The Thai Consonant Adaptation in Teochew Loanwords

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Abstract

Although there are a number of studies on foreign loanwords in Thai; however, very few examine Chinese loanwords in Thai and none of these studies offers a analysis with Optimality Theory. This paper examines the consonant adaptation in Teochew loanwords in Thai from the online database 'Thai Lexicography Resources' (Cooper, 2003). This study employs the Optimality Theory (Prince & Smolensky, 1993) to analyse the phenomena. In onset position, most consonants are directly mapped into their counterparts in the recipient language. While some phonemes of Teochew that do not exist in Thai are adjusted to their nearest equivalent segments, there are some which do exist in Thai, but they are paired with other segments. In coda position, the majority of consonants are matched into their counterparts in Thai, some Teochew segments nevertheless are adapted to other phonemes in Thai despite the fact that there are these sounds in Thai phonemic inventory system. The findings show that there are fourteen constraints for describing the situations for direct-mapping, mapping of non-existing consonants, and mapping of existing consonants. There are only four markedness constraints: *tsh, *ts, *dz, and *g; the other ten constraints are faithfulness.

Keywords: Optimality Theory, constraint-based analysis, Teochew, Thai, loanwords

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บทคัดย่อ

      แม้ว่าจะมีงานวิจัยมากมายเกี่ยวกับคำยืมภาษาต่างประเทศในภาษาไทย แต่มีงานวิจัยที่ศึกษาเกี่ยวกับคำยืมภาษาจีนในภาษาไทยน้อยมาก โดยเฉพาะ อย่างยิ่ง ยังไม่มีงานวิจัยใดที่นำเอาทฤษฎีอุตมผล (Optimality Theory) มาใช้ใน การวิเคราะห์คำยืมภาษาจีนในภาษาไทย ดังนั้น วัตถุประสงค์ของงานวิจัยนี้ จึงมี ขึ้นเพื่อสำรวจการเปลี่ยนแปลงของพยัญชนะในภาษาแต้จิ๋วในภาษาไทยจากฐาน ข้อมูลออนไลน์ 'Thai Lexicography Resources' (Cooper, 2003) โดยใช้ทฤษฎี อุตมผลในการวิเคราะห์ (Prince & Smolensky, 1993) ปรากฏการณ์ที่เกิดขึ้น ผลการศึกษาพบว่า ในตำแหน่งต้นคำ เสียงพยัญชนะส่วนใหญ่ของไทยจะมีการ จับคู่แบบตรงกับเสียงพยัญชนะในแต้จิ๋ว ขณะที่เสียงพยัญชนะที่ไม่มีในภาษาไทย ของแต้จิ๋วนั้น จะถูกจับคู่กับเสียงพยัญชนะที่มีเสียงใกล้เคียงกันมากที่สุด อนึ่ง ยังพบว่ามีเสียงพยัญชนะในแต้จิ๋วบางตัวที่มีอยู่ในภาษาไทย แต่กลับเปลี่ยนเป็น เสียงพยัญชนะอื่นในภาษาไทย นอกจากนี้ ในตำแหน่งท้ายคำนั้น เสียงพยัญชนะ ส่วนใหญ่ของแต้จิ๋วมีการจับคู่แบบตรงกับเสียงพยัญชนะของไทย และเสียง พยัญชนะบางตัวในแต้จิ๋วที่มีในไทยกลับไปจับคู่กับเสียงพยัญชนะอื่นในภาษาไทย ซึ่งปรากฏการณ์ดังกล่าวนี้ สามารถอธิบายได้ด้วยการกำหนดข้อบังคับทั้ง 14 ข้อ เพื่อใช้อธิบายการจับคู่แบบตรง การจับคู่กับหน่วยเสียงที่ไม่มีอยู่ในภาษาผู้รับ และ การจับคู่กับหน่วยเสียงอื่นของหน่วยเสียงที่มีอยู่ในภาษาผู้รับ ในคำยืมของแต้จิ๋ว ในภาษาไทยนี้ มีข้อบังคับความแปลกเด่น (markedness constraint) 4 ข้อได้แก่ *tsh, *ts, *dz, and *g เพราะเสียงดังกล่าว ไม่มีในภาษาไทย ส่วนอีก 10 ข้อนั้น เป็นข้อบังคับแบบซื่อสัตย์ (faithfulness constraint)

