Phonological process in Japanese loanwords: Gairaigo and Wasei Eigo

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Abstract - This study delves into phonological processes and changes in two distinct categories of loanwords in Japanese: gairaigo (foreign loanwords) and wasei eigo (Japanese-coined English words). Gairaigo are borrowings from foreign languages, predominantly English, while wasei eigo refers to words created within the Japanese language using English morphemes. The phonological adaptation of these loanwords undergoes various processes, e.g., assimilation, syllable structure, attenuation and strengthening, and neutralization. These processes are reflecting the dynamic nature of language contact and cultural exchange. In the case of gairaigo, phonological processes often involve the adaptation of sounds to conform to Japanese phonotactics and speech patterns. This may include the simplification or substitution of consonant clusters, vowel lengthening or shortening, and the incorporation of pitch accent patterns native to Japanese. Wasei eigo, on the other hand, undergoes phonological changes rooted in the native Japanese phonological system. Despite being constructed with English morphemes, wasei eigo words often exhibit phonetic features characteristic of Japanese. Moreover, these words may evolve over time through processes of sound change and assimilation, reflecting shifts in linguistic preferences and cultural influences. Overall, the phonological adaptation of gairaigo and wasei eigo showcases the linguistic borrowing, cultural assimilation, and the phonological systems of both source and target languages. Understanding these processes provides insights into the dynamic nature of language contact and the evolution of linguistic diversity in Japanese society.

Keywords: *Gairaigo*; *Wasei Eigo*; phonological process; sound change

1. Introduction

Japanese loanword is a phenomenon of loan-translation or calque which covers alteration in phonological and morphological level. This phenomenon is exquisite since the process manages to maintain the origin of the meaning of the words, from the source language, despite the change in the target language. As a Japonic language family, Japanese experiences two types of calques, namely gairaigo (loanwords that have been adopted into Japanese while retaining their original meaning) and wasei eigo (Japanese made English). Both gairaigo and wasei eigo are mostly influenced by English, Dutch, Chinese, Portuguese, and German. Gairaigo works by keeping the word from changing the meaning, as in miruku (ミルク) which means milk, however in wasei eigo the word experiences a slight change in form and meaning as in baikingu (バイキング). This word is used to mean "viking", however, the Japanese nowadays associate it with "buffet". Despite the change in meaning, the origin of the meaning of the word remains. Other instances of gairaigo are erebeetaa (エレベーター/elevator/lift), pasokon (パソコン), bataa (バ ター/butter), and miruku (ミルケ/milk) and other examples of wasei eigo are meiku (メイク/make up), rinsu (リンス/ hair conditioner), and sūpā (スーパー/supermarket). Apart from one word wasei eigo, Japanese also use a combined wasei eigo, where two words with more than three syllables are formed into abbreviated words combination, as in rimokon (リモコン/a combination between "remote" and "control" means remote control), shīemu (CM (シーエム/ a combination between "commercial" and "message" means commercial), and pasokon (パソコン/derived from "personal" and "computer" means laptop), Gairaigo and wasei eigo are commonly transcribed in katakana (list of characters used for writing loanwords).

Japanese language recognizes nine consonants, i.e., k, s, t, n, h, m, y, r, w, the sound 'n', however the only character that can stand on its own as a consonant is the sound 'n' \supset or \land . Other consonants must be occupied with vowels a, i, u, e, and o to create the "Japanese consonant" from the common one to be pronounced based on the Japanese pronunciation. The complete list of Japanese consonants is presented in the following chart.



Figure 1 Consonants coupled with vowels in Japanese

Due to the difference in phonological system, the sound produced in *gairaigo* and *wasei eigo* is adjusted to the target language by adding or inserting the vowel sound after the consonant. The vowel is determined by the sound similarity of the last consonant in a syllable, as in 'ice cream' into $\mathcal{P}\mathcal{A}$. $\mathcal{P}\mathcal{I}\mathcal{A}$ (*aisu kuriimu*) where the vowel 'u' and 'i' are inserted and added in the last syllable consonant with similar sound. The insertion of vowels after a consonant is essential for constructing a *gairaigo* and *wasei eigo*, and this leads to syllables and various phonological process changes within the words

