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Kanji Learning by FL Students from Character and Non-character Based Language Backgrounds – Report from a Foreign Language Class

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***Abstract*—This is classroom-based action research to develop a subject syllabus. The subject aims to improve the *kanji* learning of learners from both character (CB) and non-character based (NCB) language backgrounds. This paper reports the first phase of a three year long project to develop the proposed subject. It investigates the performance of CB and NCB learners at the beginning and end of a pilot course of the subject. The objectives of the study is to obtain a broad picture of the CB and NCB speaker groups' *kanji* performance in order to locate possible areas of difficulty for the further examination. The findings indicate advantages of a character based language background for learning *kanji*. However, the two groups did not show much difference in reading *kanji* which had been formally introduced in class. Neither group could easily correct *kanji* reading or writing errors by themselves.**

***Index Terms*—Japanese written system, kanji learning, character background, non-character background**

I. Introduction

Kanji learning does not seem to be an easy task at all. Even in Japan, where *kanji* are part of the mother tongue's written system, there has been a constant effort to keep the number of *kanji* under control. *Joyo-Kanji*, literally *Kanji* for Common Use, is designed to "serve as a yardstick so that her public media uses a limited number of *kanji* more effectively to facilitate day-to-day communication among her people" (Encyclopaedia Britannica's Japanese International Dictionary). The list of *Joyo-Kanji* has been published since 1923 (e.g., Sato, 1989; Tamaoka, 1991; Wikipedia: *Joyo-Kanji*[1]), when they were first set by the Ministry of Education (文部省臨時国語調査会[2]). They were reduced to 1,856 characters in 1931. The number was increased to 1,945 in 1981, and the Cultural Advisory Committee (文化審議会) further increased them to 2,136 in 2010. In the process, some old *kanji*[3] used with the old *kana-zukai* (old hiragana written system) were officially simplified (mostly because these complex characters had been largely replaced by their abbreviations in everyday usage) (Sato, 1989).

China, from which Japanese adopted *kanji* into the Japanese written system, also simplified their characters for common use. Since 1956, simplified characters were introduced several times (i.e., 1959, 1977, 1980, and 1986). Characters were simplified in many ways, but mainly by reducing the overall number of characters and the number of strokes per character (Ingulsrud & Allen, 1999).

If *kanji* are not easy for native speakers, how hard is it for non-native speakers, especially speakers of alphabetic languages? This is the starting point of this classroom-based research. In Japanese as a foreign language (JFL) class, a common belief among teachers and learners is that *Kanji* learning is notoriously hard for speakers of non-character based (NCB) languages and is not as easy for character based (CB) language speakers as it appears. The JFL teachers observe that although CB speakers sometimes outperform NCB speakers, sometimes they underperform them. This paper investigates how students from CB and NCB backgrounds progressed in the same tertiary JFL course where the focus is on *kanji* learning.

II. Background

A. Literature Review

Kanji are a large part of Japanese vocabulary and particularly of content words, such as nouns, verbs, adverbs, etc. Thus *kanji* knowledge and comprehension is very important for word recognition in Japanese. Research findings suggest there are possibly different models of word recognition by the speakers of an alphabetic language (English) and a logographic language (Chinese).

The Interactive-Activation Model (McClelland & Rumelhart,1981) originally developed for the English language system has been modified to explain recognition of Chinese character words (Taft, Liu & Zhu, 1999). The model

[1] http://ja.wikipedia.org/wiki/%E5%B8%B8%E7%94%A8%E6%BC%A2%E5%AD%97
[2] Special Committee on National Language organised by the Ministry of Education
[3] The number appears to vary from 254 to 274.

includes orthographic, phonological and meaning/semantic units which interact with each other. In the orthographic units, visual input is processed at three levels to be recognised as a word, i.e., feature, letter, and word levels. Alphabetical orthographic features such as \, |, c, --, correspond to the character strokes of a logographic language. The letter level of English language corresponds to radicals (part of characters) to whole single characters (morphemes) of Chinese language, which eventually form words.

