

Exploring the Effectiveness of Kanji Stroke Order Instruction

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1. Introduction

For native speakers of Japanese, teaching kanji stroke order is unquestioned and is taught compulsorily from the first year of elementary school in Japan. Characters with more than one stroke are written in a certain order, and have a beginning stroke and an ending stroke. It has been generally believed that it is beneficial to automatize the writing process by following a certain stroke order in order to remember kanji.

The situation of second language (L2) teaching, however, is quite different from that of first language (L1) teaching. Teachers of Japanese have different beliefs about whether we should teach stroke order or not; some teachers believe that the stroke order is very important, while others claim that learners do not have to learn how to write kanji. Since the introduction of the Japanese word-processor software, as long as the learners can choose what they want from the list of kanji, they do not have to be able to write kanji. However, even though many L2 learners use computers when they write in Japanese, they may find it beneficial to know how kanji is written if learning stroke order helps them remember and process kanji. Empirical studies must be conducted in order to ensure

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the effectiveness of visual kanji stroke order instruction. The purpose of this study is to explore the effectiveness of stroke order instruction.

2. Previous studies on the acquisition of kanji

2.1 Influence of L1 on Japanese L2

As for the kanji studies about L2 learners, Koda (1989) studied the effects of vocabulary knowledge transferred from L1 to L2. Her findings suggest that L2 learners with different L1 orthographic backgrounds develop their reading skills differently in terms of sub-components of reading skills and also in terms of speed. Chikamatsu (1996) and Mori (1998) also examined the effects of learners' L1 orthography on L2 word recognition. In Chikamatsu's (1996) study, lexical judgment tests containing Japanese syllabic kana script were used for the experiment. The results indicate that Chinese speaking subjects relied more on visual information, while English speaking subjects relied more on phonological information. Mori (1998) tested two groups: phonographic L1 (English) speakers and morphographic L1 (Chinese, Japanese, and Korean) speakers. In order to test how the two types of L1 background learners of Japanese remember kanji, she designed an experiment using pseudo characters. The findings show that the phonographic learners were less flexible in the use of strategies. These findings indicate that the phonographic learners tended to use phonology (the embedded katakana character in a pseudo kanji) to remember the kanji, whereas the morphographic learners not only used the embedded katakana but also used other strategies such as remembering the radicals in the case of the phonologically inaccessible characters. Thus, the findings of these three studies indicate that learners with different L1 backgrounds utilize different word recog-

niton strategies.

If this argument is true, then, how can learners with different L1 orthographic backgrounds acquire the ability to recognize words? In order to consider this question, Koda (1996) explored the relevant discussions of L2 recognition research. For L2 word recognition, she discussed three elements that must be addressed in the future studies: “a) amount of L2 orthographic processing experience, b) L1-L2 orthographic distance, and c) interaction between L1 and L2 orthographic knowledge” (p. 453). As for the first element, bilingual processing studies have confirmed that inefficient word recognition reduces L2 reading performance among otherwise fluent bilinguals. Second, cross-linguistic research repeatedly demonstrates superior word recognition performance among those with related rather than unrelated orthographies. Finally, the L1 processing experience has a long-lasting impact on the L2 processing procedures.

2.2 Japanese kanji shape studies

Hatta, Kawakami and Tamaoka (1998) conducted a study on handwritten kanji errors by native speakers of Japanese as well as by beginning level Australian learners of Japanese. They found that in the native speaker data, phonologically-related kanji writing errors were the most numerous, while in the learner data, there were more non-existing kanji written and more orthographically-related errors than semantically-related or phonologically-related errors. Analyzing closely the types of non-kanji figures produced by the learners, they found that the most frequent kanji errors were the mismatching of segments (40 %). The example for mismatching of segments given in the article was “銘” in 記銘 which had 糸-*hen* instead of 金-*hen*. This might imply that for non-native speakers, it is important to teach the spatial arrangement of kanji segments, especially at the beginning level.