คำสำคัญ: ทฤษฎีอุตมผล การวิเคราะห์แบบการกำหนดข้อบังคับ แต้จิ๋ว ไทย คำยืม

Introduction

      Thai has borrowed words from many languages such as English, Sanskrit, Khmer, and it also has adapted the loanwords in many ways;

for example, the English initial voiceless stops are mapped to voiceless aspirated stops in Thai (Kenstowicz & Suchato, 2006). Although there are a number of studies about loanwords in Thai, only a few focus on Chinese loanwords in Thai, especially Teochew, and none of these studies is analysed by the constraint-based approach. This paper is a good start for this issue. It examines Teochew loanwords from the online database 'Thai Lexicography Resources' (Cooper, 2003). This dialect has lent the highest number (88%) of Chinese loanwords in Thai (Gyarunsutu, 1983), and the number of Teochew words is more than half of those from all the southern Chinese dialect groups - the majority of Thai Chinese in Thailand (Smalley, 1994).

Additionally, this paper aims at investigating the adaptations of consonants in both onset and coda positions. It is common to observe that there are direct-mapping and changes in distinctive features when the words are used cross-linguistically; for example, in Fijian, the English voiced stops are realized as voiceless stops within the word and word-finally, but with predominant nasal in the word-initially (Michael, 2007). The English coronal plosives in Hawaiian can be paired with the voiceless velar stop in syllabic positions, and with the glottal stop in the coda position (Allison N, 2006). From the observation, the phonemes in Teochew can be adapted to the same segments with similar features accurately in Thai, or some of them might be mapped into other phonemes. Consider the following examples:

	Teochew	Thai	Meaning
(a)	kɛɛ1	kee1	'home, residence; family, domestic'
(b)	dzuuaŋ6	juan4	'to be agreeable to, go along with, permit, allow'
(c)	bak8	mɯk3	'to be dark, black'

From the above examples, there are three cases, firstly, (a) showing the direct mapping from the native phoneme to the target language: [k] to [k]. Secondly, (b) demonstrates the voiced alveolar affricate [dz] to alveopalatal glide [j] in Thai which is possible since there is no voiced alveolar affricate existing in the Thai phonological sound inventory. Lastly, (c) illustrates that the voiced bilabial stop [b] in the native language is changed to bilabial nasal [m] in Thai which is a strange behaviour of this sound since the [b] also occurs in Thai as a distinctive phoneme.

From these circumstances, the research questions of this study are: What are the strategies in consonant adaptation in loanwords from Teochew to Thai?, and how can optimality theory facilitate in the explanation of the repairing featural processes? This paper will find out how the feature(s) of the phonological sounds between two languages are similar or different, and how the generalization of the analysed data can be accounted for by a constraint-based model. The researcher presents a model of the repairing of features and direct-mapping strategy by using the Optimality Theory (Prince & Smolensky, 1993).

Hopefully, this study will be beneficial for linguists and learners who are studying Thai as their first or second language in terms of how the segments in Teochew loanwords are transliterated into Thai, and what the retained features of these segments in the onset and coda positions are.

The Sound Inventories of Thai and Teochew

Table 1 illustrates the consonant phonemes in Teochew, and the Table 2 demonstrates consonant phonemes in Thai as follows:

Table 1 Teochew Consonants

		Bilabial	Alveolar	Velar	Glottal
Nasal		m	n	ŋ	
Plosive	+ aspirated	ph	th	kh	
	- aspirated	p	t	k	ʔ
	+ voiced	b		g	
Affricate	- aspirated		ts		
	+ aspirated		tsh		
	+ voiced		dz		
Fricative			s		h
Lateral Approximant			l		

Table 2 Thai Consonants

		Bilabial	Labio-dent.	Alveolar	Alveopalatal	Velar	Glottal
Stop	+voiced	b		d			ʔ
	-aspirated	p		t		k	
	+aspirated	ph		th		kh	
Nasal		m		n		ŋ	
Frica-tive			f	s			h
Affricate	-aspirated				tɕ		
	+aspirated				tɕh		
Trill				r			
Glide					j	w	
Lateral Appox.				l			

For Teochew, all consonants can occur in the onset position, but only five segments are allowed to occur in the coda position: [dz, ŋ, k, m, p] such as [khɛ4.tsaaŋ3] hotel and [suɛj1] bad luck. In Thai, all consonants are allowed to occur in the onset position, but only stop followed by liquid. Moreover, stop and velar approximant can occur in an onset cluster. In addition, only stop, nasal, and glide can occur in coda position (Ruangjaroon, 2006) such as [hen4] see and [kop3] frog.