Taft, Liu & Zhu (1999) add abstract units "lemmas" (Levelt, 1989) as the interface for the interaction between orthographic and semantic or phonological units in Chinese word recognition. The abstract units contain the same semantic information repeatedly reoccurring with the same form. Thus the units accumulate a correlation between form and meaning over time. This allows the model to explain how the correct meaning of single characters with multiple meanings can be activated in the comprehension of compound words. (Figure 1)

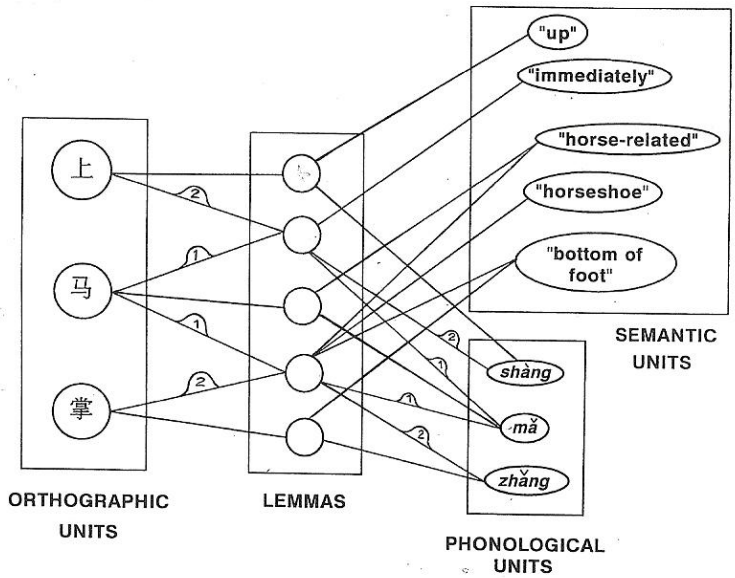

FIG. 5.2. A modification to the interactive-activation model whereby lemma levels exist and there are no orthographic or phonological representations of complete compound words.

Figure 1 Interactive-activation model for Chinese From Wang, Inhoff, & Chen, (1999, p.107)

Access to word meaning is essential not only for word recognition but also for comprehension of larger linguistic units, such as sentence, paragraph, etc. Word meaning can be directly accessed visually (orthography to meaning) and indirectly via a phonological path. *Kanji* words normally consist of a single character plus *okuri-gana* (*hiragana*) to make verbs, adjectives, and adverbs (e.g., 食べる、静かな、急いで). Characters are often compounded to make nouns (e.g., 食事、歓迎、休暇).

Compound *kanji* words can be processed in the same way as Chinese words, using both semantic and phonological access. Zhou et al (1999) argue that direct meaning access from orthographic units is predominant. In their view, the orthographic, phonological and semantic units are not all interactive with each other. Only the orthographic and semantic units interact, and the phonological units are mainly activated after the other two units.

B. JFL Course Structures in General

JFL courses at tertiary level normally offer content which promotes a balanced four skill development – dividing the course into components each of which focuses either on one skill or on some combination of the four skills (such as listening and speaking, reading and writing, listening and reading, reading and speaking, writing and speaking, etc). *Kanji* learning (recognition, comprehension in text and use in writing) tends to fall within areas such as script recognition, comprehension of text and writing. A relatively small portion of the course hours is normally allocated directly to *kanji* learning.

History and derivation of *kanji* are normally introduced to students during beginner's courses. Once students have learned around 200-250 single characters, they might be introduced to *kanji's* internal structure: radicals (*hen*, *tsukuri*). They may also learn some compounds such as *kango* words, 食事する (*shokuji-suru*: to eat) as well as their *Wago* counter part, 食べる (taberu: to eat), and four character words such as 前代未聞 (*zendai-minon*: unparalleled). Most of the class hours allocated to *kanji* learning are spent on explanation of *kanji* and *kanji* related matters (such as internal structure, meaning, pronunciation of *kanji*, and vocabulary including the *kanji*), or testing students' *kanji* learning. Very little time is left for students to practice *kanji* in class, and a large part of *kanji* learning is left to students' self-study.

