Vowel Adaptation in English Loanwords Borrowed into Cantonese: A Data-driven Approach

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1 Introduction

Throughout history, English loanwords have constituted a substantial component of the Cantonese lexicon, with the earliest recorded instances dating to 1828. A majority of these loanwords exhibit phonetically adapted syllables; for instance, /bʌs/ "bus" transforms into /pa1 si2/ in Cantonese. Certain loanwords meld a single phonetically adapted syllable with native Cantonese morphemes, such as /bɪr/ "beer" evolving into /pɛ1 tsɐu2/ (with tsɐu2 signifying "wine"). Predominantly, loanwords function as nouns spanning a range of semantic categories, including food and beverages, leisure, and the workplace (Wong, 2012). However, the central question remains: is the pattern of vowel adaptation in English loanwords entering Cantonese predictable?

2 Cantonese Phonology

Before delving into the specifics of vowel adaptation in English loanwords borrowed into Cantonese, it is essential to understand the basics of Cantonese phonology and compare it with English phonology, particularly in terms of the vowel system and inventory. Cantonese, a variety of the Chinese language spoken primarily in Hong Kong and Guangdong, is a tonal language with a rich and complex phonological system. In comparison to English, Cantonese has a smaller vowel inventory, with a total of 11 monophthongs and 11 diphthongs. English, on the other hand, has 12 monophthongs and 8 diphthongs, depending on the accent or dialect.

The Cantonese vowel system comprises front, central, and back vowels, with various degrees of height (close, mid, and open) (see figures 1 and 2). Some Cantonese vowels, such as /y/ and /œ/, do not have direct equivalents in English. Conversely, English has certain vowels, like /ʌ/ and /ɜ/, which are not present in the Cantonese inventory. The diphthongs in Cantonese generally involve a glide from one monophthong to another, while in English, diphthongs may consist of a combination of monophthongs and semi-vowels.

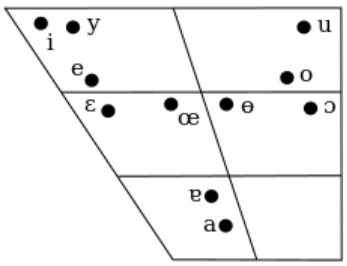

Figure 1: Cantonese monophthongs (Zee, 1999)

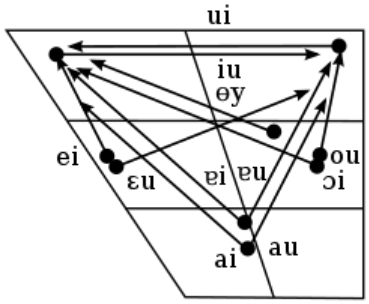

Figure 2: Cantonese diphthongs (Zee, 1999)

The tonal nature of Cantonese adds another layer of complexity to its phonology, with six tones plus three checked tones, which distinguish meaning based on pitch contour. In contrast, English is a stress-based language, where meaning is differentiated by the stress placement and pitch variations within syllables.

Understanding the differences and similarities between the Cantonese and English phonological systems, particularly regarding their vowel inventories, is crucial for examining the vowel adaptation process of English loanwords in Cantonese. This knowledge helps identify the challenges and patterns that emerge when mapping English vowels onto the Cantonese vowel system while adhering to the phonological constraints of the target language.

3 Previous Research

Borrowed words frequently undergo phonological adaptation, which often entails alterations to segmental or suprasegmental features. There exists an inclination to maintain the phonetic properties of the source language whilst conforming to the phonological constraints of Cantonese—a tonal language characterized by six tones and three checked tones. Extensive research has been conducted on the tonal adaptation of loanwords (Hao, 2009; Kiu, 1977), revealing that stressed syllables typically adapt to Tone 1 (dark level tone), whereas unstressed syllables gravitate towards Tone 2 (dark rising) or Tone 6 (light departing) (see figure 3), as exemplified by “motor” /ˈməʊtə/ transitioning into /mɔ1 ta2/ in Cantonese. Nonetheless, a noticeable gap in the literature persists regarding vowel adaptation and the potential impact of geographical variation, such as discrepancies between Hong Kong Cantonese and Guangzhou Cantonese.

$$\mathbf{V} \rightarrow \begin{cases} \text{tone 1} \;/\; \left[+ \overline{\text{stress}} \right] \\ \text{tone 2} \;/\; \left[\begin{matrix} \mathbf{V} \\ + \text{stress} \end{matrix} \right] \mathbf{X} \text{ —— } \# \\ \text{tone 6} \end{cases}$$

Figure 3: Tone assignment (Kiu, 1977)

This study posits that a discernible pattern exists in the vowel adaptation of English loan-

words incorporated into Cantonese. Intuitive understanding among native speakers in this study implies that this pattern of vowel adaptation might be predictable, potentially involving vowel raising.