Phonologically, the sound changing processes are ranging from distribution to grouping depending on the type of change occurs, these cover *assimilation* in which all segments within all syllables become more similar; *syllable structure* where alternations occur in the consonant-vowel distribution; *attenuation and strengthening* where the segments are modified according to their position

in a lexicon; and *neutralization* where the segments are grouped in certain environment (Schane, 1992). All these processes are likely to occur in all *gairaigo* and *wasei eigo*. Contrasting the loanwords, if we refer to the native Japanese lexicons, less various changes can be encountered since it is limited to sound [n] altering into [n], [m], and [ŋ], as in *kantan* (かんたん/smart), *konbanwa* (こんばんわ/good night), *kanpeki* (かんぺき/perfection), *tabun* (たぶん/perhaps), and *mikan* (みかん/orange). Other sound alterations, however, are rarely found.

Reflecting on this case, this paper will try to investigate the phonological processes in *gairaigo* and *wasei eigo* as these provide more complex sound change in comparison to the native langauge. Furthermore, phonological rules will also be determined in the phonological process by applying the theories of generative phonology, especially about phonological processes, and phonological rules. The analysis is also supported with *gairaigo* types by Ishiwata (2001) and Shibatani (2001) as well as *katakana* transformation by Kawarazaki (2004). Through the application of observing method and, the data collected can be analyzed accurately to reveal various sound variations and alterations in Japanese.

Shinohara and Subiyanto (2023) investigated the phonological process involving Japanese affricates [dz] and [ts] as pronounced by Javanese native speakers. The study analyzed how these speakers handle affricates, considering the phonetic differences between Japanese and Javanese, and highlighted specific areas of difficulty in pronunciation. Winingsih (2024) explored the errors made by second-year students in the use of Japanese particles in relative clauses. Her research aimed to uncover the common mistakes that occur when students try to structure complex clauses in Japanese, especially within the context of writing popular articles.

Trahutami and colleagues (2024) focused on the language style and meaning in Glico product advertisements on the Glico Japan YouTube channel. The study looked at how rhetorical strategies and language choices impact audience engagement and brand perception. Wiyatasari (2024) analyzed the features of grammatical and lexical cohesion in Japanese cosmetic advertisements, offering insights into how cohesive devices are employed to create persuasive discourse in the beauty industry.

Arfianty and Mulyadi (2024) examined the representation of the uchi and soto concepts in Japanese social deixis, exploring how these culturally significant terms influence social interactions and communication practices in Japanese society. Febriyani (2024) studied the influence of cultural context in Japan's intercultural negotiations by analyzing the drama Nihon Chinbotsu: Kibo no Hito. The research highlighted how cultural factors shape negotiation strategies, emphasizing the role of context in successful communication across cultures.

Iwamoto (2020) explored the effect of loanword status in Japanese on the length of vowels inserted between consonant clusters when L1 Japanese speakers speak L2 English. The study provided insights into how Japanese phonological rules influence the pronunciation of English, particularly in relation to loanwords. Siame et al (2023) investigated the phonological processes involved in the borrowing of English words into the Lungu, Mambwe, and Namwanga languages, analysing how these languages adapt foreign words to fit their native phonological systems.

Quackenbush (1977) examined the challenges faced by English-speaking learners in mastering English loanwords in Japanese. His research highlighted the difficulties caused by the structural differences between the two languages, which make certain sounds and word patterns challenging to learn. Tobin (2009) compared and contrasted three major phonological theories—Natural Phonology, Optimality Theory, and the Theory of Phonology as Human Behavior—offering a theoretical perspective on how different frameworks approach the same linguistic phenomena.

Lovins (1973) analysed how loanwords impact the phonological structure of Japanese, discussing how foreign sounds are adapted into the language. Peperkamp, Vendelin, and Nakamura (2008) conducted experimental research on the perceptual origins of loanword adaptations in Japanese, suggesting that perception plays a key role in how Japanese speakers adjust foreign words to fit their native phonological system. Wang (2023) studied how L2 proficiency influences the adaptation of English loanwords into Mandarin, focusing on the variable adaptation of the co-occurrence of low vowels and nasals, and providing insights into how linguistic proficiency impacts phonological adaptation.

