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ปัญหาการแยกเสียงระหว่างเสียง [k] และ [g] ในภาษาญี่ปุ่นระดับต้นของผู้เรียนชาวไทย: การเปลี่ยนเสียงในการพูดภาษาญี่ปุ่น*

บทคัดย่อ

คำว่า「信仰(しんこう)」และ「信号(しんごう)」มักใช้โดยชาวญี่ปุ่น อย่างไรก็ตาม เป็นการยากที่จะแยกแยะคำเหล่านี้สำหรับผู้เรียนชาวไทยที่เริ่มเรียนภาษาญี่ปุ่น การศึกษาครั้งนี้จึงเน้นตรวจสอบสาเหตุของปัญหาการฟังเสียงภาษาญี่ปุ่นออกไม่ชัดเจนของผู้เรียนชาวไทย จากการสำรวจพบว่าสาเหตุคือ 1) วิธีการออกเสียงของ /k/ สำหรับคนญี่ปุ่นเมื่ออยู่ระหว่างสระและ 2) การขาดเสียง /g/ ในระบบสัทวิทยาภาษาไทยกล่าวคือในภาษาญี่ปุ่น เสียงระเบิดอโฆษะ /k/ เป็นเพียงการระเบิดและพ่นลมและไม่มีการสั่นของเส้นเสียง ดังนั้นการออกเสียง /k/ จึงเกิดกระแสลมเล็กน้อยที่ตำแหน่งเริ่มต้นของคำ ผู้เรียนจึงรู้ว่าเป็นเสียงธนิต ‘ค’ ในทางกลับกัน เมื่อออกเสียง /k/ ที่มีตำแหน่งอยู่ระหว่างสระโดยพ่นลมเบาลงแล้วเสียงที่รับรู้เป็น 'ก' นอกจากนี้ การขาด /g/ ในระบบสัทวิทยาภาษาไทยยังทำให้เกิดความเข้าใจผิดเรื่องเสียง จึงทำให้การออกเสียง [g] ในภาษาญี่ปุ่น เป็นเสียง 'ก' เพราะว่าปริมาณของกระแสลมและวิธีผลิตเสียงของเสียงระเบิดโฆษะ [g] เป็นแบบเดียวกับเสียงระเบิดอโฆษะ 'ก' ในภาษาไทย.

คำ **สำคัญ**

โฆษะและอโฆษะ, เสียงธนิตและเสียงสิถิล, หน่วยเสียงย่อย, ปริมาณลมหายใจ, ผู้เรียนภาษาญี่ปุ่นชาวไทยระดับเริ่มต้น

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On the Difficulty of Elementary Thai Learners of Japanese in Distinguishing Between Intervocalic [k] and [g] Sounds: Sound Changes in Spoken Japanese*

Abstract

The words 「信仰(しんこう)」 and 「信号(しんごう)」 are frequently used by Japanese; however, for Thai beginning learners of Japanese, it is difficult to distinguish these words. The author in the present article verified the cause of not being able for them to distinguish these sound problems. According to the survey, it was found that the causes are the following: 1) the way of pronouncing the intervocalic /k/ for Japanese people; and 2) the lack of the /ɡ/ sound in Thai phonology. The Japanese voiceless plosive /k/ has a slight air stream at the initial position. Therefore, the learners recognized it as aspirated 'ค'. On the other hand, when it is pronounced at the intervocalic position, the air stream is reduced, and the sound is recognized as 'ก'. In addition, lack of the /ɡ/ in Thai phonology caused mishearing, as well. Thus, the pronounced [ɡ] is recognized as 'ก' because of the amount of airflow.

Key words

voiced and voiceless sound, aspirated and unaspirated sound, allophone, breath volume, elementary Thai learners of Japanese

* This paper is based on and further developed from the author's presentation titled 'Effects of changing in Japanese middle sounds on listening comprehension of Thai learners' at the 34th Annual seminar of the Association of Language Education in Thailand (AJLET) held on March 19, 2022.

