

**A study of Mandarin loanwords
: Lexical stratification, adaptation and factors**

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**A dissertation submitted in partial fulfillment of
the requirements for the degree of**

**Doctor of Philosophy
(Chinese)**

**at the
UNIVERSITY OF WISCONSIN-MADISON
2012**

Date of final oral examination: 12/10/2012

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*This dissertation is dedicated to
my mother, Jung Ae Lee*

ACKNOWLEDGEMENTS

This dissertation would not have been completed without the esteemed counsel of the committee members, the invaluable support of my incredible family, and the unremitting love and guidance of the One and Almighty God.

It is my privilege and honour to express my deepest gratitude to my academic advisor, Prof. Hongming Zhang, without whose valuable expertise, support, and devoted encouragement, this dissertation would certainly not have reached completion. In particular, he has been a constant source of inspiration in moments of difficulty and times riddled with obstacles.

It is my privilege to express my sincerest gratitude to Professor B.J. Lim for his generous support and indispensable comments, which fuelled the progress of and provided critical feedback for this dissertation. It is my further honour to thank the other committee members: Professors Marlys Macken, Yafei Li, and Rania Huntington for their compassionate support and guidance.

I am humbly obliged to Teresa Nealon and Cynthia Koerber, the coordinators in the department of East Asian Language and Literature. I truly appreciate their kind help and constant cooperation during the period of my Ph.D. courses.

It is my privilege to express exceptional gratitude to my friends: Ae Ree Nam, Mi Ok Kang, Jimi Kim, Youyong Qian, Shuxiang You, Lu Lu, Henghua Su, Tianlin

Wang, Huimin Dong, Xiang Lv, Yu-lin Chiu, Natasha Eslami, and Karen Best, for their unselfish and unwaivering support.

I cannot begin to adequately express my gratitude to Hee Sun Kwon and her family. Their consistent support alleviated any stress or difficulties that threatened my success or perseverance. My time in Madison would have certainly been lacking in thoughtful companionship and fond memories. I truly appreciate their kind concern and warm encouragement.

I am also humbly indebted to my many professors: Sohee Shim, Jae Don Lee, Wooseok Kim, whose unremitting support in Korea contributed to the completion of this dissertation. Their sincere compassion and earnest support led me through difficult times and contributed to my resolve.

It is my honour and privilege to express my tremendous gratitude to my friends in Korea: Jiyeon Kim, Yoonkyung Han, Hye Sun Lee, Hyun A Kim, Jooyeon Son, Jin Young Lee, Joo Young Lee, Sooyoung Shin, Sunja Choi, Mi Young Kim, Myung Hee Hyun. Despite the distance, they always sent me their warmest messages of support and encouragement. Whenever I visited Korea, they always greeted me with warm hugs and bright big smiles. Their friendships hold a valuable and esteemed place in my heart.

It is also my joy and privilege to express my sincerest and deepest gratitude to my parents and sisters. Without their endless love and prayers, I would never have been able to finish my dissertation. It is my further joy and honour to express my gratitude to

my husband, Young Sun Kong. He was always there cheering me up and bearing with me.

I am also deeply indebted to my precious daughters, Daisy and Claire. They always stood by me through the good times and bad times. Their beautiful smiles and words of encouragement and love always give me hope and meaning to life. Their bright eyes and beautiful spirits served as the most amazing source of inspiration and the greatest reason to wake up every morning

Last but the least, it is my honour to thank God, who always answers my prayers and always gives me strength whenever I fall into despair. Without you, this dream would have remained only that, and not become a reality. Thank you so much
Dear Lord.

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Abstract

This dissertation is about Chinese loanwords. It is mainly divided into two parts. Part I is a general discussion about loanwords in Chinese; Chapter I and II belong to the first part. Part II is a discussion about the analyses of Mandarin loanwords originating from English. Chapter III, IV, and V are all related to the second part. Chapter VI is the conclusion, which includes the summary, limitations and contributions of the dissertation. The main arguments are shown in Chapter II, IV, and V: Lexical stratification, Adaptation, and Important factors.

There are three main issues regarding Mandarin loanwords: Japanese graphic loans, semantic loans, and alphabetic loans. The previous two are very similar with the native Chinese words, while the last one is very different from the Chinese language. Therefore, there are debates of whether or not they should be considered Chinese loanwords. This dissertation provides a reasonable answer for the problems by using Ito and Mester's (1995, 1999, 2001) core-periphery structure.

English-based Mandarin loanwords are commonly used in Chinese people's daily life. This dissertation shows how English phonemes map into Mandarin phonemes through Mandarin loanwords adaptation. The consonantal adaptations are the most important in the analyses, but it includes the vowel adaptation and tonal adaptation too. Through the analyses, it proves that the functions of phonology and phonetics play a significant role in Mandarin loanword adaptation. Therefore, this dissertation supports the phonetics-phonology approach in loanword phonology. Even though phonetics and phonology are the most important factors in Mandarin loanword phonology, the functions of many other factors, such as semantic functions of Chinese characters and

English orthography, are also discussed. Additionally, the phonetic symbolization of Chinese characters is also mentioned.

Based on the important discussions, this dissertation presents a comprehensive model for Mandarin loanword adaptation: A Model of Mandarin Loanword Adaptation (MMLA). This model includes the functions of all the important factors in Mandarin loanword adaptation. Through applying it to Mandarin loanword variations, the creation of many loanword variations can be reasonably explained.

Chapter I. Introduction¹

1.1 Loanwords in Chinese

The scientific study of Chinese loanwords started relatively late. It began in the early 20th century, and gradually became actively studied in the 1950s. However, the history of Chinese loanwords is so long that people cannot know the precise beginnings of foreign language vocabulary borrowing, because words have been borrowed, in fact, since China experienced contact with other countries. According to Shi (2000), based on Guo's (1958) historical research, the 12 names of star signs such as Sheti 摄提 and Dan'e 单阏, which were already found in Qu Yuan's 屈原 (B.C.340 - 278) Li Sao 离骚 (Departing in Sorrow), are related to the names of 12 western star signs, which were created in Babylon. Those names are clearly not only disparate, but also difficult to understand in the monosyllabic language in Ancient China. Cen (1961) also ascertains loanwords borrowed from Ancient Tujue 突厥 in *Chu Ci* 楚辞 (Songs of Chu). Even though many researchers do not agree with Cen's opinions, it is certain that the phrases or words do have something different from Ancient Chinese language, and they cannot be understood with the language system in the period of Shang and Zhou dynasties 商周时代 (B.C. 1600 – B.C. 221). Therefore, with those disparate words found in ancient documents, we can assume that the history of Chinese loanword has been long.

Various loanwords are still currently flooding into China, and especially loanwords originating from English are actively imported from every field. Thus, it is time for more research on Chinese loanwords, since loanwords are commonly used in

¹ The main contents of Chapter I and II were published by Kim (2011).

daily life as well as for technical terms. This study is about Chinese loanwords which originated from English. Chapter I provides the background of Chinese loanwords. Therefore, the history and the terminology of Chinese loanwords will be generally discussed. In addition, the influence of loanwords on Chinese language and the previous studies are also treated.

1.1.1 Language contact and lexical borrowing into China²

In the history of the Chinese language, large-scale borrowing happened both between the 2nd century B.C. and the 13th century due to the translation of Buddhist scriptures and in the 16th century when the Western missionaries came to China (Lin 2007). However, borrowing has occurred throughout Chinese history as a result of political, economic, and cultural contact with foreign countries. Based on the periodical borrowing of foreign vocabulary, the history of Chinese loanwords will be discussed in 1.1.1.

In the Han 汉 dynasty (B.C.206 – A.D.220), borrowing can be divided into two groups. First is a set of vocabulary from the Huns (Xiongnu 匈奴). It was adopted through repetitive war and peaceful interactions with the Huns. Many of the words are the titles of thrones and bureaucrats, with a few common nouns included. For example, there are ‘Chanyu 单于,’ ‘Yanzhi 阏氏,’ and ‘*luò-tuo* 骆驼 (camel).’³ Second is a set of vocabulary from central Asia which was called *xī-yù* 西域. Beginning from when

2 This section is based on Masini (1993), Chen (1999), Shi (2000, 2004), Miao (2005), Yang (2007), and Yu (2010).

3 Mandarin has 4 tones, and thus the symbols of ˉ, ˊ, ˇ, and ˋ refer to the four Mandarin tones. For example, *ā* is the first tone of Mandarin *a*, *á* is the second tone, *ǎ* is the third tone, and *à* is the fourth tone. The system of Mandarin tones will be discussed in 3.1.5.

Zhang Qian 张骞 (B.C.164 - 114) was sent to the *xī-yù* as an ambassador, there was a close contact between the Chinese language and the language of *xī-yù*. As the Silk Road was opened, the interaction between China and ancient tribes increased. As a result, the Silk Road played a pivotal role in introducing new concepts to China. For example, there are ‘*shī-zi* 狮子 (lion),’ ‘*mù-xu* 苜蓿 (medicago),’ ‘*pú-táo* 葡萄 (grape),’ and ‘*shí-liú* 石榴 (pomegranate).’ In addition, ‘Xiongnu 匈奴’ and ‘Hu 胡’ which were the names of ancient tribes were widely used, and thus they developed into a prefix which indicates things adopted from foreign cultures in the northern or western border of China. For example, ‘*hú-luó-bo* 胡萝卜 (carrot),’ ‘*hú-qín* 胡琴 (huqin),’ and ‘*hú-gua* 胡瓜 (cucumber).’

In the period from the East Han 东汉 (A.D.22 - 220) through the Tang 唐 dynasty (A.D.618-901),⁴ there were also two groups of lexical borrowing. Buddhism played a significant role in the borrowings of this period. With the introduction of Buddhism in the late East Han dynasty many words had to be borrowed in order to facilitate the translation of Buddhist terms into Chinese. Buddhism was introduced through the Silk Road from ancient India in the late East Han dynasty (Shi 2000) and it was well-received by the ruling class in the Northern and Southern dynasties. In the Sui and Tang dynasties, Buddhism flourished and the translation of Buddhist scriptures gained prominence. Most Buddhist scriptures were written in Sanskrit, and many borrowings came from Sanskrit. For example, ‘*ní-lí* 泥犁 (hell)’ is used only in the scripture, but ‘*chà-nà* 刹那 (an instant in time)’ become used in daily life through the change of meaning (Zhou and You 2006). ‘*Fó-tuó* 佛陀 (Buddha),’ ‘*Mí-lè-fó* 弥勒佛 (Maitreya),’ ‘*bī-qiū-ní* 比丘尼 (a female Buddhist monastic),’ and

4 There were the Northern and Southern dynasties (A.D. 420 - 589) and the Sui dynasty (A.D.581 - 618) between the East Han and the Tang dynasty.

‘*shā-mén* 沙门 (shaman)’ are also adopted from Buddhism. In addition to Buddhist terms, many other words were borrowed through the Silk Road. They were usually terms related to material culture and social system of ancient countries (Miao 2005). Compared with earlier times, the number of borrowings increased and the subjects referred to in the borrowings became more diverse. For example, ‘*mò-yào* 没药 (myrrh),’ ‘*pí-pá* 琵琶 (lute),’ ‘*dá-là-gǔ* 答腊鼓 (West Asian cylindrical drum)’ were borrowed from Persian; ‘*bì-lì* 篳篥 (oboes),’ ‘*Yì-dū-hù* 亦都护 (a official designation),’ ‘*Kè-hán* 可汗 (Khan)’ were imported from Turkish; ‘*píng-guǒ* 苹果 (apple)’ was originally ‘*pín-pó-luó* 频婆罗 (a quantifier),’ which is a loanword adopted from Sanskrit (Shi 2000).

In the Yuan 元 dynasty (A.D.1271 - 1368), many astronomical instruments and weapons were introduced in China.⁵ Therefore, words like ‘*zán-tū-shuò-bā-tái* 咱秃朔八台,’ which means orientation instrument were widely imported. Also, Islam started to gain prominence in China during this period. In fact, Islam already had contact with China in the Tang dynasty (A.D.651), and it took a major step forward in the Song 宋 dynasty (A.D.960 - 1279), but it was in the Yuan dynasty that Islam truly exercised its influence in China. Thus, words such as ‘*mù-sù-(lǚ)-mán* 木速(鲁)蛮’ which means ‘a Muslim’ and originated from Arabic, and ‘*dá-shī-mán* 答失蛮/ *dá-sù-mán* 答速蛮/ *dà-shí-mǎ* 大石马/ *dà-shí-mì* 大实密,’ which mean ‘a Muslim missionary or scholar’ and originated from Persian, were translated in large amount.

There are two remarkable things in the period of Ming 明 dynasty (A.D.1358 - 1644) and Qing 清 dynasty (A.D.1616 -1911). One is that the western missionaries came to China, and the other is that Christian texts were translated and western learning

5 The discussion about the loanwords in the Yuan dynasty is only found in Shi (2000: 57 - 60).

adopted. Christianity was already introduced in the Tang dynasty (A.D. 635), but it disappeared, since Buddhism became the state religion in the later Tang dynasty. The real missionary work started in the 1580s, during the later Ming dynasty (Masini 1993). The missionaries' effort to spread the Christian faith naturally resulted in the translation of Christian texts. The missionaries came from many countries in Europe. For example, Matteo Ricci (A.D.1552 - 1610) the famous Italian missionary, played an important role in introducing the scientific technology of the west. In addition, various terms related to subjects such as math and astronomy were also translated in Chinese. For example, there are 'jǐ-hé 几何 (geometry),' and 'dì-qíú 地球 (Earth)' (Chen 1999). Especially, after the Opium War (A.D.1840 - 1842), China moved into a new epoch, and Chinese language had already approached the modern and contemporary stage. As the Qing dynasty, a feudal empire, started collapsing, foreign powers were rapidly transforming China into a modern society. As a result, there was a great change in the history of Chinese language. The Chinese vocabulary, usage of Chinese grammar, and increase of loanwords in Chinese at that time reveal a cross section of the change (Shi 2000). The defeat in the Opium War drove China toward the invasion of western powers, and simultaneously provided the chance to widely accept the western learning, since Chinese intellectuals realized that they had to adopt the western learning actively, in order to reform China (Chen 1999, Yu 2010). Consequently, the western masterpieces in the various fields started being translated in the middle of 19th century, and many words borrowed from foreign languages appeared. Some examples include 'ā-piàn 阿片 (opium),' 'gōng-sī 公司 (company),' 'Liáng-tiān-chǐ 量天尺 (Hylocereus),' 'luó-sī-dīng 螺丝钉 (screw),' and 'bì-jī 哔叽 (serge)' (Yang 2007).

After the Sino-Japanese war (A.D.1894 - 1895), Chinese intellectuals revered

Japan as a model for the modernization and reformation of the society (Miao 2005), and accordingly many Japanese books were imported. According to Masini (1993), 958 Japanese works were translated into Chinese between 1896 and 1911. Examples of the borrowing from Japan between the late 19th century and the early 20th century include, ‘*gàn-bù* 干部 (cadre),’ ‘*jī-jí* 积极 (active),’ ‘*xiāo-jí* 消极 (passive),’ ‘*jǐng-qì* 景气 (economic boom),’ ‘*qǔ-xiāo* 取消 (cancel),’ ‘*yǐn-dù* 引渡 (extradite),’ ‘*jǐng-chá* 警察 (police),’ ‘*cái-tuán* 财团 (financial group),’ ‘*zhǔ-guān* 主观 (subjective),’ and ‘*tè-quán* 特权 (privilege).’ In addition, in the period around the May 4th Movement (A.D.1919), the early 20th century, loanwords in many fields such as science and technology, thought, and culture were adopted through various channels. In this period, English stood out as the most influential origin of Chinese loanwords. Among the English-based Chinese loanwords used today, the older ones were usually made by the western missionaries or translators of foreign books in this period. Some examples include, ‘*lèi-dá* 雷达 (radar),’ ‘*dé-mó-kè-lā-xī* 德谟克拉西 (democracy),’ ‘*dé-lǜ-fēng* 德律风 (telephone),’ ‘*wéi-tā-mìng* 维他命 (vitamin),’ ‘*yōu-mò* 幽默 (humor),’ ‘*jiǔ-bā* 酒吧 (bar),’ ‘*yǐn-dé* 引得 (index),’ ‘*kā-fēi* 咖啡 (coffee),’ and ‘*jí-pǔ-chē* 吉普车 (jeep).’ On the other hand, most recent Chinese loanwords have been made by intellectuals or translators who are good at foreign languages, or people working in the media-related fields (Lin 2007).

In the 1950s, the middle of 20th century, many Russian vocabularies were imported into China because of the political situation, since the People’s Republic of China established in 1949, saw Russia (the Soviet Union at that time) as the first international partner or supporter in their efforts to obtain technology and industry (Miao 2005). Some examples of loanwords from Russia at that time include, ‘*Sū-wéi-āi*

苏维埃 (Soviet),’ *‘bù-ěr-shí-wéi-kè* 布尔什维克 (Bolshevik),’ *‘bù-lā-jí* 布拉吉 (clothes),’ *‘Dù-mǎ* 杜马 (a name of Russian assembly),’ *‘hù-bù* 户布 (a monetary unit),’ and *‘liè-bā* 裂粳 (bread).’ However, most of them disappeared after the close partnership between China and Russia was broken, and only a few words survived (Shi 2004). As China officially opened the economy and the interaction with foreign countries increased, many words and expressions were borrowed from various countries. Among the source languages, English occupies the dominant place. The return of Hong Kong (A.D.1997) especially facilitated many English words being adopted into Mandarin through the Yue 粤 dialect (Yu 2010). Furthermore, since the 20th century, loanwords originating from Japanese have been constantly imported into China. Usually, the loanwords from Japanese are Japanese translations of technical terms that came from Western countries. The following words are examples: *‘nèi-róng* 内容 (content),’ *‘dìng-yì* 定义 (definition),’ *‘mù-dì* 目的 (objective),’ *‘làng-màn-zhǔ-yì* 浪漫主义 (romanticism),’ and *‘nèi-zài* 内在 (intrinsic),’ which are rhetorical terms, and *‘guān-jíe-yán* 关节炎 (arthritis),’ *‘jiǎ-sǐ* 假死 (suspended animation),’ *‘jié-jíe* 结节 (a node),’ *‘kàng-tǐ* 抗体 (antibody),’ *‘tīng-lì* 听力 (hearing),’ *‘yíng-yǎng* 营养 (nutrition),’ and *‘xuè-yā* 血压 (blood pressure),’ which are medical jargon (Shi 2000). Among the loanwords, some disappeared but most of them are still used in daily life (Yang 2007). In addition, the development of the Internet and the expansion of foreign language education accelerate the lexical borrowing. As a result, the percentage of loanwords in the Chinese vocabulary currently continues to increase.

1.1.2 Terminology of loanwords in Chinese

There are many names for loanwords in Chinese: ‘*wài-lái-cí* 外来词 (a word from foreign language),’ ‘*jiè-cí* 借词 (loanwords),’ ‘*wài-lái-yǔ* 外来语 (a language from foreign language),’ ‘*yì-yǔ* 译语 (a translated language),’ ‘*yì-cí* 译词 (a translated word),’ and ‘*jiè-zì* 借字 (a borrowed character)’.⁶ Also, researchers define Chinese loanword in various ways, since they each present a different scope of Chinese loanwords, based on the various definitions. According to the definition of *Ci Hai* 辞海 (Sea of words) (1989), *wài-lái-cí* is called *jiè-cí* or *wài-lái-yǔ*, which indicates a word or a phrase adopted from other languages. In this definition, a word and a phrase are not distinguished; it is reasonable, since the distinction between a word and a phrase is very difficult in Chinese (Yang 2007). On the other hand, Gao and Liu (1958) define *wài-lái-cí* and *jiè-cí* separately. They argue that *wài-lái-cí* is a native word that originates from foreign languages, but *jiè-cí* is a foreign language which was borrowed from other languages (Gao and Liu 1958: 13).

In fact, it is hard to find historically when the term of *wài-lái-cí* or *wài-lái-yǔ* started being used. We just know that *wài-lái-cí* was formally used in *Xiandai Hanyu wailaici yanjiu* 现代汉语外来词研究 (A study of Modern Chinese loanwords) (1958) due to the reason that *wài-lái-yǔ* is improper, compared to other lexicological terms which end in ‘-*ci* 词’ (Shi 2000, Yu 2010). Currently, *wài-lái-cí* is most often used for Chinese loanwords, and the name, the meaning, and the concept itself are all adopted from foreign languages (Shi 2000).

⁶ Before the Han dynasty, ‘*yì-yǔ* 译语 (a translated language),’ ‘*yì-míng* 译名 (a translated name),’ ‘*yì-cí* 译词 (a translated word)’ or ‘*wài-lái-yǔ* 外来语 (a language from a foreign language)’ are all used to express loanwords (Shi 2000: 8-12).

In addition, ‘*jiè-rù-yǔ* 借入语 (a language entered by borrowing),’ ‘*jiè-yòng-yǔ* 借用语 (a word used through borrowing),’ ‘*jiè-zì* 借字 (borrowed characters),’ ‘*jiè-cí* 借词 (a borrowed word),’ ‘*jiè-yǔ* 借语 (a borrowed language),’ and ‘*wài-lái-jiè-cí/jiè-yǔ* 外来借词/借语 (a word/language borrowed from a foreign country)’ are also used for the formal terms of Chinese loanwords, and they show corresponding meaning to English ‘loanword.’ In fact, it is not very important which term is used for Chinese loanwords. Instead, what is significant is that Chinese loanwords became a major topic in Chinese linguistics, since they have been used for a long time and have taken root in the Chinese vocabulary, even though they originated from foreign languages.

1.1.3 Influence of loanword on Chinese language

The percentage of loanwords in the English vocabulary is much higher than the native English words.⁷ Compared to English, the percentage of loanwords in Chinese is relatively low. However, the history of Chinese language is the history of contact and integration with East Asian countries, and the history of development of the Chinese

⁷ Based on the analyses of Ronald G. Kent (1877 - 1952) in *Language and Philology* (1923) and the analyses of Paul Roberts (1917 - 1967) in *Understanding English* (1958), the following table shows the composition of English vocabulary depending on the source.

Source	The statistics of Kent	The statistics of Roberts
Native	19%	14%
Latin	15%	36%
French	36%	21%
Greek	13%	4.5%
Northern Europe	7%	2%
Italian and Spanish	1%	3%
Others	9%	19.5%

language is the history of assimilation and dissimilation of the Chinese language. Also, the history of Chinese dialects is the history of change and integration through the intervention of Mandarin Chinese and the Chinesization (*Hàn-yǔ-huà* 汉语化) of the languages of neighboring races. In a word, foreign languages have significantly affected the forming of Modern Chinese vocabulary (Li 2003).

The number of Chinese loanwords listed in the *Hanyu wailaiyu cidian* 汉语外来语词典 (The dictionary of Chinese loanwords) (1999) reaches 4370, and over 10000 loanwords are found in the *Hanyu wailaici cidian* 汉语外来词词典 [The dictionary of Chinese loanwords] (1984) (Yu 2010). According to Liu (1979), there are 60-70 source languages of Chinese loanwords, and the number is around 20,000. Among the sources, loanwords borrowed from English have rapidly increased, and thus the loanwords can be easily found anywhere such newspapers, magazines, or web sites. In other words, many of Chinese loanwords originating from English have already become everyday words. Comparing the 5th edition of *Xiandai Hanyu cidian* 现代汉语词典 (Modern Chinese dictionary) (2005) and the 2nd edition (1983), the section for the Western alphabetic words which mostly come from English was added in the 5th edition. It shows the change of usage of alphabetic words in the Chinese vocabulary during the last 20-30 years.⁸

The great amount of Chinese loanwords leads to a question about the effect of these words on the Chinese language. First, loanwords enrich the Chinese vocabulary mainly through the production of new words and morphemes. According to Masini (1993), “Modern Chinese lexicon is not simply the fruit of the linguistic experiments

⁸ Also, the generalization of loanwords in Chinese vocabulary can be found. For example, ‘*bā* 巴’ lists four meanings in the 5th edition, including the case that it was used as a phonetic loan such *bāshì* 巴士 (bus), but this usage of *bā* is not found in the 2nd edition.

that took place in the context of the literary movement of the early 20th century but in fact developed thanks both to its traditional base and to the contribution of lexical invention of the 19th century” (Masini 1993: Preface). Also, Wang (1980) says that “there are two characteristics in the production of Modern Chinese new words: One is to use semantic loans, and the other is to use Japanese translation” (Wang 1980: 525). Thus, Wang (1980) concludes that the production of Chinese new vocabulary resulted from adopting loanwords. In fact, until the middle of 19th century, China had been politically and culturally superior to neighboring countries, and Chinese was a main source exporting vocabulary. Especially, the Chinese characters were adopted by many other languages such as Japanese, Korean, or Vietnamese (Norman 1988: 16-22). However, in the course of collapse of the Qing dynasty, which was a feudal state, and the approach into the modernization of China, the invasion of western powers was a national disgrace but simultaneously was a turning point that Chinese language made a great development in the history of Chinese language. In addition, the increase of new morphemes also played an important role in enriching the Chinese lexicon. There are two ways of forming new words in Modern Chinese: compounding and abbreviating. New Chinese words are created by associating more than two morphemes and abbreviating phrases. Since there are only 430 basic Mandarin Chinese basic syllables, and only 1370 syllables created when they are combined with the four Mandarin tones, many homophones are made (Yang 2007). Therefore, it is very hard to create new morphemes by using the existing syllables. However, through phonetic loans, many new Chinese morphemes appeared. For example, ‘*bā* 吧 (bar),’ ‘*xiù* 秀 (show),’ ‘*kù* 酷 (cool),’ ‘*bàng* 磅 (pound),’ ‘*kǎ* 卡 (car, card),’ are all monosyllabic morphemes, and ‘*shā-fā* 沙发 (sofa),’ ‘*jí-pǔ* 吉普 (jeep),’ ‘*kā-fēi* 咖啡 (coffee),’ ‘*dí-shì* 的士 (taxi),’

‘*qiǎo-kè-lì* 巧克力 (chocolate),’ ‘*dí-sī-kē* 迪斯科 (disco),’ ‘*Ào-lín-pǐ-kè* 奥林匹克 (Olympic),’ ‘*ā-sī-pǐ-lín* 阿司匹林 (aspirin),’ ‘*kǎ-bù-qí-nuò* 卡布奇诺 (cappuccino),’ are all polysyllabic morphemes. In addition to phonetic loans, semantic loans also increase new morphemes. For instance, the ‘gate’ in ‘Water gate’ created ‘*mén* 门 (gate),’ the new Chinese morpheme, and it is used like ‘*qíng-bào-mén* 情报门 (information gate)’ or ‘*yī-lǎng-mén* 伊朗门 (Irangate).’ However, there are fewer morphemes which are created by semantic loans than by phonetic loans (Yang 2007: 10-12). In sum, either phonetic loans or semantic loans play a role in enriching the Chinese lexicon by creating new Chinese morphemes.

Second, Chinese loanwords affects the variety of Chinese syllables and phrases. This is also one of the direct influences of new vocabulary and morphemes. Traditionally, Chinese is called a monosyllabic language in nature (Masini 1997), but western languages, which are usually source languages, are mostly polysyllabic languages. This difference directly influences the number of the syllables in Chinese phonetic loans. In fact, Mandarin Chinese has simple structure of syllables, and only /n/ and /ŋ/ can be a coda except /ə/, the rhotacized ending. Also, a single syllable corresponds to a single morpheme in principle (Lin 2007). Mandarin Chinese does not allow consonant clusters either in onset or in coda. Due to the simplicity of Mandarin Chinese syllable structures, Mandarin Chinese experiences polysyllablization when it adopts foreign words which are composed of complex syllables. That is, the increase of polysyllabic words in Mandarin Chinese is one of the major effects of Chinese loanwords.⁹ This situation usually happens in the borrowing of proper nouns

9 According to Masini (1993: 122), “loans from western languages further encouraged this move toward polysyllabism,” and Wang (1980: 343) also says that Chinese gradually moves into polysyllablization, since the simple structure of Chinese syllables cannot borrow foreign words. He also thinks that this is

such as place names or people's names, but also can be found in common nouns, e.g., 'Tāng-mǔ 汤姆 (Tom),' 'Xī-ěr-sī 西尔斯 (Sears),' 'kè-lóng 克隆 (clone),' and 'jī-yīn 基因 (gene).' In addition, loanwords made new Chinese phrases. This situation usually resulted from semantic loans. For example, in order to express '-ize(-se),' the new English morpheme, new structure of Chinese phrase, which uses 'huà 化,' the Chinese morpheme, appeared such as 'xiàn-dài-huà 现代化 (modernization),' 'wén-fǎ-huà 文法化 (grammaticalization),' and 'xì-jù-huà 戏剧化 (theatricalization),' which did not exist in the native Chinese lexicon. In fact, this method is very effective to produce new words (Xu 1992). This kind of new structure of Chinese phrases, which is created in the process of semantic loans, is different from not only the internal structure of Chinese compounds or phrases, but also the structure of meaning that the native Chinese words express (Yang 2007). Some examples are 'fǎn- 反- (anti-),' 'chāo- 超- (super-),' and 'kě- 可- (-able/ible),' which are used in the semantic loans such 'fǎn-wù-zhì 反物质 (antimatter),' 'chāo-gāo-sù 超高速 (ultra high speed),' and 'kě-kàng-biàn 可抗辩 (pleadable).' These morphemes have their own meanings, and thus can make various Chinese phrase structures.

Third, loanwords provide a chance for Chinese characters to be used as phonetic symbols. As a result, many words, which use different Chinese characters but indicate the same meanings, are created. For instance, AIDS is adapted as 'ài-zī-bìng 艾滋病,' 'ài-zī-bìng 爱滋病,' and 'ài-zhī-bìng 爱之病.' In addition, there are many phonetic loans and the native Chinese words which indicate the same meaning. Examples of this include 'bā-shì 巴士' and 'gōng-gòng-qì-chē 公共汽车' for English bus, and 'dì-shì 的士' and 'chū-zū-qì-chē 出租汽车' for English taxi. Furthermore, one

one of the internal rules in the development of Chinese language.

identical morpheme, which is created by phonetic loans, expresses several different meanings. For instance, the ‘*kǎ* 卡’ in ‘*kǎ-chē* 卡车,’ ‘*kǎ-piàn* 卡片,’ ‘*kǎ-lù-lǐ* 卡路里,’ and ‘*kǎ-shì-lù-yīn-jī* 卡式录音机,’ indicates English ‘car,’ ‘card,’ ‘calorie,’ and ‘cassette’ respectively (Yang 2007: 17).

In this section, I discussed the influence of loanwords on Chinese language. Even though three points are presented, they are all summarized into the most important thing that loanwords play a pivotal role in enriching the Chinese lexicon.

1.1.4 Previous studies of loanwords in Chinese

It is true that there has been important development in the field of Chinese loanwords. However, most studies focus on the cultural or social function of Chinese loanwords. Gao and Liu’s study (1958) is the first comprehensive and systematic study of research on the Chinese loanwords, since it includes the history and application of Chinese loanwords, and also treats the problem of standardization. However, it only briefly mentions the linguistic analyses such as the patterns of phonemic replacement and the adaptation of codas in foreign languages. In fact, since Gao and Liu’s (1958) study, only a few studies have tried to make a comprehensive linguistic analysis of Chinese loanwords. Among these studies, there are quite a lot of etymological studies (Yu 2010), while only a few treat the nature of Chinese loanwords. Therefore, compared to the studies in which loanwords in other languages are analyzed, the study of internal structures or phonological forms in Chinese loanwords has been relatively insufficient. As a result, the study of Chinese loanwords still needs the further investigation of Chinese loanword phonology. In this section, some important previous studies of

Mandarin loanwords will be introduced.

First, the phonological/phonetic analyses of Chinese loanwords are introduced. The reason why there are only a few phonological or phonetic analyses of Chinese loanwords is that there is a big difference between the source languages, which are usually alphabetic languages, and Chinese which uses ideographs. Also, the sources, including English as a major source, are generally polysyllabic languages, while Chinese is basically a monosyllabic language. Thus, it is difficult to compare the two languages. In fact, the study of loanwords in the Chinese dialects is nonexistent, other than studies on Cantonese varieties in Hong Kong, which have been constantly studied in recent decades, since Cantonese in Hong Kong has a close relationship with English. Silverman (1992) and Yip (1993, 2006) try to explain the loanword phonology with Cantonese loanwords borrowed from English, and these works are influential in the field of loanword phonology. Also, Chan and Kwok (1990) include the linguistic analyses of Cantonese loanwords such as phonology, syntax, and orthography in the discussion. Recently, as English words adopted into Mandarin Chinese increase, based on the awareness of lack of the study on Mandarin loanwords, some noticeable research has appeared. Shih (2004) tries to analyze English-based Mandarin loanwords with an approach which treats an input as a phonetic signal. In addition, Miao's (2005) analysis is based on the perceptual similarity between source languages and Mandarin loanwords. She uses an enormous amount of data which is mostly collected from the Internet, and the data has a lot of new proper nouns such people's, companies' or brand names, but does not include rather true Mandarin loanwords like *shā-fā* (sofa) which has been used in Chinese daily life for a long time. On the other hand, Yu's (2010) data is composed of relatively old Mandarin loanwords, since she wants to supplement the shortcomings of

Miao's data. However, Yu's data is rather small in quantity, which limits the credibility of her analysis. Nevertheless, it is meaningful that Yu's (2010) analysis of Mandarin loanwords includes not only the adaptation of English consonants but also the adaptation of English vowels and tones in Mandarin loanwords. Besides, there are a few much smaller but interesting studies. Hsie, Kenstowicz and Mou (2006) present an interesting result that [\pm back] of English vowels affects the adaptation of English nasal coda in Mandarin loanwords. Moreover, Lin (2008) tries to find some rules in the adaptation of English vowels in Mandarin loanwords. Plus, Wu (2006) discusses the relationship between English stress and Mandarin tones in the adaptation of Mandarin loanwords. Yang (2007) and Cao (2004) also try a comprehensive research of Chinese loanwords, but they did not make a phonological analysis.

Next, socio-cultural analyses of Chinese loanwords are briefly mentioned. These studies consider loanwords as the result of cultural contact with foreign countries and the method or path to import foreign culture. Zhang (1930; 1977; 2003) can be called the founder in this area. He includes all the materials possible at that time, and also lists historical and modern research for evidence. Luo (1989) divides loanwords into three types and discusses the interaction among countries, the movement of races, and the origin and religion. Cheng (1985) compares the adaptation of loanwords between in Mainland China and in Taiwan, and discusses the effects of sociopolitical and cultural factors. Shi (2000, 2004) argues that a language is a special culture, and discusses the cultural interaction, based on the influence of loanwords on the Chinese lexicon.¹⁰

In fact, etymological analysis is not only the most basic research but also the

10 Shi (2000: 209-212) introduces an accomplishment of the socio-cultural analyses in detail.

most difficult, since other linguistic studies start from the basis of etymological study. The real etymological analyses of Chinese loanwords began in the early 20th century. Since then, most studies by Chinese researchers have been based on the historical research by western or Japanese researchers until the participation of Chinese researchers started increasing in the middle of 20th century (Shi 2000). The most important study in this field is Masini (1993), which discuss the development of Chinese lexicon during 1840-1898. He extensively investigates the origin of Chinese loanwords borrowed from English and Japanese. Shen (1994) also did an in-depth study of Chinese loanwords borrowed from Japanese. Kuiper (1993) discusses Dutch which came to China through Japan.

As for the types of Chinese loanwords, many studies of Chinese loanwords have a section for the discussion of types of Chinese loanwords. Luo (1950), Sun (1956), Gao and Liu (1958), Shi (2000), Miao (2005), and Yang (2007) treat the types in relative detail. However, researchers suggest different types for Chinese loanwords and their standards to classify are also various. Lü (1942) simply divides Chinese loanwords into two types, while Wang (1958a) classifies them into nine types.

Lastly, the compilation of a dictionary is hard and comprehensive work, which takes a long time to complete, in that it requires thorough historical research.¹¹ The first common dictionary of Chinese loanwords is *Wailaiyu cidian* 外来语词典 (Loanword dictionary) by Hu (1936). Because it was the first such dictionary, it has great significance, even though its influence was not that strong.¹² In addition, there are two more important dictionaries: *Guoyuribao wailaiyu cidian* 国语日报外来语词典

11 The discussion of dictionaries of Chinese loanwords is referred to Shi (2000: 215-218), Yang (2007: preface), and Yu (2010: 6).

12 Shi (2000: 216) says that the origins and the forms of origins in this dictionary are not reliable, while Yang (2007: preface p.3) thinks that it can be a reference even though it has several problems.

(Chinese Daily News dictionary for loanwords) by Zhang and Liu (1981) and *Hanyu wailaici cidian* 汉语外来词词典 (A dictionary of Chinese loanword) by Liu et al. (1984). The former one marks the sounds of words by using *zhùyīn fúhào* 注音符号 (a phonetic notation for Chinese), the phonetic symbols, and simply lists the origins of words. However, it does not include the Japanese graphic loans. The latter one is the most widely used today, and it has the Japanese graphic loans even though they are not many. Besides these, there are also *Wailaici cidian* 外来词词典 (loanword dictionary) by Chen (1986) and *Hanyu wailaici cidian* 汉语外来词词典 (A dictionary of Chinese loanwords) by Cen (1990). However, as seen above, there is a gap in compilation of Chinese loanword dictionary. As loanwords in Chinese have rapidly increased, an up-to-date dictionary of Chinese loanwords is urgently needed.

1.2 Organization of the dissertation

This dissertation is about loanwords in Mandarin Chinese. It consists of six chapters. The first chapter is the introduction, and the last chapter is the conclusion. Therefore, the major part of the dissertation is composed of four chapters. As discussed above, in Chapter I, the language contact and lexical borrowing into China, the terminology of Chinese loanwords, the influence of loanwords on the Chinese language, and the literature review of loanwords in Chinese were discussed. This chapter provides a background for Chinese loanwords.

Chapter II is about lexical stratification of loanwords in Mandarin Chinese. First, the ‘core-periphery structure’ (Itô & Mester 1995, 1999, 2000) is introduced as a theoretical framework. Next, in order to clarify the scope of loanwords in Mandarin

Chinese, the ‘core-periphery structure’ is applied to Mandarin loanwords. The discussion focuses on three main issues: the semantic loans, the Japanese graphic loans, and the alphabetic loans. Based on the application of ‘core-periphery structure,’ the types of loanwords in Mandarin Chinese will be discussed.

Before the major analysis of Mandarin loanwords adaptation in Chapter IV, Chapter III provides a background for the analysis. English phonology and Mandarin phonology are compared in Chapter III. First, Mandarin phonology such as the system of Mandarin consonants and vowels, syllable structures, the phonotactic constraints, and the tones is discussed. Also, as a source language, English phonology is briefly introduced. Lastly, Mandarin phonology and English phonology are compared and contrasted.

Based on the discussion in Chapter III, Chapter IV is a full-scale analysis of Mandarin loanwords. Focusing on the main targets listed, the analysis is mainly composed of two parts: One is a discussion of the faithful mapping between two languages, and the other is a discussion of the treatment of Mandarin phonotactics. Even though the analysis only focuses on the adaptation of English consonants in Mandarin loanwords, the analysis can provide a reliable result for the patterns of phonemic replacement between Mandarin Chinese and English, since a large amount of data, a total of 1218 Mandarin loanwords is used. The data was collected from dictionaries, previous studies, and current websites in Chinese.

Chapter V is about the important factors affecting Mandarin loanwords adaptation. Since the main factors are phonological and phonetic elements, I will briefly introduce the loanword phonology and three major approaches in this field, which treat the effects of phonology and phonetic factors in loanword adaptation. Recently, many

studies have tried to supplement the weaknesses by integrating the perception approach and the phonological approach. According to the phonetics-phonology approach, inputs in the adaptation process are based on how borrowers perceive the acoustic signals of the source language. Plus, the inputs based on perception are modified or adapted by the phonology of the borrowing language. In the case of Chinese loanwords, the adaptation is strongly controlled by the native phonology, since orthographically, Chinese cannot construct arbitrary syllables. Even though various inputs are similarly perceived in a source language, they cannot form various syllables in the process of mapping into Chinese and must change to conform to the native phonology. For a more in-depth discussion of loanword adaptation, I discuss the nature of inputs and the role of phonology in loanword adaptation with the examples of English-based loanwords in Mandarin. Furthermore, I argue that both the perception and phonology of the borrowing language and even the source language should be considered in loanword adaptation. In addition, other factors are discussed such as the effect of the semantic function, the orthography of the source language, the influence of dialects, and the degree of bilingualism. Finally, I propose a model of the loanword adaptation process, based on the discussion of Mandarin loanwords adaptation. Lastly, the conclusion and summary for this dissertation is made in Chapter VI.

1.3 Research goals

Through the discussion in the four major chapters, the goals of this dissertation are as follows: First, it provides a background of Chinese loanwords and a standard for the scope of Chinese loanwords. Second, it can contribute to the comparative or

contrastive study between Mandarin phonology and English phonology. Third, through the analyses of the adaptation patterns between Mandarin Chinese and English, the result can join in the discussions of the field of loanword phonology. Fourth, it supports the phonetics-phonology approach for loanword adaptation by showing the data of Mandarin loanwords. Fifth, other than the linguistic factors such as phonology and phonetics, it provides a consideration of other important factors such as orthography, bilingualism, or dialects. Moreover, through a discussion about many factors, it proposes a model of the loanword adaptation process. Finally, this dissertation can contribute to loanword phonology in both the areas of Chinese linguistics and general linguistics, in that it plays an important role in providing a good tool to understand loanword adaptation.

Chapter II. Lexical stratification and types of Chinese loanwords

As discussed in 1.1.2, foreign linguistic elements have been used in the Chinese language for quite a long time.¹³ However, the degree of foreignness varies depending on the method of entering into Chinese language. Therefore, words which were adopted earlier do not always show low degree of foreignness. Regardless of the period of influx, the foreignness of pure phonetic loan is never debated in Chinese loanwords, because native Chinese speakers can clearly feel the foreignness of the pure phonetic loans, compared to the native vocabulary.

In fact, it is generally thought that Chinese language resists to the adoption of foreign languages (Norman 1988: 16-22). Wang (1980: 696) says that “the superiority of semantic loans in the Chinese translation of Buddhist scriptures demonstrates non-penetrability of Chinese language.” Even in the period after the Opium War (1840-1842), in which the loanwords coming from western countries rapidly increased, there was an effort to decrease as much as possible the degree of foreignness of loanwords (Wang 1980). As a result, this tendency led Chinese people to prefer semantic loans. According to Norman (1988) and Masini (1993), the phonetic loans reveal the middle stage of loanwords, which means that they gradually disappear once the corresponding semantic loans are created.¹⁴ In addition, Miao (2005) argues that the preference of Chinese people for the semantic loans needs to be understood not only linguistically but also socio-culturally. In terms of linguistics, Chinese people are not used to consonant

13 Chinese language basically refers to Mandarin Chinese in this dissertation, since Mandarin Chinese is spoken by over 70% of Chinese people (Chin 2008:7). However, I will specifically mention Mandarin Chinese in Chapter III, IV, and V, in order to distinguish Mandarin Chinese from other dialects.

14 Masini (1993: 135-145) supports his claim by showing various data.

clusters in the Indo-European languages, since native Chinese syllables do not allow consonant clusters and a Chinese syllable stands for a morpheme.¹⁵ Also, Chinese loanwords show many variations. That is, a word can be adapted into Chinese in various forms. This phenomenon is usually seen in the beginning stage of loanwords. According to Chen (1999: 104), it was very common for a western concept to be expressed by two or three different Chinese words in the 1920s and the 1930s, since the concept was introduced to Chinese in various ways.¹⁶ Among the variations, it is hard to predict which one will survive or disappear. However, it can be said that the semantic loans, in general, survive. The reason is that the semantic loans can conform to the native Chinese language better than other types of loans. Thus, some researchers question whether semantic loans should be treated as loanwords. The debate occurs because the semantic loans in Chinese vocabulary do not seem to be foreign. A similar debate surrounds Japanese loanwords.¹⁷ Some researchers argue that the Japanese graphic loans cannot be considered as loanwords. On the other hand, the debates on the alphabetic loans have gained interest recently, since they are very different from the native Chinese language. The major topic of this chapter is how to recognize the existence of the loanwords in Chinese vocabulary. In this treatment of the topic, the scope of the Chinese loanwords will be discussed, and answers to the problems with semantic loans, Japanese graphic loans, and alphabetic loans will be suggested. First, Itô

15 Also, this claim can be found in Norman (1988), Masini (1993), and Chen (1999).

16 Based on the Miao's (2005) data, 11.72% of English-based Chinese loanwords (138 out of 1177) have diverse forms of the loanwords. Examples are as follows: English Internet → Mandarin *hù-lián-wǎng* 互联网, *yīn-tè-wǎng* 因特网, *yīng-tè-wǎng* 英特网, English e-mail → Mandarin *yī-méi-ěr* 伊梅尔, *diàn-zǐ-yóu-jiàn* 电子邮件, English Gap → Mandarin *jí-pǔ* 吉普, *jiā-pǔ* 嘉普, English Corning → Mandarin *kāng-níng* 康宁, *kē-níng* 柯宁. The examples come from Miao (2005: 37).

17 The vocabulary whose origin is Japanese and of which the Japanese character is directly adopted is called "Japanese graphic loans (Masini 1993)."

and Mester's (1995a, 1995b, 1999, 2001) core-periphery structure will be introduced as a theoretical framework in the discussion of this chapter. Even though Itô and Mester only consider the Japanese lexicon, the core-periphery structure can be applied to the discussion of the scope of Chinese loanwords.

2.1 Core-periphery structure

Itô and Mester (1995, 1999, 2001) prove that the phonological constraints which are obeyed in the native words behave differently in the loanwords, which means that the ranking of the constraints are different between the native words and the loanwords. They argue that this phenomenon shows the hidden ranking of the marked constraints in the native words are exposed through the loanwords.¹⁸ They explain the relation of the words in each stratum by applying the core-periphery structure.¹⁹ The elements belonging to the core satisfy all the lexical constraints, but the farther the elements are from the core, the more they violate the constraints. Thus, the elements belonging to the periphery only satisfy a subset of constraints. Itô and Mester (1995a: 182) suggest the following figure for the core-periphery structure.

18 Itô and Mester use the concepts of Optimality Theory (OT), which is that all the grammatical constraints are ranked according to the preference; the constraints can be violated in principle, but the violation must be minimized for the winning output. Itô and Mester (1995a: 183) say that their discussion is tries to show that their argument becomes very strengthened in OT.

19 According to Itô and Mester, all the languages show a variety of evidence for the internal strata in the lexicon. Each stratum can be named as native vocabulary, assimilated loans, or foreign vocabulary, or named according to the origin such as Sanskrit, Latinate and Sino-Korean.

Figure 1. Core-periphery organization

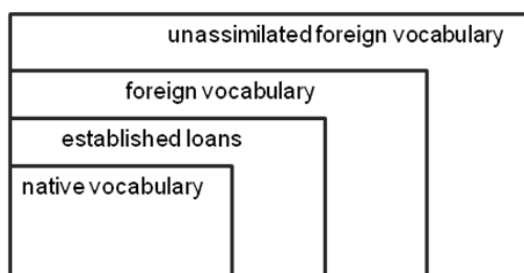


Figure 2. Partitioning of the lexicon into distinct sublexica



The Figure 1 shows well the situation of lexical distribution depending on the nativization. Any constraint which is obeyed in unassimilated foreign vocabulary must be obeyed in native vocabulary which is placed in the core. However, not all the constraints which are obeyed in native vocabulary are followed by the unassimilated foreign vocabulary in the periphery. In fact, an earlier understanding of the structure was mentioned in Kiparsky (1968, 13b). He says that, in a hierarchy of foreignness, one rule must be included in another rule, but no vice-versa. This is the point of the Figure 1. The elements cannot be divided only by [\pm foreign], instead, nativization is shown by degrees, and the process of nativization is ongoing. If the binary distinction were possible, there should not be a debate of the semantic loans, Japanese graphic loans, or alphabetic loans in Chinese loanwords. However, the distribution of a lexicon is not simple, and thus the Figure 1 demonstrates the relation among the elements in a lexicon, namely the lexical stratification. On the other hand, the elements are simply divided by compartmentalization in the Figure 2. Therefore, neither the relation among the elements nor the status of a word in the lexical space can be recognized.

To be more specific, according to Itô and Mester's core-periphery structure, the lexical stratification of Japanese lexicon (J-Lexicon) is as follows: Generally, J-Lexicon can be divided into four groups: Yamato (native vocabulary), Sino-Japanese,

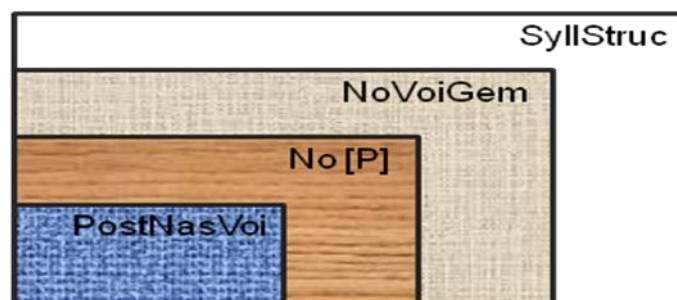
(Assimilated) Foreign, and Unassimilated Foreign. J-Lexicon has the following syllable-related constraints. ① SYLLSTRUC: basic constraints for the Japanese syllable structure such as NOCOMPLEXONSET, NOCOMPLEXCODA, or CODACOND. ② NOVOIGEM: a constraint for double voiced stops (**bb, *dd, *gg, *zz*). ③ NO-[P]: a constraint for a single [p] (*kappa/nippon, *paka/*nipon*). ④ POSTNASVOI: a stop after a nasal must be voiced (**nt, *mp, *ŋk*). Observance of the constraints depending on the four Japanese lexical groups is following (Itô and Mester 1995a: 184, 1999: 69).

Figure 3. Constraints depending on the four Japanese lexical groups

	SYLLSTRUC	NOVOIGEM	NO[P]	POSTNASVOI
Yamato	✓	✓	✓	✓
Sino-Japanese	✓	✓	✓	d.n.a.
Foreign	✓	✓	d.n.a.	d.n.a.
Unassimilated Foreign	✓	d.n.a.	d.n.a.	d.n.a.

Using the core-periphery structure, the hierarchy of the constraints can be shown as below (Itô and Mester 1995a: 185).

Figure 4. J-Lexicon



As seen in the two figures above, Yamato occurs in the core of the lexicon since it follows all the constraints, but Sino-Japanese, Foreign, and unassimilated Foreign gradually become farther and farther from the core.²⁰

In fact, it is clear that the foreign elements do not occur in a single stratum. Generally, less nativized words violate more constraints, gradually move toward the outside, and are finally placed in the periphery of the lexical space. For example, Japanese loanwords which belong to the periphery in the Japanese lexical space violate general Japanese phonological constraints. English tea is Japanese [tii]/*[ʧii], and English party is Japanese [paatii]/*[paʧii]. These Japanese loanwords violate *TI/DI, which means [t/d] cannot be placed in front of [i]. Simultaneously, there are cases that Japanese loanwords follow the *TI such as English team → Japanese [ʧiimu], English dilemma → Japanese [dʒiremma], English digital → Japanese [dedʒitaru], which are already assimilated into Japanese. The former ones (Japanese [paatii] and [tii]) are less nativized than the latter ones (Japanese [ʧiimu], [dʒiremma], and [dedʒitaru]). In other words, the former ones show greater degree of difference from the native Japanese, and thus should be located farther from the core. Therefore, loanwords which originated from English can be differently placed in the lexical space. More interestingly, some words are located at the periphery even though historically they belong to the native groups (e.g. the Japanese interjection [čeʔ]). On the other hand, some words should be placed in the core even though they were historically considered borrowed words (e.g. *Karuta* originated from Portuguese), since they follow all the constraints.²¹ In conclusion, whether or not a word is old cannot be an absolute standard for the lexical

20 Itô and Mester try the “Reranking of Faith” with the constraints for each lexical group in OT, but I will not introduce it, since the reranking is irrelevant with the discussion of this chapter.

21 The discussion was referred to Itô and Mester (1995b: 830). Further discussion about the issue can be found in Itô and Mester (1986: 54, 1997a: 427), and more examples are shown in Rice (1997: 554).

stratification.

The following section, using Itô and Mester's core-periphery structure, discusses how to recognize Chinese loanwords. I will present questions concerning semantic loans, Japanese graphic loans, and alphabetic loans and provide reasonable answers for these issues.

2.2 Three major issues of Chinese loanwords

Native Chinese vocabulary should originate in China, and be expressed by using Chinese characters. Other than this major premise there are other characteristics used to distinguish native Chinese vocabulary. A Chinese character, in principle, has its own meaning, and it is directly related to Chinese people's cognitive schema about Chinese characters. Zhao (1979: 79) says that every Chinese character seems to have a meaning even though the syllable has no meaning, since a Chinese morpheme is predominantly a monosyllable, and a morpheme must be expressed by using a Chinese character. In other words, a Chinese character is both a morpheme and a syllable at the same time. Thus, the native Chinese words in the core place of lexical space show that every character in a word has its own meaning, and the meaning should be related to the entire meaning of the word. In sum, the native Chinese vocabulary in the core is that its origin is Chinese, is expressed by Chinese characters, and the meaning of each character in a word should be connected to the meaning of word.²² However, the word should move slightly from the core, if the meaning of a character itself came from a foreign

²² Chinese is not an alphabetic language like Japanese, and thus the stratification according to the phonological constraints cannot be suggested, since Chinese syllable must follow the native phonological constraints.

country and thus there is a change of the original meaning. In addition, the structure of a word or a phrase should be indigenous. If the structure is created by borrowing from a foreign country, the vocabulary should also move far from the core. Based on the discussion above, the conditions for the native Chinese vocabulary in the core of Chinese lexical space can be presented as follows:

List 1. Conditions for the native Chinese lexicon

- ① The origin of a word or phrase is Chinese.
- ② It is expressed using Chinese characters.
- ③ The meaning of each character forming a Chinese word should be related to the meaning of a word; the meaning of a character itself should originate in China.
- ④ The structure of a word or phrase should be Chinese.

With the conditions above, I will apply Itô and Mester's core-periphery structure to the scope of Chinese loanwords.

2.3 The scope of Chinese loanwords

As mentioned earlier, there are three major issues in the discussion of Chinese loanwords: Japanese graphic loans, semantic loans and alphabetic loans. Japanese graphic loans and semantic loans are very similar to the native Chinese vocabulary, so there is a debate on whether they should be considered loanwords or not. On the other hand, alphabetic loans are very different from the native Chinese vocabulary, but they are commonly used like the native vocabulary, so there is a debate on the attribution of

alphabetic loans. Now I will discuss these three kinds of loanwords.

2.3.1 Japanese graphic loans

Some researchers argue that Japanese graphic loans are not loanwords, and some even deny that they came from Japan, since the characters were originally Chinese characters for a long time.²³ Wang (1980) does not include this group in Chinese loanwords, while Gao and Liu (1958) does include the group in Chinese loanwords, even though the authors use a strict definition of Chinese loanwords. Shi (2000) shows reservation about the issue, and calls the group of Japanese graphic loans associate loanwords. However, in the analyses of loanwords listed in the *Xiandai hanyu cidian* 现代汉语词典 (Modern Chinese dictionary) (1978), the class of graphic loans (*jiè-xíng-lèi* 借形类) are considered Japanese graphic loans. Also, focusing on the effect of graphic loans on Chinese language, Yang (2007) collected many researchers' opinions, and concluded that Japanese graphic loans should be treated as loanwords.

There is a reason why many researchers claim differently. Japanese graphic loans are imported by using the original characters and meaning, but the characters are read with Chinese pronunciation of the characters. For example, 'shǒu-xù 手續 (procedure)' was originally created in Japan, and was imported to China later. The meaning is the same both in Japan and China, but it is pronounced as [tet̚ʉzuki] in Japan, and as [ʃoucy] in China. 'shǒu-xù 手续' is expressed with Chinese characters, and the combination of the characters is familiar to the Chinese people's cognitive schema. Thus, Chinese people do not feel it is foreign. However, it should be placed

23 Many researchers discuss this issue, such as Gao and Liu (1958), Liu et al. (1984), Dai (1993), Masini (1993), Chen (1994), Zhou (1998), Shi (2000), Yang (2000), and etc.

a little outside of the core in the lexical space, since only the origin of the word is foreign. ‘*fù-xí* 复习 (review),’ ‘*xī-wàng* 希望 (hope),’ ‘*jiāo-tōng* 交通 (traffic),’ ‘*bì-yào* 必要 (need)’ are classified into this group. These words still do not fulfill all the conditions for the native Chinese vocabulary in the core, and thus should be considered as loanwords. In addition, in the core-periphery structure, they are located near the core.

However, not all the Japanese graphic loans are located near the core. For example, ‘*zhèng-tài* 正太 (a 12-year old boy),’ which is commonly used in China, is a Japanese graphic loan, and Chinese people do not feel it is part of the native vocabulary, since it is far from the Chinese people’s cognitive schema. Therefore, it should be placed farther from the core than ‘*shǒu-xù* 手續 (procedure),’ the previous example. ‘*gěi-lì* 给力 (very strong),’ ‘*kòng* 控 (a mania),’ and ‘*yù-jie* 御姐 (a mature woman)’ also belong to this group. The difference between these words and previous examples of Japanese graphic loans like ‘*shǒu-xù* 手續 (procedure)’ cannot be explained if using only [\pm foreign] and partitioning in Figure 2, because all were, in nature, created in Japan. Therefore, it is not accepted that some are loanwords and some are not. Even though they feel different, all should be considered loanwords. There is only a difference in psychological reality between those two groups of Japanese graphic loans. Therefore, through applying the core-periphery structure to the Japanese graphic loans, the problem can be solved by showing the difference between those two groups in the Chinese lexical space.

In sum, Japanese graphic loans are loanwords, since they were created in Japan and thus cannot belong to the Chinese native vocabulary. However, there are different groups of Japanese graphic loans which are differently placed in the Chinese lexical

space, depending on psychological reality in the Chinese people's cognitive schema.

2.3.2 Semantic loans

Researchers such as Gao and Liu (1958), Zhou (1959), and Liu et al. (1984) argue that semantic loans should be excluded in Chinese loanwords.²⁴ The researchers claim that semantic loans are composed of Chinese morphemes, and thus they cannot be considered as loanwords. However, it is interesting that the researchers usually include semantic loans in their analyses of Chinese loanwords. It seems that semantic loans are very similar to native Chinese vocabulary, but there is still a tinge of difference. In other words, semantic loans blur the line between the native Chinese vocabulary and Chinese loanwords.

Many other researchers show ambiguous stance on this problem. Wang (1958; 1980) also argues that semantic loans are not loanwords²⁵, but he still puts semantic loans in the scope of Chinese loanwords (Wang 1979).²⁶ In addition, Sun (1956) defines loanwords as follows: “There are two types of loanwords: Among loanwords, some are directly borrowed from foreign languages, which are called *jiè-cí* (borrowed words 借词). Some are new vocabulary, namely native Chinese vocabulary

24 Also, *Xiandai hanyu cihui* 现代汉语词汇 (Modern Chinese vocabulary) (Wang and Wu 1959), *Xiandai hanyu* 现代汉语 (Modern Chinese) (revised version, Hu 1995), *Xiandai hanyu* 现代汉语 (Modern Chinese) (revised version, Huang and Liao 1991), and some dictionaries do not mark semantic loanwords (Yu 2010: 10).

25 Chinese In Wang (1958: 516), he says that *jiè-cí* is loanword but *yì-cí* should not be considered as loanwords. Here, *jiè-cí* means phonetic loan, *yì-cí* means translated word, namely semantic loans.

26 Chinese According to Wang (1979), comparing modern written language and the written language before the Opium War (1840-1842), over a half are words from foreign countries, and comparing to the written language in the May Fourth Movement (1919), words from foreign countries are over 1/4. The meaning of words from foreign countries must be loanword, but if Wang (1979) did not include semantic loans, the number of the words from foreign countries cannot be that big (Yang 2007).

made by translating the foreign language and using Chinese characters. These are called *yì-cí* (translated words 译词) (Sun 1956: 308).” In Sun’s definition of loanwords, he shows equivocal stance, since he indicate *yì-cí* as one type of loanwords, but explains it as native Chinese vocabulary. Thus, Yang (2007) thinks that Sun includes semantic loans into Chinese loanwords, but Shi (2000) and Yu (2010) classifies Sun into the group that claims semantic loans are not loanwords. In addition, Lü (1982: 13) says that loanwords are divided into two, namely semantic loans (*yì-yǔ* 译语) and phonetic loans (*yì-yīn* 译音), but maintains that semantic loans are not loanwords. That is, Lü (1982) also makes an ambiguous definition of loanwords. Moreover, Shi (2000) says that a calque, which generally belongs to semantic loans, is made by translating morphemes, and thus a calque preserves the foreign form in terms of the order and the structure of corresponding morphemes. Thus, Shi (2000) argues that a calque is an associate loanword (*zhǔn-wài-lái-cí* 准外来词), and it can be classified into loanwords in the broadest sense. However, he also said that he does not include a calque in his analyses of loanwords, since he follows the more common opinion that this category of word cannot be considered loanwords (Shi 2000: 5).

On the other hand, there are many researchers who include semantic loans into the scope of loanwords. Luo (1989: 27-30) defines loanwords as foreign elements which are mixed into a language, and includes semantic loans in Chinese loanwords. In addition, Zou and You (2001: 167-168) claim that, in terms of linguistics and socio-cultural view, both phonetic loans and semantic loans are loanwords if they come from foreign languages. Chan and Kwok (1990), Masini (1993), Miao (2005) and Yang (2007) also consider semantic loans as loanwords.

