

# Sub-Lexical Phonological Cues in Japanese Kanji Reading

\*Wan Nur Syazwani

Academy of Language Studies, Universiti Teknologi MARA

\*Corresponding Author

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## ABSTRACT

Sub-lexical phonological cues in Japanese Kanji refer to the information embedded within parts of a Kanji character that provide hints about the character's pronunciation. While Kanji is primarily processed as a whole-word (lexical) logographic unit, sub-lexical processing operates serially, particularly in phonetic compounds (Keisei Moji). Despite the increasing number of Japanese language learners, many studies have highlighted learners' difficulties in learning Japanese, especially with Kanji. The complexity of Kanji starts to be a challenging slope for learners. Each kanji character can have multiple readings, and appropriate pronunciation need to be chosen according to the context in which the character is used. In English language, letters from alphabet are used to represent pronunciation, while in Japanese, Kanji have multiple pronunciations depending on the context in which they are used. As learners increase their proficiency, it is a desirable outcome that they will become less reliant on instant learning aids, and more reliant on their own memory when deducing the readings of unknown kanji in newspapers and magazines. The ability to identify phonological cues in Kanji can be considered as one of the alternatives to ease the Kanji reading among learners.

**Keywords:** Phonology, Kanji, Japanese language

## INTRODUCTION

There are three types of writings in Japanese language: Hiragana, Katakana and Kanji. The one labelled as the most difficult among all is Kanji. While Hiragana and Katakana only have one pronunciation for each character, Kanji has more than one pronunciation for each character (Kang & Saito, 2025). The complexity of Kanji with multiple readings for each character makes it highly time-consuming. Kanji characters are parts of logographic writing system used in both Japan and China (Huan, 2019). There is more or less 50 000 Kanji characters in Japanese language (Kochimaheni, 2018). The Japanese government listed 2136 Kanji characters needed to be learnt by foreign students as these cover the common Kanji used in daily life.

Reading Japanese Kanji presents a challenge for non-native learners due to its complex relationship between orthography and pronunciation. Unlike alphabetic systems, Kanji characters have multiple readings, making decoding it difficult. In Kanji, there is no one-to-one mapping between the character's visual form and its pronunciation. There are two types of readings for each Kanji character: On-reading (Chinese-derived readings) and Kun-reading (native Japanese readings) (Backhaus, 2014). Despite the complexities, the information embedded within Kanji characters, known as phonetic components, provides sub-lexical cues to Kanji reading. These cues give hint about Kanji characters' pronunciation, and this helps readers to decode it. For example, 寿司(sushi) and 上司(joushi) have phonetic component 司 on the right side, which is pronounced as /shi/.

Each kanji character usually has two readings. For example, Kanji character 高 can be seen in 高校(koukou) and 高い(takai), but have different readings. It is pronounced as /kou/ in 高校(koukou) and /tai/ in 高い(takai). For some Kanji, it even has more than 2 readings. These numerous pronunciations for each type of Kanji characters is a big hurdle for non-native learners especially those coming from alphabetical background language. Haththotuwa Gamage (2003) mentioned rote memorization as the most frequently used strategy in learning Kanji, in which learners try to remember the Kanji by writing it repeatedly. Hamilton (2019) later claimed that learning

to detect sub-lexical phonological cues in Kanji allow learners to bypass rote learning of Kanji reading for a larger number of characters.

Unlike reading research in Malay or English language, which usually emphasizes on text comprehension, research on Japanese Kanji reading often focuses on character recognition and phonological retrieval. The study on sub-lexical cues in Kanji reading is more on accessing how learners use phonological cues to pronounce Kanji characters rather than their comprehension in reading text. It can be considered as a component of reading skill. Word identification is the first step in Japanese reading before getting to understand the text. Incorrect identification of characters and words can result in incorrect understanding of characters and words (Thitisorn, 2024).

## LITERATURE REVIEW

### Types of Japanese Writings

Japanese used to be an oral language and did not have a well-developed orthography of its own (Seeley, 1984). The origin of Kanji can be associated with borrowed Chinese characters. Scholars of the time attempted to map these imported characters onto an already-existing Japanese morphology and phonology. As the Chinese language and its pronunciations changed over time, Japanese continued to borrow these new readings while simultaneously retaining the older readings. Nowadays, Japanese writing system can be divided into three: Hiragana, Katakana and Kanji. Figure 1 shows some examples of Hiragana, Katakana and Kanji in Japanese language.

| Hiragana | Katakana | Kanji |
|----------|----------|-------|
| あ        | ア        | 亜     |
| い        | イ        | 意     |
| う        | ウ        | 宇     |
| え        | エ        | 絵     |
| お        | オ        | 緒     |

Figure 1: Types of Japanese Writing (Hurley, 2021)

While Hiragana and Katakana are quite simple and have one pronunciation for each character, Kanji is complicated with multiple strokes and numerous pronunciations. The acquisition of Kanji cause difficulties for learners and many tend to give up halfway when learning Japanese language. In a study by Gan (2023) on learners' proficiency in Japanese language, number of learners progressing to advance level is the least, with only 2.5%. Majority stays in the beginner level, where they only master basic Japanese like Hiragana and Katakana.