C. Principle behind the Course Syllabus

It came to our notice that *kanji* were not- yet-taught or practised systematically after their initial introduction at the beginning of the course, and tended to be introduced and practised simply in relation to the topic in each lesson. Thus, if we deliver a subject which provides 1) an overview of *kanji* script, 2) explanation of *kanji* structures, and 3) practice to assist the learners to develop *kanji* learning strategies, it should promote the students' *kanji* acquisition. In practice, we need to teach character background (CB) and non-character background (NCB) learners not only in the same course but also in the same class. Therefore we need to develop a *kanji* subject which caters to both groups.

This study reports the first phase of a three year long project to develop such a *kanji* subject course. The study aims to obtain a broad picture of what each group's *kanji* performance was like at the beginning and end of a pilot course of the subject, in order to identify possible areas of difficulty for each or both CB and NCB learners. The picture should also assist with the selection of subject content better adapted to the *kanji* learning needs of both/each group.

III. The Study

A. The Subject Course and Cohort

The subject course in this study was offered to intermediate learners of Japanese co-currently with their core subject (Level 3 Japanese) which includes practice of the four language skills. The new course presents students with a summary of the current Japanese writing systems, and provides practice to develop *kanji* learning strategies and opportunities to see *kanji* from a logographic perspective. The course also intends to promote autonomous learning and voluntary vocabulary building among the learners besides their *kanji* learning.

The student cohort consisted of 22 CB and 31 NCB speakers. Among them, 13 CB and 23 NCB speakers participated in this study. The course ran for 12 weeks and the class consisted of one hour lecture and 1.5 hour tutorial per week. The lectures presented an overview of *kanji* script as part of the Japanese writing system and explanation of *kanji* structures. The tutorials provided exercises intended to assist the learners to develop *kanji* learning strategies.

Refer to Table 1 for lecture and tutorial topics. The tutorials provided exercises related to each week's topic. The worksheets used in tutorials were a mixture of lecture materials and pages from Basic *Kanji* Books (Kano et al 1989).

The students were also required to undertake an independent *kanji* project (20% of the course assessment). The aim of the project was to improve their *kanji* learning and build vocabulary. They were expected to discover their best personal methods for remembering *kanji* as well as utilising the strategies they learned in class. The ultimate goal of the project was mastery of '*kanji* on the list'. These *kanji* were a) previously-taught *kanji* taught (target *kanji* in Levels 1 and 2) and b) target *kanji* for Level 3. Due to individual differences (such as CB or NCB background, how much each student had learned *kanji* before taking this course, etc), students were instructed to determine their own specific goals. Some students decided their goals were less than complete mastery of the '*kanji* on the list', and some set more ambitious goals.

TABLE 1
THE COURSE OUTLINE

Weeks	**Lecture**	**Tutorial**
Week 1	Introduction: Explanation of course objectives, activities and assessments	*Kanji* Quiz Revision of leant *kanji*
Week 2	History of Japanese writing systems	Reading exercise Revision of Japanese writing systems
Week 3	Hira*gana* and kata*kana* (Japanese *kana* writing systems)	Reading and writing exercises *katakana* words
Week 4	Japanese sound system and phonetics (vowels, mora, etc)	Revision of the learnt homophones
Week 5	Structures of Japanese words	Practice of radicals
Week 6	*Kanji On* and *Kun* reading	Exercises with *On* and *Kun* reading and use
Week 7	Structures of *kanji*	Exercises with *kanji* structures
Week 8	Compounding *kanji*	Learning *kanji* compound characteristics
Week 9	*Kanji* compound use in sentence	Exercise with *kanji* compounds, adjectives, affixes
Week 10	Homophones	Learn homophones and accent Antonyms, Verbs
Week 11	Revision: recognizing *kanji* words	*Kanji* recognition exercises Presentation of *kanji* project
Week 12	Summary: how to learn and remember *kanji*	Discussion Presentation of *kanji* project

B. The Purpose of the Study

This is the first phase of a larger project which ultimately aims to discover more effective ways to teach *kanji* to a mixed student cohort of CB and NCB speakers. The project seeks approach(es) to motivate both groups, improve their *kanji* learning and a set of assessments which enables evaluation of their learning through the course. The immediate purpose of the current study is to examine the differences between the CB and NCB speaker groups in terms of *kanji* learning, particularly regarding:

1. How well CB learners adjusted to *kanji* learning compared to NCB learners in the same level Japanese language class,

2. Each group's test performance at the beginning and end of the course, and
3. Fundamental differences in *kanji* learning between the groups.