Semantic loans are divided into two groups. One group is words that are made

by translating foreign morphemes, and the other is words that are created to express a foreign word.²⁷ Thus, semantic loans are words whose origin is a foreign language, but they are expressed with Chinese characters and the meaning of each character is related to the entire meaning of a word. As a result, semantic loans do not seem problematic in Chinese people's cognitive schema. In addition, unlike Japanese graphic loans, the pronunciation of semantic loans also uses Chinese pronunciation. If not considering its origin, it could be said that semantic loans belong to the native Chinese vocabulary. Therefore, there is a debate about the attribution of semantic loans, since they are close to the core of Chinese lexical space. However, there is a clear reason why semantic loans cannot be located at the core. First of all, the origin is the most important element to decide whether or not a word is a loanword, since it cannot even exist without the foreign origin. For example, Mandarin '*rè-gǒu* 热狗 (hotdog)' is a calque which is a translation of the English morphemes 'hot' and 'dog.' Without considering English origin 'hotdog,' the meaning of Mandarin *rè-gǒu* cannot be imagined. Mandarin *xià-zài* 下载 (download), *rè-xiàn* 热线 (hotline), *hēi-mǎ* 黑马 (dark horse), *chāo-jī-míng-xīng* 超级明星 (superstar), and *xǐ-qián* 洗钱 (money laundering) are examples of calque. On the surface, they seem to have the original Chinese meaning, but cannot be correctly understood only by combining Chinese morphemes. In order to recognize the meaning of '*hēi-mǎ* (dark horse)' and '*xǐ-qián* (wash money),' we have to know the hidden meaning of original English words. In the case of Mandarin '*tiān-shǐ* (天使 angel),' it is hard to understand the meaning without background of the western culture of Christianity. Mandarin '*jiāo-juǎn* (胶卷, film),' '*suí-shēn-tīng* (随身听, walkman),' and '*zhí-shēng-jī* (直升机, helicopter)' require knowledge of the English

27 To be more specific, semantic loans will be discussed in 2.4.2 in detail.

counterparts. Plus, in the case of Mandarin *xià-yì-shí* 下意识 (subconsciousness), the structure of the word is completely different from the native Chinese word. If it were a native Chinese word, it should be a *yì-shí-xià* 意识下. That is, the structure of the phrase came from foreign language, and thus has a disparate element. Therefore, this kind of word cannot be placed in the core of the Chinese lexical space. How far the words are from the core depends on the individual words, but generally a calque is rather far from the core, and the words created to indicate a foreign meaning is rather close to the core, while the latter can conform to the native Chinese vocabulary better.

2.3.3 Alphabetic loans

Recently, alphabetic loans rapidly flood into Chinese language. Since the 1970s, a new type of loanword, which is made up of words directly imported from languages with the Latin letters, has increased, and has been an important part in the Chinese vocabulary. Pinyin, which was created as a Mandarin writing system, plays a role in promoting the import of alphabetic loans, because Chinese people have become familiar with the Latin letters (Miao 2005). Contrary to the previous issues with semantic loans and Japanese graphic loans, alphabetic loans are too different to belong to the Chinese vocabulary. As a result, there is a debate on the attribution of alphabetic loans existing in the Chinese speech. In other words, some researchers argue that alphabetic loans are not Chinese loanwords but a foreign language, while some include them in Chinese loanwords. Therefore, a group of alphabetic loans should be placed at the most periphery in the Chinese lexical space, although whether they should be considered part of the Chinese lexicon at all, is debated. Some words that fall into this debate are:

Mandarin ‘UT *Sī-dá-kāng* (UT 斯达康, UTStarcom),’ ‘W.W *Gé-léi-jié* (W.W. 格雷杰, W.W. Grainger),’ ‘AAI *gōng-sī* (AAI公司, AAI),’ and ‘Adobe *chū-bǎn-shè* (Adobe 出版社, Adobe press).²⁸ These words were created in the foreign country yet use a mixture of Chinese characters and Latin letters. Therefore, the meaning of morphemes and the structures of the words clearly show foreignness. However, they still can enter to the scope of Chinese loanwords, since they use Chinese characters, even though they have to be placed in the farthest periphery of the Chinese lexical space.

In fact, the alphabetic loans mentioned above are not a big problem. The real issue is about the words which are composed of only Latin letters. Liu (1994) defines alphabet loans as direct borrowing of foreign alphabets entirely or partially. Thus, he includes both loans consisting of only Latin letters and loans mixed with Latin letters and Chinese characters in his analyses of alphabetic loans. Miao (2005) classifies loans composed purely of Latin letters into the type of graphic loans (*xíng-yì-cí* 形译词) and includes loans mixed with Latin letter and Chinese characters in the type of Hybrid. Recently, some have argued that loans composed purely of Latin letters should be considered as graphic loans (or loans borrowing forms) like Japanese graphic loans (Shao 2001, Diao 2006). However, this kind of loan should be differently treated from Japanese graphic loans, since it borrows not only the forms but also the pronunciations. In other words, both the sound and the form are not related to the native Chinese language. Yu (2003) argues that the words such as ‘CD,’ ‘AIDS,’ and ‘WTO’ are not loanwords but foreign language words, but the mixed forms like ‘IBM公司’ and the abbreviation of Pinyin such as ‘RMB’ and ‘HSK’, however, are loanwords. Yu’s opinion is reasonable, in that there is no connection between the words that are composed of

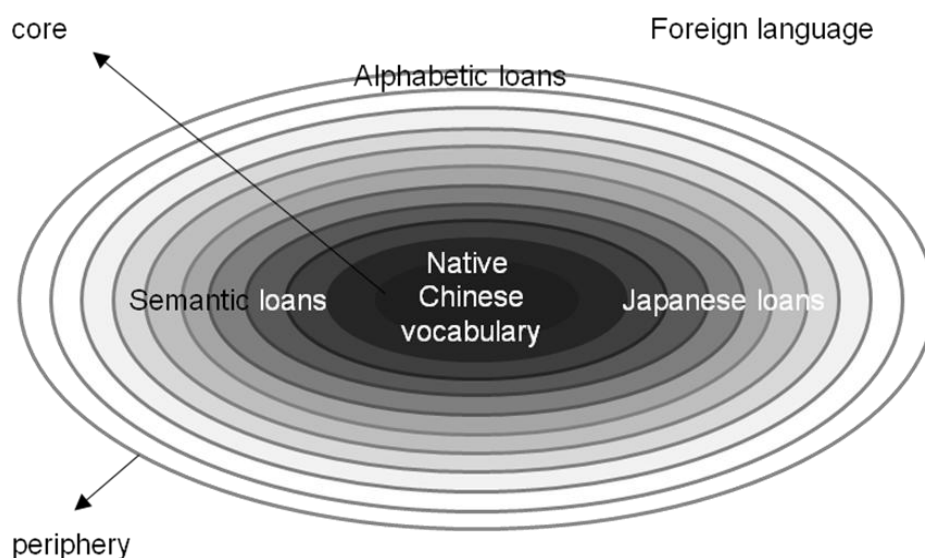
28 The examples come from Miao (2005: 35-36).

only foreign letters with the core of the Chinese lexical space, because the origin of the words was a foreign language, and the concept itself came from a foreign country. In addition, the words are not expressed with Chinese characters, and thus the Chinese people's cognitive schema will not be considered. Even the pronunciation is foreign. No matter how far the periphery is, there is no place for this kind of words in the Chinese lexical space. If this kind of words should be considered as Chinese loanwords within the Chinese vocabulary since they are often used in Chinese speech, the basic question of the difference between native language and foreign language should be revisited. In sum, loans composed of only Latin letters should be treated as foreign language words that appear in the interaction with foreign countries, because they borrow both the form and the pronunciation of foreign language (Yang 2007).

In fact, considering words or abbreviations which consist of only the Latin letters as foreign language words seems unproblematic. However, the abbreviation of Pinyin needs to be discussed in more detail. On the surface, this kind of abbreviation seems identical to words composed of only Latin letters, in that the pronunciation is also the same with English pronunciation. For example, 'HSK' is an abbreviation of Mandarin *Hàn-yǔ-shuǐ-píng-kǎo-shì* 汉语水平考试 (a standardized test of Standard Chinese language proficiency), but it is read as English pronunciation. However, this kind of word still can find its place in the Chinese lexical space, in that its origin is Chinese language. That is, the word itself was created in China, which is the most important connection with the native Chinese vocabulary. Without Chinese language, nothing can explain the existence of this kind of word. However, it does not use Chinese characters, and thus looks disparate. As a result, this type of loan should be located at the farthest place from the core.

2.3.4 Summary

In sum, I discussed three major issues of Chinese loanwords in section 2.3, and defined the scope of Chinese loanwords, applying Itô and Mester's core-periphery structure. Through the discussion, I tried to provide the answer for the three major problems of Chinese loanwords: semantic loans, Japanese graphic loans, and alphabetic loans. The point is that semantic loans and Japanese graphic loans should be treated as loanwords even though they seem to be very similar to the Chinese native vocabulary. They should be placed in the close location from the core of the Chinese lexical space. On the other hand, alphabetic loans are very different from the native Chinese vocabulary, and thus they should be located at the farthest place in the Chinese lexical space. More specifically, the abbreviations of foreign language should be excluded in the Chinese vocabulary, and instead treated as foreign language since they have no relation with the native Chinese vocabulary. However, Pinyin abbreviation should be considered as loanwords, namely a part of the Chinese vocabulary, due to their Chinese origin. In conclusion, Figure 5 provides a visual representation of these three loanword types in relation to the core of native Chinese vocabulary.

Figure 5. Lexical stratification of Chinese loanwords²⁹

As seen above, in spite of belonging to the same group, the nature of each word in the group is not homogeneous. Thus there is difference of distance between the core and each word.

2.4 Types of Chinese loanwords

Based on the scope of Chinese loanwords according to the lexical stratification in section 2.3, types of Chinese loanwords will be discussed in this section. There are four types of Chinese loanwords depending on the borrowing type: phonetic loans (*yīn-yì-cí* 音译词), semantic loans (*yì-yì-cí* 意译词), graphic loans (*jiè-xíng-cí* 借形词), and hybrids (*yīn-yì-xíng-jīn-yì-cí* 音义形兼译词). There are different names for the types of Chinese loanwords, but they can be generally summarized into four

²⁹ The core-periphery structure was referred to Itô and Mester (1995b: 824).

types which will be discussed in this section.

As mentioned earlier, Chinese people prefer semantic loans to phonetic loans.³⁰ Traditionally, phonetic loans were restricted, and they were easily replaced by semantic loans even though a word was originally borrowed as a phonetic loan.³¹ For example, ‘*dé-lǜ-fēng* 德律风 (telephone)’ was replaced by ‘*diàn-huà* 电话 (telephone),’ ‘*kāi-mài-lā* 开卖啦 (camera)’ by ‘*zhào-xiāng-jī* 照相机,’ and ‘*gé-lǎng-mǎ* 葛朗玛 (grammar)’ by *yǔ-fǎ* 语法. On the other hand, there are many examples that show that phonetic loans are more popular than semantic loans. For instance, ‘*ní-gǔ-dīng* 尼古丁 (nicotine)’ is used more often than ‘*yān-jiǎn* 烟碱,’ and ‘*jítā* 吉他 (guitar)’ is more familiar to Chinese people than ‘*liù-xián-qín* 六弦琴.’ In addition, there are many cases that the meaning is more easily or effectively expressed through phonetic loans, such as a word ‘*yōu-mò* 幽默,’ the phonetic loan of English ‘humor.’ Recently, foreign company names and brand names have been frequently imported due to rapid economic growth of China and active interaction with foreign countries. The names are usually borrowed in the form of phonetic loans, since there is a possibility that semantic loans cannot directly show the image of the company or brand (Yu 2010: 9-10). According to Miao (2005: 12-16), among the Chinese loanwords that have been borrowed since the middle of the 1950s, phonetic loans have the highest percentage, and hybrid loans follow. Also, Diao (2006: 269) says that many of the phonetic loans,

30 According to Chen (1983: 239), phonetic loans are avoided, but partial or entire semantic loans are preferred in Modern Chinese. For example, ‘*dé-mó-kè-lā-xī* 德谟克拉西 (democracy)’ became ‘*mín-zhǔ* 民主,’ and ‘*lái-sè* 莱塞 (laser)’ became ‘*jī-guāng* 激光.’ Also, ‘*huái-é-líng* 怀娥铃 (violin)’ and ‘*pò-yǎ-nà* 破雅娜 (piano)’ disappeared and instead ‘*xiǎo-tí-qín* 小提琴’ and ‘*gāng-qín* 钢琴’ were created. However, Masini (1993: 136) points out a case that a phonetic loan is a later form than the corresponding semantic loan, and presents ‘*dé-mó-kè-lā-xī* 德谟克拉西 (democracy)’ and ‘*mín-zhǔ* 民主’ as an example.

31 According to Wang (1954), semantic loan is normal method of borrowing words, but phonetic loan is only a temporary makeshift method. Wang’s (1954) opinion represents a traditional view of Chinese loanwords, but it cannot work for Modern Chinese loanwords any more. Phonetic loan is also normal.

which are used in the four steps of the development of Modern Chinese (now since China's reform and opening up), are not listed in the *Hanyu Wailaiyu cidian* 汉语外来语词典 (Chinese loanwords dictionary) (Liu et al. 1984). The phonetic loanwords were new ones which were created during the last 20 years.

However, the phonetic loans continue to increase. There are two reasons why phonetic loans are increasing. First, plenty of new technology, brand names, and company names, which are not familiar to Chinese people, have flooded into China since the 1970s due to increasing interaction with western countries. Semantic loans are not an effective method to borrow proper nouns, and naturally phonetic loans are used for foreign proper nouns.³² Second, it is well-known that English education is increasingly popular in China. Consequently, many Chinese people are familiar with English and can accept phonetic loans easily. Then, with the phonetic loans at the head, I will discuss each type of Chinese loanwords in more detail.

2.4.1 Phonetic loans (*yīn-yì-cí* 音译词)

Phonetic loans are transcriptions of foreign sounds. That is, in phonetic loans a foreign pronunciation changes to new sounds which are allowed in Chinese phonological system (Chao 2002: 605). There are two types of phonetic loans: loans that borrow only the sounds of foreign words (Pure phonetic loans, PPL) and loans that borrow sounds with the consideration of meaning (Phonetic loans with consideration of meaning, PCM).³³

32 According to Yang (2007: 78-81), phonetic loans are usually used to borrow the country, place, and person's names. Especially, brand names are imported only by the way of phonetic loans.

33 There are several names for these two types of phonetic loans. The various names are found in Gao

First, the meaning of Chinese characters does not play any role in PPL. Namely, the characters are used as phonetic symbols to transcribe the foreign sounds. However, as mentioned earlier, Chinese characters seem to have a meaning even though they do not have any meaning (Chao 1979: 79). Nevertheless, the combination of Chinese characters used in PPL cannot mean anything. Examples are shown below.

List 2. Examples of PPL³⁴

English	Mandarin loanwords	English	Mandarin loanwords
Compaq	Kāng-bǎi 康柏 [k ^h ɑŋ-pai]	shock	xiū-kè 休克 [ɕjou-k ^h ɤ]
Disney	Dí-sī-ní 迪斯尼 [ti-sɿ-ni]	clone	kè-lóng 克隆 [k ^h ɤ-luŋ]
sofa	shā-fā 沙发 [ʂa-fa]	jeep	jí-pǔ 吉普 [tɕi-p ^h u]
coffee	kā-fēi 咖啡 [k ^h a-fei]	chocolate	qiǎo-kè-lì 巧克力 [tɕ ^h ɑu-k ^h ɤ-li]
curry	gā-lí 咖喱 [ka-li]	taxi	dí-shì 的士 [ti-ʂɿ]

Next, the combination of Chinese characters used to transcribe the foreign sounds has meaning in PCM. Thus, the sound of the combination is close to the sound of original word as well as has a desirable meaning. Many brand names, therefore, are borrowed in this way and provide esthetic and social effects (Hong 1995). However, they are clearly different from semantic loans, in that the meaning of PCM is not exactly indicating original meaning of the foreign word.

and Liu (1958: 163), Masini (1993: 130), Shi (2000: 127-128), Miao (2005: 29), and Yang (2007: 39-46).

34 The examples come from Shi (2000:127), Miao (2005: 30), and Yang (2007: 40).

List 3. Examples of PCM³⁵

English	Mandarin loanwords	Meaning
Febreeze	Fǎng-bì-shì 纺必适 [fɑŋ-pi-ʂɿ]	fabric-must-comfortable
Hummer	Hàn-mǎ 悍马 [xan-ma]	brave-horse
Coca-cola	Kě-kǒu-kě-lè 可口可乐 [k ^h ʅ-k ^h ou-k ^h ʅ-lɿ]	can-mouth-can-happy
Esperanto	À i-sī-bù-nán-dú 爱斯不难读 [ai-sɿ-pu-nan-tu]	ø-ø-not-difficult-read
Utopia	Wū-tuō-bāng 乌托邦 [wu-t ^h wo-pɑŋ]	no-depending-country
Benz	Bēn-chí 奔驰 [pən-tʂ ^h ɿ]	speeding-speeding

Luo (1989) thinks that this kind of loanword is a combination of phonetic loans and semantic loans. However, I argue that the meanings, in fact, do not indicate the actual meaning of words, but they just have a special effect for a good image of products or brands. Therefore, they cannot be treated as semantic loans, since semantic loans are directly related to the meaning of foreign words.

2.4.2 Semantic loans (*yì-yì-cí* 意译词)

Semantic loans borrow the meaning of foreign words. The best advantage of semantic loan is that they fit the Chinese people's cognitive schema well and thus they usually do not feel different from the native Chinese vocabulary.³⁶ There are two types

35 The meanings of the PCMs and more examples can be found in Shi (2000:127-128), Miao (2005: 30-31), and Yang (2007: 40-42).

36 Wang (1980: 523) says that semantic loans are easily harmonized with Chinese language, and presents 'shì-jìè 世界 (world), xiàn-zài 现在 (at present), yīn-guǒ 因果 (causality), yuán-mǎn

of semantic loans: loans in which each morpheme is translated (calque) and loans in which the foreign word is translated into Chinese (semantic translation).³⁷ Generally, the former one is named *fǎng-yì* 仿译 in Chinese. List 4 provides examples of calques while List 5 provides examples of semantic translations.

List 4. Examples of calque³⁸

English	Mandarin loanwords	English	Mandarin loanwords
download	xià-zài 下载	superman	chāo-rén 超人
Microsoft	Wēi-ruǎn 微软	superstar	chāo-jí-míng-xīng 超级明星
blackboard	hēi-bǎn 黑板	cold war	lěng-zhàn 冷战
hotline	rè-xiàn 热线	hotdog	rè-gǒu 热狗
software	ruǎn-jìàn 软件	dark horse	hēi-mǎ 黑马

List 5. Examples of semantic translations³⁹

English	Mandarin loanwords	English	Mandarin loanwords
Clinique	qiàn-bì 倩碧	vitamin	wéi-shēng-sù 维生素
Sprite	xuě-bì 雪碧	microphone	kuò-yīn-jī 扩音机
Walkman	suí-shēn-tīng 随身听	angel	tiān-shǐ 天使
helicopter	zhí-shēng-jī 直升机	film	jiāo-juǎn 胶卷

In sum, semantic loans use a combination of Chinese morphemes, and focus on translating the meaning of foreign words.

圆满 (satisfactory)' as the examples.

37 There are several different names for semantic loans. Translating each morpheme in a foreign word is called loan translations (Masini 1993, Chen 1999) or calque (Yang 2007). Translating a foreign word is called semantic loans (Masini 1993) or semantic translation (Chen 1999).

38 The examples come from Miao (2005: 32) and Yang (2007: 107).

39 The examples are also adopted from Miao (2005:32) and Yang (2007: 107).

2.4.3 Graphic loans (*jiè-xíng-cí* 借形词)

Graphic loans borrow the letters of a foreign word directly. Basically, it indicates the Japanese translations for western concepts which were introduced to China by Chinese students or scholars studying in Japan during the late 19th century and the early 20th century. Japanese also uses Chinese characters, and thus the characters were directly imported to China, but the pronunciation of the characters changed to Chinese pronunciation. For example, as mentioned in section 2.3, ‘*shǒu-xù* 手續 (procedure),’ which was created in Japan, is read as [ʃouɕy]. That is, the Japanese ‘手續’ and Chinese loanwords use the same characters, but their pronunciations are different. It is read as [tɛ^suzuki] in Japan. The Japanese graphic loans played a pivotal role in transferring the western knowledge into China in the 1940s. Even though the function of the Japanese graphic loans is over, this type of loanword still continues to flood into China. However, the simplified Characters have been used in China since the 1950s, the forms of the characters changed (Miao 2005). There are countless examples of the Japanese graphic loans in the Chinese vocabulary. Examples are given below.

List 6. Examples of Japanese graphic loans⁴⁰

Japanese	Mandarin loanwords	Meaning
ぶんがく 文學	wén-xué 文学 [wən-ɕyɛ]	literature
ばしょ 場所	cháng-suǒ 场所 [tɕ ^h ɑŋ-swo]	place
ふくしゅう 復習	fù-xí 复习 [fu-ɕi]	review
げいじゅつ 藝術	yì-shù 艺术 [ji-ʂu]	art
ぶんぽう 文法	wén-fǎ 文法 [wən-fa]	grammar

⁴⁰ The examples come from Gao and Liu (1958: 82-88).

In addition to Japanese graphic loans, Mandarin Pinyin abbreviations such as HSK and RMB are also included in this type.

2.4.4 Hybrids (*yīn-yì-xíng-jiàn-yì* 音义形兼译)

Hybrids combine both phonetic loans and the semantic loans. In other words, Chinese morphemes are added to the phonetic loans in order to provide a clearer meaning, or a part of the foreign word is literally translated in Chinese (Miao 2005).⁴¹ In addition, another type of hybrid occurs when letters from a foreign alphabet are added directly to the phonetic loans or semantic loans. Therefore, there are two types of hybrids. The first one is half a phonetic loan and half a semantic loan (Hybrid of phonetic and semantic loans, HPS). Either phonetic loan or semantic loan can go first. Another type of hybrid is the combination of foreign letters and phonetic or semantic loans (Hybrid of foreign letters, HFL).⁴² Examples for each type follow.

41 As mentioned in 2.3.3, I do not think of alphabetic loans, which are composed of only letters from the Latin letters, as Chinese loanwords. They are excluded in my classification of Chinese loanwords. In addition, the alphabetic loans of ‘Latin letters + phonetic loan’ or ‘Latin letters + semantic loan’ are considered as a type of hybrid in this study.

42 Researchers apply different standards to classify hybrids and also use different names. Miao (2005:35-36) divides this type of loanwords into three types: ‘graphic + phonemic hybrids,’ ‘graphic + semantic hybrids,’ ‘graphic + phonemic + semantic hybrids.’ She classifies a word that consists purely of Latin letters as a type of graphic loan. Yang (2007: 127-143) also divides into three types: 1. The type of ‘*yīn-yì-shuāng-guān* 音义双关,’ which blurs the line between semantic loans and hybrid. 2. The type of ‘*bàn-yīn-yì-bàn-yì-yì* 半音译半意译,’ which consists of a phonetic loan and a semantic loan. 3. The type of phonetic loans which function as semantic elements. But the distinction between the second type and the third type is not clear. On the other hand, Shi’s (2000: 126-133) classification is based on the different standard, and thus Yang’s second type is classified as a subcategory of phonetic loan. Also, Yang’s third type is treated as one of the major categories of Chinese loanwords. Therefore, I will classify hybrids with my own standard.

List 7. Examples of HPS⁴³

English	Mandarin loanwords	Type
AIDS	À i-zī-bìng 艾滋病	phonetic + semantic loan
bowling	bǎo-líng-qiú 保龄球	phonetic + semantic loan
credit card	xìn-yòng-kǎ 信用卡	semantic + phonetic loan
Barbie doll	bā-bǐ-wá-wa 芭比娃娃	phonetic + semantic loan
New Zealand	Xīn-xī-lán 新西兰	semantic + phonetic loan
Internet	yīn-tè-wǎng 因特网	phonetic + semantic loan
Jurassic period	Zhū-luó-jì 侏罗纪	phonetic + semantic loan
motorbike	mó-tuō-chē 摩托车	phonetic + semantic loan

List 8. Examples of HFL⁴⁴

English	Mandarin loanwords	Type
UTStarcom	UT 斯达康	foreign letter + phonetic loan
W.W. Grainger	W.W 格雷杰	foreign letter + phonetic loan
AAI	AAI 公司	foreign letter + semantic loan
Adobe Press	Adobe 出版社	foreign letter + semantic loan
X-Men	X 站警	foreign letter + semantic loan
W.B. Sanders Company	W.B. 桑德斯出版公司	foreign letter + phonetic loan + semantic loan

In sum, hybrids are a type of Chinese loanwords in which more than two types of loans are mixed.

43 The examples come from Yang (2007: 134-135).

44 The examples come from Miao (2005: 35-36).

2.5 Summary

Chapter II mainly consists of two topics: a discussion of the scope of loanwords in Chinese, which leads to a discussion on the major types of Chinese loanwords. There are three major debates on Chinese loanwords: Japanese graphic loans, semantic loans and alphabetic loans. Whether or not the former two (i.e. Japanese graphic loans and semantic loans) should be treated as loanwords is debated because they are very close to the native Chinese vocabulary. On the contrary, alphabetic loans are very different from the native Chinese vocabulary, despite the fact that they are often used in daily life. Thus, some people argue that alphabetic loans should be considered foreign words while some claim that they are loanwords. This chapter provides the conditions of native Chinese vocabulary in List 1. Based on these conditions and Itô and Mester's core periphery structure, I argue that Japanese graphic loans and semantic loans should be considered loanwords, which are placed in the close location from the core of the Chinese lexical space. In addition, I also argue that alphabetic loans which are composed of only Latin letters should be treated as part of foreign words. However, Pinyin abbreviations should be considered loanwords, although they should be located at the farthest place in the Chinese lexical space, since their origin came from Chinese language.

Based on the scope of Chinese loanwords, there are four types of Chinese loanwords depending on the borrowing type. Phonetic loans are transcriptions of foreign sounds, and they can be divided into two types: pure phonetic loans (PPL) and phonetic loans with consideration of meaning (PCM). Semantic loans borrow the meaning of foreign words, and there are two types of semantic loans: loans in which

each morpheme is translated (calque) and loans in which the foreign word is translated into Chinese (semantic translation). Graphic loans borrow the letters of a foreign word, and this type of loan basically indicates the Japanese graphic loans. In addition, Mandarin Pinyin abbreviations are also classified into this type. Hybrids are combinations of two types of loans. Hybrids are classified into two types: Hybrid of phonetic and semantic loans (HPS) and hybrid of foreign letters (HFL). The names for the types of Chinese loanwords differ by researcher, but the Chinese loanwords can usually be summarized into the four types mentioned above.

Chapter III. Comparative study of Mandarin phonology and English phonology

Mandarin belongs to the Sino-Tibetan language family while English belongs to the Indo-European family (Chang 2009: 8). Many identical phonemes can be found when the phonological inventories of these two languages are compared. However, in terms of phonemic placement, phonotactic constraints, and the functions of each phoneme, there is a significant difference due to their origin in two separate language families. (He 2002: 10, Yu 2010: 29). Lately, several studies such as He (2002), Chin (2008), and Chang (2009) have analyzed and compared the phonological systems of Mandarin and English in detail. Comprehensive studies for Mandarin phonology were done by Duanmu (2007) and Lin (2007). Based on the previous studies, in Chapter III, the phonological systems of Mandarin and English will be discussed. Through the comparison and contrast of the phonology of these two languages, Chapter III provides a background for Mandarin loanword adaptations originating from English, which will be discussed in Chapter IV.

3.1 Mandarin phonology

Phonological analysis is composed of two levels: segmental level and supra-segmental level. The former one consists of consonants and vowels while the latter one includes tone, stress (accent), and intonation (Chang 2009: 11). As already mentioned the research object of this study is Mandarin. Mandarin is used in many areas of China,

and there are various accents in Mandarin. However, so-called ‘Common Accent (*pǔ-tōng-huà* 普通话)’ or ‘the National Speech (*guó-yǔ* 国语)’ generally refers to the language spoken in Beijing (Chin 2008: 7). Therefore, Mandarin in this chapter refers to the Beijing speech. In the section of 3.1, the Mandarin phonological system will be discussed in the order of consonants, vowels, syllable structures, phonotactic constraints, and tones.

3.1.1 Mandarin consonants

Researchers generally agree about the number of Mandarin consonants. Mandarin has 22 consonants⁴⁵, and all the consonants can be placed in the onset position of a syllable except /ŋ/. On the other hand, only /n/ and /ŋ/ among the consonants can be located in the coda position of a syllable.⁴⁶ Mandarin consonants can be classified according to the three features of consonants: place of articulation, manner, and aspiration. The most debatable issue in the discussion of Mandarin consonants is which group Mandarin *r* should be classified into. Some researchers argue that Mandarin *r* is a voiced fricative [ʒ] (He 2002, Dunamu 2007, Chin 2008, Chang 2009, Yu 2010), whereas some researchers claim that it is an approximant [ɹ] (Fu 1956, Wang

45 Duanmu (2007: 23, 27) argues that Mandarin has 19 consonants. He thinks that Mandarin *j* [tɕ], *q* [tɕʰ], *x* [ç] are ‘consonant-glide combination,’ and thus these three are considered as the palatalized dentals [tɕ^j, tɕʰ^j, ç]. However, Mandarin [tɕ, tɕʰ, ç] also have the relationship of complementary distribution with [tɕ, tɕʰ, ç] and [k, kʰ, x] other than [tɕ, tɕʰ, ç]. Even though Mandarin [tɕ, tɕʰ, ç] can be considered as variations appearing only before high vowels or high glides, we still cannot tell which Mandarin phonemes they are variations of (Lin 2007: 48-49). Therefore, this study follows the majority of researchers, and considers Mandarin [tɕ, tɕʰ, ç] as independent phonemes.

46 Other than /n/ and /ŋ/, the retro-palatal [ɹ] can be located in the coda position. In principle, it is a contraction of *-er*, the morpheme, which is used to indicate something cute or small. This is called ‘R-coloring or Rhotacization (儿化)’ (Chin 2008: 52). Some linguists argue that this [ɹ] is a vowel rather than a consonant (Lee and Zee 2003, Ladefoged and Maddieson 1996), and called it ‘Rhotacized vowels (r-colored vowel)’ or ‘rhotic vowels’ (Lin 2007: 80).

1979, Duanmu 2000, Miao 2005, Lin 2007). The former ones consider that the relationship of [ʃ] and [ʒ] is similar to the relationship of [s] and [z] (Duanmu 2007: 24). Also, this kind of view has an advantage, in that [ʃ] and [ʒ] can be systematically treated in terms of making a pair of [\pm voiced], as the Mandarin stops and affricates make a pair with [\pm aspirated]. However, the voiced fricative [ʒ] should be treated as an exception because in Mandarin there are no voiced fricatives. As a result, Mandarin *r* is generally classified into an approximant in many studies (Yu 2010: 39). Also, considering Mandarin *r* and English *r* are perceptually similar (Lin 2007: 45), Mandarin *r* will be treated as an approximant in this study, since one of the most important functions of this chapter is to provide a background for the adaptation of Mandarin loanwords originating from English by comparing Mandarin and English phonemes.

Mandarin consonants will be classified according to place of articulation, manner of articulation, and aspiration. First, Mandarin consonants will be divided into seven, based on the place of articulation. The examples are presented in the same order of phonemes.

List 9. Types of Mandarin consonants classified by the place of articulation

1. Bilabials : /p/, /p^h/, /m/ (Pinyin : *b, p, m*) Examples: *bō* (wave), *pò* (broken), *mó* (to rub)
2. Labiodental : /f/ (Pinyin : *f*) – Example: *fó* (Buddha)
3. Dentals : /ts/, /ts^h/, /s/ (Pinyin : *z, c, s*) – Examples: *zì* (a character), *cí* (a word), *sì* (four)
4. Alveolars : /t/, /t^h/, /n/, /l/ (Pinyin : *d, t, n, l*) - Examples: *dé* (virtue). *tè* (special), *nán* (difficult), *lè* (happy)
5. Retroflexes : /ʈʂ/, /ʈʂ^h/, /ʃ/, /ʒ/ (Pinyin : *zh, ch, sh, r*) – Examples: *zhī* (a branch). *chī* (to eat), *shí* (ten), *rì* (sun)

6. Palatals : /tɕ/, /tɕʰ/, /ɕ/ (Pinyin : *j, q, x*) – Examples: *jī* (a chicken), *qī* (seven), *xī* (west)
7. Velars : /k/, /kʰ/, /x/, /ŋ/ (Pinyin : *g, k, h, ng*) – Examples: *gē* (a song), *kě* (thirsty), *hē* (to drink), *dǒng* (to understand)

Next, Mandarin consonants can be divided into six, based on the manners. The Pinyin and the examples are the same with above.

List 10. Types of Mandarin consonants classified by the manner of articulation

1. Plosives : /p/, /pʰ/, /t/, /tʰ/, /k/, /kʰ/
2. Nasals : /m/, /n/, /ŋ/
3. Fricatives : /f/, /s/, /ʃ/, /ɕ/, /x/
4. Affricates : /ts/, /tsʰ/, /tʃ/, /tʃʰ/, /tɕ/, /tɕʰ/
5. Approximant : /ɻ/
6. Lateral approximant : /l/

[±voiced] is not distinctive in Mandarin consonants. Instead, [±aspirated] plays a role in distinguishing Mandarin consonants, and thus Mandarin consonants can be divided into two, based on the feature [±aspirated].

List 11. Types of Mandarin consonants classified by [±aspirated]

1. Aspirated consonants: /pʰ/, /tʰ/, /kʰ/, /tsʰ/, /tʃʰ/, /tɕʰ/
2. Unaspirated consonants : /p/, /t/, /k/, /x/, /f/, /m/, /n/, /ŋ/, /l/, /ɻ/, /ts/, /s/, /tʃ/, /ʃ/, /tɕ/, /ɕ/

Mandarin glides [j], [w], and [ɥ] can appear when the onsets of syllables start with /i/, /u/, and /y/ depending on the corresponding vowels. The glides are treated not as

phonemes but as variations of the corresponding vowels appearing in the onset position. Therefore, the glides are not classified into independent Mandarin consonants in this study. Based on the discussion above, Mandarin consonants can be presented as follows.

Table 1. The inventory of Mandarin consonants

	Bilabial	Labiodental	Dento-alveolar	Alveolar	Retroflex	Palatal	Velar
Plosive	/p/ /p ^h /			/t/ /t ^h /			/k/ /k ^h /
Nasal	/m/			/n/			/ŋ/
Fricative		/f/	/s/		/ʂ/	/ç/	/x/
Affricate			/ts/ /ts ^h /		/tʂ/ /tʂ ^h /	/tɕ/ /tɕ ^h /	
Approximant					/ɻ/		
Lateral approximant				/l/			

3.1.2 Mandarin vowels

The most important element in a Mandarin syllable is a vowel. Researchers have different opinions about the best phonetic symbol for expressing Mandarin vowels and the numbers of Mandarin vowels, while most researchers agree about Mandarin consonants.

First, there are contrary views about the Mandarin vowel *ü* [y]. Some researchers consider it as a single vowel, but others think that it is a diphthong. In fact, the vowel [y] is rarely found in many languages. Researchers such as Wu (1994), Martin

(1957), Chao (1968), and Pulleyblank (1983) claim that [y] should be considered as a complex segment, and it is composed of [ui] or [iu] (Yu 2010: 41). On the other hand, according to Cheng (1973), the view that [y] is a complex segment not only has no historical evidence, but also is not sufficiently supported by linguistic proofs (Yu 2010: 41). In addition, [y] has been treated as a single vowel in most recent studies (Miao 2005, Duanmu 2007, Lin 2007, Chin 2008, Chang 2009, and Yu 2010). Therefore, following the latest trend of the field, the vowel [y] in Mandarin is included as a single vowel in this dissertation.

Second, there are different opinions about the number and the expression of Mandarin vowels. The differing views depend on whether researchers discuss Mandarin vowels on the level of underlying representation (UR) or surface representation (SR). According to traditional analysis, Mandarin has six vowels in its UR, namely /i, u, y, a, o, e/. This view is consistent with the vowel system of Pinyin (Yu 2010: 40). Chin (2008: 55-57) divides Mandarin vowels into five, namely /i, u, a, y, ə/ in the level of UR. He considers the other Mandarin vowels other than the five vowels as allophones in the level of SR. Duanmu (2007: 34-35) argues that Mandarin has five vowels, namely /i, y, u, ə, a/. He excludes two apical vowels, since he treats [i] after [ʈ, ʈ^h, s] and [tʂ, tʂ^h, ʂ] as syllabic consonants ([z], [r]). Also, he does not include the retroflex vowel [ɤ]. Lin (2007: 72) suggests the same Mandarin vowel system as Duanmu (2007). She concludes that the two apical vowels are a syllabic consonant [ɿ], and that the other SRs of Mandarin vowels other than the five vowels should be considered as allophones. However, Chang (2009: 18-20) suggests eight Mandarin vowels, namely /i, y, u, ɤ, o, ə, ε, a/. She treats many vowels, which are considered allophones in many studies discussed above, as Mandarin vowel phonemes, and also does not classify the apical

vowels. Miao (2005: 40) and Yu (2010: 39) include the apical vowels in Mandarin vowel phonemes⁴⁷, and classify the central mid vowel into two, namely /ə/ and /ə̃/. They also present /e, ε, a, ʌ, ə/ as Mandarin vowel phonemes. Therefore, Miao (2005) suggests 14 Mandarin vowels including /œ/, and Yu (2010) presents 13 vowels.

In this study, 12 Mandarin vowels will be presented as follows: /i, y, u, e, ə, ʌ, o, ε, a, ɑ, ɿ, ʅ/. Regardless of the expression of Pinyin, in the case that the actual sounds of vowels are clearly different from its UR, they will be included into the Mandarin vowel inventory. Thus, the apical vowels [ɿ] and [ʅ] are counted as Mandarin vowels, but the retroflex vowel [ə̃] is treated as [əɿ], so it will not be included into the vowel inventory. One more reason why this study suggests that Mandarin has 12 vowels is that the relationship between Mandarin vowels and English vowels should be considered in this study in order to apply the classification to the analyses in the following chapter.

Mandarin vowels can be classified by three features: tongue height, backness, and lip rounding. Compared to consonants, the Latin letters used in Pinyin for Mandarin vowels is very limited. Therefore, Pinyin will be shown in () next to each Mandarin vowel. The examples are presented in the same order of vowel phonemes.

First, Mandarin vowels can be divided into four groups, based on the height of the tongue.

List 12. Mandarin vowels classified by tongue height

1. High vowels : /i/(i), /ɿ/(i), /ʅ/(i), /u/(u), /y/(ü) – Examples: *nǐ* (you), *zì* (character), *zhǐ* (only), *wǔ* (five), *nǚ* (girl)
2. Mid-high vowels: /e/(e), /ɛ/(e), /o/(o) – Examples: *běi* (north), *tè* (special), *zǒu* (to walk)

⁴⁷ Miao (2005) marks the apical vowels as /z/, /ɿ/, but Yu (2010) indicates the apical vowels with /ɿ/ and /ʅ/.

3. Mid vowel: /ə/(e) – Example: *fēng* (wind)
4. Mid-low vowel: /ɛ/(e) - Example: *lián* (to link)
5. Low vowel: /a/(a), /ɑ/(a) – Example: *bā* (eight), *bāng* (to help)

Next, the following classification is based on the backness of the tongue. The Pinyin and the examples are the same as above, so they will not be presented.

List 13. Mandarin vowels classified by backness

1. Front vowels : /i/, /ɿ/, /y/, /e/, /ɛ/
2. Central vowels : /ə/, /a/
3. Back vowels : /u/, /ʊ/, /o/, /ɑ/, /ɤ/

Lastly, according to the roundness of the lips, Mandarin vowels can be classified into two groups as follows:

List 14. Mandarin vowels classified by lip rounding

1. Rounded vowels : /u/, /y/, /o/
2. Unrounded vowels : /i/, /ɿ/, /ɿ/, /e/, /ɛ/, /ə/, /ʊ/, /a/, /ɑ/

Based on the discussion above, Mandarin vowels can be presented as follows:

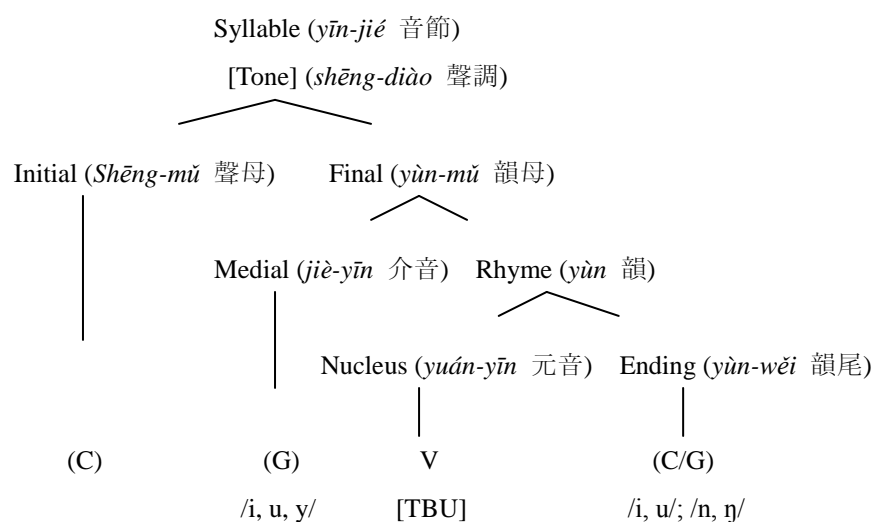
Table 2. The inventory of Mandarin vowels

	Front		Central	Back	
	Unrounded	Rounded		Unrounded	Rounded
High	/i/, /ɿ/	/y/		/ʊ/	/u/
Mid-high	/e/			/ɤ/	/o/
Mid			/ə/		
Mid-low	/ɛ/				
Low			/a/	/ɑ/	

3.1.3 Mandarin syllables

A syllable plays a pivotal role in Mandarin phonology, since Mandarin is a monosyllabic language. A syllable is a Mandarin character, and all the inner changes of syllable structure cause a change in meaning (Yu 2010: 41). Traditionally, since a tone is a feature of an entire syllable (Lin 2007: 106), it is said that a Mandarin syllable consists of an initial and a final. An initial is a syllable-initial consonant, and a final is composed of some elements including a rhyme (Miao 2005: 40). Therefore, initials are almost identical to Mandarin consonants, but they are, in fact, different concepts. First, the Mandarin syllable structures shown in traditional Mandarin phonology will be given, and the elements of each part of syllable structure will be discussed in detail.

Figure 6. Traditional description of Mandarin syllable structure



An initial and a final are particular concepts used in Mandarin phonology. For example, when the initial consonant in a Mandarin syllable is called an initial and the rest of a Mandarin syllable is called a final, the *k* in Mandarin *kàn* 看 is an initial, and the *an* is a final (He 2002: 10). More specifically speaking, all the Mandarin consonants except /ŋ/ can be an initial. Or the place of initial can be empty, and this case is called Zero-initial (\emptyset).⁴⁸ For instance, *ān* 安 has no initial consonant, so it is a Zero-initial. Thus, Mandarin has 22 initials including all the Mandarin consonants except /ŋ/ and Zero-initial. On the other hand, as seen above, a final is a very different concept from a vowel. A final is divided into a medial and a rhyme. A medial means that vowels /i, u, y/ are pronounced as the glides [j, w, ɥ] in real speech. A rhyme is divided into a nucleus and an ending. A nucleus is an essential element in a Mandarin syllable. That is, a nucleus must exist in a Mandarin syllable as a major vowel, while the other elements are

⁴⁸ There is a high possibility that in ancient times, an initial existed in the place of modern Zero-initial. In modern times, the initial should be dropped as the result of historical sound change (Yu 2010: 42).

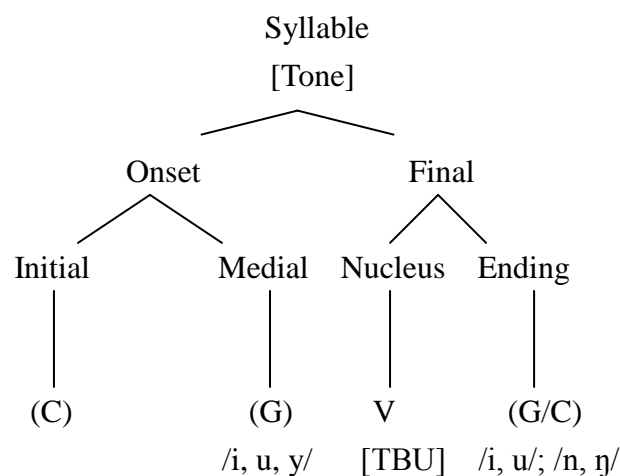
supplementary. The vowels /i, u/, which are realized as glides [j, w] in real speech, and the nasals /n, ŋ/ can occur in the rhyme.

Although there are various opinions about the number of Mandarin finals, most researchers agree that the number of Mandarin initials is 22. It depends on how allophones are interpreted (Miao 2005: 41). However, they agree about the fact that the number of actual combinations of an initial and a final is much smaller than the number of possible Mandarin syllables that can appear by combining an initial and a final.⁴⁹ The situation shows that there should be rules to control arbitrary combination of an initial and a final. This will be discussed in depth in the following section of Mandarin phonotactic constraints.

The strongest difference of opinions is about the position of a medial. Some researchers claim that a medial should be placed in the onset position of a syllable with an initial, while other researchers argue that a medial should be under a final. The syllable structure from the latter opinion can be presented as the traditional description of Mandarin syllable structure. On the other hand, the Mandarin syllable structure should be drawn as follows, if a medial is placed under the onset position.

⁴⁹ According to Yu (2010: 42), 770 Mandarin syllables can appear by adding the total number of initials and finals, but only 405 combinations of Mandarin syllable can be made.

Figure 7. Mandarin syllable structure



The analysis that a medial is placed under the onset position (Duanmu 2007, Lin 2007) can provide an advantage for the analyses of Mandarin loanword adaptation originating from English in this study, in that the Mandarin syllable structure can be consistent with the structure of English syllables. However, this study follows the traditional viewpoint that a medial is placed under a final. The reason is that the phonological position of Mandarin medials in Mandarin syllable structure is very different from English glides placed in the onset position, and Mandarin medials have a close relationship with a rhyme (Yu 2010: 43). In fact, where a medial should be placed is not an important issue in this study, and does not affect the analyses of Mandarin loanword adaptation. Thus, further discussion about this issue will not be made.

In sum, the characteristics of Mandarin syllable structures can be summarized as follows, based on the discussion above. The smallest structure of Mandarin syllable is composed of a single nucleus (V), and the biggest one consists of four segments of consonants and vowels (CGVX: X= i, u, n, ŋ). In other words, the most necessary

element in Mandarin syllables is a nucleus; the other elements are optional.⁵⁰ Moreover, the vowels have the advantage over the consonants in Mandarin syllables, and thus two or three vowels can come continuously, whereas consonant clusters are not allowed in Mandarin syllables. The types of Mandarin syllables can be listed as follows:

List 15. Types of Mandarin syllables

Mandarin syllable structures		examples	
1. V	è	饿	hungry
2. CV	mā	马	horse
3. GV	yā	鸭	duck
4. CGV	duō	多	many
5. VC	ān	安	peace, safe
6. VV	ài	爱	love
7. CVC	lán	蓝	blue
8. CVV	lái	来	come
9. GVC	yán	盐	salt
10. GVV	yào	药	medicine
11. CGVC	huàn	换	change
12. CGVV	huài	坏	bad

(Lin 2007: 107)

3.1.4 Mandarin phonotactic constraints

There should be 1620 Mandarin syllables after adding 4 tones, since Mandarin has 405 basic syllables before adding tones (Chin 2008: 89). However, there are only

50 A few Chinese dialects have syllables composed of consonants. ‘你[n]’ in Hunan Changsha speech (湖南长沙口語), ‘五[n]’ in Shanghai speech, and a few of answering words (应答应词) such as “姆”[m], “嗯”[ŋ], “哼”[h, ŋ] can be examples (He 2002: 25).

1278 tone syllables in Mandarin, because some syllables do not have all four tones (Chin 2008: 89). Compared to English, which has almost 10,000 syllables, Mandarin has many fewer syllables (He 2002: 26).

The system of Mandarin syllable structure is expressed by combining the relationship between an initial and a final. However not every initial can arbitrarily form a syllable with all the finals. In other words, there are many rules and constraints govern syllable formation with Mandarin initials and finals. In particular, strong regularity is shown between the place of articulation of the initials and the shape of lips of vowels (He 2002: 26). Mandarin phonotactic constraints can be listed as follows:

List 16. Mandarin phonotactic constraints

1. The smallest Mandarin syllable is composed of a nucleus only, while the biggest ones have four segments.
2. Regardless of onset or coda position, consonant clusters are not allowed in Mandarin syllables.
3. All the Mandarin consonants except /ŋ/ and a Zero-initial can be a Mandarin initial.
4. Only the vowels /i, u/ and the consonants /n, ŋ/ can be placed in the coda position of Mandarin syllable.
5. Bilabials /b, p, m/, alveolars /t, t^h/, retroflexes /tʂ, tʂ^h, ʂ/, and dento-alveolars /tʃ, tʃ^h, ʃ/ cannot combine with the high front round vowel /y/.
6. The labiodental /f/ and velars /k, k^h, x/ do not combine with /i, y/.
7. Palatals /tɕ, tɕ^h, ɕ/ combine only with /i, y/.
8. In Mandarin, the only consonants that can combine with /y/ are /n, l/.
9. The finals having /a/, /ɑ/, and /o/ do not combine with /y/.
10. /ai/ and /ei/ do not combine with /i, y/, /ao/ and /ou/ nor with /u, y/ when the three vowels come in a row in the final.
11. /aŋ/ in a final does not combine with /y/.

When Mandarin syllables are discussed, there is one more important thing to consider in the discussion of Mandarin syllables. That is, Mandarin syllables can have an accidental gap. Accidental gap, which only appears sporadically, are not easy to explain, while a systematic gap in the phonological form can be explained by general linguistic principles and features (Lin 2007: 117).⁵¹ For example, Mandarin retroflexes [tʂ] and [ʂ] can combine with [ei], but *[tʂ^hei] is an impossible form (Yu 2010: 44). The reason why this kind of accidental gap exists is not clear, but historical reasons of language development, sound changes, dialectal phonology, or the effect of the frequency of using segments can be considered (Yu 2010: 44). Other examples of accidental gaps are as follows: [ʧa], [ʧaŋ], [ʧəŋ], [kwəŋ], [tia], [nia], [nia], [tin], [tiaŋ], [lwei], [nwaŋ] (Lin 2007: 120).

3.1.5 Mandarin tones

Mandarin syllables not only have consonants and vowels that are segmental elements but also tones that are suprasegmentals. The relationship between tones and syllables is arbitrary, and in principle every structure of Mandarin syllables should be able to combine with every tone (Yu 2010: 45). Mandarin typically has four tones which have different pitch values.⁵² There are various ways to mark the tones. The numbers 1, 2, 3 and 4 can be given, or diacritics such as ˉ, ˊ, ˋ, and ˋ can be added on the vowel of

51 The examples of systematic gaps are [pw] and [bw] which are not found in many languages. That is, a form that cannot be accepted by native speakers is a systematic gap, but on the other hand it is an accidental gap, which is a form not found in the language even though it can be accepted by native speakers since it is possible phonological forms such as *[tin] and *[nia] in Mandarin (Lin 2007: 117).

52 In addition, Mandarin has a neutral tone other than four lexical tones, but it is naturally shorter than other four tones. Thus, it is given to the grammatical morphemes or unstressed syllables (Miao 2005: 42, Chin 2008: 67).

Pinyin of a word. Mandarin four tones can be presented as follows⁵³:

Table 3. The four tones in Mandarin

Mandarin tones	Tone name (Pitch contours)	Tone number (letter) ⁵⁴	Examples
1 st tone	High even (HH)	55 (ˉ)	mā or ma1 妈 (mother)
2 nd tone	High rising (MH)	35 (ˊ)	má or ma2 麻 (hemp)
3 rd tone	Low (L)	214 (ˇ)	mǎ or ma3 马 (horse)
4 th tone	Falling (HL)	51 (ˋ)	mà or ma4 骂 (to scold)

As seen above, the meaning of a word is different depending on the tone given to the word, even though the word has the same combination of an initial and a final. Therefore, Mandarin tones play an important role in forming Mandarin syllables, since they have a function to distinguish meaning as consonants and vowels. The following sentences show well how important Mandarin tones are.

List 17. Examples of meaning variations based on Mandarin tones

1. Má mā mà mǎ ma? “Does the hemp mother scold the horse?”
2. Mǎ mà má mā ma? “Does the horse scold the hemp mother?”
3. Má mǎ mà mā ma? “Does the hemp horse scold the mother?”
4. Mā mà má mǎ ma? “Does the mother scold the hemp horse?”

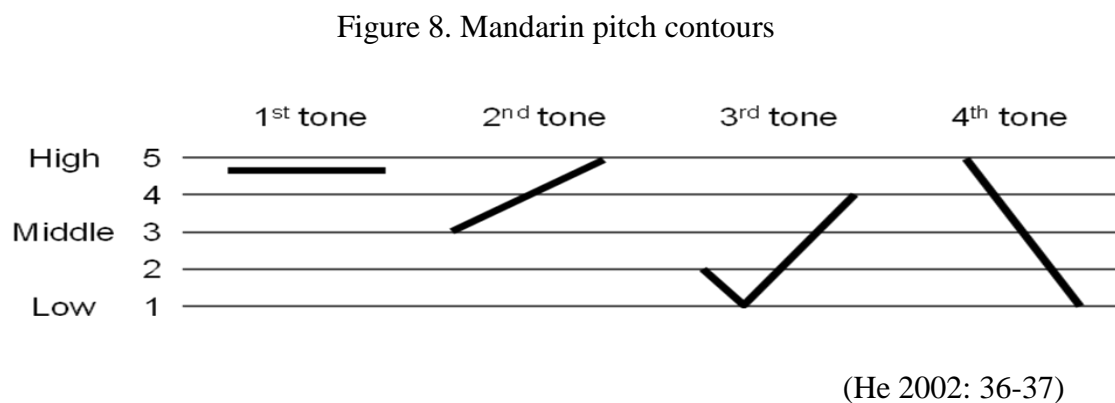
(Chin 2008: 67)

⁵³ For example, the Mandarin first tone can be described as ma1, mā, maHH, and maˉ.

⁵⁴ This kind of Mandarin tones marking method is introduced by Yuen Ren Chao (1930, 1933, 1968). In particular, the pictures in () are known as ‘Chao tone letters’, and they are adopted into the International Phonetic Alphabet (IPA).

The pitch ranges of each person are different, and thus we cannot tell the absolute pitch ranges of Mandarin tones. However, the pitch contours are identical (Chin 2008: 67).

Mandarin pitch contours can be drawn as follows :



As shown in Figure 8, the Mandarin first tone is a high-even tone, the second tone is a high-rising tone, and the fourth tone is a falling tone. As for the third tone, the most particular feature is that it is a low tone, so it should be low enough to show as a low tone. However, its tonal value changes ‘214’ to ‘21’ since the rising part disappears, when it is followed by the other tones. This kind of third tone is called ‘Half Shangsheng (*bàn-shǎng* 半上)’ (Yu 2010: 46).

3.2 English phonology

Many English variations have been diachronically and synchronically shown.

Various English pronunciations can appear according to dialects.⁵⁵ Among these

⁵⁵ English is spoken in many countries such as Australia, Canada, the Commonwealth Caribbean, Ireland, New Zealand, the United Kingdom, and the United States. In addition, English is used as a 1st and 2nd language in most continents, especially in South Africa and India. Among these English variations, English spoken in England, America, and Australia is treated as prestige or standard accents

English variations, American English has been the more influential one in the world. In China, British English was influential in the past time, but the power has moved on American English (Miao 2005, Yip 1993). Thus, the standard of English discussed in this study is the sound system of American English.

3.2.1 English consonants

There are different opinions about the total number of English consonants. Some researchers suggest 25 consonants (Clemente 2012, McCully 2009, Celce-Murica, Brinton and Coodwin 1996), but some present 24 consonants (Freeman and Freeman 2004, Spencer 1996, Avery and Ehrlich 1992). The key issue is whether or not English /hw/ (or /ʍ/) should be included into English consonant inventory. The view that English has 24 consonants will be taken in this study, since English /hw/ was already merged into /w/ in many English dialects (Chang 2009: 10). Just as the classification of Mandarin consonants discussed earlier, English consonants can be classified by three features. The only difference is that [±voiced] is a standard of classification instead of [±aspirated]. First, English consonants can be divided into eight types by the place of articulation as follows:

List 18. Types of English consonants classified by the place of articulation

1. Bilabials : /p/, /b/, /m/, /w/ - Example: **p**ost, **b**at, **m**other, **w**ide
2. Labiodentals: /f/, /v/ - Example: **f**ood, **v**est
3. Dentals: /θ/, /ð/ - Example: **th**ree, **th**at
4. Alveolars: /t/, /d/, /n/, /s/, /z/, /l/, /r/ - Example: **t**oast, **d**og, **n**oon, **s**ea, **z**oo, **r**un, **l**ion

(Clemente 2012: 3).

5. Palato alveolars: /ʃ/, /ʒ/⁵⁶, /tʃ/, /dʒ/, /j/ - Example: **she**, **genre**, **child**, **judge**, **universe**
6. Velars: /k/, /g/, /ŋ/ - Example: **kite**, **goose**, **sing**
7. Glottal: /h/ - Example: **house**

English consonants are divided into six types by the manner as follows:

List 19. Types of English consonants classified by the manner of articulation

1. Plosives: /p/, /b/, /t/, /d/, /k/, /g/
2. Nasals: /m/, /n/, /ŋ/
3. Fricatives: /f/, /v/, /θ/, /ð/, /s/, /z/, /ʃ/, /ʒ/, /h/
4. Affricates: /tʃ/, /dʒ/
5. Liquids: /l/, /r/
6. Glides: /w/, /j/

English consonants are divided into two groups by [±voiced]

List 20. Types of English consonants classified by [±voiced]

1. voiceless : /p/, /t/, /k/, /f/, /θ/, /s/, /ʃ/, /tʃ/, /h/
2. voiced : /b/, /d/, /g/, /m/, /n/, /ŋ/, /v/, /ð/, /z/, /ʒ/, /dʒ/, /l/, /r/, /w/, /j/

Based on the discussion above, English consonants can be presented as below.

⁵⁶ Basically, /ʒ/ and /ŋ/ cannot come in the onset place in English syllables (McCully 2009: 92). However, /ʒ/ in the onset position can be found in only a few loanwords which originated from foreign languages, while /ŋ/ is never located in the onset position (He 2002: 29).

Table 4. The inventory of English consonants

	Labial	Labio dental	Dental	Alveolar	Palato alveolar	Velar	Glottal
Plosive	/p/ /b/			/t/ /d/		/k/ /g/	
Nasal	/m/			/n/		/ŋ/	
Fricative		/f/ /v/	/θ/ /ð/	/s/ /z/	/ʃ/ /ʒ/		/h/
Affricate					/tʃ/ /dʒ/		
Liquid				/ɹ/			
				/l/			
Glide	/w/				/j/		

In the table above, the voiceless consonants are listed on the left, and the voiced consonants are on the right. As for the liquids, the lateral one is listed in lower cell, and the non-lateral one is in upper cell.

3.2.2 English vowels

The standard classification of English vowels includes both vowel quality and vowel quantity. (Spencer 1992: 25). Vowel quantity means how long the sound lasts. However, this study does not consider vowel quantity, since it is not an important element for the analysis of Mandarin loanword adaptation. Thus, English vowels will be classified only by vowel quality in this study. The most important factors in vowel quality are tongue height, backness, and lip rounding (Spencer 1992: 25).

The description and numbers of English vowels are different depending on researchers and dictionaries. The *Longman Pronunciation Dictionary* by John C. Wells presents 23 vowels including diphthongs; the *American Heritage Dictionary* lists 18

vowels including r-colored vowels (Clemente 2012: 3). A.C. Gimson (1975) suggests 12 single vowels and eight diphthongs (He 2002: 9). Hammond (1999) argues that English has four diphthongs, and Bauman-Waengler (2009) shows five English diphthongs (Yu 2010: 33). Thus, the English diphthong is one of most significant factors that causes different opinions about English vowels. In fact, it is more difficult to qualify vowels than consonants, since vowel quality is distinguished by subtle changes of the vocal tract (Smakman 2006: 231). In addition, the definition of diphthong is “not entirely straightforward” (Spencer 1996: 30), and thus it makes the classification of vowels more difficult. Therefore, English diphthongs are not included in the discussion of this study just as they are not included in the discussion of Mandarin vowels.

Generally, 12 American English single vowels are presented (Avery and Ehrich 1992, Fromkin and Rodman 1993, Spencer 1996, Odden 2005, Clemente 2012). If /ə/ is treated as an allophone of /ʌ/ placed in the unstressed syllable, 11 vowels can be suggested, but /ə/ will be included in this study. First, English vowels can be divided into three types by tongue height. The examples are adopted from Spencer (1992: 33), and will be presented in the same order of corresponding vowels.

