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อิทธิพลของความคุ้นเคยเชิงศัพท์ ต่อการรับรู้เสียงพยัญชนะกักเสียดแทรก [ts] ของผู้เรียนชาวไทย

บทคัดย่อ

งานวิจัยนี้เสนอผลการทดลองเพื่อศึกษาว่า อิทธิพลของความคุ้นเคยเชิงศัพท์มีผลต่อการรับรู้เสียงพยัญชนะกักเสียดแทรก [ts] ในภาษาญี่ปุ่นต่อผู้เรียนชาวไทยหรือไม่ ผลการวิจัยชี้ให้เห็นว่าความคุ้นเคยเชิงศัพท์มีผลต่อการรับรู้เสียงพยัญชนะกักเสียดแทรก [ts] ผู้เรียนชาวไทยสามารถรับรู้เสียงพยัญชนะดังกล่าวได้ดีในคำศัพท์ที่คุ้นเคยมากกว่าคำศัพท์ที่ไม่คุ้นเคยหรือคำศัพท์ที่ไม่มีความหมาย นอกจากนี้ผู้เรียนชาวไทยชั้นต้นและชั้นกลางมีความสามารถในการรับรู้เสียงพยัญชนะดังกล่าวไม่ต่างกัน ถึงแม้ระยะเวลาการเรียนภาษาญี่ปุ่นจะนานกว่าก็ตาม ไม่ทำให้ความสามารถในการรับรู้เสียงพยัญชนะกักเสียดแทรกของผู้เรียนชั้นกลางดีกว่าผู้เรียนชั้นต้น งานวิจัยนี้ยังได้เสนอผลซึ่งเกี่ยวข้องกับทฤษฎีในการรับรู้เสียงในภาษาที่สองและการนำประโยชน์ของผลวิจัยเพื่อนำไปใช้ปรับปรุงการเรียนการสอนเสียงภาษาญี่ปุ่น

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The Effect of Lexical Familiarity on the Perception of the Japanese Affricate Consonant [ts] by Thai Learners of Japanese

Abstract

This paper presents the results of a preliminary study investigating the effects of lexical familiarity on the identification of the Japanese [ts] by Thai native speakers learning Japanese. The results showed that the degree of lexical familiarity can be shown to influence the degree to which Thai learners perceive accurately. Thai learners were better at identifying words of high lexical familiarity than words of low lexical familiarity and nonsense words. However, the results also indicated that inexperienced and experienced learners perform similarly at identifying the target sound. After years of learning, experienced learners still struggled with the Japanese [ts]. Lastly, the findings of this study have relevance to theoretical issues regarding cross-linguistic speech perception. The pedagogical implications for Japanese pronunciation teaching and learning are also discussed.

Key words

Japanese affricate, L2 speech learning, lexical familiarity, cross-language mapping

1. Introduction

Japanese alveolar affricate [ts] (hereafter referred to as the "Japanese [ts]") is the area in which the most frequent errors are made by Thai learners both in perception and production, even after a long period of experience with Japanese, since Thai does not have this contrast (河野, 2014). This issue should be carefully examined because it hinders valid communication and gives a bad impression to Japanese speakers. Previous studies have shown that a factor that has been found to interact with performance in second language speech (L2) is lexical familiarity (Cebrian, 2009; Flege, Takagi & Mann, 1996; Guion et al., 1992). Flege et al. (1996) found that Japanese learners were better able to correctly identify /r/ and /l/ tokens in more common words than those in less common words. It is thus hypothesised that Thai learners will correctly identify [ts] tokens more often in words that are more familiar than less familiar word and nonsense words. This study seeks evidence of learners acquiring new L2 sounds by directing their attention to the phonetic characteristics of the target sounds not by focusing on meaning. In summary, with regard to the background that knowledge of vocabulary seems to be a crucial factor in determining identification ability, this paper will investigate the influence of word familiarity, where familiar is understood as previously learned, on the identification of Japanese alveolar affricates by Thai learners of Japanese. Another aim was to determine whether Thai learners who were more experienced in Japanese could identify the target contrast better than inexperienced learners.