4 Methodology

4.1 Data Collection

A compilation of approximately 100 pairs of English loanwords and their corresponding Cantonese transcriptions was assembled, drawing from sources from native speakers and mainly, the corpus of English loanwords in Hong Kong Cantonese (Bauer & Wong, 2008; Wong, 2012) (see Appendix for word lists). We divided the word list into three sublists: monosyllabic, disyllabic and trisyllabic. Two consultants—a Cantonese speaker from Hong Kong and another from Guangzhou—were engaged to read the loanwords aloud, with their speech subsequently recorded.

4.2 Data Analysis

Upon analyzing the collected data, we encountered a complex landscape of findings. The dataset exhibited a multitude of transformations, including instances of vowel raising, lowering, backing, fronting, rounding, and diphthongization (as indicated in the bolded vowels in examples 1 to 6), without yielding a clear pattern tied to vowel quality or position. Moreover, an attempt to explore geographical variation within this study presented a unique set of challenges.

(1) Vowel raising:
English: /kæʃ/ “cash”
Cantonese: /k^{h}**ɛ**1 sy4/

(2) Vowel lowering:
English: /ˈn**ʌ**mbər/ “number”
Cantonese: /l**ɐ**m1 pa2/

(3) Vowel backing:
English: /ˈmæŋgoʊ/ “mango”
Cantonese: /m**ɔ**ŋ1 kwɔ2/

(4) Vowel fronting:
English: /gɪˈt**ɑ**r/ “guitar”
Cantonese: /kit8 t^{h}**a**1/

(5) Vowel rounding:
English: /ti-ʃ**ɜ**rt/ “T-shirt”
Cantonese: /ti1 s**ɵ**t7/

(6) Diphthongization:
English: /ˈkʊk**i**/ “cookie”
Cantonese: /kʰʊk7 kʰ**ei**4/

In our data collection process, the Guangzhou Cantonese speaker demonstrated difficulty in understanding and accurately pronouncing a significant portion of the loanwords on our list. This was largely due to the fact that these loanwords were primarily derived from Hong Kong Cantonese, which, despite sharing a linguistic lineage with Guangzhou Cantonese, possesses a repertoire of loanwords that are not mutually intelligible between the two varieties. The high prevalence of loanwords in Hong Kong Cantonese can be traced back to historical factors, particularly the region’s prolonged contact with the English language during its tenure as a British colony. This contact, especially with the British variety of English, led to the incorporation of a substantial number of English loanwords into Hong Kong Cantonese - a phenomenon not mirrored to the same extent in Guangzhou Cantonese.

Due to these factors, the feasibility of conducting an independent scrutiny of geographical variation within the scope of this study was significantly impeded. It became evident that the historical, socio-cultural, and linguistic contexts of the respective varieties contribute to the disparities in their adaptation of loanwords, thus complicating the interpretation of our data.

5 Results

In light of the absence of an anticipated overarching trend of vowel raising, the research strategy was recalibrated to adopt a more empirical approach. Drawing from data-driven methodologies, an analysis rooted in frequency-based patterns was initiated, with the aim to identify and examine recurring patterns that emerged with noticeable regularity.

To facilitate this, the initial dataset, encompassing 244 instances of monosyllabic, disyllabic, and trisyllabic loanwords, was refined by excluding morphological vowel insertions and eliminating vowels with scarce adaptation samples. Consequently, the refined dataset contained 169 word pairs suitable for pattern analysis.

Morphological vowel insertions, also known as epenthesis, refers to the insertion of a vowel sound within a word to prevent the occurrence of unfamiliar or disallowed consonant clusters in the borrowing language. In the context of Cantonese loanword phonology, these insertions serve to conform the English loanwords to the phonotactic constraints of Cantonese, which typically does not permit certain types of consonant clusters that are found in English. To illustrate, consider the English word “film,” phonetically transcribed as /fɪlm/. Given that Cantonese does not permit a final consonant cluster /lm/, a vowel is inserted between /l/ and /m/, resulting in the adaptation /fei1 lɐm2/. The inserted vowel aids in making the word conform to Cantonese phonotactic rules. In our analysis, we decided to exclude morphological vowel insertions from our dataset. This is because these insertions are more a function of the phonotactic constraints of the borrowing language, rather than a reflection of the phonological or perceptual similarities between the sounds of the source and target languages. By excluding these insertions, we focused our analysis on the more direct adaptations of English vowel sounds to their Cantonese counterparts.

