Using Mnemonics to Facilitate Learning of Japanese Script Characters

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Extra tutorial sessions on the use of pictorial mnemonics to facilitate memorization of Japanese hiragana and katakana script characters, as well as vocabulary words and kanji characters, were offered to university first year undergraduate students taking a beginners' Japanese language course. 27 students, most of whom were experiencing some difficulties with the course, volunteered to attend. Although the improvement in actual marks that the students evidenced subsequent to attending the sessions did not prove to be statistically significant, a significant improvement in pass rate was found. Furthermore, the students rated the sessions highly in terms of their helpfulness, and the majority indicated that they believed the sessions helped their performance in the course assessments. It is concluded that mnemonic strategies can effectively be employed in facilitating retention of the script of a foreign, non-alphabetic language within a real educational setting.

初心者対象の日本語コースを取っている大学１年生に、日本語のひらがなとカタカナ、及び語彙と漢字の記憶を促進するため、絵を用いた連想法を使った追加授業が行われた。２７名（そのうちのほとんどは、コースにおいて何らかの困難に直面している）が自主的に追加授業に出席した。追加授業出席後、学生の実際の小テストの点の向上には有意差は認められなかったものの、合格率の向上においては有意差は確認された。さらに、追加授業に出席した学生は授業が役立ったと高く評価し、大多数が追加授業がコースの成績向上に貢献したと思うと述べた。本論は、実際の教育現場で英語のアルファベットを用いない外国語の文字を教える際、連想法を効果的に使用することができると結論づけた。

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Mnemonics are schemes for assisting memory. They include well-known and simple rhymes like the one that starts "Thirty days hath September, April, June and November ...," intended as a reminder of the number of days in each of the months of the year, as well as methods that are a little more technical such as *soh cah toa,* a code that for many students of trigonometry serves as a reminder of when to use the sine, cosine, and tangent rules for solving the dimensions of triangles. Baddeley (1997) provided a good general description of mnemonic strategies, and noted that they usually employ various manipulations of the material to be remembered to make that material more memorable (e.g., by using imagery, elaboration, or reduction).

Research findings during the past twenty years have shown that mnemonic strategies can have practical educational applications. Their usefulness in learning a wide range of information, from foreign vocabulary words to science facts, have been reported in many research studies (e.g., Desrochers, Gelinas, & Wieland, 1989; Ehri, Deffner, & Wilce, 1984; McDaniel & Pressley, 1989; McDaniel, Pressley, & Dunay, 1987; Rosenheck, Levin, & Levin, 1989). These studies consistently show that participants taught using mnemonic methods outperform those taught using other methods in tests that gauge the retention of the target information (for reviews, see Levin, 1983; and Manalo, 1997). Furthermore, mnemonics have been found effective in teaching individuals with learning disabilities (e.g., Condus, Marshall, & Miller, 1986; Elliott & Gentile, 1986; Manalo, 1991; Manalo, Bunnell, & Stillman, 2000; Mastropieri, Scruggs, & Fulk, 1990; Mastropieri, Scruggs, Levin, Gaffney, & McLoone, 1985), as well as those who have sustained brain injury (for a review, see Richardson, Cermak, Blackford, & O'Connor, 1987). Thus mnemonics can provide a potentially effective alternative instruction strategy when other more traditional forms of instruction may have already been tried but failed to produce the desired results in the learning performance of individuals who have special needs. A number of recent research studies have also shown that, contrary to traditional views that mnemonics are unnatural and used only in artificial environments, the majority of people in general spontaneously use various forms of mnemonics when given tasks that require memorisation (e.g., Brooks, Friedman, Gibson, & Yesavage, 1993; Hill, Schwob, & Ottman, 1993; Manalo, 1999).

Language learning is an area of educational pursuit that, among other things, requires a considerable amount of memorisation. It is therefore not surprising that there are many mnemonic techniques advocated and practised by instructors and students alike in this area. Research, how-

ever, has focused mainly on vocabulary acquisition and the use of the keyword method. Atkinson and Raugh (1975) provided a good description of the keyword method, as well as an application of it in learning Russian vocabulary. As they explained, using this method to learn a new word involves two basic steps: finding an English word (the "keyword") that sounds similar to a part of the foreign vocabulary word to be learnt, and then creating a mental image of the keyword interacting with the English translation of the foreign word. Hence, to learn, for example that the Russian word *zdanie* (pronounced "zdawn-yeh") means *building* in English, the English word *dawn* is used as a keyword, and then a mental image of "the pink light of dawn reflected in the windows of a tall building" (Atkinson & Raugh, 1975, p. 127) is conjured. Thus, when the word *zdanie* is encountered again in the future, the image previously conjured would return, serving as a reminder of the correct translation of the word in English. The keyword method of course is not limited to English translations: the user's native or other familiar language can be used in generating keywords for association with the translation of the foreign or other unfamiliar word to be learnt.