There are rather great differences between phonemes in the onset position of Thai and Teochew though all of phonemes in both phonemic inventory of two languages can occur in this position. For stops, Teochew has a voiced velar stop while Thai has a voiced alveolar stop, which these two sounds of each language do not occur at the other's sound system. There is also a labio-dental fricative, glides: alveopalatal and velar, and alveolar trill that occur only in Thai, not in Teochew. For affricate, Thai contains unaspirated alveolar affricate, aspirated alveolar affricate, and voiced alveolar affricate, while there are unaspirated alveopalatal affricate and aspirated alveopalatal affricate in the recipient language. These five segments do not occur at the other's as well.

It should be further noted that although Thai has some similar phonemes in the coda position as in Teochew, but there are some discrepancies in both languages. For instances, glides can occur in Thai, but there are no glides in the native language. Moreover, even though both languages have the same three nasal sounds: [m, n, ŋ] and the members of stops are almost similar, voiced alveolar stop occurs in Thai phonemic inventory system but not in Teochew. Contrastively, there is a voiced velar stop in the source language but not in the recipient language.

Research Methodology

The data have been collected from online database named 'Thai Lexicography Resources' (Cooper, 2003) which combines Modern Chinese Loanwords in Thai from two studies (Gyarunsutu, 1983; Qunhu, 2000). This database has a number of Chinese loanwords from many Chinese dialects which are written in Thai; however, only Teochew loanwords were selected since they have the most occurrences among all Chinese loanwords in Thai. From the data, there are 343 words in total; however, only 295 words were analysed since the rest of Teochew origins (48 words) could not be traced.

These words in Thai were transliterated to Teochew sound system by two Thai people. The first one was raised in Thailand and had Teochew as his mother language, hence, he is a bilingual speaker of Thai and Teochew. He is a teacher of Teochew, and has invented the writing Roman characters for Teochew sound system. The second informant was raised in Teochew family in Thailand. At the present time, he is studying the second Bachelor's degree in Beijing, China. The transcriptions of Roman characters of the first informant were confirmed their accuracy by the second informant to prove the reliability of the transliteration from Thai characters to Roman characters. Then these Roman characters are transcribed to IPA for Teochew dialect and Thai by the researcher.

Table 3 illustrates data collection for this study. Starting by the leftmost column, it is the number which is followed by the second column which is Teochew loanwords written in Thai. The third column shows Roman characters for Teochew. The fourth column expresses IPA characters for this Chinese dialect, and IPA characters for Thai are filled in the last column as follows:

Table 3 Examples of Data Collection for the Study

No	Teochew loanwords	Roman character for Teochew	Teochew IPA	Thai IPA
1	กี	ki1	kii1	kii1
2	เก๊กซิม	kek4.sim1	kɛk4.siim1	kek5.sim1
3	โชย	chuei1	tshuɛj1	tɕhooj1
4	เต้าส่วน	tau7.suang7	taaw7.suuaŋ7	taw2.suan3
5	เม่งแซ	pheng5.se1	phɛɛŋ5.sɛɛ1	meŋ2.sɛɛ1

The tones for both Teochew and Thai in the third to fifth columns have been added. Since there are five tones in Thai, 1, 2, 3, 4, 5, represent mid, falling, low, rising, and high tones respectively. For Teochew tones, there are eight tones - 1, 2, 3, 4, 5, 6, 7, 8. They are level, falling, low rising, low stop, high level, high rising, low level, and high stop, respectively. A period between syllables represents the syllable boundary for each word.