For his computer-assisted language instruction material, Nara (1992) includes a unique feature of the search method that uses visually salient components of kanji. The purpose of this component is to enhance the efficiency of learning kanji for beginning level learners who do not have the ability to look up unknown characters using radical information. Nara conducted a study of four learners of Japanese at two different levels, showing each student 150 kanji and asking them to write down as many parts of each kanji they felt stood out. Based on the data he collected from those four students, he has extracted 74 visually salient components of kanji and created a principal list of kanji components with example kanji for each component. Those 74 components were incorporated as a search tool in the dictionary part of his computer-assisted language learning program. Although the number of participants and the number of kanji used in this study are limited, creating this kind of classification with visually salient components for beginning level learners seems to be useful for them for finding and remembering kanji. However, each learner may have his/her own system, and the effectiveness of such visually salient components has not been empirically proven.

2.3 Japanese L1 kanji processing and recognition studies

Yamada (1998) discusses the findings of his two experiments for investigating the processing time of semantic and phonological access: 1) he examined how quickly Japanese adults can name a single word (both nouns and verbs) written in kanji and the same word written in kana; 2) he examined how quickly they can translate them into English. The results showed that words were named faster in kana than in kanji, but were translated faster in kanji than in kana. Yamada interprets the results as indicating that kana characters are closer to phonology and kanji characters are closer to meaning. However, as Matsunaga and

Crosby (1997) discuss, it is controversial as to whether people process kanji relying more on visual coding or phonological coding. Matsunaga and Crosby's study using an eye-tracking measurement set out to discover which process native speakers use. Their main finding is that native speakers use the phonological information in reading kanji. They suggest that the potential application of this study is that if native speakers use phonological elements for reading kanji, then software designers may be able to utilize phonological information when creating programs for non-native speakers (NNS). However, further investigation of NNS's kanji reading ability is needed in order to determine the importance of phonological information for NNS.

Saito, Masuda and Kawakami (1998) also showed that the phonological information of a whole character as well as a part of a kanji (radical) was automatically activated. This indicates that the interaction of phonology and the shape of kanji results from a mutual activation of the whole character and its radicals in the process of word identification.

For Japanese kanji recognition, Sasaki (1987) discusses his kanji anagram task experiments of Japanese adults and children. Sasaki describes that most Japanese use their finger to write in the air or on the palm of their hand when they attempt to recall the form of a particular kanji. He named this action of recalling kanji "finger writing." He concluded that both Japanese adults and children used finger writing to facilitate finding the solution to the kanji task. He claims that there is a relationship between cognitive ability for the development of images and motoric-based representation (finger writing). Does the same kind of relationship exist between the second language learners' cognitive ability in the development of images and motoric-based representation? In other words, do their learning strategies for writing help kanji retention?

2.4 Chinese L1 and L2 studies of Chinese characters

Law, Ki, Chung, Ko and Lam (1998) studied stroke order of Chinese children who were in the first grade by asking them to write Chinese characters using a computer input system with a pressure pad. Their study focused on stroke sequencing errors. They discovered that for familiar characters and unfamiliar characters with familiar components, errors in sequencing of strokes were dominant, whereas for unfamiliar characters with unfamiliar components, there were errors both in sequencing of strokes and in sequencing of components within a character. In other words, Chinese children seem to make different errors based on the familiarity of characters. Also, primary functional units in recognizing Chinese orthography by skilled readers are stroke patterns rather than strokes themselves according to Chen, Allport and Marshall (1996) based on their visual analysis. These studies suggest that for L1 learners a character is recognized as a unit (either a whole Chinese character or a radical) rather than individual strokes.

For L2 learners of Chinese, Ke (1996) investigated the relationship between Chinese character recognition and production by L2 learners. The subjects of this study were 47 first-year Chinese language students in the U.S. The main findings of the study are that 1) students performed better in recognition tasks than in the production tasks, and 2) students performed better with low density characters than high density characters in the production tasks.¹

As we have seen, there are a number of significant studies related to kanji acquisition. No research, however, has discussed the effectiveness of stroke instruction. This leads to the research question: does showing visual stroke order with writing practice assist L2 learners in the

¹ The examples provided in the study for “low density” characters were 女, 別, 在, 見 and 住 and those for “high density” characters were 幾, 難, 教, 還 and 書.

automatization process of learning kanji?