2. Method

The phonological process occurred as the result of loan translation can be mainly recognized through the process of listening. Therefore, the lexicons are gathered from Japanese learning videos downloaded from Japanesepod101 and Waku-Waku Japanese, a channel providing abundance lessons for learning

Japanese language and culture with English as the lingua franca. The *gairaigo* and *wasei eigo* are pronounced in both English and Japanese language, thus the sound change can be clearly heard.



Figure 2 Example of Japanese Lexicon from JapanesePod101 and Waku-Waku Japan

The *gairaigo* and *wasei eigo* are transcribed in *katakana*, indicating foreign words. Japanese loanwords are quite easy to comprehend due to the sound similarity to its source language with the frequent occurrence of sound alteration. Furthermore, these lexicons hold simplicity in reading in Latin transcription because the sounds match the characters, in other words there are not too many rules binding the pronunciation, underlying the main reason of choosing the data.

The data are collected through listening and taking notes on some words representing the phonological process in this study. By listening comprehensively, the sound change can be heard to be later analyzed. Furthermore, in analyzing the data, the method used is the intralingual equivalent method. This method works by comparing lingual elements, within one language or in several different languages (Mahsun 2005: 112). For supporting the method, a differential comparison technique or in Indonesian language known as *Teknik Hubung Banding Membedakan (HBB)* by providing data in the source language and Japanese. In addition, phonetic transcriptions are provided thus the occurred sound changes can be identified and then analyzed descriptively. The results of the analysis are presented using formal and informal methods where the data are presented in a table and descriptively described in words.

The analysis focuses on the scope of generative phonology theory by Schane (1992) specifically in phonological processes and phonological rules. Schane divides phonological processes into four main categories, namely assimilation (the segments become increasingly similar), syllable structure (there are alternations in the consonant-vowel distribution), attenuation and strengthening (the segments are modified according to their position in the word), neutralization (segments are joined in a particular environment). Meanwhile, phonological rules can be divided into feature change rules, deletion and insertion rules, permutation and transfer rules, and variable rules.

In addition to Schane's phonological rules, this study is also conducted by referring to the *gairaigo* types by Ishiwata and Shibatani (2001) and Kawarazaki (2004) about katakana transformation. Ishiwata argues that *gairaigo* is foreign words that turns into Japanese. However, some word taken from Chinese language is not called *gairaigo*, yet they have their respective category or type. The *gairaigo* itself specifically refers to words derived from European languages. The function of *gairaigo* is categorized to express new concepts and ideas, to express new image, to replace old gairaigo, technical terms of professionalization period, influence of internationalization period, to express euphemism, and originates in language structure Ishiwata (1986) (in Oshima 2002). Regarding its function and development, *gairaigo* and *wasei eigo* have merged into daily Japanese usage, then creating change in its transcription. this is leading to Katakana transformation as mentioned by Kawarazaki (1998) that names from foreign languages are written using katakana by first converting them into Japanese pronunciation. This causes a change in the pronunciation of names from foreign languages when written in Japanese using *katakana*.

3. Results and Discussion

(1) Assimilation

Assimilation occurs because a segment is influenced by the characteristics of other segments around it, so that the sound becomes more and more similar. In Japanese, assimilation is often found in the sound [n] (\mathcal{L}), where this sound can be realized as [n], [m], and [n] due to the process of assimilation with subsequent sounds where the similarity of these sounds is due to the similarity place and manner of articulation. The data will be presented as follows:

