perception (Rost, 1990; Nunan, 2002), errors in understanding input are likely to contribute to Chinese TFL learners' problems in pronouncing Thai words and sentences. In other words, if they cannot recognize Thai initial consonant sounds, they are unlikely to be able to pronounce those sounds correctly.

A comparison of Thai initial consonant sounds with those in the Chinese language (See Table 1), suggests that the Thai initial consonants most likely to cause the difficulties in listening and speaking for Chinese TFL learners are /b/ voiced unaspirated bilabial stop, /d/ voiced unaspirated alveolar stop, /ŋ/ voiced velar nasal, and /ʔ/ voiceless glottal stop. Previous studies have found that Chinese TFL learners have difficulties with four sound pairs of Thai initial consonants: /b/ and /p/, /d/ and /t/, /k/ and /kʰ/, and /r/ and /l/ (Permkesorn, 2008; Sheng, 2012; Leelapornpinit, 2016; Damrongrojsakul and Phunphon, 2017). However, as Table 1 suggests, there are the other pairs of Thai initial consonant sounds which may be difficult for Chinese TFL learners to clearly distinguish, and consequently, to produce. These additional sound pairs are /p/ and /pʰ/, /t/ and /tʰ/, and /ŋ/ and /ʔ/. Together with the four sound pairs identified in previous studies, there are a total seven Thai initial consonant sound pairs which are potentially problematic for Chinese TFL learners.

Our results confirm that the "common list" of Thai initial consonant sounds such as the sound pairs /b/ and /p/, /d/ and /t/, /k/ and /kʰ/, and /r/ and /l/, cause problems in listening comprehension for Chinese TFL learners (Permkesorn, 2008; Sheng, 2012; Leelapornpinit, 2016; Damrongrojsakul and Phunphon, 2017), possibly due to the absence of the voiced unaspirated bilabial stop /b/ and voiced unaspirated alveolar stop /d/ in Chinese language, as well as to the confusion Chinese TFL learners face attempting to detect differences between the voiceless unaspirated velar stop /k/ and the voiceless aspirated velar stop /kʰ/, which are similar to, but not the same as, sounds in their native language. The reason the sound pair /r/ and /l/ is challenging for Chinese TFL learners (Sheng, 2012; Lianghiranthaworn and Chapoo, 2019) may be because the sound /r/ in Thai language is a voiced alveolar trill, but in Chinese language a similar /r/ sound is produced as a voiced post-alveolar affricate; absence of this trill sound in their native language may mean the ability to recognize trill sounds has yet to be developed in many Chinese TFL learners who are unable to hear the difference between /r/ and /l/ (voiced alveolar lateral). The Chinese TFL learners do not distinguish between these two sounds. For this reason, Chinese speakers learning Thai language find it hard to hear the difference between these two initial consonant sounds /r/ and /l/ and they also have difficulty to produce the right one. However, the substitution of the voiced alveolar lateral /l/ for its homorganic voiced alveolar trill /r/ is allowed for the initial consonant sound pronunciation by Thai native speakers although these two sounds /r/ and /l/ are orthographically different (Slayden, 2009). It involves with the sociolinguistic conditioning in speech situations, i.e. formal speech and colloquial speech (Diller, 2008).

Noticeably, the Thai initial consonant sounds that we found to cause difficulties for listening comprehension of Chinese TFL learners were not only the sounds in the "common list", but also sounds from the "additional list", i.e. the Thai initial consonant sound pairs /p/ and /pʰ/, /t/ and /tʰ/, and /ŋ/ and /ʔ/. Although these sounds exist in Chinese, there are, nonetheless some points that cause them to be difficult for Chinese TFL learners to distinguish. The sounds /ŋ/ (voiced velar nasal) and /ʔ/ (voiceless glottal stop) are not phonetically similar, and are not categorized as initial consonant sounds in the Chinese language. In the questionnaire, Chinese TFL learners profess that the /ŋ/ and /ʔ/ sound pair is not a problem for them, whereas instructors think that it is the most difficult sound pair for Chinese TFL students to differentiate. In the actual minimal-pair task, it was in distinguishing these sounds that the Chinese TFL learners performed the most poorly. Perhaps Chinese TFL learners found it difficult to accurately evaluate their own abilities, whereas the instructors are more able to provide an accurate assessment. Also, the sound /ŋ/ does not appear as the initial consonant sound in Chinese language. The Chinese TFL learners frequently pronounce the initial consonant sound /ŋ/ to be /ʔ/ (Sheng, 2010). Thus, the sound /ŋ/ is one of the Thai phonological problems of Chinese TFL learners when they perceive and pronounce this sound as the initial consonant sound of Thai words. Chinese TFL learners, like English-speaking learners and Korean-speaking learners, find these two sounds confusing, and are unable to distinguish the differences between /ŋ/ and /ʔ/. TFL learners are also confused listening to the Thai initial consonant sound /p/ and /pʰ/ and /t/ and /tʰ/ and distinguishing between the consonants in each pair, despite the fact that these sounds also exist in Chinese.