3. Method

In order to discover whether showing visual writing in a certain stroke order assists L2 learners in the automatization process of learning kanji, a set of experiments limiting kanji learning factors to the presence or absence of stroke order instruction were designed for subjects having no previous knowledge of the Japanese, Korean or Chinese languages. Digital movie files on a computer screen were used to show how kanji should be written to the “movie (experimental) group.” The movie files used in this experiment were from a web-based kanji program called WWKanji (Komori and Ueda 1997, Komori and Zimmerman 2001). This program is designed to support Japanese L2 learners’ kanji learning by showing how each kanji is drawn with a brush in a digital movie.² Figure 1 is the example of a digital movie of a kanji shown to the movie group.



Figure 1 A digital movie of kanji “暖” (warm)

² The digital movie files which the movie group saw were downloaded from the Web-based program named WWKanji created for L2 kanji learners by S. Komori, available at <http://nihongo.isc.chubu.ac.jp/>

The hypothesis of this study is the following:

The “movie group” will improve more than the “control group” in terms of the time they spend writing and in terms of the shape of the kanji they produce after practicing kanji.

3.1 Subjects

Sixteen subjects (four males and twelve females), aged 18 to 63, participated in this experiment.³ None of the subjects had prior exposure to kanji. Eight of them were selected randomly and assigned to the movie group, which saw the kanji drawing movies, while the other eight were assigned to the control group, which did not see the kanji drawing movies. They were all right-handed. The entire experiment for each participant was videotaped, digitized, and then analyzed on a computer screen.

3.2 Experimental procedure

There are five sections for this experiment :

- 1) Biographical questionnaire and alphabet writing,
- 2) Pre-practice test,
- 3) Kanji practice,
- 4) Post-practice test, and
- 5) Reflection questionnaire

During the experiment, each participant in both groups worked on a set of ten commonly used kanji. The kanji can be categorized into three groups based on the number of strokes :

³ The average age of the control group was 35.5, and that of movie group was 31.3. The total average was 33.3. Five of sixteen subjects were graduate students at the University of Hawaii, four of them were language instructors, four were undergraduate students, and the last two were not affiliated with the university.

- 1) 3-stroke kanji (山, 口, 川 and 大),
- 2) 8-stroke kanji (雨, 物, 神 and 実), and
- 3) 13-stroke kanji (遠 and 暖)

The researcher met each subject individually. The subjects in the movie group tended to take more time than those in the control group because they spent extra time watching how each kanji was written on the computer screen.

In the first section of each experiment, the subjects were asked to fill out the biographical questionnaire including age and language experience. They were also asked to (block) print all letters of the English alphabet (see Appendix 1 for an example sheet of this section). The second section was the pre-practice test. There were two parts in this section : copy and memory. For the copy part of the experiment, each subject was asked to copy five kanji as quickly and as accurately as possible (see Appendix 2). For the memory component of the experiment, the participants were asked to memorize the other five kanji, one at a time, and to write down each kanji from memory (Appendix 3). In the third section, each subject practiced writing kanji. The researcher told the subject to practice ten times and remember all the kanji (Appendix 4). The control group (N=8) practiced all the kanji by writing them 10 times without stroke instruction. The movie group (N=8) also practiced the same kanji 10 times but they saw kanji movie clips on a computer screen. They were allowed to watch the model drawing as many times as necessary. This was the only difference between the control and the movie groups throughout the experiment procedure. The fourth section was the post-practice test. The subjects were asked to perform three different tests: 1) associate kanji with meaning (recognition), 2) copy kanji, and 3) write kanji from memory (Appendices 5, 6 and 7). In the last section the subjects were

asked to reflect on the whole process by answering a questionnaire (Appendix 8).

4. Results

Five different approaches have been adopted for analyzing the data collected in this experiment: 1) analysis of automatization using the amount of time spent writing each kanji, 2) analysis of the recognition test score, 3) native speaker judgments of the kanji produced by the subjects in terms of its shape, 4) analysis of the differences between kanji drawing and alphabet writing, and 5) analysis of the reflection questionnaire.