Moreover, this study will also look into theoretical issues in cross-linguistic speech perception by investigating the learning strategies used by Thai learners to perceive the contrast, with the general aim of this study being to provide insight into the perception of Japanese consonants by native speakers of Thai.

2. Background

2.1 The effect of lexical familiarity

Previous studies have shown that a factor that has been found to interact with performance in L2 speech is lexical familiarity (Flege, Takagi & Mann, 1996; Guion et al., 1992). According to Pierce (2014, p.63), "lexical items that occur more often in the target language can bias the participants' performance in perceptual training tasks". Moreover, Yamada et al. (1992) and Flege et al. (1996) similarly observed a positive correlation between lexical familiarity and the percentage of correct identifications of English /r/ and /l/ sounds by Japanese learners of English. They both found that Japanese learners were better able to correctly identify /r/ and /l/ tokens in more common words than those in less common words. In addition, Lacabex & Puerto (2014) examined the impact of phonetic training on English lexical schwa vowel by Spanish learners of English. They found that word familiarity affected learners' performance in identifying the target sounds. To be specific, known words tended to be judged as "correct" by the students more often than unknown words. In line with these previous studies it is hypothesised that Thai learners

will correctly identified [ts] tokens more often in words that are more familiar than words that are less familiar.

2.2 Learning difficulty of Japanese [ts] sound by Thai learners

It is commonly stated that Japanese [ts] presents a challenge and is one of the most difficult sounds for many Japanese learners to perceive (Trakantalerngsak, 2016; 山川仁子・菅木禎史・宇佐川毅, 2005). メーターピスィット(2014) surveyed 44 Thai learners on the current issues regarding Japanese pronunciation teaching and pronunciation learning awareness. The results of the self-evaluation questionnaire by the learners reported that they have difficulty mostly in distinguishing Japanese fricative and affricate contrasts especially [ts]. Moreover, regarding the error patterns made by Thai learners in both the perception and production of [ts], it is reported that Thai learners substitute the target sound with an [s] (河野, 2014; 山川他, 2005). After undertaking an examination of the relevant research dealing with the learning of the [ts] contrast by Thai learners, it is clear that previous studies have not

sufficiently provided data which can be used in pronunciation instruction. Most studies present the learning results based on researchers' subjective observations and have not conducted experimental research to look into in what target sound or content Thai learners have difficulty in acquiring. Hence, efficient implications for classroom L2 pronunciation instruction have not been fully established for Thai learners in Japanese language education. Table 1 illustrates the error patterns in both perception and production made by Thai learners as reported in previous studies.

Research Questions:

1. Does identification accuracy differ across different lexical contexts? And will participants be better at identifying the Japanese [ts] in familiar words rather than unfamiliar words?

2. Will experienced Thai learners be more successful in identifying the Japanese [ts] than inexperienced subjects?

3. Regarding the cross-language-mapping, do Thai learners perceive the Japanese [ts] accurately?

Table 1. Error patterns in perception and production made by Thai learners of Japanese

[ts]	→	[s]	(平岩(2004)、河野 (2014)、山川他 (2005))
	→	[z]	

3. Methodology

3.1 Subjects

The participants were 32 adult Thai native speakers (3 male and 29 female) who were divided into two groups according to their experience of learning Japanese to see whether there will be a difference in identification ability. Their age range was 20-24 years old. Both groups could read Hiragana well. None had difficulties in hearing.

Group A: Inexperienced learners (Beginners) of Japanese who had been enrolled in a Japanese course for an average of 6 months (n=17). They had completed "Minna no nihongo textbook volume 1".

Group B: Experienced learners (Intermediate learners) of Japanese who had been learning Japanese for an average of three years (n=15). They had completed "Minna no nihongo textbook volume 4"

3.2 Stimuli

The materials were 30 nonsense words, and low and high lexical familiarity words contrasting [ts] and [s] as illustrated below in Table 2. The minimal pair of [ts] and [s] were chosen because these pairs of sounds, in particular, presented a problem for Thai learners of Japanese in previous studies (e.g., Trakantalerngsak, 2016; Yamakawa et al., 2005). Moreover, nonsense words and low lexical familiarity words were used in order to see the lexical familiarity effect, which was evident in previous studies (Flege et al., 1996). The low lexical familiarity stimuli were selected from a word familiarity database created by the NTT Database series (Amano & Kondo, 2008) to assure the low frequency of their use. Within this database, lexical familiarity of words starts from level 1 to level 7 (the higher the number the higher the degree of familiarity).