Table 1: Relative Frequency chart of English-Cantonese vowel mapping in loanwords

	English Vowels													
Cantonese Vowels	**ə**	**ɪ**	**æ**	**oʊ**	**ɑ**	**ʌ**	**ɔ**	**ɑɪ**	**i**	**eɪ**	**ɛ**	**aʊ**	**u**	**o**
a	41.20%		61.10%		57.10%	21.40%	8.30%	9.20%		12.50%				
i	14.70%	47.40%	11.10%						63.60%	12.50%				
ɪ	5.90%	26.30%	16.70%							37.50%				
y		5.30%		6.25%			8.30%							
ɛ	2.90%	5.30%	5.60%						9.10%		80%			
ɔ			5.60%	31.25%	28.60%		75%					66.70%		100%
ə	2.90%													
ɐ	11.80%	5.30%				57.10%								
u													100%	
ʊ	2.90%			31.25%		7.10%								
ɵ	5.90%					7.10%								
ai								54.50%						
æ					7.10%									
ɑu					7.10%	7.10%								
ɔi											20%			
eɪ		10.5%							27.30%	25.00%				
ou	11.80%			31.25%										
oʊ							8.30%							
ɵy										12.50%				
ɐi								36.30%						
ɐu												33.30%		
Total	34	19	18	16	14	14	12	11	11	8	5	3	3	1

The relative frequency chart were constructed to identify patterns in vowel adaptation. The chart displayed correlations between English vowels and their Cantonese counterparts. All correlations were included in the appendix for further reference. A cutoff of five data samples was set as a threshold to consider a correlation significant. This number was selected based on preliminary analysis, and further tests were conducted to explore the impact of raising this number on the results. The 50% benchmark was chosen as an indicator of a significant pattern in sound change. However, this number may be considered low, and further research is needed to determine a more accurate threshold. The literature on loanword phonology may provide insights into the appropriate and possibly higher benchmark for identifying patterns.

Drawing from the relative frequency table, the following phonological rules for vowel adaptation were proposed. Although the percentages are lower than the 50% benchmark, rules were proposed for /ə/ and /ɪ/ as well, as these vowels exhibited considerably larger sample sizes than other vowels.

Table 2: High-frequency phonological adaptations

Original Vowel	Adapted Vowel	Percentage
/ə/	/a/	41.20%
/ɪ/	/i/	47.40%
/æ/	/a/	61.10%
/ɑ/	/a/	57.10%
/ɑɪ/	/ai/	54.50%
/ʌ/	/ɐ/	57.10%

Several distinct vowel adaptation patterns were identified based on the data. In a number of instances, English vowels appeared to be reduced to the "simpler," frequently occurred Cantonese counterparts. For instance, English /ə/,/æ/ and /ɑ/ were all predominantly adapted as Cantonese /a/. This suggests that these specific Cantonese vowels might be perceived by Cantonese speakers as closer equivalents to the corresponding English vowels, thereby being more likely to be utilized in the adaptation process. In certain cases, such as the adaptation of English /ɑɪ/ as Cantonese /ai/, phonetic similarity appeared to play a significant role. This indicates that the process of vowel adaptation may not be arbitrary; instead, it seems to be influenced by the phonetic properties inherent to the vowels in both the source and target languages.

While the study illustrates the above findings, it is important to note that the sample size for some vowels was relatively small (e.g., /o/ adapting to /ɔ/ had only one occurrence). This underscores the necessity for larger datasets in future research to ensure more robust and representative results.

The potential role of individual differences was also considered in this study. Variability in vowel adaptation can be influenced by a multitude of factors, such as the speaker's familiarity with the source language and individual perception. Future research could delve deeper into this aspect, potentially employing sociolinguistic interviews or experimental phonetic studies to determine how factors such as language proficiency or exposure to English influence the process of adaptation.