List 21. English vowels classified by tongue height

1. high : /i/, /ɪ/, /u/, /ʊ/ - Examples: **beat, bit, boot, book**
2. mid : /e/, /ɛ/, /ə/, /ʌ/, /o/, /ɔ/ - Examples: **bait, bet, machine, but, boat([ou]), bought**
3. low : /æ/, /a/ - Examples: **bat, pot**

List 22. English vowels classified by backness

1. Front : /i/, /ɪ/, /e/, /ɛ/, /æ/
2. Central : /ə/, /ʌ/, /a/
3. Back: /u/, /ʊ/, /o/, /ɔ/

List 23. English vowels classified by lip rounding

1. rounded vowels : /u/, /ʊ/, /o/, /ɔ/
2. unrounded vowels : /i/, /ɪ/, /e/, /ɛ/, /æ/, /ə/, /ʌ/, /a/

English vowels can be classified by tense/lax. Lax vowels are a little shorter and lower/centered than corresponding tense vowels, so they are closer to mid vowel (Lin 2007: 60-61).

List 24. English vowels classified by tense/lax

1. Tense : /i/, /u/, /e/, /ɔ/, /o/, /a/, /ə/
2. Lax : /ɪ/, /ʊ/, /ɛ/, /ʌ/, /æ/

As based on the discussion above, English vowels can be presented as in the table below.

Table 5. The inventory of English vowels

		Front/Unrounded	Central/Unrounded	Back/Rounded
High	Tense	/i/		/u/
	Lax	/ɪ/		/ʊ/
Mid	Tense	/e/	/ə/	/o/
	Lax	/ɛ/	/ʌ/	/ɔ/
Low	Lax	/æ/	/a/	

3.2.3 English syllables

Researchers have different opinions about English syllable structures as well.⁵⁷ Kessler and Treiman (1997) argue that there is significant connection between the vowel and the following consonant (coda) in the English syllable CVC while the initial consonant (onset) and the vowel do not have that kind of association. Kessler and Treiman (1997) support the idea that English CVC syllables are composed of an onset and a vowel-coda rhyme. This study agrees with this interpretation, and presents English syllable structure as follows:

57 The following figures demonstrate various analyses of English syllable structures.

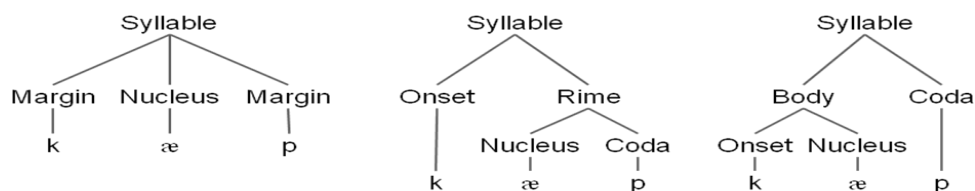
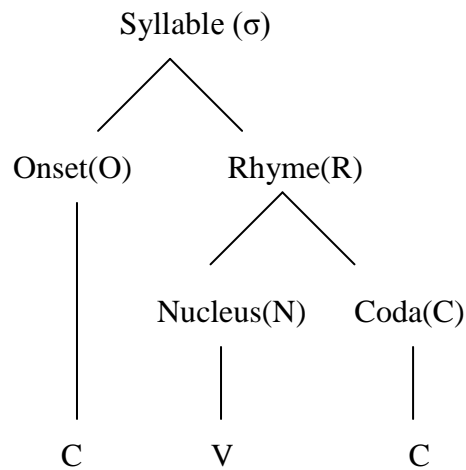


Fig. 1: Flat, onset-rime, and body-coda theories of syllable structure, illustrated with the word *cap*.
(Kessler and Treiman 1997: 297)



Fig. 2: Moraic theory of syllable structure, illustrated with 'cap' (short vowel) and 'keep' (long vowel).
(Kessler and Treiman 1997:298)

Figure 9. English syllable structure



The structure of English segments which can be placed in each part of the syllable is much more complicated than the structure of Mandarin segments. The following figure shows the complexity of the structure of English segments in each part of a syllable.

Figure 10. English segmental components in each part of a syllable

Syllable		
Onset	Rhyme	
	Nucleus	Coda
(C)(C)(C)	V	(C)(C)(C)(C)

English allows consonant clusters in both the onset and coda positions. In the onset position, up to three consonants can occur (e.g. strike, Christmas, grasp, study, good, pet). In the coda position, up to four consonants can occur (e.g. against, sixths, sculpts, next, twelfth, glimpse, put, see). Thus, it is very interesting to study about how English words are adapted into Mandarin loanwords, since Mandarin does not allow consonant

clusters in any position of a syllable. The following tables show consonant clusters existing in English syllables.⁵⁸

Table 6. English consonant clusters

Table 6-1. Initial two-consonant clusters beginning with a stop consonant

lips		tooth ridge		velum	
cluster	example	cluster	example	cluster	example
pl	play			kl	clean
pr	pray	tr	tree	kr	cream
py	pure	ty	tune	ky	cute
		tw	twin	kw	queen
bl	blue			gl	gleam
br	brew	dr	dream	gr	green
by	beautiful	dy	due		
		dw(rare)	dwindle	gw(rare)	gwen

Table 6-2. Initial two consonant clusters beginning with a fricative

lips		tooth ridge		velum		hard palate	
cluster	example	cluster	example	cluster	example	cluster	example
fl	flew			sl	slow		
fr	fly	θr	three			ʃr	shriek
fy	few			sy	suit		
		θw (rare)	thwart	sw	switch		
				sp	spit		

⁵⁸ The tables are adopted from Avery and Ehrich (1992: 55-58).

				st	stone		
				sk	school		
				sm	smile		
				sn	snow		
				sf	sphere		
vy (rare)	view						

Table 6-3. Clusters beginning with a nasal

lips		tooth ridge	
cluster	example	cluster	example
my	music	ny	news

Table 6-4. Clusters beginning with /h/

cluster	example
hy	huge
hw	whether

Table 6-5. Initial clusters of three consonants in English

cluster	example	cluster	example	cluster	example
spl	splice			skl(rare)	sclerosis
spr	spring	str	string	skr	screw
spy	spew	sty	stew	sky	skew
				skw	squirt

Table 6-6. Final clusters of two consonants beginning with a nasal

lips		tooth ridge		velum	
mp	bump	nt	rant	ŋk	think
m(p)f	triumph	nd	hand		
		ns	tense		
		nθ	tenth		
		ntʃ	wrench		
		ndʒ	strange		

Table 6-7. Final clusters of two consonants beginning with a liquid

l		r		l		R	
cluster	example	cluster	example	cluster	example	cluster	example
lp	help	rp	harp	lθ	wealth	rθ	hearth
lb(rare)	bulb	rb	curb	ls	else	rs	course
lt	welt	rt	art	lʃ	Welsh	rʃ	marsh
ld	old	rd	cord	ltʃ	belch	rtʃ	arch
lk	milk	rk	cork	ldʒ	bluge	rdʒ	barge
		rg	morgue	lm	film	rm	arm
lf	elf	rf	scarf	ln	kiln	rn	barn
lv	shelve	rv	serve			rl	girl

Table 6-8. Final clusters of two consonants beginning with a fricative or stop

fricative		stop	
cluster	example	cluster	example
sp	wasp	pt	apt
st	trust	pθ	depth
sk	ask	ps	lapse
ft	rift	tθ(rare)	eighth
fθ	fifth	ts	ritz
		kt	act
		ks	tax
		dz	adze

Table 6-9. Final clusters of three consonants in English

stop		Nasal		liquid	
cluster	example	cluster	example	cluster	example
kst	text	mpt	exempt	lts	waltz
ksθ	sixth	mps	glimpse	rps	corpse
		nts	prince	rts	quartz
		nst	against	rst	first
				rld	world
				rlz	Charles
				r(p)θ	warmth

The most pivotal element of a syllable is the nucleus, and a vowel as a nucleus must exist to form a syllable. An onset and a coda, on the other hand, are not required. Vowels that are loud and high are syllabic, since they can form a syllable by themselves. On the contrary, most consonants are non-syllabic. However, some English consonants such as /n, m, ŋ, l, r/ are called sonorants, since they are loud and high sounds. When they are pronounced without stress, they can form a syllable with another consonant in front of them. Thus, this kind of consonant is called a ‘syllabic consonant’ and marked as [,]. ‘Even,’ ‘happen,’ ‘awful,’ ‘rhythm,’ and ‘able’ can be examples (He 2002: 27).

So far, the syllable structures of American English have been discussed. In section 3.2, the phonotactic constraints to control English syllable structures were not discussed, since they are not necessary to analyze adaptation of Mandarin loanwords that originated from English while Mandarin phonotactic constraints are very important in adaptation of Mandarin loanwords.

3.2.4 English stress

English is a stress language, while Mandarin is a tone language. English stress generally does not play a significant role in distinguishing the meaning of a word. However, English stress sometimes can be phonemic. For example, English ‘desert’ and ‘dessert’ are distinguished by stress. The noun ‘a record’ is different from the verb ‘to record’ only in stress (Clemente 2012: 9). According to Avery and Ehrlich (1992: 185), “suprasegmentals are extremely important in the communication of meaning in spoken language. It is the suprasegmental that controls the structure of information.” Therefore, English stress is important when foreigners learn English as a second language.

English lexical words (e.g. nouns, adjectives, and verbs, etc.) must bear stress (McCully 2009: 69, Clemente 2012: 9). On the other hand, grammatical words (e.g. auxiliary verbs, prepositions, pronouns, etc.) do not have any stress (Clemente 2012: 9). Even a monosyllabic word also must bear stress if it is a lexical word, but that stress is not transcribed (McCully 2009, Hammond 1999). Generally speaking, there are three degrees of stress in English: Primary, secondary, and unstressed.⁵⁹ Primary stress is marked as [ˈσ], and secondary stress as [,σ]. According to McCully (2009), the three degrees of stress are given by the following rules.

List 25. Three degrees of stress

1. Syllables that are most prominent within individual words bear primary stress
2. Syllables that are less prominent than those in 1, but which do not have pronunciation

⁵⁹ These concepts can be described in a different way: Stressed, unstressed, and reduced. In addition, “a four-way stress classification” can be presented: Primary (tonic stress), secondary (lexical stress), tertiary (unstressed full vowel), and quaternary (reduced vowel) (Clemente 2012: 9). This present study follows these concepts of primary, secondary, and unstressed.

(in schwa, or /ɪ/, or possibly a syllabic consonant like /r/, /n/, /m/) diagnostic of stresslessness, may be said to have secondary stress

3. Syllables having pronunciations diagnostic of stresslessness may be said to be unstressed.

(McCully 2009: 71)

Stressed syllables are louder, longer, and higher pitched than unstressed ones. Moreover, stressed syllables not only have a tendency to show a fuller realization, but also have a steady tempo (Clemente 2012: 9).

In addition to stress, intonation is important in English. “The pattern of pitch changes over a phrase or sentence is called intonation” (Lin 2007: 88). Intonation plays a role in carrying meaning in spoken language, as well as provides the information about the attitude of speakers (Avery and Ehrlich 1992: 192). However, intonation cannot distinguish the meaning of words, and only expresses the syntactic or contextual meanings (Lin 2007: 89). The target of this study is limited to the level of words, not sentences, and thus further discussion about intonation will not be made.

3.3 Comparison and contrast between Mandarin and English⁶⁰

There are a number of similarities between Mandarin and English. First, both languages have a large phonemic inventory (Yang 2000). Second, they have affricates. Third, their vowels are generally unrounded (Chang 2009: 21). However, an in depth phonological inventory reveals more differences than similarities. In section 5.3, based on the discussions so far, Mandarin and English phonemes, syllables, and

⁶⁰ Section 3.3 and Section 4.3 were published by Kim (2012c).

suprasegmental elements will be compared or contrasted. The discussion will focus on three things: First, the consonants and vowels of both languages are compared. Second, the difference between Mandarin syllables, which do not allow consonant clusters, and English syllables, which have various consonant clusters in the onset and coda positions, will be discussed. Third, Mandarin tones, which are lexical tones, and English stress will be compared.

3.3.1 Consonants

Mandarin and English consonants can be compared with five types according to the places of articulation: plosive, fricative, affricate, approximant, and nasal. The feature [\pm aspirated] is distinctive in Mandarin, while [\pm voiced] is distinctive in English. The letter in () of Mandarin phonemes in the tables is the corresponding Pinyin of each Mandarin phoneme.

Plosives

Mandarin has three pairs of plosives distinguished by [\pm aspirated], while English has three pairs of plosives with [\pm voiced].

Table 7. Mandarin and English plosives

	Bilabial	Alveolar	Velar	voiced	Aspirated
Mandarin	/p/ (<i>b</i>)	/t/ (<i>d</i>)	/k/ (<i>g</i>)	-	-
	/p ^h / (<i>p</i>)	/t ^h / (<i>t</i>)	/k ^h / (<i>k</i>)	-	+

English	/b/	/d/	/g/	+	-
	/p/	/t/	/k/	-	+

According to Yang (2000), English /b, d, g/ are unaspirated, and /p, t, k/ are aspirated. Also, according to Kane (2006), Mandarin /p^h, t^h, k^h/ show stronger aspiration than English /p, t, k/. In fact, both aspirated plosives and unaspirated ones exist in spoken English, but they are not distinctive, unlike Mandarin plosives, since English aspirated and unaspirated plosives are allophones in complementary distribution. Aspirated sounds appear in the beginning of a syllable, while unaspirated ones appear after [s] (Lin 2007: 42). The following figures demonstrate the difference of phonemic positions of aspirated bilabial plosives and unaspirated counterparts in Mandarin and English.

Figure 11. Phonemic representation of /p/ and /p^h/ in Mandarin and English

	Mandarin		English	
Phoneme	/p/	/p ^h /	/p/	
			/ \	
Phonetic realization	[p]	[p ^h]	[p]	[p ^h]
			allophone	allophone
			after [s]	syllable initially

(Lin 2007: 42)

Fricatives

Unlike plosives, Mandarin does not have any pair of [\pm aspirated] fricatives. However, English fricatives still have some pairs distinguished by [\pm voiced].

Table 8. Mandarin and English fricatives

	Labio-dental	Dental	Alveolar	Retroflex	Alveo-palatal	Velar	Glottal	Voiced
Mandarin	/f/ (<i>f</i>)		/s/ (<i>s</i>)	/ʃ/ (<i>sh</i>)	/ç/ (<i>x</i>)	/x/ (<i>h</i>)		-
English	/f/	/θ/	/s/		/ʃ/		/h/	-
	/v/	/ð/	/z/		/ʒ/			+

Mandarin /f/ is almost the same as English /f/ (Lin 2007: 44), and also Mandarin /s/, in fact, is not different from English /s/ (Chang 2009: 24). English does not have any phoneme that is the same as Mandarin /ʃ/. Pronouncing Mandarin /ʃ/, the tip of the tongue should be lifted more up to the palate, while the tongue is placed in the back of the front teeth when /s/ is pronounced. Mandarin /ç/ is similar to English /ʃ/, in that they are voicelessly made between the hard palate and the blade of the tongue (Chang 2009: 25), but their parts of articulation are different. That is, when /ç/ is pronounced, the front part of the blade of the tongue moves closer to the front of the hard palate, and thus the friction is made in a little more front part than when English /ʃ/ is pronounced (He 2002: 20). Therefore, when /ç/ is pronounced, the approaching area of the tongue and the hard palate is much smaller than English /ʃ/, and the lips do not protrude, but become flat (He 2002: 20). Also, English /ʃ/ is different from Mandarin /ʃ/, in that the front part of the tongue moves a little toward the hard palate when English /ʃ/ is pronounced, while the front part of the tongue is flat when Mandarin /ʃ/ is pronounced (Lin 2007: 46). Mandarin /x/ and English /h/ are perceptually similar, but Mandarin /x/ shows stronger friction than English /h/ (Chang 2009: 25). English /v, θ, ð, z, ʒ/ do not exist in the Mandarin phonemic inventory. Thus, many Mandarin speakers tend to pronounce English /θ, ð/ as Mandarin /s, ts/ (He 2002: 20). In addition, there is a tendency to

pronounce English /z/ as Mandarin /ts/, but they, in fact, must be pronounced with completely different places of articulation and manners (He 2002: 20). This kind of tendency may be affected by Pinyin z [ts].

Affricates

English has only one pair of [\pm voiced] affricate, while Mandarin has three pairs distinguished by [\pm aspirated].

Table 9. Mandarin and English affricates

	Dento- alveolar	Retroflex	Alveo- palatal	voiced	Aspirated
Mandarin	/ts/ (<i>z</i>)	/tʂ/ (<i>zh</i>)	/tɕ/ (<i>j</i>)	-	-
	/tsʰ/ (<i>c</i>)	/tʂʰ/ (<i>ch</i>)	/tɕʰ/ (<i>q</i>)	-	+
English			/tʃ/	-	
			/dʒ/	+	

Mandarin /tɕ, tɕʰ/ are the same sounds as English /tʃ, dʒ/, in that their places of articulation and manners are identical (He 2002: 21, Chang 2009: 26). Therefore, they can be mixed with each other, but they are different only in that the lips protrude when pronouncing English /tʃ, dʒ/, while this is not the case with Mandarin /tɕ, tɕʰ/ (Xu 1984). As for Mandarin /ts, tsʰ/ and /tʂ, tʂʰ/, English does not have the same sounds. However, Mandarin /tsʰ/ is perceptually similar with ‘ts’ in English ‘cats,’ and Mandarin /ts/ is with ‘ds ([dz])’ in English ‘seeds’ (Lin 2007: 44-45). The difference is that Mandarin /tsʰ/ can appear in the beginning of syllable, and is a dental affricate, while English ‘ts’

cannot be placed in the beginning of syllable and, is a ‘two-consonant sequence’ (Lin 2007: 44). In addition, Mandarin /ts/ is a voiceless sound, but English [dz] is a voiced sound, so their feature of [\pm voiced] is clearly different. Mandarin retroflexes /tʂ, tʂʰ, ʂ, ʐ/, in fact, are rarely found in other languages (He 2002: 18).⁶¹ Comparing Mandarin /tʂ, tʂʰ/ to English affricates /tʃ, dʒ/, the quality of sound of English /tʃ, dʒ/ is harder than Mandarin /tʂ, tʂʰ/ (He 2002; 21). The reason is that the part of friction in English /tʃ, dʒ/ is a little more back, and the area of friction is also smaller than Mandarin /tʂ, tʂʰ/ (He 2002: 21).

Approximants

Neither Mandarin nor English has any pair of approximant with [\pm voiced] or [\pm aspirated]. Mandarin has two approximants and English has four approximants.

Table 10. Mandarin and English approximants

	Bilabial	Alveolar	Retroflex	Palatal
Mandarin		/l/ (<i>l</i>)	/ʐ/ (<i>r</i>)	
English	/w/	Non-lateral Lateral	/ɹ/ /l/	/j/

Basically, Mandarin /l/ and English /l/ are the same sounds (Chang 2009: 27). In

61 Traditionally, based on Chao’s (1948, 1968) description, Mandarin /tʂ, tʂʰ, ʂ, ʐ/ are classified into retroflexes. “Retroflexes are apical-alveolar in which the tongue tip is curled upward and backward and make use of the underside of the tongue tip to touch or approach the post-alveolar region” (Lin 2007: 45). In fact, the latest studies such as Lee and Zee (2003) and Zee (2003a) show that the pronunciations of Mandarin speakers are not typical retroflex sounds (Lin 2007: 45). However, this study follows traditional view, and thus classifies Mandarin /tʂ, tʂʰ, ʂ, ʐ/ as retroflexes.

addition, Mandarin /ɿ/ is perceptually similar with English /ɪ/ (Lin 2007: 45). However, it is hard for Mandarin speakers to distinguish English /l/ and /ɹ/, and thus they tend to change English /ɹ/ to Mandarin /l/ (Avery and Ehrlich 1992: 116). In fact, English /ɹ/ is a different sound from Mandarin /ɿ/. Native English speakers pronounce /ɹ/ as an alveolar or post-alveolar or sometimes even pronounce it by pulling the tongue tip down and lifting the tongue body (Ledefoged and Maddieson 1996: 223-226). Moreover, many native English speakers pronounce /ɹ/ as a rounded sound, but Mandarin speakers, on the contrary, do not round the lips when pronouncing /ɿ/, but do round the lips when [w] or [u] follows after /ɿ/ (Lin 2007: 45-46). In addition, Mandarin /ɿ/ is made by lifting the tongue tip toward the back of the alveolar ridge, and is a voiced sound (Lin 2007: 46). As for English glides, the glides /j, w/ are very similar sounds with vowels, in that they make little or no friction when the air passes (He 2002: 19). Mandarin also has [j, w, ɥ]. They are easily perceived as the vowel [i, u, y], so they are written as vowels in Pinyin. Thus, they are often treated as vowels in Mandarin phonetics and phonology (Lin 2007: 49). However, Mandarin [j, w, ɥ] and English glides are different, in that English glides are independent consonant phonemes, which can distinguish the meanings of words, while Mandarin semi-vowels are not independent phonemes but only allophones of the vowels /i, u, y/. The Mandarin semi-vowels have a little higher tongue position than English [i, u]. Mandarin [j, w, ɥ] appear when Mandarin /i, u, y/ come in the onset of a Zero-initial syllable, because the tongue tip or the back of the tongue is lifted and by doing so, friction is made. The function of Mandarin semi-vowels is that they prevent the consonant in the coda position from forming a syllable with the vowel in the beginning of the syllable, since Mandarin [j, w, ɥ] can function as consonants (He 2002: 19).

Nasals

Basically, Mandarin and English nasals are identical which can be seen in the following table.

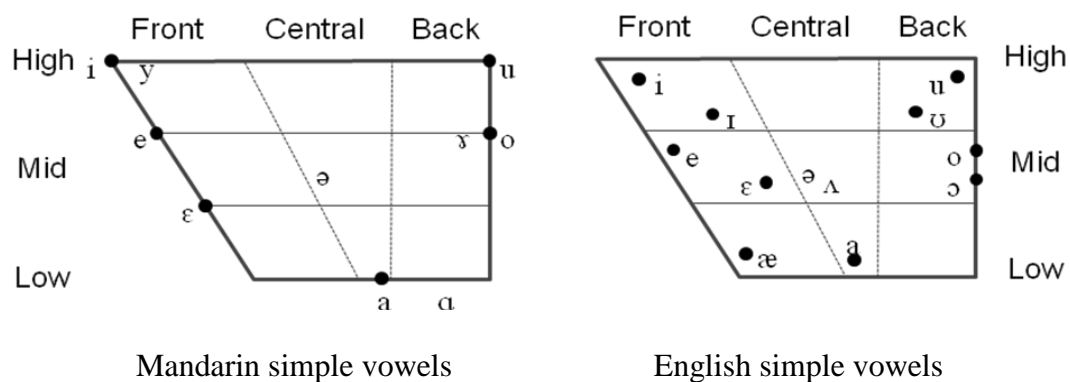
Table 11. Mandarin and English nasals

	Bilabial	Alveolar	Velar
Mandarin	/m/ (<i>m</i>)	/n/ (<i>n</i>)	/ŋ/ (<i>ng</i>)
English	/m/	/n/	/ŋ/

3.3.2 Vowels

As discussed in 3.1.2 and 3.2.2, this study presents 12 Mandarin vowels /i, y, u, e, ə, ɤ, o, ε, a, ɑ, ɿ, ʅ/ and 12 English vowels /i, ɪ, u, ʊ, e, ε, ə, ʌ, o, ɔ, æ, ʌ/.⁶² The vowel systems of both languages can be compared as follows:

Figure 12. Vowel comparison between Mandarin and English⁶³



⁶² According to Lin (2007: 59), English [a] is used as the central vowel, while Mandarin [a] is treated as the front low vowel (Lin 2007: 59).

⁶³ Chang (2009), Lin (2007), He (2002), and Spencer (1996) were referenced for this figure.

As seen above, English vowels are more evenly spread throughout the tongue position, compared to Mandarin vowels. All the English vowels are dorsal sounds, have various tongue heights, varying degree of backness/frontness, and thus generally look balanced (He 2002: 12). On the other hand, all the Mandarin vowels are mid or high vowels except three low or low-mid vowels /a, ɑ, ɛ/. In other words, there are many high vowels but only a few low vowels in Mandarin. Also, Mandarin has two apical vowels other than dorsal vowels. Thus, Mandarin speakers tend to lift the tongue height when they start learning English (Chang 2009: 28, Yang 2000). Unlike English vowels which contrast with tense/lax (e.g. i and ɪ, e and ɛ, u and ʊ), all the Mandarin vowels are rather long (He 2002: 12). According to He (2002), when pronouncing Mandarin vowels, the tongue is located in the most front/back/high/low places as shown in the figure above. Among the vowels, the locations of the tongue for /i, y, u, o/ are exactly identical to the standard vowels' position. On the other hand, English vowels, except for the central vowel, tend to be closer to the center than Mandarin vowels (He 2002: 13). The vowels of both languages can be classified with the tongue height as follows (R=rounded, U=unrounded, T=tense, L=lax, F=front, C=central, B=back):

High vowels

Table 12. High vowels in Mandarin and English

Mandarin	i	U	F	
	y	R		
	u	R	B	
English	i	T	U	F
	ɪ	L	U	
	u	T	R	B
	ʊ	L	R	

As shown in the table above, Mandarin high front vowels contrast in [\pm rounded], and English high front and back vowels contrast with tense/lax. Moreover, English high front vowels are all unrounded, while English high back vowels are all rounded. According to Yang and Liu (2006), Mandarin does not have the contrast of tense/lax, and thus Mandarin speakers tend to change English /ɪ/ to Mandarin /i/ (Chang 2009: 29). Also, Yang and Liu (2006) argue that Mandarin /u/ and English /u/ are almost the same sounds, which results in Mandarin speakers often pronouncing Mandarin /u/ instead of English /ʊ/ due to the same reason with English /ɪ/ (Chang 2009: 31).

Mid vowels

Table 13. Mid vowels in Mandarin and English

Mandarin	e	U	F	
	ɛ	U		
	ə	U	C	
	ɤ	U	B	
	o	R		
English	e	T	U	F
	ɛ	L	U	
	ə	T	U	C
	ʌ	L	U	
	o	T	R	B
	ɔ	L	R	

Most Mandarin mid vowels are unrounded, but the back vowels (ɤ/o) show the contrast in [\pm rounded].⁶⁴ However, all the English mid vowels show the contrast with tense/lax

⁶⁴ Lin (2007: 76) argues that Mandarin has three high vowel phonemes, but has only a single mid vowel phoneme, which has four allophones as follows:

regardless of the features of front/back and high/mid/low. Moreover, the front vowels and mid vowels are all unrounded, but the back vowels are all rounded. Even though Mandarin /ɛ/ and English /ɛ/ are similar, the tongue height of Mandarin /ɛ/ is lower than English /ɛ/. Due to the same reason of English /ɪ/ and /ʊ/, it is hard for Mandarin speakers to distinguish English /e/ and /ɛ/ (Chang 2009:30). English /ə/ is the most general central vowel, a schwa. It appears in the unstressed syllable as ‘a’ in English, such as in the word ‘about’ (Lin 2007: 58). Another central vowel /ʌ/ is used in the stressed syllable, and is slightly lower than /ə/ (Carr 1999: 25, Ladefoged 2001: 74). As for the mid back vowel /o/, Mandarin /o/ is slightly higher than English /o/ (Chang 2009: 31).

Low vowels

Table 14. Low vowels in Mandarin and English

Mandarin	a	U	C
	ɑ	U	B
English	æ	L	F
	a	T	C

Both Mandarin and English have two low vowels, which are unrounded.⁶⁵ The low vowel /a/ exists in both languages, but Mandarin does not have a corresponding vowel to the English low front lax unrounded vowel /æ/. Therefore, it is hard for Mandarin



⁶⁵ Lin (2007: 77) argues that phonologically speaking, Mandarin has a single low vowel. That is, only /a/ is a low vowel phoneme, and it becomes similar with the back unrounded vowel [ɑ] when it comes before [u] and [ŋ], since the tongue moves backward.

speakers to distinguish English /æ/ and /ɛ/ (Avery and Ehrlich 1992: 118).

3.3.3 Syllable structures

Compared to relatively simple Mandarin syllable structures, English has very complicated and various syllable structures. English can form 18 types of the syllable structures maximally, and a single syllable has up to eight phonemes. On the contrary, Mandarin does not allow consonant clusters in any place of the syllables, and only /n/ and /ŋ/ can come in the coda position. Thus, most Mandarin syllables are open syllables, while many consonant clusters can appear and most of the syllables are closed in English. The following table shows the comparison between Mandarin and English syllable structures.

Table 15. Syllable structures in Mandarin and English⁶⁶

Types of syllable structures	Mandarin		English	
	Possibility of combination	Example	Possibility of combination	Example
V(V)	+	<i>ā</i> (阿), <i>ài</i> (爱)	+	ah , I
CV(V)	+	<i>tǐ</i> (替), <i>mài</i> (卖)	+	tea, my
V(V)C	+	<i>ān</i> (安), <i>wán</i> (完)	+	an, oil
CVC	+	<i>tōng</i> (通)	+	tongue
V(V)CC	-		+	east, old
VCCC	-		+	asks
CVCC	-		+	meets
CVCCC	-		+	next
CCV(V)	-		+	free, play

⁶⁶ The table was adopted from He (2002: 28).

CCVC	-		+	fresh
CCVCC	-		+	threads
CCVCCC	-		+	prompt
CCVCCCC	-		+	glimpsed
CCCV(V)	-		+	straw
CCVCV	-		+	screen
CCCVCC	-		+	strict
CCCVCCC	-		+	strenghts
CCCVCCCC	-		+	scrambles

3.3.4 Suprasegmentals

Tone, intonation, and stress are suprasegmental elements, while consonants and vowels are segmental elements. The change of pitch range in non-tonal languages like English generally provides syntactical and contextual information, but the pitch change in tonal languages such as Mandarin additionally demonstrates difference in meaning. Therefore, tone can be defined as the types of pitch change that affect the meaning of words (Lin 2007: 88-89). Tones have a syllable or a word as a basic carrier, but intonation, on the other hand, has a phrase or a clause as its carrier (He 2002: 34). Thus, English is an intonation language, since the sentence types can change depending on the different pitches. However, it is the tone that primarily controls the pitch changes in Mandarin, even though intonation also functions in the Mandarin sentences (Guo 1993). English does not have this type of tone, but the most primary element in the pitch change is intonation, and the next is stress or accent (He 2002: 35). Generally, there are two types of words in English: content words which express independent meaning and function words which show grammatical relationships. The former are all given major word stress, and the latter are usually unstressed (Avery and Ehrlich 1992: 75).

Both Mandarin tone and English stress are “not inherent properties of single consonants or vowels but can be associated with a span of more than one segment” (Lin 2007: 91). In other words, English stress is easily found in a nucleus vowel, but it does not mean that stress is a property of a vowel. In English, the phonological unit of stress is a syllable or a MORA,⁶⁷ and stress is usually given to a heavy syllable in stress languages as English (Lin 2007: 92). On the other hand, a tone bearing unit (TBU) can be a syllable, rhyme, MORA, sonorant, or vowel depending on the various phonological analyses (Lin 2007: 92). Many ideas about Mandarin TBU have been suggested, but generally Mandarin tones are phonetically realized in the rhyme of the syllables, and phonologically anything such as a syllable, a rhyme, or MORA can be chosen (Lin 2007: 92).

3.3.5 Writing systems

English is representative of languages which have an orthography based on the Latin letters. The smallest unit standing for a sound or a phoneme in English is an alphabetic orthography (Miao 2005: 46), since the English writing system is naturally phonemic. Sometimes, in English, two letters can express one phoneme, and one letter can represent two phonemes. For example, the ‘sh’ sound in English as in ‘shake,’ is formed by combining two letters, which represents /ʃ/, while the ‘x’ in English ‘six,’ a single letter, expresses [ks]. More interestingly, an identical letter can represent different sounds depending on the words. For instance, ‘c’ in English ‘cat’ is pronounced as [k],

⁶⁷ According to Lin (2007: 91), MORA is a prosodic weight unit. Heavy syllables have two MORAs, and light syllables have one MORA. Heavy syllables are long vowels, diphthongs, and vowels which have a coda.

but ‘c’ in English ‘city’ sounds like [s] (Chang 2009: 8). In addition, English is a multi-syllabic language, and thus it has many words composed of more than two syllables.

On the other hand, Mandarin has a non-alphabetic writing system. In addition, it is well known that Mandarin is a monosyllabic language. All the Mandarin morphemes are expressed by a single Mandarin character. A character is *zì* 字 in Mandarin. Therefore, one *zì* functions as a written symbol, a single morpheme, and a single syllable at the same time (Chin 2008: 8-9). Moreover, a character only shows the meaning of a word, but does not provide any information about the sounds of a word. Wang and Geva (2003: 2) also say that Mandarin is a “logographic system or more accurately, a morphosyllabic system (DeFrancis 1989, Mattingly 1992, Perfetti and Zhang 1995).” In sum, the basic unit of the Mandarin writing system is the character, and each character represents a monosyllabic morpheme.

In order to supplement the drawback of Mandarin characters, Pinyin is generally used. Pinyin is a system which spells sounds, and thus plays the role of both the phonetic and orthographic system (Chin 2008: 49). However, it still does not demonstrate one-to-one correspondence between sounds and spellings. For example, the letter ‘*i*’ represents three phonemes such as /i/, /ɿ/ and /ʅ/ in Mandarin (Chang 2009: 9), and ‘*c*’ in Pinyin is a sound which consists of [t] and [s] phonetically, but is expressed as a letter while ‘*ts*’ in English is a consonant cluster (Chin 2008: 49). As discussed above, Mandarin and English are completely different language types, and the analysis of loanwords that result from the contact of these two languages, therefore, should be based on the comparative study of the Mandarin and English phonological systems.

3.4. Summary

Mandarin and English belong to completely different language families (i.e. Sino-Tibetan language family and Indo-European language family). Therefore the study of loanwords that result from the contact of these different languages should start from close examination of both languages' phonological systems.

Mandarin has 22 consonants. The most contentious issue is if Mandarin consonant *r* should be considered a voiced fricative [ʐ] or an approximant [ɹ]. Mandarin *r* is considered an approximant in this chapter, since [ʐ] should be viewed as an exception due to the lack of voiced fricatives in the Mandarin phonemic inventory. As for the English consonants, this study takes the view that English has 24 consonants because English /hw/ was already merged into /w/ in many English dialects.

In the contrast of Mandarin consonants and English consonants, the most significant difference is that [±aspirated] is distinctive in Mandarin while [±voiced] is distinctive in English. As for plosives, Mandarin has three pairs distinguished by [±aspirated], and English has three pairs distinguished by [±voiced]. In fact, English has both aspirated plosives and unaspirated ones in its spoken language, but they are only allophones in complementary distribution. Thus, aspirated/unaspirated plosives are not distinctive in English. Unlike plosives, Mandarin does not have any pairs of fricatives, while English has four pairs of [±voiced] fricatives. Mandarin only has five fricatives, while English has various fricatives. Among the five fricatives, Mandarin /f/ and /s/ are the same as English /f/ and /s/. The other three Mandarin fricatives do not exist in English phonemic inventory and many English fricatives are not found in Mandarin phonemic inventory. Therefore, it is expected that there are many mismatches when

English fricatives are adapted into Mandarin loanwords. However, the exactly opposite situation is shown in the comparison of affricates. Mandarin has three pairs of affricates while English has only one pair. In addition, Mandarin and English fricatives do not have any exactly matched sounds. Consequently, it is predicted that there will be a high possibility of a variety of matches when English affricates are adapted into Mandarin. Unlike fricatives and affricates, English approximants are usually consistent with Mandarin ones. The phoneme /l/ is the same in both languages, and Mandarin /ɭ/ is perceptually similar to English /ɭ/. However, due to the particular property of English /ɭ/, it is hard for Mandarin speakers to distinguish English /ɭ/. As a result, they tend to replace English /ɭ/ with /l/. In addition, Mandarin, in fact, does not have any glide consonants (i.e. /j/ and /w/), but it has very similar sounds when Mandarin vowels /i/ and /u/ appear in the beginning of a syllable (i.e. [j] and [w] in a Zero-initial syllable). Lastly, Mandarin and English nasals are generally identical.

Mandarin vowels are the most important element in a Mandarin syllable, since Mandarin syllables cannot be formed without a vowel. This study presents 12 Mandarin vowels. As for the most debated issue of whether or not Mandarin *ü* [y] is a single or complex segment, this dissertation argues that Mandarin *ü* [y] is considered a single vowel because there is not enough evidence to historically or linguistically prove it as a complex segment. In addition, in this study, two apical vowels, /ɿ/ and /ʅ/, are included in Mandarin vowels. However, the retroflex vowel /ə̃/ is treated as [əɿ], so it is not considered a vowel. As for the English vowels, English vowel classification in this study does not consider vowel quantity, since it is not important in the adaptation of Mandarin loanword adaptation. Therefore, this study presents 12 American English vowels including /ə/.

In the discussion of contrasting vowels in both languages, the most distinctive difference is that English vowels contrast with tense/lax (e.g. i and ɪ, e and ε, u and ʊ) while Mandarin vowels are usually long. Also, English vowels have various tongue positions, and thus seem to be generally balanced. On the contrary, Mandarin vowels are usually high vowels including two apical vowels (i.e. /ɿ/ and /ʅ/). However, it is generally shown that an English vowel has its corresponding Mandarin vowel, unless considering both slight differences of tongue height and the contrast of tense/lax in English vowels.

A syllable is a very pivotal element in Mandarin phonology because Mandarin is a mono-syllabic language. Any inner change of syllable also changes the meaning in Mandarin. In addition, there are particular terms in traditional Mandarin phonology that need to be taken into consideration: initials and finals. The initial consonant in a Mandarin syllable is an initial, but there is also a Zero-initial where the initial consonant does not exist. The other part of a syllable is a final, which is composed of a medial and a rhyme. As for the English syllable structure, this study follows Kessler and Treiman's (1997) interpretation that the vowel has a close relationship with the following consonant but the initial consonant does not have that close relationship with the vowel. Therefore, this study presents English CVC syllables as being composed of an onset and a vowel-coda rhyme.

A comparison of syllable structures in both languages reveals that English can have various types of syllable structures while Mandarin syllable structure is relatively simple. This is because Mandarin phonology does not allow any consonant clusters and only /n/ and /ŋ/ can be used as codas while English allows various consonant clusters and many consonants in the coda position. The simplicity of Mandarin syllable structure

is closely related to Mandarin phonotactic constraints, which are listed in List 16.

One of the most important characteristics of Mandarin is that it has four lexical tones. Thus, like consonants and vowels, Mandarin tones function to distinguish the meaning of a word. On the other hand, English is considered a stress language or an intonation language. Even though either stress or intonation can sometimes change the part of speech or the sentence type, neither distinguishes the meaning of a word.

Lastly, there is a significant difference in the writing systems of English and Mandarin. English has an alphabetic writing system while Mandarin has a non-alphabetic writing system. Therefore, English orthography is basically phonemic, but Mandarin orthography does not carry any phonemic information. In fact, Mandarin writing system is very particular, since a Mandarin character (i.e. 字) is a written symbol, a single morpheme, and a single syllable at the same time; however, it only shows the meaning of a word but does not provide any phonological information. Therefore, it is easily predicted that there will a significant change to express English words in Mandarin characters.

Chapter IV. Adaptation of Mandarin loanwords originating from English

Loanword adaptation is a several-step process. First, the input of the source language will be replaced with the corresponding phoneme in the phonological system of the borrowing language. If the input does not correspond to anything in the borrowing language, the form of the loanword will be modified to fit the phonological system of the borrowing language. In other words, the process occurs in order for the input of the source language to not only map into the closest phoneme but also to conform to the system of the borrowing language. For example, English ‘Fox’ is adapted as Mandarin *Fú-kè-sī* 福克斯 [fu-k^hɤ-sɿ]. English /f/ is faithfully mapped into the corresponding Mandarin phoneme /f/, and the English coda x [ks] is adapted by inserting vowels, since Mandarin does not allow coda consonants such as /k/ and /s/. By doing so, English ‘Fox’, a single syllable word, becomes a three-syllable Mandarin loanword. Also, ‘LaCrosse,’ the English place name, is adapted as Mandarin *Lā-kē-luó-sī* 拉科罗斯 [la-k^hɤ-lwo-sɿ]. The English phonemes /l, k, r, s/ is replaced by /l, k^h, l, s/, the closest Mandarin phonemes, and the initial consonant cluster which is not allowed in Mandarin phonology is fixed by inserting Mandarin vowels. Thus, ‘Crosse’, a single syllable word, becomes a three-syllable Mandarin word. These two examples above show well the process of loanword adaptation: the input of the source language changes to the form which faithfully adopts the sounds of the source language within the phonemic inventory of the borrowing language and conforms to the phonological system of the borrowing language.

In this chapter, a full-scale observation of Mandarin loanwords from corpus data will be made. The discussion will include the adaptation of consonants, vowels, and suprasegmentals. The objectives of this chapter are to observe the general aspect of adaptation of Mandarin loanwords originating from English, in order to find the rules which control the mapping between the phonemes of both languages, and to provide the backgrounds for the factors that affect the adaptation of Mandarin loanwords, which will be discussed in Chapter V.

4.1 Main targets for the analyses of Mandarin loanwords originating from English

The discussion of the adaptation of Mandarin loanwords originating from English will be based on the comparison between Mandarin and English phonology in the discussion of Chapter III. The main targets for the analyses can be listed as follows:

List 26. Main targets for the analyses

1. The faithful mapping between Mandarin and English consonants
2. The patterns of adaptation of non-Mandarin English consonants
3. The patterns of adaptation of English syllable structures which are not allowed in Mandarin phonology
4. The characteristics of vowel epenthesis in the adaptation of Mandarin loanwords
5. The patterns of vowel adaptation and tonal adaptation
6. Mandarin characters as a phonetic symbol

4.2 Data collection

A total of 1218 words will be used to discuss the adaptation of Mandarin loanwords in this paper. The data had been collected for one year (from June 2011 to May 2012), and there are three types of data sources:

List 27. Three types of data sources

List 27-1. Dictionaries

- *Xiandai hanyu cidian* 现代汉语词典 (Modern Chinese dictionary). 2011. Beijing: Shangwu yinshuguan.
- *Hanying xiao cidian* 汉英小词典 (Little Chinese-English dictionary). 2010. Beijing: Waiyu jiaoxue yu yanjiu chubanshe.
- *Xiandai hanyu xinciyu cidian* 现代汉语新词语词典 (A dictionary of new words in Chinese). 2009. Shanghai: Shanghai cishu chubanshe.
- *Langwen Gaojie yinghan shuangjie cidian* 朗文高价英汉双解词典 (Longman advanced English dictionary). 2010. Beijing: Waiyu jiaoxue yu yanjiu chubanshe.

List 27-2. Internet portal sites

- google.cn
- yahoo.cn

List 27-3. Previous studies

- Yu, Hui 于辉. 2010. *Hanyu jieci yinxixue – yi yingyuan jieci de yuyin he yinxi fenxi weili* 汉语借词音系学 – 以英源借词的语音和音系分析为例 [A study of Chinese loanword phonology taking English-origin loanword adaptation as an example]. Ph.D. dissertation, Nankai University.
- Zhou, Honghong. 2009. *A sociolinguistic study on Chinese loanwords*. Beijing: Beijing jiaotong daxue chubanshe.
- Chan, Bik Yan. 2007. *Brand Naming – A study of brand translation in China: U.S.*

- brands translated into Chinese and Chinese brands translated into English*. B.A. thesis, Hongkong Baptist University.
- Yang, Xi Peng 杨锡彭. 2007. *Hanyu wailaiyu yanjiu* 汉语外来词研究 (A study on Chinese loanwords). Shanghai: Shanghai renmin chubanshe.
 - Miao, Ruiqin. 2005. *Loanword adaptation in Mandarin Chinese: Perceptual, phonological, and sociolinguistic factors*. Ph.D. dissertation, Stony Brook University.
 - Lauren Asia Hall-Lew. 2002. *English loanwords in Mandarin Chinese*. B.A. thesis, The University of Arizona.
 - Shi, You Wei 史有为. 2000. *Hanyu wailaici* 汉语外来词 (Chinese loanwords). Beijing: Shangwu yinshuguan.

The data collected from the dictionaries is a group of loanwords completely accepted as Mandarin vocabulary. The data from internet portal sites includes the loanwords which are not standardized yet. This kind of data shows many variations of the same English names of persons, places, and brands. The data from the previous studies makes up the loanwords that are not found in the other sources.

The corpus data used in this study has several limitations. First, the data is not divided by time period. Loanwords can change according to the passing of time, but this study does not consider the change. Thus, the data will be analyzed by the same standard regardless of the adopted time. In addition, the path of influx of each loanword will not be investigated in this chapter. Instead, as for the route, dialects, and sources, further discussion will be complementally made in section 5.3.

4.3 English consonant adaptation in Mandarin loanwords

As mentioned in Chapter III, the consonants of Mandarin and English can be

classified by three features: the place of articulation, manner of articulation, and voicing/aspiration. Among these features, the manners are most resistant to change (Broselow 1999, Kenstowicz 2003a, Miao 2005), since it is the most perceptible feature. Using these features, the classification of consonants, depending on the manners, can be presented as follows:

Table 16. The classification of consonants

	Cons	Approx	Son	Cont	Nas
Plosives	+	-	-	-	-
Fricatives	+	-	-	+	-
Nasals	+	-	+	-	+
Liquids	+	+	+	+	-
Glides	-	+	+	+	-

(Spencer 1996: 112)

Section of 4.3 is composed as follows: In 4.3.1, the mappings of the phonemes which exist in both language inventories will be the focus. Also, the adaptation of the non-Mandarin phonemes from English will be discussed. In 4.3.2, the modification and adaptation of the English syllable structures, which Mandarin phonotactic constraints do not allow, will be treated. Section 4.3.3 is the summary for the consonant adaptation.

4.3.1 Faithful mappings and adjustments for non-Mandarin consonants

English phonemes that are replaced by the Mandarin phonemes of the same phonological categories will be considered as a faithful mapping. Also, regardless of the

phonological categories, mappings that are perceived as the most similar will be treated as faithful mappings, when English phonemes are not found in the Mandarin phonological inventory. The consonants in the initial position of a word will be analyzed for consonant adaptation. In the observation of phonemic mapping between both languages, the word-initial consonants are thought to be most appropriate, since they are least affected by neighboring phonemes.⁶⁸ In addition, even though only the word-initial consonants are included, this will not seriously affect the result of the analyses, because a large collection of Mandarin loanwords are analyzed. The adaptation of coda consonants will not be discussed in 4.3.1, since the Mandarin phonotactic constraint that consonants except /n/ and /ŋ/ are not allowed in the coda position, plays a role. Thus, the coda consonants are discussed in 4.3.2.

Plosives

The following table shows Mandarin and English plosives.

Table 17. Mandarin and English plosives

	Bilabial	Alveolar	Velar	voiced	Aspirated
Mandarin	/p/ (<i>b</i>)	/t/ (<i>d</i>)	/k/ (<i>g</i>)	-	-
	/p ^h / (<i>p</i>)	/t ^h / (<i>t</i>)	/k ^h / (<i>k</i>)	-	+
English	/b/	/d/	/g/	+	-
	/p/	/t/	/k/	-	+

⁶⁸ For example, only /#pV_#/ , /#tV_#/ , and /#kV_#/ are included for the mapping of the plosives. ‘V’ refers to a vowel and the symbol ‘#’ stands for a word boundary.

As seen above, it can be hypothesized that English plosives, the inputs, will be mapped into Mandarin plosives of the same place of articulation. Thus, in the case of faithful mapping, English plosives will be adapted as follows:

List 28. Faithful mapping of English plosives in Mandarin loanwords

English /b/ → Mandarin /p/	English /p/	$\left\{ \begin{array}{l} \text{/#pV_ /} \\ \text{/_sk_ /}^{69} \end{array} \right.$	$\left\{ \begin{array}{l} \rightarrow \text{Mandarin /p}^h\text{/} \\ \rightarrow \text{Mandarin /p/} \end{array} \right.$
English /d/ → Mandarin /t/			
English /g/ → Mandarin /k/	English /t/	$\left\{ \begin{array}{l} \text{/#tV_ /} \\ \text{/_st_ /} \end{array} \right.$	$\left\{ \begin{array}{l} \rightarrow \text{Mandarin /t}^h\text{/} \\ \rightarrow \text{Mandarin /t/} \end{array} \right.$
	English /k/	$\left\{ \begin{array}{l} \text{/#kV_ /} \\ \text{/_sk_ /} \end{array} \right.$	$\left\{ \begin{array}{l} \rightarrow \text{Mandarin /k}^h\text{/} \\ \rightarrow \text{Mandarin /k/} \end{array} \right.$

English voiced plosives /b, d, b/ will be faithfully mapped into Mandarin unaspirated plosives /p, t, k/, and English voiceless plosives into Mandarin aspirated plosives, since [±voiced] is distinctive in English, while in Mandarin [±aspirated] is distinctive. However, English voiceless plosives have allophones, depending on the position in a syllable. That is, in the front of the initial position, English /p, t, k/ are realized as [p^h, t^h, k^h], but they are pronounced as [p, t, k] after [s]. Therefore, the former ones will be faithfully mapped into Mandarin /p^h, t^h, k^h/, while the latter ones will be adapted as Mandarin /p, t, k/. Also, English /k, g/ before the high front vowels /i, ɪ/ are often replaced by Mandarin palatals /tɕ^h, tɕ/. This mapping will be considered as a faithful mapping resulted from Mandarin palatalization, one of Mandarin phonotactic constraints. First, the adaptation of English /b, d, g/ in Mandarin loanwords will be discussed.

69 The symbole ‘.’ stands for a syllable boundary.

List 29. Examples of English /b, d, g/ faithfully mapped into Mandarin /p, t, k/

English		Mandarin (Pinyin)	IPA
Barney	→	Bā-ní	[pa-ni]
bell	→	bèi-ěr	[pei-ɚ]
Boeing	→	Bō-yīn	[po-jin]
Bush	→	Bù-shí	[pu-ʃʊ]
bye bye	→	bài-bài	[pai-pai]
darling	→	dà-lín	[ta-lin]
disco	→	dí-sī-kē	[ti-sʅ-kʰɿ]
Disney	→	Dí-sī-ní	[ti-sʅ-ni]
domino	→	duō-mǐ-nuò	[two-mi-nwo]
dyne	→	dá-yīn	[ta-jin]
Gateway	→	Gài-tè-wéi	[kai-tʰɿ-wei]
golf	→	gāo-ěr-fū	[kau-ɚ-fu]
gondola	→	gòng-duō-lā	[kuŋ-two-la]
Google	→	Gǔ-gē	[ku-kɿ]
Grammy	→	Gé-lái-měi	[kɿ-lai-mei]

According to the corpus data, English /b, d/ are usually faithfully mapped into Mandarin /p, t/. Only five among 105 loanwords show that English /b/ is adapted into Mandarin /p^h/, and only one among 59 loanwords demonstrated that English /d/ is replaced by Mandarin /t^h/.⁷⁰ Examples are as follows.

List 30. Examples of English /b, t/ mapped into Mandarin /p^h, t^h/

English		Mandarin (<i>Pinyin</i>)	IPA
bacon	→	péi-gēn	[p ^h ei-kən]
Beatles	→	Pī-tóu-shì	[p ^h i-t ^h ou-ʃʊ]

⁷⁰ All of the data will be presented in the appendix.

beer	→	pi (jiu)	[p ^h i]
Bombardier	→	Páng-bā-dí	[p ^h ɑŋ-pa-ti]
bushel	→	pú-shì-ěr	[p ^h u-ʂɿ-əɿ]
DiverseyLever	→	Tài-huá-shī-lì-huá	[t ^h ai-xwa-ʂɿ-li-xwa]

In fact, in the case of English **DiverseyLever** → Mandarin *Tài-huá-shī-lì-huá* 泰华施利华, the semantic factor plays a role in the adaptation. Therefore, the mapping between English /d/ and Mandarin /t/ perfectly shows a faithful mapping.⁷¹ On the other hand, the adaptation of English /g/ shows more complex situations than English /b, d/. The majority of English /g/ and Mandarin /k/ faithfully map, namely 36 out of 49 loanwords. However, 12 cases show that English /g/ is adapted into Mandarin /tɕ/, and among 12, five are affected by the Mandarin palatalization. Examples are as follows.

List 31. Examples of English /g/ mapped into Mandarin /tɕi/

English		Mandarin (Pinyin)	IPA
geek	→	jǐkè	[tɕi-k ^h ɤ]
Gibbon	→	Jǐběn	[tɕi-pən]
Gibson	→	Jǐbù-sēn	[tɕi-pu-sən]
Guinness	→	Jǐn í-sī	[tɕi-ni-sɿ]
guitar	→	jǐtā	[tɕi-t ^h a]

As mentioned earlier, the examples above are considered as a faithful mapping. Among the rest of the seven cases, only a few, other than the cases where the semantic factors function, show the adaptation of English /g/ → Mandarin /tɕ/. In short, most English

⁷¹ As mentioned earlier, English plosives that appear in the middle of word as an initial consonant are not included. There are examples such as English frisbee → Mandarin *fú-lì-sī-bī* [fu-li-sɿ-pi], English ladder → Mandarin *lèi-dá* [lei-ta], English reggae → Mandarin *ruì-gé* [ɿwei-kɤ]. However, if counting the number of those plosives, the statistics support the same result.

voiced plosives are faithfully adapted into Mandarin plosives. Next, the adaptation of English voiceless plosives /p, t, k/ in Mandarin loanwords will be examined.

List 32. Examples of English /p, t, k/ faithfully mapped into Mandarin /p^h, t^h, k^h/

English		Mandarin (Pinyin)	IPA
Packard/	→	Pà-kǎ-dé	[p ^h a-k ^h a-tʂ]
palace	→	pài-lì-sī	[p ^h ai-li-sɿ]
pass	→	pāi-sī	[p ^h ai-sɿ]
pie	→	pài	[p ^h ai]
poker	→	pū-kè	[p ^h u-k ^h ʅ]
talk show	→	tuō-kǒu-xiù	[t ^h wo-k ^h ou-ɕjou]
tips	→	tiē-shì	[t ^h je-ʂɿ]
Titanic	→	Tài-tǎn-ní-kè	[t ^h ai-t ^h an-ni-k ^h ʅ]
Tom	→	Tāng-mǔ	[t ^h aŋ-mu]
Tyson	→	Tài-sēn	[t ^h ai-sən]
cappuccino	→	kǎ-bù-qí-nuò	[k ^h a-pu-tɕ ^h i-nwo]
carnation	→	kāng-nǎi-xīn	[k ^h aŋ-nai-ɕin]
cocain	→	kě-kǎ-yīn	[k ^h ʅ-k ^h a-jin]
Kansas	→	Kān-sà-sī	[k ^h an-sa-sɿ]
koala	→	kǎo-lā	[k ^h au-la]
quark	→	kuā-kè	[k ^h wa-k ^h ʅ]

Only 43 of 77 loanwords demonstrate that English /p/ is mapped into Mandarin /p^h/. Even excluding the effect of semantic factors in 15 loanwords such as English Paddle Pop (a brand name of ice cream) → Mandarin *Bǎi-bǎo-lè-bǎo* 百宝乐宝, English Prudential (a insurance company name) → Mandarin *Bǎo-dé-xìn* 宝德信, 19 loanwords still show the adaptation of English /p/ → Mandarin /p/. In addition, English /t/ is mapped into Mandarin /t^h/ in 45 out of 55 loanwords, and it seems that the semantic

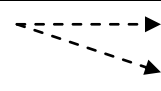
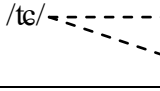
factor does not have an effect in other ten cases. Moreover, as a faithful mapping, English /k/ is replaced by Mandarin /k^h/ in 116 out of 134 loanwords. In particular, all the English /k/s spelled by k in the word-initial positions are faithfully adapted into Mandarin /k^h/ or Mandarin /tɕ/ due to the Mandarin palatalization. Examples of English input /kɪ/ mapped into Mandarin /tɕi/ are as follows:

List 33. Examples of English /kɪ/ mapped into Mandarin /tɕi/

English		Mandarin (Pinyin)	IPA
Kieth	→	jī-sī	[tɕi-sɿ]
Kimberly	→	Jīn-bǎi-lì	[tɕin-pai-li]
Kindersley	→	Jīn-dé-sī-lì	[tɕin-tɕ-sɿ-li]
kiwi	→	jī-wéi	[tɕi-wei]

On the other hand, for the English /k/ spelled by c in the word-initial position, 82 out of 94 loanwords show the faithful mapping, English /k/ → Mandarin /k^h/, and mapping into Mandarin /k/ occurs only in the 5 cases. Excluding the examples such as English Costco → Mandarin *Hǎo-shì-duō* 好事多, English Colgate (a brand name of toothpaste) → Mandarin *Gāo-lù-jíe* 高露洁, English Coottee's (a name of beverage) → Mandarin *Gāo-tiān* 高天, which are affected by the semantic factor, only a few are replaced by other phonemes. In the cases of English /k/ spelled by q in the word-initial position, only two out of nine loanwords map into Mandarin /k/, but one among those two cases is affected by the semantic factor. As a summary, the adaption of English plosives in Mandarin loanwords will be presented in the following table.

Table 18. Adaptation of English plosives in Mandarin loanwords

English phoneme	Mandarin phoneme	%	Faithful mapping
/b/	/p/	95.24 (100/105)	Faithful mapping : 92.99 %
	/p ^h /	4.76 (5/105)	
/d/	/t/	98.31 (58/59)	Non-faithful mapping : 7.01 %
	/t ^h /	1.69 (1/59)	
/g/	/k/	75.00 (36/48)	Faithful mapping : 75.74 %
	/tʃ/ 	10.42 (5/48) (palatalized) 14.58 (7/48)	
/p/	/p ^h /	55.84 (43/77)	Non-faithful mapping : 24.26 %
	/p/	44.16 (34/77)	
/t/	/t ^h /	81.82 (45/55)	Faithful mapping : 75.74 %
	/t/	18.18 (10/55)	
/k/	/k ^h /	86.57 (116/134)	Non-faithful mapping : 24.26 %
	/k/	5.22 (7/134)	
	/tʃ/ 	2.99 (4/134) (palatalized) 3.73 (5/134)	
	Others (/x/, /tʃ ^h /)	1.49 (2/134)	

As shown in the table, generally English plosives are faithfully mapped into Mandarin plosives. Also, English voiced plosives demonstrate more faithful adaptation in the feature of [±aspirated] of Mandarin plosives than the voiceless plosives. Considering that [±voiced] is not distinctive in Mandarin and thus a English plosive can be faithfully mapped into Mandarin plosives regardless of [±aspirated], the ratio of the faithful mapping in the total adaptations of English plosives in Mandarin loanwords will be much higher. The following figures show the situation well.

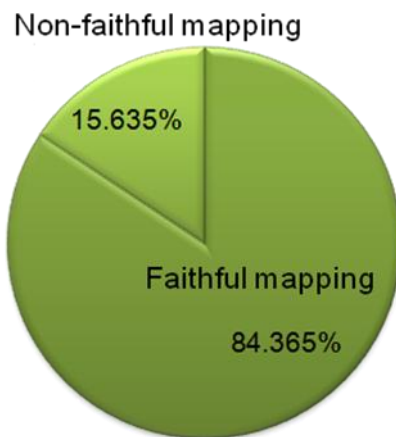


Figure 13. Adaptation considering the mapping of [±voiced] and [±aspirated]

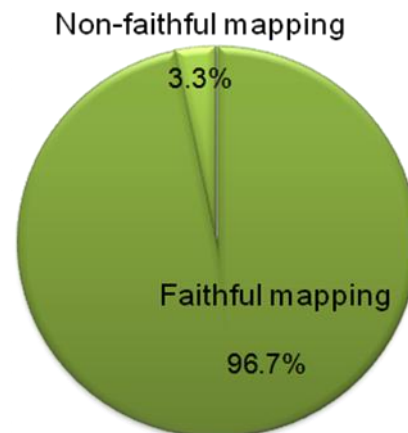


Figure 14. Adaptation ignoring the mapping of [±voiced] and [±aspirated]

As mentioned earlier, English /p, t, k/ can be realized as allophones according to the syllable position. Now, the adaptation of the English allophones in Mandarin loanwords will be discussed. In the corpus data, 24 loanwords have the syllable structure of /_ .sp_ /, /_ .st_ /, /_ .sk_ /. Examples are as follows.

List 34. Examples for the adaptation of English /p, t, k/ after [s] in the syllable-initial position

English		Mandarin (Pinyin)	IPA
Scody	→	Shǐ-kū-bǐ	[ʃɿ-k ^h u-pi]
Scott	→	Sī-kǎo-tè	[sɿ-k ^h au-t ^h ɤ]
Squibb	→	Shī-gu à bǎo	[ʃɿ-kwei-pau]
sparkling	→	sī-pà-kè-lín	[[sɿ-p ^h a-k ^h ɤ-lin]
Sprint	→	Sī-pǔ-lín-tè	[sɿ-p ^h u-lin-t ^h ɤ]
Spencer	→	Sī-bān-sài	[sɿ-pan-sai]
Staples	→	Sī-tè-pǔ-ěr-sī	[sɿ-t ^h ɤ-p ^h u-əɪ-sɿ]
Starwood	→	Sī-tǎ-wǔ-dé	[sɿ-t ^h a-wu-tɤ]
Stephen	→	Shǐ-d ì fēn	[ʃɿ-ti-fən]

Faithful mapping would be demonstrated if English /p, t, k/ after [s] were adapted into Mandarin /p, t, k/. However, English /p, t, k/ after [s], in fact, are mapped into Mandarin plosives regardless of [±aspirated]. The general ratio is as follows:

Table 19. Adaptation of English voiceless plosives after [s] in the syllable-initial position

English phoneme	Mandarin phoneme	%	Semantic factors
/._sp_/	/p/	20% (1/5)	√
	/p ^h /	80% (4/5)	
/._st_/	/t/	37.5% (6/16)	
	/t ^h /	56.25% (9/16)	
	∅ (drop)	6.25% (1/16)	
/._sk_/	/k/	33.33% (2/6)	√ (one of two)
	/k ^h /	50% (3/6)	
	/tɕ/	16.67% (1/6)	√

As shown in the table, English /p, t, k/ tend to be adapted into Mandarin /p^h, t^h, k^h/, instead of Mandarin /p, t, k/. That is, it shows the faithful mapping more often phonologically than phonetically. This result can be further supported by observing English /p, t, k/ after [s] in the word-middle syllable. In these situations they are mapped into Mandarin plosives regardless of [±aspirated]. There is no rule found in the mapping. Some illustrative examples are listed below.