1. Introduction

In the elementary level of Japanese class, Thai learners frequently write wrong letters, for instance, 「よしごさん」 (yoshigo san) instead of correct writing of「よしこさん」yoshiko san). Furthermore, learners mishear the intervocalic /k/, such as the word「過去(かこ)」(kako) which is misheard as「加護(かご)」(kago) and miswrite it as「かご」(kago). In addition to this word, it is frequently found throughout various vocabularies that have the opposite sound of /k/ and /g/, such「健康(けんこう)」(kenko) and「剣豪(けんごう)」(kengo),「新子先生(しんこせんせい)」(Shinko sensei) and「慎吾先生(しんごせんせい)」(Shingo sensei)、「信仰がありますか？」「信号(しんごう)がありますか？」etc. Mishearing of these words might be a cause of communication troubles.

This is probably because it is difficult for learners to distinguish「こ」(ko) and「ご」(go) differently. Why do such errors occur? According to Lin (2001) and Maruyama (2021), the reason of mishearing occurs from the sound changes in spoken languages. In other words, learners understand the changed sound in spoken Japanese through Thai phonological system. Thus, the author assumed a hypothesis as below that it might be caused by the difference in phonological system between Thai and Japanese and the system of sound change in Japanese speech sound.

Why do the Thai learners of Japanese mishear intervocalic「こ」as「ご」? The learners hear and understand the sound, then write down and pronounce the words as they hear. Thus, learners understand intervocalic「こ」as「ご」. However, the learner's hearing problems appear in /k/and /g/, merely.

Both Thai /k/ and Japanese /k/ are plosive sounds and the articulation point is velar, as well. However, Thai and Japanese have different articulation methods. This difference of articulation method makes it difficult for Thai learners to distinguish between Japanese intervocalic [k] and [g] sounds in hearing.

The Thai /k/ is unaspirated, as opposed to the aspirated /k^h/. In other words, whether air comes out or not is the distinctive feature. On the other hand, for Japanese, voiced and voiceless is the distinctive feature. Voiced sounds are with vibration of vocal cords. Voiceless sounds are without vibration of vocal cords. In other words, such as /k/ in Japanese, air stream is not the distinctive feature. When the vocal cords do not vibrate, the sound is voiceless, and when the vocal cords vibrate, the sound is voiced. Air stream is not the distinctive feature in Japanese. The distinctive feature is vibration of vocal cord. For instance, the word 「パパ」 can be pronounced as [p^hap^{h}a], [papa], [p^hapa], or [pap^{h}a], any pronunciation of them is recognized as 「パパ」. This cannot be in Thai. In Thai, when the aspirated [p^ha] replaces with the unaspirated [pa], the meaning changes. The table below shows the characteristics of Japanese, English, Chinese, and Thai consonants.

Table 1: Comparison of Characteristics of Japanese, English and Chinese consonants

Plosive	Bilabial	Alveolar	Velar
Japanese Voiceless/ voiced	p/b	t/d	k/ɡ
EnglishVoiceless/ voiced	p/b	t/d	k/ɡ
ChineseUnaspirated/ aspirated	p/p^h	t/t^h	k/k^h

Cited from Kariya (2007, p134) (summarized by the author)

The /k/ sound in Japanese is a voiceless plosive as seen in the table above. According to Kariya, the /k/ sound has slight air release at the initial position of the word (Kariya p134), however, air release is not the distinctive feature. In Chinese, /p/ is unaspirated. There is no outflow of air. Also, the sound opposite to /p/ is the aspirated sound of /p^h/. This is a Chinese distinctive feature.

According to Slayden, in Thai, like Chinese, aspirated and unaspirated system is the distinctive feature. Moreover, in Thai, there is, like Japanese, voiced and voiceless system, as well. In other words, Japanese has only voiceless and voiced sound system, however, Thai has voiced and voiceless system (see table 2), (Slayden, 2009).

Table 2: Characteristics of Thai consonants

Plosive	Bilabial	Alveolar	Velar
Unaspirated/aspirated/voiced	p /p^h / b	t /t^h / d	k /k^h /

Cited from Slayden (2009, p2) (summarized by the author)

It should be noted that Japanese and English have /b d ɡ/ as opposed sounds of voiceless /p t k/, however, there is a lack of voiced /ɡ/ in Thai. According to Shimizu, this is a major feature of Thai phonological system (Shimizu, 2011. P.2). The /ɡ/ sound is a voiced sound and articulation point is velar. Thus, in Thai, unaspirated /k/ (ก) is substituted for /ɡ/.

