



Rote learning versus mnemonics: A comparison of kanji learning strategies

Crasy Wolfgang

Centre for Languages and Literature

Lund University

2026

Supervisor: Shinichiro Ishihara

Course code: JAPK12

Abstract

The current study compares the efficiency and effects of a combination of keyword mnemonics and mnemonics stories in comparison to rote learning in kanji acquisition.

A sample of 46 students of beginner's Japanese were recruited for the experiment and randomly assigned to either the rote learning- or the mnemonics condition. The target characters consisted of 14 composite kanji, which were carefully selected based on their components. The participants studied the target characters for 30 minutes and their retention was assessed over a 48-hour interval.

Their results were analyzed across three separate levels, determined by the student's current curricular progress. The analysis accounted for general scores, and error typologies. Furthermore, the retention rate of each target character, external attributes, and the participant's attitudes towards kanji were examined.

The results showed a significant difference in the retention between the two strategies, in which mnemonics was about twice as efficient as rote learning; and furthermore, promoted confidence in the participants. The effects were more pronounced in learners with more experience.

Keywords: kanji, kanji acquisition, L2, learning strategies, rote learning, rote repetition, mnemonics, mnemonic stories, key-word mnemonics

Acknowledgements

The path to this thesis cannot be described. My gratitude goes out to the army, and members of the yakuza. I owe the opportunity to you.

Eight years have passed since the study was initiated. I would like to thank Axel Svahn, who was the original supervisor for the thesis; Arthur Holmer, who was involved with ideas for the study; and Shinichiro Ishihara, my current supervisor. I would also like to give a big thanks to Lina Pfeiffer, who lent me her time and high school students as participants for the study. The conclusions from the study would not have been possible without the data that she helped me gather.

I am grateful for the friends I made during this time, and who would frequently visit me to play board games; and for the students who preceded me and helped me with my studies, in which Simon Wiklund became a role model for good conduct. Within my friend group, I would like to extend additional gratitude to Xenia Uffrecht, Christoffer Ahrling and Emil Hoof for their thoughtful comments on the final draft of the thesis.

Crasy Wolfgang, May 2026.

CONTENTS

Abbreviations	5
Glossary	6
1 Introduction	8
1.1 The problem with kanji	9
1.2 Strategies for learning	12
2 Previous Studies	16
2.1 Lexical retrieval	16
2.2 Pro-rote learning	17
2.3 Pro-mnemonics	18
2.4 Neutral studies	19
3 Methodology	21
3.1 Target characters	21
3.2 The experiment	22
3.3 Participants	23
3.4 Error analysis	24
4 Results	27
4.1 Overall test scores	27
4.2 Kanji error analysis	28
4.3 Component error analysis	30
4.4 Analysis of attributes	33
4.5 Attitudes	35
5 Discussion	37
6 Conclusion	40
6.1 Further studies	41
References	43
Appendix A	47

Abbreviations

hs1	level of high school students at their first year of Japanese
hs2	level of high school students at their second year of Japanese
L1	first language
L2	second language
m	mnemonics group
PSC	phono-semantic composite
r	rote learning group
RQ	research question
uni2	level of university students at their second semester of Japanese

Glossary

associative strategies	a learning strategy in which associations are created between the target and already established knowledge; mnemonics are frequently utilized to create associations
character	an orthographic unit of text
component	an orthographic unit that constitutes composite kanji
context strategies	a learning strategy in which the target is acquired through context
hanzi	Chinese characters of written Chinese
kanji	Chinese characters adopted into the Japanese language
kanji composite	a Chinese character which is constructed through the combination of at least two components
keyword mnemonics	a mnemonic device in which the target is correlated with one or multiple known words; sometimes referred to as <i>link words</i>
<i>kun-yomi</i>	native Japanese pronunciation of kanji which were adopted based on meaning
meta-cognitive strategies	a learning strategy in which the learner evaluates and adopts their learning strategies
mnemonic device	additional information supplemented to target information for memorization purposes
mnemonic story	a mnemonic device in which a story is created for the target information; sometimes referred to as mnemonic narratives
mnemonics	a learning strategy which involves deliberate elaboration of the target information to enhance retention
morphological analysis	a learning strategy in which the target character is broken down into its components; the strategy is often utilized for mnemonic stories in kanji acquisition
non-learner	an individual who does not study the target language

<i>on-yomi</i>	pronunciation of kanji based on the original Chinese pronunciation
phono-semantic composite	a Chinese character which is constructed through the combination of a phonetic and a semantic component
radical	the lexical component of kanji and hanzi; sometimes referred to as <i>determinative</i>
<i>regular-use kanji list</i>	a list, issued by the Japanese Ministry of Education, of recommended kanji for general use
rote learning	a learning strategy which involves quantitative repetition
rote repetition	the active act of rapid repetition which often constitutes rote learning

1 Introduction

Kanji is, alongside particles and honorifics, considered to be one of the most difficult aspects of mastering the Japanese language as a second language (Nagaho, 1987:186). These linguistic challenges were exemplified in the case of foreign caretakers, who were invited to work within the nursing and medical workforce in Japan through a bilateral contract in 2008. The immigrants received 6 months of Japanese language training, after which they had three years¹ to pass the Japanese national nursing examination; however, no foreign nurses passed the examination in 2009, despite that they were skilled workers within their field; and only three passed the following year. The high failure rates were attributed to the foreigners' lack of reading and writing skills in Japanese, and caused a loss of valuable human resources for Japanese hospitals and nursing homes (Gottlieb, 2012:53-55).

The inherent complexity of the Japanese writing system necessitates for learners to employ effective learning strategies to achieve proficiency. The current study investigates two learning strategies: rote learning and mnemonics. Rote learning, which is characterized by extensive repetition, has long served as the conventional method within kanji education, where it was still prevalent at the turn of the century (Shimizu & Green, 2002:237-238). The second strategy, mnemonics, which is defined as the deliberate elaboration of target information to enhance retention, has been dismissed as bizarre throughout the 1980s and 1990s (Gruneberg & Jacobs, 1991:25), but has experienced a surge in popularity in the more recent decades (Rose, 2013:982).

Research on rote learning and mnemonics within the context of Japanese is sparse, especially for kanji acquisition; and general research interest for the two learning strategies seem to have largely shifted away since the 2000s. Consequently the current study aims to elucidate available learning strategies and to evaluate their efficiency for kanji acquisition, thereby underscoring their potential utility in Japanese language education. The current study focuses on the efficiency and effects of keyword mnemonics in combination with mnemonic stories in comparison to rote learning, and has the following two research questions:

¹Four years in the case of nursing care assistants.

1. Between rote learning and mnemonics, which one is more efficient in learning kanji as a second language?
2. Do the results of the two strategies in question differ in any major way?

Moreover, since the purpose of the current study is to examine the effects for more efficient acquisition and retention of kanji, other possible attributes are examined in relation to the test results. These include characteristics of the target characters, exposure to Japanese through time spent in Japan, previous studies of the Japanese language, and knowledge of any additional languages. Demography is not examined and compared for the current study. Furthermore, the current study briefly gathers a consensus of learners' attitudes towards kanji and their preferred learning strategy.

1.1 The problem with kanji

The Japanese writing system derived from the Chinese writing system although the two languages are vastly different from each other, both grammatically and phonetically. These differences have caused a series of creative adoptions into the Japanese language which usually come off as unnecessarily complicated to new learners. Whereas other languages that adopted Chinese characters, namely Korean and Vietnamese, have long since moved on to other systems of writing,² kanji has become viewed as an important part of the Japanese identity (Gottlieb, 2012:10).

Kanji was imported into Japan throughout many centuries and from different regions of China. Consequently, many characters were imported multiple times with different pronunciations (Shibatani, 1990:130; Tamamura, 1992:161; Chikamatsu et al., 2000:483; Hasegawa, 2015:45; Rose, 2013:982), so called *on-yomi*, which is further classified into *go-on*, *kan-on* and *tōsō-on*^{3,4} based on their origin. Multiple readings of characters was already controversial in the 8th century, during which the Japanese imperial court tried to ban the use of the older *go-on* (Tamamura, 1992:167). The consequences of multiple *on-yomi* is that the same character, or kanji compound, can have different readings which may further diverge in meaning.

²Multiple unsuccessful attempts have also been made to abolish kanji in Japan (Shibatani, 1990:130; Hasegawa, 2015:50-51).

³Classification of *on-yomi* is generally not taught to learners of Japanese.

⁴The English correspondent terminology is *wu-*, *han-* and *tang reading*.

All kanji contain one component which acts as the lexical identifier. These are called *radicals*, but are also referred to as *determinatives* for their use in lexical identification. The modern Japanese kanji inventory consists of 214 radicals.

The most basic Chinese characters are formed as either pictograms, where the characters have been traced after physical objects; or as indicative symbols that resemble ideas (Tamamura, 1992:164). However, most kanji are composites of symbols, either of two semantic components, known as *semantic composites*; or one semantic and one phonetic component, which are referred to as *phono-semantic composites* (PSC). In ancient Chinese, homophonous vocabulary was frequently represented through phonetic borrowing (Dingguo & Weidong, 2009:47-51). To differentiate the meaning in homophonous vocabulary, semantic components were added to phonetic bases, which gave rise to PSCs (Seeley & Henshall, 2016:13-14). While the orthographic system was adequate to represent Chinese, its adoption into the Japanese language necessitated phonological simplification, which created many homophones and rendered the relationship between pronunciation and semantics less reliable. Estimates on how much of the kanji inventory consists of PSCs range from 60%⁵ (Tamaoka et al., 2002:262-263) to 90% (Tamamura, 1992:165).

$$\begin{array}{ccc} \text{人} & + & \text{木} = \text{休} \\ \text{'person'} & & \text{'tree'} \quad \text{'rest'} \end{array}$$

Figure 1: An example of a semantic composite.

$$\begin{array}{ccc} & \text{青} & \text{'blue'} \\ & qīng/[sei] & \\ + & \text{水} & = \text{清} \quad \text{'clear'} \\ & \text{'water'} & qīng/[sei] \\ + & \text{心} & = \text{情} \quad \text{'feelings'} \\ & \text{'heart'} & qīng/[sei] \end{array}$$

Figure 2: An example of phono-semantic composites. The *pinyin* (Chinese pronunciation) is provided in italics and the *kan-on* (*on-yomi*) in brackets. The top character is the phonetic component, and the two left characters show the semantic radicals origin.

Adoption of Chinese characters to represent native Japanese vocabulary, so called *kun-yomi*, became common during the Heian period (794-1185), and it was also during this period that the two phonetic scripts, hiragana and katakana, were developed (Ottosson

⁵Based on the 1981 issue of the *regular-use kanji list*.

& Ekholm, 2007:47; Seeley, 2000:62). The two kana scripts found their way into Japanese writing where hiragana became used to write grammatical functions and katakana for pronunciation. The ambiguity of Chinese characters in the Japanese language caused some characters to have multiple native words assigned to them, and furthermore, native words to be assigned to multiple different characters.

取る	[toru]	take (general)
採る	[toru]	get/gather/pick fruits, nuts, flowers, etc.
捕る	[toru]	catch fish, animals, etc.
摂る	[toru]	intake
執る	[toru]	take a pen in hand, manage, perform the duties of an office
盗る	[toru]	steal
撮る	[toru]	take a picture

Table 1: An example in which a single native Japanese word is represented with different kanji. (Hasegawa, 2015:45)

生まれる	[umareru]	be born
生きる	[ikiru]	live
生える	[haeru]	grow/sprout
生る	[naru]	bear fruit
生う	[ou]	grow/spring up
生	[nama]	raw/fresh
生	[ki]	pure/undiluted

Table 2: An example in which multiple native Japanese words have been assigned to a single character. Some of the words are homonyms and the reading is determined by its context.

The end result is a very rich writing system, which allows for depth and nuance based on the selection of characters; however, it also requires the reader to pay attention to context in order to produce the correct pronunciation.

Furthermore, the Japanese Ministry of Education has issued a list of *regular-use kanji*, which since 2010 consists of 2 136 characters, that the average native Japanese is expected to have learnt by the end of their high school education. Knowledge of around 600 characters is required to read books (Shigaki, 1992 cited in Chikamatsu, 2005:73), and common beliefs consider newspapers to require knowledge of 2000-3000 characters; however, frequency analysis of kanji does not support the latter claim (Chikamatsu et al., 2000:484). The kanji inventory dwarfs any alphabetical inventory in comparison (Nagaho, 1987:186), and mastering the kanji inventory might be a life-long process for some learners (Akamatsu, 2006:10). While some students find this complexity intrinsically rewarding (Mori

& Shimizu, 2007:484), navigating the Japanese writing system remains an inevitable hurdle for all who seek proficiency in the written language.