Table 2. Speech materials used in the experiment

Familiarity level	High	Low	Nonsense
Rating	4.3	1.5	1.5
Initial	つくえ ついたち つぎ つま つめたい	ついかい つくめ つるばみ つゆけし つまぐる	つお つあ つう つさ つに
Medial/ Final	しつれい あつい くつ こんげつ いつ	もつやく ぶざつ まつがく じつり あつゆ	あつま ひつみ もつい えつ るつ

Stimuli from level 1 and 2 were chosen to create the "low lexical familiarity" word items. The vowel following the tokens was set as [ɯ] since [ts] only occurs in combination with this vowel in Japanese [tsɯ] of each word was in one of three positions within the word (i.e. word-initial, word-medial intervocalic, or word-final). The speech materials were recorded by two female Japanese speakers speaking standard Japanese. All 30 tokens were presented in isolation. The recording was made using a SHURE KSM32 microphone with a sampling rate of 44.1 kHz in a recording room in the Faculty of Liberal Arts building at Mahidol University. The speakers read the target words in isolation. The recordings of the words were then segmented into individual WAV files using Praat software. Before using these stimuli to conduct the identification test, the stimuli were screened for intelligibility by two different Japanese native speakers with similar approach to the participants. All the stimuli were identified with an accuracy of 100% correct identifications by those two native Japanese speakers, indicating that the test stimuli were appropriately representative of each sound tested.

3.3 Assessment of lexical familiarity

The lexical familiarity was then again assessed by all participants to investigate whether they knew the test words or not. The approach used to assess the lexical familiarity was adapted from (Thomson & Isaacs, 2009). A 5-point Likert scale of familiarity judgement used for each word was as follows: 1 = I am certain that I don't know it; 2 = I don't think I know it; 3 = I might know it 4 = I think I know it; 5 = Yes, I know it.). The group of high lexical familiarity words was given an average rating of 4.3. The group of low lexical familiarity words and nonsense words were given an average rating of 1.5.

3.4 Procedure

All participants performed a minimal pair identification task of the Japanese affricate [ts]. In the identification task, they were presented with 30 minimal pairs contrasting [ts] and [s]. Participants heard a word twice and selected the choice that matched what they heard from a minimal pair written on an answer sheet by circling it. All words were presented in Hiragana. The subjects listened to the stimulus items through headphones (Sennheiser HD4.40) at a comfortable level. After the perception test, all participants were asked to complete a 5-point familiarity judgement for each word ranging from 1 = "very unfamiliar" to 5 = "very familiar" to rate the words they knew for subjective familiarity. The whole experiment took approximately 15 minutes. Instructions were delivered in Thai to ensure proper understanding of the task.

4. Results

4.1 Overall identification score

Figure 1 illustrates the overall mean percentage of correct identification for the Japanese alveolar affricate as a function of group. The mean accuracies are detailed as followed: 61%

for the inexperienced Thai learners (IT) and 65% for the experienced Thai learners (ET). The performance of the ET group was slightly better than the IT group. Overall, the results indicate that the average of identification accuracy was not high, thus suggesting that [ts] is a challenging contrast for Thai learners to identify.

learning Japanese for six months (or sixty hours), and the fourth-year students, who have been learning Japanese for three years (or at least three hundred sixty hours), perform equally well at identifying the target sound, indicating that their proficiency level does not seem to determine their success in identification ability.
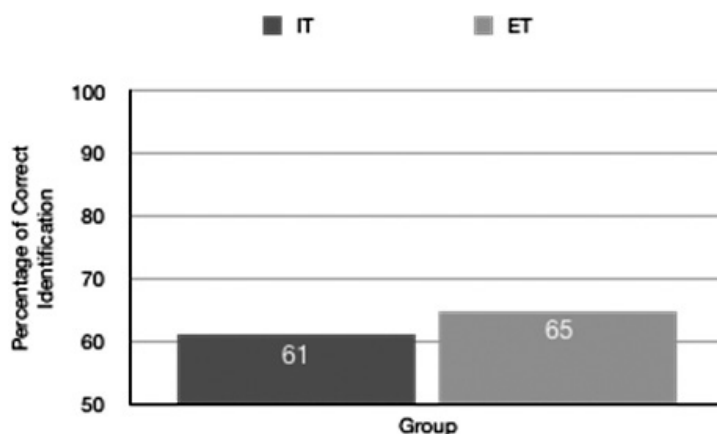