6 Discussion

6.1 Mini-Experiment

To test the preliminary findings, a mini experiment was conducted, wherein a non-native speaker endeavored to adapt English words not present in the wordlist into Cantonese loanwords, following the rules derived from the preliminary results as shown on Table 2. Concurrently, a native speaker furnished transcriptions based on intuition. The outcomes revealed that vowel adaptation transcends a mere mapping of English vowels to their nearest Cantonese counterparts and necessitates consideration of the vowels' surrounding consonants (environment).

Table 3: Results of Mini-Experiment

English words	IPA (English)	Cantonese: Rules-based version	Cantonese: Native speaker's version
arson	/ˈɑrsən/	/ˈarsan/	/a1 sɐn2/
charge	/ʧɑrʤ/	/ʧarʤi/	/tsʰa1 tsʰy4/
fuse	/fjuz/	/fjuzi/	/fiu1 si2/
feel	/fil/	/fil/	/fiu1/
counter	/ˈkaʊntər/	/ˈkantar/	/ka:ŋ1 ta:2/
offer	/ˈɔfər/	/ˈɔfar/	/ɔ:1 fa4/
quality	/ˈkwɑləti/	/ˈkwaliti/	/kʰɔ1 lɐt4 ti2/
saxophone	/ˈsæksəˌfoʊn/	/ˈsaksiˌfɔn/	/sɛk1 si6 fʊŋ1/
supercali-	/ˌsuːpərˌkælɪ	/ˌsuːparˌkali	/sut1pʰa4 ka1li4
fragilistic-	ˌfrædʒɪˌlɪstɪk	ˌfradʒiˌlistik	fɛ1tsi4 li1si4dik2
expialidocious	ˌɛkspiˌælɪˈdoʊʃəs/	ˌɛkspeiˌaliˈdouʃasi/	ɪk6si4bi1 a1li4 tou1sət9si2/

The mini-experiment provides a microcosm of the intricacies involved in vowel adaptation in Cantonese loanwords. It reaffirms that vowel adaptation is not a straightforward, one-to-one mapping of English vowels to their nearest Cantonese equivalents, but rather a complex process that takes into account various phonetic and phonological factors, including the surrounding consonantal environment.

Consider the example of the English word "arson", transcribed as /ˈɑrsən/. The non-native speaker's attempt at adaptation resulted in /ˈarsan/. However, the native speaker's intuitive version (/a1 sɐn2/) shows the adaptation of the English schwa /ə/ to the Cantonese vowel /ɐ/, which, according to our preliminary findings, is not the most common adaptation for the English /ə/. This discrepancy highlights the importance of the consonantal environment in vowel adaptation. Furthermore, words like "charge" and "fuse" reveal an interesting deviation in the final vowel sound between the rules-based version and the native speaker's version. While the rules-based version adheres to a direct mapping strategy, resulting in /ʧarʤi/ and /fjuzi/, the native speaker's version (/tsʰa1 tsʰy4/ and /fiu1 si2/) exhibits a unique adaptation that possibly reflects the phonotactic constraints of Cantonese. Additionally, the results for the word "feel" demonstrate the potential influence of vowel length and quality on adaptation. The non-native speaker replicated the English vowel /i/ in the Cantonese version /fil/, while the native speaker opted for the long vowel /iu/ in the transcription /fiu1/. This suggests that in the native speaker's perception, the quality of the vowel sound may take precedence over its length. Finally, the word "supercalifragilisticexpialidocious" is a striking example of how the complexity of vowel adaptation increases with the length and complexity of the word. The non-native speaker's rules-based version, while attempting to maintain a direct mapping of the English vowels, results in a Cantonese version that is noticeably different from the native speaker's intuitive version.

In conclusion, the mini-experiment, while preliminary, provides valuable insights into the complexities of vowel adaptation in Cantonese loanwords. It underscores the importance of not only the individual vowel sounds but also the overall phonological and perceptual context in which these sounds occur. The results also highlight the potential limitations of a direct mapping approach to vowel adaptation, suggesting the need for a more nuanced understanding of this

complex process.

6.2 Theortical Framework

Moira Yip's seminal work, "The symbiosis between perception and grammar in loanword phonology" (2006), offers valuable insights into the adaptation of English vowels in Cantonese loanwords, emphasizing the interplay between phonological and perceptual factors in the adaptation process. As evidenced by our preliminary results, the complexities of vowel adaptation may involve more than merely mapping English vowels to their closest Cantonese counterparts, and this is where Yip's work becomes particularly relevant.