1.2 Strategies for learning

In Japanese language curricula, kanji is frequently taught as a separate subject, which disconnects it from the rest of the study material (Nagaho, 1987:224), such as vocabulary even though the two are connected (Richmond, 2005:67). To achieve proficiency, learners must evaluate and implement learning strategies, which is a process that can be implemented in learning materials through varied descriptions and applied practices.

Mori & Shimizu (2007:474-475) identify five distinct learning strategies for kanji acquisition: *rote learning*, in which information is acquired through high quantities of repetition; *context strategies*, in which the information is learned in its context such as vocabulary in a sentence; *morphological analysis*, in which kanji is broken down into components; *associative strategies*, in which the target or parts of the target are associated with established information or knowledge, which may involve the use of mnemonics; and *meta-cognitive*, strategies which involve self awareness and coordination of one's own learning strategies. The current study investigates rote learning and mnemonics in which the latter is defined as an associative learning strategy while also employing morphological analysis to distinguish components of kanji.

1.2.1 Rote learning

Rote learning is memorization based on quantitative repetition, and is informally referred to as '*to learn by heart*', through which fragments of information can be committed to memory in isolation from its context (Anderson & Krathwohl, 2001:65-66). The act of rapid repetition for rote learning is called *rote repetition*. The strategy is flexible and can be applied to both motor skills and to cognitive knowledge. Targets can be vocally read or orthographically written repeatedly, either committed on paper with a pen, or written in the air with one's fingertips in the air (Naka & Naoi, 1995:201), a technique called *kūsho* 'air writing' (Thomas, 2013:24). Furthermore the strategy may be either short and intense, or methodologically planned out over a long span of time. When carefully constructed, rote learning is seen as a non-demanding task, and with enough repetition the strategy facilitates unconscious recall or automatic habit (Nesbitt, 2009:64).

Rote learning is frequently believed to be the most efficient learning strategy (Mori & Shimizu, 2007:485), favored by both second language learners of Japanese (Haththotuwa Gamage, 2026:12-13) and their teachers (Shimizu & Green, 2002:237-238). This preference is mirrored in native contexts; rote learning has long been the conventional preferred method for kanji acquisition among Japanese speakers (Naka & Naoi, 1995:201) and continues to be the standard approach for English vocabulary proficiency among Japanese students (Paton, 2020:83).

Nesbitt (2009:64) argued that rote learning does not force the learner to focus on the complicated features of kanji, such as stroke order, and that they would therefore not get discouraged from studying; however, Mori & Shimizu (2007:484) found that reliance on rote learning correlates with both perceived difficulty and a sense of helplessness in second language kanji acquisition. This helplessness, in turn, contributes to a decline in the learner motivation (Lindholm, 2006:159-160). It remains unclear, however, whether helplessness is a consequence of rote learning or if a predisposition toward helplessness leads learners to rely more heavily on such strategies.

1.2.2 Mnemonics

Mnemonics is a strategy which involves deliberate elaboration of the target information to enhance retention. Target information is often supplemented with additional information, so called *mnemonic devices*, in order to associate it with already established knowledge. There are many different mnemonic strategies, some which involve rhymes, locative imagination or visual images (Thompson, 1987 cited in Amiryousefi & Ketabi, 2011:179-180). A prevalent mnemonic strategy in second language acquisition is the keyword method, wherein novel vocabulary is assimilated through associations with familiar words. In the context of kanji, mnemonic keywords are commonly assimilated with components and their semantic meaning to create mnemonic stories. Comprehensive kanji curricula have been developed upon this theoretical foundation, most notably by Heisig (2011)⁶ and Conning (2013).

Although keyword mnemonics and mnemonic stories were previously thought of as unconventional (Gruneberg & Jacobs, 1991:25) and were not recommended by teachers (Richmond, 2005:62; McDaniel & Pressley, 1989:204), the methods have since then become

⁶The first edition of Heisig's *Remembering the Kanji* was originally published in 1977.

more accepted, and are sometimes even introduced to intermediate and advanced learners of Japanese (Rose, 2013:982). Despite the rise in popularity, there is still a stigma attached to the method (Rose, 2013:986; Heisig, 2011:7), and reason studies show that the strategy is not favored (Haththotuwa Gamage, 2026:11).

Mnemonics overall have been shown to promote both motivation and retention in learners (Gibson, 2009:61-62; Gruneberg & Jacobs, 1991:26). Gruneberg & Jacobs (1991:28) contend that mnemonic strategies enable the acquisition of 100 to 150 new lexical items daily; similarly, Heisig (2011:6) asserts that the standard kanji inventory can be acquired in as little as six weeks. In addition, studies on nursing and medical staff have shown a boost in confidence from mnemonics (Gibson, 2009:61; Fernandes & Speer, 2002:412).

There are a few theories as to why mnemonics may help with memorization. The dual-coding theory by Paivio (1975:180-182) suggests that mnemonics are helpful because images and verbal information are processed in two different memory systems. Therefore, when accompanied with images or vivid imagination, the information is retrieved via a dual path. Other theories suggest that mnemonics is a type of associative strategy which connects the target information with known information in the long term memory.

Mnemonics can either be provided with the study material or self generated by learners (Lu et al., 1999:294). Self generated mnemonic stories have shown to be effective which is believed to be contributed to a higher degree of attention to the target (Wittrock, 1990 cited in Kuo, 2004:25). Self generated mnemonics do however take a significant amount of time to generate (Kuo, 2004:31), and require elaborate imagination and associations (Esposito, 2017:97).

Mnemonics can be made for kanji to either represent phonetic pronunciation or semantic meaning. The vast majority of kanji are made out of composite characters, which, for the current study, are broken down into components that are further translated into keywords for mnemonic stories. Unfortunately, learners of Japanese at lower levels have not yet acquired the analytic ability to break down kanji (Chikamatsu, 2005:86-87), which might make utilization of mnemonics difficult, especially for complicated characters. It is therefore suggested that in a mnemonic kanji curriculum, the characters are learned in order of complexity to facilitate connections with previously learned kanji (Esposito, 2017:104-105), which some kanji study books already adhere to. Although the order in which characters are introduced has shown to have an impact, especially for initial learn-

ers (Lu et al., 1999:305-306), the complexity of characters do not correlate with their frequency (Chikamatsu et al., 2000), which is also a factor for acquisition (Richmond, 2005:51).

2 Previous Studies

While a vast body of literature exists regarding kanji acquisition, there remains a notable scarcity of empirical research which directly compares the various learning strategies used for kanji acquisition. Rather, most research is focused on the lexical retrieval strategies of learners. Among the studies that address rote learning and mnemonics, few offer a direct comparison between the two strategies. Furthermore, much of the existing comparative research contains methodological shortcomings, which has come under criticism by Gruneberg (1998). For starters, the majority of these studies utilize non-learners of the target language as subjects. Consequently, these methodologies only measure the acquisition of a completely novel language, rather than evaluating learners who are already familiar with linguistic fundamentals and possess an intrinsic motivation to learn. Regarding research on kanji acquisition, the target characters are limited to pictographic and ideographic kanji which represents a very limited amount of the kanji inventory (Tamura, 1992:164; Tamaoka et al., 2002:263). Most of the studies only examine the participants' immediate acquisition of the targets without any follow-up to test retention. Furthermore, many of the studies that examine the effectiveness of mnemonics provide their subjects with etymology or accompanied images as mnemonics. Although these are valid conditions to examine, they do not represent the full potential of mnemonics.

2.1 Lexical retrieval

Ivarsson (2016) compared kanji error tendencies of Swedish learners of the Japanese language with level-matched native learners at two different levels. The results showed that the majority of writing errors from both L1- and L2 learners were pseudo-kanji (i.e. characters that do not correspond to any proper kanji), and within those, most sub-errors were component based (p.143-148). The Swedish learners of Japanese at the lower level were prone to semantic errors, likely as a result of the curriculum, which included semantically related characters that had not yet been sorted out in the mental lexicon (p.176). At the higher level, L2 learners had acquired the ability to decompose kanji into components (p.183) and made fewer whole character errors. Mnemonics may help learners to form more robust semantic encoding to avoid mixups; however, their ability to utilize mnemonics might be limited by their component based analogy.

Chikamatsu (2005) compared the recall strategies of L1 and L2 learners in the so-called “tip-of-the-pen” state (a counterpart to tip-of-the-tongue in writing) in which the subjects felt they knew the target character but could not produce it at the moment. The results showed that phonological activation is not yet established in L2 learners at beginners’ level, and that the multiple aspects of kanji are yet not well established (p.88).

Kano et al. (1989) performed a free recall study on L2 learners of Japanese in which the participants would recall as many kanji as they could. The study showed that L2 learners apply three different strategies to freely recall kanji: *stroke strategies*, in which two characters differ by a stroke; *component strategies*, in which one of the components are swapped; and *compound strategies*, in which the next character is recalled via an association in a compound word. Interestingly, the component strategy was dominated by swaps of the radical rather than preservation (p.73), although the radical has long been seen as central to the lexical unit for kanji.

2.2 Pro-rote learning

Nesbitt (2009) studied the benefits of rote learning in L2 learners of Japanese. The participants were given four different computer programs, which all utilized rote learning to assist the students. The study found that rote learning has positive benefits for learners, however, rote learning was positive as opposed to no strategy, as the study had no other group to compare with. Furthermore, the results were self-reported by the students rather than compared with data, and as described by Mori & Shimizu (2007:485), these results were to be expected since learners already have a positive view on rote learning.

Naka & Naoi (1995) investigated the comparative efficiency of orthographic rehearsal (written rote repetition) versus verbal rehearsal (read rote repetition). The study examined recall and recognition of different types of words which included target words made of kanji, hiragana and English words; graphic nonsense symbols; and Arabic letters. While the study was primarily conducted with Japanese native speakers, it also included a cohort of English speakers to determine whether an alphabetic background influenced the results. The results showed that orthographic rehearsal has a benefit over verbal rehearsal for recall of graphical targets such as novel symbols and Arabic letters,⁷ which suggests that rote learning is a good strategy for foreign scripts such as kanji for

⁷Arabic letters were defined as graphical targets since they were unfamiliar to the participants. Conversely, kanji were defined as word type targets since the participants were literate in Japanese.

beginners. Moreover, orthographic rehearsal had no additional positive effect for word type targets (which included kanji compounds), nor did it have any additional effect on recognition. No differences in rote learning between participants of English or Japanese backgrounds were observed.

The same experimental design was conducted again by Naka (1998), in which the participants were changed for Japanese children. The study yielded similar results as Naka & Naoi (1995), but also added that stroke order does not have an effect on rote learning, and that feedback is an important part of writing down graphic targets. When the targets were traced or written without feedback (ex. with a finger in the air), the added benefits of orthographic rehearsal were diminished.

2.3 Pro-mnemonics

Cohen & Aphek (1980) investigated the retention and utility of keyword mnemonics among second language learners of Hebrew across different proficiency levels. The study was conducted over a five-week period and the results demonstrated that when an initial keyword association is forgotten, learners can generate a new one without compromising the mnemonic efficiency. Furthermore, the data indicated that more experienced learners facilitate recall better through remembered keywords, and are better at leveraging contextual cues for vocabulary retrieval compared to beginners. The study combined mnemonics with context strategies and did not have any control group.

Lu et al. (1999) compared mnemonics and instructional hierarchies in kanji acquisition (i.e. the order in which kanji are taught). The target characters consisted of simple kanji, and semantic compounds that combined some of the non-composite targets. The participants were non-learners and were tested on a combination of two conditions: mnemonics or no mnemonics; and instructional hierarchies or random order. The mnemonic targets were provided with mnemonic stories and the order of the target characters were sorted into the most efficient order (see Lu et al., 1999:299 for more details) for the hierarchy group. The participants' acquisition was assessed directly and was followed up by a delayed retention test after a 48-hour interval. The results showed that mnemonics have a positive effect, but also that instructional hierarchy has a bigger impact than mnemonics. The study never examined the participants' ability to write kanji and only examined simple characters that learners would face initially in their kanji curriculum.

Kuo (2004) examined the effect of mnemonics when self generated by the learner. The participants for the experiment consisted of non-learners which were either given mnemonics or instructed to generate mnemonics. The provided mnemonics consisted of either etymology, images or both. The self generation group made up stories and were asked to draw images to accompany the target characters. The participants were tested both immediately after the acquisition, and on their retention a week later. The results showed that self generated mnemonics provided the highest retention; however, they also consumed a significant amount of time, about three times greater than for the other groups. Secondly the results showed that kanji were better recalled when accompanied with images in the learning process. The study only examined the participants ability to recognize characters by their meaning. Furthermore, there was no group which was given mnemonics with similar stories to the ones that were generated in the experiment.