It may be noteworthy that this is the first study to report that the /k/ and /kʰ/ sound pair does not present serious difficulties for Chinese TFL learners, in contrast to earlier studies, whereas the /ŋ/ and /ʔ/ sound pair, which has not been addressed in earlier studies, does pose a serious problem. The findings of this study identify the sound pairs of Thai initial consonants which cause difficulties in the listening comprehension of Chinese TFL learners as /ŋ/ and /ʔ/, /d/ and /t/, /b/ and /p/, and /r/ and /l/, whereas the sound pairs of /t/ and /tʰ/, /k/ and /kʰ/, and /p/ and /pʰ/ appear to be difficult for some Chinese TFL learners to distinguish, but may not cause problems for other Chinese TFL learners.

6. CONCLUSION

Initial consonant sounds which are different between the Thai and Chinese languages cause difficulties in listening comprehension for Chinese TFL learners. However, the initial consonant sounds which exist in both languages are also potential sources of difficulty for Chinese TFL learners because of the differences in sound production. The initial consonant sounds which are similar between Thai and Chinese languages are produced differently in place and manner of articulation. Based on the findings of this study, there are four pairs of Thai initial consonant sounds which are hard to be differentiated for Chinese TFL learners: /ŋ/ and /ʔ/, /d/ and /t/, /b/ and /p/, and /r/ and /l/ due to either the absence of these initial consonant sounds in the Chinese language, or to differences in sound production between the two languages. The other three sound pairs examined, each containing an unaspirated and an aspirated initial consonant, /t/ and /tʰ/, /k/ and /kʰ/, and /p/ and /pʰ/, were easier for Chinese TFL learners to be differentiated.

The findings of the study also provide two pedagogical implications. First, the difficulties to distinguish the Thai initial consonant sound pairs of Chinese TFL learners should be identified in order to find out the best way to avoid the errors. Second, the listening errors are also related to speaking, including pronunciation. The difficulties in listening comprehension contribute to the problems in subsequent speech (Garrett and Johnson, 2013; Yildirim and Yildirim, 2016). This point should therefore be realized in the process of teaching and learning Thai language. The findings of the present study may prove useful for instructors to design and develop the learning materials to improve the understanding of Thai initial consonant sounds of Chinese TFL learners.

ACKNOWLEDGEMENTS

This research was supported by the 60th Year Supreme Reign of His Majesty King Bhumibol Adulyadej Scholarship for the academic year 2018-2021, awarded by the Faculty of Graduate Studies, Mahidol University. Also, this research was successfully completed due to the cooperation of the participants throughout the duration of this research operation.

REFERENCES

Damrongrojsakul, S. and Phunphon, S. (2017). Pronunciation problems and Thai teaching activities to Chinese students. *Payap University Journal* 27(2): 31-40. [in Thai]

Defense Language Institute. (1974). *A Contrastive Study of English and Mandarin Chinese*. Monterey, CA: Defense Language Inst. [Online URL: https://bit.ly/2UfL15P] accessed on November 27, 2018.

Diller, A. V. N. (2008). Resources for Thai Language Research. In *The Tai-Kadai Languages*, edited by A. V. N. Diller, J. A. Edmondson and Y. Luo, pp. 31-82. Abingdon: Routledge. [Online URL: https://www.routledgehandbooks.com/doi/10.4324/9780203641873.ch3] accessed on June 15, 2021.

Dow, F. D. W. (1972). *An Outline Mandarin Phonetics.* 2nd ed. Canberra: Faculty of Asian Studies in Association with the Australian National University Press.

Garrett, A. and Johnson, K. (2013). '3 Phonetic Bias in Sound Change. In *Origins of Sound Change: Approaches to Phonologization*, edited by A. C. L. Yu, pp. 51-97. Oxford, England: Oxford University Press.

Gilakjani, A. P. (2011). A study on the situation of pronunciation instruction in ESL/EFL Classrooms. *Journal of Studies in Education* 1(1): E4.

Hobbs, M. (2019). *The Ultimate Guide to the "Chinese Alphabet"*. [Online URL: https://ltl-school.com/chinese-alphabet/] accessed on April 6, 2021.

Hou, P. (2019). Spelling errors in Thai made by Chinese students learning Thai as a foreign language. *Manusya* 22(3): 358-374.