4.1 Analysis of automatization using the amount of time spent writing each kanji

This analysis is based on the assumption that the time spent for writing kanji represents the subject's processing time. If the subject wrote one kanji in a short time, it means that the subject has less trouble processing the kanji and can write it automatically. There are thirty frames per second and the length of time was calculated by the number of frames, using Adobe Premiere 5.0. The drawing time of each kanji for each subject in both groups was measured and the Matched pair t-test has been conducted to test the difference in the means of the time spent writing kanji during the pre-practice and post-practice tests. Table 1 shows the t-test scores of the time spent for each kanji.

Statistical analysis revealed that only the control group spent significantly less time writing 山 in the post-practice test than in the pre-practice test, $t(14) = .04$, $p < .05$, two tailed. As for other kanji, there were no significant differences observed in either the control group or the

Table 1 T-test score of comparison between pre-practice and post-practice

	copy kanji					memory kanji				
	山	口	雨	物	遠	川	大	神	実	暖
control	0.04*	0.12	0.07	0.36	0.41	0.62	0.85	0.75	0.72	0.49
movie	0.15	0.15	0.72	0.48	0.14	0.70	0.54	0.33	0.72	0.10

movie group. In other words, it is difficult to conclude that there was any effect on the automatization process for writing of kanji.

4.2 Analysis of the recognition test score

In order to see if there were any significant differences between the control group and the movie group in terms of kanji and its meaning, a recognition test containing 10 kanji was conducted. The results are summarized in Table 2.

Table 2 Mean score and standard deviation of recognition test

	mean score	standard deviation
control group (N=8)	7.5	5.14
movie group (N=8)	7.0	6.28

The mean score of control group was slightly better than the movie group, but the difference was not statistically significant, $t(14) = 0.42$, $p = 0.68$, two-tailed.

4.3 Native speaker judgments of kanji production

There are 130 kanji characters that each subject had written throughout the experiment in the pre-practice test, in the ten-time practice, and in the post-practice test. Two native speakers rated the shape based on the 5-point scale (“native-like production” is given 5 points, “all the strokes are correct but not native-like” is 4 points, “missing one or two

strokes or incorrect shape” is 3 points, “difficult to identify the figure of kanji” is 2 points, and “totally unrecognizable” is given 1 point).

Kappa statistics were adopted to calculate the inter-rater reliabilities :

$$k = 0.49$$

$$(k = 0.60 \text{ for movie group})$$

$$(k = 0.40 \text{ for control group})$$

The results indicate that the evaluation done by the two native speakers are moderately reliable. It shows that the reliability is higher in the movie group data than the control group data. Thus, the kanji written by the movie group received a higher agreement in evaluation between the two native raters than the control group.

Next, Wilcoxon’s “signed-rank” test was adopted to see if there was improvement after the subjects practiced writing kanji. The 5-point scale score of the pre-practice and the post-practice was compared and summarized in Table 3:

Table 3 Signed-rank test of the comparison between the pre-practice and the post-practice tests

	control group	movie group
copy	0.74	0.0078 ($p < 0.01$)
memory	0.0078 ($p < 0.01$)	0.0078 ($p < 0.01$)

For the copied kanji, the results of the movie group showed significant improvement, whereas those of the control group did not. In other words, according to the native raters’ evaluation, kanji shapes copied by the subjects in the control group did not improve after practice writing the kanji ten times. However, the shape of the kanji written from memory by

the subjects both in the control and the movie groups did improve. The movie group was predicted to improve in terms of kanji shape for both copy and memory kanji because they were given a model they can follow. Unexpectedly, however, the control group subjects did improve for the memory kanji as well.

4.4 Analysis of the differences between kanji and alphabet writing

Typical stroke order for writing kanji is from top to bottom, from left to right, from upper left corner towards bottom right corner, and from outside to inside. In order to compare the kanji drawing with English alphabet writing, all subjects were asked to print all of the English alphabet in capital letters. The following tendencies have been identified through observation.⁴

1) Top to bottom

Many letters were written from top to bottom, especially when it has only one stroke per letter. The examples are C, G, I, L, S, X and Y.