Figure 1. The mean percentage of correct identification of the Japanese [ts] for inexperienced Thai learners (IT) and experienced Thai learners (ET).

To explore whether the mean identification accuracy score of the two groups differed significantly or not, a Levene's test was used. The result of this analysis revealed that there was no significant difference between the two groups (p>.05). A T-test was further conducted and revealed that the mean percentage of correct identification between two groups showed no difference (p=0.640), suggesting that the perception performance of the Japanese alveolar affricate did not differ between groups. The second-year students, who have been

From the results, with a mean accuracy of less than 70%, it can be said that Japanese learners find [ts] quite confusing to identify. Furthermore, [ts] seemed to still be a challenging sound to accurately identify for Thai learners after a few years of exposure to Japanese.

4.2 Word groups

Figure 2 shows the mean correct identification scores of the Japanese [ts] by Thai learners as a function of word type. For the inexperienced Thai learners, the overall mean identification scores were 74% (SD=23.23), 55%

(SD=19.41) and 55% (SD=19.66) respectively for the familiar words, unfamiliar words and nonsense words. For the experienced Thai learners, the overall mean identification scores were 81% (SD=18.97), 57% (SD=20.18) and 57% (SD=27.79) respectively for the familiar words, unfamiliar words and nonsense words.

did not (p>.05). Both groups performed equally well at identifying the target contrast. Regarding lexical familiarity, next, a Scheffe analysis was performed to see what difference in mean scores would be posed by each lexical grouping.

The results showed that there was a significant difference between words of high
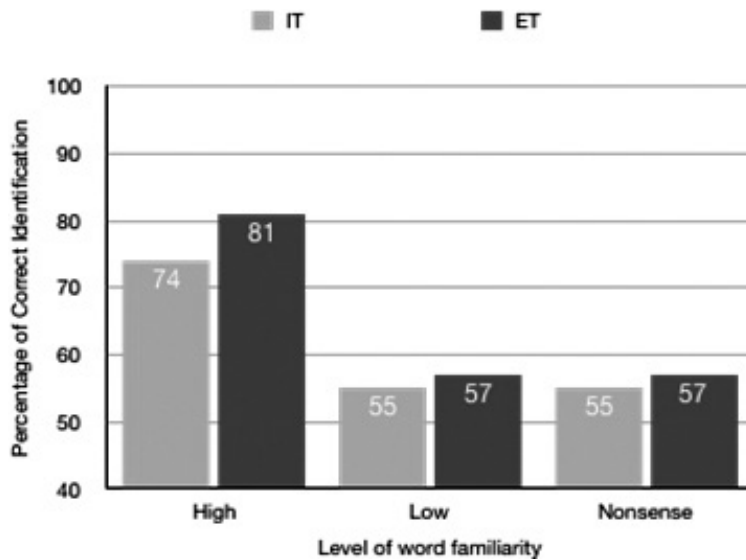

Figure 2. The mean percentage of correct identification of the Japanese alveolar affricate for inexperienced Thai learners (IT) and experienced Thai learners (ET) in high lexical familiarity words, low lexical familiarity words and nonsense word.