International Phonetic Association. (1999). *Handbook of the International Phonetic Association: A Guide to the Use of the International Phonetic Alphabet*. Cambridge: Cambridge University Press.
Jaroonroj, J. (2009). *Introduction to Linguistics*. Bangkok: Kasetsart University Press. [in Thai]
Krejcie, R. V. and Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement* 30(3): 607-610.
Kupongsak, N. (2012). Problems of using Thai language of foreign students: A case study of Chinese students at Bangkok University. *Ramkhamhaeng University Journal Humanities Edition* 31(1): 123-139. [in Thai]
Lapyai, R. (2016). Guidelines and best-practices in teaching Thai as a foreign language for Chinese students. *Journal of Liberal Arts, Rangsit University* 12(21): 37-48. [in Thai]
Leelapornpinit, S. (2016). A comparative study of Thai and Chinese phonology for the use of basic Thai language teaching as a foreign language. *Suthiparithat* 30(93): 33-46. [in Thai]
Lianghiranthaworn, S. and Chapoo, L. (2019). Thai language pronunciation problems of Chinese overseas students of Maejo University, Chiang Mai, Thailand. *Journal of Liberal Arts Maejo University* 7(2): 114-129.
Lightbown, P. and Spada, N. (2013). *How Languages Are Learned*. 4th ed. Oxford: Oxford University Press.
Norman, J. (1988). *Chinese*. Cambridge: Cambridge University Press.
Nunan, D. (2002). Listening in Language Learning. In *Methodology in Language Teaching: An Anthology of Current Practice*, edited by J. Richards and W. Renandy, pp. 238-241. Cambridge: Cambridge University Press.
Office of the Higher Education Commission of Thailand. (2018). *International Students Studying in Public and Private Higher Education Institutions in Thailand for Academic Year of 2013* [Data set]. Ministry of Higher Education, Science, Research and Innovation.
Panthumetha, B. (2011). *Thai Language Characteristic*. 18th ed. Bangkok: Ramkhamhaeng University Press. [in Thai]
Paton, S. (2008). *A Dictionary of Chinese Characters Accessed by Phonetics*. Abingdon: Routledge.
Permkesorn, N. (2008). Thai usage problems of Chinese TFL students. *Vannavidas* 8: 146-159. [in Thai]
Pimpuang, K. (2015). Guideline for preparing 2+2 joint-program: international dual undergraduate degree program between Department of Thai Language, Kasetsart University and Pusan University of Foreign Studies, Republic of Korea. *Journal of Korean Association of Thai Studies* 22(2): 117-135.
Piyapasuntra, S. (2018). *Introduction to Thai language*. 2nd ed. Bangkok: Thammasat University Press. [in Thai]
Plangsorn, R. (2017). *The Science of Teaching Thai as a Foreign Language*. Bangkok: Chulalongkorn University Press. [in Thai]
Rost, M. (1990). *Listening in Language Learning*. London: Longman.
Sheng, L. (2010). *A Development of Thai Language Pronouncing Instructional Model Using Phonetic Alphabet and Personal Interaction for Chinese Student*. Doctoral dissertation. Burapha University, Thailand. [in Thai]
Sheng, L. (2012). A development of Thai language pronouncing instructional model using phonetic alphabet and personal interaction for Chinese students. *Journal of Administration and Development Mahasarakham University* 4(1): 122-142. [in Thai]
Slayden, G. (2009). *Central Thai Phonology*. [Online URL: http://www.thai-language.com/resources/slayden-thai-phonology.pdf] accessed on June 15, 2021.
Suen, C. Y. (1982). *Computational Analysis of Mandarin Sounds with Reference to the English Language*. In J. Horecky (Ed.), *COLING 82: Proceedings of the Ninth International Conference on Computational Linguistics*, pp. 371-376. Prague: Academia. [Online URL: https://aclanthology.org/C82-1060.pdf] accessed on November 27, 2018.
Thonglor, K. (2011). *Principles of the Thai Language*. 4th ed. Bangkok, Thailand: Ruamsarn. [in Thai]
Trask, R. (1996). *A Dictionary of Phonetics and Phonology*. London: Routledge.
Treiman, R., and Kessler, B. (2013). Learning to use an alphabetic writing system. *Language Learning and Development* 9(4): 317-330.
Třísková, H. (2008). The sounds of Chinese and how to teach them. *Archiv Orientalni* 76(4): 509-544.
Yang, J. (2006). *Hanyu Jiaocheng Vol. 1*. Beijing: Beijing Language and Culture University Press. [in Chinese]
Yildirim, S. and Yildirim, Ö. (2016). The importance of listening in language learning and listening comprehension problems experienced by language learners: A literature review. *Abant İzzet Baysal Üniversitesi Eğitim Fakültesi Dergisi* 16(4): 2094-2110.
Yip, M. (2002). *Tone*. Cambridge: Cambridge University Press.
Yooyen, W. (2013). *Teaching Material: Sounds and Sound Systems in Thai*. Bangkok: Faculty of Humanities, Kasetsart University. [in Thai]