A good example of a study that examined the effectiveness of the keyword method was reported by Levin, McCormick, Miller, Berry, and Pressley (1982). In this study, the participants—children in the fourth grade—were required to learn the meaning of unfamiliar words, such as that *surplus* means "having some left over, having more than was needed." Children in the mnemonic condition were shown pictures that involved stimulus recoding. For example, they were shown a picture of someone pouring lots of syrup over pancakes and saying that there was a surplus of it in the cupboard. Thus, apart from illustrating a situation where surplus was involved, the word *syrup* was also used as a keyword to help remember the meaning of the word surplus. Levin et al. found the mean vocabulary recall of children in the mnemonic condition significantly greater than the recall of children who were shown non-mnemonic pictures, and children who were shown no pictures at all (i.e., just the words and their definitions, and either verbal contexts or nothing else).

Other research studies have found mnemonic keywords effective in facilitating the acquisition of German nouns and their grammatical gender (Desrochers, Gelinas, & Wieland, 1989), the learning of the meanings of unfamiliar Old English words (McDaniel & Pressley, 1989) and obscure English words (McDaniel, Pressley, & Dunay, 1987), and the recall of botany concepts (Rosenheck, Levin, & Levin, 1989). In fact, in reviewing the effectiveness of the keyword method in vocabulary learn-

ing, Levin and Pressley (1985, p. 153) went as far as stating that "with respect to definition memory, no strategies investigated to date ... have rivaled the mnemonic keyword method in either their consistency or their potency."

Whilst there have been many studies that have investigated the effectiveness of mnemonics in vocabulary learning, there have only been three previous research studies that have looked at the usefulness of mnemonics in learning the script of another language: Gruneberg and Sykes (1996), Lu, Webb, Krus, and Fox (1999), and Quackenbush, Chujo, Nagamoto, and Tawata (1989). Gruneberg and Sykes used mnemonic descriptions aimed at helping learn letters of the Russian alphabet and their equivalent English sounds. For example, the Russian letter ф sounds like the English letter F, and so experimental participants were asked to imagine ф as looking like a *f*ishing *f*loat. Gruneberg and Sykes found that experimental participants obtained a significantly higher overall score compared to control participants (who were not provided with the mnemonic descriptions) in subsequent tests that required them to recall the English equivalents of the Russian letters. Lu et al.'s results were similar: In their case, they found that their participants learned more of Japanese and Chinese kanji characters and their meanings when the characters were presented with the aid of descriptive mnemonics. For example, they used the description "Three peaks of a MOUNTAIN" as a mnemonic to help learn the kanji character for mountain, 山.

While both the Gruneberg and Sykes (1996) and the Lu et al. (1999) studies reported better memory performance from participants provided with mnemonic descriptions, both studies used artificial (laboratory) rather than real classroom settings, and their participants were not really learning the languages in question. Both studies also did not require participants to produce or write the scripts in question, as students who are really studying these languages would usually be required to do. Thus, as Gruneberg and Sykes themselves acknowledged, the usefulness of their findings "in real life learning situations is difficult to assess" (p. 83). There are in fact very few studies that have looked at the usefulness of mnemonic strategies where actual production of the foreign language is involved. Ellis and Beaton (1993) is one such study, and their findings suggest that–at least where the keyword method is concerned–a mnemonic strategy may not be as effective in facilitating recall of the foreign word (given the native translation of the word as stimulus, e.g., English to German), as it appears to be in facilitating recall of the native translation of the foreign word (e.g., German to English).

It should also be noted that the Gruneberg and Sykes (1996) and Lu et al. (1999) studies did not examine the potential usefulness of *pictorial* mnemonics in learning the script of another language. Although the mnemonics employed in both studies largely pertained to the visual characteristics of the scripts in question, both employed *descriptive* rather than pictorial mnemonics. It could of course be argued that the descriptive mnemonics provided to the experimental participants lent themselves to visualization. However, the extent to which participants employed visualization was not gauged in either of the studies. Levin (1983) argued that a beneficial feature of pictorial mnemonics is that "the relationship between each letter's visual and phonetic properties is strengthened by an easily identified picture that contains an analogous relationship" (p. 219). He gave examples of the letters M, F, and S transformed to look like a mountain, a flag, and a snake respectively in their pictorial mnemonic states. Whether this beneficial feature of pictorial mnemonics holds true for the learning of script characters other than English was not investigated in the Gruneberg and Sykes, and Lu et al. studies. In any case, while Levin and Pressley (1985) acknowledged that although the pictorial component is not necessary for mnemonic strategies to be effective, they believed that the use of pictures reduces "the information-processing load associated with visual imagery generation" (p. 158).