C. The Methods

To find out the differences between the two groups, the outcomes of two tests were examined and analysed. The first test was given as a *kanji* quiz at the very beginning before subject teaching started. The second test was given when the course was over, after 12 weeks of instruction.

The initial *kanji* quiz included *kanji* previously-taught in Levels One and Two, and new *kanji* to be introduced. The quiz intended to find out how much the CB and NCB speakers knew about the target *kanji* for the course. The quiz consisted of two parts: A and B (50 questions each), each of which was divided into reading and writing *kanji* sections (25 questions each). For Part A the twenty-five words (either *kanji* compound or *kanji-kana* words) to be tested in each section were chosen randomly from a pool of 376 single *kanji* (taught in Levels 1 and 2). The twenty-five words to be tested in each section of Part B were selected in the same manner from a pool of not-yet-taught *kanji* (*kanji* for Level 3). All *kanji* words were tested in sentences (not as stand-alone single words) in the quiz.

TABLE 2
CONTENTS OF THE FINAL EXAMINATION

PartA/B	scores	**what was tested**
A	40	***kanji* words reading and writing**
B-1	10	remembering **radicals**
B-2	10	***kanji* writing**
B-3	5	***kanji* reading** and **vocabulary** knowledge
B-4	5	**vocabulary** knowledge
B-5	10	**vocabulary** knowledge/ ***kanji* recognition**
B-6	5	**radical**
B-7	5	**radical recognition**
B-8	5	**meaning of *kanji***
B-9	5	**meaning of *kanji***, parts of *kanji* **recognition**
B-10	5	how to use prefix *kanji*, **vocabulary** knowledge
B-11	10	***kanji* meaning** and ***kanji* component recognition**
B-12	10	key word comprehension

N.B> all vocabulary tested above included kanji.

The final examination was held around four weeks after the teaching period was over. The examination was basically an achievement test, divided into Parts A and B. Part A had the same format as the *kanji* quiz at the beginning, and *kanji* compound or *kanji-kana* words were chosen randomly in the same manner (40 questions). Thus the cohort performance should provide some indication about how much and to what depth the cohort has learnt the *kanji* on the list over the twelve week course.

Part B involved 11 different questions, including three questions (B-1, 6, and 7) related to radicals but not directly testing *kanji*, and a key word comprehension question (B-12) which tested comprehension of lecture content but not *kanji* directly.

IV. STUDENT PERFORMANCE

To answer the research questions, the test performances by the CB and NCB speakers of the cohort were quantitatively examined.

A. Analysis of Student Performance on Quiz

The participants (36), a mixed cohort of CB (13) and NCB (23) speakers, took a *kanji* quiz consisting of 100 questions divided into 25 questions for each of:

Part A-reading; Part A-writing (Levels 1 & 2 *kanji*): reading and writing test on already introduced *kanji*, and

Part B-reading; Part B-writing (Level 3 *kanji*): reading and writing test on not yet introduced *kanji*.

The purpose of the quiz was primarily to understand what sort of *kanji* vocabulary knowledge each speaker group might have before taking the course. The quiz was given to the participants in class and they did it in their own time; however no one took more than 40 minutes. Once the quiz papers were collected and their answers checked, the participants were allowed to take the quiz home and A) correct their answers and B) add new answers if they wished, provided both the original and new answers were clearly shown.

Each part of the quiz was marked twice to find out a) *kanji* they-thought-they-knew and b) *kanji* they-actually knew on the list. The first marking was after the in-class test and the second after the participants took the quiz home and self-examined their answers. The scores for the *kanji* they-thought-they-knew were generated by giving one mark for any attempted answers, and the scores for the *kanji* they-actually-knew were generated by giving one mark for correct answers only.

Two markers scored the quiz and any discrepancy in the two markings was corrected by discussion between the two markers.