Furthermore, in Japanese speech sounds, the /k/ sound at the initial position of a word has a slight airflow. Therefore, the learners understand Japanese initial sound /k/ with Thai /k^h/, for instance, 'ค' in Thai. However, in Japanese, the air flow volume is reduced when Japanese /k/ is pronounced at intervocalic position. Thus, Thai learners hearing Japanese /k/ at intervocalic position understand it as Thai /k/ (ก).

As above, it can be described the difficulty between Thai and Japanese language, 1) Voiced and voiceless sound system is a distinctive feature in Japanese, 2) In Thai, adding to voiced and voiceless sound system, aspirated and unaspirated sound system is a distinctive feature. 3) In Thai, there is a lack of voiced /ɡ/. Thus, unaspirated /k/ (ก) is substituted for /ɡ/, 4) In Japanese, the volume of airflow of voiceless sound is reduced from initial position of the word to intervocalic position of the word.

These Japanese sound changes by reduction of air flow make it difficult for Thai learners to distinguish the sounds of Japanese speech.

In this paper, the author investigated and verified that the listening difficulties were derived from the difference of phonological systems of Thai and Japanese, especially sound change in Japanese speech sounds.

Mishearing has occurred due to the speech sound change in spoken Japanese. According to Lin (2001), Japanese /k/ at the initial position is pronounced aspirated [k^h]. /k/ at the intervocalic position is pronounced [k]. Thus, the sound of 「こ」in「信仰」is heard by learners as Thai unaspirated /k/ or「信号」because of the reduction of air stream. This slight sound change of air reduction is a big sound change for the learners. In order to prove how air stream changes are a big sound change for Thai learners, the author hypothesizes as below.

Hypothesis 1) The pronunciation of Japanese in speech sound, the intervocalic plosive /k/ is pronounced similar to Thai unaspirated sound /k/ due to the reduction of air stream. Thus, Thai learners perceive Japanese intervocalic /k/ as Thai /k/.

Hypothesis 2) Another hearing problem of /k/ and /g/ for Thai learners is due to the lack of a voiced sound opposed to voiceless /k/ in the Thai phonological system, unlike /p, b/ and /t, d/. In Japanese, voiced sounds and voiceless sounds are the distinctive feature as /p, b/, /t, d/ and /k, g/. Therefore, due to the absence of a voiced sound, Japanese /g/ is understood as unaspirated Thai /k/, since both sounds are the same articulation of plosive although they are pronounced in different manner.

To prove these hypotheses above, the author conducted a listening survey of Japanese /k/ and /g/ to the Thai learners. Finally, to verify these hypotheses is significant to improve phonetic education especially for listening comprehension for Thai learners of Japanese.

2. Preceding research

This research is a study of Thai and Japanese, however, it refers to papers in Chinese, as well. In Chinese, aspirated and unaspirated are the distinctive features. In Thai, voiced and voiceless is the distinctive feature. This is the same as Japanese. Furthermore, Thai has aspirated and unaspirated phonological system. It is possible to say that the phonological situation is partially similar to Chinese sound system.

Yoshihiro (2004) conducted an acoustic analysis of pronunciation and listening problems caused by differences in phonological system between voiced and voiceless Japanese and Chinese voiceless and voiced sounds. Subjects are four Chinese speakers (two people are ten-year Japanese learners. Two people are three to four-year learners. The length of stay in Japan ranges from three years up to ten years. Four Japanese speakers are two-year Chinese learners at the university. And she measured VOT of the sampling words. They are initial sounds of /ta-da, pa-ba, ka-ga/ and /t'a-ta, p'a-pa, k'a-ka/ were recorded and VOT were measured. Yoshihiro concluded that

1) Chinese aspirated sounds spoken by Japanese people have less breath, and sound like unaspirated to Chinese people. 2) It is difficult for Chinese people to distinguish and pronounce /k/ and /g/, for instance,「退学(たいがく)」「体格(たいかく)」. It seems that it is the same situation to the listening problem related to “ga" and "ka" for Thai Speakers. In other words, from Yoshihiro’s research, it can be inferred that this is the reason why Thai learners understand Japanese intervocalic /k/ as Thai unaspirated /k/.