### Reading of Japanese Kanji words

For every Kanji character, there are two types of reading; On-reading and Kun-reading. On-reading, where a word's pronunciation can be read from its character level, derives from the pronunciation of original Chinese characters. Kun-reading, where the constituent character's pronunciation obeys less corresponding regularity, derives from the pronunciation of an original Japanese word. The ability to detect sub-lexical phonological cues is mainly focus on the On-reading, as the reading is highly related to phonological cues. The reading of Kanji characters becomes more complex as a Kanji character can have several On-readings (Kang & Saito, 2025). In order to know the correct reading of a character with multiple pronunciations, one can fully utilise phonological knowledge.

## Dual-Route Cascaded (DRC) Model

The Dual-Route Cascaded (DRC) model (Coltheart et al., 2001) mentions that there are two separate ways of reading: a lexical route and sub-lexical route. The lexical route is about reading it as a whole word, where the brain assesses the stored word pronunciation directly. For sub-lexical route on the other hand, the brain converts graphemes to phonemes (letters to sounds) step by step. It usually applies for new word or unfamiliar word. Kanji reading can involve lexical and non-lexical routes. If by lexical route, it involves whole character recognition. In sub-lexical route, it involves phonological cues, where reader make use of phonetic component in the Kanji compound words. Reader can make use of phonological cues in Kanji character to know its pronunciation. The following figure shows the representation of Dual-Route Cascaded model.

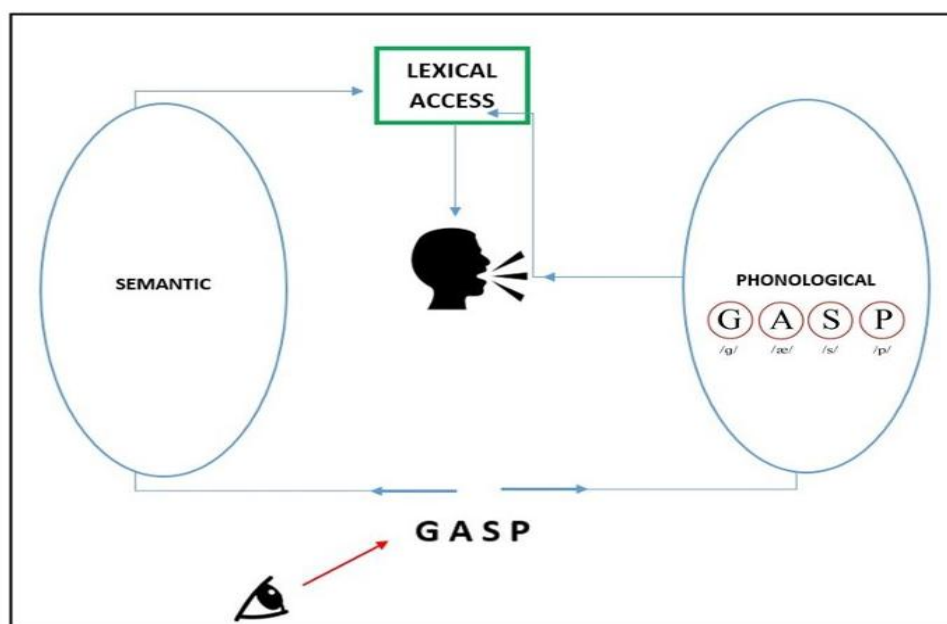


Figure 2: Dual-Route Cascaded (DRC) Model (Coltheart et al., 2001)

Dual-Route Model of Reading (Coltheart et al., 2001) describes the routes that learners undergo in decoding information when reading. To give a clearer view based on figure 2 above, let's see the word "gasp". When presented to readers, in sub-lexical route, the phoneme /g/, /æ/, /s/ and /p/ are assembled in sequence before lexical access, and the word is thus vocalised. In lexical route, the phonological form of /gæsp/ is taken as a whole, thus allowing the word to be vocalised.

In Kanji reading, once learner can identify the reading of 可 as /ka/, it is fairly chance of guessing correctly the reading of word 可愛い as /ka/, /wai/, /i/ and the word 可能性 as /ka/, /nou/, /sei/. Although it is not 100% reliable since a Kanji character may have other pronunciations as well, it could give an avenue of shortcut to the travails of reading Kanji characters (Townsend, 2011) since as many as 65% of commonly used Kanji characters have phonological cues (Suzuki, 2007). Hamilton (2019) have listed 150 commonly used phonetic cues, or also known as phonetic component to help learners acquire the fluency in reading Kanji.

### Sub-Lexical Phonological Cues in Kanji Reading

The phonology of a Kanji word can be generated from both lexical and sub-lexical processing (Sambai et al., 2018). In relation to sub-lexical processing, new or unfamiliar words are decoded using the phonological cues in each character, where it is converted to corresponding sounds. Sub-lexical phonological cues allow learners to have greater ability to decode Kanji character and helps improve reading comprehension in Japanese text. Gustaffsson (2019) conducted a survey on Swedish students, proved that the ability to use phonological cues is beneficial to students, despite having low awareness of it. In comparison to traditional approach of learning Kanji, approach related to phonological cues seems not frequently used.