(A) *KANJI* THEY-THOUGHT-THEY-KNEW: QUESTIONS THEY RESPONDED TO

The cohort response averages for reading and writing the taught *kanji* were nearly 80%, which demonstrates that the learners were reasonably confident with this (Table 3). The CB speaker group (86.8%: average for reading and 87.4% for writing) were more confident with the taught *kanji* but NCB speaker group also showed good confidence (75.3% for reading and 70.1% for writing). Regarding the *kanji* never formally introduced to class, the picture was very different. The CB speakers still believed that they knew the *kanji* reasonably to fairly (66.8% for reading and 48.3% for writing), whereas the NCB speakers recognised less than a quarter of the *kanji* at best (26.4% for reading and 9.9% for writing).

When we compare the two groups (One-way ANOVA), the rather large *F* numbers with low *p*-figures (critical value of *F* for p=.01 is 7.44) suggest that the CB and NCB groups definitely differ in perceived knowledge about the new *kanji* (see Table 4: shadowed columns) and possibly about the taught *kanji*.

TABLE 3
COMPARISON (1): *KANJI* THEY- THOUGHT-THEY-KNOW: IN CLASS PERFORMANCE

Quiz		Whole cohort (39)	CB speakers (13)	NCB speakers (23)
A-reading (25)	Taught *kanji*	79.4%	86.8%	75.3%
A-writing (25)		76.1%	87.4%	70.1%
B-reading (25)	*Kanji* to learn	41.0%	66.8%	26.4%
B-writing (25)		23.1%	48.3%	9.9%

TABLE 4
COMPARISON (2): KANJI THEY- THOUGHT-THEY-KNOW: IN CLASS PERFORMANCE

Part	df	*F*	Sig.
A-Reading Between CB and NCB	1	7.434	.010
A-Writing Between CB and NCB	1	8.311	.007
B-Reading Between CB and NCB	1	19.663	.000
B- Writing Between CB and NCB	1	21.843	.000

The participants were allowed to take the quiz home to correct or add new answers. 17 participants changed their answers (5 CB and 12 NCB speakers). The summary of answers by participants (Table 5) shows that the take home option increased answer rates for *kanji* writing more than reading, and particularly writing not-yet-taught *kanji* (in bold).

TABLE 5
COMPARISON (1): ANSWER RATES AFTER TAKING THE QUIZ HOME

Quiz		Whole cohort (39)		CB speakers (13)		NCB speakers (23)	
		in class	take home (17)	in class	take home (5)	in class	take home (12)
A-reading (25)	Taught	79.4%	83.3%	86.8%	89.5%	75.3%	79.8%
A-writing (25)	*kanji*	76.1%	85.9%	87.4%	91.7%	**70.1%**	**82.6%**
B-reading (25)	*Kanji*	41.0%	48.0%	66.8%	72.3%	26.4%	34.3%
B-writing (25)	to learn	23.1%	37.6%	**48.3%**	**64.3%**	**9.9%**	**22.4%**

(B) *KANJI* THE PARTICIPANTS REMEMBER CORRECTLY

The participants' answers in the quiz were then examined for correct answers. Table 6 shows the summary of the cohort/group scores for 1) answered in class; 2) increased answer rate after taking home; 3) correct answers in class; and 4) correct answers after self-check.

Taking the quiz home provided both groups with an opportunity to increase their answer rate noticeably (about 10% or more: e.g. A-writing: whole cohort: from 76.1% to 85.9%, NCB group: from 70.1% to 82.6%; B-writing: CB group: from 48.3% to 64.3%) (refer to Table 5 or Table 6 columns (1) Answered in class and (2) Answer rate after taking home). However, there was little difference between (3) correct answers in class and (4) correct answers after self-check.

The CB and NCB groups were compared in terms of how correctly they remembered the *kanji* reading and writing in the quiz. The internal consistency of the four quiz sections was reasonable (Cronbach's $\alpha = .855$). Within each group in this study, *kanji* performance variance was reasonably homogeneous except for B-writing section (the-not-yet-taught) (see Table 7).