English word and phonetic	Japanese word and phonetic transcription	Japanese
transcription		script
Cunning (cheating in	kanningu ['kʌnɪŋgu]	カンニング
exam)/[ˈkʌnɪŋ]	CV-CVC-CV	
CV-CVC		
Sandal/[ˈsændəl]	Sandaru [sʌndʌru]	サンダル
CVC-CVC	CVC-CV-CV	
Rinse (hair conditioner) /[rɪns]	Rinsu [rɪnsu]	リンス
CVCC	CVC-CV	
Kentucky Fried Chicken/	Kentakkī furaido chikin [kənˈtʌki	ケンタッキー フライド チキン
[kənˈtʌki fraɪd ˈʧɪkən]	foraidoʻfikiŋ]	
CVC-CVC-CV CCVC CV-CVC	CVC-CVC-CV CV-CVV-CV CV-CVC	
Talent/['tælənt]	Tarento [tʌrɛnto]	タレント
CV-CVC	CV-CVC-CV	
Convenience store/ [kənˈvinjəns	Konbini [kɔmbɪni])	コンビニ
stor]	CVC-CV-CV	
CVC-CV-CCVC CVC		
Computer/[kəmˈpjutər]	Konpyuutaa [kɔmpyu:ta:]	コンピュ-タア-
CVC-CCV-CVC	CVC-CCV-CV	
To jump/ [tu ʤлmp]	Janpu suru [ʤлтриsuru]	ジャンプする
CV-CVC	CVC-CV CV-CV	
Handkerchief/['hænkərtʃif]	hankachi[hʌŋkʌʧɪ]	ハンカチ
CVC-CVC-CVC	CV-CV-CV	

Table 1 Gairaigo and wasei eigo experiencing assimilation

The sound [n] is still pronounced [n] (apicoalveolar nasal) if it is placed before the sounds [d] (voiceless apicoalveolar inhibition), [t] (voiceless apicoalveolar inhibition), [s] (voiceless fricative lamino palatal), and [n] (apicoalveolar nasal). As in the words: sandaru, rinse, tarento, and kentaki furaido cikin. Therefore, there is no sound change in these data.

The sound [n] will be pronounced as [m] (bilabial nasal) if it is placed before the sound [p], which is a voiceless bilabial stop sound and [b], which is a voiced bilabial stop sound; as in the words: konbini, konpyuutaa, janpu suru, and gyanbaru suru. This sound change can be written in the following rules:

$$\begin{bmatrix} K \\ + Nasal \\ + Koronal \\ + Anterior \end{bmatrix} = > \begin{bmatrix} K \\ + Nasal \\ - Koronal \\ + Anterior \end{bmatrix} / \underline{\qquad} K \begin{bmatrix} -Koronal \\ + Anterior \end{bmatrix}$$

The sound [n] will be pronounced as [n] (dorsovelar nasal) if it is located before the sound [g] (voiced dorsovelar stop) and [k] (voiceless dorsovelar stop), and when it is at the end of a word, as in the words: kaninggu, hankachi, and cikin. This process can be written in the following rules:

$$\begin{bmatrix} K \\ + Nasal \\ + Koronal \\ + Anterior \end{bmatrix} => \begin{bmatrix} K \\ + Nasal \\ - Koronal \\ -Anterior \end{bmatrix} / \underline{\qquad} K \begin{bmatrix} -Koronal \\ -Anterior \end{bmatrix}$$

(Sound [n] which becomes [n] if it is placed prior to [k] and [g])
$$\begin{bmatrix}
K \\
+ Nasal \\
+ Koronal \\
+ Anterior
\end{bmatrix} => \begin{bmatrix}
K \\
+ Nasal \\
- Koronal \\
- Anterior
\end{bmatrix} / ____#$$

(An [n] sound that alters into [n] when being placed in the final position)

All data demonstrate the assimilation between the consonant sounds. This process results in three different realizations of the phoneme /n/, namely the sound [n], [m], and [n].

(2) Syllable Structuring Process

Alterations in the syllable structure can occur due to the omission or insertion of vowels or consonants, the combination of two segments into one. This process is encountered in the following words:

Table 2 Gairaigo experiencing syllable structuring process

English word and phonetic transcription	Japanese word and phonetic transcription	Japanese script
Christmas	Kurisumasu/ [kʊrɪsʊmasu]	クリスマス
[ˈkrɪsməs]	CV-CV-CV-CV	
CCVC-CVC		
Soprano	Sopurano/	ソプラノ
[səˈprænoʊ]	[sɔpʊrano]	
CV-CCVV-CVV	CV-CV-CV	