It needs to be noted that the use of pictorial mnemonics for remembering the script of another language is advocated in many books and by some language teachers. In teaching Japanese alone, there are teachers' guides such as Ogawa's (1990) *Kana can be easy;* Quackenbush and Ohso's (1983) *Hiragana in 48 minutes;* Quackenbush and Ikeda's (1989) *Katakana in 48 minutes;* Quackenbush's (1999) *Hiragana/katakana in 48 minutes: Teacher guide;* and Takabe's (1993) *Kanji isn't that hard! Kanji can be mastered with the 24 rules.* These types of instruction guides are used by many language instructors despite the fact that hardly any research has been undertaken and published to report on the efficacy of such techniques. The authors of the present paper are aware of only Quackenbush, Chujo, Nagamoto, and Tawata's (1989) paper reporting on a study that attempted to find out if pictorial mnemonics are effective in learning one of the Japanese scripts, hiragana.

Quackenbush et al. (1989) used 16 foreign students with little knowledge of the Japanese language, who were enrolled in a Japanese language course at Hiroshima University, as participants for their study. They assigned nine of the students to a "mnemonics" group (taught the hiragana script using Quackenbush and Ohso's book), and seven to a "colour

association" group (taught using a colour matrix so that each hiragana character had a top line colour and a right hand side colour derived from the matrix). Quackenbush et al. found that the mnemonic and colour association groups did not significantly differ in their pre-instruction scores in hiragana *reading*. Furthermore, even though both groups significantly improved in their post-instruction scores in hiragana reading, no significant advantage was shown by the mnemonics group. After the post-instruction test, Quackenbush et al. allowed the participants three days of study at home before administering a test in hiragana *listening*. Here they found the mnemonic group scored significantly better compared to the colour association group. However, because no pre-instruction scores were collected and reported on the groups' *pre-instruction* hiragana *listening* performance, their conclusion that mnemonic instruction facilitated better long term retention is unwarranted.

There are a number of other problems with the Quackenbush et al. (1989) study that make it impossible to gauge the usefulness and efficacy of pictorial mnemonic instruction in learning the Japanese hiragana script. One of the more major of these problems lies with the questionable rationale for providing colour association instruction to the other group instead of using a control group provided with standard classroom instruction in the hiragana script. Quackenbush et al. provided no research evidence to show the colour association strategy to be more effective than (or at least as effective as) standard classroom instruction. There is therefore no possible way of telling whether the pictorial mnemonic instruction they used improved the students' acquisition of the Japanese hiragana script compared to what would normally have been expected.

Thus, despite the three studies that have investigated the usefulness of mnemonic strategies in learning the script of another non-alphabetic language, a number of important questions remain unanswered. First, are such strategies useful in real classroom settings, with students who are really learning the language in question and who not only have to recognize but also recall and reproduce the script? Second, would evidence of the usefulness of mnemonic strategies manifest in class assessment scores and in student appraisal of those strategies? Third, are pictorial mnemonics—in particular—useful in remembering the script of another language, as is advocated in many books and by some language teachers?

The present study sought to address the above questions where the learning of Japanese script characters in a natural university classroom setting was concerned. Thus the main hypothesis was that students tak-

ing a first year Japanese course who attend extra tutorials showing them how pictorial mnemonics could be used to remember Japanese script characters would evidence an improvement in their course assessment.

Method

Participants

The participants in this study were 27 students who were taking a stage one Japanese language acquisition course at a university in New Zealand. The course is designed for students with little or no background in learning the Japanese language and includes instruction and assessment in reading, writing, and speaking. It comprises four hours of instruction per week over 12 teaching weeks. The 27 students volunteered to attend extra tutorials that were advertised as being aimed at those who may be experiencing some difficulties in learning the Japanese script. Seventeen of the 27 students were female, and 10 were male. Their mean age was 20.8 years (SD = 2.95), with the range being 17 to 28 years. The other 169 students who were taking the course but did not attend the extra tutorials served as a control group.

The students involved in this study (participants and controls) came from a variety of first language (L1) backgrounds, reflecting the diverse multicultural mix of students at the university where this study took place. However, all were proficient in English, which is a requirement for entry at the university.