TABLE 6
COMPARISON (1): PARTICIPANTS' ANSWERS IN KANJI QUIZ

		Answered in class (%) (1)	**Answer rate after taking home (%) (2)**	**Correctly answered in class (%) (3)**	**Correct answers after taking home (%) (4)**
A-reading	Whole cohort	79.4	83.3	63.4	63.7
	CB-group	86.8	89.5	68.6	68.9
	NCB-group	75.3	79.8	60.5	60.7
A-writing	Whole cohort	76.1	**85.9**	46.4	47.3
	CB-group	87.4	91.7	60.6	61.8
	NCB-group	70.1	**82.6**	38.4	39.1
B-reading	Whole cohort	41.0	48.0	25.7	25.8
	CB-group	66.8	72.3	42.5	42.5
	NCB-group	26.4	34.3	16.2	16.3
B-writing	Whole cohort	23.1	**37.6**	12.8	13.1
	CB-group	48.3	**64.3**	27.7	27.7
	NCB-group	9.9	**22.4**	4.3	4.9

TABLE 7
HOMOGENEITY OF VARIANCES WITHIN EACH GROUP

	Levene Statistics	df1	df2	Sig.
A-reading	.002	1	34	.968
A-writing	.283	1	34	.599
B-reading	.022	1	34	.883
B-writing	20.697	1	34	.000

The correctly answered *kanji* ratios were definitely different between the CB and NCB speaker groups for three of the sections: previously-taught *kanji* writing, not-yet-taught *kanji* reading and writing ($F > 7.44$: Table 8). Mean test revealed that the *kanji* performance scores in the quiz were not associated with the independent variable (CB or NCB) for the taught *kanji* reading (Eta value .259 < 0.5). However they may or may not be associated with whether participants belonged to CB or NCB groups (Eta value around .5) for the other three sections: taught *kanji* writing, not-yet-taught *kanji* reading and writing (Table 9: next page).

TABLE 8
COMPARISON: PARTICIPANTS' CORRECT ANSWERS IN KANJI QUIZ (ANOVA)

		df	*F*	Sig
A-reading	Between CB and NCB Groups	1	2.438	.128
A-writing	Between CB and NCB Groups	1	13.213	.001
B-reading	Between CB and NCB Groups	1	11.441	.002
B-writing	Between CB and NCB Groups	1	14.964	.000

TABLE 9
MEASURES OF ASSOCIATION BETWEEN GROUP IDENTITY AND PERFORMANCE

	Eta	Eta Squared
A-reading * CB=1, NCB=0	.259	.067
A-writing * CB=1, NCB=0	.529	.280
B-reading * CB=1, NCB=0	.502	.252
B-writing * CB=1, NCB=0	.553	.306

B. Student Performance in the Final Examination

Part A was in the same format as the *kanji* quiz and questions were constructed in the same manner from the same pool of single *kanji.* Part B consisted of questions testing *kanji* words (with a focus on *kanji* learning strategies that were introduced and practised through the previous twelve weeks).

The participants' scores for the final examination were quantified and grouped as follows: 1) Part A: *kanji* reading and writing in text, and 2) Parts B-2, B-3, B-4, B-5, B-8, B-9, B-10, and B-11: questions testing *kanji* words (refer back to Table 2 for details). As seen in Table 10, the CB speaker group outperformed the NCB speaker group in both Parts A and B. The internal consistency of 1) and 2) was good (Cronbach's $\alpha = .907$), and the correlation between the cohort performance in Parts A and B was (*rho* = .883, p =.000).

TABLE 10
COMPARISON: PARTICIPANTS' CORRECT ANSWERS IN FINAL EXAMINATION

		Whole cohort (36)	CB group (13)	NCB group (23)
Part A	Mean	26.24 (65.6%)	32.69 (81.7%)	22.59 (56.5%)
(out of 40)	Std Dev	7.96	4.14	7.27
Part B	Mean	39.19 (65.3%)	49.65 (82.8%)	33.28 (55.5%)
(out of 60)	Std Dev	11.40	6.94	8.89

Lastly when the participants' *kanji* performance in the quiz and final examination were placed together, the gap between the CB and NCB speaker groups became more distinct (Table 11). All *F* figures became larger (critical *F*

figure was 7.44) and significance levels became statistically significant. In particular *F* figures for the final examination were larger than those in the quiz. Eta values for Part A and B were .618 and .700 respectively and showed even stronger connection between the scores and group identity than in the quiz.