Yip's analysis, grounded in the Optimality Theory (OT) framework, highlights the importance of perception in loanword phonology. The adaptation process, as she demonstrates, is influenced not only by the phonological constraints of the target language but also by the perceived similarity between source and target language sounds. In her paper, Yip unveils key features of the environment affecting vowel adaptation. For instance, /ə/ adaptation rules encompass [aː] in open syllables and [ɐ] and [ø] in closed syllables, as evidenced by "foreman" /fɔːmən/ adapting to /fɔːmɐn/ in closed syllable, and "broker" /brəʊkə/ adapting to /pʊ1k**a**ː2/ in open syllable. These observations align with our preliminary results, where the environment played a significant role in determining the adapted vowel forms.

Yip's paper also presents several intriguing observations, which can be integrated into our discussion of vowel adaptation in Cantonese loanwords. She notes that, for pre-nasal instances, a quality match is more important than a length match when adapting vowels, as evidenced by English [æ] being adapted to Cantonese long vowels [aː] and [ɛː] despite their differing lengths. This preference for quality matching over length matching adds a layer of complexity to our understanding of loanword phonology and resonates with our findings in the preliminary results that [æ] is most frequently being adapted to [a] despite vowel length not being considered.

Furthermore, some of the phonotactic constraints affecting vowel adaptation in Cantonese. For example, [I] has a fairly restricted distribution, occurring only before velar consonants (very commonly before [k]), and not in open syllables or before labials and coronals. This information is crucial in understanding the limitations and preferences in vowel adaptation, helping to explain some of the patterns observed in our data. Yip also addresses the role of visual cues in the perception of rounded vowels, suggesting that speakers may entertain more than one option for novel vowel adaptations. According to her findings, more than one Cantonese vowel may satisfy MIMIC-VOWEL, a constraint that assesses vowel quality, not length. This indicates that the adaptation process involves choosing between multiple plausible outputs based on both phonological and perceptual factors, which aligns with our own observations of the complexity of vowel adaptation in the mini experiment.

By building on Yip's insights, future research could focus on integrating vowel adaptation patterns with consonant/environment-related discoveries to develop a more comprehensive understanding of the phenomenon. This could provide a more nuanced and complete picture of the factors shaping phonological processes in loanword adaptations.

While this study has provided valuable insights into vowel adaptation in Cantonese loanwords from English, it is important to acknowledge its limitations. Firstly, the selection of loan-

words, though based on the availability in the corpus, might not be fully representative of the broad spectrum of Cantonese loanwords from English. Secondly, the cutoff of five data samples and the 50% benchmark for identifying patterns in sound change, while practical for this preliminary study, may not accurately capture all significant patterns. Furthermore, the variability in loanword adaptation from person to person was noted but not comprehensively explored in this study. This interpersonal variation could significantly impact the identified patterns and is a factor that warrants more detailed examination. Lastly, while the findings of this study are supported by a mini-experiment, additional empirical research is needed to validate and extend these results.

7 Conclusion

In summation, the vowel adaptation of English loanwords incorporated into Cantonese constitutes a multifaceted process that extends beyond merely pairing English vowels with their most proximate Cantonese analogs. The environment surrounding the vowel, particularly consonants, assumes a pivotal role in determining the ultimate adaptation. Although the present study furnished some insights into potential patterns and rules for vowel adaptation, additional research is required to investigate the influence of consonant environments and other factors on shaping the vowel adaptation process in Cantonese.

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Appendix: Word Lists and vowel-mapping occurrences

Table 4: Monosyllabic Cantonese loanwords

English word	Cantonese transcription	English Vowel	Cantonese Vowel
jam	/tsim1/	æ	i
jack (poker)	/tsɪk7/	æ	ɪ
tie	/tʰai1/	aɪ	ai
tyre	/tʰai5/	aɪ	ai
mic	/mɐi1/	aɪ	ɐi
fight	/fɐi1/	aɪ	ɐi
pound	/pɔŋ6/	aʊ	ɔ
foul	/fɐu1/	aʊ	ɐu
card	/kʰat7/	ɑ	a
watt	/wɔt7/	ɑ	ɔ
tart	/tʰat7/	ɑ	a
gay	/kei1/	eɪ	ei
cake	/kʰɪk7/	eɪ	ɪ
beat	/pit7/	i	i
lift	/lip7/	ɪ	i
grip	/kip7/	ɪ	i
mold	/mou1/	oʊ	ou
ball	/pɔ1/	ɔ	ɔ
boot	/put7/	u	u
fund	/fɐn7/	ʌ	ɐ
pump	/pɐm1/	ʌ	ɐ
ton	/tɵn1/	ʌ	ɵ