In more recent times, Crowley (2015) conducted a study to examine the effects of mnemonics and rote learning on second language acquisition. A group of non-learners were recruited for the experiment and were given simple Japanese words together with images and audio. The rote group was presented with images which represented the words, and were told to write the target words three times each. For the mnemonics group, the participants were presented with images, which represented keyword mnemonics for the target words, though without the keyword mnemonics included. The participants were tested on their active and passive recall both directly and with one month delay. The study demonstrated that salient mnemonics, in this case in the form of images, had a modestly better effect on recall than rote learning. Unfortunately, since there were two independent variables in the experiment with no control group, the results could not measure the effects of salient mnemonics or rote learning independently from each other.

2.4 Neutral studies

Wang & Thomas (1995) examined keyword mnemonics effects, in comparison to context learning, on both old English, and Tagalog⁸ vocabulary. The findings indicated that while mnemonics outperformed context strategies during immediate acquisition, they were characterized by lower long term retention. A subsequent experiment revealed that mnemonics necessitate significantly more frequent repetition than context strategies to successfully

⁸Tagalog is a major Austronesian language spoken in the Philippines.

facilitate retention.

In another study, Thomas & Wang (1996) examined mnemonics effects in non-learners' retention of Tagalog vocabulary. One group of participants were tested on the effect of self generated mnemonics, and their mnemonic stories were then used for a group of mnemonic provided participants. In addition, the two groups were compared with rote learning. Similar to their previous study, the results showed that although the provided mnemonics were the most efficient for acquisition, the retention was very low. In these results, the highest retention was by far from the rote learning group. It must however be stated that the experimental design was questionable as the conditions were different between the groups. As shown in Kuo's (2004:31) study, generating mnemonics consumes a lot of time, which might have led to the participants' low retention. In a subsequent experiment in the same study, Thomas & Wang (1996:340) found that when images accompany the learning material, retention is boosted; and further, in a third experiment they showed that visual information and verbal information are likely processed in different mental faculties (p.339), which supports Paivio's (1975) dual-coding theory.

3 Methodology

The data for the current study were gathered through a written test on kanji in classroom settings, which were followed by a supplemental survey. Data collection consisted of two distinct sessions: one in which the participant got to familiarize themselves with the target characters (acquisition), and one in which the participant filled in the written test (recall).

The dependent variable is defined by the amount of correct target characters recalled and measured across two experimental conditions: rote learning and mnemonics.

During the acquisition phase, participants encode the semantic and orthographic properties of the target characters via one of the assigned strategies, with phonetic information (pronunciation) intentionally withheld. While Esposito (2017:101) argues that phonetic cues are vital for kanji retention, this study omits them to maintain methodological control. Specifically, the included pronunciation would introduce a confounding variable, making it impossible to determine whether a recall failure stemmed from a lack of orthographical encoding or phonetic encoding.

3.1 Target characters

The top 6 most frequent radicals and their alternative forms were used as target components to enable an inter-component analysis. Namely 水 / 氵 (‘water’), 人 / 亻 (‘person’), 手 / 扌 (‘hand’), 木 (‘tree’), 心 / 忄 (‘heart’) and 口 (‘mouth’).

A list of kanji that all contained at least one target component was drafted via KANJIDIC2 (Breen, 2003), and kanji categorized as N3-N5⁹ were removed to lower the probability that participants were already familiar with one or more characters. The list of characters was then read into computer software which generated 124 000 possible combinations for the experiment via random selection from the list. Each combination was automatically rated by the balance between the target components. The highest ranked combination was the only one to contain two of each target component and was used for the experiment.

⁹The *Japanese Language Proficiency Test* is categorized into 5 different levels in which N1 is the highest level and N5 the lowest.

3.2 The experiment

The experiment consisted of two sessions, one for acquisition and one for recall. For the acquisition session, the participants were handed 14 flashcards (see appendix A) which they had 30 minutes to memorize. The order of the cards for each deck was rotated so that each participant would start with a different target character. Each card consisted of one target character, a translated meaning and stroke order. Furthermore, the mnemonics group's flash cards also contained one or two mnemonic stories for the target character, which were inspired by Conning's (2013) mnemonic stories.

Preserve	
	1. A <i>person</i> (亻) puts his <i>mouth</i> (口) into the trunk of a <i>tree</i> (木) and whispers in the hope that the tree will PRESERVE his secrets. 亻 <i>person</i> 口 <i>mouth</i> 木 <i>tree</i>

Figure 3: An example of a flashcard with mnemonics. For rote learning groups the mnemonic story was cut off before handout. The flash cards that were utilized for the test were written in Swedish.

At the start of the acquisition session, the participants were given written instructions. The rote group was instructed to write the characters as many times as possible and consider the stroke order for prettier handwriting. Meanwhile the mnemonics group was instructed to utilize the stories on their cards for memorization, and to make up their own stories if they could think of any. To facilitate morphological analysis of characters into the components that made up the narrative elements, the mnemonic group's instructions included a comprehensive list of components of the target characters alongside a brief mnemonic description for each component (see appendix B). To accommodate lower proficiency levels, characters in the experimental environment were decomposed into their smallest constituent components to facilitate recognition. Conversely, this level of granularity depends on learner knowledge; more proficient learners would typically decompose characters into fewer, larger, and more complex components, resulting in shorter mnemonic stories.

All the participants had access to notepaper to write on. At the end of the acquisition

session, all the material was collected, including note paper; and the participants were asked to not discuss the material between each other, nor were they allowed to repeat the material on their own.

The recall session was held two days¹⁰ (48h) after the acquisition session, in which the participants were tested on their ability to recall the target characters through a written test. To encourage the participants to also attempt partial recall, they were told that they would score points based on each correct component rather than the kanji as a whole. The max score for the test was 14 points (one for each correct target character), and was limited to 10 minutes. The test was followed up with a short survey to control the participants' learning strategy, which also contained a few questions on other possible attributes, such as if the participants had spent any time in Japan and for how long, if they had studied the Japanese language before, and if they spoke or were literate in any other languages. The survey also asked for the participants to describe their preferred learning strategy, and their opinion on the Japanese writing system. All the questions were formatted as free response questions.

3.3 Participants

The experiment was conducted with 46 Japanese language learners, all of whom were fluent in Swedish and English. 22 were students of Japanese studies at Lund university at the end of their second semester (uni2). 24 were students enrolled at various high schools out of which 12 students took Japanese as a modern language course at the first level (hs1), and 12 students at the second level (hs2), both near the end of their courses.

There was one higher level of Japanese students (uni4) available at Lund University for the experiment; however, in pilot trials, the target characters and the quantity of characters were deemed to be too easy, and their data would not have yielded any valuable results. In addition, the experiment was also conducted on a group of non-learners; however, the amount of data was insufficient (3 participants) and their result will only be briefly touched upon.

The participants were assigned to either the rote- or mnemonic strategy by a lottery draft. The two groups were handed instructions for their respectively assigned strategy; however, some participants in the rote group utilized the mnemonic strategy by creating

¹⁰Based on the 6th interval of Ebbinghaus' (1885:66) spaced repetition.

their own mnemonic stories, most likely in an attempt to reach better results, and some participants in the mnemonic group ignored their instructions and used a rote strategy. The strategic switch is explained by their better familiarity with the other strategy. These participants' results have been marked by their de facto strategy. Some participants were absent for the recall sessions which caused a slight disproportion in the amount of participants in each group.

	rote	mnemonic	total
hs1	6	6	12
hs2	8	4	12
uni2	10	12	22
total	24	22	46

Table 3: Overview of the sample sizes.

3.4 Error analysis

Test data were collected, reviewed for errors, and analyzed in two stages: a character-level error analysis for the 14 target characters, and a component-level error analysis for their constituent parts. The 14 target characters comprised a total of 20 target components, which were counted individually. Ten of the characters contained a single target component, two contained two target components, and two contained three target components. The target components that were constituents of a larger component were not counted.

For the kanji error analysis, errors were classified into 6 different types of errors: *empty answers*, in which the answer has been omitted; *whole character errors*, in which the input has little to no overlap with the target character; *configuration errors*, in which all of the components were written, but not correctly configured; *stroke based errors*, in which a stroke had been added, omitted or incorrectly placed; *substitute errors*, in which a different target character was written; and *component based errors*, in which the error could be identified on a component level. In cases where a stroke error occurred within a single target component, it was classified as a stroke error during the character-level analysis rather than a component based error, but was coded as a component error for the subsequent component-level analysis. In contrast, characters with stroke errors on two or more different components were classified as component errors. In cases in which a stroke error overlaps with a component substitution error, the error was classified as a stroke error.

Classification	Description
Empty answer	Input field is left empty.
Whole character error	Input has little to no overlap with target character.
Configuration error	All components are correct but their placement are incorrect.
Stroke based error	Input has an incorrect stroke.
Substitute error	Input is the wrong target character.
Component based error	The error can be identified at the component level.

Table 4: Overview of kanji errors classifications.

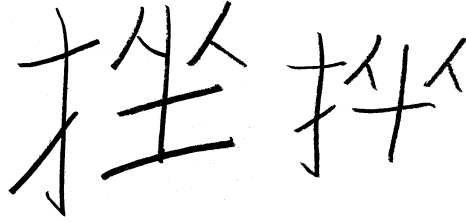


Figure 4: An example of a stroke error. A correct input is displayed on the left, and an input with a stroke error on the right.

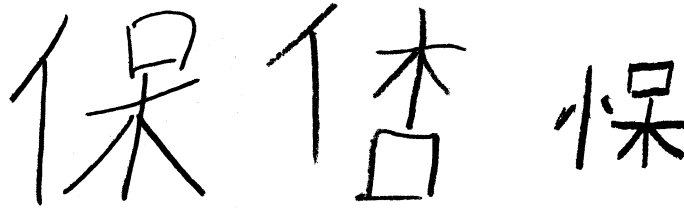


Figure 5: An example of a configuration error and a component based error. A correct input is displayed on the left, an input with a configuration error in the middle, and an input with a component based error on the right.

Component errors were further analyzed at the component-level, and all of the constituent target components were further categorized into one out of three error types: *empty input*, in which the target component had been omitted; *stroke based*, in which a stroke was omitted, added, or misplaced; and *substitute error*, in which another component had been written. To ensure consistency, all the target components of characters with component based errors were counted, regardless of whether the error was on a target or non-target component. Additionally, this inclusion criterion made it possible for components to be classified as *correct*. Furthermore, since eight out of the ten target components were semantic pairs, the component substitute errors could be further classified into three types: *semantic substitution*, in which the target component had been switched with its semantic pair; *non-semantic substitution*, in which the target component has been

switched for another semantic component; and *non-applicable substitutions* in which the target character does not have a semantic pair.

Classification	Description
Correct	Component is correct.
Empty answer	Component is omitted.
Stroke based error	Component has an incorrect stroke.
Substitute error	Incorrect component written.

Table 5: Overview of component errors classifications.

4 Results

4.1 Overall test scores

The distribution of the overall test scores is shown in table 6 and figure 6.

level	group	mean	median	std dev
hs1	r	3.0	2.5	1.63
	m	5.3	5.5	2.87
	both	4.2	3.5	2.61
hs2	r	3.3	2.0	3.31
	m	8.0	7.5	3.24
	both	4.8	4.0	3.98
uni2	r	6.3	5.5	4.08
	m	11.8	12.5	2.28
	both	9.3	9.5	4.21
all	r	4.5	4.0	3.7
	m	9.3	9.5	3.85
	both	6.8	6.0	4.49

Table 6: Overview of test scores. The max score for the test was 14 points.