TABLE 11
COMPARISON: PARTICIPANTS' COMBINED KANJI PERFORMANCE (ANOVA)

			df	*F*	Sig
Final Examination	Part A	Between CB and NCB Groups (combined)	1	21.063	.000
	Part B	Between CB and NCB Groups (combined)	1	32.660	.000
Kanji Quiz	A-reading	Between CB and NCB Groups (combined)	1	3.814	.056
	A-writing	Between CB and NCB Groups (combined)	1	15.500	.000
	B-reading	Between CB and NCB Groups (combined)	1	11.872	.002
	B-writing	Between CB and NCB Groups (combined)	1	15.941	.000

V. DISCUSSION

This study was conducted in a pilot course which aimed to assist both CB and NCB speakers with their Japanese learning, with a particular focus on *kanji* learning and subsequent vocabulary building. 13 CB and 23 NCB speakers participated in this study. At the beginning of the course, they were given a quiz of 100 *kanji* word questions in class without any advance notice. For the following12 weeks, the participants attended lectures where *kanji* were presented formally as a part of the Japanese writing system, and tutorials in which they practised methods/strategies to learn *kanji* systematically (refer back to Table 1). The participants also conducted independent *kanji* learning projects for those 12 weeks. Then they were given another *kanji* test as part of the final examination – Part A: a smaller test (40 questions) made in the same way as the quiz at the beginning and Part B: *kanji* questions requiring methods/strategies practiced in the tutorials (see 3.3. Methods).

The study was conducted to answer three questions (see 3.2 The purpose of the study). The first question asks how well CB learners adjusted to *kanji* learning compared to NCB learners in the same level Japanese language class.

The scores from the quiz at the beginning were examined at two levels: 1) *kanji* participants thought they knew about and 2) *kanji* they remembered correctly. The former included *kanji* which they were very confident they knew to those they recollected well enough to produce answers (they thought their answers might be right).

Comparison of CB and NCB speaker groups at the first level showed that the CB and NCB groups definitely have different perceived knowledge regarding the new *kanji* in class and possibly about previously-taught *kanji*. The low scores by the NCB group for not-yet-taught *kanji* (Part B: reading 26.4% and writing 9.9%) strongly indicated that NCB speakers have little idea about *kanji* which have not been formally introduced to them. On the other hand, the CB speakers believed that they knew not-yet-taught *kanji* to a certain extent (Part B: reading 66.8% and writing 48.3%). The gaps between the scores for reading and writing not-yet-taught *kanji* might indicate writing is harder than reading *kanji* for the both groups when it comes to unfamiliar *kanji*. However, it should be noted that the scores by the NCB speaker group were not much lower regarding previously-taught *kanji* (Part A-reading and writing: CB 86.8% and 87.4% and NCB 75.3% and 70.1%).

Statistical analysis demonstrated the two groups can be similar with reading of previously-taught *kanji* ($F <$ the critical value; $p =$. 01) in terms of responsiveness and possibly so for writing previously-taught *kanji*. It is also interesting that the CB speaker group answered slightly more to *kanji* writing questions whereas the NCB speaker group answered more to the reading questions.

When it comes to the correctness of the *kanji* they remembered, Mean test results suggest that participants' performance for reading previously-taught *kanji* was not affected by being a CB or NCB speaker. However their performance for reading not-yet-taught *kanji* and writing *kanji* (both previously-taught and not-yet-taught) may or may not relate to which group they belonged to. In addition, variance within each group was reasonably homogeneous except for not-yet-taught *kanji* writing. Therefore it can be said that the CB and NCB speakers can have similar facility with reading *kanji* which have been formally introduced (i.e, their meaning, pronunciation/reading and orthography). In other words, the more they work on learning *kanji*, the better they can read them regardless of a character or non-character based background. However, CB speakers will likely outperform NCB speakers in writing *kanji*, even if the NCB speakers work equally hard on the previously-taught *kanji*.

The study's second research question asks what each group's test performance was at the beginning and end of the course.