To see whether or not there was any significant difference between the groups and the lexical group, an analysis of variance (ANOVA) was carried out with experimental group (experienced and inexperienced) and lexical grouping (high-familiarity, low familiarity and nonsense words) as fixed factors. The results of this analysis revealed that lexical familiarity had a significant effect [F=6.543 p=.003], but the relative experience of the experimental groups

lexical familiarity and words of low lexical familiarity (p<.05); and words of high lexical familiarity and nonsense words (p<.05). These results indicate that words of high lexical familiarity were easier to identify than words of low lexical familiarity and nonsense words. Regarding the low lexical familiarity and the nonsense words, there were no significant differences found (p>.05), indicating that Thai learners performed equally well at identifying

the unfamiliar words and nonsense words. This study yielded a significant real word versus nonsense word difference as well as a significant high lexical familiarity words versus low lexical familiarity words difference. In other words, the results indicated that the Thai learners were relatively good at identifying the familiar words, however, they found it quite challenging to identify the unfamiliar words and the nonsense words.

4.3 Follow-up interview (Cross-language mapping)

In addition to the identification experiment results described above, a follow-up interview was conducted to observe the strategies used by Thai learners to perceive the Japanese alveolar affricate. Data was collected randomly from 15 participants in individual interviews. The results of the follow-up interview are briefly summarised here along with some direct quotes from the participants' responses.

patterns of the strategies used by Thai learners were observed here. The trends are summarized as follows:

1) The L1 phonetic inventory plays a crucial role in perceiving the L2 sound.

2) Thai learners do not tend to establish a new sound category for the contrast. They tend to use their L1 to grasp the [ts] contrast. The strategy varies depending on the individual. A few believe that [ts] is similar to the Thai [s], showing the similar results as reported in previous research (e.g. 助川, 1993; Trakantalerngsak, 2016). Others assimilate the sound into multiple Thai phonetic categories such as [s] and [tɕ].

3) A few learners misunderstand the phonetic characteristics of [ts]. They use "aspiration" or "vowel cues" to differentiate [ts] from [s].

The results above showed that Thai learners' perception of [ts] was predominantly

Table 3. Cross-language mapping used by Thai learners

Japanese [tsɯ]	⇒	Thai [s] (n=5)
		Thai [tɕ] (n=3)
		Stronger sound of [s] sound (n=3)
		[z] (n=2)
		In between Thai [tɕ] and Thai [s] (n=1)
		[tsɯ] as [tsɯ] and [sɯ] as [su] (n=1)

Table 3 illustrates the majority of the rules and strategies used by Thai learners to perceive the Japanese [tsɯ] contrast obtained from the follow-up interview. From the chart above, six

influenced by their L1 phonological learning, which does not allow them to perceive the target sound correctly. The Speech Learning Model (SLM) by Flege (1995), which examines

the constraints of L1 experience on learners' perception and production of L2 speech sounds, predicts that the greater the perceived phonetic distance between an L2 sound and the closest L1 sound is, the more likely it is that phonetic differences between the sounds will be detected and a phonetic category eventually established.

Results of the follow-up interviews:

All fifteen participants responded that they find the Japanese [ts] quite challenging to acquire. A few participants reported that they have more trouble in perceiving than producing the contrast.

> **Question 1:** Does the meaning of the word help you identify the word you hear? For example, in the word "つくえ [tsɯkɯe]", would you be able to predict that [tsɯ] is in the word and not [sɯ]?

All fifteen participants reported that their prior knowledge of the word biased their decision about their identification ability.

"When I listened to the word in the test, I did not know whether it was [tsɯ] or [sɯ]. I just chose the word that I thought I knew as my answer (IT group)."

"There are many words that I have never learned in the test so I randomly chose the answer without really knowing what I heard (ET group)."

> **Question 2:** Would you like your Japanese course to focus more on pronunciation skill?

All participants responded that they would like to learn more about pronunciation.

> **Question 3:** Would you like to learn Japanese with a native Japanese instructor?

All participants responded that they would like to learn with a Japanese native teacher.

> **Question :** What do you think of the Japanese course at the Faculty? What kind of Japanese course do you want to take?

The fifteen participants responded thus:

"Our Japanese class is one four-hours long class. The content is mainly about Grammar and writing Kanji."

"The Japanese course does not teach listening and speaking at all. I would love to learn those skills too."

"There is no focus on speaking skills in the classroom so I don't feel confident to speak Japanese outside the classroom."

"Four hours on grammar is too long."

"Learning Japanese culture might help our language skills as well."

A few participants reported similarly that "they would love to learn more than once a week."