There are a number of guidelines under which a study of this kind—in natural settings—needs to operate if fairness to the participants (and potential participants) is to be considered and the study is to be approved by the appropriate institutional ethics committee. For example, in the present study, because the participants were students who were really studying the language in question, random assignment to an experimental group was out of the question: the participants had to volunteer and hence self-select to be in the experimental group (exclusion from attending potentially beneficial instruction is not acceptable practice). Likewise, providing delayed or placebo instruction was not permissible as this could conceivably disadvantage students in their course performance. The control group in this study is therefore merely a comparison group for establishing the stability of the students' course performance in the absence of the experimental instruction provided (see Brown, 1992, for the use of this kind of control group in language research). Whilst there are many obvious restrictions and limitations about how

variables affecting the participants can be manipulated or controlled in a study like this (in a natural setting), there are also numerous advantages which include having participants with the "real" motivations for what they are learning, and greater confidence about the generalisability of findings. Apart from research in language teaching and learning, academic intervention studies also fall under this category (e.g., Heerman & Maleki, 1994; Manalo, Wong-Toi, & Henning, 1996; Walsh, 1985).

Procedure

In the Japanese course that the students were enrolled in, there were regular course assessments in the form of short tests administered during regular class times. There were six such tests (one each week) during the first half of the semester, when the present study was undertaken. These tests covered vocabulary, grammar, and kanji, and were usually held on a Tuesday or Wednesday. Tests 1 and 2 did not require writing in Japanese script. From Test 3 onwards, writing in Japanese script was required. The extra tutorials covering the use of pictorial mnemonics were offered after Test 3. The timing of the extra tutorial sessions in relation to the course weeks and tests, and the content of these tutorials, are shown in Table 1. At least two streams of each extra tutorial session were offered to avoid possible clashes with the students' regular lectures and tutorials.

Pictorial mnemonics that the students could use to better remember the Japanese script characters, in hiragana and katakana, were described, drawn on the board, and explained during the extra tutorial sessions. For example, the hiragana symbol い is approximately equivalent to the short /i:/ sound of the vowel i and was described as "two eels" (see Figure 1). The pictorial mnemonics used were a combination of those devised by Ogawa (1990), Quackenbush (1999), and ones devised by the second author of this paper. In the examples provided in Figure 1, the pictorial mnemonics for い is based on Ogawa's pictures, う is based on Quackenbush's pictures, and the mnemonic for さ was devised by the second author.

During the tutorial session on using mnemonics to remember vocabulary words (extra tutorial session number 6), the keyword method—where new foreign words to be learned are associated with similar sounding words known to the learner—was described to the students. Ten examples, such as those shown in Figure 2 (which were devised by the first author), were explained and drawn on the board. It was pointed out to the students that from the key words extracted (e.g., "sago" and

Table 1. Schedule of Course Tests and the Extra Tutorial Sessions Provided on Mnemonic Use (with Weeks of the Course Indicated in Brackets)

Tests 1 to 3 (Weeks 1–3)	
Extra tutorial sessions (Weeks 3–4):	1 Hiragana あ (A) to の (NO) [25 Japanese script characters]
	2 Hiragana は (HA) to ん (N) [21 Japanese script characters]
	3 Revision of hiragana and variations
Test 4 (Week 4)	
Extra tutorial sessions (Weeks 4–5):	4 Katakana ア (A) to ノ (NO) [25 Japanese script characters]
	5 Katakana ハ (HA) to ン (N) [21 Japanese script characters]
Test 5 (Week 5)	
Extra tutorial sessions (Weeks 5–6):	6 Vocabulary
	7 Kanji
Test 6 (Week 6)	

"hand" from *asagohan*), mnemonic images and/or phrases could be constructed to help in remembering the target foreign word. The importance of practising recall and self-testing was also emphasised. As an exercise, the students were given a list of 12 new Japanese vocabulary words to "extract" key words from and then construct mnemonic mental images and/or phrases for. They were then subsequently asked to recall the Japanese words when prompted with the English equivalents.

During the session on mnemonics for remembering kanji (extra tutorial session number 7), the students were introduced to methods with which they could better appreciate the meaningful nature of kanji script characters and construct pictorial mnemonics, when necessary, to help in remembering these script characters. Approximately 30 examples (including variants), such as those shown in Figure 3 (based on mnemonics devised by Takabe, 1993, and by the second author), were explained, drawn on the board, and discussed. The students were also given an opportunity to practise applying the strategies described to about 20 kanji script characters.