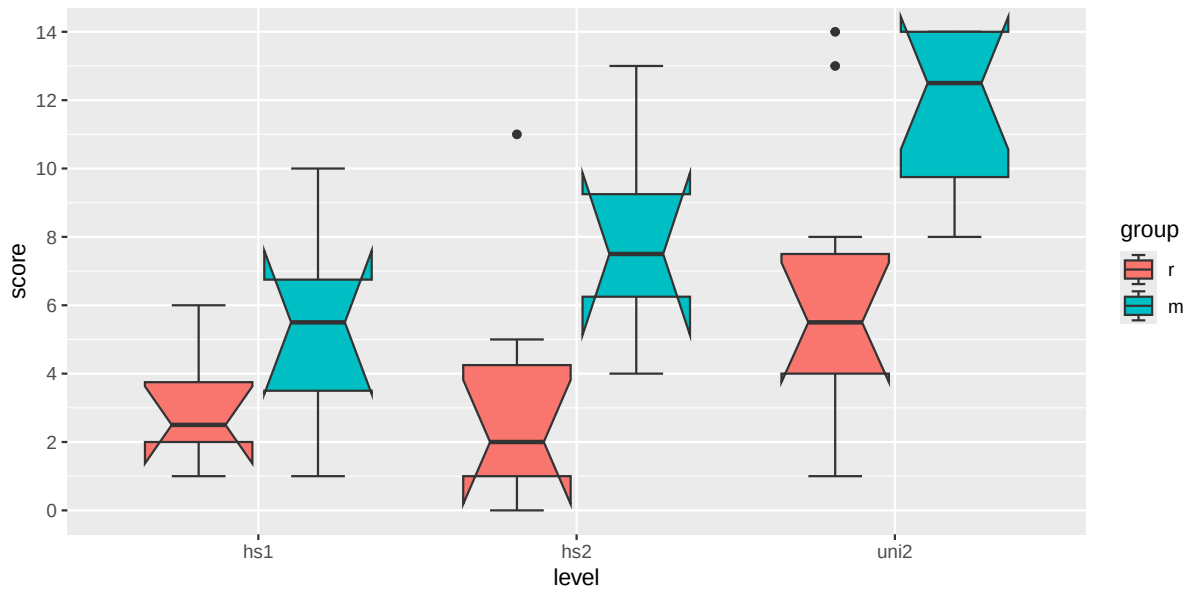


Figure 6: Overview of test scores. The max score for the test was 14 points.

A Welch's t -test was conducted to compare the mean scores of the two learning strategies with all levels combined. This revealed a significant main effect of learning strategy, $t(43.24) = -4.26$, $p = .0001$. Furthermore, a nested ANOVA was conducted to examine the effect of these learning strategies when nested within their specific levels. The analysis confirmed that a significant difference between the learning strategies persisted within

those levels, $F(3, 40) = 7.52$, $p < .001$. The difference suggests a robust advantage for the mnemonic condition over rote repetition.

Although more efficient acquisition of kanji was expected with each higher level, the two high school levels experienced similar results through the rote learning strategy (a mean of 3.0 for hs1, and 3.3 for hs2); and the rote learning strategy at university level had the highest score (a mean of 6.3) of all the rote learning groups.

Conversely, the mnemonic strategy showed higher efficiency with higher level (a mean of 5.3 for hs1, 8.0 for hs2, and 11.8 for uni2); and the hs1 and uni2 mnemonic group scored almost double than their rote learning counterparts; and more than double the score for the hs2 mnemonic group in comparison to their rote learning counterpart. Many of the university students of the mnemonic strategy achieved the max score for the test (14 points). Therefore, the true efficiency of mnemonics for the university students is higher than what the results show. The results contained a few outliers in the rote learning groups which are further analyzed in section 4.4.

4.2 Kanji error analysis

The distribution of kanji errors is shown in table 7; and in figure 7, 8 and 9.

level	group	empty	whole	config	stroke	sub	comp	total
hs1	r	46 (70%)	1 (2%)	0 (0%)	0 (0%)	1 (2%)	18 (27%)	66
	m	27 (52%)	5 (10%)	1 (2%)	3 (6%)	1 (2%)	15 (29%)	52
hs2	r	51 (59%)	7 (8%)	0 (0%)	2 (2%)	4 (5%)	22 (26%)	86
	m	7 (29%)	2 (8%)	0 (0%)	1 (4%)	1 (4%)	13 (54%)	24
uni2	r	43 (56%)	4 (5%)	2 (3%)	4 (5%)	3 (4%)	21 (27%)	77
	m	7 (26%)	1 (4%)	0 (0%)	1 (4%)	0 (0%)	18 (67%)	27

Table 7: Overview of kanji errors.

The most common result of failed recall was empty (omitted) answers. Empty answers facilitated the majority of errors for all the rote learning groups (70% for hs1, 59% for hs2, and 56% for uni2) and the hs1 mnemonic group (52%). All of the mnemonic groups had a lower ratio (29% for hs2, and 26% for uni2) of empty answers than their rote learning counterparts; and the ratio of empty answers were lower with higher levels with a greater reduction seen for the mnemonics groups.

The second most common error was component based errors, which was the dominant error tendency for the hs2 mnemonics group (54%) and the uni2 mnemonics group (67%).

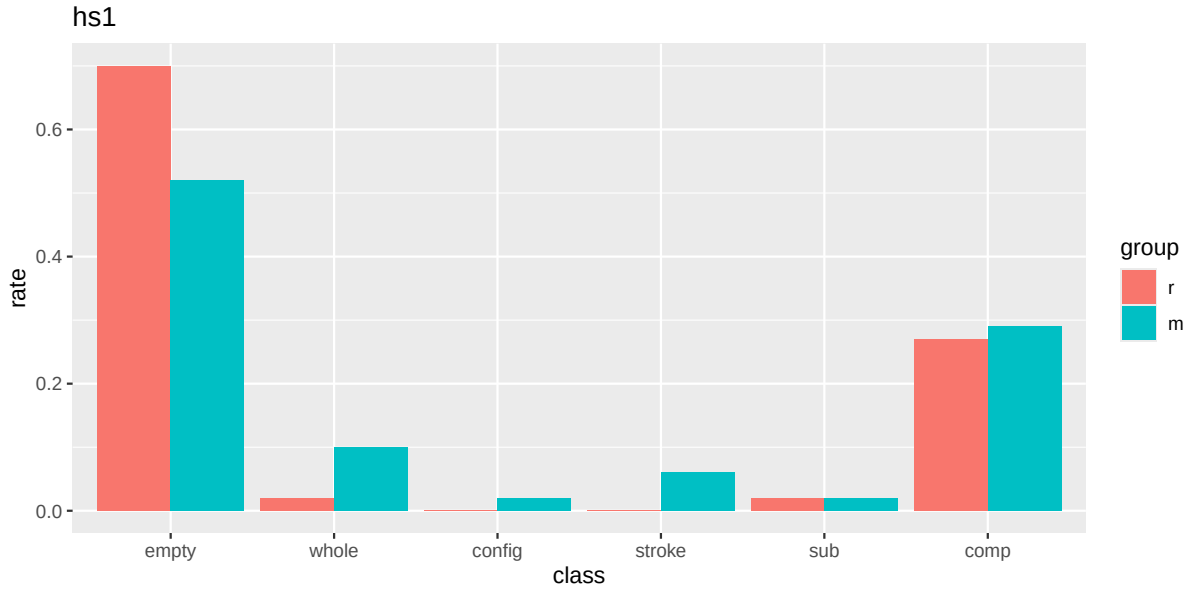


Figure 7: Distribution of kanji errors for hs1.

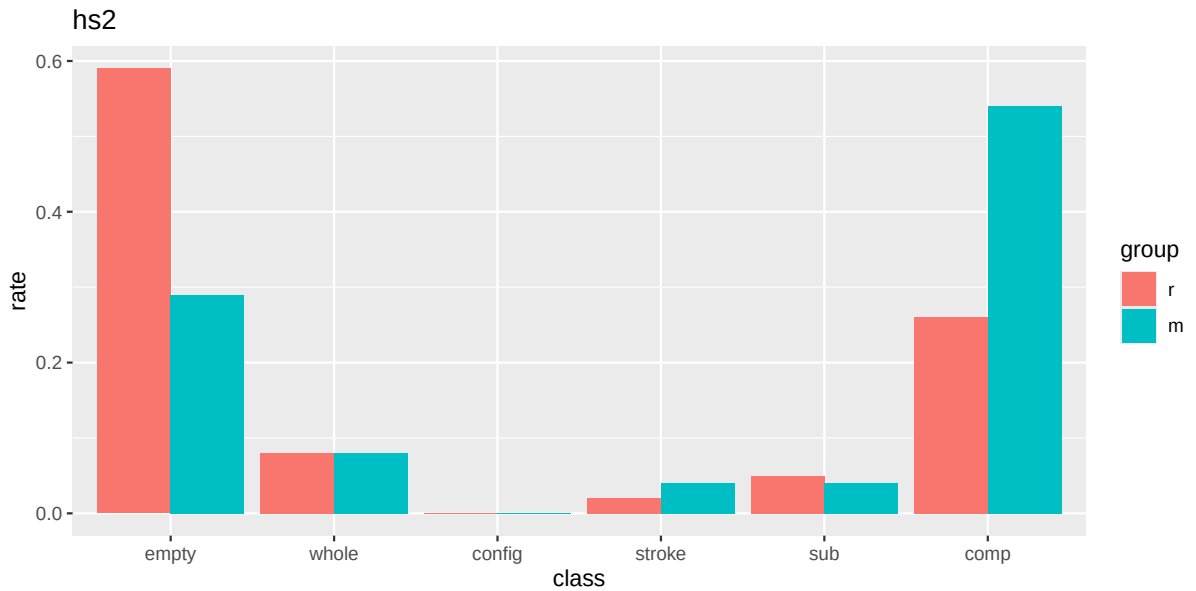


Figure 8: Distribution of kanji errors for hs2.

Component based errors had the opposite trend of empty errors, where the ratio of component based errors became higher with higher level, and showed a greater increase for the mnemonics groups.

The ratio of whole character errors, configuration errors, stroke errors and substitute errors, each constituted a ratio of 10% or lower, and were scattered across the levels and groups without any clear trends in the results.

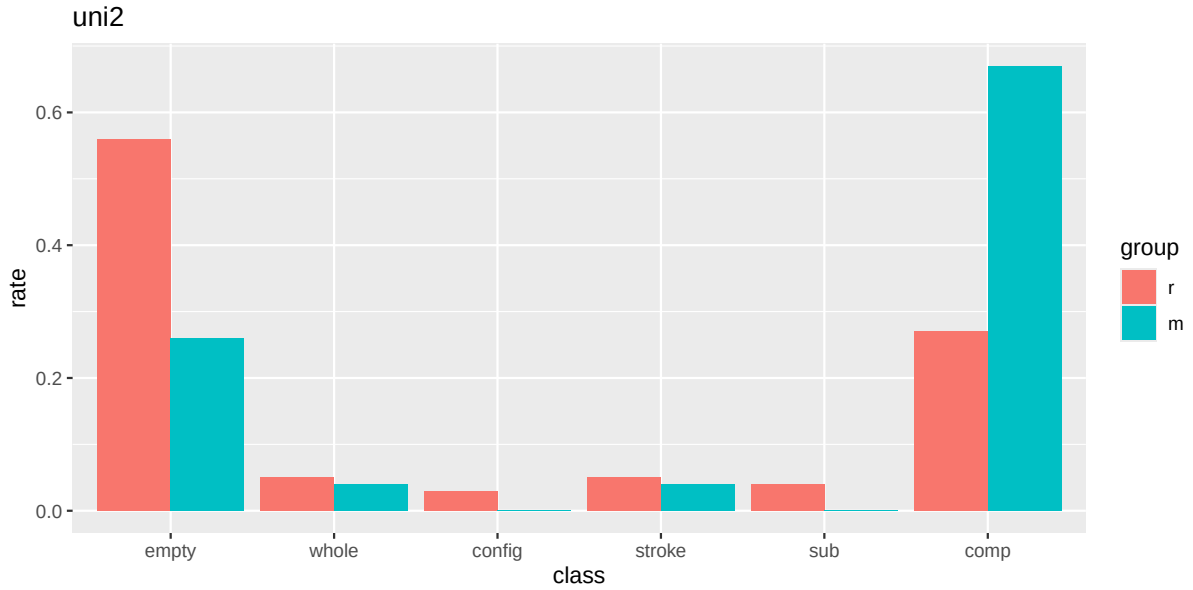


Figure 9: Distribution of kanji errors for uni2.

4.3 Component error analysis

The distribution of component based errors based on all the target components is shown in table 8; and figure 10, 11 and 12. The distribution of the component substitution errors is shown in table 9.

level	group	correct	empty	stroke	sub	total
hs1	r	16 (57%)	7 (25%)	1 (4%)	4 (14%)	28
	m	12 (55%)	3 (14%)	3 (14%)	4 (18%)	22
hs2	r	20 (56%)	8 (22%)	1 (3%)	7 (19%)	36
	m	7 (39%)	6 (33%)	0 (0%)	5 (28%)	18
uni	r	18 (64%)	4 (14%)	1 (4%)	5 (18%)	28
	m	13 (48%)	7 (26%)	0 (0%)	7 (26%)	27

Table 8: Overview of component errors.