Table 5: Disyllabic Cantonese loanwords

English Word	Cantonese Word	First English Vowel	First Cantonese Vowel	Second English Vowel	Second Cantonese Vowel
sofa	/sɔ1 fa3/	ɔ	oʊ	a	ə
bow tie	/pou1 tʰai1/	oʊ	ou	aɪ	ai
cigar	/syt8 ka1/	ɪ	y	ɑ	a
guitar	/kit8 tʰa1/	ɪ	i	ɑ	a
boycott	/pui1 kɔt8/	ɔɪ	ui	ɑ	ɔ
cookie	/kʰʊk7 kʰei4/	ʊ	ʊ	ei	i
pancake	/pan1 kʰɪk7/	æ	a	eɪ	ɪ
salad	/sa1 lət2/	æ	a	ə	ɵ
fashion	/fa1 sɐn2/	æ	a	ə	ɐ
wire	/wɐi1 ja2/	aɪ	ɐi	ə	a
sergeant	/sa1 tsin2/	ɑ	a	ə	i
modern	/mɔ1 tɐŋ1/	ɑ	ɔ	ə	ɐ
margin	/ma1 tsin2/	ɑ	a	ə	i
laser	/ləy4 sɛ6/	eɪ	ɵy	ə	ɛ
lemon	/lɪŋ4 mʊŋ1/	ɛ	ɪ	ə	ʊ
engine	/æn1 tsin2/	ɛ	æ	ə	i
sister	/si1 ta2/	ɪ	i	ə	a
motor	/mɔ1 ta2/	oʊ	ɔ	ə	a
broker	/pʊ1kaː2/	oʊ	ʊ	ə	a
yoga	/jy4 ka1/	oʊ	y	ə	a
soda	/sɔ1 ta2/	oʊ	ɔ	ə	a
order	/ɔ1 ta2/	ɔ	ɔ	ə	a
sauna	/sɔŋ1 na4/	ɔ	ɔ	ə	a
cushion	/ku1	ʊ	u	ə	ɵ
number	/lɐm1 pa2/	ʌ	ɐ	ə	a
brother	/pa1 ta2/	ʌ	a	ə	a
trouble	/tsʰa4 pou1/	ʌ	a	ə	ou
truffle	/tsʰʊŋ4 lou6/	ʌ	ʊ	ə	ou
library	/lai1 pa2/	aɪ	a	ɛ	a
cassette	/kʰat7 sɪk7/	ə	a	ɛ	ɪ
spare	/si6 pɛ1/	ø	i	ɛ	ɛ
t-shirt	/ti1 sət7/	i	i	ɜ	ɵ
taxi	/tɪk7 si2/	æ	i	i	i
jelly	/tsɛ1 lei2/	ɛ	ɛ	i	ei
cream	/kei6 lim1/	ø	ei	i	i
coffee	/ka3 fɛ1/	ɔ	a	i	ɛ
movie	/mu1 fi2/	u	u	i	i
darling	/ta2 lɪŋ2/	ɑ	a	ɪ	ɪ
omelette	/ɐm1 lit9/	ɒ	ɐ	ɪ	i
bearing	/pɛ1 lɪŋ2/	ɛ	ɛ	ɪ	ɪ
stick	/si6 tɪk7/	ø	i	ɪ	ɪ
bowling	/pou2 lɪŋ4/	oʊ	ou	ɪ	ɪ
cutlet	/kɐt7 lit9/	ʌ	ɐ	ɪ	i
argue	/au3 kiu6/	ɑ	au	ju	i