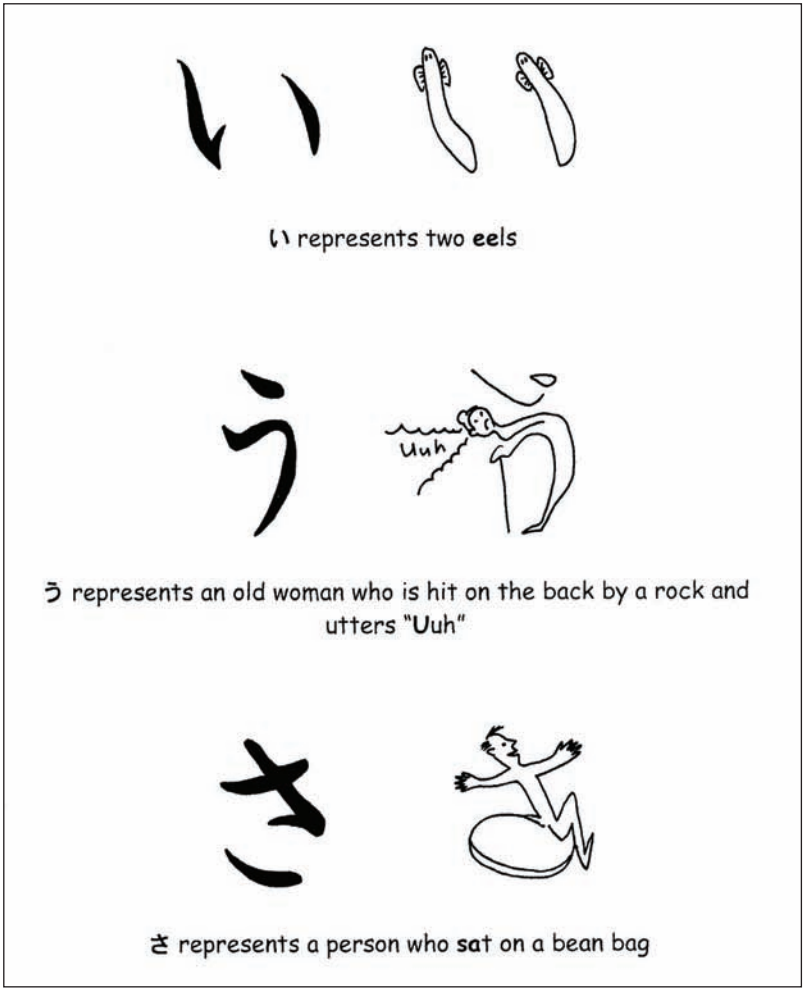

Figure 1. Examples of pictorial mnemonics used for the hiragana script characters

The students were able to attend the extra tutorial sessions at any stage during the time they were offered: 16 of the 27 participants started attending prior to Test 4, eight participants started attending prior to Test 5, and three attended for the first time before Test 6. The participants' pre- and post-attendance test scores and average pass rates were examined. Subsequent to the extra tutorial sessions, the participants were also

Figure 2. Examples of mnemonics used for the Japanese vocabulary words

asked to complete a questionnaire evaluating the usefulness of the sessions provided, and the Academic Motivation Scale (Vallerand, Pelletier, Blais, Briere, Senecal, & Vallieres, 1992).

The authors are well aware of the debate concerning the value of student evaluations of courses they take. However, while some authors are very negative about the value of such evaluations, citing reasons