The comparison of the participant group performances in the two tests (Table 6, Column 3 and Table 10) suggested some improvement for both groups. The CB speaker group raised their *kanji* performance in the examination by scoring 81.8 % for remembering *kanji* (Part A: Table 10), which is higher than their group scores for any sections in the quiz (Table 6, Column 3). The CB speaker group did even better with using learnt strategies to recognise both single and compound *kanji* (Part B: Table 10). The NCB speaker group managed to remember 56.5% of *kanji* correctly in the final examination (Part A: Table 10), which was slightly lower than their previous score for previously-taught *kanji* reading, but remarkably higher than the scores for the remaining three sections, i.e., not-yet-taught *kanji* reading and writing and previously-taught *kanji* writing.

The two test combined statistical analysis (Table 11) revealed that the CB and NCB speaker groups in this study differed in their *kanji* learning, except for reading of previously-taught *kanji* ($F >$ critical figure), and that this will very likely be the case for each class we might have in the future ($p \leq .002$).

The third and final research question asks what are the possible fundamental differences in *kanji* learning between the NC and NCB groups.

The large discrepancy between the CB and NCB speaker groups' responses to new *kanji* suggests that having a character background assists the CB learners at the initial stage of *kanji* learning. The CB learners not only already know single characters but also the writing system (and system rules), and have had character learning experience in their mother tongue.

When new *kanji* are introduced into a lesson, CB speakers can sometimes identify the *kanji* by sight, even without knowing the meaning or pronunciation. Firstly, they can recognise the word without going through analysis of strokes, radicals, or (single character) morphemes (refer to Figure 1 in 2.1). Secondly, they know how to assign meaning to the *kanji* from their character learning experience, and can develop abstract units (lemmas: Levelt, 1989) by accumulating form-meaning information.

On the other hand, without a character network in their cognition, NCB speakers have no idea about newly presented *kanji* unless they have seen similar *kanji* before (e.g., analogous shape, components or context). Their word recognition training with alphabetic languages is not easily adapted to their *kanji* learning (Taft, Liu & Zhu, 1999). This two-fold unfamiliarity might cause considerable anxiety as well as difficulty for NCB speakers.

In terms of the correctness of the *kanji* the participants remembered, in both groups a recognizable proportion of their answers in the quiz were either simply wrong or incomplete (compare the rates between Column (2) and (3) in Table 6). Very interestingly, the corrections and additions after taking the quiz home did not much improve the correctness of either *kanji* reading or writing (compare Column (3) and (4) in Table 6).

This indicates self-correction of *kanji* (which have been learnt partially or remembered wrongly) might be very hard, regardless of whether the learner is a CB or NCB speaker. A possible explanation is that the CB learners might have strong interference from their L1. The NCB speakers might not have enough information in lemmas to reach a threshold to activate a link between appropriate orthographic representation and semantic or phonological elements.

The *kanji* performance of both groups (particularly the CB speakers) appears to have improved after completing the lectures and tutorials, and conducting their own *kanji* learning project. The validity or reliability of two tests has not been confirmed yet, and it is not certain to what extent the knowledge introduced in the course was utilised by the participants. No measurement of each participant's time and effort though the semester was available, so in this study the improvement cannot be reliably connected to any particular factor(s).

However, at least it may be said that both groups can improve their *kanji* learning by increasing exposure to *kanji*. The difference between the two groups became more distinct when the two test results were combined (Table 11). This suggests that the gap between the two groups may become larger when they are given the same instruction and opportunities for *kanji* learning. In other words, NCB speakers require more assistance, resources or time to catch up with CB speakers in class.

VI. Conclusions

The findings of the analysis can be summarised around the research questions as follows.

Before taking the course, CB speakers as a group performed better overall on both previously-taught and not-yet-taught *kanji*, in terms of both recognition and correctness. The difference between the groups could likely be attributed to whether they were CB or NCB speakers, except for reading previously-taught *kanji*.

When the CB and NCB speaker groups' test performance was examined at the end of the course, the difference observed at the beginning appeared to intensify. Even though both groups improved their performance noticeably, the improvement made by the CB speaker group was greater.

The findings provide support for the argument that a character based background is overall beneficial for *kanji* learning. However, the findings that there is little difference between the groups in reading previously-taught *kanji* and the poor rates of self-correction need to be explored further to understand *kanji* learning by both learner groups.

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