The adaptation of consonants in the onset position

1. The direct-mapping of consonants in the onset position

From table 1 and 2, Teochew contains 18 phonemes of consonant, while Thai has 21 consonant segments. In the onset position, most Teochew onsets are directly transliterated to their Thai phoneme counterparts. There are thirteen direct counterparts that they appear in the onset positions of Teochew and Thai: [k, s, ph, h, l, b, kh, p, n, m, th, t, ŋ]. The examples of each segment are shown as follows:

k > k

Teochew	Thai	Meaning
kɔɔŋ1	koŋ1	grandfather
kap4.kaaj3	kap3.kaj3	a medicinal made by fermenting a gecko in alcohol

s > s

Teochew	Thai	Meaning
sɯɯ7	sɯɯ3	matter, affair
siia3	siiaj3	the son of a wealthy Chinese

ph > ph

Teochew	Thai	Meaning
phoow6	phoo4	a prepared list of names
phɔɔj1	phooj1	a list of names

l > l

Teochew	Thai	Meaning
luu5.tiiŋ5	loo2.tin5	a variety of rush or reed
lo8	lo5	fireplace

p > p

Teochew	Thai	Meaning
paaŋ1.tɔɔ1	paŋ1.tɔɔ1	a Chinese-style cleaver
paaj5	paaj2	poster

th > th

Teochew	Thai	Meaning
thɔɔ5	thɔɔ5	peach money
thaaw5	thaw5	the head

t > t

Teochew	Thai	Meaning
tuua7.kɔɔ1	tua2.kɔɔ1	oldest brother
taaŋ1.kĨia1	taŋ1.kiia4	Tonkin

h > h

Teochew	Thai	Meaning
huuɛj6	huaj4	to assemble
haaŋ5	haaŋ2	business

b > b

Teochew	Thai	Meaning
buuaŋ7	buan2	ten thousands
bɔɔ5	bɔɔ5	no, not

kh > kh

Teochew	Thai	Meaning
khɛ4	khɛk3	foreigner
kha4.naa5	kha5.na	Chinese kale

n > n

Teochew	Thai	Meaning
naaŋ5	naŋ5	person, people
nɔɔw1.kĨia2	nooŋ1.kia5	children, offspring

m > m

Teochew	Thai	Meaning
muuɛj5	muaj5	boiled rice soup
mɔɔ5	mɔɔ5	hair

ŋ > ŋ

Teochew	Thai	Meaning
ŋɯɯŋ5	ŋɤɤn1	silver,
ŋiiaŋ3	ŋiian2	lust, craving

To explain the direct-mapping of the above phonemes, three constraints are provided: IDENT(F), DEP-IO and MAX-IO. The IDENT(F) means that the distinctive features of two corresponding segments must be identical. The DEP-IO refers to the input correspondence to the output (no epenthesis), and the MAX-IO is the output correspondence to the input segment (no deletion). These three constraints are in the same ranking and they have no interaction because from the data, there have no any insertion, deletion, and all features in the source language are maintained. The ranking of constraints can be summarized as follows:

IDENT(F), DEP-IO, MAX-IO

The tableau shows the examples of the direct-mapping analysis for the onset consonants below:

/thaaw5/	IDENT(F)	DEP-IO	MAX-IO
a. staaw5	*!	*	
b. aaw5	*!		*
c. ☞ thaw5			
/ŋiiaŋ3/	IDENT(F)	DEP-IO	MAX-IO
a. pliian2	*!	*	
b. iian2	*!		*
c. ☞ ŋiian2			

From the above table, [thaw5] and [ŋiian2] for two words are the optimal outputs since they do not break any basic constraints. The [staaw5] and [aaw5] have fatal violation for IDENT(F) since some features in their onsets are changed. Similarly, [pliiaŋ3] and [iian2] break IDENT(F) due to their dishonesty to the onset in the source language.

2.   The mapping of non-existing consonants in the onset position

From the data, there are four segments in Teochew that do not exist in Thai, including aspirated alveolar affricate, unaspirated alveolar

affricate, voiced alveolar affricate, and voiced velar plosive [tsh, ts, dz, g, respectively].These four phonemes in the original language are mapped into five segments in Thai as illustrated in the examples below:

	tsh > tɕh			ts > tɕ	
Teochew	*Thai*	*Meaning*	*Teochew*	*Thai*	*Meaning*
tshaaw2	tɕhaw4	grass	tsuuŋ5	tɕun5	boat
tshaaj3	tɕhaj3	vegetables	tsuuj2	tɕuj3	to be drunk
	dz > j			g > ŋ	
Teochew	*Thai*	*Meaning*	*Teochew*	*Thai*	*Meaning*
dzii6	jii2	two	taaw7.gɛɛ5	taw2.ŋee5bean	
dzii6.ik4	jii2.it5	game			sprouts
	tsh > s				
Teochew	*Thai*	*Meaning*			
tshiiam1.sii1	siiam1.sii1 casting lots to tell fortunes				