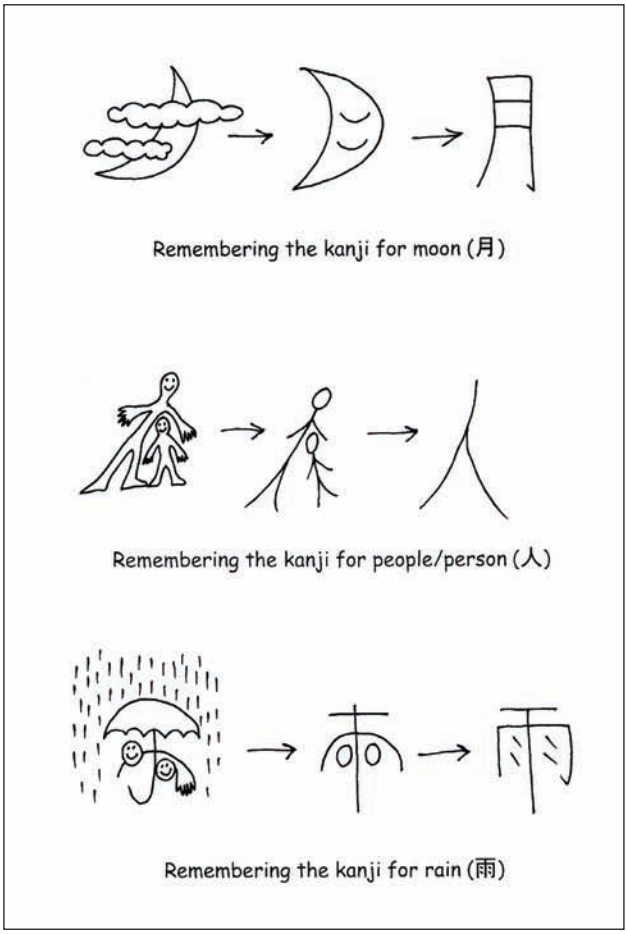

Figure 3. Examples of mnemonics used for the kanji script characters

such as instructors bowing to student demands in order to gain satisfactory course evaluations for the purposes of tenure or promotion (e.g., Trout, 1997), the students' honesty hardly ever comes into question. It is generally accepted that, at least where *anonymous* course evaluations are concerned, the students filling them out will be honest—in fact, sometimes brutally honest, particularly when they are not satisfied with a course. As DeZure (reported by Plater, Matthews, D'Appollonia,

& Abrami, 1997, p. 17) pointed out, "students want opportunities for mutual ongoing feedback, including a chance to tell their instructors what is working for them, and what is not." Using clustering procedures, Young and Shaw (1999) also found that students' perception of the value of a course is one of the three most important variables that impact on their evaluation of it.

The Academic Motivation Scale was administered to find out whether the participants differed in any way in their academic motivation from their counterparts who chose not to attend the extra tutorial sessions. Hence, amongst the "control" group of students who did not attend the extra tutorials, volunteers were solicited to likewise complete the Scale, and 48 students obliged. The Scale provides scores in intrinsic motivation (engaging in an activity for itself, and the pleasure and satisfaction that could be derived from undertaking that activity), extrinsic motivation (engaging in various kinds of behaviour as a means to an end and not for their own sake), and amotivation (when no contingencies are perceived between outcomes and one's own actions) (Vallerand et al., 1992).

The students in both groups were not required to write their names on either the questionnaire to evaluate the usefulness of the tutorials or the Academic Motivation Scale.

Results

As noted in the previous section, students were able to attend the extra tutorial sessions offered at any stage. The participants' test scores were therefore analysed according to whether they were pre- or post-attendance scores. For example, a participant who started attending from extra tutorial session 1 would have his/her scores in Tests 1 to 3 categorised as pre-attendance, while his/her scores in Tests 4 to 6 would be categorised as post-attendance. On the other hand, a participant who started attending only from extra tutorial session 6 would have his/her scores in Tests 1 to 5 categorised as pre-attendance, and only his/her score in Test 6 categorised as post-attendance. (Please refer to Table 1 for clarification on when the tests occurred in relation to the extra tutorial sessions.)

Test performance

The participants' mean pre-attendance test score was 51.39% (SD = 28.53), while their mean post-attendance score was 55.81% (SD = 26.74).

Although these scores suggest some improvement in the mean test score following the instructions provided (and it is worth noting also that 19 of the 27 participants [70%] evidenced improvements in their post-attendance marks), the *t*-test procedure undertaken indicated no significant difference between these scores at the .05 level.

Pass rate was calculated as the number of tests passed divided by the total number of tests taken. For example, if a student passed three out of four tests that he or she sat, then his or her pass rate was 75%. In the university where this study was undertaken, pass rate is an often-used measure of whether a student is making satisfactory progress in his or her courses. A score of 50% or higher counted as a pass in the tests the students took.

The *t*-test undertaken showed that the participants' mean post attendance pass rate of 64.81% (SD = 41.97) was significantly higher than their mean pre-attendance pass rate of 51.41% (SD = 39.31), t (26) = 2.50, $p < .05$ (two-tailed). Hence the participants demonstrated an overall improvement in their pass rate subsequent to attending the extra tutorials provided.

The 169 other students who did not attend the extra tutorials served as the 'control' participants in that they received the regular instruction provided in the course, but not the mnemonic instruction provided in the extra tutorials. Hence, their test performance represented what would normally have been expected of students in the course—without the intervention provided in this study. It needs to be pointed out that an analysis of the data using a 2-factor ANOVA was not appropriate because the control participants did not receive any 'treatment' as such. Hence, no natural 'pre-instruction' and 'post-instruction' dichotomy could be applied to the control participant data.

The control participants showed no significant differences at the .05 level in their mean scores and mean pass rates *across the six tests administered*. (Their mean score across the six tests was 56.18%, and their overall pass rate was 74.35%.) This finding suggests a general stability in the students' test performance—in the absence of any intervention.

There were also no significant differences found at the .05 level between the motivation scores (intrinsic, extrinsic, and amotivation) of the participants and those of the 48 other students who did not attend the extra tutorials provided. The participants' mean scores were 56.15, 60.65, and 7.35 for intrinsic motivation, extrinsic motivation, and amotivation respectively, with the corresponding mean scores for the control group

being 51.19, 59.92, and 8.48. This suggests that the students who attended the extra tutorials were no more (or less, for that matter) academically motivated than the other students who did not attend.