List 35. Examples for the adaptation of English voiceless plosives after [s] in the word-middle syllables

English		Mandarin (Pinyin)	IPA
Aspirin	→	Ā-sī-pǐ-lín	[a-sɿ-p ^h i-lin]
Greenspan	→	Gé-lín-sī-pān	[kɤ-lin-sɿ-p ^h an]
Torstar	→	Tuō-ěr-sī-tǎ	[t ^h wo-əɪ-sɿ-t ^h a]

Caster	→	Kǎ-sī-tè-ěr	[k ^h a-sɿ-t ^h ɿ-əɪ]
Weston	→	Wēi-sī-dùn	[wei-sɿ-twən]
Winston	→	Wēn-sī-dùn	[wən-sɿ-twən]
disco	→	dí-sī-kē	[ti-sɿ-k ^h ɿ]
Masco	→	Mǎ-sī-kě	[ma-sɿ-k ^h ɿ]
Prescott	→	Pǔ-léi-sī-kē-tè	[p ^h u-lei-ɿ-k ^h ɿ-t ^h ɿ]

In fact, other than the examples affected by the semantic factors, there are not many cases that English plosives in the structure of /_st_/ are mapped into the Mandarin unaspirated plosives, and only a few are found. Therefore, [\pm voiced] plays an insignificant role in the adaptation of English plosives in Mandarin loanwords. Instead, the mappings are generally made based on the phonological categories of both languages. Nevertheless, there are definitely examples that show English [+voiced] mapped into Mandarin [-aspirated]. Thus, it is hard to say that only phonological elements function in the adaption of English plosives in Mandarin loanwords.

Fricatives

The following table shows Mandarin and English fricatives.

Table 20. Mandarin and English fricatives

	Labio-dental	Dental	Alveolar	Retroflex	Alveo-palatal	Velar	Glottal	voiced
Mandarin	/f/ (<i>f</i>)		/s/ (<i>s</i>)	/ʃ/ (<i>sh</i>)	/ç/ (<i>x</i>)	/x/ (<i>h</i>)		-
English	/f/	/θ/	/s/		/ʃ/		/h/	-
	/v/	/ð/	/z/		/ʒ/			+

As seen in the table, English fricatives are expected to be adapted into Mandarin fricatives of the same places of articulation. However, English, the source language, has more fricatives than Mandarin, the borrowing language. As a result, non-Mandarin fricatives in English will be expected to be mapped into either the closest Mandarin fricatives in the same place of articulation or the most similar ones in perception. Due to the difference between the systems of both languages, the adaptation of English fricatives in Mandarin loanwords is complex, and thus the fricatives will be discussed one by one. First, the faithful mapping between English /f/ and Mandarin /f/ can be expected, since they are almost identical.

English /f/ → Mandarin /f/

As the analysis of English plosives, the data only includes English /f/ in the word-initial position. Examples are below.

List 36. Examples of English /f/ faithfully mapped into Mandarin /f/

English		Mandarin (Pinyin)	IPA
fee	→	féi	[fei]
Foster	→	Fú-sī-tè	[fu-sɿ-tʰɛ]
frisbee	→	fú-lì-sī-bǐ	[fu-li-sɿ-pi]
Phillips	→	Fēi-lì-pǔ	[fei-li-pʰu]

The relevant data contains 33 loanwords. Based on the data, all cases of English /f/ are adapted into Mandarin /f/.

Next is the adaptation of English /v/. Mandarin speakers tend to pronounce

Mandarin /u/ in a word-initial or syllable initial position as [w] or [v]. Therefore, as for English /v/, even though English /v/ does not exist in the Mandarin phonological inventory, in the spoken Mandarin there is [v] sound. Thus, the mapping of English /v/ to Mandarin /u/ ([w] or [v]) will be considered as a faithful mapping. The examples are as follows.

List 37. Examples of English /v/ faithfully mapped into Mandarin /u/ ([w] or [v])

English		Mandarin (Pinyin)	IPA
Visa	→	Wéi-sà	[wei-sa]
vitamin	→	wéi-tā-mìng	[wei-t ^h a-mjəŋ]
Vogue	→	Wò-gǔ	[wo-ku]

English /v/ only in the structure of /#vV_#/ is considered, and the relevant data has 19 loanwords. Among them, 13 cases show the mapping into Mandarin /u/, and English /v/ is adapted into Mandarin /f/ in the rest of the six loanwords such as English vaseline → Mandarin *fán-shì-lín* [fan-ʃɿ-lin], and English violin → Mandarin *fàn-yā-lín* [fan-ja-ljəŋ].

As for English /θ/, the non-Mandarin phoneme, there is only one example in the word-initial position (English **Th**urow → Mandarin *Suō-luó* [swo-lwo]). Therefore, in order to obtain more data, English /θ/ is included regardless of the position within a word. Examples are shown below.

List 38. Examples for the adaptation of English /θ/ in Mandarin loanwords

English		Mandarin (Pinyin)	IPA
Bethlehem	→	Bó-lì-héng	[pwo-li-xəŋ]

Cosworth	→	Kè-sī-wò-sī	[k ^h ɿ-sɿ-wo-sɿ]
Elizabeth	→	Yī-lì-shā-bái	[ji-li-ʂa-pai]
ether	→	yǐ-tài	[ji-t ^h ai]
Kenneth	→	Kěn-ní-sī	[k ^h ən-ni-sɿ]
marathon	→	mǎ-lā-sōng	[ma-la-sun]
Northrop	→	Nuò-sī-luò-pǔ	[nwo-sɿ-lwo-p ^h u]
Raytheon	→	Léi-shén	[lei-ʂən]
Thurrow	→	Suō-luó	[swo-lwo]
Smith	→	Shǐ-mì-sī	[ʂɿ-mi-sɿ]
Woolworths	→	Wò-ěr-wò-sī	[wo-əɪ-wo-sɿ]

Usually, English /ə/ is mapped into Mandarin /s/ (7 out of 11). This result supports He (2002) that Mandarin speakers have a tendency to replace English /ə/ with Mandarin /s/. Perceptually, the most similar Mandarin sound of English /ə/ is Mandarin /s/. Thus, the mapping of English /ə/ → Mandarin /s/ will be considered a faithful adaptation in this study. Other than the seven faithful mappings, two examples are affected by the semantic factors (i.e. English Elizabeth → Mandarin *Yī-lì-shā-bái* 伊丽莎白 and Raytheon → Mandarin *Léi-shén* 雷神). In addition, English /ð/, the voiced counterpart of English /ə/, is not found in the corpus data.

Now, the adaptation of English /s/ in Mandarin loanwords is discussed. The most faithful mapping of English /s/ in Mandarin loanwords can be hypothesized as Mandarin /s/, since the /s/ in both languages, in fact, is identical. The data has a plenty of examples for the adaptation of English /s/, and thus only the /s/ in the structure of /#sV_#/ will be included in this discussion. Examples are as follows.

List 39. Examples of English /s/ faithfully mapped into Mandarin /s/

English		Mandarin (Pinyin)	IPA
salad	→	sì-lā	[sʅ-la]
saxophone	→	sà-kè-sī-fēng	[sa-kʰɤ-sʅ-fəŋ]
sauna	→	sāng-ná	[saŋ-na]
soda	→	sū-dá	[su-ta]
cellophane	→	sài-lù-fēn	[sai-lu-fən]

Among the total 94 loanwords, 49 cases, only a half of the loanwords, show the faithful mapping hypothesized above. English /s/ is usually replaced by Mandarin /ʂ/, which does not exist in English. Mandarin /ʂ/ is pronounced by lifting the tongue more toward the hard palate than the pronunciation of /s/, and thus /s/ and /ʂ/, in fact, are perceptually similar. If /s/ were not in Mandarin, the adaptation of English /s/ into Mandarin /ʂ/ could be considered a faithful mapping. 17 out of the total 94 loanwords show the mapping to Mandarin /ɛ/. Among these 17 cases, 11 loanwords, more than a half, have English [sɪ] as the input (e.g. English Searns → Mandarin *Xī-ě-r-sī* [ɛi-əɪ-sʅ], English Cincinnati → Mandarin *Xīn-xīn-nà-tí* [ɛin-ɛin-na-tʰi]). Mandarin /s/ cannot combine with a front vowel /i/ (*/si/), and instead combines with /ɤ/, the apical vowel (/sʅ/). Therefore, perceptually, the most similar sound of English /si/ is not Mandarin /sʅ/, but Mandarin /ɛi/. As a result, the adaptation of English /sɪ/ to Mandarin /ɛi/ should be considered a faithful mapping. As for English /z/, the voiced counterpart /s/, in the word-initial position, there are only four examples found in the corpus data. Theoretically, English /z/ should be adapted Mandarin /s/, which is different only with [\pm voiced], but it is mapped into various sounds such as Mandarin /s/, /ʂ/, or /tʂ/.

English /ʃ/ is adapted to Mandarin /ɛ/ in the 14 cases out of the total 23

loanwords. Moreover, seven examples show the adaptation of English /ʃ/ to Mandarin /ʃ/. In fact, English /ʃ/ is a non-Mandarin phoneme, but Mandarin /ʃ/ is a perceptually similar sound. Thus, the adaptation of English /ʃ/ to Mandarin /ʃ/ can be considered a faithful mapping.⁷² As for English /ʒ/, the voiced counterpart of English /ʃ/, is not found in the corpus data.

The last aspect of fricatives to be discussed is the adaptation of English /h/ in Mandarin loanwords. There is no disagreement about the fact that the corresponding consonant of English /h/ in Mandarin is Mandarin /x/. Those two sounds are perceptually similar sounds. Therefore, the most faithful mapping can be hypothesized as the adaptation of English /h/ to Mandarin /x/. Among the data, English /h/ only in the structure of /#hV_#/ will be considered.

List 40. Examples of English /h/ faithfully mapped into Mandarin /x/

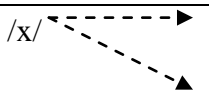
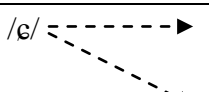
English		Mandarin (Pinyin)	IPA
hacker	→	hài-kè	[xai-k ^h ɤ]
heroin	→	hǎi-luò-yīn	[xai-lwo-jin]
hormone	→	hé-ěr-méng	[xɤ-əɪ-məŋ]
Hyatt	→	Hǎi-yà-tè	[xai-ja-t ^h ɤ]

Among the total 56 loanwords, 45 cases show the adaptation of English /h/ to Mandarin /x/. The mapping to Mandarin /ɛ/ is seen in the nine examples, but seven out of them are affected by the Mandarin palatalization (e.g. English hill → Mandarin *xī-ěr* [ɕi-əɪ], English hysteria → Mandarin *xiē-sī-dǐ-lǐ* [ɕje-sɿ-ti-li]). Therefore, the seven cases can be treated as faithful mappings. In sum, the adaptation of English fricatives in Mandarin

72 Miao (2005: 58) also thinks that the faithful output of English /ʃ/ is Mandarin /ʃ/.

loanwords can be presented as follows:

Table 21. Adaptation of the English fricatives in Mandarin loanwords

English phoneme	Mandarin phoneme	%	Faithful mapping
/f/	/f/	100% (33/33)	Faithful mapping: 100% Non-faithful mapping: 0%
/v/	/u/ ([w])	68.42% (13/19)	Faithful mapping: 68.42 % Non-faithful mapping: 31.58%
	/f/	31.58% (6/19)	
/θ/	/s/	63.64% (7/11)	Faithful mapping: 63.64% Non-faithful mapping: 36.36%
	/ʃ/	9.09% (1/11)	
	/tʰ/	9.09% (1/11)	
	∅	18.18% (2/11)	
/s/	/s/	52.13% (49/94)	Faithful mapping: 63.83% Non-faithful mapping: 36.17%
	/ʃ/	29.79% (28/94)	
	/x/ 	11.70% (11/94) (Input [sr-]) 6.38% (6/94)	
/z/	/s/	25.00% (1/4)	Faithful mapping: 25.00% Non-faithful mapping: 75.00%
	/ʃ/	25.00% (1/4)	
	/tʃ/	50% (2/4)	
/ʃ/	/ɕ/	60.87% (14/23)	Faithful mapping: 91.30% Non-faithful mapping: 8.70%
	/ʃ/	30.43% (7/23)	
	/tɕʰ/	4.35% (1/23)	
	/s/	4.35% (1/23)	
/h/	/x/	80.36% (45/56)	Faithful mapping: 92.86 % Non-faithful mapping:
	/ɕ/ 	12.50% (7/56) (palatalized) 3.57% (2/56)	

	/f/	1.785% (1/56)	7.14%
	/j/	1.785% (1/56)	

Based on the table above, the ratio of the adaptation of English fricatives between the faithful mapping and the unfaithful mapping can be described in the following figure.

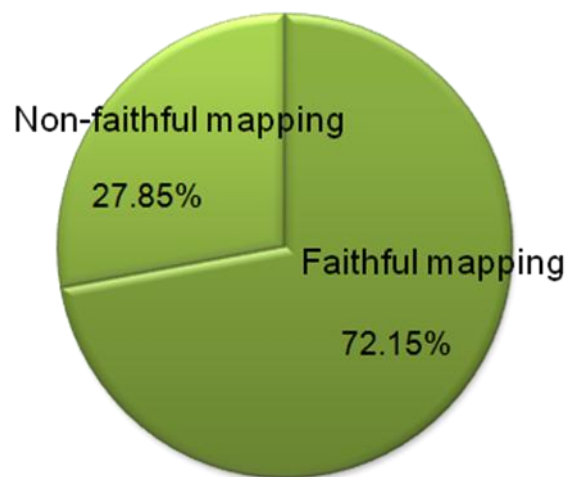


Figure 15. The ratio of the faithful mapping of English fricatives in Mandarin loanwords

As shown in the figure above, the adaptation of English fricatives in Mandarin loanwords demonstrate more variations than the adaptation of English plosives, since many non-Mandarin phonemes as the inputs from English are given for the adaptation of English fricatives. It is highly possible that foreign phonemes of the source language can match to various native phonemes of the borrowing language in the process of the adaptation.

Affricates

The following table shows Mandarin and English affricates.

Table 22. Mandarin and English affricates.

	Dento- alveolar	Retroflex	Alveo- palatal	voiced	Aspirated
Mandarin	/ts/ (<i>z</i>)	/tʂ/ (<i>zh</i>)	/tɕ/ (<i>j</i>)	-	-
	/tsʰ/ (<i>c</i>)	/tʂʰ/ (<i>ch</i>)	/tɕʰ/ (<i>q</i>)	-	+
English			/tʃ/	-	
			/dʒ/	+	

Mandarin has many affricates, while English has many fricatives. That is, relatively simple inputs in the source language can yield a variety of outcomes since there may be a diverse set of phonemes to which it can match in the borrowing language. Thus, the adaptation of English affricates in Mandarin loanwords will yield a variety of outcomes. However, as mentioned in the discussion of plosives, considering the similarity between English [\pm voiced] and Mandarin [\pm aspirated] and the places of articulation, the faithful mapping can be hypothesized as follows:

English /tʃ/ → Mandarin /tɕʰ/

English /dʒ/ → Mandarin /tɕ/

English affricates can be placed in the coda, but Mandarin does not allow the coda affricates. Therefore, the data in this discussion only includes English affricates in the structure of /#tʃV_#/ and /#dʒV_#/.

List 41. Examples of English /tʃ, dʒ/ faithfully mapped into Mandarin /tʃʰ, tʃ/

English		Mandarin (Pinyin)	IPA
cha-cha	→	qià- qià	[tʃʰja- tʃʰja]
chat	→	qià-tè	[tʃʰja- tʰɿ]
chocolate	→	qiǎo-kè-lì	[tʃʰjau-kʰɿ-li]
jacket	→	jiā-kè	[tʃja-kʰɿ]
jeep	→	jí-pǔ	[tʃi-pʰu]
Jim	→	Jí-mǔ	[tʃi-mu]

English /tʃ/ appears orthographically in ‘ch [tʃ]’ or ‘ture [tʃə],’ and English /dʒ/ is typically shown in ‘j,’ ‘ge-,’ or ‘gi-.’ As expected earlier, English affricates are mapped into various Mandarin affricates. First, as for English /tʃ/, half of the data shows the mapping into Mandarin /tʃʰ/, which is a faithful mapping, and the next most common mapping is Mandarin /tʃʰ/. The mapping into Mandarin /tʃ/, which is different only in [±aspirated], is affected by semantic factors (e.g., English Chubb (fire and security system company) → Mandarin *Jí-bǎo* 集宝). In the corpus data, there is only one example of mapping into Mandarin /tʃ/ (e.g. English cheese → Mandarin *zhī-shì* 芝士), and there is a possibility that the loanword may be adopted into Mandarin through a dialect.⁷³

Next, in the adaptation of English /dʒ/ in Mandarin loanwords, the most common mapping is Mandarin /tʃ/ (14 out of 35), which is a faithful mapping. However, nine cases show mapping into Mandarin /tʃʰ/, and eight cases into Mandarin /tʃ/. Also, four cases are mapped into Mandarin [j] or [ɥ] (Pinyin y), which are all names such as John, Joseph, Jacobs, and Johnson. The names originated from the characters in the

⁷³ English cheese was adopted into Mandarin through Yue 粵 dialect. The course of adoption will be discussed in Chapter V.

Bible, and thus the relation with the pronunciation in Hebrew can be considered. Based on the discussion so far, the adaptation of English affricates in Mandarin loanwords can be presented as follows:

Table 23. Adaptation of English affricates in Mandarin loanwords

English phoneme	Mandarin phoneme	%	Faithful mapping
/tʃ/	/tʃʰ/	50.00% (8/16)	Faithful mapping: 45% Non-faithful mapping: 55%
	/tʃ/	6.25% (1/16)	
	/tʃʰ/	37.5% (6/16)	
	/tʃ/	6.25% (1/16)	
/dʒ/	/tʃ/	40.00% (14/35)	Faithful mapping: 55%
	/tʃʰ/	25.71% (9/35)	
	/tʃ/	22.86% (8/35)	
	[j] or [ɥ] (Pinyin y)	11.43% (4/35)	

As seen in the table above, hypothesizing the most faithful mapping, many variations are shown in the adaptation of English affricates. However, there are several things that should be considered. First, in most cases that English /tʃ/ maps to Mandarin /tʃʰ/, /tʃ/ combines with the vowel /a/ ([tʃa]) such as English Charles → Mandarin *Chá-lǐ*. In fact, Mandarin /tʃʰ/ cannot combine with /a/ (*[tʃʰa]). Therefore, the mapping of English /tʃa/, the input, into Mandarin /tʃʰa/ can be treated as a faithful mapping, considering the perceptual similarity. Similarly, English /dʒa/ or /dʒu/, the input, will be faithfully mapped into Mandarin /tʃa/ or /tʃu/, since */tʃa/ or */tʃu/ does not exist in Mandarin. Thus, the faithful mapping between Mandarin and English affricates is presented in the following figures.



Figure 16. Faithful mapping between English /tʃ, dʒ/ and Mandarin /tɕ, tɕʰ/

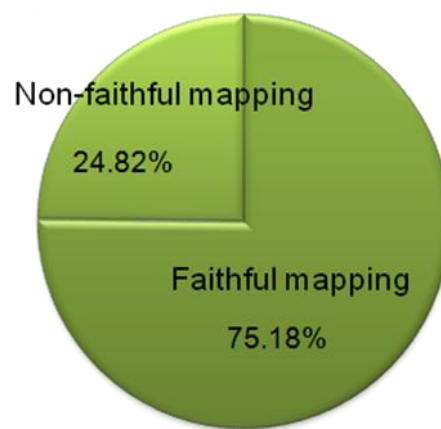


Figure 17. Considering the mapping of English /tʃ, dʒ/ and Mandarin /tɕʰ, tɕ/ as a faithful mapping

If also considering that [\pm aspirated] is not distinctive in English and thus do not considering the distinction of [\pm aspirated] in outcomes, the adaptation of the English voiceless affricate (i.e. /tʃ/) shows 100% faithful mapping. The adaptation of English voiced affricates (i.e. /dʒ/) also demonstrates a much higher percentage of faithful mappings. The following figures show this situation well.



Figure 18. Adaptation of the affricates, considering the mapping between English [\pm voiced] and Mandarin [\pm aspirated]

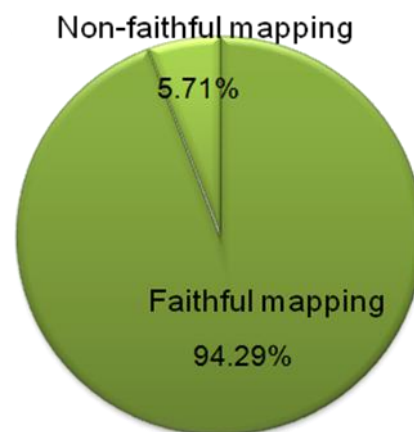


Figure 19. Adaptation of the affricates, regardless of the match between English [\pm voiced] and Mandarin [\pm aspirated]

Approximants

The following table shows the approximants of Mandarin and English.

Table 24. Mandarin and English approximants

	Bilabial	Alveolar	Retroflex	Palatal
Mandarin		/l/ (<i>l</i>)	/ɭ/ (<i>r</i>)	
English	/w/	Non-lateral	/ɹ/	/j/
		Lateral	/l/	

The discussion of the approximants can be divided into two topics. The discussion of English /l/ and /ɹ/, corresponding to Mandarin /l/ or /ɭ/, and the discussion of English /w/ and /j/, corresponding to Mandarin [w] and [j], which are the allophones appearing when the Mandarin syllables start with the vowels /u/ and /i/. First, Mandarin /l/ and English /l/ are basically identical, and English /ɹ/ is perceptually similar to Mandarin /ɭ/ (Chang 2009, Lin 2007). Therefore, the most faithful mapping between English /l/ and /ɹ/ can be hypothesized as follows:

English /l/ → Mandarin /l/

English /ɹ/ → Mandarin /ɭ/

English /l/ and /ɹ/ can be placed both in the initial and the coda, but Mandarin does not allow the lateral codas, and thus the codas will be discussed in 4.3.2.1. The relevant data for the discussion here has the structure of /#lV_#/ and /#ɹV_#. The list below provides

some examples.

List 42. Examples of English /l/ and /ɫ/ faithfully mapped into Mandarin /l/ and /ɫ/

English		Mandarin (Pinyin)	IPA
lace	→	lěi-sī	[lei-sʅ]
logic	→	luó-jí	[lwo-tɕi]
Lycos	→	Lái-kē-sī	[lai-k ^h ɕ-sʅ]
Reebok	→	Ruì-bù	[ɽwei-pu]
Rimmel	→	Ruì-měi-ěr	[ɽwei-mei-əɻ]
Rizla	→	Ruì-sī-lái	[ɽwei-sʅ-lai]

English /l/ in the initial position is 100% mapped into Mandarin /l/. On the other hand, English /ɫ/ in the initial position is mapped into Mandarin /ɫ/ in only three out of 57 cases and in the rest 54 cases, it is adapted to Mandarin /l/. The situation can be explained by the following two reasons. First, it is hard for Mandarin speakers to distinguish English /l/ and /ɫ/, since there is only one liquid, /l/ in Mandarin. Thus, Mandarin speakers tend to replace English /ɫ/ with Mandarin /l/ (Avery & Ehrlich 1992: 116). Second, Mandarin /ɫ/ can combine with a few Mandarin vowels, while Mandarin /l/ can combine with almost all the Mandarin vowels. Therefore, it is natural that Mandarin /ɫ/ is more limited in its syllable placement than Mandarin /l/. For example, Mandarin /ɫ/ cannot form a syllable with /a/ (*ɫa/), while Mandarin /l/ can combine with /a/. As a result, English /ɫa/ is adapted to Mandarin /la/ instead of *ɫa/. In addition, the combination of Mandarin /ɫ/ and the high vowel /i/ is not *ɫi/, but /ɽi/. Therefore, the most similar form of the combination of English /ɫ/ and a high front vowel /i/ in perception can be the combination of Mandarin /l/ and a high front vowel /i/. This can be seen in English Ralph Lauren → Mandarin *Lā-fū-láo-lún* [la-fu-lau-lun], and English

Rice → Mandarin *Lài-sī* [lai-sɿ], English Richard → Mandarin *Lǐ-chá-dé* [li-tʂ^ha-tʂ]. Thus, the mapping of English /ɹ/ in the initial position and Mandarin /l/ will be treated as a faithful mapping, considering the fact that the match will be the closest mapping perceptually between English and Mandarin phonemic inventory. Then, the adaptation of English /ɹ/ in the initial position shows 100% faithful mapping. Based on the discussion above, the adaptation of English liquids can be presented as follows:

Table 25. Adaptation of English liquids (/l/ and /ɹ/) in Mandarin loanwords

English phoneme	Mandarin phoneme	%	Faithful mapping
/l/	/l/	100% (59/59)	Faithful mapping: 100%
/ɹ/	/ɻ/	5.26% (3/57)	
	/l/	94.74% (54/57)	

Next is the discussion of adaptation of English glides in Mandarin loanwords. As mentioned earlier, English has two glides: /j/ and /w/. Mandarin has the corresponding sounds ([j] and [w]), but their phonological positions are different from English glides. Mandarin [j, w, ɥ] are allophones of Mandarin vowels /i, u, y/, which only appear when the vowels are placed in the initial position. However, it is not a problem in the discussion of this study. As Mandarin has the similar sounds of English glides, if English glides, as the inputs, are mapped into the similar Mandarin sounds, they will be treated as faithful mappings:

English /j/ → Mandarin /i/ ([j]) (Pinyin *y*)

English /w/ → Mandarin /u/ ([w]) (Pinyin *w*)

The relevant data only includes the English glides in the initial position (/#jV_#/ and /#wV_#/). Examples are listed below.

List 43. Examples of English /j/ and /w/ faithfully mapped into Mandarin [j] and [w]

English		Mandarin (Pinyin)	IPA
Eureca	→	Yóu-lǐ-kǎ	[jou-li-k ^h a]
UFO	→	Yōu-fú	[jou-fu]
Earnst & Young	→	Yǒng	[juŋ]
Yahoo	→	Yǎ-hǔ	[ja-xu]
Walgreen	→	Wò-ěr-gé-lín	[wo-əɪ-kɤ-lin]
Walmart	→	Wò-ěr-mǎ	[wo-əɪ-ma]
Wendy's	→	Wēn-dí-shì	[wən-ti-ʃɿ]
Wisconsin	→	Wēi-sī-kāng-xīn	[wei-sɿ-k ^h aŋ-ɕin]

Every English /j/ except only one is nicely mapped into Mandarin [j]. The exception is English utopia → Mandarin *Wū-tuō-bāng* 乌托邦 [wu-t^hwo-paŋ], which is affected by the semantic factor. The English /w/ is generally adapted to Mandarin [w], but it seems a little more complicated than English /j/, since there are 11 variations. The variations include Mandarin characters such as *huá* 华 (magnificent), *huì* 惠 (favor), *hù* 护 (protect), and *huái* 怀 (to think of). These characters have desirable meanings, and thus the effect of the semantic factors can be considered in the 11 variations. However, it is interesting that the initial consonant of all the characters is /x/. As mentioned earlier, English /hw/ (/ʍ/) already merged to English /w/ in many dialects (Chang 2009). However, considering that English /w/ and /hw/ are perceptually similar and that the most similar Mandarin sound to English voiceless labio-velar fricative /hw/ is a voiceless velar fricative /x/, the mapping of English /w/ and Mandarin /x/ can also be

explained. Based on the discussion so far, the adaptation of English glides in Mandarin loanwords is presented as below.

Table 26. Adaptation of English glides in Mandarin loanwords

English phoneme	Mandarin phoneme	%	Faithful mapping
/j/	[j]	90.00% (9/10)	Faithful mapping: 85.35% Non-faithful mapping: 14.65%
	[w]	10.00% (1/10)	
/w/	[w]	80.70% (46/57)	
	/x/	19.30% (11/57)	

Other than phonetic loans affected by the semantic factors, in the pure phonetic loans, English glides are 100% faithfully adapted into Mandarin sounds. Also, even in the cases in which semantic factors are considered, the sounds of the source are still somewhat reflected in the Mandarin loanwords.

Nasals

Basically, the nasals between Mandarin and English are identical. The nasals in both languages are in the following table.

Table 27. Mandarin and English nasals

	Bilabial	Alveolar	Velar
Mandarin	/m/ (<i>m</i>)	/n/ (<i>n</i>)	/ŋ/ (<i>ng</i>)
English	/m/	/n/	/ŋ/

Also, it can be hypothesized that Mandarin and English nasals will be faithfully mapped as follows:

List 44. Faithful mapping of English nasals in Mandarin loanwords

English /m/ → Mandarin /m/

English /n/ → Mandarin /n/

English /ŋ/ → Mandarin /ŋ/

English /m/ can come in either initial or coda position, while Mandarin /m/ can only be placed in the initial. Therefore, English /m/ in the coda position will be discussed in 4.3.2.1, and here only the /m/ in the structure of /#mV_#/ will be included. As for /n/, it can come in the initial and the coda of both languages, and thus the /n/ in the structure of /#nV_#/ and /n/ in the structure of /#_n#/ will be separately discussed. In the case of /ŋ/, it can be placed only in the coda position of both languages, so /ŋ/ in the structure of /#_ŋ#/ will be discussed. Examples of English nasals in Mandarin loanwords are listed below.

List 45. Examples of English /m, n, ŋ / faithfully mapping into Mandarin /m, n, ŋ /

English		Mandarin (<i>Pinyin</i>)	IPA
mark	→	mài	[mai]
massage	→	mǎ-shā-jī	[ma-ʂa-tʂi]
mini	→	mínǐ	[mi-ni]
mole	→	mó-ěr	[mwo-əɿ]
Nissan	→	Nísāng	[ni-saŋ]
Nobel	→	Nuò-bèi-ěr	[nwo-peɪ-əɿ]
Nottingham	→	Nuò-dīng-hàn	[nwo-tjəŋ-xan]
nylon	→	nílóng	[ni-luŋ]

cocaine	→	kě-kǎ-yīn	[k ^h ɤ-k ^h a-jin]
heroin	→	hǎi-luò-yīn	[xai-lwo-jin]
Lincoln	→	Lín-kěnn	[lin-k ^h ən]
Browning	→	Bó-láng-níng	[pwo-lan-njəŋ]
shilling	→	xiān-lìng	[ɕjɛn-ljəŋ]

Among 119 loanwords, only two English /m/s in the word-initial match to Mandarin /u/ ([w]), and they are affected by the semantic factors (e.g., English Marlboro → Mandarin *Wàn-bǎo-lù* 万宝路 and English MasterCard → Mandarin *Wàn-shì-dá* 万事达). Also, English /n/ in the word-initial is 100% mapped into Mandarin /n/, but in the word-coda, only 162 out of 220 loanwords map into Mandarin /n/. In addition, in the 54 loanwords, English /n/ is adapted to Mandarin /ŋ/, and 11 out of the 54 loanwords are affected by the semantic factors (e.g. English Avon (a brand name of cosmetics) → Mandarin *Yǎ-fāng* 雅芳, English lumen → Mandarin *liú-míng* 流明). In addition, English /n/ is completely dropped in four cases. One of these four loanwords is affected by the semantic factor (e.g. English cyclamen – Mandarin *xiān-kè-lái* 仙客来), and in another one of these four loanwords, only the initial consonants are survived since the word is a long compound (e.g. English GlaxoSmithKleine – Mandarin *Gé-lán-sù-shǐ-kè*). As for English /ŋ/, in 11 out of 19 loanwords, it is mapped into Mandarin /ŋ/, but in the other eight cases, it is adapted to Mandarin /n/. It seems that there is no effect of semantic factors for the adaptation of English /ŋ/ in Mandarin loanwords. Based on the discussion so far, the adaptation of English nasals in Mandarin loanwords can be presented as follows:

Table 28. Adaptation of English nasals in Mandarin loanwords

English phoneme	Mandarin phoneme	%	Faithful mapping
/m/	/m/	98.17% (109/111)	Faithful mapping: 82.43%
	/w/	1.83% (2/111)	
/#nV_ /	/n/	100% (19/19)	Non-faithful mapping: 17.57%
/_Vn#/	/n/	73.64% (162/220)	
	/ŋ/	24.55% (54/220)	
	∅	1.81% (4/220)	
/ŋ/	/ŋ/	57.89% (11/19)	
	/n/	42.11% (8/19)	

As seen in the table above, the mapping between English and Mandarin nasals nearly always map faithfully. In particular, the word-initial nasals show 100% faithful adaptation, excluding the data in which semantic factors function. On the other hand, the word-final /n/ and /ŋ/, which are only allowed in Mandarin phonology, demonstrated many variations.⁷⁴ This situation reflects that the place features can change, while the manner feature should hold for the adaptation of English nasals in Mandarin loanwords. It can be supported by the examples of ‘English Wisconsin → Mandarin *Wēi-sī-kāng-xīn* 威斯康辛 or *Wēi-sī-kāng-xīng* 威斯康星’ in which the same sound of the source is adapted to different sounds of the borrowing language. The following figures show the situation of the adaptation of English nasals in Mandarin loanwords.

⁷⁴ However, there is no mapping into Mandarin /m/ due to Mandarin phonotactic constraint which does not allow any coda /m/.

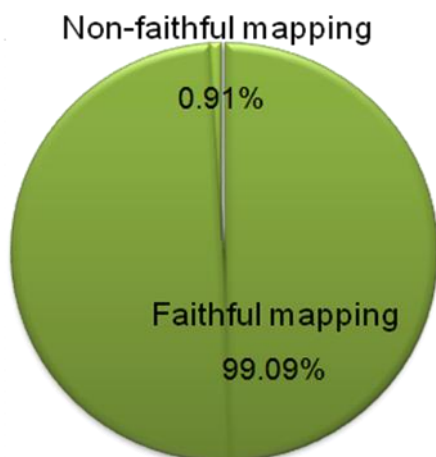


Figure 20. Faithful mapping of the word -initial English nasals in Mandarin loanwords

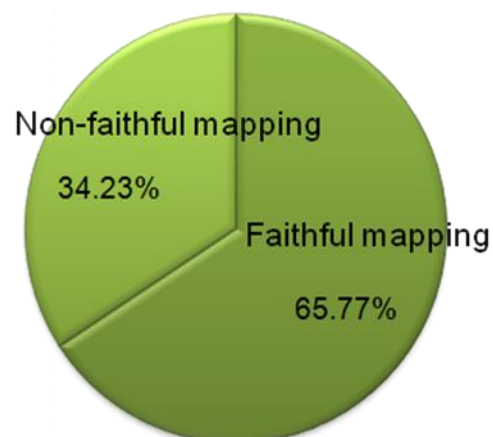


Figure 21. Faithful mapping of the word -final English nasals in Mandarin loanwords

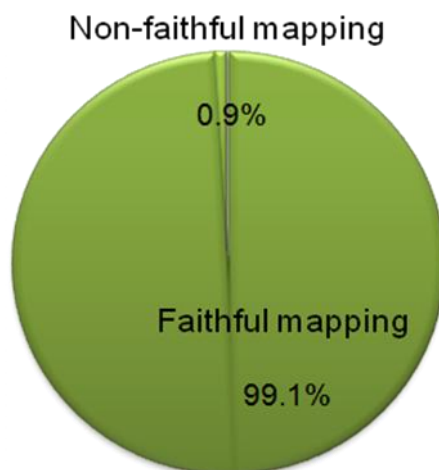


Figure 22. The ratio of English nasals in the coda position mapped into Mandarin loanwords, not considering the place features but only the manner features

4.3.2 Treatment for Mandarin phonotactics

As mentioned earlier, there are two steps for the adaptation of an English word in Mandarin loanwords. First, the English sound is replaced by the phonologically or

phonetically closest Mandarin phoneme. Second, syllable structures, which cannot be allowed in Mandarin phonology, are fixed to conform to Mandarin phonotactic constraints. In 4.3.2, the adaptation of English coda consonants and consonant clusters that are not allowed in Mandarin phonology will be discussed.

4.3.2.1 Adaptation of English coda consonants in Mandarin loanwords

English allows all the consonants except /h/ and the glides to be placed in the coda. On the contrary, none of consonants except /n/ and /ŋ/ can occur in the coda in Mandarin. In 4.3.2.1, the adaptation of English word-final consonants will be analyzed. The discussion will mostly focus on whether or not the coda is preserved and whether or not the coda is faithfully mapped into the corresponding Mandarin consonant if the coda is preserved. Not only the phonological or phonetic factors which plays the most important role for most loanwords, but also the functions of the semantic factors and the symbolization of Mandarin characters will be briefly discussed. The symbolization of Mandarin characters are especially shown in the adaptation of English coda consonants. This situation can be explained by the fact that Mandarin usually does not allow the coda consonant while all the consonants except /ŋ/ are used for the initial consonants, and thus in order to fix the foreign syllable structure, some Mandarin characters are used as a phonetic symbol, losing their nature as ideographs.

A single coda English plosive

All the English plosives can be coda consonant, but no Mandarin plosives can

be. The following examples show the adaptation of the English word-final plosives in Mandarin loanwords.

List 46. Examples for the adaptation of English word-final plosives in Mandarin loanwords

English		Mandarin (<i>Pinyin</i>)	IPA
Gap	→	Gài-pǔ	[kai-p ^h u]
pick-up	→	pí-kǎ	[p ^h i-k ^h a]
Bob	→	Bào-bó	[pau-pwo]
bit	→	bǐ-tè	[pi-t ^h ɿ]
jacket	→	jiǎ-kè	[tɕja-k ^h ɿ]
Brad	→	Bù-lā-dé	[pu-la-tɿ]
salad	→	sè-lā	[sɿ-la]
Cadillac	→	Kǎ-dí-lā-kè	[k ^h a-ti-la-k ^h ɿ]
Kodak	→	Kē-dá	[k ^h ɿ-ta]
Vogue	→	Wò-gǔ	[wo-ku]
BobDog	→	Bā-bù-dòu	[pa-pu-tou]

The discussion in this section does not include the English plosives in consonant clusters such as /-st/, /-lk/, or /-mp/. As shown in the examples above, the English plosives as a single coda consonant can be preserved by inserting a vowel, or they can be deleted in Mandarin loanwords. English /p/ is preserved in five cases out of eight, and all five are adapted to Mandarin /p^h/. A remarkable thing is that only the character *pǔ* 普 is used for the mapping of the English coda /p/. As for English /b/, it is always preserved and adapted to Mandarin /p/, and there is no example of the /b/ being deleted. In addition, English word-final /t/ is preserved in 29 cases of relevant 47 loanwords, and except for two loanwords in which the semantic factor functions, every /t/ in the 27

loanwords is faithfully mapped into Mandarin /tʰ/. It is remarkable that the character *tè* 特 is used for all 27 cases. In the cases of the adaptation of English /d/, it is preserved in 12 cases out of 21, and they are all adapted to Mandarin /t/, other than ‘English Tide → Mandarin *Tài-zì* 汰渍,’ which is affected by the semantic factor. Among the preserved ones, only one word uses the character *dé* 得 for the semantic effect, but the character *dé* 德 is used in all the other loanwords. As for English word-final /k/, it is preserved in 36 out of 42 loanwords. In the preserved ones, the character *kè* 克 is preferably used, other than a single exception, English *geek* → Mandarin *jíkè* 吉客, which is affected by the semantic factor. Lastly, English word-final /g/ is almost always preserved (nine out of ten loanwords), and among the preserved ones, five English /k/s are mapped into Mandarin /k/, but four are adapted to Mandarin /kʰ/. The discussion so far can be presented in the following table.

Table 29. Adaptation of a single word-final English plosive in Mandarin loanwords

English plosives	Mandarin phoneme	%	Preservation	Deletion
/p/	/pʰ/	62.50% (5/8) : 100% adapted into <i>pǔ</i> 普	62.5% (5/8) Semantic functions: 0/8	37.5% (3/8) : 66.67% affected by semantic factors (2/3)
/b/	/p/	100% (5/5)	100% (5/5) Semantic functions: (3/5)	0% (0/5)
/t/	/tʰ/	57.45% (27/47) : 100% adapted into <i>tè</i> 特	61.70% (29/47) Semantic functions: (2/29)	38.80% (18/47): 55.56% affected by semantic factors (10/18)
	/t/	4.26% (2/47) : 100% affected by semantic factors		

/d/	/t/	52.38% (11/21) : 90.91% adapted into <i>dé</i> 德	57.14% (12/21) Semantic functions: 2/12	42.86% (9/21): 66.67% affected by semantic factors (6/9)
	/ts/	4.76% (1/21) : 100% affected by semantic factors		
/k/	/k ^h /	85.71% (36/42) : 99.22% adapted into <i>kè</i> 克	85.71% (36/42) Semantic functions: 2/36	14.92% (6/42): 66.67% affected by semantic factors (4/6)
/g/	/k ^h /	40.00% (4/10)	90.00% (9/10) Semantic functions: 4/9	10.00% (1/10): 0% affected by semantic factors
	/k/	50.00% (5/10)		

The adaptation of English single word-final plosives shows that the preservation occurs much more than the deletion. In the preservation, pure phonetic mapping is much more preferable, while the cases affected by the semantic factors are more frequently shown in the deletion. This situation is presented in the following figure below.

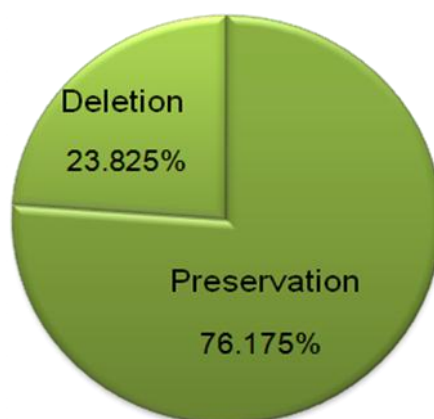


Figure 23. The ratio of preservation and deletion of English word-final plosives

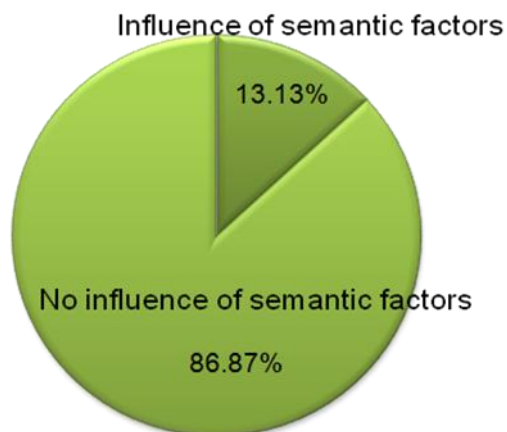


Figure 24. Phonemic preservation and influence of semantic factors

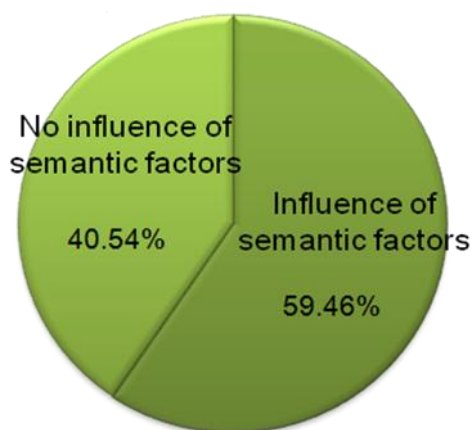


Figure 25. Deletion and influence of semantic factors

A single coda English fricative

All the English fricatives except /h/ can come in the coda position, but Mandarin does not allow any coda fricative. The following examples show the adaptation of English word-final fricatives in Mandarin loanwords.

List 47. Examples for the adaptation of English word-final fricatives in Mandarin loanwords

English		Mandarin (<i>Pinyin</i>)	IPA
Cardiff	→	Kǎ-dí-fū	[k ^h a-ti-fu]
Dove	→	Dé-fú	[tʰ-fu]
Cosworth	→	Kè-sī-wò-sī	[k ^h ʰ-sɿ-wo-sɿ]
Elizabeth	→	Yī-lì-shā-bái	[ji-li-ʂa-pai-∅]
Adidas	→	Ā-dí-dá-sī	[a-ti-ta-sɿ]
Cheetos	→	Qí-duō	[tʰ ^h i-two-∅]
Diaz	→	Dí-yà-zī	[ti-ja-tsɿ]
Febreeze	→	Fǎng-bì-shì	[fan-pi-ʂɿ]
Bush	→	Bù-shí	[pu-ʂɿ]

Oshkosh	→	À o-xù-kòu-xù	[au-ey-k ^h ou-ey]
Mackintosh	→	Mài-jīn-tǎ	[mai-tɛin-t ^h a-ø]

The data does not include the English fricatives in consonant clusters such as /-ls/ or /-rz/. As seen in the examples above, English coda fricatives are preserved or deleted in Mandarin loanwords. English /f/ is always mapped into Mandarin /f/, and the character *fū* 夫 is preferably used to transcribe English coda /f/. In addition, English /v/ is all adapted to Mandarin /f/ except in ‘English valve → Mandarin *fá* 阀,’ in which the coda /v/ is deleted. As for English /ʃ/, the ratio of preservation to deletion is 50:50. In the preservation, it is faithfully mapped into Mandarin /ɕ/ or /ʃ/. Most English word-final /θ/s are faithfully replaced by Mandarin /s/, and in these cases, the character *sī* 斯 is preferred. In the cases of English word-final /z/, many loanwords show the mapping into /ʃ/, but they are mostly affected by the semantic factors such as ‘English Febreeze (a brand name) → Mandarin *Fǎng-bì-shì* 纺必适.’ In addition, the mapping into /ts/ is also shown in the four cases, and it may be the effect of Pinyin *z* [ts]. Besides, the character *zī* 兹 is used for all four loanwords. The following table shows the situation of adaptation of English word-final fricatives in Mandarin loanwords.

Table 30. Adaptation of English single word-final fricatives in Mandarin loanwords

English fricatives	Mandarin phoneme	%	Preservation	Deletion
/f/	/f/	100% (8/8) : 75.00% adapted into <i>fū</i> 夫	100% (8/8)	0% (0/8)
/v/	/f/	80% (4/5)	80% (4/5)	20% (1/5)

/θ/	/s/	66.67% (6/9) : 66.67% adapted into <i>sī</i> 斯	88.89 % (8/9)	11.11% (1/9) : 100% affected by semantic factors (1/1)
	/f/	11.11% (1/9)		
	/ʃ/	11.11% (1/9)		
/s/	/s/	77.03% (57/74) : 82.46% adapted into <i>sī</i> 斯	83.78% (62/74)	16.22% (12/74) : 41.67% affected by semantic factors (5/12)
	/ʃ/	6.76% (5/74)		
/z/	/s/	29.41% (5/17)	94.12% (16/17)	5.88% (1/17)
	/ts/	23.53% (4/17) : 100% adapted into <i>zī</i> 兹		
	/ʃ/	41.18% (7/17) : 71.43% affected by semantic factors (5/16)		
/ʃ/	/ɛ/	16.67% (1/6)	50.00% (3/6)	50.00% (3/6) : 33.33% affected by semantic factors (1/3)
	/ʃ/	33.33% (2/6)		

The adaptation of English single word-final fricatives shows that the preservation is much more frequent than the deletion, just as in English plosives. Also, pure phonemic matches are much preferred in the preservation, while the semantic factors play a larger role in the deletion. This situation is presented in the following figures.

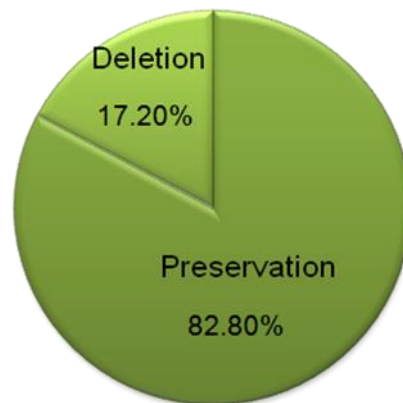


Figure 26. The ratio of the preservation and deletion of English word-final fricatives

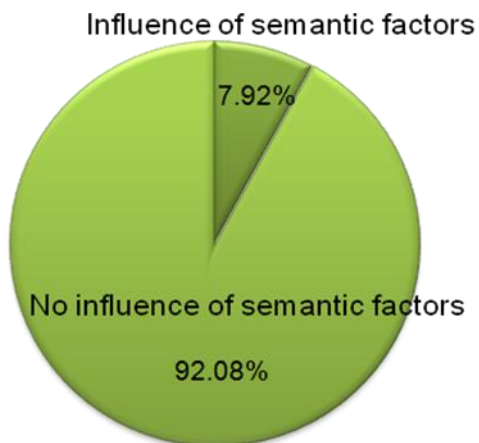


Figure 27. Phonemic preservation and influence of semantic factors

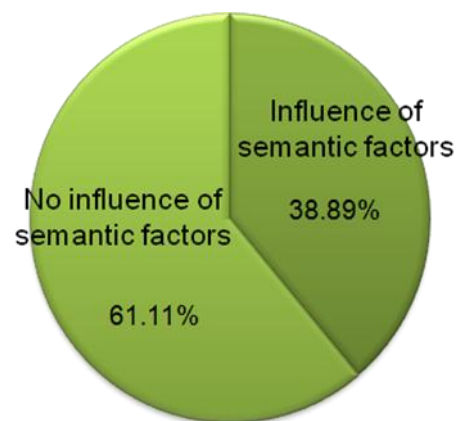


Figure 28. Deletion and influence of semantic factors

A single coda English affricate

English affricates /tʃ/ and /dʒ/ are adapted in Mandarin loanwords as can be seen in the following examples.

List 48. Examples for the adaptation of English word-final affricates in Mandarin loanwords

English		Mandarin (<i>Pinyin</i>)	IPA
Greenwich	→	Gé-lín-ní- zhì	[kɤ-lin-ni- tʂʅ]
Welch	→	Wéi-ěr- qí	[wei-əɪ- tɕʰi]
massage	→	mǎ-shā- jī	[ma-ʂa- tɕi]
Orange	→	À o-lán- qí	[au-lan- tɕʰi]

All the English affricates are adapted to Mandarin affricates, excluding the cases that show the deletion due to the effect of semantic factors (e.g. English Goodrich → Mandarin *Gù-tè-lì* 固特立, English bandage → Mandarin *bēng-dài* 绷带). Most English /tʃ/s are faithfully mapped into Mandarin /tɕʰ/, and some are adapted to Mandarin /tʂʅ/. English /dʒ/ is generally replaced by Mandarin /tɕ/ and /tɕʰ/. It is interesting that regardless of the adaptation of English /tʃ/ and /dʒ/, the character *qí* 奇 is used for all the Mandarin /tɕʰ/, and the character *zhì* 治 is chosen for all the Mandarin /tʂʅ/. The general situation of the adaptation of English word-final affricates can be presented as follows:

Table 31. Adaptation of English single word-final affricates in Mandarin loanwords

English phoneme	Mandarin Phoneme	%	Preservation	Deletion
/tʃ/	/tɕʰ/	62.50% (5/8) : 100% adapted into <i>qí</i> 奇	87.50% (7/8)	12.50% (1/8) : 100% affected by semantic factors (1/1)
	/tʂʅ/	25.00% (2/8) : 100% adapted into <i>zhì</i> 治		
/dʒ/	/tɕ/	45.46% (5/11)	90.91%	9.09% (1/11) : 100% affected by semantic factors
	/tɕʰ/	36.36% (4/11) : 100% adapted into <i>qí</i> 奇		

	/tʃ/	9.09% (1/11) : 100% adapted into <i>zhì</i> 治	(10/11)	(1/1)
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As seen in the table above, English word-final affricates are usually preserved in Mandarin loanwords. Also, the preservation is barely affected by the semantic factors, while all deletions are caused by the semantic factors. The following figures show this situation.

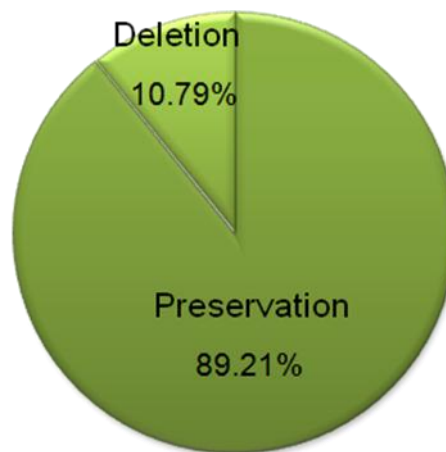


Figure 29. The ratio of preservation and deletion of English word-final affricates

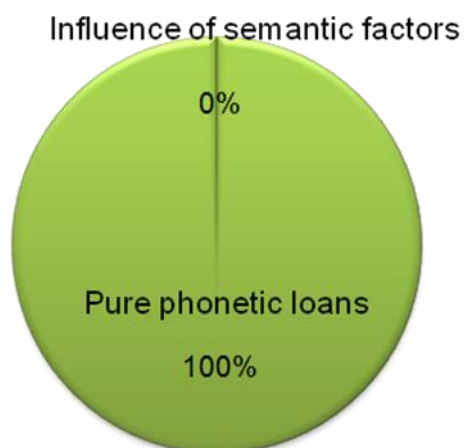


Figure 30. Phonemic preservation and influence of semantic factors

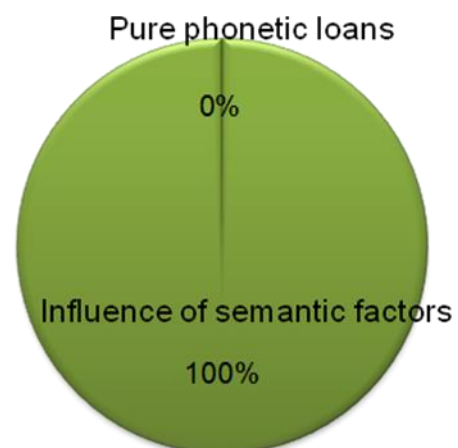


Figure 31. Deletion and influence of semantic factors

A single coda English /l/ and /ɫ/

Among English approximants, the glides are not placed in the coda, and thus only the adaptation of English /l/ and /ɫ/ will be discussed. The following examples of the adaptation of /l/ and /ɫ/.

List 49. Examples for the adaptation of English word-final /l/ and /ɫ/ in Mandarin loanwords

English		Mandarin (<i>Pinyin</i>)	IPA
angel	→	ān-qí-ér	[an-tɕʰi-əɻ]
hill	→	xī-ěr	[xi-əɻ]
Dole	→	Dōu-lè	[tɔu-lɤ]
Liverpool	→	Lì-wù-pǔ	[li-wu-pʰu]
car	→	kǎ	[kʰa]
bar	→	bā	[pa]
Eau Claire	→	Yōu-kè-léi-ěr	[jou-kʰɤ-lei-əɻ]

The most remarkable difference between the adaptation of English word-final /l/ and English word-final /ɫ/ is that the /l/ is mostly preserved while the /ɫ/ is generally deleted. The /l/ is preserved as Mandarin retroflex vowel /əɻ/ (or /ɻɫ/), and there are very few examples in which the /l/ is mapped into Mandarin /l/. Even though the examples show the mapping into Mandarin /l/, they are generally affected by the semantic factors. On the other hand, English word-final /ɫ/ is usually deleted in Mandarin loanwords. The data shows that the /ɫ/ is deleted in 87 cases out of 107. In the cases of preservation, the /ɫ/ is also adapted to Mandarin retroflex vowel /əɻ/. In fact, English coda /l/ and /ɫ/ are perceptually similar to a back vowel (Miao 2005: 75); they are often pronounced as a syllabic consonant in the final position. Moreover, the Mandarin retroflex vowel [əɻ]

(/əɪ/) is similar to the postvocalic /-ɪ/ in the perception (Miao 2005: 75). Therefore, the mapping of English word-final /l/ and /ɪ/ into Mandarin retroflex vowel [ʂ] can be treated as a more faithful mapping than the preservation through vowel insertion. This is because mapping to the retroflex vowel [ʂ] is perceptually more similar to the source sound. It is also remarkable that the character *ěr* 尔 is used for all the Mandarin retroflex vowel [ʂ] in the pure phonemic loans.

One interesting problem is found in the data. The problem is the question of why the word-final /l/ is mostly preserved while the word-final /ɪ/ is usually deleted in Mandarin loanwords. Miao (2005) suggests the possibility that the English source was not American English but British English, since the coda /ɪ/ is not pronounced in British English. This idea can make sense, in that British English affected Mandarin in the beginning period of adoption of English words. However, the problem still cannot be solved, since the lately adopted English words also prefer the deletion of the coda /ɪ/ in Mandarin loanwords, even though American English is the predominant source language. Further discussion about this phenomenon will be made later.

In sum, the situation of the adaptation of English word-final /l/ and /ɪ/ in Mandarin loanwords is presented in the following table.

Table 32. Adaptation of English single word-final /l/ and /ɪ/ in Mandarin loanwords

English phoneme	Mandarin phoneme	%	Preservation	Deletion
/l/	/l/	7.69% (5/65) : 80% (4/5) affected by semantic factors	80% (52/65)	20% (13/65) : 53.85% (7/13) affected by semantic factors
	[ʂ] (/əɪ/)	72.31% (47/65) : 89.36% (42/47)		

		mapped into Mandarin ǎr 尔		
/ɪ/	[ə] (/əɪ/)	18.69% (20/107) : 100% (20/20) mapped into Mandarin ǎr 尔	18.69% (20/107)	81.31% (87/107) : 8.05 (7/87) affected by semantic factors

As seen in the table above, English word-final /ɪ/ is generally preserved, and the deletion of it is affected by the semantic factors. When it is mapped into Mandarin /ɪ/ by inserting a vowel, the semantic factors also play a role, but in the mapping into Mandarin [ə], which is a more faithful match in the perception than Mandarin /ɪ/, the semantic factors barely affect the adaptation. On the other hand, unlike English /ɪ/, English word-final /ɪ/ has a high possibility of being deleted in Mandarin loanwords, and this deletion is rarely affected by the semantic factor. The following figures show the situation of the discussion so far.