According to two informants, [tsh] is generally pronounced as [tɕh] instead of [s], and the changing of [tsh] to [s] occurs only once in the data, thus the changing from aspirated alveolar affricate to voiceless alveolar fricative is likely to be the coincidence, and there will not be an analysis for this transliteration. For [g] to [ŋ], however, two informants stated that this changing commonly happens in the language acquisition of Thai learning Teochew, hence it should be analysed.

In these circumstances, there are the interactions of four groups of constraints for the transliterations. 1.) The markedness constraints [*tsh], [*ts], [*dz], and [*g]; 2.) The existing three basic constraints from the previous analysis of direct mapping: DEP-IO, MAX-IO, and IDENT(F); 3.) IDENT-IO(manner), IDENT-IO(place), IDENT-IO(aspiration); and 4.) ALVEOPALATAL, GLIDE, NASAL have been used to yield the optimal output.

For the changing of [tsh] to [tɕh], manner of articulation and aspiration of the segment of the native language are retained. Therefore, two constraints are added: IDENT-IO(manner) and IDENT-IO(aspiration). The [*tsh] outranks IDENT-IO(aspiration) and IDENT-IO(manner) because of its markedness. Then these three constraints are followed by basic faithfulness constraints: DEP-IO, MAX-IO, IDENT(F). The constraint ranking is s hown as follows:

tsh > tɕh: [*tsh] >> IDENT-IO(manner), IDENT-IO(aspiration) >> DEP-IO, MAX-IO, IDENT(F)

tshaaw2	[*tsh]	IDENT-IO(manner)	IDENT-IO(aspiration)	DEP-IO	MAX-IO	IDENT(F)
a. aw4		*!	*		*	*
b. taw4		*!	*			*
c. ☞ tɕhaw4						*
d. tshaw4	*!					
e. tɕlaw4			*!	*		*

From the above tableau, the candidate [tɕhaw4] is the optimal output since it only violates IDENT(F) constraint which is the lowest ranked constraint. The [aw4] and [taw4] fatally violate the constraint IDENT-IO(manner) which is the second rank of constraints. The [tshaw4] fails to be the winner due to the violation of [*tsh] since there is no this segment in Thai phonemic inventory system. [tɕlaw4] has no aspiration in the onset position; thus it breaks ASPIRATION constraint.

Next, the constraints for the transliteration of [ts] to [tɕ] are similar to the above changing. The IDENT-IO(aspiration) is still necessary to exclude [tɕh] in Thai. The ranking of constraints is sketched as follows:

ts > tɕ: [*ts] >> IDENT-IO(manner), IDENT-IO(aspiration) >> DEP-IO, MAX-IO, IDENT(F)

tsuuŋ5	[*ts]	IDENT-IO(manner)	IDENT-IO(aspiration)	DEP-IO	MAX-IO	IDENT(F)
a. tsrun5	*!			*		
b. ☞ tɕun5						*
c. khun5		*!	*			*
d. un5		*!			*	*

The above tableau shows that [tɕun5] is the optimal output even though it violates IDENT(F) constraint. The [tsrun5] fails to satisfy the constraint [*ts] since there is no this segment in Thai sound system. There is the insertion of alveolar trill. The other two candidates [khun5] and [un5] fatally violate IDENT-IO(manner) since the onsets of the words are not affricate.

Next one is the transliteration from [g] to [ŋ]. Since the voiced velar stop does not exist in Thai, the first ranked constraint would be [*g]. Because these two segments are similar in place of articulation, IDENT-IO(place) is used. Additionally, since the [ŋ] in Thai contains nasality which does not exist in the native segment, another constraint is employed: NASAL, and this constraint outranks IDENT-IO(place) due to its markedness. The other three basic constraints are also employed to justify the candidate. The ranking of constraints is illustrated below:

g > ŋ: [*g] >> NASAL >> IDENT-IO(place) >> DEP-IO, MAX-IO, IDENT(F)

taaw7.gɛɛ5	[*g]	NASAL	IDENT-IO(place)	DEP-IO	MAX-IO	IDENT(F)
a. taw2.gee5	*!	*				
b. ☞ taw2.ŋee5						*
c. taw2.ŋlee5				*!		*
d. taw2.ee5		*!	*		*	*