Lin (2001) conducted a listening survey of intervocalic sounds. Subjects were two Japanese natives, two Taiwanese with advanced Japanese level, and forty-six Japanese learners at their beginner level. She concluded that when「ハチ」was pronounced as an unaspirated intervocalic sound, it was difficult to understand the sound correctly. However, for intervocalic sounds pronounced as aspirated, subjects could understand the words correctly.This result of Lin can apply to the intervocalic unaspirated /k/ for Thai learners, as well.

Jin (2019) examined the phonetic differences using VOT between voiced and voiceless sounds at initial word position and intervocalic word position. Subjects are six female Japanese native speakers in their 20s and 30s. Survey items are voiced and voiceless plosives at the initial position and intervocalic position: [tata], [papa], [kaka], [baba], [dada], [gaga]. As a result, although the VOT value is originally negative for voiced sounds, Jin’s survey showed a positive value. That is, both voiced and voiceless sounds coexist in a narrow region of positive values. This is thought to be the cause of hearing difficulties for Thai learners, as well. Jin’s research suggests a cause for the hearing difficulties of voiceless plosives for Thai speakers.

Shimizu (2018) investigated eleven Asian and European languages and he investigated the phonetic characteristics of the voiced and voiceless consonants by using VOT. The subjects from Thailand were five females and two males from Khon Kaen University aged 20-27 years old, and they had stayed in Japan for one month. Investigations have examined voiced consonants, voiceless unaspirated consonants and aspirated consonants by VOT such as [b, d, (g), p, t, k, ph, th, kh]. As a result, Thai voiceless unaspirated /k/ has lesser airflow than Japanese /k/. However, the volume of air flow of aspirated sounds in Thai shows two or three times higher than Japanese initial plosive /k/.

‘Thai Notation Guidelines (translated from Thai by the author)’ (2018) was issued by the Thai government, where it is written that for /k/ in the intervocalic position, the amount of air stream is reduced. Thus, they are transcribed with the Thai voiceless unaspirated /k/. Furthermore, it is written that the Japanese initial /g/ is also transcribed as Thai /k/, and the intervocalic Japanese /g/ is also transcribed as Thai /k/ or / ŋ /.

3. Research Method

The main purpose of this survey is to investigate how Thai learners of Japanese language understand Japanese voiced /g/ and voiceless plosive /k/ at the initial and intervocalic position in spoken language. /p t b d/ were also investigated to compare Japanese /g/ and Thai /k/.

3.1 Samples

The first survey was conducted on February 21, 2022. It was conducted via zoom meeting. Sound sources are recorded by the author. The author pronounced each item two times. The subjects listened to them and chose the correct answers. The numbers of the subjects were thirty-three people (fifteen males, eighteen females) of 2nd year students of the Department of Business Japanese, Faculty of Liberal Arts at Panyapiwat Institute of Management in Thailand. They have three to six years of Japanese learning experience. Six subjects started Japanese language learning at this institute.

The survey vocabulary were nouns verbs and adjective. However, there were some words that subjects had learned previously. Thus, the subjects were able to infer the answer.

The second survey was conducted on September 12, 2022, at a classroom of Panyapiwat Institute of Management. The class rooms offered a noiseless situation. Survey was conducted during the break time of the class. The author pronounced each item two times and subjects chose whether the author's pronunciation was voiced or voiceless. Subjects were the same as the first survey, however, they were 3rd year students, since new school calendar started from September.

In this research, the author used meaningless lists of two-syllable sounds, referring to the examples of Yoshihiro, Shimizu, and Lin. These two-syllable sounds are accent aligned. The number of sample items are insufficient because the survey was conducted during the students' fifteen minutes short break time.

Both the first recording and the pronunciation for the second survey were pronounced by the author. The reason for this is that for usual native Japanese people, it should be difficult to intentionally modify the pronunciation, for example, air flow volume. Lin (2002) conducted survey using intentionally modified pronunciation for survey items such plosives in words with aspirated consonants, as well.

3.2 Method to survey

The following vocabularies and sounds were used for survey by modifying pronunciation manner of the intervocalic consonants.

3.3 Sample vocabulary

Table 3: Survey data for the first survey

1) 信仰	2) 信号	3) 柿	4) 柿	5) 柿	6) 柿	7) 柿	8) 柿
9) 信仰	10) 信仰	11) 信仰	12) 柿	13) 柿	14) 柿		

These vocabularies are minimal pair of intervocalic /k/ and /g/.