2) Left to right

There was a tendency to start from the left and proceed towards the right. The examples are E, F, H, K, M, R, V, W and Y.

3) Vertical to horizontal

If there are both vertical and horizontal lines, then they tend to write the vertical line first and then horizontal such as in E, F, H and T.

4) One stroke

⁴ Eleven of sixteen subjects were native speakers of English. Two are native speakers of Spanish. There are three bilinguals (two English-Spanish, and one English-Tagalog). All of the subjects were right-handed.

There was a tendency to write all connected lines in one stroke, such as G, N, V, W and Z.

It is difficult to draw direct connections between writing the alphabet and writing kanji, but some similarities which seem to indicate the use of stroke order in writing the alphabet have been observed in writing kanji before the practice session in both control and movie groups. Although there are a few cases where subjects wrote some kanji from bottom to top, many kanji were written from top to bottom.⁵ Similar tendencies have been observed for horizontal lines. There was a strong tendency to draw vertical lines before horizontal lines among the subjects, in kanji such as 山 and 土 in 遠. Some subjects drew kanji such as 口 and 日 in 暖 with one or two strokes.⁶ Another interesting point observed was that many subjects wrote longer and salient lines (or parts) first and shorter and minor lines (or parts) later.⁷ Some subjects in the movie group who had seen how each kanji should be written on the computer screen followed the correct stroke order during the practice period as well as during the post-practice test period.⁸ However, there were some subjects who did follow the correct stroke order during the practice period, but did not follow the model order during the post-practice test period. Often, subjects did better in following the correct stroke order of simpler kanji such as 大 and 山, but they did not seem to be able to follow the correct order when they wrote more complicated kanji such as 遠 or 暖. This suggests that as for more complicated kanji, they could not learn the

⁵ For example, one learner wrote the first stroke of 大 from bottom to top, from left to right.

⁶ Actually, 口 should be written in three strokes, and 日 in 暖 should be written in four strokes.

⁷ For example, the part “牛” in 物, the long vertical line was often written first.

⁸ One subject in the movie group wrote 口 with four strokes (two vertical lines first and then two horizontal lines) in the pre-practice period, but she wrote it correctly in the practice period with a movie model, and she also did correctly in the post-practice test period.

correct order because practicing only ten times was not enough, or the structure was still unfamiliar to process automatically.

4.5 Analysis of the reflection questionnaire

Each subject reflected about the experiment. Appendix 8 is the questions the subjects answered. Factor analysis has been conducted to determine what factors were influential. Figure 2 shows the factor plot for the rotated factor space.

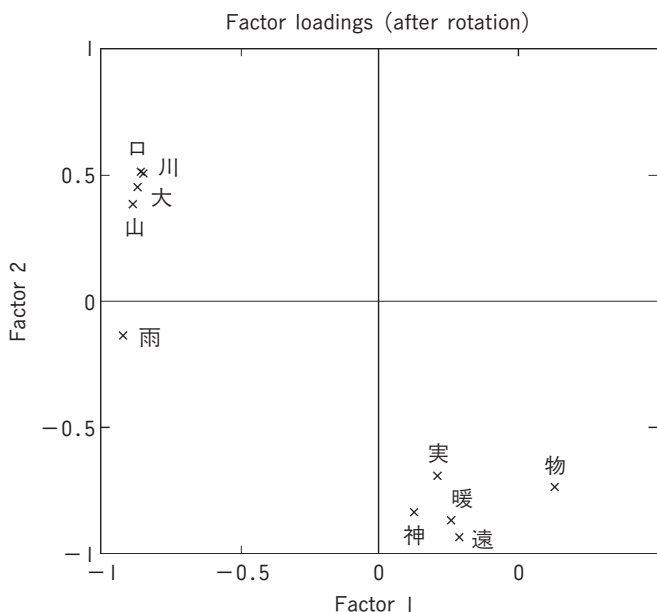


Figure 2 Factor analysis of reflection questionnaire

The first factor seems to be “cognitive processing difficulty.” Kanji such as 雨, 山, 大, 口, and 川 are easier in terms of processing than 神, 実, 暖, 遠, and 物. Taft and Chung (1999) show in their study of naive L2 Chinese learners that introducing the radical structure of characters at

the beginning of the learning stage is beneficial. In other words, if kanji 神 is introduced with two radical components (礻 and 申), it may have been easier to process and therefore easier to remember. The second factor can be called “physical simplicity” which includes number of stroke and symmetry. 口, 川, 大, 山, and 雨 are simpler because they are symmetrical in shape and have a smaller number of strokes, whereas 実, 物, 神, 暖, and 遠 are more difficult because they are asymmetrical in shape and have more strokes.