From the above tableau, the [taw2.ŋee5] is the optimal constraint since it only breaks IDENT(F) which is in the lowest ranking. The [taw2.gee5] fatally violates [*g] which is in the highest ranking, thus it fails to win the other candidate. The [taw2.ŋlee5] violates two constraints: DEP-IO and IDENT(F) since there is the insertion of alveolar lateral approximant. The [taw2.ee5] has a fatal violation for NASAL constraint which is in the second ranking because it starts the second word with a vowel.

The last transliteration which the onset consonant does not exist in Thai is [dz] > [j]. For this changing, the first required constraint is [*dz]. Although the two segments [dz] and [j] do not share the place nor manner of articulations, but it is possible that the changing from [dz] to [j] is due to their occurrences in the nearest place of articulation since [dz] is alveolar, and [j] is alveopalatal; both consonants occur in the alveolar area. In addition, the changing of [dz] to [j] is common in many other languages. This result is supported by the study in the Sanskrit loanwords in the Cebuano-Bisayan language since there is no [dz] in phonemic inventory of the recipient language (Kuizon, 1962). Therefore, the constraints ALVEOPALATAL and GLIDE are additionally required in the second ranking constraint as they are markedness constraints. These two constraints are accounted for this case, and they do not interact each other. The constraints for this changing are shown in the sketched ranking below:

dz > j: [*dz] >> ALVEOPALATAL, GLIDE >> DEP-IO, MAX-IO, IDENT(F)

dzii6	*dz	ALVEOPALATAL	GLIDE	DEP-IO	MAX-IO	IDENT(F)
a. ii2		*!	*		*	*
b. wii2		*!				*
c. tɕii2			*!			*
d. ☞ jii2						*
e. dzii2	*!	*	*			

The above tableau illustrates that the optimal output is [jii2] since it only violates the constraint IDENT(F) which is one of the three lowest ranking constraints. The [ii2] and [wii2] violate the second ranked constraint ALVEOPALATAL; thus they fail to be the optimal output. The [tɕii2] violates GLIDE constraint since [tɕ] is affricate. Lastly the [dzii2] has the fatal violation for [*dz] since there is no voiced alveolar affricate in Thai.

3.   The mapping of existing consonants in the onset position

The mapping of existing consonants in the onset position from Teochew to Thai occurs in rare cases. This study has found only four occurrences of the mapping of the existing sounds in Teochew that also occur in Thai phonemic inventory but they are mismatched, including unaspirated alveolar stop [t], voiced bilabial stop [b], aspirated bilabial stop [ph], and aspirated alveolar stop [th]. In each case, it has only one occurrence. The first Teochew phoneme [t] is paired with aspirated alveopalatal affricate [tɕh]. The second and third segments [b, ph] are matched with bilabial nasal [m], while the last phoneme [th] is mapped into unaspirated alveolar stop [t]. Each occurrence is shown as follows:

	t > tɕh			b > m	
Teochew	*Thai*	*Meaning*	*Teochew*	*Thai*	*Meaning*
tɛɛ5	tɕhaa1	tea	bak8	mɯk3	ink
	ph > m			th > t	
Teochew	*Thai*	*Meaning*	*Teochew*	*Thai*	*Meaning*
phɛɛŋ5.sɛɛ1	meŋ2.sɛɛ1	a borax-based food adulterant	thɯɯŋ3	tɯŋ5	to pawn

Despite the fact that there are also similar phonemes in the recipient language, these are non-faithful mappings from the Teochew segments to the other segments in Thai. However, due to their once occurrence, we might not be able to generalize the transliteration in these loanwords. Therefore they lack of analysis in these cases. However,

it is worth noting that the finding that the voiceless aspirated bilabial stop is changed to voiced bilabial nasal is contradictory to the behaviour of Japanese voiced plosive in onset position which is adapted to voiceless counterparts in Korean. The examples supported by the study of Shinohara, Ji, Ooigawa and Shinya (2011) are [buɕi] to [pusi] 'soldier', [daɕi] to [tasi] 'soup stock', and [soba] to [sopa] 'buckwheat noodle.'