3.4 Survey data for the second survey

Table 4: Survey data for the second survey

1) くく	2) くぐ	3) きぷ	4) きぶ	5) かか	6) かが	7) けけ	8) けげ
9) ここ	10) こご	11) くと	12) くど				

4. Results and findings for the first survey and the second survey

4.1 Results of the first survey

1) Intervocalic /k/ was pronounced as usual pronunciation

Table 5: Intervocalic /k/ was pronounced as usual pronunciation

Vocabulary number	Vocabulary	Number of correct answers	Correct answer rate
1)	「信仰」	6	18%
3)	「柿」	19	58%
6)	「二回」	4	12%
7)	「掃く」	17	52%
9)	「負ける」	7	21%

As table showed correct answer rate of Japanese usual pronunciation of intervocalic /k/ was below sixty percent.

2) Intervocalic /k/ was pronounced as [k^h]

Table 6: Intervocalic /k/ was pronounced as [k^h]

Vocabulary number	Vocabulary	Number of correct answers	Correct answer rate
1)	「信仰」	31	93%
3)	「柿」	32	97%
6)	「二回」	32	97%
7)	「掃く」	32	97%
9)	「負ける」	31	94%

As table showed correct answer rate of /k/ as [k^h] was over ninety percent.

3) Intervocalic /ɡ/ was pronounced as plosive [ɡ]

Table 7: Intervocalic /ɡ/ was pronounced as plosive [ɡ]

Vocabulary number	Vocabulary	Number of correct answers	Correct answer rate
2)	「信号」	29	88%
4)	「鍵」	31	94%
5)	「苦い」	32	97%

Vocabulary number	Vocabulary	Number of correct answers	Correct answer rate
8)	「剥ぐ」	27	82%
10)	「曲げる」	29	88%

As table showed correct answer rate of /ɡ/ was over eighty percent.

4) Intervocalic /ɡ/ was pronounced as fricative [ɣ]

Table 8: Intervocalic /ɡ/ was pronounced as fricative [ɣ]

Vocabulary number	Vocabulary	Number of correct answers	Correct answer rate
2)	「信号」	30	91%
4)	「鍵」	32	97%
5)	「苦い」	32	97%
8)	「剥ぐ」	28	85%
10)	「曲げる」	28	85%

As table showed correct answer rate of [ɣ] was over eighty percent.

5) Intervocalic /p, b, t, d/ was pronounced as usual voiced sound

Table 9: Intervocalic /p, b, t, d/ was pronounced as usual voiced sound

Vocabulary number	Vocabulary	Number of correct answers	Correct answer rate
(11)	「信望」	33	100%
(12)	「信奉」	33	100%
(13)	「振動」	33	100%
(14)	「浸透」	33	100%

As table showed correct answer rate of voiced was one hundred percent.

4.2 Results of the second survey

1) Intervocalic /k/ was pronounced as usual pronunciation

Table 10: Intervocalic /k/ was pronounced as usual pronunciation

Item number	items	Number of correct answers	Correct answer rate
5)	「かか」	9	27%
9)	「ここ」	18	55%

As table showed correct answer rate of Japanese usual pronunciation of intervocalic /k/ was below fifty five percent.

2) Intervocalic /k/ was pronounced as [k^h]

Table 11: Intervocalic /k/ was pronounced as [k^h]

Item number	items	Number of correct answers	Correct answer rate
1)	「くく」	32	97%
7)	「けけ」	33	100%

As table showed correct answer rate of /k/ as [kh] was ninety-seven and one hundred percent, respectively.

3) Intervocalic /g/ was pronounced as plosive [g]

Table 12: Intervocalic /g/ was pronounced as plosive [g]

Item number	items	Number of correct answers	Correct answer rate
6)	「かが」	13	39%
10)	「こご」	9	27%

As table showed correct answer rate of /g/ as [g] was below forty percent.

4) Intervocalic /g/ was pronounced as fricative [ɣ]

Table 13: Intervocalic /g/ was pronounced as fricative [ɣ]

Item number	items	Number of correct answers	Correct answer rate
2)	「くぐ」	33	100%
8)	「けげ」	33	100%

As table showed correct answer rate of /g/ as [ɣ] was one hundred percent.