Both words *kurisumasu* and *sopurano* depict a perfect example of syllable structure, specifically the insertion of vowels or epenthesis. Japanese language is well-known for its rarely encountered clusters, therefore, to avoid the formation of consonant clusters, the vowel [u] in the words *kurisumasu* and *sopurano is* inserted. As a result, there is a change in the structure of the syllable from CCVC-CVC to CV-CV-CV-CV-CV; and CV-CCVV-CVV to CV-CV-CV-CV. This process can be written in the following formula:

$$\emptyset = > \begin{bmatrix} V \\ +High \\ +Round \end{bmatrix} / K \underline{\qquad} K$$

(3) Attenuation and Strengthening

In Japanese there tends to be sound reinforcement, especially in *gairaigo* where there is a trill sound [r] which follows the vowel sound, the result is that when you pronounce it there is a contraction of the vowel. The process of vocal contractions, described in the data below.

Table 3 Gairaigo experiencing attenuation and strengthening

English word and phonetic transcription	Japanese word and phonetic transcription	Japanese script
Hamburger/['hæmbɜ:rgər] CVC-CVC-CVC	Hambaagaa/[hambaagaa] CVC-CVV-CVV	ハンバ-ガ-
Apartment/[əˈpɑ:rtmənt] V-CVCC-CVC	Apaato/[apaato] V-CVV-CV	アパ-ト
Concert/[ˈkɑːnsərt] CVC-CVCC	Konsaato/[kɔnsaato] CVC-CVV-CV	コンサ-ト

The vowel [a] contracts in the three data above to avoid pronouncing the sound [r] in the words *hambaagaa*, *apaato*, and *konsaato*. This is because syllables in Japanese cannot end in closed syllables, so a vowel is needed to replace the sound [r] to become an open syllable. This process can be written in the following terms:

$$V \Rightarrow [+ Long] / \underline{\hspace{1cm}} \begin{bmatrix} K \\ -Lateral \end{bmatrix}$$

(4) Neutralization

Neutralization occurs because of the elimination of phonological distinctions in certain environments. In Japanese, the neutralization process tends to occur in consonants, namely in the

sound [v] (voiced labiodental fricative) to [b] (voiced bilabial plosive). The neutralization process is shown by the data below:

Table 4 Gairaigo experiencing neutralization

English word and phonetic transcription	Japanese word and phonetic transcription	Japanese script
Elevator/['eliveitər]	Erebeetaa/[erεbε:ta:]	エレベーター
V-CV-CVV-CVC	C-CV-CVV-CVV	
Television/['telɪvɪʒn]	Terebi/[tɛrɛbi]	 テレビ
CV-CV-CV-CVC	CV-CV-CV	

Neutralization occurs for the sounds [v] and [b], which is called consonant neutralization, where the sound [v] changes to the sound [b] to suit the pronunciation in Japanese. This is because in Japanese there is no [v] sound. The sound [b] was chosen because there are similar characteristics, namely both [+voiced] and [+anterior]. This change can also be referred to as an archiphoneme (which is the equivalent of neutralization, as occurs in the words *sabtu* and *saptu* in Indonesian), the sound changes in [v] and [b] does not cause any change in meaning either in the basic form or the word form after being adapted to Japanese. This process can be written in the following terms:

$$\begin{bmatrix} K \\ + Malar \\ + Obstruen \end{bmatrix} = > \begin{bmatrix} K \\ + Malar \\ + Obstruen \end{bmatrix} / \underline{\qquad}$$

4. Conclusion

Gairaigo and wasei eigo are the depiction of the rapid development of Japanese language, specifically in the level of lexicon. The analysis reveals that Japanese language experience several phonological processes, covering assimilation, changes in syllable structure, strengthening and weakening, and neutralization. All these process affects the katakana transformation, sound change, and the syllable structure within the lexicon. The loanwords (*gairaigo* and *wasei eigo*) experience more variative sound change and process in phonology, starting from the assimilation (*Kaninggu, sandaru,* and *rinsu*), syllable structure as in (*kurisumasu* and *sopurano*), strengthening and attenuation (*hambaagaa, apaato, konsaato*), and neutralization (*erebeeta* and *terebi*). In comparison with the native Japanese lexicons, the sound change is limited to the alteration of sound [n] into [n], [m], and [n].

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