Student evaluation of the tutorials

Twenty of the 27 participants completed and returned the questionnaire evaluating the usefulness of the extra tutorial sessions provided. The mean ratings they provided for the different sessions are shown in Table 2.

Table 2. Students' Mean Usefulness Ratings of the Instruction Sessions Provided

Instruction sessions	Mean[a]	SD
Hiragana and Katakana	4.16	.86
Vocabulary	3.90	1.10
Kanji	4.33	.82

[a] On a scale of 1 to 5, where 1 = "not useful" and 5 = "very useful."

Eighteen of the 20 students who completed and returned the questionnaire attended the hiragana and katakana sessions. When asked to indicate which hiragana characters they found mnemonics helpful in remembering, 44% reported all the characters, while 33% circled anywhere from 12 to 18 of the characters (mean = 14.83 characters, *SD* = 2.79). Where the katakana characters were concerned, 33% of these participants reported having found mnemonics helpful in remembering all of them, while 50% circled anywhere from one to 28 of the characters (mean = 14.78 characters, *SD* = 8.32).

The participants were asked if they thought the extra tutorials helped their performance in the course assessments (the tests they had to sit for the course). Sixty-five percent (65%) circled "yes" on the questionnaire, while 20% circled "no," and 15% did not respond to the question.

The students were also given an opportunity on the questionnaire to provide any comments they would like to make that could be helpful to the researchers. Six of the participants wrote comments. One simply wrote "Good," while another commented on the hard work devoted by

the tutor (the second author) to the project. Two of the comments were requests: one for more tutorials offered at various times so that more people could attend, and the other for the speed of teaching to be slowed down (in the course itself) as there were students finding it difficult to keep up. The final two were compliments. One student wrote:

> I found learning the Japanese alphabet using pictures and words was helpful for me to remember them. I am very grateful for the patience that [second author's surname]-sensei displayed. She needed it! And I liked her pictures and explanations. I now know how to read hiragana and katakana relatively better—a few hiccups—but kanji still gets me. どうもありがとうございます。

Another wrote:

> I have performed poorly in this [course]—but this has no reflection on these extra tutorials. They were the [course's] only redeeming feature ... Thanks for your help. I enjoyed the mnemonics tutorials.

Discussion

The extra tutorials on mnemonic use provided in the present study were all highly rated in terms of their helpfulness by the students who attended. Furthermore, the majority of the students indicated that they believed the sessions helped their performance in the tests they sat.

Is there any basis though for their belief that these mnemonic tutorials were helpful? Although the improvement shown by the participants in their actual test scores was not statistically significant, the majority of the participants did evidence improvements in their post-attendance test scores. More importantly, however, when pass rates were examined, a significant improvement in the participants' post-attendance pass rate was found. This indicates an improvement in their capability to pass the tests following attendance of the tutorials on mnemonic use. Hence there are good reasons for the positive appraisals made by the participants.

There is a criticism frequently levelled at studies showing improvements in students' academic performance following instructional intervention: that those who choose to participate in such intervention programmes are probably better motivated and apt to show improvements in performance anyway–even without the interventions. Authors such as Mealey (1990) argue that there are strong links between motivation and

academic performance. In the present study, however, motivation as a possible contributing factor was also examined and, where academic intrinsic, extrinsic, and amotivation were concerned, no significant differences were found between the students who attended the extra tutorials and those who did not. There was therefore no evidence to suggest that the pass rate improvements shown by those who attended the tutorials were simply due to greater motivation.

A related question that could be raised is: If the participants were no more or less academically motivated compared to their control counterparts, why were their mean scores and pass rates lower? The extra tutorials provided were advertised as being aimed at those who may be experiencing some difficulties in learning the Japanese script. Thus, the students who volunteered to attend (the participants) would have been those performing relatively poorly in the course. The possible reasons for their poor performance in the first place are many (including perhaps inappropriate study strategies) and outside the parameters of the present study to investigate.

It could be argued that because the instructions provided in the present study covered the use of pictorial mnemonics in remembering not only kana script characters but also vocabulary words and kanji characters, it would be difficult to claim positive effects of instructions provided *specifically* on retention of kana script characters. The participants, however, were asked to evaluate the usefulness of each of the instructional sessions provided and all—including those dealing with the kana script characters—were rated highly by the participants as being useful in helping them remember. As noted earlier, more than three-quarters of the participants explicitly indicated on the questionnaire they completed that the mnemonics instructions helped in remembering either all or specific hiragana and katakana characters they identified.