The adaptation of consonants in the coda position

1.   The direct-mapping of consonants in the coda position

Although Thai does not allow all consonants to occur in coda position, the number of segments that can occur in this position is more than Teochew, i.e. Thai allows stops, nasals, and glides, while only [dz, ŋ, k, m, p] are allowed in coda position of the native language. There are four direct-mapped phonemes for coda positions of these two languages: [ŋ, p, m, k]. The examples are shown below:

	ŋ > ŋ			p > p	
Teochew	*Thai*	*Meaning*	*Teochew*	*Thai*	*Meaning*
kaaŋ1.sai1	kaŋ1.sai4	Jiang Xi	tsap8.kaaŋ1	tɕap3.kaŋ1	purely physical, brainless
sãa1.lɛɛŋ2	saa1.leŋ5	a pedicab	kap4.kaai3	kap3.kai3	a medicinal made by fermenting a gecko in alcohol
	m > m			k > k	
Teochew	*Thai*	*Meaning*	*Teochew*	*Thai*	*Meaning*
tshaam1	tɕham1	assorted goods	kɛk4	kek5	to dismiss, fire
naam2	nam4	olive	bak8	mɯk3	ink

Since they are direct-mapped segments in the coda position from Teochew to Thai, the constraints for this situation are the same as in the onset position: IDENT(F), DEP-IO, MAX-IO. Additionally, there is no

interaction between these three constraints since they are in the same ranking as follows:

IDENT(F), DEP-IO, MAX-IO

The tableau below shows the examples of the direct-mapping analysis for the coda consonants:

/tshaam1/	IDENT(F)	DEP-IO	MAX-IO
a. tɕhan1	*!		
b. tɕha1	*!		*
c. ☞ tɕham1			
d. tɕhalm1		*!	
/kɛk4/	IDENT(F)	DEP-IO	MAX-IO
a. kep5	*!		
b. ke5	*!		*
c. ☞ kek5			
d. kerk5		*!	

For the changing from /tshaam1/ to [tɕham1], the [tɕham1] is the optimal output since it satisfies all basic constraints, unlike the other three candidates [tɕhan1], [tɕha1], and [tɕhalm1]. The first two have a fatal violation for IDENT(F) since they change [m] to [n]; while the last candidate violates DEP-IO since there is the insertion of alveolar lateral approximant causing the a consonant to be a cluster. The changing of /kɛk4/ to [kek5] is the same phenomenon. The [kek5] does not violate any constraints. The [kep5] and [ke5] fail to satisfy IDENT(F) since the coda of the first word is a voiceless bilabial stop and the second word is a vowel,. The last candidate [kerk5] breaks the DEP-IO since there is the insertion of an alveolar trill.

2. The mapping of existing consonants in the coda position

The velar nasal [ŋ] in Teochew can be directly paired to its counterpart in Thai; sometimes, it can unsystematically be matched with alveolar nasal [n] as well. The examples are shown below:

ŋ > n

Teochew	Thai	Meaning	Teochew	Thai	Meaning
ŋɯɯŋ5	ŋɤn1	money	siiŋ1.tɯɯŋ5	sin1.tɯŋ5	to be newly arrived from China
tsuuŋ5	tɕun5	boat	tɯɯŋ7	tun1	stock up

This situation of velar nasal is changed to alveolar nasal is not uncommon since there are many English loanwords in Mandarin that the coda is changed from [ŋ] to [n] (Hsieh, Kenstowicz, & Mou, 2005), such as Anguilla to [an.gui.la], Angus to [an.ge.si], Frankfurt to [fa.lan.ke.fu]. In order to explain this changing, the IDENT-IO(manner) and ALVEOLAR constraints are added to justify candidates. The ALVEOLAR outranks the IDENT-IO(manner) since it is markedness constraint. The ranking of constraints is shown as follows:

ŋ → n: ALVEOLAR >> IDENT-IO(manner) >> IDENT(F), DEP-IO, MAX-IO

ŋɯɯŋ5	ALVEOLAR	IDENT-IO(manner)	IDENT(F)	DEP-IO	MAX-IO
a. ŋɤln1			*!	*	
b. ŋɤ1	*!	*	*		*
c. ŋɤr1		*!	*		
d. ŋɤŋ1	*!				
e. ☞ ŋɤn1			*		

From the above tableau, the [ŋɤn1] is the optimal output though it violates one constraint since it breaks the basic constraints only once. The [ŋɤln1] fails to be the winner because the coda is changed from [ŋ] to [n] and there is the insertion of alveolar lateral approximant; thus it breaks

two constraints: IDENT(F) and DEP-IO. The [ŋɤ1] and [ŋɤŋ1] violates the high ranking constraint ALVEOLAR, and the [ŋɤr1] has the fatal violation for IDENT-IO(manner).