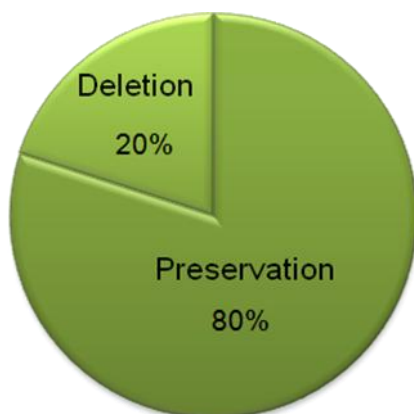


Figure 32. The ratio of preservation and deletion of English word-final /ɪ/

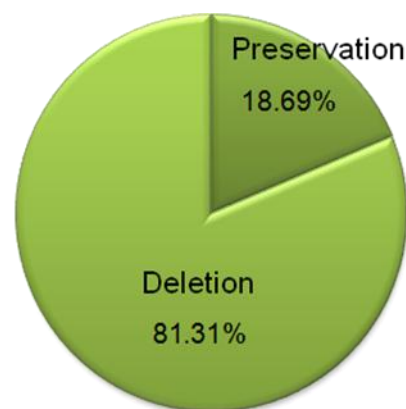


Figure 33. The ratio of preservation and deletion of English /ɪ/

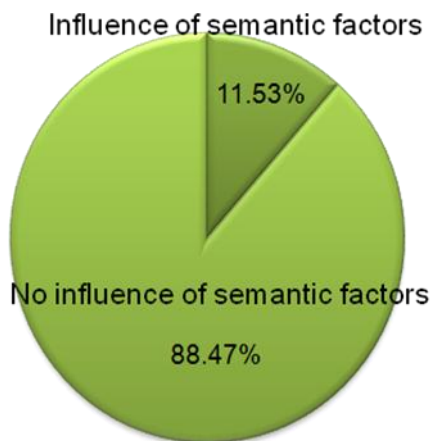


Figure 34. Phonemic preservation and influence of semantic factors in the adaptation of English word-final /l/

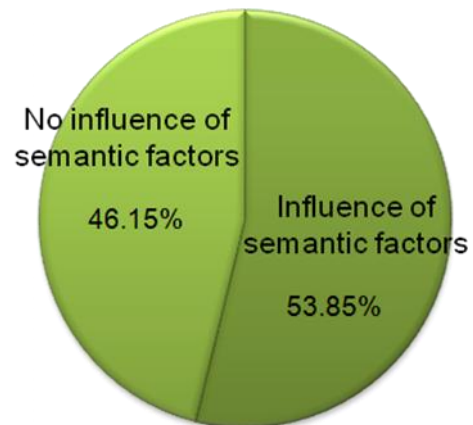


Figure 35. Deletion and influence of semantic factors in the adaptation of English word-final /l/

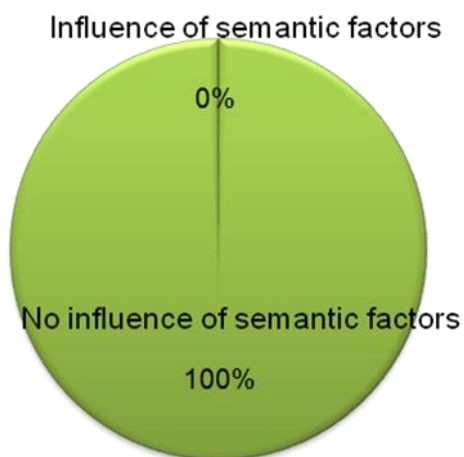


Figure 36. Phonemic preservation and influence of semantic factors in the adaptation of English word-final /ɪ/

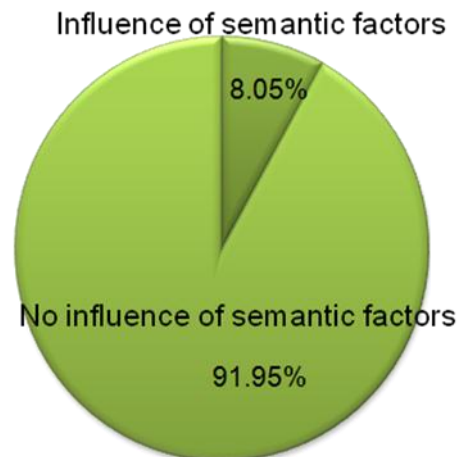


Figure 37. Deletion and influence of semantic factors in the adaptation of English word-final /ɪ/

A single coda English nasal

Among Mandarin nasals, only Mandarin /m/ cannot be placed in the coda position. Therefore, the adaptation of English word-final /m/ will be discussed in detail here, since the other nasals were already discussed earlier. However, the discussion of

the preservation and deletion of English nasals in Mandarin loanwords will include all three nasals. First, the examples showing the adaptation of English word-final /m/ in Mandarin loanwords are as follows:

List 50. Examples for the adaptation of English word-final /m/ in Mandarin loanwords

English		Mandarin (<i>Pinyin</i>)	IPA
Graham	→	Gé-léi-è- mǔ	[kɤ-lei-ɤ- mu]
Nottingham	→	Nuò-dīng-hàn	[nwo-tjəŋ-xan]
totem	→	tú-téng	[t ^h u-t ^h əŋ]

As shown above, English word-final /m/ is adapted into all three Mandarin nasals. Among the total data, the most common adaptation of English word-final /m/ is the mapping into Mandarin /mu/ by inserting a vowel /u/. The character *mǔ* 姆 is used in 100% of the pure phonetic loans. When the English /m/ is mapped into Mandarin /n/ or /ŋ/, since Mandarin allows /n/ and /ŋ/ as a coda, no vowel is inserted in the adaptation of English word-final /m/. Instead, the initial consonant of the syllable including the coda /m/ must be faithfully adapted to the corresponding Mandarin consonant. For example, as in the case of English Nottingham → Mandarin *Nuò-dīng-hàn* 诺丁汉, the initial consonant /h/ of the syllable including the English coda /m/ should be faithfully mapped into Mandarin /x/. Therefore, in the adaptation of English coda nasals, the preference of a special character should have a close relationship to the entire syllable including the English coda /m/ (e.g. English /-ton/ → Mandarin *dùn* 顿, English /-man/ → Mandarin *màn* 曼, English /-yin/ → Mandarin *yīn* 因, English /-mɪŋ/ → Mandarin *míng* 明, English /-tɪŋ/ or /tn/ → Mandarin *dīng* 丁, and English /-lɪn/ → Mandarin *lín* 林). There is no exception of this situation for the pure phonetic loans. Also, when the

English word-final /m/ is adapted to Mandarin /mu/, through vowel insertion, no case in which it is affected by semantic factors. Therefore, including the discussion of the English /n/ and /ŋ/ in 4.3.1, the adaptation of English word-final nasals in Mandarin loanwords is summarized in the following table.

Table 33. Adaptation of English single word-final nasals in Mandarin loanwords

English phoneme	Mandarin phoneme	%	Preservation	Deletion
/m/	/mV/	45.71% (16/35) : 93.75% mapped into Mandarin <i>mǔ</i> 姆	100% (35/35)	0% (0/35)
	/n/	28.57% (10/35) : 10% (1/10) affected by semantic factors		
	/ŋ/	25.71% (9/35) : 44.44% (4/9) affected by semantic factors		
/n/	/n/	73.63% (162/220)	98.18% (216/220)	1.82% (4/220) : 25% (1/4) affected by semantic factors
	/ŋ/	24.55% (54/220) : 20.37% (11/54) affected by semantic factors		
/ŋ/	/n/	42.11% (8/19)	100% (19/19)	0% (0/19)
	/ŋ/	57.89% (11/19)		

Based on the discussion of the adaptation of English word-final consonants in Mandarin loanwords, English word-final nasals are usually preserved in Mandarin loanwords. Nasals are sounds that have high sonority, and thus, the sounds should be perceptually salient. This perceptual salience can be a reasonable answer for the high preservation of English nasals. In addition, I argue that there is a possibility that English

nasal codas are more easily perceived by Mandarin speakers than other coda consonants since Mandarin allows nasal coda /n/ and /ŋ/.

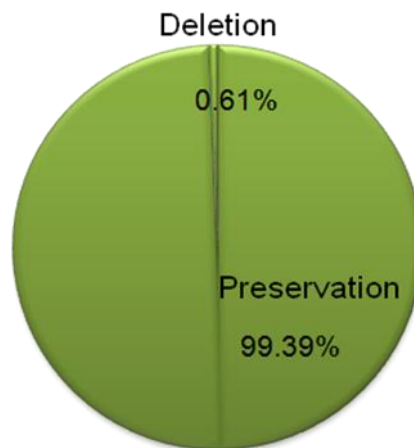


Figure 38. The ratio of preservation and deletion of English single word-final nasals

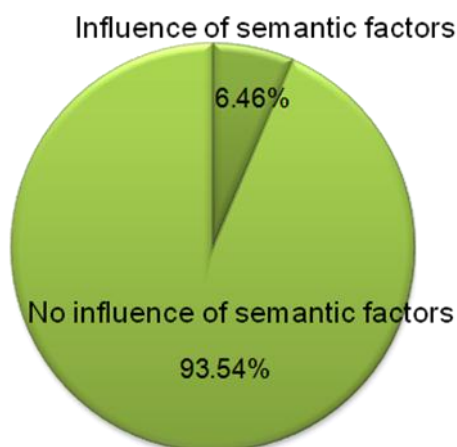


Figure 39. Phonemic preservation and influence of semantic factors in the adaptation of English single word-final nasals

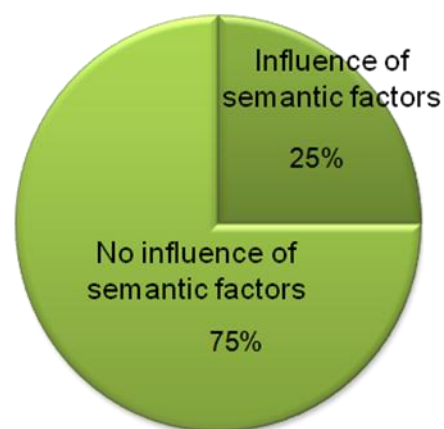


Figure 40. Deletion and influence of semantic factors in the adaptation of English single word-final nasals

4.3.2.2 Adaptation of English initial clusters in Mandarin loanwords

As discussed in Chapter III, English syllable structures are much more

complicated than Mandarin syllable structures. English has a maximum of three consonants in the initial position, but Mandarin does not allow consonant clusters. Therefore, English inputs should be modified to conform to the relatively simple Mandarin syllable structures. The relevant data in the discussion of this section includes all the initial consonant clusters (e.g. /#CCV_#/ , /#_ .CCV_#/ , /#_V.CCV#/ , /#CCCV_#/ , and /#_ .CCC_#/) regardless of the position in the English words. In addition, the data used in this analysis contains loanwords which are not affected by the semantic factors, since the deletion often occurs due to the semantic effect, which was proven in the previous section.

4.3.2.2.1 Treatment for double initial consonants (initial C₁C₂ clusters)

The data has 18 types of English double initial consonants as inputs.

Table 34. English double initial consonants

English initial CC clusters	English → Mandarin loanwords	English initial CC clusters	English → Mandarin loanwords
/st-/	Starwood → <i>Sī-tǎ-wǔ-dé</i> [sɿ-t ^h a-wu-tɿ]	/ʃɪ-/	Shreck → <i>Shǐ-ruì-kè</i> [ʃɿ-ɿwei-k ^h ɿ]
/sm-/	Smith → <i>Shǐ-mì-sī</i> [ʃɿ-mi-sɿ]	/fɪ-/	frisbee → <i>fú-lì-sī-bǐ</i> [fu-li-sɿ-pi]
/sn-/	Snoopy → <i>Shǐ-nǚ-bǐ</i> [ʃɿ-nu-pi]	/kɪ-/	Chrysler → <i>Kè-lái-sī-lè</i> [k ^h ɿ-lai-sɿ-lɿ]
/sl-/	Slamdance → <i>Shǐ-lán-dān-sī</i> [ʃɿ-lan-tan-sɿ]	/gɪ-/	Greenwich → <i>Gé-lín-ní-zhì</i> [kɿ-lin-ni-tʃɿ]
/sk-/	Scott → <i>Sī-kǎo-tè</i> [sɿ-k ^h au-t ^h ɿ]	/pl-/	Plains → <i>Pǔ-lín-sī</i> [p ^h u-lin-sɿ]
/sp-/	sparkling → <i>sī-pà-kè-lín</i> [sɿ-p ^h a-k ^h ɿ-lin]	/bl-/	black → <i>bù-lái-kè</i> [pu-lai-k ^h ɿ]

/tʃ-/	Troy → <i>Tè-luò-yī</i> [tʰɤ-lwo-ji]	/kl-/	clone → <i>kè-lóng</i> [kʰɤ-luŋ]
/bɹ-/	broken → <i>Bù-lǚ-kě</i> n [pu-lu-kʰən]	/gl-/	Glass → <i>Gē-lá-sī</i> [kɤ-la-sɿ]
/pɹ-/	Princeton → <i>Pǔ-lín-sī-dùn</i> [pʰu-lin-sɿ-twən]	/fl-/	flannel → <i>fǎ-lán-róng</i> [fa-lan-ɹuŋ]

Analyzing all of the 144 loanwords which belong to one of the 18 types of initial C₁C₂ clusters, the result comes out as shown in the table below. Preservation indicates the cases in which all the English consonants in the initial clusters appear in Mandarin loanwords by a vowel insertion. When one of the consonants in the initial clusters is deleted, only ‘r’ in the position of C₂ is deleted. Therefore, this situation can be described as ‘r-deletion.’

Table 35. Adaptation of English double initial consonants in Mandarin loanwords

English initial CC cluster	Preservation by V insertion	r - deletion	English initial CC cluster	Preservation by V insertion	r – deletion
/st-/	100% (20/20)		/ʃɹ-/	100% (1/1)	
/sm-/	100% (2/2)		/fɹ-/	83.33% (5/6)	16.67% (1/6)
/sn-/	100% (3/3)		/kɹ-/	85.71% (12/14)	14.29% (2/14)
/sl-/	100% (7/7)		/gɹ-/	100% (18/18)	
/sk-/	100% (10/10)		/pl-/	100% (1/1)	
/sp-/	100% (4/4)		/bl-/	100% (8/8)	
/tɹ-/	88.89% (8/9)	11.11% (1/9)	/kl-/	100% (10/10)	
/bɹ-/	100%		/gl-/	100% (7/7)	

	(13/13)				
/pɹ-/	75% (3/4)	25% (1/4)	/fl-/	100% (7/7)	

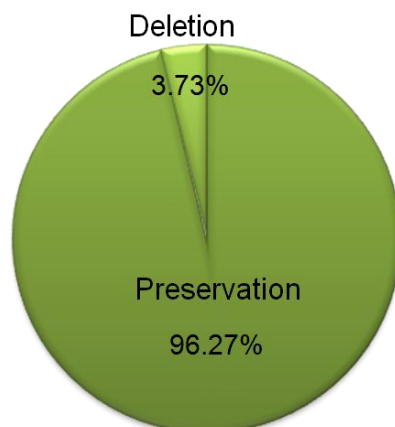


Figure 41. The ratio of preservation and deletion of the English initial CC clusters

As seen above, the English initial CC clusters are mostly preserved in Mandarin loanwords by a vowel insertion. The deletion occurs in only a few initial clusters, whose C₂ is ‘r’. In the case of English Coventry → Mandarin *Kǎo-wén-chuí* [k^hau-wən-tɕ^hwei], it is not counted as a deletion, since many native English speakers pronounce English /tɹ/ as [tʃ] (Yu 2010), and English /tɹ/ and /dɹ/, in fact, can be treated as affricates such as /tʃ/ and /dʒ/ (Duanmu 2008). Rather, the mapping of English /tɹ/ to Mandarin /tɕ^h/ shows more perceptual similarity than preserving /tr/ through vowel insertion.

The deletion occurs only in syllables which have ‘r’ as a C₂. It results from the features of English consonant /ɹ/. In native English speaker childhood language acquisition, the post-alveolar approximant /ɹ/ is lately acquired (Cruttenden 2001: 209). In addition, English /ɹ/ is a particular phoneme which is not easily found in other languages, and its sound is a very similar to a vowel. Gimson (1962) suggests that foreign learners of English /ɹ/ pronounce English /ɹ/ as a vowel of their native language

or as the English central vowel (Cruttenden 2001. 2009). Therefore, there is a high possibility that the characteristics of English /ɪ/ cause borrowers to confuse the /ɪ/ with the following vowel, when it comes as a C₂ in the consonant cluster. Thus, it is reasonable that this kind of /ɪ/ can cause the deletion in Mandarin loanwords. To be more specific, in the case of ‘English microphone → Mandarin *mài-kè-fēng* [mai-k^hɤ-fəŋ]’ r-deletion occurs, since the following vowel /ə/ of English /ɪ/ is perceptually similar to the /ɪ/, and thus it is not salient in the borrower’s perception. Therefore, it is possible that the /ɪ/ in the input is dropped when it is adapted in the Mandarin loanword. Consequently, the reason for r-deletion in the place of C₂ results from the phonetic characteristics of the source sound.

There is one more interesting point in the adaptation of English initial consonant clusters in Mandarin loanwords. C₁ usually prefers a particular character, while various characters can be used for C₂, even when the same source sound is replaced. This situation can be explained by the hypothesis that C₁ is not affected by any vowel due to the following consonant (C₂), and thus it can be uniformly transcribed by a specific character. On the other hand, C₂ generally has a close relationship with the following vowel, so it cannot be fully transcribed by a particular character that only focuses on the sound value of the consonant, since Mandarin characters are monomorphemic. This can be exemplified through the English initial cluster /st-/, which has the highest percentage of the relevant data (there are totally 143 loanwords for the case). [s], the C₁, is mostly expressed by the character *sī* 斯 (80%), while [t], the C₂, is diversely transcribed by various characters such as *dùn* 顿, *tè* 特, *tǎ* 塔, *tǎn* 坦, and *dài* 黛. Also, the characters show the close relationship with the following vowels of the C₂. Examples are shown below.

List 51. Examples for the adaptation of English /st-/ in Mandarin loanwords

English		Mandarin (<i>Pinyin</i>)	IPA	Character
Stern	→	Sī-tè-ēn	[sɿ-tʰɛ-ən]	斯特恩
Winston	→	Wēn-sī-dùn	[wən-sɿ-twən]	温斯顿
Stanley	→	Sī-tǎn-lì	[sɿ-tʰan-li]	斯坦利
Starwood	→	Sī-tǎ-wù-dé	[sɿ-tʰa-wu-tɛ]	斯塔伍德
Stiles	→	Sī-dài-ěr-sī	[sɿ-tai-əɪ-sɿ]	斯黛尔斯

As seen above, C₁ uniformly uses the character *sī* 斯. Therefore, the *sī* 斯 is not used as an ideograph any more, but is used as a phonetic symbol. On the contrary, different characters are used for C₂, and it can be easily shown that the characters are chosen with the consideration of the following vowels.

4.3.2.2.2 Treatment for triple initial consonants (initial C₁C₂C₃ clusters)

The data does not have many loanwords that have triple initial consonants.

There are two kinds of triple initial consonants in the data.

Table 36. Adaptation of English triple initial consonants

English initial CCC cluster	Preservation by V insertion	Deletion	English initial CCC cluster	Preservation by V insertion	Deletion
/stɪ-/	80% (4/5)	20% (1/5)	/spɪ-/	100% (1/1)	0% (0/1)
	e.g. English Strauss → Mandarin Sī-tè-láo-sī [sɿ-tʰɛ-lau-sɿ]			e.g. English Sprint → Mandarin Sī-pǔ-lín-tè [sɿ-pʰu-lin-tʰɛ]	

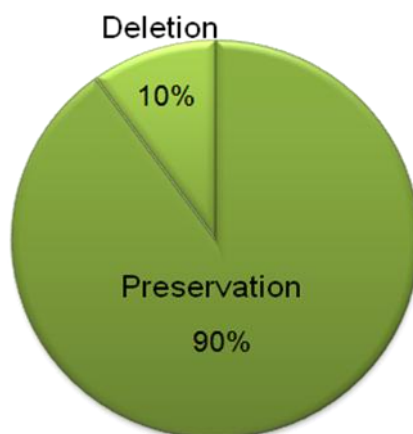


Figure 42. The ratio of preservation and deletion of the English initial CCC clusters

As shown above, based on the analyses of pure phonetic loans, the adaptation of English initial CCC clusters is generally preserved through inserting vowels. In the case of ‘English **Armstrong** → Mandarin *Ā-mǔ-sī-zhuāng*,’ [-tɹ-], the C₂C₃, can be classified into an affricate, as mentioned earlier, and thus the matching of English [-tɹ-] and Mandarin [tʂ] is not treated as a deletion in this study. Rather, it is a faithful mapping in which both perceptual similarity and phonetics are considered. In addition, in the case of ‘English **Australia** → Mandarin *À-o-dà-lì-yà*,’ only the C₂ survives (English /t/ → Mandarin /t/), but the C₁ and C₃ are deleted (English /s/ and /ɹ/ → Mandarin ∅).

In the adaptation of English initial CCC clusters in Mandarin loanwords, the preference for a specific character is also found. English [s], the C₁, prefers the character *sī* 斯, *tè* 特 and *pǔ* 普 are generally chosen for English [t] and [p], the C₂. However, for the C₃, various characters are used for the match with the following vowel (e.g. English **Strauss** → Mandarin *Sī-tè-láo-sī* 斯特劳斯, English **Sprint** → *Sī-pǔ-lín-tè* 斯普林特).

4.3.2.3 Adaptation of English final clusters in Mandarin loanwords

As in English initial clusters, the structure of the English final clusters is much more complicated than Mandarin syllables. Maximally, four English consonants can be placed in the final position of the syllable, but Mandarin allows only one consonant, which is Mandarin /n/ or /ŋ/. Therefore, the input that has a final consonant cluster should be fixed when it is adopted in Mandarin loanwords. The relevant data discussed in this section includes all the final consonant clusters, regardless of the position within the syllable (/#_VCC.#/, /#_VCC#/, /#_VCCC.#/, /#_VCCC#/). The cases which are affected by the semantic factors are excluded, but only pure phonetic loans are included in this analysis.

4.3.2.3.1 Treatment for double final consonants (Final C₁C₂ clusters)

There are 29 types of English double final consonant clusters in the data.

Table 37. English double final consonants clusters in the data

English final CC clusters	English → Mandarin loanwords	English final CC clusters	English → Mandarin loanwords
/-mp/	Campbell → <i>Kān-bèi-ěr</i> [k ^h an-peɪ-əɿ]	/-ɪn/	Blackburn → <i>Bù-lái-kè-běn</i> [pu-lai-k ^h ɿ-pən]
/-mz/	James → <i>Zhān-mǔ-sī</i> [tʂan-mu-sɿ]	/-ɪp/	Sharp → <i>Xià-pǔ</i> [ɕia-p ^h u]
/-nd/	Standford → <i>Sī-tǎn-fú</i> [sɿ-t ^h an-fu]	/-ɪt/	Mozart → <i>Mò-zhá-tè</i> [mwo-tʂa-t ^h ɿ]
/-nt/	pint → <i>pǐn-tuō</i> [p ^h in-t ^h wo]	/-ɪə/	Cosworth → <i>Kè-sī-wò-sī</i> [k ^h ɿ-

			sɿ-wo-sɿ]
/-nz/	Irons → <i>Ài-ēn-sī</i> [ai-ən-sɿ]	/-ɪdʒ/	George → <i>Qiáo-zhì</i> [tʰɿjau-tʂɿ]
/-ŋk/	tank → <i>tǎn-kè</i> [tʰan-kʰɿ]	/-ɪʃ/	Marsh → <i>Mǎ-shí</i> [ma-ʂɿ]
/-ŋz/	Cummings → <i>Kāng-múng-sī</i> [kʰaŋ-mjəŋ-sɿ]	/-ɪz/	Sears → <i>Xī-ěr-sī</i> [xi-ər-sɿ]
/-ld/	Donald → <i>Duō-nà-dé</i> [two-na-tɿ]	/-ft/	Bancroft → <i>Bān-kè-luò-fū-tè</i> [pan-kʰɿ-lwo-fu-tʰɿ]
/-lf/	Delph → <i>Dé-ěr-fú</i> [tɿ-ər-fu]	/-st/	Comcast → <i>Kāng-kǎ-sī-tè</i> [kʰaŋ-kʰa-sɿ-tʰɿ]
/-lt/	Walt → <i>Wò-tè</i> [wo-tʰɿ]	/-bz/	Jacobs → <i>Yǎ-gè-bù</i> [ja-kɿ-pu]
/-lʃ/	Welch → <i>Wéi-ěr-qí</i> [wei-ər-tʰɿ]	/-ps/	tips → <i>tiē-shì</i> [tʰje-ʂɿ]
/-lz/	Stiles → <i>Sī-dài-ěr-sī</i> [sɿ-tai-ər-sɿ]	/-dz/	Leedz → <i>Lì-zī</i> [li-tʂɿ]
/-ld/	Lord → <i>Luó-dé</i> [lwo-tɿ]	/-ts/	Gates → <i>Gài-cì</i> [kai-tʂɿ]
/-ɪg/	Greenburg → <i>Gé-lín-bó-gé</i> [kɿ-lin-pwo-kɿ]	/-ks/	Maxwell → <i>Mài-sī-wēi-ěr</i> [mai-sɿ-wei-ər]
/-ɪl/	Carlson → <i>Kǎ-ěr-sēn</i> [kʰa-ər-sən]		

The data has 130 loanwords which have one of the 29 types of final CC clusters. The result of the analyses based on the 130 loanwords is summarized in the following tables. Preservation means that both C₁ and C₂ appear in Mandarin loanwords by inserting a vowel; deletion means that both C₁ and C₂ are deleted in Mandarin loanwords.

Table 38. Final CC clusters beginning with a nasal

Preservation	Preservation + Deletion		Deletion
	Preservation of a nasal + Deletion of non-nasal	Deletion of a nasal + Preservation of non-nasal	
82.86% (29/35)	17.14% (6/35)	0% (0/35)	0% (0/35)
	17.14% (6/35)		

Table 39. Final CC clusters beginning with a liquid

Preservation	Preservation + Deletion		Deletion
	Preservation of a liquid + Deletion of non-liquid	Deletion of a liquid + Preservation of non-liquid	
16.95% (10/59)	1.69% (1/59)	71.19% (42/59)	10.17% (6/59)
	72.88% (43/59)		

Table 40. Final CC clusters beginning with a fricative

Preservation	Preservation + Deletion		Deletion
	Preservation of a fricative + Deletion of non-fricative	Deletion of a fricative + Preservation of non-fricative	
63.64% (7/11)	36.36% (4/11)	0% (0/11)	0% (0/11)
	36.36% (4/11)		

Table 41. Final CC clusters beginning with a stop

Preservation	Preservation + Deletion		Deletion
	Preservation of a stop + Deletion of non-stop	Deletion of a stop + Preservation of non-stop	
60.00% (15/25)	16.00% (4/25)	20.00% (5/25)	4.00% (1/25)
	36.00% (9/25)		

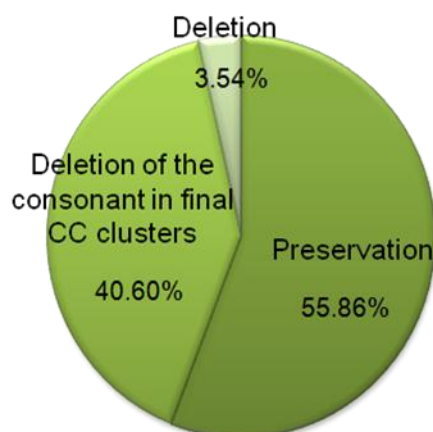


Figure 43. The ratio of preservation and deletion in the adaptation of the final CC clusters

As shown in the tables above, it is rare that both consonants in the final CC clusters are deleted in Mandarin loanwords. That is, English final consonants, the inputs, are generally replaced by Mandarin phonemes. In other words, both consonants in final CC clusters are preserved by vowel insertion, or at least one of the final consonants, which is perceptually more salient, is preserved. The high survival rate of more salient ones suggests that phonetics plays a role in the adaptation of Mandarin loanwords. To be specific, if the input has a nasal sound in the final CC clusters (e.g. /-mp/, /-nt/, /-nd/, /-nz/, /-ŋk/, /-ŋz/, /-m/), the nasal has a high possibility of surviving in Mandarin loanwords, when one of the final consonants is deleted. The reason is that nasals are sonorant consonants, and thus they are “able to cue the following consonant better than an obstruent” (Kenstowicz 2007: 329). In addition, in the cases that a fricative is the C₁, the structures of /-ft/ and /-st/ are targeted. Usually, the fricative, the C₁, is preserved but the stop, the C₂, is deleted. According to Kenstowicz (2007: 329), this situation can be explained by “the relative salience of strident fricatives over stops” by Steriade (2001a). On the other hand, English /l/ in the final CC clusters is frequently deleted, since it is a

‘dark l,’ and has “high-back vowel-like quality” (Brown 1989). Thus it is hard for the borrower to perceive. With the same reason, English /ɹ/ in the final clusters is often deleted in Mandarin loanwords. As a result, if the inputs have a liquid, the liquid is usually deleted. To conclude, phonetics cannot be ignored in the adaption of Mandarin loanwords, even though it is through the phonological replacement and vowel insertion that the inputs tend to be preserved in Mandarin loanwords.

In addition, it is remarkable that the nasal in the final CC cluster is preserved as the coda of the preceding syllable, while the other consonant in the final CC cluster is preserved as an independent syllable by inserting a vowel. Examples can be seen below.

Figure 44. Adaptation of English nasals in the final CC clusters

English	<u>Ran</u> --d	<u>tan</u> ---k	<u>fan</u> ---s	<u>pin</u> ---t
	↓ ↓	↓ ↓	↓ ↓	↓ ↓
Mandarin	lán - dé	tǎn - kè	fǎn - sī	pǐn - tuō

This situation occurs due to the native Mandarin phonology. That is, Mandarin allows /n/ in the syllable-final position, and thus the nasal, the C₁, naturally conforms to the native Mandarin phonology. However, the following consonant, the C₂, is not allowed in the Mandarin phonology, so it must be changed to conform to the rules of Mandarin phonology. Therefore, the C₂ is preserved through vowel insertion. This analysis also can be supported by the result that English /m/, the C₁ in the final CC clusters (/mp/, /mz/), is generally preserved by inserting a vowel such as *mǔ* 姆 or *mó* 摩 (e.g. English *Bloomsbury* → Mandarin *Bù-lú-mǔ-sī-bó-lǐ*).⁷⁵ The following figures can show the situation well.

⁷⁵ English /m/ in the final clusters is replaced by /n/ in only two Mandarin loanwords.

English /n/ forming an independent syllable by vowel insertion



Figure 45. English /n/, the C₁, in the final C₁C₂ clusters mapped into a final consonant of the preceding syllable

English /m/ mapped into /n/ as a final consonant of the preceding syllable

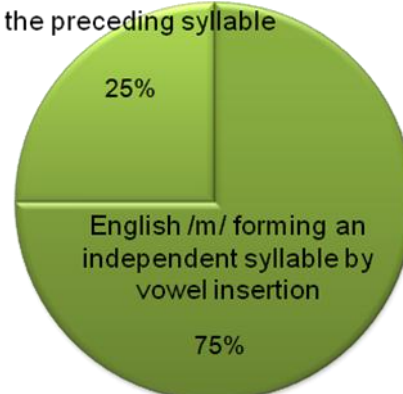


Figure 46. English /m/, the C₁, in the final C₁C₂ cluster forming an independent syllable by vowel insertion

This result shows the role of the borrowing language's native phonology in the loanword adaptation.

The epenthetic vowels also demonstrate the interesting relationship between the source inputs and the native Mandarin phonology. In the case that C₂ in the final C₁C₂ clusters is preserved, inserted vowels are chosen by considering the perceptual similarity to the source sounds. For example, /-C₁z/, /-C₁dʒ/, /-C₁f/, and /-C₁ts/ are preserved by the vowels /i, ɿ, ʊ/; /-C₁p/ and /-C₁f/ by the vowel /u/; /-C₁d/, /-C₁t/ and /-C₁g/ by the vowel /ɤ/. Further discussion of the epenthetic vowels will be made in 4.3.2.5.

4.3.2.3.2 Treatment for triple final consonants (Final C₁C₂C₃ clusters)

The data does not have many loanwords with the triple final consonant cluster. Based on the data, there are seven types of English triple final consonant clusters.

Table 42. English triple final consonant clusters in the data

English final CCC clusters	English → Mandarin loanwords	English final CCC clusters	English → Mandarin loanwords
/-ɪts/	Herz → <i>Hè-zǐ</i> [xɤ-tzɿ]	/-ɪlz/	Charles → <i>Chá-ě-r-sǐ</i> [tʂʰa-əɪ-sɿ]
/-ɪks/	Marks → <i>Mǎ-kè-sǐ</i> [ma-kʰɤ-sɿ]	/-ɪnz/	Bear Stearns → <i>Bèi-ě-r-sǐ-tè-ě-n</i> [pei-əɪ-sɿ-tʰɤ-ən]
/-ɪbz/	Forbez → <i>Fú-bù-sǐ</i> [fu-pu-sɿ]	/-ɪdz/	Reynolds → <i>Léi-nuò-sǐ</i> [lei-nu-əɪ-sɿ]
/-ɪst/	karst → <i>kā-sǐ-tè</i> [kʰa-sɿ-tʰɤ]	/-ɪts/	waltz → <i>huá-ě-r-zǐ</i> [xwa-əɪ-tsɿ]

All the inputs in the data have a liquid in the final CCC clusters. Therefore, the cases in which /ɹ/ or /l/ is deleted in /-ɹCC/ or /-lCC/ will be included in the ‘liquid deletion.’ The cases in which a fricative as a C₃ is also deleted with the deletion of a liquid will belong to the ‘deletion of a fricative’ under ‘deletion of a liquid.’ In addition, ‘preservation of non-liquid’ under ‘deletion of a liquid’ indicates the cases that a liquid is deleted, but in all other situations, C₂C₃ are preserved in the C₁C₂C₃ clusters. The result of the analyses of 14 relevant loanwords is as follows:

Table 43. Adaptation of English triple final consonant clusters in Mandarin loanwords

Preservation	Deletion of a liquid	
	Preservation of non-liquid	Deletion of a fricative
7.14% (1/14)	78.57% (11/14)	14.29% (2/14)
	92.86% (13/14)	

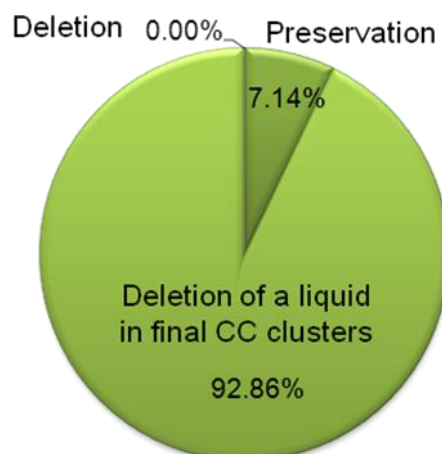


Figure 47. The ratio of preservation and deletion in the adaptation of the final CCC clusters

All three consonants in the English final CCC clusters are rarely preserved in Mandarin loanwords. Mostly, a liquid which is not a relatively salient sound in the final position tends to be deleted, while other two consonants are preserved. This result is very different from the earlier argument that the inputs of the source language are usually preserved. However, it can be understood that the case of the final CCC clusters shows a different result, since the structure of the final CCC clusters is too complicated to be accepted in Mandarin due to the lack of the consonant clusters except only two (/n/ and /ŋ/) in Mandarin native phonology. Therefore, the consonant that is not salient in the cluster tends to be deleted in Mandarin loanwords. There are two ways to preserve two consonants, the input, in Mandarin loanwords. First, two consonants are preserved by inserting vowels such as in English *Hearst* → Mandarin *Hè-sī-tè*. Second, two consonants are transcribed by one Mandarin consonant such as in English *Roberts* → Mandarin *Luó-bó-cì* (English consonant cluster /ts/ → a Mandarin affricate /tʂ^h/). When comparing ‘English *Robert* → Mandarin *Luó-bó-tè* and English *Roberts* → Mandarin *Luó-bó-cì*,’ the perceptual similarity between the source sound and the sound of

borrowing language can be seen.

4.3.2.4 Summary for the preservation and deletion of English consonant inputs in Mandarin loanword adaptation

The discussion of 4.3.2 is all about how the inputs that are not allowed in the native Mandarin phonology are changed to adapt to Mandarin phonotactics. The focus of the analyses and the discussion is on whether or not the elements in the input are preserved or deleted. Also, in the cases that the elements are preserved, the discussion is focused on how the inputs are mapped into Mandarin phonemes. In the cases where the elements are deleted, the discussion is focused on why the deletion happens. Based on the discussion so far in 4.3.2, this section will be the summary for the discussion of preservation and deletion in the adaptation of Mandarin loanwords.

The following figures show the total preservation and deletion of English single final consonants in Mandarin loanwords.

Figure 48. Preservation and deletion of English single final consonant in Mandarin loanwords.

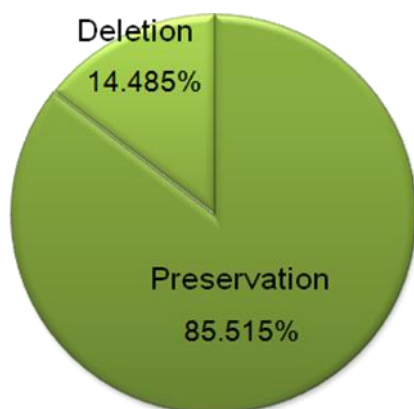


Figure 48-1.

Excluding the adaptation of English /_V.ɪ#/

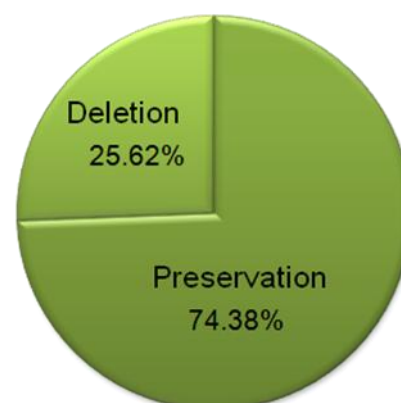


Figure 48-2

Including the adaptation of English /_V.ɪ#/

As seen above, English single final consonants are usually preserved in Mandarin loanwords. Only English /-ɪ/ is much more frequently deleted than preserved in Mandarin loanwords. The special behavior of English final coda /-ɪ/ considerably affects the total percentage of deletion and preservation in the adaptation of English final consonants. The most important factor affecting on this situation is the characteristics of English /ɪ/. That is, English /ɪ/ which has a special phoneme, is phonetically similar to the vowels. This feature makes it hard for Mandarin speakers to perceive it, and furthermore English /ɪ/ is a non-Mandarin phoneme. Therefore, considering the role of phonetics in the adaptation, the deletion of English /ɪ/ in Mandarin loanwords is not unexpected. The fact that the deletion of English /ɪ/ happens not only in the single final position, but also in the final CC clusters, also supports the argument.

Except for the single final English /ɪ/, the other consonants in the final position tend to be preserved in Mandarin loanwords. However, there are still many cases in which the elements of the inputs are deleted. The reason why this situation happens also should be discussed. The following figures show the effect of the semantic factors between preservation and deletion.

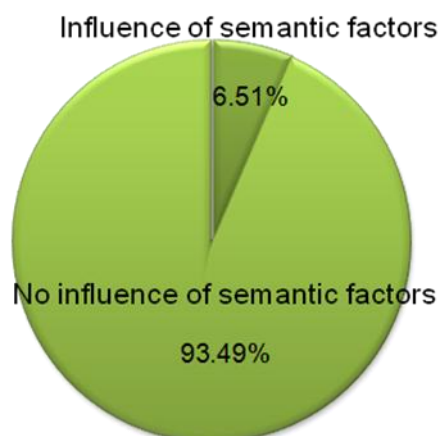


Figure 49. Preservation and influence of the semantic factors

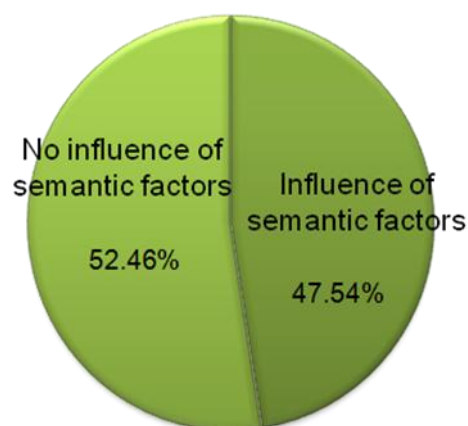


Figure 50. Deletion and influence of the semantic factors

As shown above, in the cases of the preservation, the semantic factor does not play a significant role in the adaptation, while considerably affecting the deletion. If excluding the cases of the /-ɪ/ in the total percentage of the deletion, since the deletion is usually caused by its own characteristic, the closer relationship between the semantic factors and the deletion is shown.⁷⁶ In fact, compared to the languages using alphabetic writing systems, it is natural that the semantic factors are very important in the adaptation of Mandarin loanword since Mandarin uses ideographs. Generally speaking, deletion is the strategy for the adaptation of loanwords based on the perception while preservation is the strategy for the adaptation of loanwords adopted from the written sources (Smith 2007, Miao 2005). In addition, the characteristic of ideograph is also considered in the adaptation of Mandarin loanwords.

In addition to the characteristics of the ideographs, the borrower's perception also plays a pivotal role in the deletion. The following figures are the results of the analyses of English initial CC/CCC clusters and final CC/CCC clusters.

⁷⁶ The influence of the semantic factor for the deletion is 55.44% without the deletion of English /ɪ/.

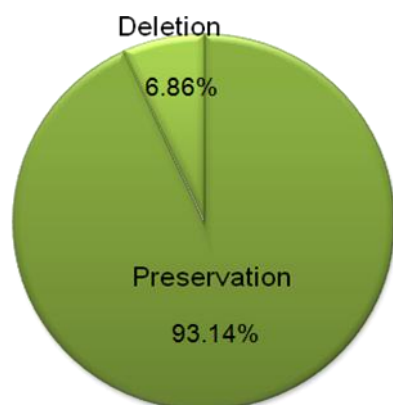


Figure 51. Preservation and deletion of the English initial consonant clusters in Mandarin loanwords

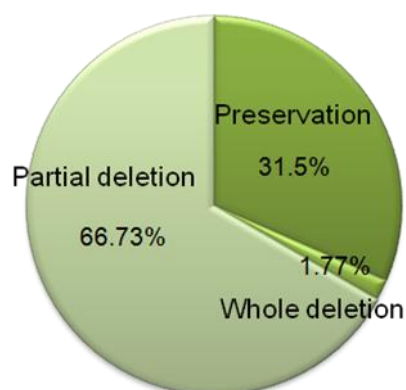


Figure 52. Preservation and deletion of the English final consonant clusters in Mandarin loanwords

As shown in the figures above, English initial consonant clusters as inputs, are usually preserved. However, for the final consonant clusters deletion occurs twice as often as preservation, but the deletion of all the final consonants is rare. This situation raises a question about the reason why this asymmetry between the initial and the final consonants occurs. As discussed earlier, among the final consonant clusters in inputs, salient consonants generally survive, while relatively non-salient consonants are usually deleted in Mandarin loanwords. This situation shows the effect of phonetics or perceptual factors in the adaptation of Mandarin loanwords. However, it still cannot explain the imbalance between the initial consonant clusters and the final consonant clusters for the deletion and the preservation in Mandarin loanwords. I find the reason in the Mandarin native phonology, which allows almost all the consonants to be placed in the initial position, while strictly prohibiting consonant codas except /n/ and /ŋ/. Thus, I hypothesize that Mandarin speakers will more clearly perceive the initial consonant clusters than the final consonant clusters. In spite of the high percentage of deletion of the English final consonant clusters in Mandarin loanwords, in the inputs having a

consonant clusters including nasal consonants, there is no case in which the nasal consonant is deleted. This situation also can support my hypothesis, since nasal consonants as sonorants are relatively salient, compared to other consonants and also can be used as Mandarin final consonants. Thus, the English nasal consonants are easily perceived by Mandarin speakers, and the nasal consonants are not deleted in the adaptation of Mandarin loanwords.

4.3.2.5 Minimal saliency and minimal modification of the quality of epenthetic vowels in Mandarin loanword adaptation

In the analysis of loanword adaptation, ‘epenthesis’ means that the vowel insertion conforms to the syllable structure in order to fulfill the minimum qualification of a word. There are three ways to choose the inserted vowel in loanword adaptation: “insertion of a default or unmarked vowel, a copy vowel, or a vowel sharing place features of a neighboring consonant” (Uffmann 2004). Miao (2005: 124-125) says that Mandarin speakers use the third strategy, namely using “a vowel sharing place feature of a neighboring consonant,” since the inserted vowel generally shares the place feature of the preceding consonant in Mandarin loanword adaptation. As discussed earlier, the preservation of inputs by inserting a vowel is preferred to the deletion in Mandarin loanword adaptation. Thus, the nature of the inserted vowel will be discussed in this section. In order to have various final consonants of the inputs, the data that has a single word-final consonant is analyzed; only pure phonetic loans will be considered in order to exclude the semantic effect. By doing so, the analysis will focus only on the phonological or phonetic nature of inserted vowels. The following examples are the

Mandarin loanwords that are considered in the analysis.

List 52. Epenthetic vowels in Mandarin loanword adaptation

English	Mandarin	IPA
Gap	Gài-pǔ	[kai-p ^h u]
Bob	Bào-bó	[pau-pwo]
puff	pào-fú	[p ^h au-fu]
rum	lǎng-mǔ	[laŋ-mu]
chat	qià-tè	[tɕ ^h ja-t ^h ɤ]
Mead	Mǐ-dé	[mi-tɤ]
shock	xiū-kè	[ɕjou-k ^h ɤ]
Kellogg	Kǎi-luò-gé	[k ^h ai-lwo-kɤ]
blues	bù-lǚ-sī	[pu-lu-sɿ]
Jazz	jué-shì	[tɕɤɕ-ʂɿ]
Ruth	Lù-sī	[lu-sɿ]
Norwich	Nuò-wēi-qí	[nwo-wei-tɕ ^h i]
Dodge	Dào-qí	[tau-tɕ ^h i]
Total	Dào-dá-ě	[tau-ta-ɤɪ]

Based on the analysis of the data, epenthetic vowels in Mandarin loanword adaptation can be summarized as follows:

List 53. Characteristics of epenthetic vowels in Mandarin loanword adaptation

1. Mandarin labials (/p, p^h, f, v, m/) are mostly preserved by inserting the Mandarin vowel /u/ (or /o/ in just a few cases).
2. Mandarin alveolar and velar plosives are generally preserved by inserting the Mandarin vowel /ɤ/.
3. Mandarin non-labial fricatives and affricates are mostly preserved by inserting the apical vowels (/ɿ, ʅ/), and Mandarin palatals are preserved by inserting the Mandarin

vowel /i/.

4. Mandarin liquids are preserved by being transcribed as the retroflex vowel [ʂ] (/əɪ/).

Statements 1 through 4 can all be applied to pure phonetic loans almost without exception. In fact, the tendency of epenthetic vowels as above can be seen cross-linguistically. Steriade's (2001) P-map hypothesis provides an important principle of 'minimal modification and perceptual similarity' for loanword adaptation. According to the principle, the quality of epenthetic vowels should modify the sounds of the source language to conform to the syllable structure of the borrowing language with the most minimal change in perception. Then, considering the acoustic quality of vowels, high vowels are usually preferred to middle vowels, and middle vowels to low vowels, since higher vowels have a shorter duration and are lower in amplitude. It means that higher vowels are less salient, and thus less likely to hinder the perceptual similarity between the source words and loanwords.

Both Mandarin and English have the high vowels /i, u/. As shown in Chapter III, the qualities of these vowels are almost identical in both languages. As a result, the following hypothesis can be made: Mandarin vowels /i, u/ will be preferred as epenthetic vowels, in order to preserve the coda consonants or consonants in clusters. In addition, /a/ is one of the most common vowels in languages, and both Mandarin and English have it. Besides, the central vowel /ə/ exists in both languages. Thus, the following hypothesis can also be made: the Mandarin vowels /a, ə/ will also be preferred. However, based on the analysis of data, it is not true that /a, i, u, ə/ are always used as epenthetic vowels in Mandarin loanword adaptation. For 'minimal modification and perceptual similarity,' the quality of the preceding consonant must be considered when epenthetic vowels are discussed. That is, if the quality of epenthetic vowel is

different from the quality of the preceding consonant, the degree of perceptual similarity will be decreased, while the agreement of quality between epenthetic vowels and preceding consonants increases the perceptual similarity. This hypothesis can be applied to the tendency of epenthetic vowels discussed earlier. For example, the reason why Mandarin labials (/p, p^h, f, v, m/) are mostly preserved by inserting the Mandarin vowel /u/ (or /o/ in just a few cases) is that through inserting the labial vowel after labials, perceptual saliency is minimized and simultaneously the form of loanword can conform to the Mandarin native phonology, which does not allow a coda consonant or a consonant cluster. Therefore, Rose and Demuth (2006: 1136) argue that, “the place features of the epenthetic vowel are largely predictable, agreeing with the coronal or labial features of surrounding consonants or vowels.” In conclusion, the epenthetic vowels in Mandarin loanwords can be formulated by using the following constraint ranking:

List 54. The constraints for epenthetic vowels in Mandarin loanword adaptation

1. OK- σ : it must satisfy the syllable structure of the borrowing language, including phonotactic constraints (Yip 1993, Jacob and Gussenhoven 2000). For example, Mandarin syllable structure does not allow any coda consonant except /n/ and /ŋ/.
2. MAX-IO : Every input segment must have a correspondent in the output.
3. DEP-IO (V) : Any vowel that is not in the input cannot appear in the output.
4. DEP-IO (Place) : “An epenthetic segment cannot have an independent place feature” (Miao 2005: 133).

Table 44. The formulation for epenthetic vowels in Mandarin loanword adaptation

Gap [gæ p]	OK – σ	DEP-IO (Place)	MAX-IO	DEP-IO (V)
[kai]			*!	
☞ [kai-p ^h u]				*
[kai-p ^h i]		*!		*

Ruth [ruθ]	OK – σ	DEP-IO (Place)	MAX-IO	DEP-IO (V)
[lu]			*!	
[lu-su]		*!		*
☞ [lu-sɿ]				*

4.3.3 Summary for English consonant adaptation in Mandarin loanwords

Faithful mapping between Mandarin consonants and English consonants occurs when an English consonant is replaced by a Mandarin consonant of the same phonological category. In addition, for the English consonants that are non-Mandarin consonants, the mapping that is perceived as the most similar is also considered faithful mapping. The results of analyses of the English consonant adaptation in Mandarin loanwords are summarized as follows.

First, English plosives are generally faithfully mapped into Mandarin plosives. English voiced plosives especially show more faithful adaptation in the feature of [±aspirated]. However, if it is hypothesized that [±voiced] is not distinctive in Mandarin and thus a plosive can be faithfully mapped into a Mandarin plosive regardless of [±aspirated], the percentage of the faithful mappings between English plosives and Mandarin plosives are much higher. The adaptation of English /p, t, k/ after /s/ in Mandarin loanwords also supports the hypothesis that [±voiced] plays an insignificant

role in Mandarin loanword adaptation.

Second, unlike the adaption of plosives, the mapping between English fricatives and Mandarin fricatives shows more variation. The reason is that there are many English fricatives which are non-Mandarin phonemes. In other words, compared with the large variety of English fricatives (i.e. various inputs), Mandarin fricatives (i.e. the outputs) are relatively limited. Contrarily, English affricates in Mandarin loanword adaptation are the opposite; English has only two affricates, and thus the simple inputs can be mapped into a diverse set of Mandarin affricates. However, as in the adaptation of plosives, if hypothesizing that the match between [\pm voiced] in English and [\pm aspirated] in Mandarin is not important in Mandarin loanword adaptation, the adaptation of English affricates generally shows faithful mappings.

As for the adaption of English approximants, there are two topics: liquids and glides. First, the adaptation of English liquids was analyzed as follows: English /l/ in the initial position is faithfully mapped into Mandarin /l/, while English /ɹ/ is usually adapted to Mandarin /l/. However, if considering that English /l/ and /ɹ/ are not well-distinguished by Mandarin speakers since they have only one liquid (i.e. /l/), the replacement of English /ɹ/ with Mandarin /l/ should be considered a faithful mapping. The reason is that the match of English /ɹ/ to Mandarin /l/ is the closest perceptual mapping between the English and Mandarin phonemic inventories. As a result, the adaptation of English liquids in Mandarin loanwords usually shows faithful mappings. Second, English has two glides and Mandarin has corresponding sounds (i.e. [j] and [w]). In pure phonetic loans, English glides are 100% faithfully mapped into the corresponding sounds in Mandarin.

Lastly, English nasals and Mandarin nasals almost completely map faithfully,

especially in the word-initial position, since the nasals in both languages are identical. However, the adaptation of the word-final /n/ and /ŋ/ shows many variations. This result demonstrates that in the adaptation of English word-final nasals, the place features can change as long as the manner feature is preserved.

All the consonants except for both /h/ and the glides can come in the coda position in English, while Mandarin usually does not allow coda consonants other than /n/ and /ŋ/. Therefore, when the English coda consonants are adapted into Mandarin, they can be preserved by inserting a vowel or they can simply be deleted. The result of analyses shows that the preservation occurs much more frequently than the deletion, except with the English coda /ɹ/. Also, pure phonetic mappings generally preserved, while the cases affected by semantic factors are more frequently deleted. Especially, nasal codas are almost always preserved. This phenomenon should be related to the facts that nasal sounds are perceptually salient since they have high sonority and also Mandarin speakers perceive nasal codas better than other coda consonants since they have nasal codas in their native language.

Consonant clusters in any position are not allowed in Mandarin phonology. However, English has various consonant clusters both in the initial and the final positions. Therefore, the English consonant clusters must be modified when they are adapted into Mandarin. That is, they should be preserved by using an epenthetic vowel or they should be deleted, as in the adaptation of English coda consonants. The results of analyses show that the consonant clusters in the initial positions are mostly preserved and deletion occurs in only a few initial clusters, especially when the second consonant (i.e. C₂) is /ɹ/. I argue that this phenomenon is caused by the feature of English /ɹ/. English /ɹ/ is not easily found in other languages and is a very vowel-like sound.

Therefore, there is a high possibility that this feature causes Mandarin speakers to confuse /ɹ/ with the following vowel, when it comes as the second consonant in the C₁C₂ clusters. In addition, in C₁C₂ clusters, the C₁ usually prefers a particular character for a certain English consonant, while various characters are shown in C₂. Also, in the C₁C₂C₃ clusters, both C₁ and C₂ show preference for a specific character for a certain English consonant. This is because both C₁ in the C₁C₂ clusters and C₁ and C₂ in the C₁C₂C₃ clusters are usually not affected by the following vowel. I argue that this situation occurs due to the phonetic symbolization of certain Mandarin characters. Therefore, some Mandarin characters are used only to transcribe a certain English consonant (e.g. *sī* 斯 used for English /s/, *tè* 特 used for English /t/).

The adaptation of English consonant clusters in the final position also shows preference for preservation opposed to deletion. However, there are many cases in which one of final consonants is deleted while all the consonants in clusters tend to be preserved. In other words, in the final positions, both consonants are preserved by vowel insertion, or at least one of the final consonants, which is more salient in perception, is preserved. Therefore, the English nasal consonant in the final clusters has a high possibility of surviving. I argue that this phenomenon shows that perception and phonetics have important functions in Mandarin loanword adaptation. Also, the nasal in the final CC clusters is preserved as the coda of the preceding syllable in Mandarin loanwords, while the other consonant in the final CC clusters is preserved as an independent syllable by inserting a vowel (e.g., English **tank** → Mandarin *tǎn-kè* [t^han -k^hʅ]). I argue that this situation demonstrates that the native phonology of the borrowing language plays a role in Mandarin loanword adaptation. As for the adaptation of English CCC clusters in the final positions, it is rare for all three consonants to be

preserved in Mandarin loanwords. A liquid which is not relatively salient in the final position tends to be deleted while the other two consonants are preserved. I argue that this phenomenon is caused because the structure of the final CCC is too complicated to be accepted in Mandarin due to the lack of consonant codas in Mandarin native phonology.

Lastly, epenthetic vowels should be discussed with the consonant adaptation, since the vowels are inserted to conform to the Mandarin syllable structures, when English consonants are in a position in which Mandarin phonology does not allow consonants. Mandarin epenthetic vowels are chosen according to the quality of the preceding consonant due to the minimal modification and the perceptual similarity. The characteristics of epenthetic vowels in Mandarin loanword adaptation are as follows: First, Mandarin labials (/p, p^h, f, v, m/) are mostly preserved by inserting the Mandarin vowel /u/ (or /o/ in just a few cases). Second, Mandarin alveolar and velar plosives are generally preserved by inserting the Mandarin vowel /ɤ/. Third, Mandarin non-labial fricatives and affricates are mostly preserved by inserting the apical vowels (/ɿ, ʅ/), and Mandarin palatals are preserved by inserting the Mandarin vowel /i/. Fourth, Mandarin liquids are preserved by being transcribed as the retroflex vowel [ɤ] (/əɿ/).

4.4 English vowel adaptation in Mandarin loanwords

There are very few studies of English vowel adaptation in Mandarin loanwords. This is because both the adaptation of consonants and the adjustment of syllable structures are more important than the match of vowel qualities (Yip 2006, Yu 1010). Also, it is because vowels are the most easily changeable element in loanword

adaptation (Yip 2006, Yu 2010).⁷⁷ However, Yu (2010) shows the matching relationship between English vowels and Mandarin vowels in Mandarin loanword adaptation by analyzing data and presenting statistics. In order to make a consistent conclusion with consonant adaptation, she tries to relate the result of her analyses with perceptual similarity. In addition, Lin (2008) tried not only to find consistent rules to control English vowel adaptation in Mandarin loanwords, but also to explain which aspect of vowel quality is most carefully reduplicated. Even though both Yu (2010) and Lin (2008) try to find the features that control vowel adaptation in Mandarin loanwords, I argue that English vowel adaptation in Mandarin loanwords is too complicated to draw a reasonable conclusion with consistent rules. In fact, it could be argued that the results of both Yu (2010) and Lin's (2008) studies only support the idea that English vowel adaptation shows a wide variety of matching in Mandarin loanwords. However, Lin (2008) argues that the [\pm backness] is important for English vowel adaptation in Mandarin loanwords. On the other hand, many examples can show that [\pm backness] of English vowels in Mandarin loanword adaptation is not considered.

List 55. Examples of mismatch of English vowels' [\pm backness] in Mandarin loanword adaptation

English	Mandarin (Pinyin)	IPA
jaket	jiā-kè	[tɕja-k ^h ɤ]
party	pài-duì	[p ^h ai-twei]
index	yǐn-dé	[jin-tɤ]
jelli	zě-lí	[tsɤ-li]
reggae	ruì-gé	[ɽwei-kɤ]
lumen	liú-míng	[ljou-mjəŋ]

⁷⁷ Therefore, many studies of Mandarin loanword adaptation did not include the adaptation of vowels in their analyses (Li 2004, Shih 2004, and Miao 2005).

coffee	kā-fēi	[k ^h a-fei]
short	xiù-dòu	[ɕjou-tou]
Toffee	Tài-fēi	[t ^h ai-fei]
salad	sè-lā	[sɿ-la]

In addition, Yu (2010) argues that English vowels are, to some degree, adapted according to perceptual similarity, even though English vowel adaptation shows various mapping in Mandarin loanwords. She presents the matching of /ʊ/ → /u/ and /æ/ → /a/ as examples to support her claim. However, I argue that many vowel mappings which seem like faithful mappings result from the effect of English orthography.⁷⁸

List 56. Examples of vowel adaptation showing the effect of English orthography

English	Mandarin (Pinyin)	IPA
quinine	kuí-níng	[k ^h wei-njəŋ]
Dallas	Dá-lā-sī	[ta-la-sɿ]
Comcast	Kāng-kǎ-sī-tè	[k ^h ɑŋ-k ^h a-sɿ-t ^h ɿ]
Sallah	Sà-lā-hè	[sa-la-xɿ]
Shadid	Shā-dí-dé	[ʂa-ti-tɿ]
tank	tǎn-kè	[t ^h an-k ^h ɿ]
massage	mǎ-shā-jī	[ma-ʂa-tɕi]
rally	lā-lì	[la-li]
Reid	Léi-dé	[lei-tɿ]
Mandala	Màn-dá-lā	[man-ta-la]
Wake	Wǎ-kè	[wa-k ^h ɿ]
Dana	Dánà	[ta-na]
Lucas	Lú-kǎ-sī	[lu-k ^h a-sɿ]
quark	kuā-kè	[k ^h wa-k ^h ɿ]

⁷⁸ I will generally discuss the effect of English orthography in Mandarin loanword adaptation in 5.3.2. Here, I only emphasize the influence of English spelling for the vowel adaptation.

rupee	lú-bǐ	[lu-pi]
Russo	Lǚ-suǒ	[lu-swo]
Sula	Sū-lā	[su-la]
Tulane	Dù-lán	[tu-lan]
Vogue	Wò-gǔ	[wo-ku]
bushel	pú-shì-ěr	[pu-ʃɿ-ɛr]
Duke	Dù-kè	[tu-k ^h ɿ]
Dupont	Dù-bāng	[tu-paŋ]
Grumman	Gé-lǚ-màn	[kɿ-lu-man]
hula	hū-lā	[xu-la]
Humana	Hú-mǎ-nà	[xu-ma-na]
Julia	Zhū-lì-yà	[tʃu-li-ja]

As seen above, many Mandarin loanwords show that English vowel spellings are consistent with Mandarin Pinyin. In fact, there are no cases in which the faithful mapping of a consonant is ignored for the sake of the faithful mapping of a vowel. However, in many Mandarin loanwords which show consistent vowel adaptation on the surface, the role of English orthography can be seen.

Hsieh, Kenstowicz, and Mou (2006) discuss the role of vowel in the English coda nasal adaptation in Mandarin loanwords. They argue that the “English vowel determines the outcome and can force a change in the place of articulation of the nasal coda” (Hsieh, Kenstowicz, and Mou 2006: 1). They use this result to support the argument that phonetic salience plays an important role in loanword adaptation, in that “more salient vowel normally determines the adaptation even though the nasal coda is the site of the phonological contrast” (Hsieh, Kenstowicz, and Mou 2006: 17). Therefore, English [æ n] and [æŋ] are usually mapped into Mandarin [an] while English [ɑn] and [ɑŋ] are usually mapped into Mandarin [ɑŋ]. Their conclusion is well-

supported by their data.