The effectiveness of sub-lexical phonological cues in helping learners remains an active area in research. Researchers such as Townsend (2011), Hamilton (2019) and Toyoda et al., (2013) have listed these cues (also referred as phonetic components) in Kanji learning studies. Not only the phonological cues are identified, the position where it usually appeared is also reported. Phonological cues are normally on the right side of a Kanji character (Gustafsson, 2019). For example, 官 in 館 gives clue that the character is pronounced as /kan/. It can also be at the bottom if divided vertically, like 介 in 芥 provides a clue that it can be pronounced as /kai/.

Many Kanji learning books took a visual learning approach, by providing visual clues to make learner understand the hidden picture behind every Kanji character. However, this still involves a high number of Kanji characters and an optional approach can be considered. A book on Kanji learning by Heiseg (1977) took a componential approach, by learning about the constituent character of Kanji. It is a shift from rote memory strategy to component strategy, which makes use of cues or hints provided within the Kanji character.

## Background of Learners

The background of learners does play a role in Kanji learning. Mori (1998) conducted experiment on reading skills between alphabetic and non-alphabetic groups and found that Kanji is harder to memorise by alphabetic group. This is due to differences in writing system that represent each language. Alphabetic learners, like English or Malay speakers, tend to decode reading using grapheme-to-phoneme conversion and does not rely on phonological cues. However, in Japanese Kanji reading, sub-lexical phonological processing plays an important role to learners' ability to identify and read Kanji accurately.

Haththotuwa Gamage (2003) compared learning strategies between alphabetical background learners (AB) and Chinese character background learners (CB) undergraduate students and found out that these two groups have different preference of strategies in learning Japanese Kanji. It was found out that AB preferred 'repeated writing' strategies while CB learners made use of the phonological strategies in learning Kanji. The CB learners used phonetic strategies such as 'grouping Kanji with similar pronunciations' while AB learners tended to use visual strategies including 'picture association to kanji'. Hamilton (2019) suggested that the strategies used by CB learners can also be used by AB learners.

Similar to the Japanese language, the Chinese language is also written in logographic script. Readers of Chinese language use decoding strategies by looking for information available within characters to identify unfamiliar character (Wu and Anderson, 2007). Findings indicate that phonological awareness is important to read Chinese that children use phonetic cues to read unfamiliar Chinese characters. (So & Siegel, 1997; Wu & Anderson, 2007).

## METHODOLOGY

This research attempts to find the effectiveness of sub-lexical phonological cues in Kanji reading of non-native learners of Japanese language. Non-native learners, mainly from alphabetical background has been reported to face difficulties in Kanji reading. Experimental comparisons between sub-lexical phonological approach and traditional approach will show the effectiveness of both approaches in improving Kanji reading. A pre-test and post-test will be used to compare participants' reading performance before and after receiving instructions.

The participants are Malay undergraduate students enrolled in Japanese courses. A Kanji reading test will be conducted and data is collected before and after the intervention. In addition, questionnaires will be distributed to gather their perceptions or awareness on of sub-lexical phonological cues in Kanji.

## DISCUSSION

Unlike the alphabet languages, learners of Japanese language need to at least have knowledge of about 1,000 basic Kanji characters in order to be able to read and understand the Japanese used in newspapers and movies (Danh, 2021). Each Kanji character required learners to memorise the stroke orders when writing it and ways of reading Kanji in On-reading and Kun-reading. For example, Kanji 日 can be read in many different ways. It can

be read /hi/ in the word 日焼け /hiyake/ (sunburn) ; /bi/ in the word 月曜日 /getsuyoubi/ (Monday); /ka/ in the word 二日 'futsuka' (second day of the month); and /jitsu/ in the word 本日 (honjitsu). All these ways of reading for just one Kanji character, even memorising 10 Kanji will be time consuming and put a lot of pressure on learners.

Decoding reading in Kanji takes longer time compared to simple characters of Hiragana and Katakana (Saito, 1981). Early research on word recognition suggested that phonological access is a primary source of access to the meaning and written words (Sakuma et al, 1998). This suggests stronger reliance on phonological information in alphabetic learners than in non-alphabetic learners.

The ability to detect sub-lexical phonological cues in Kanji reading may give a better improvement for learners. It gives options for learners to cope with the difficulties in memorising Kanji characters. While the task of learning kanji would still be complex and extremely challenging, if learners are able to recognise familiar components and extract information from them on that basis, it could equip them with a reliable method for making systematic progress in their Kanji studies (Hurley, 2021).

## CONCLUSION

Kanji poses the steepest challenge due to its lack of systematic print-to-sound correspondence (Adachi, 2026) and cause learners to lose motivation or give up on learning Japanese (Haththotuwa Gamage, 2003). Inability to pronounce Kanji resulted in inefficiency in Kanji reading. If learners do not know how to read Kanji well, it prevented learners from going further up the level. With thousands of Kanji characters to remember, phonological approach is one of the options for learners to go forward.

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