When the component based errors were further analyzed, they showed that many of the components were correct. The two high school rote learning groups had a similar ratio of correct components (57% for hs1, and 56% for hs2); and a higher ratio was found for the university rote learning group (64%). Meanwhile, the mnemonic groups had a lower ratio of correct target components, which decreased with higher levels (55% for hs1, 39% for hs2, and 48% for uni2).

The rote learning groups showed a trend of fewer empty errors as they progressed to a higher level (25% for hs1, 22% for hs2, and 14% for uni2). The ratios of empty errors were scattered for the mnemonics groups (14% for hs1, 33% for hs2, and 26% for uni2).

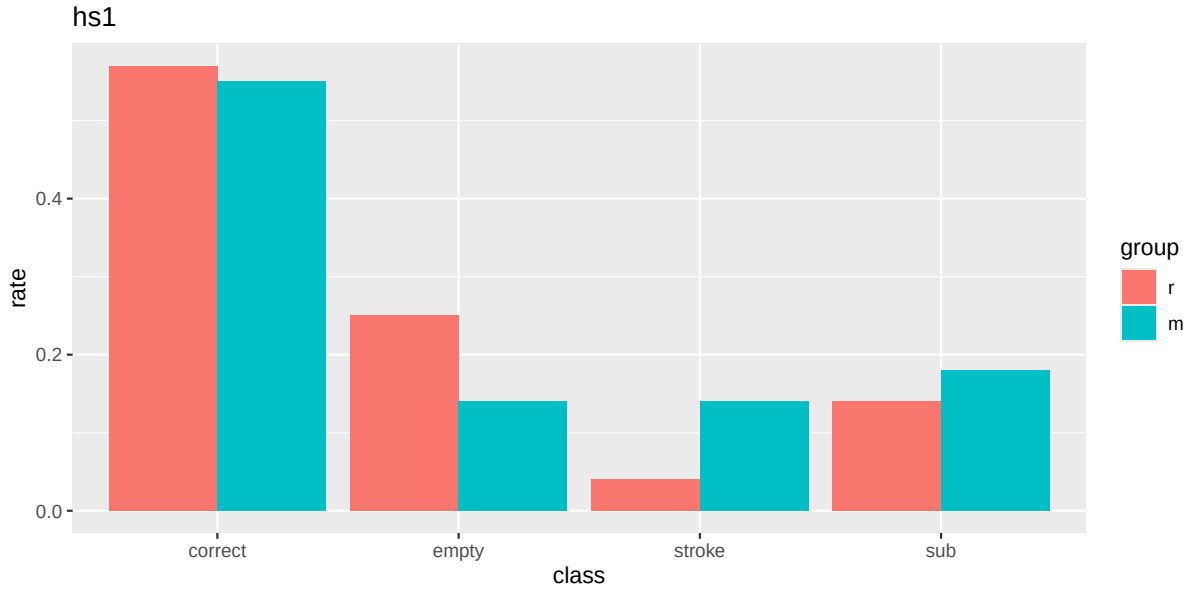


Figure 10: Distribution of component errors for hs1.

level	group	semantic	non-semantic	non-applicable	total
hs1	r	1 (25%)	3 (75%)	0 (0%)	4
	m	2 (50%)	2 (50%)	0 (0%)	4
hs2	r	0 (0%)	5 (71%)	2 (29%)	7
	m	1 (20%)	3 (60%)	1 (20%)	5
uni2	r	3 (60%)	0 (0%)	2 (40%)	5
	m	1 (14%)	4 (57%)	2 (29%)	7

Table 9: Overview of component substitute errors.

Contrary to expectations, the ratio of substitution errors were higher for the mnemonics groups than their rote learning counterparts. It would be possible that the participants of the mnemonic groups would have mixed up components which are semantically paired, however, the sub-analysis (see table 9) did not find any conclusive pattern, which might be due to the low total count of component substitute errors.

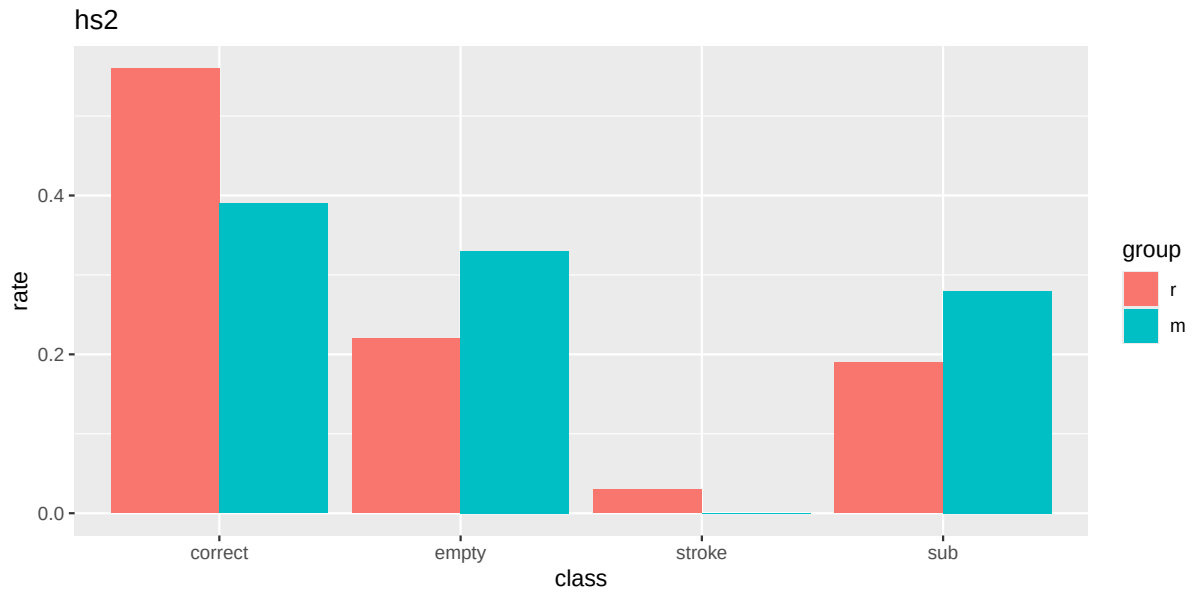


Figure 11: Distribution of component errors for hs2.

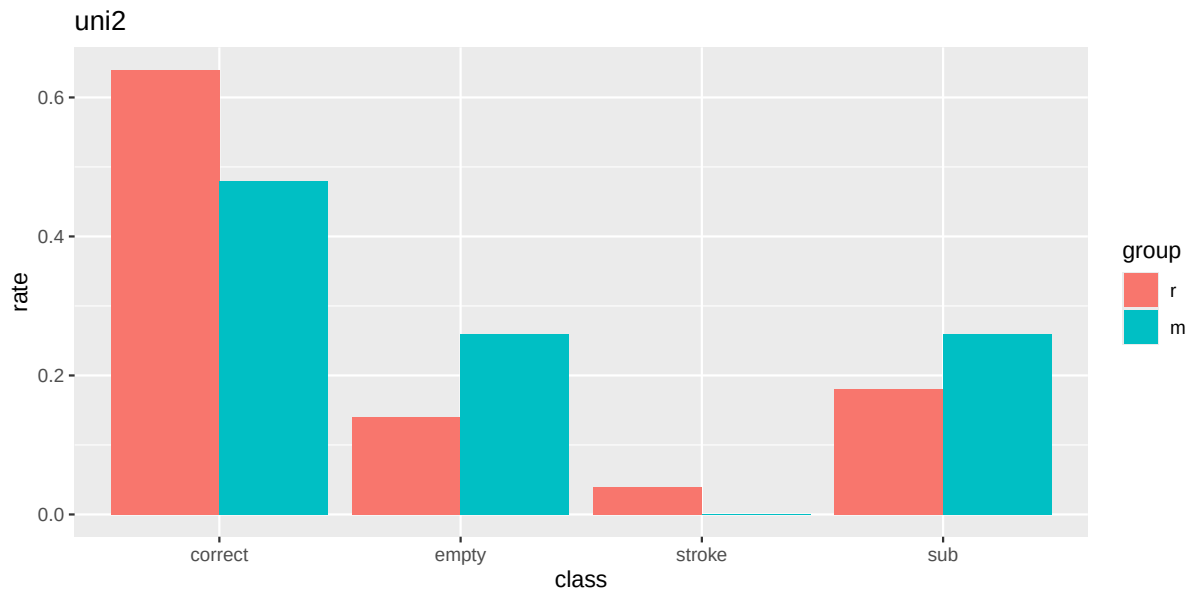


Figure 12: Distribution of component errors for uni2.

4.4 Analysis of attributes

For the current study, a few other attributes were examined to see if they had a correlation to the test scores. The ratio of successful recall was counted for each target character and summarized in table 10. Other attributes involved: passive exposure to the Japanese language (summarized in table 11), previous studies of Japanese (summarized in table 12), and knowledge of other languages (summarized in table 13).

target	r	m	both
尿 ‘urine’	18 (75%)	22 (100%)	40 (87%)
傘 ‘umbrella’	18 (75%)	19 (86%)	37 (80%)
泉 ‘spring’	11 (46%)	20 (91%)	31 (67%)
拉 ‘kidnap’	10 (42%)	14 (64%)	24 (52%)
浴 ‘bathe’	7 (29%)	17 (77%)	24 (52%)
拏 ‘arrest’	7 (29%)	15 (68%)	22 (48%)
恁 ‘nice’	5 (21%)	17 (77%)	22 (48%)
忠 ‘loyalty’	6 (25%)	13 (59%)	19 (41%)
摩 ‘rub’	6 (25%)	12 (55%)	18 (39%)
保 ‘preserve’	3 (13%)	14 (64%)	17 (37%)
恫 ‘painful’	4 (17%)	12 (55%)	16 (35%)
挫 ‘sprain’	4 (17%)	12 (55%)	16 (35%)
添 ‘attach’	4 (17%)	10 (45%)	14 (30%)
惜 ‘regret’	4 (17%)	8 (36%)	12 (26%)

Table 10: Overview of correct input of each target character. The table is sorted by the overall rate of correct input. Note that input is counted across all levels.

When sorted by retention rate, the order of the target characters differs between the rote learning groups and the mnemonics groups. The results showed that the retention rate was the highest for 尿 ‘urine’ (100%) for the mnemonics groups; the split highest was 傘 ‘umbrella’ (75%) for the rote learning groups; the second highest was 泉 ‘spring’ (91%) for the mnemonics group. The order of the second and third most retained target character was reversed between the two groups (傘 ‘umbrella’ at 86% for m, and 泉 ‘spring’ at 46% for r).

The rote learning group showed low retention for 恫 ‘painful’ (17%), 挫 ‘sprain’ (17%), 添 ‘attach’ (17%), 惜 ‘regret’ (17%); and the lowest retention for 保 ‘preserve’ (13%). The mnemonics group’s retention rate was the lowest for 惜 ‘regret’ (36%).

Based on answers on the survey, the participants’ exposure to Japanese was divided into three groups: *no passive exposure* to Japanese, *three months or less* spent in Japan, and *about one year* spent in Japan. No correlation was found on kanji acquisition to

level	group	none	≤ 3 months	ca. 1 year
hs1	r	3.4 ($n=5$)	1.0 ($n=1$)	- ($n=0$)
	m	5.3 ($n=6$)	- ($n=0$)	- ($n=0$)
hs2	r	4.0 ($n=6$)	1.0 ($n=2$)	- ($n=0$)
	m	8.0 ($n=4$)	- ($n=0$)	- ($n=0$)
uni2	r	5.1 ($n=7$)	9.5 ($n=2$)	8.0 ($n=1$)
	m	11.5 ($n=8$)	12.3 ($n=3$)	12.0 ($n=1$)

Table 11: Internal comparison of the mean of the scores, grouped by passive exposure to Japanese based on the participants' time spent in Japan.

passive exposure to Japanese. The high school students who had passive exposure to Japanese did worse than average. Only the university students showed better results from passive exposure, and even then the students who had spent one year in Japan did worse than the students who had been there for 3 months or less.

level	group	none	self-studies	high school
hs1	r	2.4 ($n=5$)	6.0 ($n=1$)	n/a
	m	5.2 ($n=5$)	6.0 ($n=1$)	n/a
hs2	r	3.3 ($n=8$)	- ($n=0$)	n/a
	m	8.0 ($n=4$)	- ($n=0$)	n/a
uni2	r	4.0 ($n=7$)	- ($n=0$)	11.7 ($n=3$)
	m	10.9 ($n=7$)	- ($n=0$)	13.0 ($n=5$)

Table 12: Internal comparison of the mean of the scores, grouped by previous studies of the Japanese language.