5) Intervocalic / p, b, t, d / was pronounced as usual voiced sound

Table 14: Intervocalic / p, b, t, d / was pronounced as usual voiced sound

Item number	items	Number of correct answers	Correct answer rate
(3)	「きぷ」	33	100%
(4)	「きぶ」	33	100%
(11)	「くと」	33	100%
(12)	「くど」	33	100%

As table showed correct answer rate of voiced sound was one hundred percent.

4.3 Findings

As seen above, in case of 1) and 6), Intervocalic /k/ was pronounced as usual pronunciation. It meant the airflow has reduced sound. A number of subjects understood /k/ as /g/. In case of unaspirated intervocalic [k], learners were confused in distinguishing it. Pronunciation of intervocalic /k/ with unaspirated [k] which was the normal pronunciation of Japanese speakers (Lin, 2001, p.141; Yoshihiro, 2004, p.13; Shimizu, 2018, p.70) materialized the confusion for learners to distinguish the sounds.

This result of the second survey showed lower percentage of incorrect answer rate than the first survey. In the first survey, the error rate was 82% for the unaspirated /k/. This might be related to the difference in the study period (Yoshihiro, 2004, 13) and to what Shimizu described as learners creating a new listening category (Shimizu, 2011, p. 7, 10; Shimizu, 2012, p.67).

In case of 2) and 7), intervocalic /k/ was pronounced as [k^h], which is intentionally modified pronunciation [k^h], and no problems were found. Correct answer rate was mostly 100%. From this result, it seems that learners recognize the Japanese voiceless plosives /k/ in [か行] is the same sound with Thai voiceless aspirated sounds /k^h/ although it was at the intervocalic position. It might be problems in listening. Teachers should pay attention in teaching that Japanese [か行] sound should change from initial position [k^h] to intervocalic position [k].

In case of 3), 4) and 9) Intervocalic /ɡ/ was pronounced as plosive [ɡ] and pronounced as fricative [ɣ], and no major listening problems were found. However, in case of 8) Intervocalic /ɡ/ was pronounced as plosive [ɡ], the percentage of correct answers decreased compare to the first survey. The correct answer rate for the first survey was over 80%, however, in the second survey, it was less than 50%. In this point, further survey is needed. It is speculated that although the students' comprehension has improved, teachers still intentionally pronounce Japanese intervocalic /ɡ/ as plosive [ɡ] for the sake of students. This is so-called 'teacher's talk'. This makes students confuse the understanding of Japanese intervocalic /ɡ/ with Thai /k/. Further survey is required.

In case of 9) fricative allophone [ɣ] for intervocalic /ɡ/, no problems were found. When the intervocalic /ɡ/ was pronounced with allophone [ɣ] (Lin, 2001, p. 141), which is the normal pronunciation of Japanese speakers, there is no problem with the learners' hearing and correct answer rate is 100%. This had proven that allophonic fricative [ɣ] can be heard correctly as voiced plosive /ɡ/ sounds (Lin, 2001, p. 140, Jin, 2019, p.61). Thus [ɣ], is a better pronunciation for intervocalic /ɡ/, otherwise, learners' hearing might confuse it with Thai /k/. Thus, for the sake of learners, [ɣ] is better pronunciation than [ɡ].

In case of 5) and 10), where intervocalic /t, d, p, b/ was pronounced as usual voiced sound, there were no listening problems, because voiced and voiceless consonants of /t, d, p, b/ are distinctive features in Thai, as well.

As a summary, the problem of distinguishing Japanese /k/ and Thai /k/ was clarified throughout this research. The problem occurred when the intervocalic /k/ was pronounced as the air flow weakened [k], and learners' distinguishment of the sounds became problematic. However, instead, when it was intentionally pronounced with aspirated [k^h], there was no problems as seen in 1) and 2). Furthermore, it was found that learners were confused when Japanese intervocalic plosive /ɡ/ is pronounced as plosive [ɡ]. The listening problem occurred with Thai intervocalic /k/ as shared in (3).