In addition to Hsieh, Kenstowicz, and Mou (2006), I claim that there is another important possibility to affect the English nasal coda adaptation in Mandarin loanwords. That is the symbolization of Mandarin characters. As I mentioned earlier, Mandarin is a monosyllabic language and a consonant and a vowel cannot arbitrarily combine to describe a certain sound. A consonant and a vowel or a consonant, a vowel, and either a coda nasal /n/ or /ŋ/, should behave as a set. Moreover, “all the Mandarin syllables must have written forms in characters and if a sound has no established written form, it cannot be a possible syllable in Mandarin” (Wu 2006: 245). Due to this characteristic of Mandarin phonology, certain Mandarin characters are used as phonetic symbols to describe certain English syllables. This phenomenon can be found in the English nasal coda adaptation in Mandarin loanwords. Moreover, this phenomenon is closely related to English orthography, and the role of vowel’s phonetic salience is not important in the adaption of English nasal codas in Mandarin loanwords. For example, English ‘-man’ is usually adapted into Mandarin *màn* 曼 [man], English ‘-ton’ into Mandarin *dùn* 顿 [twən], English ‘-son’ into Mandarin *sēn* 森 [sən] or *shēng* 生 [ʃəŋ], English ‘-lan’ or ‘-land’ into Mandarin *lán* 兰 [lan], English ‘-han’ or ‘-ham’ into Mandarin *hàn* 汉 [xan], English ‘-ming’ into Mandarin *míng* 明 [mjəŋ], English ‘-ning’ into Mandarin *níng* 宁 [njəŋ], English ‘-tin’ or ‘-ting’ into Mandarin *dīng* 丁 [tjəŋ]. These matches between English syllables and Mandarin characters, in fact, have no relationship to the phonetic salience of English vowels. They only show consistent matches between English orthography and Mandarin Pinyin. Therefore, I argue that these Mandarin characters are used as symbols to transcribe certain English syllables. Examples are as follows:

List 57. Examples of English nasal coda adaptation in Mandarin loanwords

English	Mandarin (Pinyin)	IPA	Character
romance	luó-màn-sī	[lwo-man-sɿ]	罗曼司
Eastman	Yī-sī-màn	[ji-sɿ-man]	伊斯曼
Hamilton	Hàn-mì-ěr-dùn	[xan-mi-ɛɪ-twən]	汉密尔顿
Lipton	Lì-dùn	[li-twən]	立顿
Tyson	Tài-sēn	[tʰai-sən]	泰森
Epson	Ài-pǔ-shēng	[ai-pʰu-ʂəŋ]	爱普生
Ashland	Ā-shí-lán	[a-ʂɿ-lan]	阿什兰
flannel	fǎ-lán-róng	[fa-lan-ɿŋ]	法兰绒
Handler	Hàn-dé-lè	[xan-tɛ-lɛ]	汉德勒
Buckingham	Bái-jīn-hàn	[pai-tɛin-xan]	白金汉
Cummings	Kāng-míng-sī	[kʰɑŋ-mjəŋ-sɿ]	康明斯
Fleming	Fú-lái-míng	[fu-lai-mjəŋ]	弗莱明
Browning	Bó-láng-níng	[pwo-lɑŋ-njəŋ]	勃朗宁
Corning	Kāng-níng	[kʰɑŋ-njəŋ]	康宁
Latin	Lā-dīng	[la-tjəŋ]	拉丁
karting	kǎ-dīng	[kʰa-tjəŋ]	卡丁

In sum, the adaptation of English vowels in Mandarin loanwords shows no consistent mapping. Therefore, I argue that it is hard to draw a consistent conclusion for the English vowel adaptation in Mandarin loanwords. Instead, the faithful mapping between English vowels and Mandarin vowels are often ignored in order to faithfully map English consonants into Mandarin consonants. Many loanwords that show faithful vowel mappings on the surface, in fact, are affected by English orthography. In addition, this claim also can be supported by the fact that many English nasal codas can be adapted into particular Mandarin characters, depending on the sets of an initial consonant, a vowel, and a nasal coda. These Mandarin characters are used as symbols

and only transcribe a particular English syllable. The match between a Mandarin character and an English syllable is therefore based on English orthography.

4.5 English stress adaptation into Mandarin tones

As discussed in 3.3.4, each English word has a clear stress pattern while Mandarin words do not have stress. However, when an English word is adapted into Mandarin, in addition to conforming to Mandarin syllable structures, a lexical tone must be assigned since Mandarin has four lexical tones. There are very few studies about the adaptation of English stress in Mandarin loanwords because most researchers recognize that there is no close relationship between English stress and Mandarin tones in loanword adaptation. However, because of studies on related languages, some might hypothesize that a stressed English syllable would be adapted into the Mandarin high tone. According to Silverman (1992), English stressed syllables are adapted into the Cantonese high tone without exception. However, Mandarin loanword adaptation reveals a different pattern. Examples are as follows.

List 58. Examples showing the relationship between English stress and Mandarin tones

English	Mandarin (Pinyin)	Mandarin tone	Character
bar	bā	1 st tone (high tone)	吧
guitar	jǐ-tā	1 st tone	吉他
sofa	shā-fā	1 st tone	沙发
Minnesoda	Míng-ní-sū-dá	1 st tone	明尼苏达
dozen	dá	2 nd tone (high-rising tone)	打
ammonia	ā-mó-ní-yà	2 nd tone	阿摩尼亚
candela	kǎn-dé-lā	2 nd tone	坎德拉

Adidas	Ā- dí -dá-sī	2 nd tone	阿迪达斯
car	kǎ	3 rd tone	卡
khaki	kǎ -jī	3 rd tone	咔叽
engine	yǐn -qíng	3 rd tone	引擎
Milwaukee	Mì-ěr- wǎ -jī	3 rd tone	密耳瓦基
cool	kù	4 th tone (falling tone)	酷
sparkling	sī- pà -kè-lín	4 th tone	斯帕克林
sundae	shèng -dài	4 th tone	圣代
hacker	hài -kè	4 th tone	骇客

As seen above, stressed English syllables are adapted into all four Mandarin tones. A stressed English syllable is even assigned the Mandarin third tone (a low tone), which is the most unfaithful mapping among the four tones.

Recently, Wu (2006) conducted a study of Mandarin tonal adaptation. In addition, Yu (2010) discusses the adaptation of suprasegmentals (i.e. stress and tone) between English and Mandarin. They also present an identical conclusion that there is no consistent matching relationship between English stress and Mandarin tones. Also, the tonal assignment for epenthetic vowels in Mandarin loanword adaptation supports the claim that there is no relationship between English stress and Mandarin tones. The following examples show tonal assignment for epenthetic vowels in Mandarin loanwords.

List 59. Examples of tonal assignment for epenthetic vowels

English	Mandarin (Pinyin)	Mandarin tone of epenthetic vowel
Adidas	Ā-dí-dá-sī	1 st tone
bit	bǐ-tè	4 th tone
Calvin Klein	Kǎ-ěr-wén- kè -lái- ēn	4 th tone, 1 st tone

Delph	Dé-ěr-fú	2 nd tone
fans	fě'n-sī	1 st tone
Gap	Gài-pǔ	3 rd tone
jazz	Ju'é-shì	4 th tone
Norwich	Nuò-wēi-qí	2 nd tone
Oshkosh	À o-xù-kòu-xù	4 th tone, 4 th tone
Taft	Tǎ-fū-tuō	1 st tone, 1 st tone
Wedgwood	Wéi-qí-wǔ-dé	2 nd tone, 2 nd tone

In fact, in order to decrease the saliency of epenthetic vowels, a low tone should be assigned on the vowels. However, as shown above, the tonal assignment for epenthetic vowels has no relationship with non-saliency of epenthetic vowels, and a high tone is assigned on them.⁷⁹ This therefore raises the question of why English stress is disregarded in Mandarin tonal adaptation. The reasons can be summarized into two main points. First, segmental changes have a priority in Mandarin loanword adaptation. Even though tones which are suprasegmentals also have a function to distinguish the meanings of words, there is a hierarchical difference between segmentals and suprasegmentals. Cutler and Chen (1997) argue that “the processing of lexical tone distinctions may be slowed, relative to the processing of segmental distinctions, and that, in speeded-response tasks, tone is thus more likely to be misprocessed than is segmental structure” (Cutler and Chen 1997: 165). In other words, listeners can recognize segmental changes better than tonal changes. Based on the experimental results of Cutler and Chen’s (1997) study, Wu (2006) argues that tonal difference is less salient than the difference of onset consonants or nucleus vowels and speakers always change tones first due to the “smaller change perceptually” (Wu 2006: 233). In addition, the

79 According to Yu (2010), the 3rd tone is assigned to only 21% of epenthetic vowels in her data.

result of Hsieh's (2006) analyses also supports this argument because the study shows that Japanese pitch patterns are completely ignored in Taiwanese loanword adaptation. Also, according to Hsieh and Kenstowicz (2008), Lhasa Tibetan loanwords originating from Mandarin and English do not preserve suprasegmental properties (i.e. stress and tone) even though the Lhasa Tibetan language is a tonal language. Instead, the tonal assignment is decided by segmental properties, especially consonant voicing, based on the phonotactic constraints. This result also supports the claim of non-mapping between English stress and Mandarin tones.

The other important reason for the non-mapping is "Mandarin's unique morphemically based orthographic system" (Wu 2006: 232). The Mandarin writing system highly limits the possibility of syllable combination. Even though there is a possible segmental combination which cannot be transcribed with Mandarin characters, it should change to a different combination which can be represented by a Mandarin character. In addition, Mandarin lexical words must have lexical tones and all the possible segmental combinations can ideally have four tones, but the real situation is different. For example, none of the Mandarin characters having CVN syllables with unaspirated obstruent initials has the second tone (Wu 2006: 229). Therefore, some segmental combinations cannot have certain Mandarin tones while foreign sounds adapted into Mandarin must have a Mandarin lexical tone. For example, English car is adapted into Mandarin *kǎ* [k^ha]. English car is a single syllable word which has its own stress. When considering the faithful mapping of English stress, the assignment of the low tone (3rd tone) seems to be the most unfaithful mapping. However, there is no Mandarin character for either **ká* or **kà* in the Mandarin lexicon. Therefore, either *kā* or *kǎ* can be assigned, and *kā* is preferable since it is a high tone. However, none of the

Mandarin characters representing *kā* are appropriate for denoting English car, since they are verbs, onomatopoeias, or words that cannot be used alone (Yu 2010: 129). Thus, the low tone (3rd tone) is assigned to the Mandarin loanword (*kǎ*), which originated from English car.

To conclude, there is no close relationship between English stress and Mandarin tones in Mandarin loanword adaptation. To summarize two reasons discussed above, a simple OT generalization is presented as below.⁸⁰

Table 45. Generalization of the Mandarin tonal adaptation

IDENT-Lex: There must be a corresponding written form/syllable in the native lexicon

Ranking: IDENT-Lex ≫ IDENT-Vowel ≫ IDENT-Tone

car [kɑː]	IDENT-Lex	IDENT-V	IDENT-T
ká [k ^h a]	*!		
☞ kǎ [k ^h a]			*
ké [k ^h ɛ]		*!	

4.6 Summary

Chapter IV discusses the adaptation of English segmentals and suprasegmentals. The most important analysis regards the English consonant adaptation in Mandarin loanwords. I argue that the consonant adaptation is prioritized over the vowel adaptation and English stress is often disregarded in the adaptation. Through the analyses of Mandarin loanwords originating from English in this chapter, Mandarin loanword

⁸⁰ The generalization is referred to Wu (2006: 233).

adaptation is summarized as follows.

First, the adaptation of initial English consonants in Mandarin loanwords generally shows faithful mapping either phonologically or phonetically. However, if the English inputs are more various than the possible Mandarin outputs as in the adaptation of fricatives and if the possible Mandarin outputs are more diverse than the English inputs as in the adaptation of affricates, the mappings naturally reveal many variations. As a result, based on the consideration of the possible perceptual similarities, there could be more than one faithful mapping between an English consonant and a Mandarin consonant. (e.g., English /ʃ, dʒ/ and Mandarin /tɕ^h, tɕ/, English /ʃ, dʒ/ and Mandarin /tɕ^h, tɕ/). In addition, if the matching between English [\pm voiced] and Mandarin [\pm aspirated] is not considered, the percentage of faithful mappings between both languages increases. Therefore, Mandarin loanword adaptation seems to be based mostly on the phonological categories of both languages. Nevertheless, there are clearly loanwords that show either the matching between English [\pm voiced] and Mandarin [\pm aspirated] or other perception-based adaptation (e.g., English **Coventry** \rightarrow Mandarin *Kǎo-wén-**chí*** [kau-wən-tɕ^hwei]).

In order to modify English coda consonants or consonant clusters which are not allowed in Mandarin phonology, there are two major strategies: preservation by vowel insertion and simple deletion. The analyses in this chapter reveal that other than the cases in which semantics of Mandarin characters function, both the coda consonants and the consonants clusters are usually preserved in Mandarin loanwords through the vowel insertion. Especially nasal consonants in any syllable position of a word tend to be mostly preserved. In fact, nasal consonants /n/ and /ŋ/ can come both in the initial and the coda positions in Mandarin. Therefore, I argue that this phenomenon results from the fact that salient sounds such as nasal consonants are usually preserved and the

consonants which are allowed in the native phonology of borrowing language are also preserved, since the native phonology helps borrowers more easily perceive the foreign sounds. On the other hand, English /ɹ/ is more frequently deleted in both coda position and consonant clusters than other consonants. This phenomenon is caused by the vowel-like perception of English /ɹ/, which makes it difficult for Mandarin speakers to perceive it, or it becomes confused with the following vowel. In addition, there is no sound like English /ɹ/ in the Mandarin phonemic inventory, and this makes it more difficult for Mandarin speakers to perceive it. In fact, this study shows that except for English /ɹ/ in the coda position and the consonant clusters, deletion is closely related to the semantic functions of Mandarin characters. However, compared to the preference for the preservation of the initial consonant clusters, the consonants in the final clusters show higher percentage of deletion in the adaptation. I argue that this is also closely related to Mandarin speakers' perception and the Mandarin phonology. All the Mandarin consonants except /ŋ/ can come in the initial position, while only /n/ and /ŋ/ can occur in the coda position. Therefore, English consonants in the final positions are not only more unfamiliar to Mandarin speakers than the initial clusters but also harder for them to perceive. The fact that a consonant in the final CCC cluster tends to be deleted more frequently than a consonant in the final CC clusters, also supports my argument, in that the final CCC structures are more complicated not only for Mandarin speakers to perceive but also to be accepted in the Mandarin phonology than the final CC clusters. In sum, I conclude that the analyses in this chapter reveal that both perception and Mandarin native phonology play the most significant roles in the adaptation of English consonants in Mandarin loanwords.

In addition to the functions of perception and the Mandarin phonology, the

symbolization of Mandarin characters is also seen. Mandarin characters are used not as ideographs but only as symbols to transcribe certain English consonants. This phenomenon is consistently shown in the adaptation of English consonant clusters. Also, it is clearly seen in the adaptation of English nasal codas in Mandarin loanwords.

To preserve an English consonant which is placed in the position not allowed in Mandarin phonology, a Mandarin vowel is inserted after the English consonant. These epenthetic vowels are usually chosen based on two important rules: minimal saliency and minimal modification. That is, an epenthetic vowel should not be salient because it is inserted to only save an English consonant. In addition, inserting a vowel results in the least amount of changes or modifications needed. For example, a labial vowel /u/ is usually inserted to save the English labial consonant /p/ in the adaptation of English **Gap** to Mandarin *Gài-pǔ* [kai-p^hu]. Both the minimal saliency and the minimal modification are consistently shown in almost every case of vowel insertion in Mandarin loanword adaptation. On the other hand, no consistent patterns are found in the adaptation of English vowels. I argue that faithful mappings in the English vowel adaptation in Mandarin loanwords can be ignored and that the consonant matching between English and Mandarin is always prioritized in faithful mapping. However, there is one especially interesting aspect of English vowel adaptation in Mandarin loanwords is that many vowel mappings which seem like faithful mappings are affected by English orthography (e.g., English **Duke** → Mandarin *Dù-kè* [tu-k^hɤ]).

As in the English vowel adaptation in Mandarin loanwords, there is also no close relationship between English stress and Mandarin tones in loanword adaptation. In fact, stressed English syllables are adapted into all four Mandarin tones. In addition, epenthetic vowels in Mandarin loanwords can be assigned all four tones, while it is

generally expected that the epenthetic vowel should be assigned a low tone for the minimal saliency. This disregard of English stress in Mandarin tonal adaptation can be explained with two reasons. First, according to Culter and Chen (1997), tonal difference is less salient than the difference of consonants or vowels, and thus people usually change tones first for the minimal change of perception. Second, this non-mapping of English stress is due to “Mandarin’s unique morphemically based orthographic system” (Wu 2006: 232). That is, a lexical Mandarin word must be assigned a lexical tone, but some segmental combinations cannot have certain Mandarin tones (e.g., Mandarin *C’VN syllable). In addition, certain possible segmental combinations cannot be transcribed with Mandarin characters. In this case, the combination should be changed. Thus, in order for an English word to be adapted into a Mandarin loanword, it first should find a possible segmental combination which can be transcribed with Mandarin characters. Therefore, English stress as a suprasegmental is usually disregarded in Mandarin loanword adaptation, since the segmental mapping is always prioritized in loanword adaptation and furthermore all the segmental mappings between English and Mandarin must be made within a combination which can be expressed with Mandarin characters.

Chapter V. Important factors affecting Mandarin loanword adaptation

As seen in the analyses of chapter IV, after an English word input is introduced into Mandarin, many factors affect the process of Mandarin loanword adaptation. Chapter V is an investigation of these factors, including relatively minor elements beyond the main phonological and phonetic linguistic factors. In other words, Chapter V provides a more in-depth discussion of these issues that were introduced in Chapter IV.

The most important factor in Mandarin loanword adaptation is the function of the phonology and phonetics between the borrowing language and the source language. The discussion about the phonology and phonetics affecting loanword adaptation is usually treated in the field of loanword phonology. Thus, in section 5.1, loanword phonology is briefly introduced and the three major approaches in loanword phonology are generally discussed. The discussion in section 5.2 more focuses on the phonological and phonetic factors affecting Mandarin loanword adaptation. In section 5.3, many other factors which can more effectively explain the complicated process of Mandarin loanword adaptation are observed. Based on the discussion in the previous sections, section 5.4 proposes a comprehensive model of Mandarin loanword adaptation. In addition, in section 5.5 this proposal is supported by applying the model specifically to the adaptation of Mandarin loanwords originating from English.

5.1 Loanword phonology⁸¹

Loanword phonology has developed over the last 20 years into an important

81 Section 5.1 and 5.2 were published by Kim (2012a).

research area of phonology. It has become one of the most interesting topics in linguistics, since loanwords demonstrate the conflicts occurring between sound systems of languages. The conflicts are caused by a process in which loanwords preserve a source language as much as possible, while simultaneously conforming to a borrowing language's system. The interaction between these two is a major issue in loanword phonology, and many researchers have tried to find both consistent and systematic explanations for how it occurs. In fact, loanword adaptation in a language shows a fairly systematic pattern in many cases (Broselow 2004:1). However, researchers have different views on how the patterns should be interpreted. For example, English 'cream [kri:m]' is adapted into Japanese /ku.ri:.mu/. Peperkamp and Dupoux (2003) argue that Japanese /ku.ri:.mu/ results from Japanese listeners' misperception. It means that the input itself is /ku.ri:.mu/, which is a vowel-inserted form, and the process of UR→SR mapping does not need to be postulated. According to Peperkamp and Dupoux (2003), loanword adaptation is only based on "perceptual assimilation." On the other hand, Smith (2006) argues that perception is not the only factor in loanword adaptation. Smith (2006) emphasizes the role of the phonology of the borrowing language (*L_b*) in loanword adaptation. According to her, the phonology of a borrowing language maps UR into SR, and thus loanwords are adapted into the forms that fit the phonological requirements of the borrowing language. Therefore, the UR of the example 'cream [kri:m]' is /kri:m/, but the constraints such as onset clusters and codas make the Japanese SR [ku.ri:.mu] by forcing the insertion of vowels. In addition to the role of the phonology of the borrowing language, she presents the data which are irrelevant to listeners' perception, but rather are faithful to the source language's orthography. Orthography is a phonology-based element in loanword adaptation, in that it makes the

input faithfully map into the phoneme of the source language. Thus, Smith's (2006) data faithfully reflect the phonological representation of the source language.⁸² The contrasting arguments about loanword adaptation made by Peperkamp and Dupoux (2003) and Smith (2006) raise a question about how to consider the inputs in loanword adaptation process.

In addition, loanword adaptation includes adjustment or modification in various phonological levels. Consider an example of English loanwords into Cantonese.⁸³ English 'body /'bɑdi/' is adapted into /pɔ̃[H] ti[MH]/ in Cantonese. At the segmental level, English /b/ is replaced by the closest correspondence, /p/, in Cantonese. At the prosodic level, the stressed syllable becomes a high tone ([H]), but the unstressed syllable in the coda position becomes a contour tone ([MH])⁸⁴. At the phonotactic level, English 'fluk /fluk/' is adapted into /fu[L] luk[H]/ in Cantonese. Vowels are inserted, since Cantonese does not allow consonant clusters in a syllable. At the prosodic level, an inserted vowel in non-coda position is assigned to the low tone ([L])⁸⁵.

Loanword phonology starts from a question of how to model inputs, and expands into a discussion of how to analyze the whole process of loanword adaptation. In addition, this analysis of loanword adaptation contains various levels of phonological structures such as segmental features, phonotactic rules, and prosodic patterns. Many studies on loanword adaptation have been done over the past twenty years with data

82 See Smith (2006: 70-73) for the discussion and the data about the effect of orthography.

83 The examples of English loanwords in Cantonese are adopted from Miao (2005: 1-2) and Silverman (1992).

84 On the other hand, unstressed syllables in non-coda position are mapped into a middle tone([M]). For example, there is English 'buffet /bə'feɪ/' > Cantonese /pɔw[M] fey[H]/.

85 However, an inserted vowel in coda position is assigned to a contour tone ([MH]). English 'film /film/' > Cantonese /fey[H] Ləm[MH]/ can be an example.

from various languages⁸⁶. The discussion and analyses of the studies are mainly made within three major approaches: The perception approach, the phonology approach, and the phonetics-phonology approach, which is a compromise between the other two approaches.⁸⁷ The argument in 5.1 will be made that the phonetics-phonology approach is the most promising approach, because the evidence in the perception and phonology approaches conflicts with each other. Thus, they cannot fully explain the process of loanword adaptation. I support this conclusion by showing examples from various languages as well as English-based Mandarin loanwords in section 5.2.

5.1.1 The perception approach

The perception approach argues that loanword adaptation uses perception (Dupoux and Peperkamp 2002, Peperkamp 2002, 2005, Peperkamp and Dupoux 2003, Vendelin and Peperkamp 2004, Peperkamp, Vendelin and Nakamura 2008). The researchers following the perception approach say that speakers of the borrowing language do not access the phonology of the source language, and the inputs of loanwords are on the level of sounds, and thus only the perception of borrowers plays an important role in the loanword adaptation process. Therefore, according to them, adaptation is the result of borrowers' misperception of a source language. In other words,

86 Mandarin (Shi 2004, Miao 2005, Wu 2006, Lin 2007a,b, 2009), Cantonese (Silverman 1992, Yip 1993, 2002, 2006), Korean (Kang 2003, Davis and Cho 2006, Iverson and Lee 2006), Japanese (Itô and Mester 1995, Shinohara 2000, Smith 2006, 2007, Mutsukawa 2009, Dohlus 2010), Hawaiian (Adler 2006), Fula (Paradis and LaCharité 1997), Fijian (Kenstowicz 2007), Fon (Kenstowicz 2003).

87 There are many studies of many other factors which affect loanword adaptation such as orthography, morphology, semantics, bilingualism, and borrowing situations (e.g. Adler 2006, Davis and Cho 2006, Miao 2005, Smith 2006, 2007, Vendelin and Peperkamp 2006, Dohlus 2010). However, the discussion in 5.1 will be limited to these three competing approaches, and other factors will be discussed in section 5.3.

the change of non-native sounds in loanwords is not including any phonology, but is made only at the perceptual level. Peperkamp, Vendelin, and Nakamura (2008: 131) also argue that phonology is not a decisive factor, only having an indirect influence on non-native sound mapping.

Dupoux et al. (1999) tested Japanese speakers' perception of consonant clusters. The results show that the tendency of Japanese speakers to insert vowels in consonant clusters that are not allowed in Japanese phonology is not caused by their articulatory difficulty, but by their misperception of the borrowing language due to their native language. In addition, Peperkamp and Dupoux (2003: 359) demonstrate examples of adaptation based on native perception as shown in List 60. Besides, they present examples that show the phenomenon of phonological 'deafness' as in List 61.

List 60. Repair strategies in loanwords⁸⁸

a. [rəntən]	<	Lodon	Korean listeners
b. [wəkmán]	<	walkman	French listeners
c. [sufɪŋkɯsu]	<	sphinx	Japanese listeners
d. [pe.si]	<	pepsi	White Hmong

List 61. Phonological 'deafness'⁸⁹

88 Peperkamp and Dupoux (2003) bring these examples from the following articles: Kenstowicz, M. and H.-S. Shon. 2001. Accentual adaptation in North Kyungshang Korean. In Ken Hale, *A Life in Language*, M. Kenstowicz (ed.), 239-270. Cambridge: MIT Press. Itô, J. and A. Mester. 1995. Japanese phonology. In *The Handbook of Phonological Theory*, J. Goldsmith (ed.), 817-838. Oxford: Blackwell. Golston, C. and P. Yang. 2001. White Hmong loanword phonology. In *Proceedings of HILP 5*, C. Féry, A.D. Green, and R. van de Vijver (eds.), 40-57. Potsdam: University of Potsdam.

89 Peperkamp and Dupoux (2003) bring these examples from the following articles: Ingram, J. and P. See-Gyoon. 1998. Language, context, and speaker effects in the identification and discrimination of English /r/ and /l/ by Japanese and Korean listeners. *Journal of the Acoustic Society of America*, 103, 1161-1174. Dupoux, E., et al. 1997. A distressing "deafness" in French?. *Journal of Memory and Language*, 36, 406-421. Dupoux, E., et al. 1999. Epenthetic vowels in Japanese: A perceptual illusion?.

- | | |
|----------------------|--------------------|
| a. [li:d – ri:d] | Korean listeners |
| b. [vásuma - vasúma] | French listeners |
| c. [ebzo - ebuzo] | Japanese listeners |

They argue that the similarity between loanword adaptation and phonological deafness is never accidental, and loanword adaptation is made due to the perceptual process of decoding non-native sounds, rather than phonological grammar.

The examples which can support the perception approach are found in adaptation of English /v/ into Cantonese (Silverman 1992: 299, 323). Cantonese does not have voiced fricative /v/, but has a voiceless counterpart /f/. Therefore, English /v/ should be mapped into /f/ in Cantonese in terms of phonology, because /f/ is the closest phoneme, and mismatches only in voicing. However, English /v/ is adapted to Cantonese approximant /w/, because /w/ is the closest element perceptually.⁹⁰ Also, the result of Vendelin and Peperkamp's (2004) online experiment supports the perception approach. They tested the adaptation of English and French word-final /n/ in Japanese. English and French /n/ is identical phonologically, but they are differently adapted into Japanese. English /n/ is mapped into Japanese moraic nasal /N/, while French /n/ is adapted into a nasal geminate by inserting a vowel. This difference results from the fact that Japanese speakers perceive English /n/ (no release) and French /n/ (release and longer duration) differently, which reflect a phonetic difference. Definitely, the perceptual approach appears robust when it explains mismatches of identical phonemes in borrowing language and source language, and also explains why different strategies

Journal of Experimental Psychology: Human Perception and Performance, 25, 1568-1578.

⁹⁰ Phonologically, /v/ → /f/ is a more systematic change than /v/ → /w/, since a change in manner of articulation is a greater phonological divergence from the source than a mismatch in voicing. (Steriade 2001, Miao 2005, Adler 2006)

such as consonant deletion or insertion of vowels are preferred in loanword adaptation.

On the contrary, there is a limit to the perception approach which relies only on borrowers' perception, since it does not admit the access to phonology of borrowing language and source language in loanword adaptation. The following examples are Mandarin loanword adapted from English.

List 62. Examples I of Mandarin loanwords adapted from English⁹¹

English		Mandarin (Pinyin)	IPA
cool /kʊl/	→	kù	[k ^h u]
Whirlpool /wɜːlpʊl/	→	Huì-ér-pǔ	[xwei-əɪ-p ^h u]
ampule /æmpʊl/	→	ān-bù	[an-pu]
mile /maɪl/	→	mài	[mai]
waffle /wɒfəl/	→	huá-fū	[xwa-fu]
Arsenal /arsənəl/	→	Ā-sēn-nà (duì)	[a-sən-na]

List 63. Examples II of Mandarin loanwords from English

English		Mandarin (Pinyin)	IPA
angel /endʒəl/	→	ān-qí-ér	[an-tɕ ^h i-əɪ]
Staples /stepəlz/	→	Sī-tè-pǔ-ěr-sī	[sɿ-t ^h ɥ-p ^h u-əɪ-sɿ]
Dell /del/	→	Dài-ér	[tai-əɪ]
E-mail /i-mel/	→	yī-mèi-ér	[ji-mei-əɪ]
Dunhill /dʌnhɪl/	→	Dēng-xī-lù	[təŋ-ɕi-lu]
Bill /bɪl/	→	Bǐ-ěr	[pi-əɪ]
Wall /wɒl/	→	Huá-ěr (jiē)	[xwa-əɪ]
Nobel /nobəl/	→	Nuò-bèi-ér	[nwo-peɪ-əɪ]
Marshall /maɪʃəl/	→	mǎ-xiē-ěr	[ma-ɕje-əɪ]

91 English pronunciations come from *Oxford Dictionary of Pronunciation for Current English* (2001, New York: Oxford University Press Inc.).

English /l/ in the coda position is deleted in Mandarin loanwords as in List 62, while preserved as in List 63.⁹² Due to the characteristics of /l/ in coda position, the /l/ in List 62 and List 63 is one of the most difficult phonemes for Mandarin speakers in both perception and pronunciation. However, the perception approach cannot be well-supported by the difference between the data in List 62 and List 63, deletion and preservation, because it argues that loanword adaptation is based only on borrowers perception of the acoustic signals of source languages. It does not make sense that one phoneme of source language can be differently perceived under the same syllabic environments depending on the word. In fact, the first three examples in List 62 (cool, Whirlpool, ampule) may be less clearly perceived because of /l/ in front of /u/ than the examples in List 63 such as Dell, Dunhill, E-mail.⁹³ Therefore, the former ones can be deleted, while the latter ones can be preserved. This analysis should clearly support the perception approach, and the perception must be the one most important factor to affect a loanword adaptation process. However, there are many examples that cannot be explained by the perception approach. For example, the /l/ in ‘Arsenal’ and ‘waffle’ is deleted, while the /l/ in ‘angel’ and ‘Staples’ is preserved, even though the syllabic environment of the /l/ is identical. The counter examples show the limitations of the perception approach, and reveal that perception cannot completely explain the process of loanword adaptation. In addition, mapping elements of source language into Mandarin vowels and tones demonstrates many variables, regardless of phonetics or

92 The so-called ‘dark l’([ɫ]) is placed in coda position such as call and trial, or is put in front of a consonant like milk and hold. On the other hand, ‘clear l’ or ‘light l’([l]) is placed in front of a vowel or a glide. It is well-known that the pronunciation of ‘dark l’ is difficult for Asian students like Chinese speakers or Korean speakers.

93 “For the dark /l/, the high back vowel-like quality may have a severe disguising effect, on the quality of a preceding vowel, even neutralizing phonemic distinction” (Brown 1989: 295).

perception.⁹⁴ Sometimes, perception or phonetic details of source languages is even completely ignored in adaptation of Mandarin loanwords. This fact presents a challenge to the perception approach.

5.1.2 The phonology approach

The phonology approach presents loanword adaptation as a process made solely at the level of phonology. (Itô and Mester 1995, Paradis 1996, 2006. Paradis and LaCharité 1997, 2008, Paradis, Carole and Prunet 2000, Jacobs and Gussenhoven 2000, LaCharité and Paradis 2002, 2005, Shinohara 2004, Uffman 2006) According to The phonology approach, the inputs in the adaptation process should access the phonological categories of the source language. Therefore, UR of loanword is similar to the form of source language, and the phonological grammar of borrowing language plays a role in mapping UR into SR, and by doing so, a loanword is changed to satisfy the phonological requirements of the borrowing language.

In addition, the researchers on the side of the phonology approach argue that the process of phonetic approximation is used only by monolingual borrowers (Paradis and LaCharité 2008), but that loanword adaptation is fundamentally made by bilinguals. These bilinguals clearly distinguish the phonemic structures of a source language and a native language, and thus they can describe loanwords as UR while ignoring the information in SR. In short, the forms of loanwords are underlying representations (UR), deep structures, or real expression of phonemes in the phonology of source language. Therefore, a phonemic change of a phoneme from the source language will be adapted

⁹⁴ According to Lin (2009:7), “there is a limited range of variation in consonant adaptation but the variation in vowel adaptation and stress-to-tone adaptation is more extensive.”

in the same way (Yu 2010: 18).

Paradis (1996) and Paradis and LaCharité (1997), the strongest supporters for the phonological approach, propose TCRS (Theory of Constraints and Repair Strategies). TCRS is about the principles which decide the fate of loanwords. They argue that the variation between segmental preservation and deletion is restricted depending on how many repair strategies are used. First, the ‘Preservation Principle’ is the principle that prevents the loss of phonological information from the source language. The segments of a source language in phonotactic positions disallowed by borrowing languages are adapted by applying repair strategies. Second, the ‘Threshold Principle’ is to block repair strategies when they are applied more than twice. Third, the ‘Minimality Principle’ is that repair strategy must be used minimally. Last, the ‘Precedence Convention’ is that repair should be made from the lowest level of the phonological hierarchy.⁹⁵

Table 46. Overview of TCRS (Paradis 1996: 513)

TCRS	
Constraint Violation	Governed by the
↓	· Preservation Principle (limited by the Threshold Principle)
Repair	· Minimality Principle (based on the PLH)
(insertion / deletion)	· Precedence Convention (base on the PLH)

LaCharité and Paradis (2005: 252) show the comparison of Mexican Spanish and English obstruents to support their argument. Comparing the VOT of obstruents in both languages, Spanish voiceless sounds overlap English voiced sounds, since both

⁹⁵ According to Paradis (1996: 512), Phonological Level Hierarchy(PLH) consists of the following order: metrical level > syllable level > skeletal level > root level > non-terminal feature > terminal feature.

kinds of sounds have VOT of 0-30 msec. Therefore, in terms of VOT, English voiced stops should be closely matched to Spanish voiceless stops. However, English loanwords with voiced stops are adapted into [voiced] in Spanish which is an identical category phonologically. That is, the categorization of [\pm voice] in English obstruents is faithfully preserved in Spanish in spite of their phonetic difference. In addition, English /i/ and /o/ are adapted into French /i/ and /u/, even though the English high lax vowel is close to French mid tense vowels phonetically, because French /i/ and /u/ are the same with the category of source language phonologically (LaCharité and Paradis 2005: 234-235). Thus, LaCharité and Paradis argue that phonetic details do not have any effect on the loanword adaptation process. They also say that phonemic mismatches are modified not on the basis of phonetics, but on the basis of phonological similarity. There are some English-based loanwords in Korean that also support their argument. Real sound values of English /t/ are different according to the position in a syllable. However, English /t/ is all adapted into Korean [t^h], even though some English /t/ (in the example of ‘style’) are more similar to Korean fortis [tt] phonetically,⁹⁶ because English /t/ is replaced by the Korean phoneme that belongs to the same phonological category in English.

However, the phonology approach meets challenges due to data which cannot be explained by it, just as the perception approach. Unlike Korean loanwords above, the aspiration of real English pronunciation is reflected in Cantonese loanwords. For example, English ‘stamp’ is adapted into Cantonese /sitam/, while English ‘tips’ to /t^hipsi/. That is, the allophones of English /t/ are differently mapped to Cantonese loanwords, since the phonetic detail of English /t/ is distinctive in Cantonese phonology.

96 [\pm aspirated] is an important feature to distinguish phonemes in Korean, but English phonemes are adapted into Korean loanwords without distinguishing [\pm aspirated], just according to the categories of English phonemes.

According to the phonology approach, allophonic and phonetic details are not decisive in the process of loanword adaptation, and thus it cannot provide reasonable analysis for the Cantonese loanwords above, since allophonic details of English /t/ are specifically described in Cantonese loanwords. Also, the data to disprove the phonology approach can be found in English-based Korean loanwords. English ‘bat’ is adapted to /pæ.tʰi/, ‘deck’ to /tɛ.kʰi/, and ‘hip’ to /hi.pʰi/, while ‘flat’ to /pʰil.læ t/, ‘pack’ to /pʰæ k/, and ‘cap’ to /kʰæ p/ (Kang 2003: 223). Looking at the coda of the Korean data above, the same English phoneme is mapped into different Korean phonemes. Kang (2003) argues that this situation occurs due to faithful constraints which require maximization of perceptual similarity between inputs and outputs. In other words, because of a subtle distinction (a phonetic distinction [\pm release]) between English and Korean, vowel-inserted forms are closer to the source forms when Korean speakers perceive data such as English ‘bat’, ‘deck’, and ‘hip.’ The examples from List 62 can be used here again.

List 64. Some examples of Mandarin loanwords from List 62

English		Mandarin (Pinyin)	IPA
cool /kul/	→	kù	[kʰu]
Whirlpool /wəlpul/	→	Hu ì-ér-pǔ	[xwei-əɪ-pʰu]
ampule /æ mpul/	→	ān-bù	[an-pu]

The deletion of English /l/ is caused by the phonetic effect of ‘dark l.’ The preservation of English ‘dark l’ through vowel insertion following [u] cannot be found in Mandarin loanwords. As shown in List 63, English /l/ can be faithfully adapted into Mandarin /l/ or /əl/, and the phonology approach can explain these faithful mappings. However, the systematic deletion in List 62 cannot be explained with the phonology approach.

List 65. Examples III of Mandarin loanwords adapted from English

English		Mandarin (Pinyin)	IPA
Sprint /spɹɪnt/	→	Sī-pǔ-lín-tè	[sɿ-p ^h u-lin-t ^h ɿ]
Sparklin /spaɹklin/	→	Sī-pà-kè-lín	[sɿ-p ^h a-k ^h ɿ-lin]
Staples /steɪplz/	→	Sī-tè-pǔ-ěr-sī	[sɿ-t ^h ɿ-p ^h u-əɹ- sɿ]
Steven /stivən/	→	Shǐ-dì-wén	[ʃɿ-ti-wən]

Two of the previous examples (English ‘Sprint’ – Mandarin *Sī-pǔ-lín-tè*, English ‘Sparklin’ - Mandarin *Sī-pà-kè-lín*) can support the phonological approach, since [± aspirated] is distinctive in Mandarin, and thus English /p/ in ‘Sprint’ and ‘Sparklin’ should be mapped to Mandarin /p/ which is perceptually or phonetically close to the allophone [p] of English /p/ after /s/. However, English /p/ after /s/ is always adapted into Mandarin /p^h/. In other words, English /p/ is faithfully mapped into Mandarin /p^h/, which belongs to the identical category phonologically. On the other hand, the latter two examples (English ‘Staples’ – Mandarin *Sī-tè-pǔ-ěr-sī*, English ‘Steven’ – Mandarin *Shǐ-dì-wén*) present a challenge to the phonology approach, because English /t/ in the same syllabic environment is differently adapted in Mandarin. In fact, in terms of perception, this English /t/ should be mapped into Mandarin /t/, while adapted into Mandarin /t^h/ in terms of phonology. Therefore, neither the perception approach nor the phonology approach can provide a comprehensive analysis for this kind of data in Mandarin loanwords, since neither of these approaches fully explains the situation in which an identical phoneme of source language in the same syllabic environment is mapped to a different phoneme in the borrowing language.

5.1.3 The phonetics-phonology approach

The phonology approach can explain the changes in loanwords adapted by phonological process, but it ignores the roles of perception and phonetics. On the other hand, the perception approach underestimates the fact that borrowers can access the lexical, phonological, and orthographic knowledge of source languages. Therefore, neither approach can fully explain the adaptation process. Recently, many studies have tried to supplement the weaknesses by integrating the two approaches. According to the phonetics-phonology approach, the inputs in adaptation process are based on how borrowers perceive acoustic signals of source language. Plus, the inputs based on perception are modified for adaptation by the phonological grammar of borrowing languages. (Silverman 1992, Yip 1993, 2002, 2006, Kenstowicz 2003, Davis and Cho 2006, Iverson and Lee 2006, Kenstowicz and Suchato 2006, Boersma 2009, Broselow 2009, Lin 2009) Among the studies, Silverman(1992) is the first study to consider both phonetics/perception and phonology, and continues to influence studies on loanword adaptation. Silverman(1992) analyzed Cantonese loanwords adapted from English. He argues that there are two steps in a loanword adaptation process, namely ‘perceptual level’ and ‘operative level.’ Inputs in perceptual level are acoustic signals which are not analyzed linguistically. That is, the inputs do not carry any phonological information in the source language. In this ‘perceptual level’, segments which are not salient in acoustic signals are ignored. Whether or not segments are filtered in the ‘perceptual level’ is decided by the degree of saliency and the existence of the segments in phonological inventory of the borrowing language. Segments that passed ‘perceptual level’ are adjusted according to phonotactic constraints of the borrowing language. For

example, English ‘bus’ is input as [pus]. English /b/ does not exist in Cantonese, and thus /p/, which is phonetically similar with /b/, is entered. Also, fricatives such as English /s/ are salient sounds, and therefore are preserved, since they are perceived easily. After moving to the ‘operative level,’ [pus] is adapted to /pa si/ which conforms to the native Cantonese system by inserting a vowel, since Cantonese does not allow [s] in the coda position. Silverman’s (1992) approach is also followed by Yip (1993). However, she uses Optimality Theory (OT) as her analytical framework. Yip (2006) also maintains the two-step approach, but emphasizes that grammar is prioritized in the adaptation process.

Through analyzing French loanwords in Fon, Kenstowicz (2003) argues that both the phonological level and phonetic/perception level should be considered when analyzing the change of sounds in source language. According to Kenstowicz (2003b), the borrower’s perception of an input from a foreign language is also modified, and also unallowable forms are adjusted. In other words, in the case of Fon, coda consonant clusters of French inputs are modified, since Fon does not allow any consonants in the coda position. Just as Cantonese, sibilants are preserved by inserting a vowel, while stops are deleted. For example, *poste* /post/ → *pòsù*, **posutu*, **po*.⁹⁷

Iverson and Lee (2006) also emphasize the interaction of perception and phonology. They present the ‘principle of phonological perception’ as in List 66.

List 66. Principle of phonological perception

Phonetic representations are interpreted and structured according to the

⁹⁷ In terms of OT, it seems that two conflicting FAITH constraints coexist: MAX(C) » DEP(V) for a vowel insertion, and DEP(V) » MAX(C) for deletion of a consonant. Kenstowicz (2003) argues that this coexistence is caused by the difference of hierarchy of DEP(V) and MAX(C) between perception grammar and production grammar.

contrastive categories of the native language.

(Iverson and Lee 2006: 53)

Iverson and Lee (2006) argue that “foreign features of articulation (or their acoustic correlates) that contrast in the recipient language appear to be apprehended directly” (Iverson and Lee 2006: 81). For example, [spread glottis] is distinctive in both English and Korean, but consonantal duration is distinctive only in Korean. Therefore, phonetically short [s] in English consonant clusters is simply adapted into a Korean /s/, while phonetically long [s] in singletons is mapped into a Korean geminate /ss/, namely a tense [s']. That is, English /s/ in *slump, smog, snack, test, toast* is adapted into a lax [s] (simplex /s/) in Korean loanwords, while English /s/ in *salary, single, size, bus,* and *news* is mapped into a tense [s'] (geminate /ss/). As a result, Iverson and Lee (2006) conclude that the “identified basis for adaptation is the listener’s perception of similarity to source language sounds in terms that are categorically salient rather than subliminal in the recipient language” (Iverson and Lee 2006: 84). Namely, they emphasize on the role of the borrowing language’s phonology in the perception of source language. However, Davis and Cho (2006) present evidence that contrasts with Iverson and Lee’s (2006) analysis. They point to examples in which distinctive features in a borrowing language are still adapted into identical phonemes. Nevertheless, they also agree that both perception/phonetics and phonology play an important role in loanword adaptation. Besides, Broselow (2009) highlights the importance of ‘native language perception grammar’ in the process of mapping acoustic signals into phonological representations. In addition, Lin (2009) and Boesma (2009) also consider both phonetics/perception and phonology in loanword adaptation.

The researchers who follow the phonetics-phonology approach agree with the

perception approach in that they stress language-specific perception in the level of perception, but they are different in that they emphasize the role of borrower's native phonology in inputs. Paradis and LaCharité (1997: 418) criticize the phonetics-phonology approach, because they think that it only shows the process of conforming to native phonological constraints. However, the phonetics-phonology approach is a more comprehensive approach, since the phonetics-phonology analysis gives a better explanation for the problems of why an identical phoneme is adapted into different phonemes or insertion/deletion is chosen in adaptation.

This dissertation follows the phonetics-phonology approach. Through the examples of Mandarin loanwords originating from English, I will argue that phonetic-phonology approach is the most appropriate method to analyze loanword adaptation in the following section.

5.2 The phonetics-phonology approach for Mandarin loanwords originating from English

In this section, first, the nature of inputs will be discussed in order to highlight the role of perception. Next, the role of phonology will be emphasized. Finally, based on the discussion above, a model of loanword adaptation process will be proposed in section 5.4.

5.2.1 The nature of input

As mentioned earlier, the most debated issue in loanword phonology is about the nature of inputs. In the phonetics-phonology approach, the input in a process of

loanword adaptation is based on how borrowers perceive acoustic signals of the source language, and the perception-based input is modified or adapted by the phonology of the borrowing language. According to this phonetics-phonology approach, I will discuss the nature of input through analyzing the data of English-based loanwords in Mandarin in this section.

Jacobs and Gussenhoven (2000) argue that listeners can correctly identify regardless of native and non-native sounds because of their ‘universal perception grammar.’ They say that “there is no evidence that people cannot in general perceive segmental contrasts that do not occur in their own language” (Jacobs and Gussenhoven 2000: 197). That is, the modification of foreign sounds is made only in production due to language-specific restrictions which prevent non-native structures. Also, LaCharité and Paradis (2005) argue that loanword adaptation is not caused by misperception of non-native sounds, and that borrowers can identify forms of source language correctly. However, the process of loanword adaptation does occur in spoken language to some degree, and it means that borrowers encounter acoustic signals of the source language. Therefore, in the first step of the loan process, there is a possibility that speakers are unable to correctly perceive and recognize foreign sounds. This problem is separate from whether or not they pronounce non-native sounds correctly. As a result, the fate of loanwords is, to some degree, decided by how borrowers perceive and categorize speech sounds in the source language, and this should strongly relies on the sound system of borrowing language (Dohlus 2010: 137).

Mandarin data also support the importance of perception in loanword adaptation. Just as the preservation of sibilants in Cantonese and Fon, as discussed in the previous sections, English /s/ in the coda position is preserved in Mandarin. On the

other hand, usually English /t/ in the coda position is deleted.

List 67. Adaptation of English /s/ in coda position in Mandarin loanwords

English		Mandarin (Pinyin)	IPA
bus /bʌs/	→	bā-shì	[pa-ʃɿ]
Holmes /hɒlməs/	→	Fú-ěr-mó-sī	[fu-əɪ-mwo-sɿ]
lux /lʌks/	→	lè-kè-sī	[lɿ-kʰɿ-sɿ]
mousse /mus/	→	mó-sī	[mwo-sɿ]
ounce /aʊns/	→	àng-sī	[aŋ-sɿ]
Venus /vɪnəs/	→	wéi-nà-sī	[wei-na-sɿ]
Alps /ælpz/	→	ā-ěr-bēi-sī	[a-əɪ-peɪ-sɿ]
bass /bes/	→	bèi-sī	[pei-sɿ]
lace /les/	→	lěi-sī	[lei-sɿ]
sauce /sɔs/	→	shā-sī	[ʃa-sɿ]

List 68. Adaptation of English /t/ in coda position in Mandarin loanwords

English		Mandarin (Pinyin)	IPA
chocolate /tʃɒkəlɪt/	→	qiǎo-kè-lì	[tʃʰjau-kʰɿ-li]
jacket /dʒækɪt/	→	jiā-kè	[tʃja-kʰɿ]
toast /tɔst/	→	tǔ-sī	[tʰu-sɿ]
trust /trʌst/	→	tuō-lā-sī	[tʰwo-la-sɿ]
tart /tɑ:t/	→	tǎ	[tʰa]
Walmart /wɒlmaɪt/	→	wò-ěr-mǎ	[wo-əɪ-ma]
Dupont /dupɒnt/	→	dù-bāng	[tu-paŋ]
Colgate /kɒlɡet/	→	gāo-lù-jíé	[kau-lu-tɕje]

As seen in List 67 and List 68, the /s/ in List 67 is uniformly preserved, while the /t/ in List 68 tends to be deleted. This difference can be explained by the argument that salient

segments are preserved, while non-salient segments are deleted. Especially, ‘trust’ and ‘toast’ in List 68 show the difference in salience between /s/ and /t/ in one word.

Also, this difference can be explained by ‘perceptual similarity,’ which was discussed in Steriade’s (2001) P-map theory. According to Steriade (2001), “the P-map is a mental representation of the degree of distinctiveness of different contrasts in various position, and the primary function of the P-map is to guide the speaker in search of the minimal input deformation that solves a phonotactic problem.” Moreover, P-map is comprised of universal knowledge. This P-map theory can be applied to loanword adaptation, in that inputs are adapted into the most similarly perceived forms of the native language, when inputs of foreign language are modified to follow the markedness constraints of the native language. The P-map can provide more specific faithfulness constraints depending on segmental environment, and thus the degree of similarity is perceived differently according to the segmental environment reflected. This P-map can give more reasonable answers for differential changes of consonants which are shown in many languages’ loanwords including Mandarin.⁹⁸

Miao (2005) suggests a constraint-based analysis according to the viewpoint of perception, based on phonemic replacement patterns of Mandarin loanwords.⁹⁹ Miao (2005) argues that the contrast in manner features is more distinctive perceptually than the contrast in place, and the contrast in place is more distinctive perceptually than the contrast in voicing or aspiration. This perceptibility scale projects the constraint ranking,

98 Without consideration of ‘salience’ or ‘perceptual similarity’ in loanword adaptation analysis in OT, there should be conflicting hierarchies of faithfulness constraints between vowel insertion (MAX(C) » DEP(V)) and consonant deletion (DEP(V) » MAX(C)).

99 ‘Perceptibility scale of featural distinctiveness’ (Miao 2005: 82)

: Manner » Place » Voicing/Asp

‘Ranking of featural correspondence’

: IDENT(Manner) » IDENT(Place) » IDENT(Voicing/Asp)

IDENT(Manner) » IDENT(Place) » IDENT(Voice/Asp), which limits the variations of segmental mapping of foreign languages to Mandarin. Moreover, manner identity can be violated only to satisfy a higher ranking of constraint. The analysis of Miao (2005: 89-90) also supports the P-map theory that perceptual similarity plays an important role in controlling phonological process.

In addition, I will show the adaptation of English /v/ in Mandarin loanwords, which can support the hypothesis that inputs of loanwords are related to ‘perceptual similarity.’ English /v/ is adapted into three different phonemes in Mandarin loanwords.

List 69. English /v/ → Mandarin /f/

English		Mandarin (Pinyin)	IPA
vaselin /væ səlin/	→	fán-shì-lín	[fan-ʃʌ-lin]
Avon /æ vən/	→	Yǎ-fāng	[ja-faŋ]
Wave /weɪv/	→	Wēi-fú	[wei-fu]

List 70. English /v/ → Mandarin /u/ ([w])

English		Mandarin (Pinyin)	IPA
Venus /vinəs/	→	Wéi-nà-sī	[wei-na-sʅ]
Venice /vɛnis/	→	Wēi-ní-sī	[wei-ni-sʅ]
Irvine /əɪrvajŋ/	→	Ěr-wān	[əɪ-wan]
Steven /stivən/	→	Shǐ-dì-wén	[ʃʌ-ti-wən]

List 71. English /v/ → Mandarin /x/

English		Mandarin (Pinyin)	IPA
Revlon /ɪɛvln/	→	Lù-huá-nóng	[lu-xwa-nuŋ]
carnival /kɑrnəvəl/	→	jiā-nián-huá	[tɕja-njɛn-xwa]

Unilever /junəlivəɪ/ → (Lián-hé) lì-huá¹⁰⁰ [(ljɛn-xɿ)li-xwa]

The phonologically closest phoneme to English /v/ is definitely Mandarin /f/, since they are different only in [±voiced]. Therefore, according to Miao's (2005) 'reranking of correspondence,' English /v/ should be mapped into Mandarin /f/. However, based on my data, English /v/ is usually adapted into Mandarin /u/ ([w]), and there are only three loanwords in which English /v/ is replaced by Mandarin /x/. A semantic function is considered in these three words, namely 'hua 華 (magnificent or splendid)'. Thus, strictly speaking, they should be excluded in phonemic analysis.

Table 47. The ratio of mapping English /v/ into Mandarin phonemes¹⁰¹

Input /v/	Output /f/	Output /u/([w])	Output /x/
(%)	28.1%	62.5%	9.4%

As seen in Table 48, the result of Table 47 raises the question of why an output which violates a higher constraint is preferred to one that violates a lower constraint.

Table 48. English /v/ → Mandarin /f/, /u/([w]), /x/

/v/	IDENT (Manner)	IDENT (Place)	IDENT (Voicing/Asp)
↔ /f/			*
/u/([w])	*!		
/x/		*	*

100 'Liánhé) lihuá' is a hybrid that is a mixed form of semantic loan and phonetic loan. () is a semantic loan, and the rest are phonetic loans.

101 This statistics is different from Table 21, since I considered all the English /v/ regardless of its syllable position.

This problem does not seem to be completely solved in terms of phonetics or phonology. Instead, it is important to note that Mandarin speakers have a tendency to pronounce /u/ as glides [w] or [v] in their real speech. Especially, the difference between /u/ ([w]) and [v] in the onset position is insignificant for Mandarin speakers, and therefore they are mixed in Mandarin speakers' real speech (Miao 2005: 84). In fact, the fricative /v/ and the glide /w/ are distinctive phonemes due to their difference in manner of articulation, but both of them share the features [+labial] and [+voiced]. Also, they are perceptually similar. Even though Mandarin phoneme inventory does not have /v/, [v] is spoken by Mandarin speakers as a variation of /u/ ([w]) (Hu 1991, Zhao 2001). Therefore, Mandarin speakers tend to pronounce [v] instead of [w] when speaking English /v/.¹⁰² Mandarin speakers' frequency of using [v] differs depending on both the individual speaker and the context of the word. The [v] is used at a higher frequency when speakers are young and when a nuclear vowel in a syllable is unrounded (Li 1999: 102-104). As a result, there is high possibility that Mandarin speakers perceive English /v/ corresponding to the variation of Mandarin /u/ ([w], [v]), and thus, it is natural that /v/ adapted from English is mapped into Mandarin /u/ due to their 'perceptual similarity.'¹⁰³

In view of perceptual similarity between Mandarin /u/ ([w] or [v]) and English /v/ in native Mandarin phonology, the hierarchy of constraints in Table 48 can be re-arranged as Table 49. Then, the result can be consistent to the preference.

102 This part of discussion referred to Yu (2010: 61-62).

103 The mapping /v/ to [w] can be found in other languages such as Fula (Paradis 1996), Thai (Kenstowicz and Suchato 2006), and Hawaiian (Adler 2006).

Table 49. English /v/ → Mandarin /f/, /u/ ([w]), /x/

/v/	[v] = /u/([w])	IDENT (Manner)	IDENT (Place)	IDENT (Voicing/Asp)
/f/	*!			*
↳ /u/([w])		*		
/x/	*!		*	*

The preference of correspondence between English /v/ and Mandarin /u/ demonstrates the importance of perception in loanword adaptation. However, it does not imply that people have a simple perception of the source language, but rather it means that people's perception of a language is as similar as possible to its source form within the sound system of borrowing language.

5.2.2 The role of phonology in loanword adaptation

Mandarin loanwords strictly follow the constraints of native phonology, even though perceptual similarity in inputs is considered as much as possible. That is, all the sound changes are made within the scope of native Mandarin phonology without exception. A phoneme from a source language must map into Mandarin following the constraints of native Mandarin phonology. Therefore, two identical phonemes from a source language may map to different phonemes in Mandarin based on the syllabic environment. For example, native Mandarin palatalization affects loanword adaptation.

List 72. Standard Chinese palatalization constraint and rules¹⁰⁴

- a. Palatal constraint : Coronal fricative/affricates and velar obstruents cannot be followed by high front vowels/glides.
- b. Palatalization rule 1:
Coronal fricative/affricates → [-back, +high] / _ [-back, +high] vocoids
- c. Palatalization Rule 2:
Velar obstruents → [-back, +high] / _ [-back, +high] vocoids

As shown in List 73, List 72c is applied to inputs which are violating (72a).

List 73. English velar stop /k, g + i, ɪ/ → Mandarin palatal affricate /tʃi/

English		Mandarin(Pinyin)	IPA
Kentucky /kɛntʌki/	→	Kě-n-dé-jī	[kʰən-tʃ-tʃi]
khaki /kaki/	→	kǎ-jī	[kʰɑ-tʃi]
kiwi /kiwi/	→	jī-wéi	[tʃi-wei]
Kimberly /kɪmbəli/	→	Jīn-bǎi-lì	[tʃin-pai-li]
quitar /gɪtɑɪ/	→	jí-tā	[tʃi-tʰɑ]

‘Velar stop /k, g/ + high front vowel /i/’ cannot exist in the native Mandarin phonology, since velar stops must be palatalized in front of the high front vowel /i/. However, it does not mean that Mandarin speakers misperceive English [ki] or [gi] as [tʃ^hi] or [tʃi].

List 74. Transcription of a Korean song by a Chinese speaker

Nan miwoha'er yong'giduo ao'bsagi'ei Kezao maolao ji'erdagaji jikiiaobuaya'man haijiu.wow I'll be there for you¹⁰⁵

104 Adopted from Lin (2007: 152). The rule in (72a) must be obeyed in Mandarin. If (72a) is violated, (72b) and (72c) must be applied.

105 Retrieved from <http://music.yahoo.cn/s?q=salang&m=10>

The text in List 74 is transcription of a Korean song by a Chinese speaker.¹⁰⁶ Whether the transcription is exact or not is insignificant in this discussion. The important issue is that they can perceive the forms which are not allowed in Mandarin such as [ki] or [gi]. This can support the fact that palatalization of English /k+i/ or /g+i/ in Mandarin loanwords does not result from Mandarin speakers' misperception. Miao (2005: 83-84) argues that the sound change of source language in List 73 is made in order to increase the perceptual similarity between inputs and outputs. However, 'velar stops' and 'palatal affricates' are perceptually different sounds, because of their different manners and places of articulation. Thus, Miao's (2005) analysis for the palatalization of Mandarin loanwords seems to be hard to accept, in that she thinks that /ki/ or /gi/ is adapted into /tɕhi/ or /tɕi/ due to perceptual similarity.

The question of what causes the sound change of a source language needs to be addressed. It seems to be reasonable that inputs of non-Mandarin syllable structures are adjusted to native Mandarin phonological grammar. In other words, inputs of English /ki/ and /gi/ are mapped into Mandarin /tɕhi/ and /tɕi/, since they are controlled by the native Mandarin phonology. It shows that native Mandarin phonology strongly controls the loanword adaptation process. In the OT, a correct output for Mandarin loanwords can be chosen when the constraint of *VELAR-I(*ki, *gi, *xi)¹⁰⁷ is ranked in the highest position as shown in Table 50.

106 Recently, K-Pop has gained sensational popularity in China. Thus, it is easy to find transcriptions of K-Pop songs on-line, using English letters.

107 Adopted from Ma (2008: 64).

Table 50. English /k, g + i/ → Mandarin /tɕʰi/ or /tɕi/

/ki/, /gi/	*VELAR-I	IDENT (Manner)	IDENT (Place)	IDENT (Voicing/Asp)
/ki/, /kʰi/	*!			
ㄌㄝ /tɕʰi/, /tɕi/		*	*	
/xi/	*!	*		

In fact, most English /ki/ and /gi/ are adapted not into /tɕʰi/ but into /tɕi/ in Mandarin. Considering that [±voice] is not a distinctive feature in Mandarin, it seems insignificant that both English /ki/ and /gi/ are mapped into Mandarin /tɕi/. On the other hand, it is still unclear why /tɕi/ is preferred to /tɕʰi/. More research is needed in the future to address this issue.

The effect of *VELAR-I in native Mandarin phonology can be seen in the adaptation of English /h+i/ in Mandarin loanwords. In other words, due to the control of native Mandarin phonology which prevents velar consonants from forming a syllable with the high front vowel /i/, English /h+i/ maps into Mandarin /ɕ + i/.¹⁰⁸

List 75. English glottal fricative /h + i/ → Mandarin velar fricative /ɕ+i/

English		Mandarin (Pinyin)	IPA
Hilton /hɪltən/	→	Xī-ěr-dùn	[ɕi-ər-twən]
hippy /hɪpɪ/	→	xī-pí	[ɕi-pi]
Dunhill /dʌnhɪl/	→	Dēng-xǐ-lù	[təŋ-ɕi-lu]

Table 51 shows the correct output can be chosen when the constraint of *VELAR-I is

¹⁰⁸ Mandarin /x/ is a velar fricative, and thus *VELAR-I is applied to the adaptation of English /h/ into Mandarin /x/, even though English /h/ is a glottal fricative.

ranked in the highest position as the following table.

Table 51. English /h+i/ → Mandarin /ɛi/

/hi/	*VELAR-I	IDENT (Manner)	IDENT (Place)	IDENT (Voicing/Asp)
/xi/	*!		*	
ɛi /ɛi/			*	
/tɛi/		*!	*	

Mandarin loanwords seem to be more strongly controlled by native phonology than other languages such as Japanese or Korean. Mandarin is a monosyllabic language, which cannot arbitrarily form a syllable of just any consonant and vowel. In other words, a syllable consists of specific sets of consonants and vowels. Thus, Mandarin never has a syllable which violates phonotactic constraints. That is, even though inputs are similarly perceived in a source language, there is a possibility that the inputs cannot form source-similar syllables in the process of mapping into Mandarin. Therefore, they must change to conform to the Mandarin native phonology.

In conclusion, loanwords are adapted by considering perceptual similarity as much as possible, within the scope allowed by native phonology. Therefore, in addition of the perceptual and phonetic level considerations, loanword adaptation should also consider phonology.

5.3 Discussion of other factors in Mandarin loanword adaptation¹⁰⁹

The primary factors affecting loanword adaptation are phonological and phonetic elements; since they interact to adapt foreign inputs, neither can be viewed as more important. However, the adaptation of loanwords is a result of the complicated effects of many factors other than the phonology and the phonetics. Therefore, there is no uniform rule that can predict every single possible adaptation of foreign inputs. Instead, factors which affected the process of loanword adaptation with already-created loanword can be analyzed. In section 5.3, other factors will be treated, since other factors apart from phonology and phonetics play a significant role in the adaptation of Mandarin loanwords. The consideration of other factors can reduce exceptions in the adaptation of Mandarin loanwords, because they explain some of the exceptions in the phonetics-phonology approach.