English Word	Cantonese Word	First English Vowel	First Cantonese Vowel	Second English Vowel	Second Cantonese Vowel
file	/fai3 lou2/	aɪ	ai	l	ou
fail	/fei4 lou2/	eɪ	ei	l̩	ou
cash	/kʰɛ1 sy4/	æ	ɛ	ø	y
cast	/kʰa1 si2/	æ	a	ø	i
size	/sai1 si2/	aɪ	ai	ø	i
pear	/pɛ1 lei2/	ɛ	ɛ	ø	ei
pence	/pin6 si6/	ɛ	i	ø	i
cheese	/tsi1 si2/	i	i	ø	i
film	/fei1 lɐm2/	ɪ	ei	ø	ɐ
mince	/min5 tsi6/	ɪ	i	ø	i
tips	/tʰip7 si2/	ɪ	i	ø	i
fuse	/fiu1 si2/	ju	i	ø	i
toast	/tɔ1 si2/	oʊ	ɔ	ø	i
pose	/pʰou1 si2/	oʊ	ou	ø	i
fluke	/fu4 lʊk7/	u	u	ø	ʊ
bus	/pa1 si2/	ʌ	a	ø	i
punch	/pɐn1 tsi6/	ʌ	ɐ	ø	i
puff	/pʰau3 fu4/	ʌ	au	ø	u
guts	/kɐt7 si6/	ʌ	ɐ	ø	i
mango	/mɔŋ1 kwɔ2/	æ	ɔ	oʊ	ɔ
cologne	/ku2 lʊŋ4/	ə	u	oʊ	ʊ
encore	/æn1 kʰɔ1/	ɑ	æ	ɔ	ɔ
store	/si6 tɔ1/	ø	i	ɔ	ɔ
sirloin	/sɐi1 laŋ1/	ɜː	ɐi	ɔɪ	a
plum	/pou3 lɐm1/	ø	ou	ʌ	ɐ
donut	/tʊŋ1 lɐt7/	oʊ	ʊ	ʌ	ɐ
ounce	/ɔn1 si2/	aʊ	ɔ	ø	i
brake	/pɪk7 lɪk7/	eɪ	ɪ	ø	ɪ
kiss	/ki1 si2/	ɪ	i	ø	i
boss	/pɔ1 si2/	ɔ/ɑ	ɔ	ø	i

Table 6: Trisyllabic Cantonese loanwords

English	Cantonese	First English Vowel	First Cantonese Vowel	Second English Vowel	Second Cantonese Vowel	Third English Vowel	Third Cantonese Vowel
spare tire	/si6 pɛ1 tʰai1/	ø	i	ɛ	ɛ	aɪ	ai
spanner	/si6 pa1 na2/	ø	i	æ	a	ə	a
carnival	/ka1 nin4 wa4	ɑ	a	ə	i	ə	a
vanilla	/wɐn6 nɛ1 na2/	ə	ɐ	ɪ	ɛ	ə	a
heroin	/hɔi2 lɔk8 jɱ1/	ɛ	ɔi	o	ɔ	ə	ɪ
chocolate	/tsy1 ku1 lɪk7/	ɔ	y	ø	u	ə	ɪ
snooker	/si6 lʊk7 ka2/	ø	i	ʊ	ʊ	ə	a
brandy	/pak9 lan4 tei6/	ø	a	æ	a	i	ei
calorie	/kʰa1 lou6 lei5/	æ	a	ə	ou	i	ei
bikini	/pei2 kin1 nei4/	ɪ	ei	i	i	i	ei
carefree	/kʰɛ1 nɛ1 fɛ1/	ɛ	ɛ	ø	ɛ	i	ɛ
forecast	/fɔ1 ka4 si2/	ɔ	ɔ	æ	a	ø	i
dacron	/tɪk7 kʰɔk8 lœŋ4/	æ	ɪ	ɑ	ɔ	ø	œ
Cocaine	/hɔ2 kʰa1 jɐn1/	oʊ	ɔ	eɪ	a	ø	ɐ
tennis	/tɛn1 nə4 si2/	ɛ	ɛ	ə	ə	ø	i
cherry	/tsʰɛ1 lei4 tsi2/	ɛ	ɛ	i	ei	ø	i
sandwich	/sam1 mɐn4 tsi6/	æ	a	ɪ	ɐ	ø	i
golf	/kɔ1 ji5 fu1/	ɔ	ɔ	ø	i	ø	u
saxophone	/sɪk7 si6 fʊŋ1/	æ	ɪ	ə	i	oʊ	ʊ
microphone	/mɐi1 kou1 fʊŋ1/	aɪ	ɐi	ə	ou	oʊ	ʊ
disco	/tɪk7 si6 kou1/	ɪ	ɪ	ø	i	oʊ	ou
passport	/pa1 si4 pʰɔt1/	æ	a	ø	i	ɔ	ɔ
salmon	/sam1 mɐn4 jy4/	æ	a	ə	ɐ	ø	y