5. Discussion

5.1 Does identification accuracy differ across lexical context? And are native Thai learners of Japanese better at identifying the Japanese [ts] in familiar words rather than unfamiliar words?

The results of the identification experiment were in line with previous studies in that known words tended to be judged as "correct" by the students more often than unknown words (Lacabex & Puerto, 2014). These findings clearly indicate that a lexical familiarity effect has occurred, supporting the claims of previous studies that lexical familiarity influences L2 learners' success in identifying non-native sounds (Flege et al., 1996). As expected, the [ts] contrast was best perceived in familiar words with a mean accuracy of identification above 74% in both the experienced and inexperienced groups of learners. On the contrary, when they were exposed to the words of low lexical familiarity and the nonsense words, they performed poorly at identifying the contrast, with a 55% and 57% mean of identification accuracy, respectively across both experimental groups. It can be supposed that this trend may have resulted from their L2 learning experiences. Words with high lexical familiarity subjectively were identified as known words at an average of 4.3 out of 5. Words such as 「こんげつ [kongetsɯ]」; 「あつい [atsɯi]」and 「つくえ [tsɯkue]」are reported to be very familiar to the participants and much higher in frequency than other low-frequency words. However, if their lexical knowledge interfered with their decisions made here in this experiment, it is presumable that the results would show lower mean accuracy when using only low lexical familiarity items and nonsense words. The answers to Question Two of the follow-up interviews showed that when Thai learners were presented familiar words including [ts], instead of focusing on the phonetic characteristics of [ts] they chose [ts] as their immediate answer because they knew the words. As can be seen, it is believed that the meaning of the words biased their identification ability of the target words. This finding implies that using familiar words alone to test the identification ability of the non-native contrasts might not be sufficient. The findings of this study are preliminarily that to truly gauge the identification ability of the target contrast, it is important to use nonsense words in the experimental phase.

5.2 Will the experienced Thai subjects be more successful in identifying the Japanese sound than the inexperienced subjects?

The overall results show that identification ability of the Japanese [ts] did not differ between groups of different experience levels in identifying the Japanese [ts]. In other words, Thai learners of Japanese at Mahidol University have difficulty in identifying the Japanese alveolar affricate [ts] to the same degree, regardless of the length of time they have been learning Japanese. This suggests that learning Japanese for a longer period of time at Mahidol

University does not improve the identification ability of the target contrast. The reason why there was no significant difference between beginner learners and experienced learners might be because of the content of the course conducted at the university. However, it is necessary to further conduct with more number of subjects to investigate whether the claim is valid. These results imply that the Japanese alveolar affricate should be emphasized among Thai students of Mahidol University. From the follow-up interview, it was reported that the Japanese courses conducted at the university stress the content of Japanese grammar. The instruction of phonetics, particularly of how to perceive and to pronounce the Japanese sounds, is neglected.

5.3 To see the strategies of cross-language mapping used by Thai learners to perceive the Japanese alveolar affricate

Regarding the strategies used by Thai learners to grasp the Japanese [ts], the results from the follow-up interviews showed that:

1) Thai learners do not establish a new phonetic category for [ts].

2) Thai learners assimilate [ts] into inaccurate phonetic categories such as the Thai [s] or Thai [tɕ] or the voiced [z].

3) A few learners misunderstand the phonetic characteristics of [ts]. They use "aspiration" or "vowel cues" to differentiate [ts] from [s].

From the responses of the follow-up interviews, six patterns of strategies used by Thai learners were observed in this study (See Table 2). This evidence strongly shows that they have a perceptual foreign accent (Strange, 1995). It is clear that the L1 influences the way L2 sounds are perceived (Flege, 1995). Thai learners assimilate the L2 sound into their L1 categories and these substitutions are likely to lead to learning difficulties. For the substitutions for [ts], the Thai [s], Thai [tɕ] and [z] were used. The substitutions found here are in line with previous studies (山川他, 2005; Trakantalerngsak, 2016).