5.3.1 Semantic functions of Mandarin characters

Mandarin loanwords can be adapted from the foreign inputs in a variety of ways, including phonetic and semantic loans. Often the same foreign word will be adapted into Mandarin Chinese in multiple ways, which means there will be both a phonetic and alphabetic loanword variation.¹¹⁰ Since the 1980's, the phonetic loans and

109 Section 5.3 was published by Kim (2012b).

110 There are several types of Mandarin words for English UFO: the phonetic loan 'Yōufú 幽浮,' the semantic loan 'Bù-míng-fēi-xíng-wù 不明飞行物,' and the native word 'fēi-dié 飞碟.' Even English 'UFO' itself is directly used. In addition, the Mandarin words for English SARS are as follows: the phonetic loan, 'Shā-sī 莎斯,' the semantic loan, 'Yán-zhòng-jí-xìng-hū-xī-zōng-hé-zhēng 严重急性呼吸综合症,' and the native word, 'fēi-diǎn-xíng-fèi-yán 非典型肺炎.' Also, English SARS itself can be used. The examples are adopted from Zhou (2009: 48).

alphabetic loans¹¹¹ have been the most common loanword types (Cao 2004: 95). However, among the phonetic loans, there is preference to use characters that not only sound like the input also have a meaning that relates to the original idea. For example, there are four Mandarin phonetic loans for English AIDS: ‘*ài-zhī-bìng* 爱之病,’ ‘*ài-zī-bìng* 爱滋病,’ ‘*ài-sǐ-bìng* 爱死病,’ and ‘*ài-zī-bìng* 艾滋病.’ Among them, the most influential one is ‘*ài-zī-bìng* 爱滋病,’ whose combination of Mandarin characters means the disease caused by love. In other word, ‘*ài-zī-bìng* 爱滋病’ is a Mandarin phonetic loan for English AIDS, but simultaneously has a special meaning. However, the Ministry of Health in China indicated ‘*ài-zī-bìng* 艾滋病’ as an official name for AIDS, since the ‘*ài-zī-bìng* 爱滋病’ can mislead people to think that the real cause of AIDS is only one (i.e. love) (Zhou 2009: 81). In addition, there are some cases in which a phonetic loan, which was faithfully adapted based on the source sound, is replaced by another form of phonetic loan that can show a good meaning. For instance, at the first stage of borrowing, ‘Coca Cola,’ the famous drink brand, was adapted as ‘*Kǒu-kě-kǒu-là* 口渴口蠟 [*kʰou-kʰɿ-kʰou-la*],’ and ‘*Kē-kē-kěn-là* 蝌蝌啃蜡 [*kʰɿ-kʰɿ-kʰən-la*],’ which are similar to the sound of source language. However, the meanings of combination of Mandarin characters were not good, and people were not interested in the product. As a result, the Mandarin loanwords for ‘Coca cola’ changed to ‘*kě-kǒu-kě-lè* 可口可乐 [*kʰɿ-kʰou-kʰɿ-lɿ*],’ which means ‘it’s tasty and you will be happy,’ and it was widely accepted as well as gained a high market share (Yu 2010: 142). Therefore, I argue that semantics sometimes can play a more important role in Mandarin loanword adaptation than phonological or phonetic factors. Thus, in spite of analyses of Mandarin

111 I argue that directly borrowing foreign letter abbreviations as UFO or SARS should not be considered as a Mandarin loanword in Chapter II. However, I will call the cases, which foreign letters are directly used in Mandarin, alphabetic loans here for the convenience.

phonetic loans, semantic factors should also be considered.

The discussion in 5.3.1 reveals that faithful phonological or phonetical mapping can be affected by semantic factors. In other words, the final output of Mandarin phonetic loans sometimes discards the most faithful phonological or phonetical form, but chooses a secondary form for semantic reasons.¹¹² I hypothesize that the input should be close to the sounds of the source language due to either salience or perceptual similarity, but in order to have a good meaning, the input takes another form before coming out as an output. If the semantic function is not considered, these unfaithful mappings should be treated as exceptions, which make systematic analyses of adaptation of Mandarin loanwords difficult. This is especially seen, when English brand names are adapted into Mandarin, since brand names need a high market share and thus they should consider the effect of meanings shown in the combination of Mandarin characters. For example, English ‘Pizza Hut’ was adapted to Mandarin ‘*Bì-shèng-kè* 必胜客 [pi-ʂəŋ-kʰɤ],’ which means the faithful mapping of English /p/ to Mandarin /pʰ/ was not chosen for the final output. However, the combination of Mandarin characters carries the meaning of ‘it must make customers win.’ I hypothesize that the English /p/ is inputted as Mandarin /pʰ/, but before coming out as a final output, it is affected by the semantic factor in order to create a good image for the pizza restaurant. The following examples show the same situation:

112 According to Cao (2004), Chinese people think that the most desirable loans are phonetic loans which also have appropriate meanings (*yīn-yì-jīān-yì-cí* 音义兼译词). Therefore, there are many phonetic loans which are faithfully adapted based on the sound of source language and simultaneously whose combination of Mandarin characters show proper or good meanings, for example, English Yahoo (an internet portal) → Mandarin *Yǎ-hǔ* (雅虎, a decent tiger), English Dove (a brand of skincare product) → Mandarin *Duō-fēn* (多芬, strong fragrance), English mini → Mandarin *mí-nǐ* (迷你, fascinate you). However, these examples are different from the loanwords discussed in this section, in that they still show faithful mapping between English and Mandarin even though they fully consider the semantic effect by combining the Mandarin characters.

List 76. Phonologically or phonetically unfaithful mapping due to the semantic functions

English	Mandarin	IPA	characters (meaning)
Tide (a brand name of detergent)	Tài-zì	[^h ai-tsɿ]	汰渍 (remove dirt)
Marlboro (a cigarette brand)	Wàn-bǎo-lù	[wan-pau-lu]	万宝路 (the way of ten - thousand jewelry)
Nike ¹¹³ (a brand of sporting goods)	Nài-kè	[nai-k ^h ɤ]	耐克 (long endure and overcome)
Allstate (an insurance company)	Hǎo-shì-dá	[xau-ʃɿ-ta]	好事达 (good things will be accomplished)
Gerber (a baby healthcare product)	Jiā-bǎo	[tɕja-pau]	嘉宝 (beautiful treasure)
Kleenex (Facial issue product)	Kě-lì-shú	[k ^h ɤ-li-ʃu]	可丽殊 (can be beautiful and special)

There are countless examples which show the semantic effect: English Pampers (a brand of baby products) → Mandarin *Bāng-bǎo-shì* 帮宝适 (help babies be comfortable), English Revlon (a brand of cosmetic products) → Mandarin *Lù-huá-nóng* 露华浓 (gorgeous and high-concentrated as morning dew), English Pringles (a brand of potato based snacks) → Mandarin *Pǐn-kè* 品客 (a decent customer), English P&G (a brand of body care products) → Mandarin *Bǎo-jié* 宝洁 (clean

113 Yu (2010: 135) argues that the adaptation of English Nike → Mandarin *Nài-kè* [nai-k^hɤ] is a result of English orthography. That is, English has words as ‘like, bike, and hike,’ and thus the sounds of the common orthography should affect the adaptation of Mandarin *Nài-kè*. However, considering that Nike came to China in 1980’s, was a very famous brand name, and loanwords are usually borrowed by people who are good at English, it is unlikely that Mandarin *Nài-kè* was a mistake which was affected by the orthography of ‘like, bike and hike.’ Therefore, I argue that, based on the hypothesis that a brand name is usually borrowed as a faithful form of source sound, the input of Nike is [naiki], but it should be [nai-tɕi] since it is affected by Mandarin palatalization to conform the Mandarin syllable structure. However, for the desirable image of a brand name of sporting goods, it was adapted to Mandarin *Nài-kè* due to the semantic effect.

as treasure).

In sum, Chinese people often intentionally choose particular characters for loanwords to have a desirable meaning. The consideration of semantic effect is sometimes superior to the phonological faithfulness between English and Mandarin, and also can create deviant outputs (Miao 2005: 78). In order to explain the variants systematically, the semantic factors should be included in the analyses of adaptation of Mandarin loanwords.

5.3.2 Orthography

The effect of orthography in loanword adaptation has received attention for some time (Danesi 1985, Flege 1990, Pennington 1996), but it was not spotlighted and was just treated as a marginal factor (LaCharité and Paradis 2000, Paradis and Prunet 2000). According to LaCharité and Prunet (2000), the result of an experiment based on the English data in five languages including French shows that only 3.7% of loanwords were affected by orthography. However, researchers have recently noticed that the effect of orthography in the process of loanword adaptation cannot be ignored.¹¹⁴ Vendelin and Peperkamp (2006) argue that whether or not the written forms are given significantly influences loanword adaptation. They say that the experimental result of LaCharité and Paradis (2000) who support the phonology approach shows very low percentage for the effect of orthography in loanword adaptation, since LaCharité and Paradis (2000) consider the effect of orthography as “phonologically-based adaptation”

114 It is commonly found that orthography affects the perception and categorization of foreign sounds in loanword adaptation and second language acquisition. Many studies have mentioned the effect of orthography (Assmann et al. 1982, Dijkstra et al. 1989, Itô et al. 2006, Smith 2006, Vendelin and Peperkamp 2006, Kertész 2006, Detey and Nespoulous 2008, Dohlus 2010 and etc.).

or even ignore the difference between the effect of orthography and phonologically-based adaptation. In addition, Vendelin and Peperkamp (2006) strongly argue that orthography plays an important role in the areas of loanword phonology and language perception.¹¹⁵ Smith (2006) also indicates that Japanese loanwords borrowed through written materials were affected by orthography.¹¹⁶ Kertész (2006) says that orthography has a leading role in the adaptation of English words into Russian, and Detey and Nespoulous (2008) claim that the transformation between the input of L2 and the output of L1 can result from the effect of orthography either directly or indirectly. Besides, the important role of orthography in speech perception is mentioned in many studies, and thus many researchers argue that orthography needs to be treated more systematically in loanword phonology (Chéreau, Hallé and Segui 1999, Grainger, Nguyen Van Kang and Segui 2001, Ziegler, Muneaux and Grainger 2003). In sum, it is clear that orthography can play a significant role in loanword adaptation.

Generally speaking, the effect of orthography is more noticeable when the writing systems between the borrowing language and the source languages are completely different (Kertész 2006). However, Yu (2010) thinks that orthography does

115 Vendelin and Peperkamp (2006: 997) point out that the adaptation of English *brunch* → French [bʁœ̃ʃ] can be made by the phonological rule that English /ʌ/ is mapped into French /œ̃/, but also by “the between-language grapheme-to-phoneme correspondence rule” that the French pronounce English [u] as French vowel /œ̃/. In fact, in the case where a grapheme and a phoneme are identical, based on the borrower’s phonological or orthographical knowledge, orthography helps borrowers distinguish correctly the phonemic structure of source language. Considering this role of orthography in loanword adaptation, it is closer to the phonology approach than the perception approach (Dohlus 2010: 142). However, orthography can affect the adaptation in other situations, and thus is worth discussing in detail.

116 It is well-known that Japanese loanwords are usually borrowed through written materials, not spoken English (Lovins 1975, Miura 1993, Smith 2006). According to Smith (2007: 70-71), there are two Japanese loanwords for English *Jitterbug*. One is [dʒi.ru.ba], which was adapted based on the perception and in which deletion as a strategy was used ([g] → ∅). On the other hand, the other one is [dʒit.ta:.bag.gu], which was borrowed by written language, and in which insertion as a strategy was used (∅ → [u])

not have much effect on the adaptation of Mandarin loanwords even though the writing systems of Mandarin and English are very different. Thus, she says that orthography is not a systematic function but a marginal factor in the adaptation of Mandarin loanwords. Miao (2005), on the other hand, argues that the lexical borrowings into China largely rely on the spellings, since the contact between Mandarin and Indo-European languages is usually made through written forms. Therefore, she claims that it is also the effect of orthography that [±aspirated] in the real speech of English stops¹¹⁷ is usually ignored in the adaptation of Mandarin loanwords.¹¹⁸ Based on my data, the effect of orthography, in fact, seems insignificant in the whole adaptation of Mandarin loanwords.¹¹⁹ However, I emphasize that there are Mandarin loanwords whose adaptation cannot be explained without considering the effect of orthography. In order to include these loanwords in the systematic analyses of loanword adaptation, rather than treating them as exceptions, the influence of orthography should be considered in the process of Mandarin loanword adaptation.

I will support my claim with examples of Mandarin loanwords. English does not show one-to-one match between the written forms and the spoken sounds. That is,

117 As mentioned earlier, English stops have allophones depending on the phonemic environment. That is, English /p, t, k/ are aspirated sounds in the beginning place of words, but they are not aspirated sounds after /s/.

118 Miao (2005: 55-56) supports her claim with the examples of English Puma → Mandarin *Piāo-mǎ* ([p^h]) and English Sprint → Mandarin *Sī-pǔ-lín-tè* ([p^h]). She argues that this situation results from the fact that lexical borrowings in Mandarin are usually made through written materials. On the other hand, the English allophones are reflected in the Cantonese loanwords as English pie → Cantonese /p^hay/ and English spare → Cantonese /si pe/, since Hong Kong is a bilingual community of English and Cantonese, and as a result, the lexical borrowing is usually made through speaking.

119 If I would have included unclear cases that are affected by phonological factor or orthographical factor as the examples which result from the effect of orthography, the effect would have been greater. However, I think that the phonological factor has priority to be considered in loanword adaptation to the orthography, since researchers generally agree that phonological or phonetic factors play a major role in loanword adaptation.

identical English spelling can be read differently depending on the phonemic environment; two English spellings can represent a sound, or there are also silent spellings in English words. This situation causes a lot of confusion when English words are borrowed into Mandarin, and as a result many variations for an identical English word can be created.

List 77. Examples I showing the effect of English orthography

English		Mandarin	IPA
nylon	/naɪlən/	ní-lóng	[ni-luŋ]
Niagara	/naɪə g(ə).ɪə/	ní-yà-jiā-lā	[ni-ja-tɕja-la]
pint	/paɪnt/	pǐn-tuō	[pʰin-tʰwo]
dengue	/dɛŋgi/	dēng-gé	[təŋ-kɤ]
quinine	/kwainam/	kuí-níng	[kʰwei-njəŋ]
Nasdaq	/næ zɔːk/	Nà-sī-dá-kè	[na-sɿ-ta-kʰɤ]
Dallas	/dæ ləs/	Dá-lā-sī	[ta-la-sɿ]
Simon	/saɪmən/	Xī-méng	[ei-məŋ]

As shown above, the relation between the English orthography and Mandarin loanwords is clearly seen. The example of English dengue → Mandarin *dēng-gé* should be Mandarin **dēng-jí* due to Mandarin palatalization, if it were a phonologically faithful mapping. Thus, English orthography also played a role in its adaptation. Mandarin loanwords in List 77 have different phonemes from the phonemes in English words, but Mandarin loanwords in List 78 have phonemes with letters that are ‘silent’ in English pronunciation.

List 78. Examples II showing the effect of English orthography

English		Mandarin	IPA
wrong	/ɹɔŋ/	wū-lóng	[wu-luŋ]
Holmes	/hoʊmz/	Hú-ěr-mó-sī	[xu-əɪ-mwo-sɿ]
Powell	/paʊəl/	Bāo-wēi-ěr	[pau-wei-ər]
Illinois	/ɪlənoɪ/	Yī-lì-nuò-sī	[ji-li-nwo-sɿ]
Greenwich	/gɹɛnɪtʃ/	Gé-lín-wēi-zhì	[kɻ-lin-wei-tʂɿ]

The English spelling ‘l’ in the English word ‘Holmes’ appears in Mandarin loanwords as ‘-ěr,’ even though it is a silent ‘l’ in the word. On the other hand, the ‘l’ in English ‘Lincoln’ is not shown in Mandarin loanword ‘*Lín-kěn* [lin-k^hən]’ and thus we can say Mandarin ‘*Lín-kěn*’ was not affected by the English orthography. In addition, there is another type of Mandarin phonetic loan for English Illinois as Mandarin *Yī-lì-nuò-yī* [ji-li-nwo-ji]. The Mandarin ‘*Yī-lì-nuò-sī* [ji-li-nwo-sɿ]’ clearly shows the effect of English orthography while the Mandarin ‘*Yī-lì-nuò-yī*’ is affected from the perception of source sound.

The Mandarin loanwords in List 77 and List 78 are pure phonetic loanwords, which are not affected by semantic factors. Thus, it is easily seen that English orthography is the reason for irrelevant phonemes. Orthography can be treated as a marginal factor, which supports the phonology approach, in that the orthography of source language helps phonologically-faithful mapping in loanword adaptation. However, there are cases, in which phonemes irrelevant with the phonemes in source words but correspond to the spellings are chosen for the final output. In these cases, orthography should not be considered a marginal phonological factor, and needs to be considered as an independent factor affecting the loanword adaptation.

5.3.3 The influence of dialects, source languages, and bilingualism

There are some factors, which should be considered in loanword adaptation, but their effect to the final output is not visible, unlike semantic factors or orthography. The factors are basically consideration of borrowing situations. Thus, well-adapted Mandarin loanwords cannot directly show the effect of these factors. The factor can be either an effect coming from the characteristics of source language at the beginning stage of borrowing, or the route of borrowing process such as dialects. Also, the factor can be a reflection of the real state of invigoration of foreign language education in China. The discussion in this section, which analyzes situations, can help reduce the exceptions in the analyses of adaptation of Mandarin loanwords, and provides a cue for more accurate analysis.

First, the effect of dialect needs to be considered. It is important to recognize that the phrase ‘Chinese language’ generally refers to Mandarin Chinese. Thus, many studies of Chinese loanwords target Mandarin loanwords. If the source words are initially borrowed into Mandarin, there would be no problem in the analysis. However, if the source words are adapted into Mandarin via other dialects, the possibility that the dialects affect Mandarin loanwords and a change in the process of adaptation occurs cannot be excluded. Among the dialects, Shanghai and Hong Kong have a leading role in lexical borrowing; in addition many Mandarin loanwords, in fact, were imported via two other dialects, Wu 吳 dialect and Yue 粵 dialect (Lu 2009, Yu 2010).¹²⁰ The following Mandarin loanwords were borrowed via these two dialects.

120 Generally speaking, when two languages come in contact with each other, if one of the two languages has a more appropriate word to express something, the other language borrows the word or concept for more effective communication. This is called ‘code-mixing’ (Lu 2009:53). However, the

List 79. Mandarin loanwords borrowed via Wu dialect¹²¹

English		Shanghainese	Mandarin
sofa	/soʊfə/	[so-faʔ]	[ʃa-fa]
sandwich	/sæ n(d)wɪʃ/	[sɛ-miŋ-z]	[san-mjəŋ-tʃ]
butter	/bədəɪ/	[baʔ-tʰəʔ]	[pai-tʰwo]
coffee	/kəfi/	[kʰa-fi]	[ka-fei]
motor	/moutə(ɪ)/	[mo-daʔ]	[ma-ta]

List 80. Mandarin loanwords borrowed via Yue dialect¹²²

English		Cantonese	Mandarin
film	/film/	[fei-ləm]	[fei-lin]
tips	/tɪps/	[tʰi:p-si:]	[tʰie-ʃ]
taxi	/tæksi/	[tɪk-si:]	[ti-ʃ]
bus	/bəs/	[pa-si:]	[pa-ʃ]
cigar	/səɡɑɪ/	[sy:t-ka:]	[ɕe-tɕja]

As shown in List 79 and List 80, when the source words were borrowed into dialects before being adapted into Mandarin, the sounds of dialects were more faithfully mapped into the source phonemes. Mandarin and other Chinese dialects share the Chinese

ways of code-mixing in Cantonese and Shanghainese are very different. That is, it is often seen in Cantonese that foreign alphabetic characters, especially English letters are directly borrowed. For example, “有人 call 你 (Someone called you),” “我好 firm 呢个belief (I firmly believe in this)” (Li 1998: 176). On the other hand, Shanghainese does not use the foreign alphabetic characters. In the late 19th century and the early 20th century, there were not many people who could speak foreign languages, and as a result, code-mixing often utilized Chinese characters in order to express foreign words. Thus, many Chinese characters lost their nature as ideographs, and were used as phonetic symbols (Lu 2009: 62). Some of the early code-mixing expressions in Shanghainese were imported into Mandarin vocabulary, and finally became Mandarin loanwords. For instance, there are Mandarin *bù-dīng* (pudding), *sān-míng-zhì* (sandwich), *gā-lí* (curry), and *wéi-tā-mìng* (vitamin) (Lu 2009: 65).

121 The examples and Shanghainese pronunciations are adopted from *A Chinese-English dictionary of the Wu dialect: Featuring the dialect of the city of Shanghai* (Kensington: Dunwoody Press, 1991).

122 The examples and Cantonese pronunciation are adopted from the online dictionary ‘www.cantonese.sheik.co.uk/dictionary/,’ and the IPA presented in Wikipedia (en.wikipedia.org/wiki/jyutping) is used.

characters, and thus the pronunciation of Mandarin loanwords are much further from the source sounds, because the real borrowing of Mandarin is the characters of the loanwords from the dialects. In other words, in the case of English ‘sofa,’ it was initially adapted into Shanghainese [so-fa²]. Later, Mandarin just brought the word ‘沙发’ from Shanghainese, and it was read as Mandarin pronunciation [ʃa-fa].

Second, another factor is to consider the origin of the loanword. Even though a foreign word is written in Latin letters, there is a possibility that the origin is not English. Thus, depending on the origin, researchers should consider that the sound values of Latin letters can be different. Even though English is the source, its origin should be considered for more accurate analysis, since there are many English varieties such as British English and American English. Miao (2005: 102) argues that the reason why English /-ɪ/ is more often deleted than /-l/ in the adaptation of Mandarin loanwords is that Mandarin speakers experienced various English varieties. In other words, British English had been taught in China until the early 1990’s. Even the words from American English were taught with British pronunciations. Therefore, Miao thinks that this situation makes Mandarin speakers prefer the deletion of coda /-ɪ/.¹²³ If Miao’s hypothesis is correct, Mandarin speakers’ preference for the deletion of coda /-ɪ/ should not be analyzed with Mandarin speakers’ perceptual mistakes or the lack of salience of coda /-ɪ/. Rather, the deletion should be treated as a faithful adaptation based on the source sound.

Thus, the consideration of dialect or origin of source language requires careful observation of the data, otherwise inaccurate analyses could be made. However, a thorough analysis of loanword that incorporates all of these factors is both time

123 Yip (1993) also mentions the effect of British English in the adaptation of Cantonese loanwords.

consuming and resource intensive, which may discourage researchers from completing this level of analysis. Although it might not always be worthwhile, it does provide a reasonable explanation for some cases, which are viewed as exceptions in the phonology approach or the perception approach.

Lastly, the socio-linguistic environment when a foreign word is borrowed needs to be considered. Usually, linguistic analysis of loanword adaptation treats only phonetic loans, but the socio-linguistic environment in the borrowing period significantly influences the form of loanword. In other words, according to who the borrower is or how much people are aware of the source language in the borrowing language society, it can influence whether or not the source sounds can be described in detail. In fact, when people encounter a new foreign word, there should be difference between monolinguals and bilinguals. That is, bilinguals already have some perception of the grammar of the source language, and thus their perception should be more accurate than monolinguals' perception, since they acquire the phonological categories and phonetic properties in the process of learning a foreign language. Many studies also support that there is difference in perceptual performance between beginners and advanced learners (Flege 1990, Escudero 2005, LaCharité and Paradis 2005). Beginners can be treated as monolinguals in loanword adaptation (Dohlus 2010: 138-139), and lexical borrowing is usually made by bilinguals (Grosjean 1982, Poplack, Sankoff and Miller 1988, Miao 2005, Dohlus 2010).

Then, how does the hypothesis in loanword phonology above apply to the adaptation of Mandarin loanwords? In the period of the May 4th Movement, many English-based loanwords started flooding into Mainland China. At that time, the borrowers were usually bilinguals or translators (Lin 2007). However, the social

atmosphere rapidly changed after the opening up of China's economy, transforming China from a monolingual society one in which English could be much more commonly encountered. Since MOE (the Ministry of Education) announced the first unified primary and secondary curriculum including the first draft of English syllabus in 1978, based on the official statistics,¹²⁴ it is estimated that there had been yearly growth of over 2,600,000 secondary learners of English during the period between 1990 and 2000. Furthermore, after entering the 21st century, there was an attempt at the governmental level to expand English education to the primary curriculum. In addition, hosting the 2008 Beijing Olympics also increased the demand for English proficiency (Hu 2005: 5-11). Now, English fever in China is even greater. Thus, the social environment naturally affects the way of English-based Mandarin loanwords are adapted. In China, there are already many people who are familiar with English phonological or perceptual grammar. As the bilingualism in China is growing, many Mandarin characters lose their nature as ideographs and are often used as phonetic symbols to more accurately reflect the English sounds. As a result, it is noticeable that many recently borrowed Mandarin loanwords are phonetic loans, and Mandarin loanwords that are polysyllabic are increasing even though Mandarin is a monosyllabic language in nature. Therefore, the symbolization and polysyllablization of Mandarin characters is often found in Mandarin loanwords of proper nouns such as people's names, company names, or brand names. For example, there are Mandarin *Kǎ-ě-r-wén-kè-lái-ēn* 卡尔文 克莱恩 [k^ha-əɪ-wən-k^hɿ-lai-ən] (Calvin Klein – a cloth brand), Mandarin *Dān-ní-ěr-gē-ěr-dēng* 丹尼尔 戈尔登 [tan-ni-əɪ-kɿ-əɪ-təŋ] (Daniel Golden – a person's name), and Mandarin *Hā*

124 The statistics are presented in Hu (2005: 11). According to Hu (2005), it was based on the official total by SEC (the State Education Commission) Department of Planning and Construction (1991) and MOE Department of Development and Planning (2001).

-lǐ-fǎ-kè-sī 哈里法克斯 [xa-li-fa-k^hɿ-sɿ] (Halifax – a name of a bank).¹²⁵ In sum, the adaptation pattern of Mandarin loanwords can differ depending on the borrowing period. That is, if an identical English phoneme was borrowed into Mandarin in two different time periods, there is a possibility that it will be mapped differently and that the different mapping is a reflection of the increasing bilingualism in China. The later-borrowed one may show closer mapping between English and Mandarin.

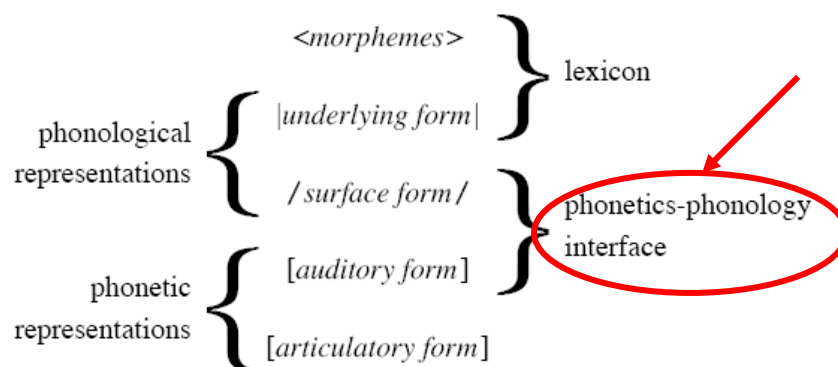
5.4 A proposal of a model for Mandarin loanword adaptation¹²⁶

So far, all the factors affecting the adaptation of Mandarin loanwords were discussed. In this section, based on the discussion so far, a comprehensive model for Mandarin loanword adaptation will be proposed. This model will be applied to Mandarin loanwords originating from English. However, before presenting my model, I will first discuss the Boersma's Biphon Model, which provides some background knowledge to understand my model.

125 The examples come from Miao's (2005) data, which shows well the symbolization and polysyllablization of Mandarin characters, since the loanwords in her data were mostly borrowed after the 1970's.

126 The contents of Section 5.4 were presented by Tae Eun Kim in Kim (2012a).

Figure 53. The Biphon Model (Boersma 2007a, Apoussidou 2007)¹²⁷



Boersma (2009) suggests ‘Phonetic representation’ by adding two forms (auditory form and articulatory form) to traditional phonological representation (underlying form and surface form, which are input and output in OT).¹²⁸ When listeners hear a foreign word, they have to change an auditory-phonetic form to a native phonological representation. The perceptual mapping occurs in phonetics-phonology interface, which is between phonetic auditory form and phonological surface form.¹²⁹ The connection of auditory form and surface form is modeled in OT-framework by the interactions of structural constraints and cue constraints. Structural constraints evaluate the output of prelexical perception, as well as control the phonological structure of surface form. According to this model, loanword adaptation is made at this level. Meanwhile, according to Boersma (2009: 60), “the cue constraints express the language

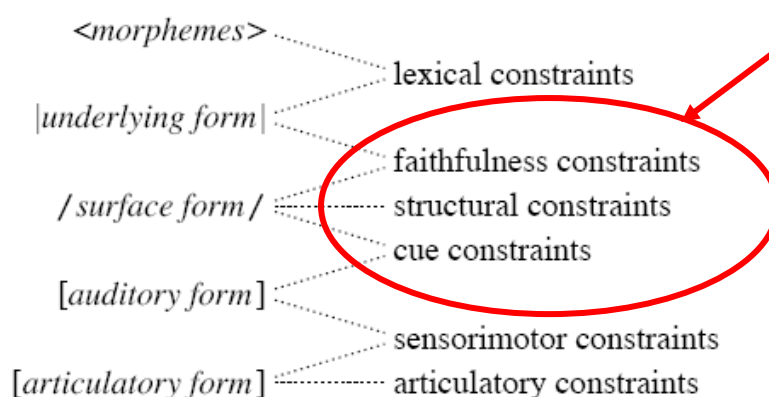
¹²⁷ According to Boersma (2009: 56), the five levels of representation minimally required for doing bidirectional phonology and phonetics.

¹²⁸ As seen in Figure 53, “multiple levels of representation are common in psycholinguistic models of speech production (e.g. Levelt 1989) and comprehension (e.g. McClelland and Elman 1986, McQueen and Cutler 1997), but are less often seen in phonological theory” (Boersma 2009: 56).

¹²⁹ “The auditory form is the continuous representation of sound; it consists of noises, pitches, spectra, silences, transitions and durations. The articulatory form is the continuous representation of the gestures of the human sound-producing mechanism; it consists of the activities of the relevant muscles of the lungs, tongue, throat, larynx, lips and nose, and their coordinations.” (Boersma 2009: 56)

user's knowledge of cues.” In other words, cue constraints describe the relation between phonetic auditory form and phonological surface form. Therefore, certain auditory forms can be cues for a surface form. For example, in English, vowel duration can be a cue for a phonological voicing feature of the some following obstruents. The following figure is “the formalization of bidirectional phonology and phonetics by means of constraints.” (Boersma 2009: 60)¹³⁰

Figure 54. the formalization of bidirectional phonology and phonetic by means of constraints

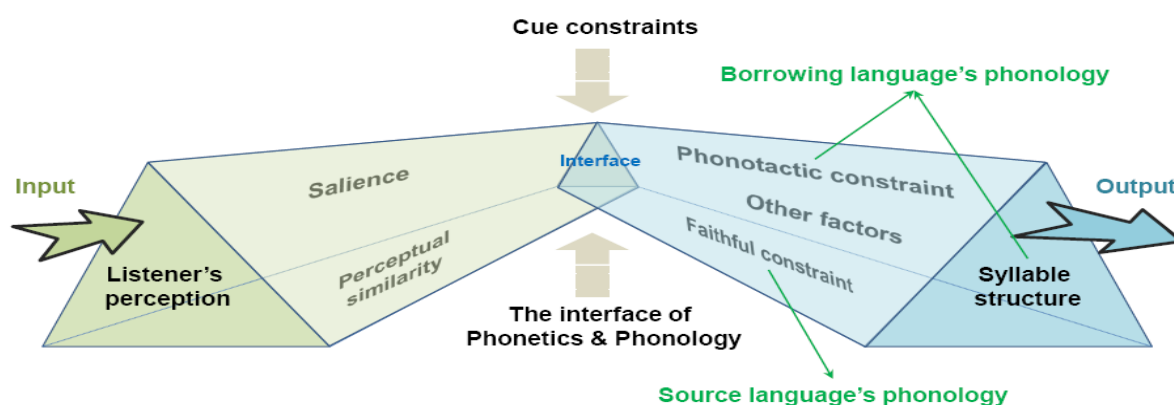


In short, the approach of Boersma (2009) and Boersma and Hamann (2007) emphasize on the role of language-specific perception in loanword adaptation, and directly integrate phonetic consideration into OT. According to them, the formalization

130 “Faithfulness constraints and the structural constraints are the same ones that phonologists have been familiar with since Prince and Smolensky (1993), although the explicit division between ‘Underlying Form’ and ‘Surface Form,’ and therefore the formulation of the faithfulness constraints, follows more closely the Correspondence account by McCarthy and Prince (1995), the faithfulness constraints therefore evaluate the similarity between underlying and surface form, and the structural constraints evaluate the surface form alone. The articulatory constraints are the ones that were proposed by Boersma (1998), and measure articulatory effort; following Boersma (1998), these constraints evaluate the articulatory-phonetic form, not the phonological surface form. The lexical constraints express the relation between underlying form and morphemes (or meaning) in the lexicon. Finally, the sensorimotor constraints express the language user’s knowledge of the relation between articulation and sound; with them, the speaker knows how to articulate a given sound and can predict what a certain articulatory gesture will sound like” (Boersma 2009: 59-60).

of prelexical perception is controlled by the interaction of structural constraints and cue constraints in the phonetics-phonology interface between auditory form and surface form. Therefore, “phonological considerations (structural constraints) are direct competition with more phonetic considerations (cue constraints); their interaction shows that perception is phonological” (Boersma 2009: 65). I argue that the red-circle areas in Figure 53 and Figure 54 are the level where inputs of source the language become outputs as loanwords. Based on the discussion made in section 5.2 and section 5.3, I propose a model of loanword adaptation process as seen in Figure 55.

Figure 55. A model of Mandarin loanword adaptation (MMLA)



The first stage of loanword adaptation is perception. In this level, both saliency and perceptual similarity play the most important roles. Elements which are not salient are mostly screened, while the surviving elements are matched into the most perceptually similar elements in a native phonological inventory of borrowing language. Before moving into the next step, cue constraints can affect the mapping of inputs into outputs, and thus the role of phonetics or perception is finished in this step in loanword adaptation. It means that the process of loanword adaptation enters into the level of phonology. The most important thing is that all these factors such as saliency, perceptual similarity, and cue constraints do not need to participate in all adaptation of loanwords.

However, one of these factors should play a major role in perception. In the next step, the forms which are not allowed in the syllable structures of borrowing language are modified, and the forms which conform to the syllable structures produce outputs through examination of phonology of borrowing language. The forms which passed through cue constraints can be modified by phonotactic constraints of the borrowing language, or can be adapted by faithful constraints, in which outputs and inputs are examined. Phonotactic constraint is a phonological action of borrowing language, while faithful matching is phonological intervention of source language. Both constraints can work in loanword adaptation, or either one can work. However, all the adaptation must follow syllable structures of borrowing language.

To conclude, loanword adaptation cannot be fully analyzed by only the role of phonetics, phonology, or one of the other factors. The phonetic or phonological elements play a pivotal role and generally affect the whole process of the adaptation, while other factors may affect adaptation right before the last step, finally, conforming to the syllable structure.

5.5 Application of MMLA

In section 5.5, through directly applying MMLA to Mandarin loanwords originating from English, MMLA will be tested and supported. Section 5.5 functions as a summary in that all the factors discussed in Chapter V are treated to analyze comprehensively the process of Mandarin loanword adaptation. In fact, without the output, it is impossible to assume which factors will play key roles in deciding the final form of Mandarin loanwords. Rather, the discussion about the factors is made by

analyzing the output, namely a loanword already adapted into Mandarin. In addition, there are many examples of Mandarin loanwords that have the same English word as an input but have various forms due to the influence of different factors. I argue that the variants show well the functions of many factors affecting Mandarin loanword adaptation and that a single factor cannot cover the complicated process of Mandarin loanword adaptation.

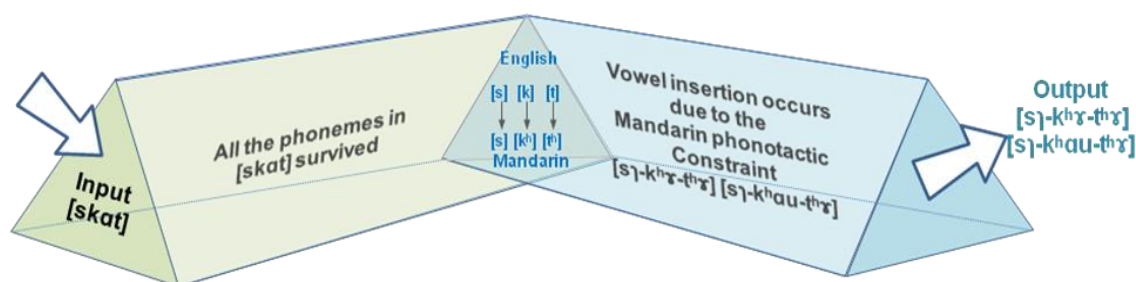
List 81. Example of Mandarin loanword variations

English	Pinyin	IPA	Character	Glossary
Scott → ①	Sī-gé	[sɿ-kɤ]	斯阁	person name
→ ②	Sī-kē-tè	[sɿ-k ^h ɤ-t ^h ɤ]	斯科特	person name
→ ③	Sī-kǎo-tè	[sɿ-k ^h au-t ^h ɤ]	斯考特	person name
→ ④	Shū-jié	[ʃu-tɕje]	舒洁	a brand name of tissue

English ‘Scott’ is adapted to several forms of Mandarin loanwords. I argue that the input is identical because the same English word cannot be perceived differently. Therefore, English ‘Scott’ should be inputted as [skɑt]. However, the identical input passes through different processes of loanword adaptation within MMLA. The most faithful mappings between English input and the Mandarin loanword for English ‘Scott’ are the second form ‘② *Sī-kē-tè*’ and the third form ‘③ *Sī-kǎo-tè*.’ The English input [skɑt] is faithfully adapted into Mandarin [s], [k^h], and [t^h], and the Mandarin vowel [ɿ] is inserted between [s] and [k^h] in order to fit the Mandarin syllable structure. Through examples of Mandarin loanword such as ‘② *Sī-kē-tè*’ and ‘③ *Sī-kǎo-tè*,’ I argue that the mapping between English vowel and Mandarin vowel is highly fluid, but the faithful mapping of consonants is consistent in Mandarin loanword adaptation. Thus, English

[ka] in [skat] can be adapted into both Mandarin [k^hɿ] and [k^hau]. The whole process of the adaptation is drawn in MMLA as follows:

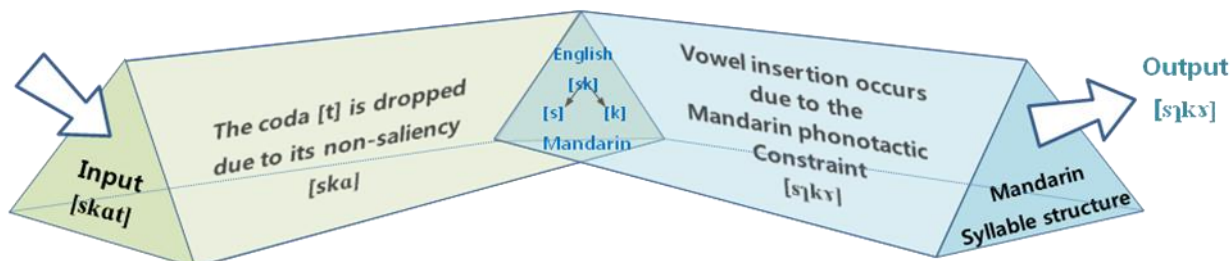
Figure 56. The adaptation of English ‘Scott’ into Mandarin ‘*Sī-kē-tè*’ and ‘*Sī-kǎo-tè*’



On the other hand, the first form ‘① *Sī-gé*’ cannot be explained thoroughly by the same process as ‘② *Sī-kē-tè*’ and ‘③ *Sī-kǎo-tè*.’ I hypothesize that ‘① *Sī-gé*’ results from the following process: The coda [t] in [skat] is dropped since English coda [t] tends to be deleted due to its lack of saliency as discussed in section 5.2.1. This is a function of phonetic factor. Thus, only [ska] survives, and then the other parts should be mapped into certain Mandarin phonemes. Here, in order to replace the English [s] and [k], Mandarin [s] and [k] are chosen. It is noticeable that English [k] is mapped into Mandarin [k], since English /k/ in the syllable structure ‘/#sk_ /’ is closer to Mandarin [k]. In other words, ‘① *Sī-gé*’ shows a function of the cue constraint between the phonetic auditory form and the phonological surface form. However, the English initial consonant cluster is not accepted in Mandarin phonological system. Thus, English [sk] should be modified by inserting a vowel between English [s] and [k]. This is a function of Mandarin phonotactic constraints. Finally, through the deletion of the coda consonant and the insertion of a vowel, the loanword ‘*Sī-gé*’ can pass through the final gate of

Mandarin syllable structure. The whole process can be drawn in the MMLA as follows:

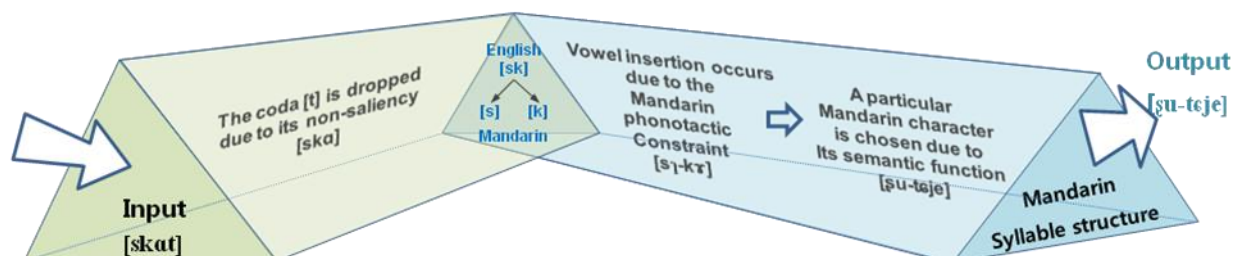
Figure 57. The adaptation of English ‘Scott’ into Mandarin ‘*Sī-gé*’



However, English ‘Scott’ is also adapted into Mandarin ‘*Shū-jíé*,’ the fourth form in List 81. Neither the processes for ‘② *Sī-kē-tè*,’ and ‘③ *Sī-kǎo-tè*,’ or the process for ① *Sī-gé* can be applied to ‘④ *Shū-jíé*.’ On the surface, ‘④ *Shū-jíé*’ is completely different from the other forms, but I argue that there is only one additional semantic factor that functions in the process of ‘*Shū-jíé*.’ That is, ‘④ *Shū-jíé*’ goes through the same process as ① *Sī-gé*. However, right before the output comes out, in order to create a good image of the brand name, Mandarin characters, which have a good meaning, are chosen (*shū* [ʃu] 舒 means ‘easy’ or ‘leisurely’ and *jié* [tɕje] 洁 means ‘clean’). In addition, as discussed in 4.3.1, English /s/ can be adapted into Mandarin /ʃ/ due to the perceptual similarity. Therefore, the mapping of English [s] and Mandarin [ʃ] considers not only semantic function of the Mandarin character but also the perceptual similarity between the input and the output. On the other hand, the mapping of English [k] and Mandarin [tɕ] is completely affected by the semantic function of the Mandarin character. The following figure shows the adaption of English ‘Scott’ into Mandarin ‘*Shū-jíé*’ in

MMLA.

Figure 58. The adaptation of English ‘Scott’ into Mandarin ‘*Shū-jié*’



In sum, Mandarin loanword adaptation is a complicated process in which many factors play a role. MMLA is a comprehensive model to analyze the complicated process, and many Mandarin loanwords, which can be treated as exceptions in other previous studies, can be included into a single model.

5.6 Summary

The linguistic study of loanword adaptation reveals the conflicts occurring between sound systems of languages. The conflicts result from a process in which loanwords preserve the source language as much as possible, while simultaneously conforming to the borrowing language's system. There are three major approaches in the analyses of loanword adaptation: the perception approach, the phonology approach, and the phonetics-phonology approach. I argue that the phonetics-phonology approach can best explain the Mandarin loanword adaptation, and that both perception and phonology play a significant role in loanword adaptation, since neither can be ignored in the process.

Mandarin data support my claim. The preservation of English coda /s/ and the deletion of English coda /t/ in Mandarin loanwords show the importance of the perception in Mandarin loanword adaptation. Also, the mapping between English /v/ and Mandarin /u/ ([w]) emphasizes the pivotal role of borrowers' perception in Mandarin loanword adaptation, since it shows that people's perception of a language is as similar as possible to its source form within the sound system of borrowing language. On the other hand, Mandarin loanwords strictly follow the constraints of native phonology. That is, all the sound changes are made within the scope of native Mandarin phonology without exception. The function of Mandarin palatalization in the adaptation of English consonants demonstrates the importance of native Mandarin phonology. In other words, the mapping of English /ki/ or /kɪ/ into Mandarin /tɕi/ is caused not by Mandarin speakers' misperception but by the influence of Mandarin palatalization constraint. Therefore, the study of Mandarin loanword adaptation should consider both perception and phonology.

Even though the main factors affecting the adaptation are perception and phonology, there are other important factors which cannot be ignored in the process. The consideration of other factors is necessary to reduce exceptions in the Mandarin loanword adaptation. Among the other factors, the most important one is the semantic function of Mandarin characters. In order to make desirable meanings through the combinations of Mandarin characters, the most faithful phonological or phonetic mapping between Mandarin and English can be discarded in some outputs. In these cases, without the consideration of the semantic function, they will be treated as exceptions. In addition, there are Mandarin loanwords whose adaptation cannot be explained without considering the effect of orthography. Even though their general

frequency in the corpus data is not high, some loanwords definitely demonstrate the effects of English spellings. In addition, there are other factors whose effect is not visible, unlike the semantic function or the orthographic effect. The factors are basically consideration of borrowing situation such as the effect of dialect, the origin of the loanword, and the socio-linguistic environment like the degree of bilingualism in the society. Even though their functions are not significant or have no effect in certain Mandarin loanwords, the consideration sometimes can decrease exceptions in the analyses of Mandarin loanword adaptation by providing a reasonable interpretation to the existence of various forms in Mandarin loanwords.

In order to summarize all the factors considered in Mandarin loanword adaptation, I provide a comprehensive model of Mandarin loanword adaptation (MMLA). According to MMLA, the first stage of loanword adaptation is perception, in which saliency and perceptual similarity greatly affect the input. In this level, non-salient elements can be filtered while the surviving elements are mapped into the most perceptually similar elements in a Mandarin native phonemic inventory. In this process, cue constraints can function. However, not all the factors such as salience, perceptual similarity, or cue constraints need to simultaneously participate in the process, but one of them should play a role in this level. In the next level, phonology starts functioning. That is, the forms which are not allowed in Mandarin phonology are modified to conform to the Mandarin syllable structures. Either Mandarin phonotactic constraints or faithful constraints between the input and the output can function. Both constraints can work together. Before the final output merges, other factors such as semantic functions, orthography, or socio-linguistic factors can affect the final form. However, the function of all the factors must conform to the native Mandarin syllable structures.

Chapter VI. Conclusion

This dissertation was a study of Mandarin loanwords. It was divided into two major topics. The first (i.e. Chapter I and II) was a general discussion about loanwords in Chinese. It included not only the background of Chinese loanwords but also a discussion of the lexical stratification of loanwords in Chinese. The other (i.e. Chapter III, IV, and V) was the adaptation of Mandarin loanwords originating from English. It contained a contrastive study between Mandarin phonology and English phonology, analyses of the adaptation of English segmentals and suprasegmentals in Mandarin loanwords, and discussions of important factors affecting Mandarin loanword adaptation.

6.1 Summary and discussion

Lexical borrowing already happened in the 2nd century in China, and thus the history of Chinese loanwords has been long. The history of Chinese loanwords is discussed generally based on the periodical borrowing of foreign vocabulary. The lexical borrowings in the Han dynasty can be classified into two: a set of vocabulary from the Huns and a set of vocabulary from central Asia. In the period from the East Han dynasty through the Tang dynasty, the spread of Buddhism to China brought many borrowings from Sanskrit, and the Silk Road introduced various terms related to material culture and social system of ancient countries. In the Yuan dynasty, the vocabulary related to astronomical instruments and weapons was introduced and also many Islam-related terms were translated into Chinese. In the period of Ming and Qing

dynasties, according to the missionaries' effort to spread the Christian faith, many Christian texts were translated into Chinese. In addition, various terms related to Math and Astronomy were also translated. In the middle of the 19th century, the western masterpieces in many fields started being translated, and therefore a variety of diverse words borrowed from foreign languages appeared. After the Sino-Japanese war (1894-1895), many Japanese books were imported, and in the early 20th century, loanwords in various fields such as science and technology, as well as thought and culture were adopted through diverse channels. Many of the loanwords are still used today. In the 1950s, many Russian words were imported into China due to the political situation, but most of them have now disappeared. As China officially opened their economy and the interaction with foreign countries increased, even more words were borrowed from many countries. Among the source languages, English is the most dominant one. In addition, the development of the Internet and the increase of foreign language education have accelerated the lexical borrowing. Currently, many Chinese loanwords originating from English have already become everyday words in China. Therefore, the loanwords in Chinese have significantly influenced the Chinese vocabulary. Especially, they play a role not only in the creation of new words and morphemes but also in expanding the variety of Chinese syllables and phrases. This linguistic interaction with foreign languages has even changed the function of Chinese characters: many Chinese characters are used only to transcribe certain combinations of Latin letters, which means that those characters no longer function as ideographs.

As many lexical borrowings have occurred through the history of Chinese language and many words have been used in daily life for a long time, there are some debates on the attribution of the native Chinese vocabulary and the loanwords in

Chinese. Three main issues related to these debates are Japanese graphic loans, semantic loans, and alphabetic loans. The debate on the former two sets of loanwords is whether or not they should be considered part of the native Chinese vocabulary, while the latter is whether or not the set of vocabulary can be treated as Chinese loanwords. These arguments can find a reasonable answer through the lexical stratification using Itô and Mester's core-periphery structure. In the core-periphery structure, a set of vocabulary can be stratified according to the distance from the core of the lexical space of a language. Therefore, both Japanese graphic loans and semantic loans should be considered loanwords in Chinese, since they cannot fulfill all the conditions of native Chinese vocabulary while they are placed closely to the core of the lexical space. However, each word's distance from the core varies according to its own foreignness. On the other hand, alphabetic loans can be carefully treated. The loans composed of only Latin letters such as CD, AIDS and WTO should be classified as foreign words, while the loans of Mandarin Pinyin abbreviations such as HSK and RMB should not, since their origin is in the Chinese language. However, this set of words should be placed in the farthest point from the core in the lexical space. Based on the scope discussed above, Chinese loanwords can be classified into four types: Phonetic loans, semantic loans, graphic loans, and hybrids. In addition, phonetic loans can be further divided into two sets depending to the semantics involved: pure phonetic loans (PPL) and phonetic loans with consideration of meaning (PCM). Also, there are two types of semantic loans: calque which is a translation based on each foreign morpheme and semantic translation which is a Chinese translation of foreign words. Hybrids also have two sets of loans: hybrid of phonetic and semantic loans (HPS) and hybrid of foreign letters (HFL).

Standard Chinese generally refers to Mandarin, which is spoken by over 70% of Chinese people, and the most important source language in Chinese loanwords is English. Therefore, Chinese loanword adaptation usually indicates the adaptation of English words in Mandarin loanwords. Before analyzing Mandarin loanwords originating from English, the phonology of both languages should be compared, since they are completely different languages in completely different language families; English is an Indo-European language, while Mandarin is a Sino-Tibetan language. A contrast of consonants in both languages, reveals that the most significant difference is that [±voiced] is distinctive in English while [±aspirated] is distinctive in Mandarin. Both languages have plosives that are identical in terms of articulation place, but are articulated differently in the features [±voiced] and [±aspirated]. Compared to Mandarin fricatives, English has a variety of fricatives which are mostly [±voiced] pairs. On the other hand, Mandarin has two more affricate pairs than English. English and Mandarin do not have any identical affricates; however, they do have identical fricatives, which are /f/ and /s/. In addition, English approximants generally correspond to Mandarin ones, and nasals are identical in both languages. In fact, English glides among approximants are different from Mandarin ones in the phonological hierarchy, since Mandarin [j] and [w] are allophones only when Mandarin vowels /i/ and /u/ come in the initial position of a Mandarin syllable. As for the vowels in both languages, a significant difference is that English vowels contrast with tense/lax but Mandarin vowels do not have that features. However, the corresponding relationship between English vowels and Mandarin vowels can be found. Other than consonants and vowels, Mandarin tones are very important for distinguishing the meaning of a word. Even though English word has stress, it can only sometimes change the part of speech or the sentence type. In fact, a significant

difference exists in both languages' syllable structures and writing systems. First, Mandarin has relatively simple syllable structures, because it does not allow any coda consonant except /n/ and /ŋ/ nor any consonant clusters. On the other hand, English allows all the consonants except /h/ and glides can be coda consonants and consonant clusters can come in both initial and coda positions. As for the writing systems, English is an alphabetic language and thus is basically phonemic. However, Mandarin uses ideographs and is a monosyllabic language. Therefore, a Mandarin character is simultaneously a written symbol, a single morpheme, and a single syllable.

Based on the comparison between Mandarin phonology and English phonology, the analyses of English consonant adaptation in Mandarin loanwords show the following results. English initial consonants are generally faithfully mapped into the corresponding Mandarin consonants. Only in the cases in which asymmetry exists between a set of English inputs and a set of possible Mandarin outputs, many variations are found as in fricative and affricate mappings. This is a very natural situation, since there is higher possibility for an English input consonant to appear in diverse outputs by mapping with various Mandarin consonants. Therefore, there can be more than one faithful mapping in these cases, based on various possibilities of perceptual similarities between English consonants and Mandarin consonants. For example, English /tʃ, dʒ/ are faithfully mapped into either Mandarin /tʃ, tʃ^h/ or /tʃ, tʃ^h/. In fact, the percentage of faithful mappings increases without consideration of matching between [\pm voiced] in English and [\pm aspirated] in Mandarin. In addition, the preference for phonemic preservation is also shown in the adaptation of English syllable structures that are not allowed in Mandarin phonology: coda consonants and consonant clusters. The preservation is possible by inserting a vowel. This epenthetic vowel is chosen based on

the minimal saliency and the minimal modification. Since the only objective of vowel insertion is to save a consonant in the source word for the perceptual similarity between the input and the output, the epenthetic vowel must not be salient and must minimally change the source sound. Meanwhile, the result of analyses in this study reveals that semantic functions of Mandarin characters significantly affect the deletion of the consonants in inputs.

Through analyses of English consonant adaptation in Mandarin loanwords, the functions of both borrowers' perception and the native Mandarin phonology are consistently found. The high preservation of the nasal consonants in any syllabic position clearly shows the functions, in that the salient segments are usually preserved and the acceptance of nasal codas in Mandarin phonology makes Mandarin speakers easily perceive the nasal sounds even in the coda positions. Furthermore, English /m/ and /n/ in the final positions are usually differently adapted into Mandarin loanwords. English /m/ mostly forms an independent syllable by vowel insertion while /n/ is mostly adapted into the coda nasal of the preceding syllable (e.g., English *loam* → Mandarin *lú-mǔ*, English *pint* → Mandarin *pǐn-tuō*). This tendency is due to the function of Mandarin phonology, because a nasal /n/ is allowed as a coda consonant, but /m/ is not allowed. The high deletion of English /ɹ/ in the coda or in the consonant clusters also supports the argument. The English /ɹ/, except in the initial position, is not easily perceived due to its own vowel-like quality and the fact that it is a non-Mandarin phoneme. Lastly, the higher preservation of consonants in the initial clusters than in the final clusters also shows the close relationship between perception and Mandarin phonology. Even though Mandarin does not allow consonant clusters in any position, final consonant clusters should be harder for Mandarin speakers to perceive. The reason

is that in Mandarin phonology, consonants usually do not come in the final positions while all the consonants except /ŋ/ can come in the initial positions. More frequent deletion of consonants in final CCC clusters than in CC clusters can be identically explained.

On the other hand, neither the English vowel adaptation nor the English stress adaptation into Mandarin tones shows consistent patterns. An English vowel is mapped into various Mandarin vowels. However in this process, vowel quality is often disregarded in Mandarin loanword adaptation while consonant adaptation is usually faithfully mapped. Many English vowel adaptations show the effect of English orthography. The effect of English orthography is also shown in English nasal coda adaptation. In many Mandarin loanwords, some Mandarin characters are used only to transcribe certain English syllables including nasal codas. Meanwhile, English stress is also ignored in Mandarin tonal adaptation. Generally, one of four Mandarin tones is assigned to Mandarin loanwords regardless of English stress in the source word. These phenomena in English vowel and stress adaptation are caused mainly by Mandarin's particular orthographic system. All the sounds adapted into Mandarin must be transcribed in Mandarin characters, and must have a lexical tone. Furthermore, since Mandarin is a monosyllabic language, a Mandarin character is basically a morpheme and a syllable. However, some segmental combinations cannot be expressed in Mandarin characters. As a result, if a segmental combination in English inputs does not match a Mandarin character, the combination should be modified to fit a character. Therefore, consonant mapping is always prioritized in Mandarin loanword adaptation, because consonants are more easily qualified than vowels. Moreover, segmental mappings always have a priority over suprasegmental mappings due to the hierarchical

difference between segmentals and suprasegmentals.

As mentioned earlier, the functions of both perception and phonology are significantly important in Mandarin loanword adaptation. Many researchers in the field of loanword phonology have tried to find which one is the key to loanword adaptation. However, neither individual factor can by itself fully explain the loan process. Many Mandarin loanwords in this study reveal that only a phonetics-phonology approach can explain the complicated loanword adaptations. The tendency for the preservation of English coda /s/ and the tendency for the deletion of English coda /t/ show that the borrower's perception plays a role in Mandarin loanword adaptation. In addition, the mapping between English /v/ and Mandarin /u/ ([w]) also emphasizes the role of perception. On the other hand, the mapping between English /ki/ or /kɪ/ and Mandarin /tɕi/ is caused by Mandarin palatalization, not by Mandarin speakers' misperception. Therefore, both perception and phonology should be considered in Mandarin loanword adaptation.

Other than these two major factors, the semantic functions of Mandarin characters and the effect of English orthography should also be considered. These factors can directly affect the final form of output in Mandarin loanword adaptation. In addition, there are other factors that also play important roles: Chinese dialects (e.g., Hong Kong Cantonese or Shanghainese) and origins of source language (e.g., British English or American English). Furthermore, the social bilingualism can affect the forms of loanwords, since bilinguals can distinguish foreign sounds better than monolinguals. Incorporating these factors into the analysis limits the amount of exceptions in the analysis.

This dissertation proposes a model for Mandarin loanword adaptation (MMLA).

This Model shows that Mandarin loanwords go through several levels of adaptation. The first level is the perceptual level, in which the borrower filters out non-salient elements and matches salient elements to the most perceptually similar Mandarin counterpart. In the next level phonological constraints conform each element to native Mandarin phonology. The other considerations discussed in this dissertation that have been proven to account for some items viewed as ‘exceptions’ are semantics, orthography, and socio-linguistics. Finally, it is important to note that the output must also conform to native Mandarin syllable structures.

6.2 Limitations and future studies

A large number of Mandarin loanwords were analyzed and discussed in this dissertation and the data was collected from various channels. However, the analyses in this dissertation did not concern the intermediate route in the lexical borrowings, even though the possibility that Chinese dialects affect in the middle of loan process is briefly mentioned. In addition, there needs to be more careful analysis of English dialects, since the analyses in this dissertation were only based on the American English sound system. Furthermore, the borrowing materials or situations (e.g., written materials or spoken languages), can influence the adaptation patterns; however, this dissertation did not track the materials or situations for the source words. Also, the analyses in this dissertation include many variations of Mandarin loanwords, but how to handle and control these variations also need to be discussed in the future. The future study should be related to the standardization of variations in Mandarin loanwords. In addition, the effect of English orthography and the role of Mandarin characters as symbols to

transcribe certain Latin letters are also interesting and important research topics that need to be investigated further. Thus, in the future, these topics should be more systematically investigated.

6.3 Contributions

Despite these limitations, this dissertation makes a number of valuable contributions. First, this dissertation increase understanding about loanwords in Chinese and draws attention to the studies of Chinese loanwords. Second, it provides a standard for the scope of Chinese loanwords in order to more accurately classify the types of Chinese loanwords. This can provide additional knowledge of Chinese lexicology. Third, the contrastive and comparative study of English and Mandarin phonology in this dissertation contributes to the understanding those two languages' sound systems and phonological structures. This can be used both in comparative linguistics and in second language acquisition. Fourth, through the discussion of the sound conflict and the interaction between English and Mandarin, it explains how the conflict is modified in Mandarin phonology and also shows how English as an alphabetic language is adapted into the completely different writing system. This discussion can be useful in both general linguistics and Chinese linguistics. Fifth, this dissertation provides a comprehensive understanding of loanword adaptation by considering many other factors in addition to phonology and phonetics. Also, through presenting a model of Mandarin loanword adaptation, it more systematically analyzes Mandarin loanwords, more consistently understands the internal process of Mandarin loanword adaptation, and more reasonably explains many variations existing in Mandarin loanwords. Therefore, it

has many implications for the field of loanword phonology.