Additionally, most velar stops [k] in the coda position in Teochew are directly paired to their counterparts in Thai; however, there are two occurrences that the velar stop is matched with alveolar stop [t]. The reason why Thai sometimes replaced velar stop with its alveolar pair might be due to these two sounds are very close; they are different in only the place of articulation. These two words are:

k > t

Teochew	Thai	Meaning	Teochew	Thai	Meaning
dzii5.i**k**4	jii2.i**t**5	the card game twenty-one	bɔɔ5.la**k**8	bɔɔ2.la**t**5	to be weak

This situation is consistent with Berg (1996) who found out that although a German-speaking child could mainly have accurate production in velar stop, he/she sometimes replaced this segment with alveolar stop which shows that these two sounds have some interrelationship to one another.

The changing from velar stop to alveolar stop can be accounted by the constraints as follows:

k → t: ALVEOLAR >> IDENT-IO(manner) >> IDENT(F), DEP-IO, MAX-IO

dzii5.ik4	ALVEOLAR	IDENT-IO(manner)	IDENT(F)	DEP-IO	MAX-IO
a. jii2.in5		*!	*		
b. jii2.i5	*!	*	*		*
c. jii2.ig5	*!		*		
d. jii2.ikh5	*!		*		
e. jii2.itl5		*!	*	*	
e. ☞ jii2.it5			*		

The three candidates: [jii2.i5], [jii2.ig5], and [jii2.ikh5] violate the high ranking constraint ALVEOLAR. The [jii2.in5] and [jii2.itl5] fatally violates the IDENT-IO(manner) which is the second constraint for this changing. Therefore, the [jii2.it5] is the optimal output since it only violates IDENT(F) which is in the lowest rank.

In addition, there is only one occurrence that the velar stop [ŋ] in the native language is deleted instead of changing its features to some other segments in Thai. The case is classed as an exception. The word is shown as follows:

ŋ > ø

Teochew	Thai	Meaning
hiiaŋ1.liiau7	hiia1.liiau2	spice, condiment

Conclusion

In this article, the researcher has investigated the adaptation of consonants in the onset and coda positions of Thai in Teochew loanwords. For the onset positions, it was shown that most consonants are directly mapped into their counterparts in the recipient language. While some of phonemes in Teochew that do not exist in Thai are adjusted to their nearest equivalent segments, there are some of them which exist in Thai, but they are paired with other segments. For the coda positions, the majority of consonants are matched into their counterparts in Thai, but some Teochew segments are adapted to other phonemes in Thai despite the fact that they are in Thai phonemic inventory system.

After the analysis, it can be concluded that there are fourteen constraints which are categorized into four rankings in the adaptation of Teochew loanwords in Thai. Six of them are faithfulness constraints: IDENT(F), DEP-IO, MAX-IO, IDENT-IO(manner), IDENT-IO(aspiration), and IDENT-IO(place). The other eight are markedness constraints: [*tsh],

[*ts], [*g], [*dz], NASAL, ALVEOPALATAL, GLIDE, and ALVEOLAR. The ranking of constraints are shown as follows:

[*tsh], [*ts], [*g], [*dz] >> NASAL, ALVEOPALATAL, GLIDE, ALVEOLAR >> IDENT-IO(manner), IDENT-IO(aspiration), IDENT-IO(place) >> IDENT(F), DEP-IO, MAX-IO

Shortly, Teochew loanwords in Thai rely mainly on the direct-mapping and featural changing strategies, and there is only one case of deletion: the velar stop which is counted as an exception, and no epenthesis for this adaptation. For future research, it is interesting to study the adaptation of vowels and tones from Teochew to Thai.

Acknowledgements

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