Two of the participants in the lower level high school groups had previously engaged in self-studies of Japanese before they started their Japanese language courses. Both had a higher score than their peers. Furthermore, a large number of the university students stated that they had previously studied Japanese at high school, and their mean scores also showed to be higher than their peers. The university students with previous experience in the rote learning group even scored higher than the non-experienced university students in the mnemonics group.

The results showed no additional benefits to kanji acquisition based on the amount of additional spoken or literate languages of the participants.

level	group	0	1	≥ 2
hs1	r	4.0 ($n=3$)	2.0 ($n=3$)	- ($n=0$)
	m	4.0 ($n=2$)	6.0 ($n=4$)	- ($n=0$)
hs2	r	2.3 ($n=3$)	1.5 ($n=2$)	5.3 ($n=3$)
	m	7.0 ($n=1$)	8.3 ($n=3$)	- ($n=0$)
uni2	r	6.3 ($n=3$)	7.3 ($n=3$)	5.5 ($n=4$)
	m	11.9 ($n=11$)	10.0 ($n=1$)	- ($n=0$)

Table 13: Overview of mean of the scores, grouped by the amount of languages that the participant is literate within in addition to Swedish, English and Japanese. The overall scores are similar when grouped by additional spoken languages.

4.5 Attitudes

The participants' answers on their own learning strategy were interpreted as one or multiple of the five strategies: rote learning, context strategies, morphological analysis, associative strategies and metacognitive strategies (see Mori & Shimizu, 2007:474-475); and shown in table 14.

	hs1	hs2	uni2	all
rote learning	7 (58%)	12 (100%)	13 (59%)	32 (70%)
context strategies	1 (8%)	0 (0%)	3 (14%)	4 (9%)
morphological analysis	3 (25%)	2 (17%)	9 (41%)	14 (30%)
associative strategies	4 (33%)	4 (33%)	4 (18%)	12 (26%)
metacognitive	0 (0%)	0 (0%)	0 (0%)	0 (0%)

Table 14: A summary of the participants' own learning strategies.

The majority (70%) of the participants stated that they use rote learning or some form of mass repetition to learn kanji. 14 participants (30%) wrote that they use morphological analysis; and 12 (26%) wrote that they use associative strategies, in which many mentioned mnemonics or etymology. 4 participants (9%) wrote that they use context strategies; and not a single participant wrote that they use metacognitive strategies.

In addition to the five learning strategies, 6 participants (13%) also wrote that they forget kanji quickly. All of the participants who mentioned that they were forgetful wrote that they rely on repetition to remember kanji.

Mentions of the different strategies were inconsistent between the levels, but it seems that the morphological analysis strategy is better established for the university students (41%) than for the high school students (25% for hs1 and 17% for hs2). Furthermore, associative strategies were mentioned more by the high school students (33% for both) than by the university students (18%).

	hs1	hs2	uni2	all
kanji are fun	9 (75%)	7 (58%)	18 (82%)	34 (74%)
kanji are difficult	6 (50%)	7 (58%)	12 (55%)	25 (54%)
kanji have cultural value	0 (0%)	0 (0%)	3 (14%)	3 (7%)
kanji are useful	3 (25%)	2 (17%)	3 (14%)	8 (17%)
kanji are inconvenient	0 (0%)	2 (17%)	1 (5%)	3 (7%)

Table 15: A summary of the participants’ attitude towards kanji. Attitudes that were not mentioned by any participant have been removed.

The participants’ answers on their attitude towards kanji were interpreted as one or multiple of six attitudes and their negative counterparts, where the participants consider kanji to be: fun; difficult; of cultural value to Japanese; still in use in the future; useful; or to require special abilities to learn (see Mori & Shimizu, 2007:477). The results are presented in table 15; however, some attitudes had no representation and have been removed from the table.

The majority of the participants (74%) had a positive attitude towards kanji, and wrote that kanji is either fun or interesting. A majority of the participants (54%) also wrote that kanji is difficult to learn. There was a large overlap of 20 participants (43%) who answered both that kanji is fun, and that it is difficult. 8 of the participants (17%) wrote that kanji is useful and that it makes Japanese easier to read and understand; and 3 (7%) participants had the opposite attitude, and wrote that kanji is inconvenient. 3 of the participants (7%) also mentioned that kanji has a cultural value for Japanese.

Similar to the learning strategies, the rate in which the different attitudes were mentioned were inconsistent between the different levels.

5 Discussion

The results showed that the mnemonic strategy had a significant positive effect on acquisition of kanji in comparison to rote learning. Moreover, the mnemonic strategy showed to be more efficient with more experienced learners. It is plausible that the higher efficiency through the mnemonics strategy was attributed to their higher ability to decompose and analyze characters, which many of the university students (41%) mentioned as one of their learning strategies.

Mnemonics should however not be overlooked for new learners. Although there were not enough participants for the non-learner groups to draw confident conclusions, the mnemonic non-learner group saw unexpectedly high scores (4.0 points) in comparison to their rote learning peers (1.0 points). In a brief interview on how they were able to apply the mnemonic strategy to a completely new script, one participant answered that she was able to approximate some shapes into familiar Latin letters, which she then created abbreviations for. One such example is the character 尿 ‘urine’ which could be realized as ‘PJK’ and made into a memorable phrase.

Both of the high school rote learning groups experienced similar scores despite that they differed with one year of experience of Japanese studies. It is likely that the target characters were more complicated than what either of the high school levels were accustomed to, and hence the rote learning strategy was not sufficient in acquiring the characters.

The participants’ prior knowledge of the target characters was not controlled; hence there is a possibility, particularly at the university level, that certain characters were already familiar to some individuals. While such familiarity would naturally reduce the number of novel characters in the acquisition process, this condition applied equally to both groups, ensuring they remained comparable.

The character error analysis revealed that learners who approach new kanji with mnemonics are more likely to attempt to write characters that have not yet been properly encoded. As Mori & Shimizu (2007:484) found, reliance on rote learning is correlated with helplessness; so likely the mnemonic strategy gives higher confidence than rote learning, and therefore fewer omitted attempts. The boost in confidence from mnemonics has previously been observed by Gibson (2009:61) and by Fernandes & Speer (2002:412); and

for the current study, the effect was found to be stronger for more experienced learners. Furthermore, since the mnemonic keyword strategy encodes characters through their components' semantic values, fewer non-semantic substitution errors were expected; however, no such correlation was found in the data. One plausible explanation is that mnemonic stories would not partially encode a character, and hence failed encoding would not affect the types of errors emitted. This would also explain why there were fewer correct components for the mnemonics groups as they would be less prone to partial encoding. Admittedly, the component error classification is rough and would include otherwise whole character errors as long as one or more components matched the target; furthermore, the amount of component substitute errors were too few to find any conclusive correlation.

The results showed that the highest retention was for the salient target character 尿 'urine' at 87%. Indeed, the character resulted in some audible giggles during the acquisition sessions; and the high retention rate demonstrated the advantage that salience has to memory. The results align with Crowley (2015:55), who saw a moderate positive effect of salient visual mnemonics; however, it is questionable if salience retains its positive effect when applied to expansive amounts of characters.

The character 傘 'umbrella', which is a pictogram (Seeley & Henshall, 2016:414) despite that its assembly consists of familiar components, had a substantial retention rate of 80%. Furthermore, the character had a higher retention rate through the mnemonics strategy (86%) than through rote learning (75%), which might support the usefulness of mnemonic stories for ideographic characters, which are prominent in the Japanese beginner's curriculum.

The three most retained target characters were all concrete nouns.¹¹ The character 泉 'spring', had a substantial retention rate through the mnemonic strategy of 91%. In the opposite end, the character 惜 'regret', which is an abstract noun, had the lowest retention rate at 36% through the mnemonic strategy. It is plausible that the low retention rate was owed to by the abstractness of the noun; however, given that other similarly abstract nouns had a higher retention rate through mnemonics, 悠 'nice' or 'kind' at 77%, and 忠 'loyalty' at 59%; the low retention rate was more likely constrained by an ineffective mnemonic device for the target.

It should come to no surprise that students with more study experience of Japanese

¹¹Lexical category can only be applied to kanji through context (Tamamura, 1992:160-161). In this case they are categorized through their interpreted meaning.

scored better than their peers as shown in table 12. In fact, their previous experience gave a better advantage on retention than the mnemonic strategy, even when the participant utilized rote repetition. It is unclear whether the experienced participants had studied further in their curriculum, or if they were simply more familiar with kanji.

The results showed no positive benefits of passive exposure to Japanese; rather, active efforts are required from the learner to acquire writing proficiency in Japanese. Furthermore, students who had acquired more languages showed no better proficiency in kanji acquisition.

The results from the additional survey points out that 70% of the participants use some form of rote learning for their kanji acquisition. 30% of the participants state that they utilize morphological analysis; 26% that they utilize associative strategies, such as mnemonics or etymology; and 9% that they utilize context strategies. However, associative strategies and morphological analysis should be interpreted with caution since both strategies are involved in mnemonic stories. The participants' attitude towards kanji is mainly positive (74%), and a majority (54%) also state that they think that kanji are difficult to learn. Moreover, there is a large overlap (43%) in participants who find kanji to be difficult yet enjoy learning kanji. This notion contradicts a common belief by teachers, who agree that kanji is difficult, but that because of the difficulty students do not enjoy learning kanji (Shimizu & Green, 2002:239). Only a few participants (7%) showed a negative attitude towards the usefulness of kanji.

The high number of participants that have adapted rote learning, in conjunction with that many of the learners consider kanji as difficult, indicates that the learners may have a gap in their knowledge of alternative learning strategies.

6 Conclusion

To reiterate the research questions, RQ1: *Between rote learning and mnemonics, which one is more efficient in learning kanji as a second language?* The results showed that for a 30 minute acquisition session, the mnemonics strategy, which consisted of keyword mnemonics and mnemonic stories combined, resulted in higher acquisition and retention than rote learning in every instance. Furthermore, the benefits of mnemonics, in comparison to rote learning, is greater the more familiar the learner is with kanji.

The results do not align with the findings of Thomas & Wang (1996:336, 339), who found that students who acquired vocabulary through the mnemonic keyword strategy were prone to rapid forgetting. The differences in results could be explain through that either: familiarity is required with the target language before keyword mnemonics become effective; the effects of mnemonics are inherently different for kanji than for vocabulary; or one of the studies have major flaws in its methodology, as pointed out by Gruneberg (1998:530).

RQ2: *Do the results of the two strategies in question differ in any major way?* The results showed that learners who have acquired characters through the mnemonic strategy are more likely to attempt to write their target character, even when the recall fails. The mnemonic strategy seems to have given the participants more confidence than rote learning, and supports Mori & Shimizu (2007:484) finding that rote learning is correlated with helplessness. Moreover, characters that are acquired through the mnemonic strategy seem to be less prone to partial encoding; however, this claim needs more data to be confirmed

Comparison of the test scores when grouped by attributes, show that neither passive exposure to Japanese, nor knowledge of other writing systems¹² have an effect on kanji acquisition. It seems that efforts from the learner, such as more study hours, are required to improve upon their kanji proficiency and acquisition.

The target character comparison shows that salience has a positive effect on memory. Mnemonics should therefore not be disregarded for their reputation as bizarre. On the contrary, what is bizarre is also easier to remember, therefore this view should rather be used to promote mnemonics.

¹²The data set does not include anyone with knowledge of written Chinese.

The survey indicates that rote learning is the dominant strategy for second language learners of Japanese, which aligns with the findings by Haththotuwa Gamage (2026:12-13). Furthermore, the widespread perception of kanji as a significant hurdle suggests a potential lack of exposure to diverse learning strategies. Given that many learners maintain a positive disposition toward kanji despite these challenges, there is an opportunity for pedagogical interventions. Specifically, struggling students may benefit from explicit strategy instruction to better navigate the complexities of kanji acquisition. Simultaneously, the tendency for some participants to abandon the explicit instructions to use rote learning, indicates that there is some awareness of mnemonics among learners.

The mnemonics used for the current study solely encodes the semantic value through the targets' components; however, the strategy can also be used to memorize pronunciation (Esposito, 2017:103), and other target information (Levin, 1993:237). It is, however, crucial to note that, when used in isolation, mnemonics do not deepen the acquired knowledge (Crowley, 2015:42), but rather provides a basis in which deeper learning can be built upon (Gibson, 2009:62; McDaniel & Pressley, 1989:205); and that a pedagogical approach should not limit itself to a single strategy, but instead incorporate a balance of suitable strategies.