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Appendix – English-based Mandarin loanwords (Corpus data)

English words	Mandarin words	Pinyin
A		
Abbeville	阿貝維也尔	Ā-bèi-wéi-yě-ěr
Abbey	阿比	Ā-bǐ
Abbott	雅培	Yǎ-péi
Aberdeen	阿伯丁(队)	Ā-bó-dīng-duì
Accenture	埃森哲	Āi-sēn-zhé
Ackerman	阿克曼	Ā-kè-màn
Addison	爱迪生	À-i-dí-shēng
Adelaider	阿德莱德	Ā-dé-lái-dé
Aetna	安泰	Ān-tài
Affleck	艾佛列克	À-i-fó-liè-kè
Agilent	安捷伦	Ān-jié-lún
Adidas	阿迪达斯	Ā-dí-dá-sī
AIDS	艾滋(病)	À-i-zī (bìng)
	爱滋(病)	À-i-zī (bìng)
Alan	艾伦	À-i-lún
	阿兰	Ā-lán
Albertson's	艾伯森	À-i-bó-sēn
Alice	爱丽丝	À-i-lì-sī
Allen	艾伦	À-i-lún
Alliance	安联	Ān-lián
Allstate	好事达	Hǎo-shì-dá
alps	阿尔卑斯	ā-ěr-bèi-sī
Altria	阿尔特里亚	Ā-ěr-tè-lǐ-yà
Amazon	亚马逊	Yǎ-mǎ-xūn
	亚马森	Yà-mǎ-sēn
Amerada Hess	阿美拉达赫斯	Ā-měi-lā-dá-hè-sī
Amgen	安进	Ān-jìn
ammonia	阿摩尼亚	ā-mó-ní-yà
Amoco	阿莫科	Ā-mò-kē
amoeba	阿米巴	ā-mǐ-bā
ampere	安培	ān-péi
ampoule	安瓿	ān-bù

Amway	安利	Ān-lì
Andersen	安达信	Ān-dá-xìn
Anderson	安德森	Ān-dé-sēn
Andrew	安德鲁	Ān-dé-lù
Andy	安迪	Ān-dí
angel	安琪儿	ān-qí-ér
Anglo	盎格鲁	Àng-gé-lǔ
Anheuser-Busch	安海斯布希	Ān-hǎi-sī-bù-xī
Ankara	安卡拉(兔)	Ā-kā-lā
Anna	安娜	Ān-nà
Anne	安妮	Ān-ní
Anne Klein	按克莱因	Ān-kè-lái-yīn
Anthony	安东尼	Ān-dōng-ní
Archer	阿彻	Ā-chè
Arco	阿科	Ā-kē
Arizona	亚利桑那	Yà-lì-sāng-nà
Armstrong	阿姆斯壮	Ā-mǔ-sī-zhuāng
Arsenal	阿森纳(队)	Ā-sēn-nà-(duì)
Ashgate	阿什盖特	Ā-shí-gài-tè
Ashland	阿什兰	Ā-shí-lán
Aspirin	阿司匹林	Ā-sī-pí-lín
Aston	阿斯顿	Ā-sī-dùn
AstraZeneca	阿斯特拉捷利康	Ā-sī-tè-lā-jiě-lì-kāng
atropine	阿托品	ā-tuō-pǐn
Australia	澳大利亚	Ào-dà-lì-yà
Aux	奥克斯	Ào-kè-sī
Avenet	安福利	Ān-fù-lì
Avent	安怡	Ān-yí
Aviva	阿维瓦	Ā-wéi-wǎ
Avon	雅芳	Yǎ-fāng
Azkaban	阿兹卡班	Ā-zī-kǎ-bān
Azria	阿兹利亚	Ā-zī-lì-yà
B		
Babson	巴布森(商学院)	Bā-bù-sēn
Baccarat	百家乐	Bǎi-jiā-lè

Bach	巴奇	Bā-qí
bacon	培根	péi-gēn
Bacardi	百加得	Bǎi-jiā-dé
Bain	贝恩	Bèi-ēn
Baker & McKenzie	贝克麦肯思	Bèi-kè-mài-kěn-sī
Baker Hughes	贝克休斯	Bèi-kè-xiū-sī
ball	波	bō
	波尔	bō-ěr
Ballantine's	巴郎亭	Bā-lǎng-tíng
bandage	绷带	bēng-dài
banjo	班卓(琴)	bān-zhuó (qín)
Bancroft	班克罗夫特	Bān-kè-luò-fū-tè
Bandaid	邦迪	Bāng-dí
bar	吧	bā
Barbie	芭比	Bā-bǐ
Barclays	巴克莱	Bā-kè-lái
Baring	霸菱	Bà-líng
Barney	巴尼	Bā-ní
Barnsley	巴恩斯利(队)	Bā-ēn-sī-lì(duì)
Baroque	巴洛克	Bā-luò-kè
Barrett	贝瑞特	Bèi-ruì-tè
Barron	巴伦	Bā-lún
bass	贝斯	bèi-sī
Bass	巴斯	Bā-sī
bassoon	巴松	bā-sōng
Baucus	鲍克斯	Bào-kè-sī
Baxter	百特	Bǎi-tè
	伯克斯特	Bó-kè-sī-tè
Bear Stearns	贝尔斯特恩	Bèi-ěr-sī-tè-ēn
Beatles	披头士	Pī-tóu-shì
Beckham	贝克汉姆	Bèi-kè-hàn-mǔ
beer	啤(酒)	pí-jiǔ
Beglau	贝格罗	Bèi-gé-luó
bell	贝尔	bèi-ěr
Beloit	毕罗伊特	Bì-luò-yī-tè
Ben	本	Běn

Bentley	本特利	Běn-tè-lì
Benson	本森	Běn-sén
Benz	奔驰	Bēn-chí
beret	贝雷(帽)	bèi-léi (mào)
Bergen	伯根	Bó-gēn
Berkshire	伯克希尔	Bó-kè-xī-ěr
Bert	伯特	Bó-tè
Bestbuy	百思买	Bǎi-sī-[mǎi]?
Bethlehem	伯利恒	Bó-lì-héng
Biniana	碧(毕)碧安娜	Bì-bì-ān-nà
bikini	比基尼	bǐ-jī-ní
bilge	舳	bǐ
Bill	比尔	Bǐ-ěr
Bindi	宾迪	Bīn-dí
bingo	宾戈	bīn-gē
Birmingham	伯明翰	Bó-míng-hàn
bit	比特	bǐ-tè
black	布莱克	bù-lái-kè
Blackburn	布莱克本	Bù-lái-kè-běn
Blackwell	布莱克威尔	Bù-lái-kè-wēi-ěr
Blair	布莱尔	Bù-lái-ěr
blog	博客	bó-kè
Bloody	布拉迪	Bù-lā-dí
Bloomsbury	布卢姆斯伯里	Bù-lú-mǔ-sī-bó-lǐ
blues	布鲁斯	bù-lǔ-sī
Blum	布兰	Bù-lán
Bob	鲍伯	Bào-bó
BobDog	巴布豆	Bā-bù-dòu
BOBO	波波(族)	Bō-bō-zú
Boca Raton	波卡拉顿	Bō-kǎ-lā-dùn
Boeing	波音	Bō-yīn
Bolton	博尔顿	Bó-ěr-dùn
Bombardier	庞巴迪	Páng-bā-dí
Booz	布兹	Bù-zī
Bowes	鲍兹	Bào-zī
Bowker-Saur	鲍克绍尔	Bào-kè-shào-ěr

bowling	保龄(球)	bǎo-líng (qiū)
boycott	杯葛	bēi-gě
Brad	布拉德	Bù-lā-dé
Bradford	布拉德福德	Bù-lā-dé-fú-dé
Bradley	布莱德利	Bù-lái-dé-lì
Brady	布拉迪	Bù-lā-dí
brandy	白兰地	bái-lán-dì
break (dance)	布雷克(舞)	bù-léi-kè (wǔ)
Brian	布莱恩	Bù-lái-ēn
Bristol-Myers Squibb	百时美施贵宝	Bǎi-shí-měi-shī-guì-bǎo
Britney	布兰尼	Bù-lán-ní
Broadway	百老汇	Bǎi-lǎo-duì
broken	布鲁肯	bù-lǚ-kěn
Browne	布朗	Bù-láng
Browning	勃朗宁	Bó-láng-níng
Brunswig	布鲁斯威格	Bù-lǚ-sī-wēi-gē
Bryant	布莱恩特	Bù-lái-ēn-tè
Budweiser	百威	Bǎi-wēi
Buick	别克	Bié-kè
Buckingham	白金汉(宫)	Bái-jīn-hàn (gōng)
BULATS	博思(考试)	Bó-sī
bungee	蹦极	bēng-jí
Burberry	伯贝利	Bó-bè-lì
Burke	伯克	Bó-kè
Burlington	伯灵顿	Bó-líng-dùn
Burton	伯顿	Bó-dùn
bus	巴士	bā-shì
Bush	布什	Bù-shí
bushel	蒲式耳	pú-shì-ěr
butter	白脱(油)	bái-tuō (yóu)
bye bye	拜拜	bài-bài
Byford	佰富	Bǎi-fù
Bynum	拜纳姆	Bài-nà-mǔ
C		
Cadbury	吉百利	Jíbǎi-lì

Cadillac	凯迪拉克	Kǎ-dí-lā-kè
caffeine	咖啡因	kā-fēi-yīn
California	加利福尼亚	Jiā-lì-fú-ní-yà
calorie	卡路里	kǎ-lù-lǐ
Calvin Klein	卡尔文克莱恩	Kǎ-ěr-wén-kè-lái-ēn
Campbell	坎贝尔	Kān-bèi-ěr
Canada	加拿大	Jiā-ná-dà
candela	坎德拉	kǎn-dé-lā
cannon	加农	jiān-nóng
Canola	坎诺拉	Kǎ-nuò-lā
Cantalupo	坎塔卢泼	Kǎn-tǎ-lú-pō
Capellas	卡佩拉斯	Kǎ-pèi-lā-sī
cappuccino	卡布奇诺	kǎ-bù-qí-nuò
car	卡 (车)	kǎ (chē)
carbine	卡宾	kǎ-bīn
card	卡	kǎ
Cardiff	卡迪夫	Kǎ-dí-fū
Cardinal	卡地纳	Kǎ-dì-nà
	卡迪纳尔	Kǎ-dí-nà-ěr
Carlson	卡尔森	Kǎ-ěr-sēn
carnation	康乃馨	kāng-nǎi-xīn
carnival	嘉年华	jiā-nián-huá
Carolee	卡罗丽	Kǎ-luó-lì
Carolina	卡罗琳娜	Kǎo-luó-lín-nà
Carolyn Cole	卡罗林科尔	Kǎ-luó-lín-kē-ěr
cartoon	卡通	kǎ-tōng
cashmere	开司米	kāi-sī-mǐ
Castell	卡斯特尔	Kǎ-sī-tè-ěr
Cass	卡斯	Kǎ-sī
cassette	卡	kǎ
Cassville	凯斯维尔	Kǎi-sī-wéi-ěr
caterpillar	卡特彼勒	kǎ-tè-bǐ-lè
c.c.	西西	xī-xī
Celeron	赛扬	Sài-yáng
cellophane	赛璐玢	sài-lù-fēn
celluloid	赛璐珞	sài-lù-luò

Celpip	思培	Sī-péi
Cendant	圣达特	Shèng-dé-tè
Centrino	迅驰	Xùn-chí
Centrum	善存	Shàn-cún
Cerberus	塞伯乐	Sài-bó-lè
cha-cha	恰恰	qià-qià
Chambers	钱伯斯	Qián-bó-sī
champagne	香槟	xiāng-bīn
Charles	查尔斯	Chá-ěr-sī
	查理斯	Chá-lǐ-sī
	查利斯	Chá-lì-sī
	查利	Chá-lì
Charlie	查理	Chá-lǐ
chat	恰特	qià-tè
cheese	芝士	zhī-shì
Cheetos	奇多	Qí-duō
Chelsea	切尔西(队)	Qiè-ěr-xī(duì)
Cherry	彻里	Chè-lǐ
Cheryl	谢丽尔	Xiè-lì-ěr
Chevron	雪佛龙	Xuě-fó-lóng
Chiney	切尼	Qiè-ní
Chivas (Regal)	奇弗(帝王)	Qí-fú(dì-wáng)
chocolate	巧克力	qiǎo-kè-lì
Chris	克利斯	Kè-lì-sī
Chrysler	克莱斯勒	Kè-lái-sī-lè
Chubb	丘博	Qiū-bó
	集宝	Jí-bǎo
Ciena	西埃纳	Xī-āi-nà
cigar	雪茄	xuē-jiā
Cigna	信诺	Xìn-nuò
Cincinnati	辛辛那提	Xīn-xīn-nà-tí
Cinergy	辛纳杰	Xīn-nà-jié
Cisco	思科	Sī-kē
Clapton	克莱普顿	Kè-lái-pǔ-dùn
Clark	克拉克	Kè-lā-kè
Clean & Clear	可伶可俐	Kě-líng-kě-lì

Clinton	克林顿	Kè-lín-dùn
Clokey	克洛基	Kè-luò-jī
clone	克隆	kè-lóng
Clydebank	克莱德班(队)	Kè-lái-dé-bān(duì)
cocaine	可卡因	kě-kǎ-yīn
cocoa	可可	kě-kě
Coca-Cola	可口可乐	Kě-kǒu-kě-lè
coffee	咖啡	kā-fēi
Coffin	科分	Kē-fēn
Coles	科斯	Kē-sī
Colgate	高露洁	gāo-lù-jié
Colibri	科利布瑞	Kē-lì-bù-ruì
Colin	科林	Kē-lín
collotype	珂罗(版)	kē-luó(bǎn)
Colorado	科罗拉多	Kē-luó-lā-duō
Celtic	凯尔特	Kǎi-ěr-tè
Columbia	哥伦比亚	Gē-lún-bǐ-yà
Columbus	哥伦布	Gē-lún-bù
combine	康拜因	kāng-bài-yīn
Comcast	康姆卡斯特	Kāng-mǔ-kǎ-sī-tè
	康卡斯特	Kāng-kǎ-sī-tè
	科姆卡斯特	Kē-mǔ-kǎ-sī-tè
Comey	柯弥	Kē-mí
Compaq	康柏	Kāng-bǎi
ConAgra	康尼格拉	Kāng-ní-gé-lā
Conseco	康萨可	Kāng-sà-kě
Contac	康泰克	Kāng-tài-kè
Converse	匡威	Kuāng-wēi
Cook	库克	Kū-kè
cookie	曲奇	qū-qí
cool	酷	kù
coolie	苦力	kǔ-lì
Cooper	库珀	Kù-pò
Coopers	库柏斯	Kù-bó-sī
Coottee's	高天	Gāo-tiān
Coover	库甫	Kù-fú

copy	拷贝	kǎo-bèi
Cork	柯克	Kē-kè
Cornell	康奈尔	Kāng-nài-ěr
Cornetto	可爱多	Kě-ài-duō
Corning	康宁	Kāng-níng
Corus	康力斯	Kāng-lì-sī
Corvis	考维斯	Kǎo-wéi-sī
Costco	好事(市)多	Hǎo-duō-shì
	克斯特克	Kè-sī-tè-kè
Cosworth	克斯沃斯	Kè-sī-wò-sī
coulomb	库仑	kù-lún
Coventry	考文垂	Kǎo-wén-chuí
Craig	克莱格	Kè-lái-gé
Cranfield	克伦菲尔德	Kè-lún-fēi-ěr-dē
Crawford	克劳福德	Kè-láo-fú-dé
Crislu	克利斯罗	Kè-lì-sī-luó
Crystal	克利斯多	Kè-lì-sī-duō
Cubic	蔻比克	Kòu-bǐ-kè
Cummings	康明斯	Kāng-míng-sī
curry	咖喱	gā-lí
cyclamen	仙客来	xiān-kè-lái

D

Dacromet	达克罗	Dá-kè-luó
Dacron	的确浪	Dí-què-láng
Dallas	达拉斯	Dá-lā-sī
Dan Neil	丹·尼尔	Dān-ní-ěr
Dana	达纳	Dá-nà
Daniels	丹尼尔斯	Dān-ní-ěr-sī
dahlia	大丽(花)	dà-lì
Darden	达等	Dá-dēng
darling	大林	dà-lín
Darren	达伦	Dá-lún
Dartmouth	达特茅斯	Dá-tè-máo-sī
Darwin	达尔文	Dá-ěr-wén

David	大卫	Dà-wèi
Davidoff	大卫杜夫	Dà-wèi-dù-fū
Davidson	戴维森	Dài-wéi-sēn
Davies	戴维斯	Dài-wéi-sī
Dawling	道林	Dào-lín
DDT	滴滴涕	Dī-dī-tì
DDVP	敌敌畏	Dí-dí-wèi
Decker	德克尔	Dé-kè-ěr
Deere	迪尔	Dí-ěr
Dekker	德克尔	Dé-kè-ěr
Dell	戴尔	Dài-ěr
Delmar	德尔马	Dé-ěr-mǎ
Delph	德尔福	Dé-ěr-fú
Delphi	德尔福	Dé-ěr-fú
Delta	德尔塔	Dé-ěr-tǎ
Dennis	丹尼斯	Dān-ní-sī
dengue	登革 (热)	dēng-gé (rè)
derby	德比	dé-bǐ
Diageo	迪阿吉奥	Dí-ā-jí-ào
Diaz	迪亚兹	Dí-yà-zī
Dick	迪克	Díkè
DINK	丁克	Dīng-kè
disco	迪斯科	dí-sī-kē
Disney	迪斯尼	Dí-sī-ní
DiverseyLever	泰华施利华	Tài-huá-shī-lì-huá
Dodge	道奇	Dào-qí
Dolby	杜比	Dù-bǐ
Dole	都乐	Dōu-lè
Donald	多纳德	Duō-nà-dé
Dominic	多米尼克	Duō-mǐ-ní-kè
domino	多米诺	duō-mǐ-nuò
Dorling	多林	Duō-lín
dot com(.com)	稻糠亩	dào-kāng-mǔ
Doug	道格	Dào-gé
Dove	德芙	Dé-fú
	多芬	Duō-fēn

Dow Johns	道琼斯	Dào-qióng-sī
down	当	dāng
dozen	打	dá
Duke	杜克	Dù-kè
dumdum	达姆弹	dá-mǔ-dàn
Dundee	邓迪	Dèng-dí
Dunhill	登喜路	Dēng-xǐ-lù
Dunkin Donuts	当肯多纳(饼)	Dāng-kěn-duō-nà-bǐng
Dupont	杜邦	Dù-bāng
dyne	达因	dá-yīn
Dynegy	戴纳基	Dài-nà-jī

E

Eastman	伊斯曼	Yī-sī-màn
Eau Claire	忧·克雷尔	Yōu-kè-léi-ěr
Ebola	埃博拉	À i-bó-lā
Edelman	爱德曼	À i-dé-màn
Edison	爱迪生	À i-dí-shēng
Edward	爱德华	À i-dé-huá
Edwin	爱德文	À i-dé-wén
El Nino	埃尔 - 尼诺	Āi-ěr-ní-nuò
Eli	礼来	Lǐ-lái
Elias	伊莱亚斯	Yī-lái-yà-sī
Eliot	埃利奥特	Āi-lì-ào-tè
Elizabeth Arden	伊丽莎白雅顿	Yī-lì-shā-bái-yǎ-dùn
Elkins	艾尔肯斯	À i-ěr-kěn-sī
	艾尔金斯	À i-ěr-jīn-sī
Elsevier	埃尔塞维尔	Āi-ěr-sài-wéi-ěr
Elton	艾顿	À i-dùn
email	伊妹儿	yī-mèi-ér
Emerson	艾默生	À i-mò-shēng
Emmy	艾美 (奖)	À i-měi (jiāng)
Emory	埃莫里	Āi-mò-lǐ
emu	鸸苗	ér-miáo
encore	安可	ān-kě
Enfalac	安婴乐	Ān-yīng-tè

Enfamil	安婴儿	Ān-yīng-ér
engine	引擎	yǐn-qíng
Enron	安然	Ān-rán
Epson	爱普生	À i-pǔ-shēng
erg	尔格	ěr-gé
Eric	艾利克	À i-lì-kè
	埃里克	Āi-lǐ-kè
	埃利克	Āi-lì-kè
Erikson	埃里克森	Āi-lǐ-kè-sēn
Ernst & Young	安永	Ān-yǒng
Eskimo	爱斯基摩	À i-sī-jī-mó
ether	以太	yǐ-tài
Estée Lauder	雅丝兰黛	Yǎ-sī-lán-dài
Eureca	尤里卡	Yóu-lǐ-kǎ
Everglades	埃沃格拉德斯	À i-wò-gé-lā-dé-sī
Everton	埃弗顿	À i-fú-dùn
Ewing	尤因	Yóu-yīn
Exxon	埃(艾)克森	Āi(À i)-kè-sēn

F

Faber and Faber	费伯-费伯	Fèi-bó-Fèi-bó
Falcon	福尔肯	Fú-ěr-kěn
Falkirk	福尔柯克(队)	Fú-ěr-kē-kè(duì)
Fannie Mae	范妮梅	Fàn-ní-méi
fans	粉丝	fěn-sī
Fanta	芬达	Fēn-dá
Febreeze	纺必适	Fǎng-bì-shì
fee	费	fèi
Fenbid	芬必得	Fēn-bì-dé
Ferrari	法拉利	Fǎ-lā-lì
FIDIC	菲迪克	Fēi-dí-kè
Fisher	费希尔	Fèi-xī-ěr
Flanigan	弗拉尼根	Fú-lā-ní-gēn
flannel	法兰绒	fǎ-lán-róng
FleetBoston	弗雷特波士顿	Fú-léi-tè-bō-shì-dùn
Fleming	弗莱明	Fú-lái-míng

Flint	富林特	Fù-lín-tè
Fluor	福陆	Fú-lù
Forbes	福布斯	Fú-bù-sī
Ford	福特	Fú-tè
Forest	佛里斯特	Fó-lǐ-sī-tè
formalin	福尔马林	fú-ěr-mǎ-lín
Foster	福斯特	Fú-sī-tè
FOX	福克斯	Fú-kè-sī
Franz	弗朗茨	Fú-láng-cì
Freddie	弗雷迪	Fú-léi-dí
Frederic	腓德瑞克	Féi-dé-ruì-kè
Freeman	甫里曼	Fǔ-lǐ-màn
Freon	氟利昂	Fú-lì-áng
frisbee	夫利斯比	fú-lì-sī-bǐ
Fry's	方润	Fāng-rùn

G

Gale	盖尔	Gài-ěr
Gallo	盖洛	Gài-luò
gallon	加仑	jiā-lún
gallop	加洛普	jiā-luò-pǔ
Gallup	盖洛普	Gài-luò-pǔ
Gamble	甘保	Gān-bǎo
Gannett	甘耐特	Gān-nài-tè
Gap	盖普 加普	Gài-pǔ Jiā-pǔ
Garfield	加菲 (猫)	Jiā-fēi
Gates	盖茨	Gài-cì
Gateway	盖特韦	Gài-tè-wéi
Gatorade	佳得乐	Jiā-dé-lè
Gavotte	加伏特	Jiā-fú-tè
geek	吉客	jí-kè
gene	基因	jī-yīn
Gent	金特	Jīn-tè
George	乔治	Qiáo-zhì
Georgea	佐治亚	Zuǒ-zhì-yà

Gerber	嘉宝	Jiā-bǎo
Gerstner	郭士纳	Guō-shì-nà
Gibbon	吉本	Jíběn
Gibson	吉布森	Jíbù-sēn
Gillette	吉列	Jíliè
gin	金 (酒)	jīn (jiǔ)
Glasgow	格拉斯高	Gélā-sī-gāo
Glass	格拉斯	Gē-lá-sī
Glaxo	葛兰素	Gé-lán-sù
GlaxoSmithKleine	葛兰素史克	Gé-lán-sù-shǐ-kè
Glocer	格罗瑟	Gé-luó-sè
golf	高尔夫	gāo-ěr-fū
gondola	贡多拉	gòng-duō-lā
Golden	戈尔等	Gē-ěr-dēng
Goldman	高盛	Gāo-shèng
Goodrich	固特立	Gù-tè-lì
Goodyear	固特异	Gù-tè-yì
Google	谷歌	Gǔ-gē
Gower	高尔	Gāo-ěr
Grace	格蕾丝	Gé-lěi-sī
Graham	格雷厄姆	Gé-léi-è-mǔ
Grainger	格雷杰	Gé-léi-jié
Grammy	格莱美	Gé-lái-měi
Grasso	格拉索	Gé-lā-suǒ
Graybar	格雷巴	Gé-léi-bā
Greenburg	格林伯格	Gé-lín-bó-gé
Greenspan	格林斯潘	Gé-lín-sī-pān
Greenwich	格林尼治	Gé-lín-ní-zhì
Grolier	格罗利尔	Gé-luó-lì-ěr
Grossman	格罗斯曼	Gé-luó-sī-màn
Grove	葛洛夫	Gé-luò-fū
Grumman	格鲁曼	Gé-lǔ-màn
Guggenheim	古根汉姆	Gǔ-gēn-hàn-mǔ
Guinness	吉尼斯	Jíní-sī
guitar	吉他	jítā
Gypsy	吉卜赛	Jíbǔ-sài

H

Haagen-Daz	哈根达斯	Hā-gēn-dá-sī
hacker	黑客 骇客	hēi-kè hài-kè
Hahn	哈恩	Hā-ēn
Halifax	哈里法克斯	Hā-lǐ-fǎ-kè-sī
Halliburton	哈利佰吨	Hā-lì-bǎi-dùn
Hall's	荷氏	Hé-shì
hamburger	汉堡	hàn-bǎo
Hamilton	汉密尔顿 汉弥尔顿	Hàn-mì-ěr-dùn Hàn-mí-ěr-dùn
Handler	汉德勒	Hàn-dé-lè
Hanks	汉克斯	Hàn-kè-sī
Harcourt	哈考特	Hā-kǎo-tè
Hardford	哈特福德	Hā-tè-fú-dé
Harley	哈雷	Hā-léi
HarperCollins	哈珀柯林斯	Hā-pò-kē-lín-sī
Harry	亨利 哈利 哈里	Hēng-lì Hā-lì Ha-lǐ
Hathaway	哈撒韦	Hā-sā-wéi
Hazeline	夏士莲	Xià-shí-lián
Hearst	赫斯特	Hè-sī-tè
Hedge	赫奇	Hè-qí
Heinz	亨氏	Hēng-shì
Helena	赫莲娜	Hè-lián-nà
Helliker	赫林科尔	Hè-lín-kē-ěr
Henry	亨利	Hēng-lì
Herbert	赫伯特	Hè-bó-tè
heroin	海洛因	hǎi-luò-yīn
Herrera	海莱拉	Hǎi-lái-lā
Hershey's	好时	Hǎo-shí
Hertz	赫兹	Hè-zī
Hibenian	喜伯年	Xǐ-bó-nián
hill	希尔	xī-ěr
Hillary	希拉里	Xī-lā-lǐ

Hilton	希尔顿	Xī-ěr-dùn
hippy	嬉皮	xī-pí
hippies	嬉皮士	xī-pí-shì
Hogan	霍根	Huò-gēn
Hollywood	好莱坞	Hǎo-lái-wū
Holmes	福尔摩斯	Fú-ěr-mó-sī
homepage	烘焙机(鸡)	hōng-bèi-jī
Honeywell	霍尼韦尔	Huò-ní-wéi-ěr
Hormel	荷美尔	Hé-měi-ěr
hormone	荷尔蒙	hé-ěr-méng
Houghton	霍顿	Huò-dùn
Howe	豪	Háo
Huggies	好奇	Hào-qí
hula (hoop)	呼拉 (圈)	hū-lā
Humana	胡马纳	Hú-mǎ-nà
Hummer	悍马	Hàn-mǎ
humor	幽默	yōu-mò
Hurt	赫尔特	Hè-ěr-tè
Hush Puppies	暇步士	Xiá-bù-shì
Hyatt	海亚特	Hǎi-yà-tè
hysteria	歇斯底里	xiē-sī-dǐ-lǐ

I

Illinois	伊利诺斯	Yī-lì-nuò-sī
Immelt	伊梅尔特	Yī-méi-ěr-tè
index	引得	yǐn-dé
Ingersoll-Rand	英格索尔兰德	Yīng-gé-suǒ-ěr-lán-dé
Ingram	英格雷姆	Yīng-gé-léi-mǔ
Inniskillin	易宁基林	Yì-níng-jī-lín
Intel	英特尔	Yīng-tè-ěr
Inter(brand)	英特(品)	Yīng-tè(pǐn)
inter(net)	因特(网)	yīn-tè(wǎng)
	英特(网)	yīng-tè(wǎng)
Iowa	艾奥瓦	À i-ào-wǎ
Irvine	尔湾	Ěr-wān
Irons	艾恩斯	À i-ēn-sī

Irwin	艾文	À i-wén
Isabel	伊莎贝尔	Yī-shā-bèi-ěr
Italy	意大利	Yì-dà-lì
Ivey	艾维	À i-wéi

J

Jack	杰克	Jié-kè
jacket	夹克	jiā-kè
Jacobs	雅各布	Yǎ-gè-bù
Jacuzzi	爵士	Jué-shì
James	詹姆斯	Zhān-mǔ-sī
jar	扎	zhā
Jason	杰森	Jié-sēn
jazz	爵士	jué-shì
jeep	吉普	jí-pǔ
Jeff	杰夫	Jié-fū
jelly	啫喱	zǎ-lí
Jeremy	杰瑞米	Jié-ruì-mǐ
Jim	吉姆	Jí-mǔ
Joe	乔	Qiáo
John	约翰	Yūē-hán
Johnnie	尊尼	Zūn-ní
Johnson	约翰逊	Yūē-hàn-xùn
	庄臣	Zhuāng-chén
Johnson & Johnson	强生	qiáng-shēng
Jonathan	乔纳森	Qiáo-nà-sēn
Jones	琼斯	Qióng-sī
Jonnie Walker	琼尼沃克	Qióng-ní-wò-kè
Jordan	乔丹	Qiáo-dān
Joseph	约瑟夫	Yūē-sè-fū
Josh	乔西	Qiáo-xī
Joy	乔伊	Qiáo-yī
Julia	朱莉亚	Zhū-lì-yà
	朱丽娅	Zhū-lì-yà

K

Kansas	堪萨斯	Kān-sà-sī
karat	开	kāi
karst	喀斯特	kā-sī-tè
karting	卡丁 (车)	kǎ-dīng (chē)
Katharine	凯瑟琳	Kǎi-sè-lín
Katz	卡茨	Kǎ-cì
Keith	基思	Jī-sī
Kellogg	凯洛格	Kǎi-luò-gé
Kellogg's	家乐氏	Jiā-lè-shì
Kempinski	凯宾斯基	Kǎi-bīn-sī-jī
Kenneth	肯尼斯	Kěn-ní-sī
Kenosha	肯若辖	Kěn-ruò-xiá
Kerry	克里	Kè-lǐ
Kevin	凯文	Kǎi-wén
khaki	卡叽	kǎ-jī
Kimberly-Clark	金百利克拉克	Jīn-bǎi-lì-kè-lā-kè
Kindersley	金德斯利	Jīn-dé-sī-lì
kiss	开司	kāi-sī
kiwi	几维 (鸟)	jī-wéi (niǎo)
Kleenex	可丽殊	Kè-lì-shú
Kmart	凯马特 卡尔马特	Kǎi-mǎ-tè Kǎ-ěr-mǎ-tè
Knight	奈特	Nài-tè
koala	考拉	kǎo-lā
Kobe	科比	Kē-bǐ
Kodak	柯达	Kē-dá
Kohlberg	科尔伯格	Kē-ěr-bó-gé
Kohler	科勒	Kē-lè
Kraft	卡夫	Kǎ-fū
Kravis	克拉维斯	Kè-lā-wéi-sī
Kremlin	克里姆林	Kè-lǐ-mǔ-lín
Kroger	克罗格	Kè-luó-gé

L

lace	蕾丝	lěi-sī
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LaCrosse	拉科罗斯	Lā-kē-luó-sī
ladar	雷达	lèi-dá
Lambert	兰波特	Lán-bō-tè
Lancaster	兰开斯特	Lán-kāi-sī-tè
Lander	兰德	Lán-dé
laser	莱塞	lái-sè
	镭射	léi-shè
Latin	拉丁 (文)	Lā-dīng
Laura	劳拉	Láo-lā
Lawrence	罗伦斯	Luó-lún-sī
Lay's	乐事	Lè-shì
Lazard	拉扎尔	Lā-zhā-ěr
Lear	里尔	Lǐ-ěr
	李尔	Lǐ-ěr
Leeds	利兹	Lì-zī
Leeson	列森	Liè-sén
Lehman	莱曼	Lái-màn
	雷曼	Léi-màn
Leicester	莱斯特	Lái-sī-tè
Lennox	雷诺士	Léi-nuò-shì
Leonard	伦纳德	Lún-nà-dé
Lester	莱斯特	Lái-sī-tè
Levi	李维	Lǐ-wéi
Levi's	李维斯	Lǐ-wéi-sī
Lewis	刘易斯	Liū-yì-sī
Lexmark	利盟	Lì-méng
Liberty	利宝	Lì-bǎo
libido	利比多	lì-bǐ-duō
	里比多	lǐ-bǐ-duō
Liman	李曼	Lǐ-màn
Lincoln	林肯	Lín-kěn
Lennon	列农	Liè-nóng
Lippincott	利平科特	Lì-píng-kē-tè
Lipton	立顿	Lì-dùn
Litton	立顿	Lì-dùn
Liverpool	利物浦	Lì-wù-pǔ

Lloyds	劳埃德	Láo-āi-dé
loam	垆姆	lú-mǔ
Lockheed	洛克希德	Luò-kè-xī-dé
Loescher	罗斯彻	Luó-sī-chè
Loews	洛斯	Luò-sī
logic	逻辑	luó-jí
Lolita	洛丽塔	Luò-lì-tā
Londa	伦德	Lún-dé
Lonergan	洛内甘	Luò-nèi-gān
Longman	朗文	lǎng-wén
Loose	卢斯	Lú-sī
Lopez	洛佩兹	Luò-pèi-zī
Lord	罗德	Luó-dé
Louis	路易斯	Lù-yì-sī
Lowe's	劳氏	Láo-shì
Lucas	卢卡斯	Lú-kǎ-sī
Lucent	朗讯	Lǎng-xùn
lumen	流明	liú-míng
LUX	勒克斯	Lè-kè-sī
Lux	力士	Lì-shì
Lycos	来科思	Lái-kē-sī
lysol	来苏	lái-sū

M

Mac	马克	Mǎ-kè
Mackintosh	麦金塔	Mài-jīn-tǎ
Macmillan	麦克米兰	Mài-kè-mǐ-lán
Madison	麦迪生	Mài-dí-shēng
Magna	曼格纳	Màn-gé-nà
Mahr	马赫尔	Mǎ-hè-ěr
Major	梅杰	Méi-jié
mammy	妈咪	mā-mī
Manchester	曼彻斯特	Màn-chè-sī-tè
Mandala	曼达拉	Màn-dá-lā
mandolin	曼德琳	màn-dé-lín
Manhattan	曼哈顿	Màn-hā-dùn

marathon	马拉松	mǎ-lā-sōng
Marcus	马克	Mǎ-kè
	马科斯	Mǎ-kē-sī
Marc Jacobs	马克雅克布斯	Mǎ-kè-yǎ-kē-bù-sī
Marcel	马赛尔	Mǎ-sài-ěr
margarine	麦淇淋	mài-qí-lín
Marilyn Monroe	玛丽莲梦露	Mǎ-lì-lián-mèng-lù
mark	唛	mài
Mark	马克	Mǎ-kè
Marks	马克斯	Mǎ-kè-sī
Marlboro	万宝路	Wàn-bǎo-lù
Marriott	玛里奥特	Mǎ-lǐ-ào-tè
Mars	马氏	Mǎ-shì
Marsh	马什	Mǎ-shí
Marshall	马歇尔	Mǎ-xiē-ěr
Martin	马丁	Mǎ-dìng
Martini	马提尼 (酒)	Mǎ-tí-ní (jiǔ)
Mary	玛丽	Mǎ-lì
Masco	马斯可	Mǎ-sī-kě
Masons	梅森	Méi-sēn
Massachusetts	马萨诸塞	Mǎ-sà-zhū-sài
massage	马杀鸡	mǎ-shā-jī
MasterCard	万事达[信用卡]	Wàn-shì-dá-xìn-yòng-kǎ
Matt	马特	Mǎ-tè
Mattel	马特尔	Mǎ-tè-ěr
Max	麦克斯	Mài-kè-sī
Max Factor	密丝佛陀	Mì-sī-fó-tuó
Maxwell	马柯斯韦尔	Mǎ-kè-sī-wéi-ěr
Maxwell	麦斯威尔	Mài-sī-wēi-ěr
Maybelline	美宝莲	Měi-bǎo-lián
Maytag	美泰克	Měi-tài-kè
McCann	麦肯	Mài-kěn
McCombs	迈克库姆斯	Mài-kè-kù-mǔ-sī
McDonalds	麦当劳	Mài-dāng-láo
McGraw-Hill	麦格劳希尔	Mài-gé-láo-xī-ěr
McIntosh	麦景图	Mài-jǐng-tú

Mckenna	麦肯纳	Mài-kěn-nà
Mckenzie	麦肯思	Mài-kěn-sī
McKesson	麦肯森	Mài-kěn-sēn
	麦克森	Mài-kè-sēn
McKinsey	麦肯锡	Mài-kěn-xī
McKnight	麦克奈特	Mài-kè-nài-tè
McNealy	麦尼利	Mài-ní-lì
Mead	米德	Mǐ-dé
Mead Johnson	美赞臣	Měi-zàn-chén
Medtronic	美敦利/力	Měi-dūn-lì
Mel	梅尔	Méi-ěr
Mellon	梅隆	Méi-lóng
Memphis	曼菲斯	Màn-fēi-sī
Menlo	门罗	Mén-luó
Merck	默克	Mò-kè
meter	咪 (表)	mī
Meyer	梅耶尔	Méi-yē-ěr
Miami	迈阿密	Mài-ā-mì
Michael	迈/迈克尔	Mài-kè-ěr
Michelin	米其林	Mǐ-qí-lín
Micro	麦克罗	Mài-kè-luó
microphone	麦克风	mài-kè-fēng
Middlesbrough	米德尔斯堡	Mǐ-dé-ěr-sī-bǎo
Midge	米姬	Mǐ-jī
Midland	米德兰	Mǐ-dé-lán
Mifflin	米夫林	Mǐ-fū-lín
Mike	迈克	Mài-kè
mile	迈	mài
Milwaukee	密耳瓦基	Mì-ěr-wǎ-jī
mini	迷你	mínǐ
Minnesota	明尼苏达	Míng-ní-sū-dá
Miranda	美年达	Měi-nián-dá
Mirant	迈朗	Mài-lǎng
Mitch	米奇	Mǐ-qí
Mobil	美孚	Měi-fú
Mobius	麦扑思	Mài-pū-sī

model	模特儿	mó-tè-ér
modern	摩登	mó-dēng
Modoc	默多克	Mó-duō-kè
Moen	摩恩	Mó-ēn
mole	摩尔	mó-ěr
Monsanto	蒙桑托	Méng-sāng-tuō
Montreal	蒙特利尔	Méng-tè-lì-ěr
Moody	穆迪	Mù-dí
Moore	摩尔	Mó-ěr
Moravec	莫拉韦克	Mò-lwéi-kè
Morgan	摩根	Mó-gēn
morphine	吗啡	mǎ-fēi
Morris	莫里斯	Mò-lǐ-sī
mosaic	马赛克	mǎ-sài-kè
Mosby	莫斯比	Mò-sī-bǐ
motor	摩托	mó-tuō
motor	马达	mǎ-dá
Motorola	摩托罗拉	Mó-tuō-luó-lā
Mott's	摩特	Mó-tè
Mountain	蔓登琳	Màn-dēng-lín
mousse	摩丝	mó-sī
Mozart	莫扎特	Mò-zhā-tè
MP3	马屁山	Mǎ-pì-shān
mug	马克 (杯)	má-kè
Mundell	蒙代尔	Méng-dài-ěr
Murdoch	默多克	Mò-duō-kè
Myer	迈尔	Mài-ěr

N

Nasdaq	纳斯达克	Nà-sī-dá-ké
Nasser	纳赛尔	Nà-sài-ěr
Nautica	诺迪卡	Nuò-dí-kǎ
Negro	尼格罗	Ní-gé-luó
neon	霓虹	ní-hóng
Newcastle	纽卡斯尔	Niǔ-kǎ-sī-ěr
nicotine	尼古丁	ní-gǔ-dīng

Niagara	尼亚加拉	Ní-yà-jiā-lā
Nike	耐克	Nài-kè
Nimda	尼姆达	Ní-mǔ-dá
Nissan	尼桑	Ní-sāng
Nobel	诺贝尔	Nuò-bèi-ěr
Nokia	诺基亚	Nuò-jī-yá
Norfolk	诺福克	Nuò-fú-kè
Normy	诺米	Nuò-mǐ
Northrop	诺斯洛普	Nuò-sī-luò-pǔ
Norwich	诺威奇	Nuò-wēi-qí
Nottingham	诺丁汉	Nuò-dīng-hàn
nylon	尼龙	ní-lóng

O

Obama	奥巴马	À o-bā-mǎ
office	奥菲斯	ào-fēi-sī
okapi	获加狒	huò-jiā-pí
Ogilvy	奥格威	À o-gé-wēi
Olympic	奥林匹克	À o-lín-pǐ-kè
Omaha	奥马哈	À o-mǎ-hā
Omnicom	奥姆尼康	À o-mǔ-ní-kāng
Orange	奥兰奇	À o-lán-qí
O'Neill	奥尼尔	À o-ní-ěr
O'Reilly	奥赖利	À o-lài-lì
Osborne	奥斯本	À o-sī-běn
Oscar	奥斯卡	À o-sī-kǎ
Oshkosh	奥旭寇旭	À o-xù-kòu-xù
Othniel	奥塞内尔	À o-sài-nèi-ěr
Otis	奥的斯	À o-dí-sī
ounce	盎司	àng-sī
Owen	欧文	Ōu-wén

P

P & G	宝洁	Bǎo-jié
Paccar	帕卡	Pà-kǎ
Packard	帕卡德	Pà-kǎ-dé

Paddle Pop	百宝乐宝	Bǎi-bǎo-lè-bǎo
Padgett	帕吉特	Pà-jí-tè
palace	派力司	pài-lì-sī
Palmer	帕默	Pà-mò
Pampers	帮宝适	Bāng-bǎo-shì
Pantene	潘婷	Pān-tíng
Parkinson	帕金森	Pà-jīn-sēn
Parkour	跑酷	Pá-kù
Parkside	帕克赛德	Pà-kè-sài-dé
Parmalat	帕玛拉特	Pà-mǎ-lā-tè
Pat	帕特	Pà-tè
Pataki	帕塔基	Pà-tǎ-jī
party	派对	pài-duì
Pascell	百思乐	Bǎi-sī-lè
pass	派司	pāi-sī
Patricia	帕特里希亚	Pà-tè-lǐ-xī-yà
Patrick	帕特里克	Pà-tè-lǐ-kè
Paul	保罗	Bǎo-luó
Pearson	培生	Péi-shēng
pence	便士	biàn-shì
penicillin	盘尼西林	pán-ní-xī-lín
Penney	彭尼	Pēng-ní
Pennsylvania	宾夕法尼亚	Bīn-xī-fǎ-ní-yà
Pentium	奔腾	Bēn-téng
Pepsi	百事	Bǎi-shì
Perlman	珀尔曼	Pò-ěr-màn
Permira	珀米拉	Pò-mǐ-lā
Persia	波斯	Bō-sī
Peter	彼德	Bǐ-dé
	皮特	Pítè
Peterson	彼德森	Bǐ-dé-sēn
Pharmacia	法玛西亚	Fǎ-mǎ-xī-yà
Phillips	飞利浦	Fēi-lì-pǔ
	菲利普	Fēi-lì-pǔ
pick-up	皮卡	píkǎ
pie	派	pài

pint	品脱	pǐn-tuō
Pitney	匹尼	Pǐ-ní
Pitt	皮特	Pítè
Pitts	皮兹	Pízī
Pittston	皮茨顿	Pī-cì-dùn
pizza	比萨(饼)	bǐ-sà
Pizza Hut	必胜客	Bìshèng-kè
Plains	普林斯	Pǔ-lín-sī
podcast	播客	bō-kè
point	磅	bàng
pointer	波音大	bō-yīn-dá
poker	扑克	pū-kè
Polaroid	宝丽来	Bǎo-lì-lái
Polo	保罗	Bǎo-luó
	宝路	Bǎo-lù
Pond's	旁氏	Páng-shì
Pontiac	旁蒂克	Páng-dì-kè
Portagen	保健	Bǎo-jiàn
Portland	波特兰	Bō-tè-lán
Portman	波特曼	Pō-tè-màn
pose	剖丝	pōu-sī
Potter	泼特	Pō-tè
	波特	Bō-tè
pound	磅/镑	bàng
Powell	鲍威尔	Bāo-wēi-ěr
PRAXIS	普拉克西斯	Pǔ-lā-kè-xī-sī
Prescott	普雷斯科特	Pǔ-léi-sī-kē-tè
Princeton	普林斯顿	Pǔ-lín-sī-dùn
Pringles	品客	Pǐn-kè
Procter	波克特	Bó-kè-tè
Propet	波派	Bō-pài
Prudential	保德信	Bǎo-dé-xìn
	宝德信	Bǎo-dé-xìn
pudding	布丁	bù-dīng
puff	泡芙	pào-fú
Puma	飘马	Piāo-mǎ

	彪马	Biāo-mǎ
pump	帮浦	bāng-pǔ
	泵	bèng
punk	朋克	péng-kè
	崩克	bēng-kè

Q

QinetiQ	奎奈蒂克	Kuì-nài-dì-kè
Quaker	桂格	Guì-gé
Qualcomm	高通	Gāo-tōng
Quantum	昆腾	Kūn-téng
quark	夸克	kuā-kè
Queenscliff	昆士克里夫	Kūn-shì-kè-lǐ-fū
Queensland	昆士兰	Kūn-shì-lán
Quinine	奎宁	kuí-níng
Qwest	奎斯特	Kuì-sī-tè

R

Racine	拉辛	Lā-xīn
radar	雷达	léi-dá
rally	拉力 (赛)	lā-lì (sài)
Ralph Lauren	拉夫劳伦	Lā-fū-láo-lún
	拉尔夫劳伦	Lā-ěr-fū-láo-lún
Ram	拉姆	Lā-mǔ
Ramo	拉莫	Lā-mó
RAND	兰德	Lán-dé
Random	兰登	Lán-dēng
Raymond	雷蒙德	Léi-méng-dé
Raytheon	雷神	Léi-shén
Reagon	里根	Lǐ-gēn
ream	令	lǐng
Reebok	锐步	Ruì-bù
Reed	里德	Lǐ-dé
reggae	瑞格 (舞)	ruì-gé (wǔ)
Reid	雷德	Léi-dé
Remington	雷明顿	Léi-míng-dùn

Reuters	路透社	Lù-tòu-shè
Revlon	露华浓	Lù-huá-nóng
Rex	雷克斯	Léi-kè-sī
Reynolds	雷诺兹	Léi-nuò-sī
Rice	赖斯	Lài-sī
Richard	理查德	Lǐ-chá-dé
Ridder	里得	Lǐ-dé
Ridley	雷德利	Léi-dé-lì
rifle	来复	lái-fù
Rimmel	瑞美尔	Ru-ì-měi-ěr
Ripplewood	力宝坞	Lì-bǎo-wū
Rite Aid	来德爱	Lái-dé-ài
Ritz-Carlton	丽思卡尔顿	Lì-sī-kǎ-ěr-dùn
Rizla	瑞斯莱	Ru-ì-sī-lái
Roach	罗奇	Luó-qí
Robert	罗伯特	Luó-bó-tè
Roberts	罗伯茨	Luó-bó-cì
Rockwell	罗克韦尔	Luó-kè-wéi-ěr
Rocky	洛基	Luò-jī
Roebuck	罗巴克	Luó-bā-kè
Roger	罗杰	Luó-jié
Rolex	劳力士	Láo-lì-shì
roller	罗拉	luó-lā
Rolls	劳斯	Láo-sī
	罗尔斯	Luó-ěr-sī
romance	罗曼司	luó-màn-sī
	罗曼史	luó-màn-shǐ
romantic	罗曼蒂克	luó-màn-dì-kè
Ron	罗恩	Luó-ēn
Rotman	罗特曼	Luó-tè-màn
Rover	罗孚	Luó-fú
Royce	罗伊斯	Lóu-yī-sī
	莱斯	Lái-sī
rum	朗姆 (酒)	lǎng-mǔ (jiǔ)
Rumsfield	拉姆斯菲尔德	Lā-mǔ-sī-fēi-ěr-dé
rupee	卢比	lú-bǐ

Rupert	鲁珀特	Lú-pò-tè
Ruth	露丝	Lù-sī
Russo	鲁索	Lǔ-suǒ
Ryder	莱德	Lái-dé

S

Safeguard	舒肤佳	Shū-fū-jiā
Safeway	西夫韦	Xī-fū-wéi
Sage	塞奇	Sài-qí
Said	赛德	Sài-dé
Sainsbury	桑斯博里	Sāng-sī-bó-lǐ
salad	色拉	sè-lā
Sallah	萨拉赫	Sà-lā-hè
salmon	三文 (鱼)	sān-wén (yú)
Sam	山姆	Shā-mǔ
Sanders	桑德斯	Sāng-dé-sī
San Diego	圣地亚哥	Shèng-dì-yà-gē
sandwich	三明治	sān-míng-zhì
Sandy	桑迪	Sāng-dì
Santa Fe	圣达菲	Shèng-dá-fēi
Sara	沙拉	Shā-lā
sardine	沙丁 (鱼)	shā-dīng (yú)
sari	纱丽	shā-lì
SARS	萨斯	Sà-sī
Sassoon	沙宣	Shā-xuān
sauce	沙司	shā-sī
sauna	桑拿	sāng-ná
Saunders	桑德斯	Sāng-dé-sī
saxophone	萨克斯风	sà-kè-sī-fēng
Schimit	斯密德	Sī-mì-dè
Schuster	舒斯特	Shū-xī-tè
Schwartz	施瓦兹	Shī-wǎ-zī
Schweppes	史威士	Shǐ-wēi-shì
Scooby	史酷比	Shǐ-kū-bǐ
Scott	斯科特	Sī-gé
	斯科特	Sī-kē-tè

	斯考特	Sī-kǎo-tè
	舒洁	Shū-jié
Seagate	希捷	Xī-jié
Seagram	施格兰	Shī-gé-lán
Seal	西尔	Xī-ěr
Sears	西尔斯	Xī-ěr-sī
See's	西伊氏	Xī-yī-shì
Seimens	西门子	Xī-mén-zǐ
Selma	萨尔马	Sà-ěr-mǎ
Shadid	沙迪德	Shā-dí-dé
shampoo	香波	xiāng-bō
Shangri-La	香格里拉	Xiāng-gé-lǐ-lā
shaping	舍宾	shě-bīn
shark	鲨 (鱼)	shā (yú)
Sharp	夏普	Xià-pǔ
Sheffield	谢菲尔德	Xiè-fēi-ěr-dé
Sherak	希拉克	Xī-lā-kè
shilling	先令	xiān-lìng
shock	休克	xiū-kè
shopping mall	销品茂	xiāo-pǐn-mào
short	秀逗	xiù-dòu
Shoemaker	休梅克	Xiū-méi-kè
show	秀	xiù
Shreck	史瑞克	Shǐ-ruì-kè
Simmons	席梦思	Xí-mèng-sī
Simon	西蒙	Xī-méng
Slamdance	诗兰丹斯	Shī-lán-dān-sī
Sleisinger	斯莱辛格	Sī-lái-xīn-gé
Sloan	斯隆	Sī-lóng
Slocum	斯洛科姆	Sī-luò-kè-mǔ
Smith	史密斯	Shǐ-mì-sī
	史密夫	Shǐ-mì-fū
Snapple	思蓝宝	Sī-lán-bǎo
snooker	斯诺克	sī-nuò-kè
Snoopy	史努比	Shǐ-nǚ-bǐ
soda	苏打	sūdá

Sodexo	索迪斯	Suǒ-dí-sī
sofa	沙发	shā-fā
sonar	声纳	shēng-nà
Soros	索罗斯	Suǒ-luó-sī
sparkling	斯帕克林	sī-pà-kè-lín
Spencer	思班塞	Sī-bān-sài
Spielberg	斯皮尔伯格	Sī-pí-ěr-bó-gé
Spitzer	斯皮策	Sī-pí-cè
Sprint	斯普林特	Sī-pǔ-lín-tè
Squibb	施贵宝	Shī-guì-bǎo
Stall	斯塔尔	Sī-tǎ-ěr
Standford	桑福德	Sāng-fú-dé
	斯坦福	Sī-tǎn-fú
Stanley	士丹利	Shì-dān-lì
	斯坦利	Sī-tǎn-lì
Staples	斯特普尔斯	Sī-tè-pǔ-ěr-sī
Starbucks	星巴克	Xīng-bā-kè
Starwood	斯塔伍德	Sī-tǎ-wǔ-dé
	喜达屋	Xǐ-dá-wū
Stephan	史蒂芬	Shǐ-dì-fēn
Stern	斯特恩	Sī-tè-ēn
Steven	史蒂文	Shǐ-dì-wén
Stiles	斯特尔斯	Sī-tè-ěr-sī
	斯黛尔斯	Sī-dài-ěr-sī
Strauss	斯特劳斯	Sī-tè-láo-sī
	施特劳斯	Shī-tè-láo-sī
Stuyvesant	史蒂文森	Shǐ-dì-wén-sēn
Sula	苏拉	Sū-lā
sundae	圣代	shèng-dài
Sundance	圣丹斯	Shèng-dān-sī
Sylvan	思尔文	Sī-ěr-wén
Symantec	赛门铁克	Sài-mén-tié-kè
Sysco	西斯科	Xī-sī-kē
T		
Tacoma	塔可玛	Tǎ-kě-mǎ

Taft	塔夫脱	Tǎ-fū-tuō
Taguba	塔古巴	Tǎ-gǔ-bā
talk show	脱口秀	tuō-kǒu-xiù
tank	坦克	tǎn-kè
Tannoy	天朗	Tiān-lǎng
tar	塔	tǎ
Tarascon	塔拉斯康	Tǎ-lā-sī-kāng
Target	塔吉特	Tǎ-jí-tè
tart	挞	tǎ
Taubman	陶布曼	Táo-bù-màn
taxi	的士	dí-shì
Teflon	铁氟龙	Tiě-fú-lóng
Tenneco	田纳科	Tián-nà-kē
Tenet	特内特	Tè-nèi-tè
Terylene	涤纶	Dí-lún
Tesco	塔斯科	Dǎ-sī-kē
	特易购	Tè-yì-gòu
Texaco	德士古	Dé-shì-gǔ
Texsun	泰克森	Tài-kè-sēn
Textron	特克斯特朗	Tè-kè-sī-tè-lǎng
Thomas	托马斯	Tuō-mǎ-sī
Thomson	汤姆森	Tāng-mǔ-sēn
Thurrow	梭罗	Suō-luó
Tide	汰渍	Tài-zì
Tiffany	蒂凡尼	Dì-fán-ní
Tillman	蒂尔曼	Dì-ěr-màn
tin	听	tīng
tips	贴士	tiē-shì
Titanic	泰坦尼克	Tài-tǎn-ní-kè
TNT	梯恩梯	Tī-ēn-tī
toast	土司	tǔ-sī
TOEFL	托福	Tuō-fú
TOEIC	托业	Tuō-yè
Toffee	太妃(糖)	Tài-fēi (tang)
Tom	汤姆	Tāng-mǔ
Toms	汤姆斯[杯]	Tāng-mǔ-sī(bēi)

ton	吨	dūn
TOPE	托普	Tuō-pǔ
Toronto	多伦多	Duō-lún-duō
torr	托	tuō
Torstar	托尔斯塔	Tuō-ěr-sī-tǎ
Tosco	托斯科	Tuō-sī-kē
Total	道达尔	Dào-dá-ěr
totem	图腾	tú-téng
Tottenham	托特纳姆	Tuō-tè-nà-mǔ
Trebor	天宝	Tiān-bǎo
Tribeca	特里布卡	Tè-lǐ-bù-kǎ
Tricon	特里康	Tè-lǐ-kāng
Troy	特洛伊	Tè-luò-yī
trust	托拉斯	tuō-lā-sī
Tulane	杜兰	Dù-lán
Tyco	泰科	Tài-kē
Tyleno	泰诺	Tài-nuò
Tyson	泰森	Tài-sēn
tyre	(轮)胎	(lún) tāi

U

UFO	幽浮	Yōu-fú
ultimatum	哀的美敦	āi-dì-měi-dūn
Utopia	乌托邦	Wū-tuō-bāng

V

Valero	瓦莱罗	Wǎ-lái-luó
valve	阀	fá
Vannevar	范尼瓦	Fàn-ní-wǎ
vaseline	凡士林	fán-shì-lín
Venice	威尼斯	Wēi-ní-sī
Venus	维纳斯	Wéi-nà-sī
Verizon	弗莱森	Fú-lái-sēn
Viacom	维亚康姆	Wéi-yà-kāng-mǔ
Viagra	伟哥	Wěi-gē
Villa	维拉	wéi-lā

vinylon	维纶	wéi-lún
violin	梵哑铃	fàn-yā-líng
Virgin	维珍	Wéi-zhēn
Virginia	弗吉尼亚	Fú-jí-ní-yà
Visa	维萨	Wéi-sà
Visteon	伟世通	Wéi-shì-tōng
vitamin	维他命	wéi-tā-mìng
Vodafone	沃达丰	Wò-dá-fēng
Vogue	沃古	Wò-gǔ

W

Wachovia	瓦乔维亚	Wǎ-qiáo-wéi-yà
waffle	华夫 (饼)	huá-fū (bǐng)
Wagoner	瓦格纳	Wǎ-gé-nà
Wake	瓦克	Wǎ-kè
Walden	华登	Huá-dēng
Walgreen	沃尔格林	Wò-ěr-gé-lín
Wall (Street)	华尔 (街)	Huá-ěr (jiē)
Walmart	沃尔玛	Wò-ěr-mǎ
Walras	沃尔拉斯	Wò-ěr-lā-sī
Walton	沃尔顿	Wò-ěr-dùn
Walt	沃特	Wò-tè
	华特	Huá-tè
waltz	华尔兹	huá-ěr-zī
Warner	华纳	Huá-nà
Warren	沃伦	Wò-lún
Warwick	华威	Huá-wēi
Waukisha	沃克沙	Wò-kè-shā
Wave	威福	Wēi-fú
Wedgwood	韦奇伍德	Wéi-qí-wū-dé
Weeks	威克斯	Wēi-kè-sī
Weill	威尔	Wēi-ěr
Weinbaum	温鲍姆	Wēn-bào-mǔ
Weirton	威尔顿	Wēi-ěr-dùn
Weiss	韦斯	Wéi-sī
Welch	韦尔奇	Wéi-ěr-qí

Wellcom	威康	Wēi-kāng
Wendell	温德尔	Wēn-dé-ěr
Wendy's	温迪氏	Wēn-dí-shì
Wesley	韦斯利	wéi-sī-lì
Weston	威斯顿	Wēi-sī-dùn
Wharton	沃顿	Wò-dùn
Whirlpool	惠而浦	Huì-ér-pǔ
whisky	威士忌	wēi-shì-jì
Whisper	护舒宝	Hù-shū-bǎo
White	怀特	Huái-tè
Wiley	威利	Wēi-lì
Wilkins	威尔金斯	Wēi-ěr-jīn-sī
Will	威尔	Wēi-ěr
William	威廉	Wēi-lián
Williams	威廉斯	Wēi-lián-sī
Wilson	威尔逊	Wēi-ěr-xùn
Wimbledon	温布尔顿	Wēn-bù-ěr-dùn
Windows	瘟倒死	Wēn-dào-sǐ
Winkler	温克勒	Wēn-kè-lè
Winn-Dixie	温-迪克斯	Wēn-dí-kè-sī
Winne	维尼	Wéi-ní
Winston	温斯顿	Wēn-sī-dùn
wire	威亚	wēi-yà
Wisconsin	威斯康辛	Wēi-sī-kāng-xīn
	威斯康星	Wēi-sī-kāng-xīng
Wit Soundview	威特-桑德维尤	Wēi-tè-sāng-dé-wéi-yóu
Wooldridge	伍尔德里奇	Wǔ-ěr-dé-lǐ-qí
Wolfowitz	沃尔福威茨	Wò-ěr-fú-wēi-cì
Woodward	伍德沃	Wǔ-dé-wò
Woolworths	沃尔沃斯	Wò-ěr-wò-sī
Wright	莱特	Lái-tè
	赖特	Lài-tè
wrong	乌龙	wū-lóng
Wyeth	惠氏	Huì-shì
Xerox	施乐	Shī-lè

Y

Yahoo	雅虎	yǎ-hǔ
yetties	雅特士	yǎ-tè-shì
yoga	瑜伽	yú-jiā
yuppies	雅皮 (士)	yǎ-pí-shì
yuffies	雅飞士	yǎ-fēi-shì

Z

Zagat	扎格特	Zhā-gé-tè
Zander	詹德	Zhān-dé
	桑德尔	Sāng-dé-ěr