The reason was that although Japanese plosive /g/ was voiced and Thai plosive /k/ was unaspirated, their amount of air stream is similar to Thai voiceless unaspirated /k/. Thus, in this regard of air stream, learners identified Japanese /g/ as Thai /k/. However, when allophone [ɣ] was used for Japanese intervocalic /g/, there were no problems. The learners distinguished「かが」and「こご」 correctly.

In this regard, there is detailed explanation with a deal of instances in 'Thai Notation Guidelines for Each Language' (this title was translated by the author, hereafter written as 'Guidelines') issued by Thai government (2018) as well. The documents of 'Guidelines' is transcription guideline that takes into consideration the differences in the phonological systems of the languages, especially pronunciation. This 'Guidelines' tells us how Japanese pronounce intervocalic /k/ and /g/ and how Thai people perceive the sounds.

According to the 'Guidelines', initial position of /k/ transcribes into 'ค', and intervocalic /k/ is transcribed into 'ก'. Initial position of /g/ is transcribed into 'ก'. Intervocalic /g/ is transcribed into 'ก' or 'ง'. In other words, Japanese intervocalic /k/ and intervocalic /g/ are the transcribed into the same 'ก'.

The followings are some sample words for description

Table 15: Partial excerpt from 'Thai Notation Guidelines' (2018) corresponding to Japanese initial and intervocalic /k/ and /g/

1	ありがとう	arigatō	อาริงาโต อาริกาโต
2	学校	gakkō	กักโก
3	銀行	ginkō	กิงโก
4	顔	kao	คาโอะ
5	毛糸	keito	เคอิโตะ
6	客観	kyakkan	เคียกกัน
7	急行	kyūkō	คิวโก
8	肉	niku	นิกุ
9	旅行	ryokō	เรียวโก
10	歯科医	shikai	ชิกาอิ

Cited from 'Thai Notation Guidelines' (2018) Alphabetical order (summarized by the author)

In this way, the Japanese words「信仰」and「信号」pronounced in Japanese speech sounds make it difficult for the learners to distinguish.

5. Conclusion and further issues

As a result of this investigation, it was verified that for Thai learners of elementary Japanese, it is difficult to distinguish Japanese intervocalic plosive /k/ and voiced intervocalic plosive /g/. And the results of this investigation numerically supported the description in the 'Guidelines' as

well. In addition, it was found that it is easier for Thai learners to understand intervocalic /ɡ/ pronounced as [ɣ] instead of [g]. This is significant especially for Japanese teachers, since Japanese teachers tend to pronounce intervocalic /ɡ/ as [g] in the class room for the sake of learners.

In this survey, the main topic was how Japanese people pronounce intervocalic /k/ and /ɡ/ and how Thai learners perceive Japanese /k/. The Japanese voiceless plosive /k/ has slight air stream at the initial position. Therefore, the learners recognize it as a voiceless aspirated plosive 'ค'. On the other hand, Japanese intervocalic /k/ reduces the air stream, and the sound is identified as the Thai voiceless plosive unaspirated 'ก'

In addition, the intervocalic voiced plosive /ɡ/ in Japanese is usually pronounced with the allophone [ɣ], instead. However, when a teacher intentionally pronounces the /ɡ/ as [g], it might be identified with Thai unaspirated 'ก'. In other words, since voiced plosive /ɡ/ does not exist in the Thai phonological system, it is recognized as the voiceless plosive unaspirated 'ก', which is the same manner of pronunciation with Japanese except aspiration. Furthermore, Japanese teachers' intentional pronunciation of /ɡ/ as [g], not the allophone of fricative [ɣ], is, for Thai learners, perceived as Thai 'ก'. Therefore, it is confusable for Thai learners to distinguish Japanese /k/ and /ɡ/.

In this paper, only allophone [ɣ] of /ɡ/ was focused according to Lin (2001), however, the author did not mention about [ŋ], which is the same allophone of /ɡ/. Thus, further research requires [ŋ] as an allophone of /ɡ/ as well. Japanese people are unconsciously pronouncing allophone [ŋ] for /ga/, however, pronunciation of Japanese allophone is accurately perceived and transcribed in the 'Guidelines'. A number of samples are found in it. They should be important materials for future research on [ŋ] that how the Japanese pronunciation of /ɡ/ changes into [ŋ] and is heard as [ŋ] for Thai people. Thus, the research of [ŋ] is necessary for further research.

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