5. Discussion

From the five results reported in the previous section, it is clear that the hypothesis that the movie group will improve more than the control group in terms of the time they spend for writing and in terms of the shape of the kanji after practicing cannot be confirmed. As for the automatization analysis using the time spent for writing, the subjects in the movie group do not seem to be able to reach the level where they can automatize the writing process. There might be two reasons why the results did not show the intended effect.

- 1) The assumption of automatization was correct but only practicing each kanji ten times was not enough to automatize the process.
- 2) The movie group might have spent a longer time writing kanji not because they didn't know the shape of the kanji but because they tried to follow the correct stroke order which was shown in the movie.⁹

It is obvious that more than one factor is involved with kanji learning, and

it is necessary to conduct further studies in the near future in order to discover which factors are influencing kanji learning. There were subjects in the movie group who had practiced in the correct order following the movie model, but did not write with correct order in the post-practice tests. In other words, at the time of the test period, they have already forgotten the stroke order. This suggests that the correct stroke order has not been acquired. Also, the fact that only the copy kanji 山 in the control group showed statistically significant improvement appears to show that a different mechanism of processing is working for the kanji copied and the kanji memorized. This may be related to the depth of processing, because writing kanji from memory requires deeper processing than just copying a kanji. Providing more opportunity to practice might show some difference but it needs to be tested empirically in order to determine the difference between the kanji copied and the kanji memorized. Also, the post-practice test was given right after the practice period in this study, but the results may have been different if another post-practice test had been given after a prolonged period from the practice period in order to test their long-term memory.

As for the shape of kanji that the subjects produced, kanji written by the movie group improved significantly after practicing for both kanji copied and kanji written from memory, whereas the control group only showed significant improvement for kanji that were written from memory. This may indicate that some deep processing is necessary for learning kanji.

The automatization analysis using time indicated that only 山 in the

⁹ As a matter of fact, some of the subjects in the movie group commented after the experiment that they wanted to write in a certain order which they had in mind, but when a movie model showed a different order, they felt compelled to change the order to follow the model and it was difficult for them. This may be one of the reasons why the movie group took longer.

control group proved to be easier to process. The factor analysis of the reflection questionnaire showed simpler kanji and more difficult kanji seemed to be perceived differently by the subjects. Ke (1996) reported that learners did better on low density kanji than high density kanji, implying that the density of kanji may affect the processing. If this is true, introducing the learners to the parts of kanji such as radicals or visual saliency discussed in Nara (1992) may be effective for kanji instruction. However, this also needs to be empirically tested.

6. Conclusion

This empirical study was designed to examine the effectiveness of showing visually how kanji is written. The hypothesis that the movie group would improve more than the control group in terms of the time they spend for writing and the shape of kanji after practicing was not confirmed in this experiment. The present study, however, seems to reveal some of the crucial factors that strongly influence kanji learning : 1) cognitive simplicity in terms of density and also in terms of processing, 2) the amount of practice, and 3) the quality of practice (the depth of processing). Further study is necessary to determine what exactly are the factors that affect kanji learning and what are the relationships between those factors and kanji learning.

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Appendix 1 : biographical questionnaire and alphabet writing

Name : _____ Date _____ / _____ /2000

There are six steps.

Step 1: Please give me your background information concerning language learning.