6.1 Further studies

The current study focuses on acquisition of composite kanji, which make up the majority of the kanji inventory (Tamaoka et al., 2002:262-263; Tamamura, 1992:165). Some support was found that keyword mnemonics and mnemonic stories have a positive effect to acquisition of pictographic characters; however, another study would have to be conducted to find more conclusive data.

The participants were encouraged to attempt the target characters even when their knowledge was limited to individual components. While these findings are applicable to instructional settings, they may not generalize to naturalistic environments where learners often employ avoidance strategies to bypass potential errors. To assess the robustness of the current results, future research should employ the reverse condition (i.e. no encouragement or punishments for participial recall) to verify whether the observed effects persist under altered parameters.

Empirical research into the efficacy of mnemonics for Japanese orthography remains

relatively sparse. Existing literature, including the present study, predominantly focuses on short-term recall, with few investigations extending beyond a 48-hour retention interval. Consequently, the field would benefit from longitudinal studies to determine the long-term durability of the mnemonic strategy.

The target group for the experiment are learners of beginners' Japanese. None of the participants had exceeded more than 317 kanji¹³ in their curriculum by the time of the experiment. At this lower level of proficiency, *on-yomi* are insufficiently encoded (Chikamatsu, 2005:88). Consequently, the current study excluded phonetic aspects from the experiment. For learners of higher proficiency, however, it may be advantageous to decompose characters into larger components and introduce the *on-yomi* of both the target character and its phonetic component to facilitate stronger cognitive associations.

In the pilot experiment, all of the intermediate learners retained all of the target characters, and were therefore not considered for the experiment. Additionally, many of the university students with prior study experience achieved the maximum possible score, regardless of if they acquired the characters through rote learning or mnemonics. The lack of data for intermediate and advanced learners begs the question if there is a point in the learner's progression where the mnemonics strategy becomes unnecessary for kanji acquisition, and if other strategies are sufficient to achieve similar results.

¹³The amount of kanji found in the kanji curriculum of Banno et al. (2011a, 2011b), which all of the participants used as their textbook for their Japanese language courses.

References

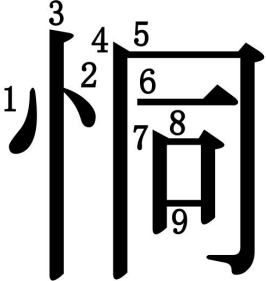
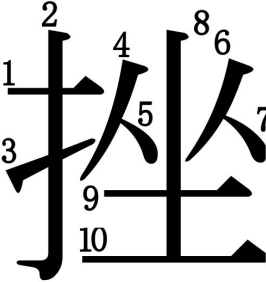
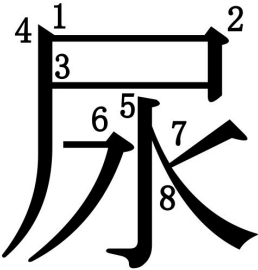
- Agency for Cultural Affairs and Ministry of Education, Culture, Sports, Science and Technology. (2010). *Jōyō kanji-hyō [regular-use kanji]*. Agency for Cultural Affairs. https://www.bunka.go.jp/kokugo_nihongo/sisaku/joho/joho/kijun/naikaku/pdf/joyokanjihyo_20101130.pdf
- Akamatsu, N. (2006). Literacy acquisition in Japanese—English bilinguals. In R. M. Joshi & P. G. Aaron (Eds.), *Handbook of orthography and literacy* (pp. 481–496). Routledge.
- Amiryousefi, M., & Ketabi, S. (2011). Mnemonic instruction: A way to boost vocabulary learning and recall. *Journal of Language Teaching and Research*, 2(1), 178–182.
- Anderson, L. W., & Krathwohl, D. R. (2001). *A taxonomy for learning, teaching, and assessing: A revision of bloom's taxonomy of educational objectives: Complete edition*. Addison Wesley Longman, Inc.
- Banno, E., Ikeda, Y., Ohno, Y., Shinagawa, C., & Tokashiki, K. (2011a). *Genki I: An integrated course in elementary Japanese* (2nd ed.). Japan Times Publishing.
- Banno, E., Ikeda, Y., Ohno, Y., Shinagawa, C., & Tokashiki, K. (2011b). *Genki II: An integrated course in elementary Japanese* (2nd ed.). Japan Times Publishing.
- Breen, J., & The Electronic Dictionary Research and Development Group. (2003). *Kanjidic2 dictionary file* [Available from <https://edrdg.org>]. Electronic Dictionary Research and Development Group (EDRDG). Retrieved April 12, 2018, from <https://edrdg.org>
- Chikamatsu, N. (2005). L2 Japanese kanji memory and retrieval: An experiment on the tip-of-the-pen (top) phenomenon. *Second language writing systems*, 71–96.
- Chikamatsu, N., Yokoyama, S., Nozaki, H., Long, E., & Fukuda, S. (2000). A Japanese logographic character frequency list for cognitive science research. *Behavior Research Methods, Instruments, & Computers*, 32(3), 482–500.
- Cohen, A. D., & Aphek, E. (1980). Retention of second-language vocabulary overtime: Investigating the role of mnemonic associations. *System*, 8(3), 221–235.
- Conning, A. S. (2013). *The kodansha kanji learner's course: A step-by-step guide to mastering 2300 characters*. Kodansha USA.

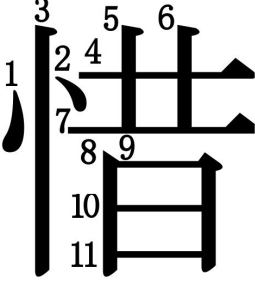
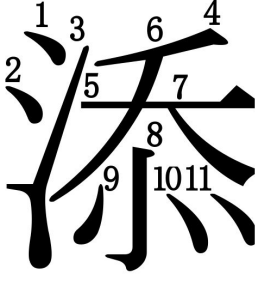
- Crowley, K. A. (2015). *The effect of keyword mnemonics compared to rote rehearsal in second-language learning* [master thesis]. Aarhus Universitet.
- Dingguo, S., & Weidong, L. (2009). *The wisdom of Chinese characters*. Beijing Language; Culture University Press.
- Ebbinghaus, H. (1913). *Memory: A contribution to experimental psychology* (H. A. Ruger & C. E. Bussenius, Trans.). Columbia University. (Original work published 1885)
- Esposito, J. (2017). Mnemonic networks: Multiple paths to learning Sino-Japanese characters. *The Reading Matrix: An International Online Journal*, 17(2), 96–116.
- Fernandes, C. J., & Speer, M. E. (2002). Using mnemonics and visual imagery to teach the new neonatal resuscitation program. *Journal of perinatology*, 22(5), 411–413.
- Gibson, H. A. (2009). Using mnemonics to increase knowledge of an organizing curriculum framework. *Teaching and Learning in Nursing*, 4(2), 56–62.
- Gottlieb, N. (2012). *Language policy in Japan: The challenge of change*. Cambridge University Press.
- Gruneberg, M. M. (1998). A commentary on criticism of the keyword method of learning foreign languages. *Applied Cognitive Psychology: The Official Journal of the Society for Applied Research in Memory and Cognition*, 12(5), 529–532.
- Gruneberg, M. M., & Jacobs, G. C. (1991). In defence of linkword. *Language Learning Journal*, 3(1), 25–29.
- Hasegawa, Y. (2015). *Japanese: A linguistic introduction*. Cambridge University Press.
- Haththotuwa Gamage, G. (2026). Kanji learning strategies and language background of l2 Japanese language learners. *Asian-Pacific Journal of Second and Foreign Language Education*, 11(4).
- Heisig, J. W. (2011). *Remembering the kanji 1: A complete course on how not to forget the meaning and writing of Japanese characters* (6th ed.). University of Hawaii Press.
- Ivarsson, F. (2016). *A study of the l2 kanji learning process: Analysis of reading and writing errors of Swedish learners in comparison with level-matched Japanese schoolchildren*. [PhD dissertation]. University of Gothenburg.
- Kano, C., Shimizu, Y., Takenaka, H., Akutsu, T., Ishii, E., Kaibo, H., & Deguchi, T. (1989). Jiyū hōshutsu-hō ni yoru gaikoku hito no kanji chishiki no bunseki [analy-

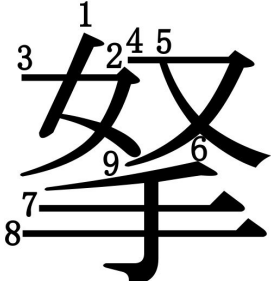
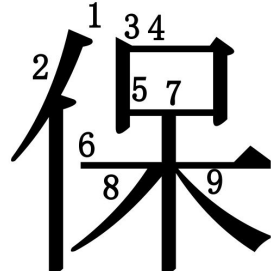
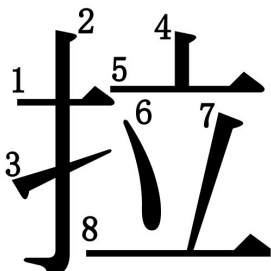
- sis of foreigners' kanji knowledge using the free recall method]. *Tsukubadaigaku ryūgakusei kyōiku sentā nihongo kyōiku ronshū*, 4, 65–91.
- Kuo, A. M.-L., & Hooper, S. (2004). The effects of visual and verbal coding mnemonics on learning Chinese characters in computer-based instruction. *Educational technology research and development*, 52(3), 23–34.
- Levin, J. R. (1993). Mnemonic strategies and classroom learning: A twenty-year report card. *The Elementary School Journal*, 94(2), 235–244.
- Lindholm, M. (2006). *Pedagogiska grunder*. Försvarsmakten.
- Lu, M.-Y., Webb, J. M., Krus, D. J., & Fox, L. S. (1999). Using order analytic instructional hierarchies of mnemonics to facilitate learning Chinese and Japanese kanji characters. *The Journal of Experimental Education*, 67(4), 293–311.
- McDaniel, M. A., & Pressley, M. (1989). Keyword and context instruction of new vocabulary meanings: Effects on text comprehension and memory. *Journal of Educational Psychology*, 81(2), 204–213.
- Mori, Y., & Shimizu, H. (2007). Japanese language students' attitudes toward kanji and their perceptions on kanji learning strategies. *Foreign Language Annals*, 40(3), 472–490.
- Nagaho, S. (1987). *Hajimete gaikokujin ni oshieru hito no nihongo chokusetsu kyōjuhō* [direct instruction method for teaching Japanese]. Tokyo: Inshokan, Japan.
- Naka, M. (1998). Repeated writing facilitates children's memory for pseudocharacters and foreign letters. *Memory & cognition*, 26(4), 804–809.
- Naka, M., & Naoi, H. (1995). The effect of repeated writing on memory. *Memory & cognition*, 23(2), 201–212.
- Nesbitt, D. (2009). Achieving unconscious recall of kanji: Can rote learning help? *New Zealand Studies in Applied Linguistics*, 15(2), 61–73.
- Ottosson, I., & Ekholm, T. (2007). *Japans historia*. Historiska media.
- Paivio, A. (1975). Coding distinctions and repetition effects in memory. In G. H. Bower (Ed.), *Psychology of learning and motivation* (pp. 179–214, Vol. 9). Elsevier.
- Paton, S. (2020). Introducing mnemonics to Japanese students as a vocabulary learning strategy. *Vocabulary Learning and Instruction*, 9(1), 80–93.
- Richmond, S. (2005). A re-evaluation of kanji textbooks for learners of Japanese as a second language. *Kyōtogakuendaigaku keizaigakubu ronshū*, 43–71.