However, according to the SLM (Flege, 1995), experiences within an L1 lead to a decreased ability to detect differences between target languages and L1 categories. Learners who have a merged L1 and L2 category will struggle to achieve native-like performance since category assimilation seems to block L2 category formation (Meyer & Schiller, 2003). The Japanese [ts] does not exist in Thai, however, most Thai learners do not form a new category for the contrast. Specifically, the patterns of the strategies used by Thai learners show that a perceptual assimilation to L1 phonemic categories has occurred and this might be the reason why they have difficulty in perceiving the contrast. In addition, another thing to keep in mind is that the perception errors that occurred in identifying [ts] among Thai learners might be related to mismatches between their L1 and the target language. These inaccurate perceptions which occurred among Thai learners result in them having difficulty in distinguishing

the target sound. However, to provide a detailed examination of cross language mapping used by learners, it is necessary to conduct a perceptual assimilation experiment. According to Guion et al. (2000), to take a specific position regarding how cross-language phonetic distance is gauged by speakers of an L2, it is necessary that the perceived phonetic distance must be assessed empirically through cross-language mapping experiments using an identification and rating methodology.

6. Pedagogical implication

The findings obtained in the follow-up interviews have provided an insightful source of inspiration for ideas about the possible modification of the Japanese course taught at the Faculty of Liberal Arts of Mahidol University. First of all, it is clear that Japanese phonetic teaching, especially of the Japanese [ts], should be focused on in the classroom setting by exposing Thai learners with a variety of real words and nonsense words through minimal-pair identification practices. Moreover, any Japanese courses conducted at the Faculty of Liberal Arts are four-hours classes taught only by Thai teachers. The course content is mainly made up of grammar lessons. An explanation of Japanese phonetics is commonly limited. However, the follow-up interviews conducted for this study showed that students are calling for a stronger focus on L2 pronunciation instruction in the classroom setting. Moreover, teachers must balance the needs of their

students within a somewhat fixed curriculum. Teachers need to find ways to integrate pronunciation into the existing curriculum and textbook materials (Celce-Murcia, Brinton, & Goodwin, 2010). Next, regarding the difficulty in perceiving the Japanese [ts], the identification ability of this contrast may be able to be trained through a period of extensive training. Trakantalerngsak (2016) conducted nine-sessions of perceptual training using a high variability method in the learning of Japanese fricative and affricate contrasts with thirty-one Thai learners of Japanese. At pre-test, it was reported that the Japanese [ts] was a challenging contrast for Thai learners. However, the author reported that Thai learners can be trained to better identify the Japanese [ts], showing an 18% improvement of identification scores after training was given. Moreover, Schmidt (2001) states that in communicative L2 learning environments, learners tend to focus on meaning, but when their attention is explicitly oriented toward phonetic form, learning outcomes can be improved. Hence, apart from teaching common words from textbooks, exposing learners to various nonsense words and unfamiliar words of which they had no lexical knowledge might direct learners' attention solely to the phonetic characteristics, and thus better learning of the target contrast may occur since these words may help learners create new, strong and stable sound categories that are founded truly on the phonetic form rather than a lexical meaning base.

7. Summary

In summary, this study showed that lexical familiarity influences the accuracy with which Thai learners of Japanese identify the Japanese [ts]. The results suggest that occurrences of [ts] are relatively difficult for them to identify. Next, unexpectedly, Japanese [ts] still poses a problem among experienced Thai learners of Japanese even after a few years of learning. They performed comparably to inexperienced learners. This finding suggests that instruction of Japanese consonants such as [ts] should be focused on in the classroom setting. The follow-up interviews showed that Thai learners do not establish a new sound category for the Japanese [ts], rather they tend to map the sound onto their L1 sound system. It is strongly believed that the perception errors of the Japanese [ts] which occurred among Thai learners might be related to mismatches between their L1 and the target language. In conclusion, as a contribution to Japanese language teaching and learning, it is necessary to focus on teaching the Japanese [ts] by introducing the listening practices using minimal-pair identification tasks in the classroom setting as well as giving the explicit articulatory explanation at Mahidol University. Moreover, not only exposing the real words from the textbook it is important to use various nonsense words and unfamiliar words of the Japanese [ts] to help learners create accurate category for the contrast. However, to support the claim found in this study, it is important to recruit larger number of participants.

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