1. What is your native language? English

other (_____)

2. Are you studying foreign languages? If yes, what are the languages and how long are your studying?

Language (_____) how long? (_____)

Language (_____) how long? (_____)

3. Do you enjoy learning a foreign language? Yes No

4. Do you think you are good at learning a foreign language?

Yes No

5. Age? (_____)

6. Sex? Male Female

7. Are you a right-handed or left-handed?

Right-handed Left-handed

8. Please PRINT all alphabet letters listed below in the given box.

A B C D E F G H I J K L M

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N O P Q R S T U V W X Y Z

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Thank you.

Now let's begin learning Kanji !

Saeko Komori

Appendix 2 : pre-practice (copy kanji)

Step2 : Please COPY the kanji as quickly as and as accurately as possible.

kanji for “mountain” :

山

kanji for “mouth” :

口

kanji for “rain” :

雨

kanji for “thing” :

物

kanji for “far” :

遠

Appendix 3 : pre-practice (memorize kanji)

Step 3 : I will show you kanji on a card. Please MEMORIZE the figure and meaning of the kanji. Once you memorize the kanji, TURN OVER the card, and then WRITE the kanji below. You cannot look at the card again.

“river” :

“big” :

“god” :

“actuality” :

“warm” :

Appendix 4 : practice sheet (for the movie group)

Step 4 : Each kanji has its own writing order. Watch the order on the computer screen, and MEMORIZE the figure and meaning of each kanji. WRITE each kanji 10 times. You will have a kanji TEST. You have only 10 minutes to work on the kanji.

“mountain” : 山

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“mouth” : 口

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“rain” : 雨

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“thing” : 物

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“far” : 遠

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“river”: 川

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“big”: 大

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“god”: 神

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“actuality”: 実

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“warm”: 暖

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Appendix 5 : post-practice test (recognition)**Step 5 : TEST**

Part one : I will give you a piece of paper with kanji. Please write its meaning with the NUMBER below. Please DO NOT write anything on THIS paper.

- 1 mountain
- 2 mouth
- 3 rain
- 4 thing
- 5 love
- 6 far
- 7 river
- 8 big
- 9 god
- 10 actuality
- 11 level
- 12 warm

Appendix 6 : post-practice test (copy kanji)

Step5 : COPY the kanji as quickly as and as accurately as possible.

kanji for “mountain” :

山

kanji for “river” :

川

kanji for “mouth” :

口

kanji for “big” :

大

kanji for “rain” :

雨

kanji for “god” :

神

kanji for “thing” :

物

kanji for “actuality” :

実

kanji for “far” :

遠

kanji for “warm” :

暖



Appendix 7 : post-practice test (memorize kanji)

Part two : Write the kanji

kanji for “god” :

kanji for “river” :

kanji for “mountain”

kanji for “love” :

kanji for “actuality” :

kanji for “warm” :

kanji for “mouth” :

kanji for “thing” :

kanji for “rain” :

kanji for “far” :

kanji for “big” :

kanji for “level” :

Appendix 8 : reflection questionnaire

Step 6 : Introspective questionnaire

1) “Circle the kanji you find easy to copy (as many as you like)”

山 口 雨 物 愛 遠

川 大 神 実 準 暖

2) “Circle the kanji you find difficult to copy (as many as you like)”

山 口 雨 物 愛 遠

川 大 神 実 準 暖

3) “Circle the kanji you find easy to remember in terms of kanji shape (as many as you like)”

山 口 雨 物 愛 遠

川 大 神 実 準 暖

4) “Circle the kanji you find easy to remember in terms of its meaning (as many as you like)”

山 口 雨 物 愛 遠

川 大 神 実 準 暖

- 5) “Circle the kanji you find difficult to remember in terms of its shape (as many as you like)”

山 口 雨 物 愛 遠

川 大 神 実 準 暖

- 6) “Circle the kanji you find difficult to remember in terms of its meaning (as many as you like)”

山 口 雨 物 愛 遠

川 大 神 実 準 暖

- 7) “Was practicing 10 times helpful to remember kanji?”

helpful			not helpful	
1	2	3	4	5

- 8) (only to the group who saw the movie clips)

“Were kanji movie clips helpful to remember kanji?”

helpful			not helpful	
1	2	3	4	5

- 9) “Was it fun to remember kanji?”

fun			not fun	
1	2	3	4	5

- 10) Any other comments?

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