It was necessary in the present study to include instructions on the use of mnemonics in remembering not just kana script characters but also vocabulary and kanji because, as noted earlier, the course tests that the students had to sit did not just assess mastery of kana but also covered vocabulary, grammar, and kanji. This is one significant limitation of undertaking research in a natural setting. Control over what is covered in regular class sessions and student assessments, as well as selection of experimental and control participants and scheduling, is very much limited. The important advantage, however, is that stronger claims about applicability of methods employed in real life settings (rather than just artificial laboratory settings) can be made. In the present study, it has

been shown that the use of pictorial mnemonics can be helpful to students who are really learning Japanese and have to recognize, recall, and reproduce the Japanese scripts.

For language teachers who still view the use of mnemonic methods with reservation and/or suspicion (not least because they are deemed "unnatural"), the present authors can only offer reassurance based on their observations that the majority of students take to the use of these techniques very well. None of the participants reported any difficulties in generating their own mnemonics during the vocabulary and kanji sessions, confirming previous research findings that there is nothing unnatural about the generation and use of mnemonic strategies for remembering various forms of information (e.g., Brooks et al., 1993; Hill et al., 1993; Manalo, 1999). In fact, some of the mnemonics the participants devised were very clever. For example, to remember らいしゅう (pronounced as /raɪʃu:/, and meaning "next week"), one participant came up with the mnemonic sentence "I do not want to *rush you* so *next week* would be fine."

Some language teachers may also feel uncomfortable about the division of Japanese words at arbitrary points (e.g., *a-sago-han,* instead of the more appropriate *asa-gohan*) that could result from generating English- and other-language-derived mnemonic keywords. However, the present authors are by no means advocating the use of mnemonics for all new vocabulary words, rather for teachers to familiarise students with mnemonic strategies so as to enable them to use these strategies *when necessary.* Presumably, with an increasing vocabulary and a growing appreciation of word structures in Japanese, students would gradually become less reliant on mnemonics and other similar "coping" strategies as they progress through their studies. However, it is important that students are equipped with such strategies at the beginning of their language acquisition—when explaining for example the morphological components of words would more likely overwhelm and discourage most students—to instil a sense of manageability and control over the demands of this process.

For future research, one particular area that appears to warrant further investigation concerns the relative effectiveness of each of the pictorial mnemonics associated with each of the hiragana and katakana script characters. It appears that some are more helpful in remembering the script characters than others. A number of the participants verbally commented that pictorial mnemonics that have a *real* similarity to the script character in question (e.g., the "two eels" for remembering い) are far

more helpful than those that do not have an inherent similarity and require a stretch of the imagination—plus considerable manipulation of the script character representation—to appreciate (e.g., "two friends watching the *se*tting sun" for remembering せ, which is pronounced /se/). This is an aspect that educators who develop and construct these kinds of teaching materials may similarly wish to consider and possibly address. The importance of the similarity of the mnemonic association with the target information has also been noted by Gruneberg (1987/1997) where keywords as linkwords are concerned, and by Bellezza (1987, 1996) who explained this importance in terms of the bi-directionality of the association between the mnemonic cue and the target information. According to Bellezza, the association must operate not only in the direction of target information to mnemonic cue, but also in the opposite direction of mnemonic cue to target information. If the similarity between these is weak or artificial, then the association either or both ways is compromised.

Another area that ought to be investigated in future research is the usefulness of mnemonic strategies in learning abstract kanji script characters. In both the present study and the earlier-mentioned Lu et al. (1999) study, the kanji used were those visually similar to the meanings they represent or are concrete in nature (making it possible, with enough imagination, to make pictorial associations with their meanings). The greatest difficulty that most learners of kanji encounter, however, is in learning the more complex and often abstract symbols that do not lend any obvious connection to objects or shapes that can be imagined. Thus, the development of effective and efficient strategies would be of great assistance to learners here.

In conclusion, the findings of the present study provide some support to the main hypothesis posed: students taking a first year Japanese course who attend extra tutorials showing them how pictorial mnemonics could be used to remember Japanese script characters do evidence an improvement in their course assessment. This however needs to be qualified: a significant improvement was found in pass rates, but perhaps because of the low number of participants, the difference in pre- and post-instruction mean scores did not reach statistical significance despite the improvement shown. There are certainly clear indications in the present study pointing to the usefulness of employing pictorial mnemonic strategies in learning the script of another language in real classroom settings–not just where scores are concerned, but also from students' appraisals of those strategies. This is but one study however,

with the limitations already noted. The present authors therefore hope to stimulate the interest of other researchers to conduct further investigations in this area.

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