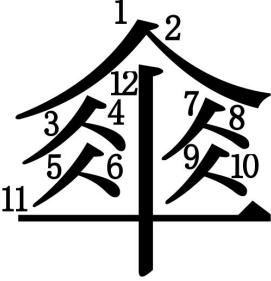
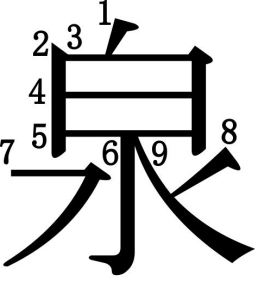
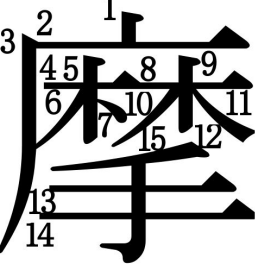
- Rose, H. (2013). L2 learners' attitudes toward, and use of, mnemonic strategies when learning Japanese kanji. *The Modern Language Journal*, 97(4), 981–992.
- Seeley, C. (2000). *A history of writing in Japan*. University of Hawaii Press.
- Seeley, C., & Henshall, K. G. (2016). *The complete guide to Japanese kanji: Remembering and understanding the 2,136 standard Japanese characters*. Tuttle Publishing.
- Shibatani, M. (1990). *The languages of Japan*. Cambridge University Press.
- Shigaki, M. (1992). Which kanji should the students of economics without a kanji-background learn? *Journal of Japanese Language Teaching*, 76, 67–87.
- Shimizu, H., & Green, K. E. (2002). Japanese language educators' strategies for and attitudes toward teaching kanji. *The Modern Language Journal*, 86(2), 227–241.
- Tamamura, F. (1992). *Nihongo wo manabu hito no tame ni [for those learning Japanese]*. Sekai shisō sha, Japan.
- Tamaoka, K., Kirsner, K., Yanase, Y., Miyaoka, Y., & Kawakami, M. (2002). A web-accessible database of characteristics of the 1,945 basic Japanese kanji. *Behavior Research Methods, Instruments, & Computers*, 34(2), 260–275.
- Thomas, M. (2013). “Air writing” and second language learners' knowledge of Japanese kanji. *Japanese Language and Literature*, 23–58.
- Thomas, M. H., & Wang, A. Y. (1996). Learning by the keyword mnemonic: Looking for long-term benefits. *Journal of Experimental Psychology: Applied*, 2(4), 330–342.
- Thompson, I. (1987). Memory in language learning. *Learner Strategies in Language Learning*, 43–56.
- Wang, A. Y., & Thomas, M. H. (1995). Effects of keyword on long-term retention: Help or hindrance? *Journal of Educational Psychology*, 87(3), 468–475.
- Wittrock, M. C. (1989). Generative processes of comprehension. *Educational psychologist*, 24(4), 345–376.

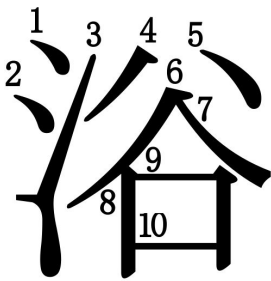
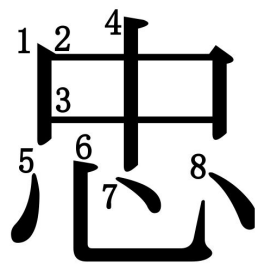
Appendix A: Mnemonic flash cards

SMÄRTSAM	
	1. När man känner SMÄRTA i sitt <i>hjärta</i> (心) kan man lindra den genom att stoppa in sin <i>mun</i> (口) i en öppen <i>låda</i> (匚) och skrika så högt man kan <i>en</i> (一) gång. 心 <i>hjärta</i> 匚 <i>låda, öppning nedåt</i> 一 <i>ett</i> 口 <i>mun</i>
VRICKA	
	1. Två <i>män</i> (人) arbetar med <i>jord</i> (土). Ena personen VRICKAR sin <i>hand</i> (手) med sitt hårda arbete. 2. Två <i>män</i> (人) sitter uppe på en <i>jordhög</i> (土) med VRICKADE händer (手). 手 <i>hand</i> 人 <i>människa (x2)</i> 土 <i>jord</i>
URIN	
	1. URIN är bara en form av <i>dött</i> (尸) <i>vatten</i> (水). 尸 <i>lik</i> 水 <i>vatten</i>

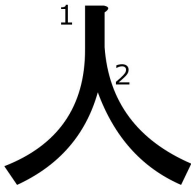
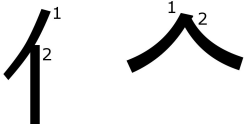
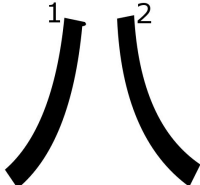
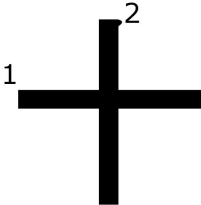
ÅNGRA	
	1. Att ÅNGRA något som hänt för <i>länge sedan</i> (昔) med hela <i>hjärtat</i> (忄). 忄 <i>hjärta</i> 昔 <i>länge sedan</i>
LÄGGA TILL	
	1. En nyligen avliden persons <i>själ</i> (小) försöker att ta sig till <i>himlen</i> (天). Vi måste offra vätska genom att LÄGGA TILL <i>vatten</i> (氵) för att hjälpa själen. 氵 <i>vatten</i> 天 <i>himmel</i> 小 <i>själ</i>
TREVLIG	
	1. En <i>godhjärtad</i> (心) TREVLIG <i>man</i> (亻) planterar ett <i>träd</i> (木). 2. Det är en varm solig dag. En <i>man</i> (亻) tar en paus och vilar mot ett <i>träd</i> (木). För honom är det en chans att gå ner i puls och lätta på <i>hjärtat</i> (心). Det är en TREVLIG känsla han sällan får. 亻 <i>människa</i> 木 <i>träd</i> 心 <i>hjärta</i>

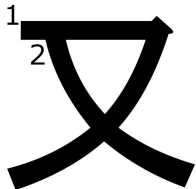
GRIPA	
	1. Nyhetsartikel: "Ännu en gång! (又) Man GRIPEN efter att ha lagt händerna (手) på kvinna (女)!" 女 <i>kvinna</i> 又 <i>igen</i> 手 <i>hand</i>
BEVARA	
	1. En <i>man</i> (亻) stoppar in sitt ansikte, <i>mun</i> (口) i stammen av ett träd och viskar sina hemligheter i hopp om att trädet kommer att BEVARA hans hemligheter. 亻 <i>människa</i> 口 <i>mun</i> 木 <i>träd</i>
KIDNAPPA	
	1. Barn är rätt så lätta att KIDNAPPA. Bara ta tag i dem hårt med båda <i>händerna</i> (扌) när de <i>står</i> (立) ensamma och spring. 2. En man <i>står</i> (立) på gatan. En skåpbil kör fram till honom, en <i>hand</i> (扌) rycker tag i honom och sedan är han KIDNAPPAD. 扌 <i>hand</i> 立 <i>stå</i>

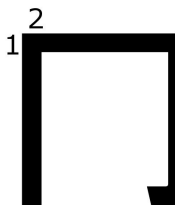
PARAPLY	
	1. Det sägs att det finns en <i>person</i> (人) med ett PARAPLY så stort att det kan täcka <i>14 personer</i> (人々人々十). 人 <i>människa</i> 人 <i>människa</i> (x4) 十 <i>tio</i>
KÄLLA	
	1. <i>Vattnet</i> (水) från en KÄLLA från glimmar <i>vitt</i> (白) i solskenet. 2. "Grundvattnet häromkring är förorenat. Man kan se det på den <i>vita</i> (白) grumliga <i>vattnet</i> (水) som kommer från den lokala KÄLLAN." 白 <i>vit</i> 水 <i>vatten</i>
GNIDA MOT	
	1. Legendan säger att det finns <i>två träd</i> (木木) i ett <i>hus</i> (广). När vinden GNED träden MOT varandra så viskade de hemskheter. Till slut byggde något ett skjul runt träden för <i>hand</i> (手) för för att stoppa viskandet. 广 <i>hus</i> 木 <i>träd</i> (x2) 手 <i>hand</i>

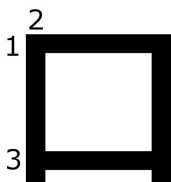
BADA	
	1. Åtta (八) personer (人) BADAR tillsammans. De sjunger en sång med sina <i>munnar</i> (口) och skvätter <i>vatten</i> (氵) på varandra. 氵 <i>vatten</i> 八 <i>åtta</i> 人 <i>människa</i> 口 <i>mun</i>
LOJAL	
	1. Man är oftast LOJAL mot det man håller <i>inuti</i> (中) sitt <i>hjärta</i> (心). 中 <i>inuti</i> 心 <i>hjärta</i>

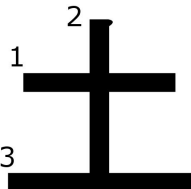
Appendix B: Mnemonic component handout

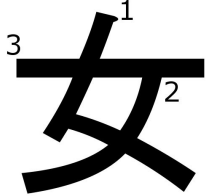
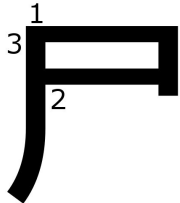
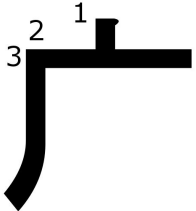
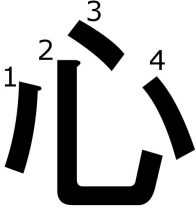
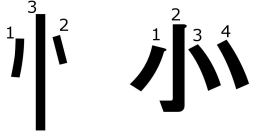
ETT	
	EN linje för att representera ETT.
MÄNNISKA	
	En grov sketch av en MÄNNISKA visar två ben och överkroppen. Andra variationer: 
ÅTTA	
	ÅTTA är ett lätt nummer att dela vilket är varför det representeras av två linjer delade från varandra.
TIO	
	Om man lägger händerna i ett kors får man en form med alla TIO fingrar.

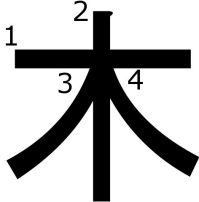
IGEN	
	En bild på två armar i kors för att ge en känsla att det är två av något. En arm och IGEN en till arm.

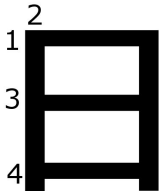
LÅDA, ÖPPNING NEDÅT	
	En LÅDA som är öppen nedåt.

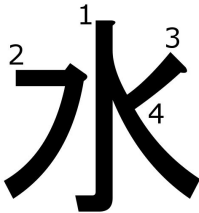
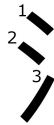
MUN	
	En bild på en öppning eller MUN.

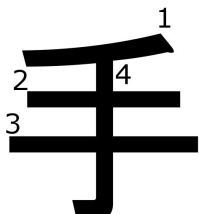
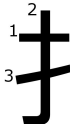
JORD	
	En bild på en växt som växer upp från JORDEN med två små grenar rakt ut från varsitt håll.

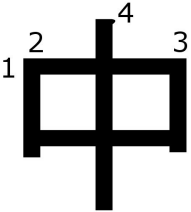
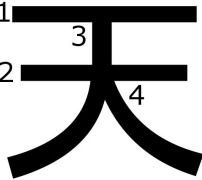
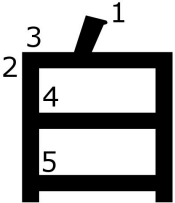
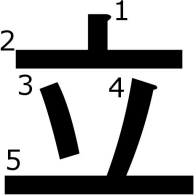
KVINNA	
	Visar från början en KVINNA på knä. Tecknet består av de tre delarna < (<i>hiragana ku</i>) ノ (<i>katakana no</i>) — (<i>kanji ichi</i>) vilket ger ordet för en KVINNLIG ninja eller kunoichi
LIK	
	Tänk att lådan är ett LIK. Linjen ner till vänster är blod som har runnit.
HUS	
	En bild på ett platt tak till ett HUS med en antenn på toppen. Till vänster är en vägg för att ytterligare skydda mot väder och vind.
HJÄRTA/SINNE	
 	En bild på ett HJÄRTA. Det böjda strecket i mitten kan tänkas vara ett hjärta och de resterande 3 streck blod som pumpas. HJÄRTA och SINNE är kopplade. Andra variationer:

TRÄD	
	En bild på ett TRÄD med två grenar rakt ut åt sidan och två som sticker ner åt varsitt håll.

SOL	
	En SOL som reser sig från horisonten.

VATTEN	
	VATTEN som rinner. Det skvätter från båda sidorna. Andra variationer: 

ETT	
	Tänk en HAND som skall gripa tag om något. Endast tre av fingrarna griper runt föremålet. Andra variationer: 

INUTI	
	En låda med en linje INUTI .
HIMMEL	
	Tänk en människa med armarna rakt ut åt sidorna. Över honom är HIMMELEN i form av en horisontell linje. Andra variationer: 
VIT	
	En sol (日) som reser sig från horisonten. Den vita linjen på toppen visar VITT ljus som kommer från solen.
STÅ	
	Grov bild på något som STÅR . Strecket på toppen är huvudet. En horisontell linje för kroppen. Sedan två streck nedåt som står på marken vilket är den nedre horisontella linjen.