Published version: http://ltr.sagepub.com/content/13/4/425

Examining the effectiveness of explicit instruction of vocabulary learning strategies with Japanese EFL university students[1]

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Abstract

This study examined the effectiveness of explicit instruction of vocabulary learning strategies (VLSs) over a ten-week semester with a group of 146 female EFL learners from two Japanese universities. A vocabulary test and questionnaires on VSLs and motivation were administered at the beginning of the course. The learners were divided into two groups based on the vocabulary test results: an experimental group and a control group. Only the experimental group received explicit instruction on VLSs in combination with their regular language lessons. The same instruments were readministered at the end of the course to examine the changes in both the questionnaire responses and test scores. Qualitative analyses were also conducted to explore the findings in detail. The results show that the experimental group outperformed the control group in the vocabulary test. It was also found that (a) strategy training was effective for both changing the repertoire of strategies used and improving their frequency of use, (b) the training increased the use of certain strategies more than it did for other strategies, and (c) different types of learners exhibited different responses to the strategy instruction. This study's findings contribute to a better understanding of strategy instruction in general and VLSs in particular.

I Introduction

Since the onset of learning strategy research some three decades ago (see Cohen & Macaro, 2007, for a comprehensive review), the promise of intervention studies, i.e., teaching students learning strategies, has been widely recognized. Rubin (1975) emphasized that "(T)he inclusion of knowledge about the good language learner in our classroom instructional strategies will lessen the difference between the good learner and the poorer one" (p. 50). Furthermore, a recent review by Rubin, Chamot, Harris, and Anderson (2007) with regard to intervention studies relating to language learning strategies suggests that teaching students learning strategies, if effectively done, increases not only their knowledge of strategies but also their motivation and performance. With these notions, a wealth of research on the effectiveness of learning strategies instruction has been conducted to date. Although some researchers such as Dörnyei (2005) point out that "the currently available evidence gives only moderate support, at best, for strategy training" (p.177), the general consensus in the field is that learning strategies instruction warrants time and effort both in and out of the classroom (Chamot, Barnhardt, El-Dinary, & Robbins, 1999; Cohen, 1998; Ikeda, 2007; Macaro, 2001; Oxford, 1990, among others). Given the high teachability of learning strategies, it is natural that practitioners would attempt to teach the strategies used by the more successful learners to the less successful ones, thereby facilitating or modifying their learning process.

Among the several types of learning strategies (Cohen & Macaro, 2007), vocabulary learning strategies (henceforce, VLSs) have attracted the attention of many researchers around the world (Ahmed, 1989; Catalán, 2003; Fan, 2003; Gu, 2003a; Gu & Johnson, 1996; Kojic-Sabo & Lightbown, 1999; Lawson & Hogben, 1996; Nakamura, 2002; Sanaoui, 1995; Schmitt, 1997). This is because mastering vocabulary is one of the most challenging tasks that any learner faces while acquiring another language, and thus, learners have consistently found it necessary to compensate for their limited vocabulary (Nyikos & Fan, 2007). This situation is especially true for EFL environments, for instance, in Japan, where exposure to English in daily life is extremely limited; consequently, vocabulary acquisition does not come naturally. Thus, the importance of VLSs has been emphasized along with the strategies related to the four other skills required in an EFL environment, namely, listening, speaking, reading, and writing (e.g., Takeuchi, 2003).

The importance of VLSs has been reflected in the fact that intervention studies have been conducted in addition to descriptive studies. Intervention studies relating to VLSs began focusing on memory strategies (commonly known as mnemonics) in the early 1980s (Cohen & Aphek, 1981; Meara, 1980), and a large portion of the past research on VLSs instruction has been conducted during this time. Research on memory strategies instruction has been mostly propelled by the depth-of-processing theory (Craik & Lockhart, 1972) in which "deeper" processing is construed as being superior to "shallow" processing. Subsequently,

similar studies have been carried out using more sophisticated methods (e.g., Atay &

Ozbuigan, 2007). Although some researchers (e.g., Gu, 2003b) point out the limitations of

mnemonics, the empirical findings suggest that memory strategies are effective for retaining

vocabulary, especially when used in combination with other strategies (Brown & Perry,

1991).

While previous studies on memory strategies instruction have generally reported positive

results, one study by O'Malley, Chamot, Stewner-Manzanares, Russo, and Küpper (1985)

presented inconsistent findings. They conducted a study in a classroom setting to investigate

whether instruction on using a combination of various strategies, incorporating metacognitive,

cognitive, and social/affective strategies, would result in improved learning with respect to

speaking, listening, and vocabulary tasks. The result of the vocabulary test revealed that there

were no differences among the treatment groups. However, when the groups were divided

according to ethnicity groups, it was discovered that the Asian control group outperformed the

Asian experimental group, thus indicating that the Asian learners could not take advantage of

the strategies that were taught (in this case, self-evaluation for metacognitive strategies;

imagery and grouping for cognitive strategies). They also concluded that the Asian learners

preferred to use the learning strategy of rote repetition. This study indicated the possibility

that cognitively demanding VLSs, namely, imagery and grouping, do not necessarily work for

all types of learners. Therefore, it is important in VLSs instruction to consider individual

differences in terms of, for example, motivation level, gender, self-efficacy, career orientation, proficiency, and the learning environment (context) in which the learners are situated (Cohen & Dörnyei, 2002; Gu, 2003b; Oxford & Nyikos, 1989; Takeuchi, Griffiths, & Coyle, 2007).

Another important point in VLSs instruction is the inclusion of metacognitive strategies. Rasekh and Ranjbary (2003) examined the effect of a ten-week, explicit metacognitive strategy training session conducted in a classroom setting with Iranian EFL students. They reported a positive effect on vocabulary learning. Zaki and Ellis (1999) also demonstrated that teaching metacognitive strategies brings about better vocabulary learning. The use of metacognitive strategies is also know as the "structured approach" (Sanaoui, 1995), and its importance is emphasized by Folse (2004) as follows: "It does not seem to matter so much what students do with new vocabulary provided that they do something and that they do it consistently" (p.91). Therefore, it appears that VLSs instruction including metacognitive strategies would prove to be more beneficial than instruction without such strategies.

Although a number of studies on VLSs instruction have contributed to a better understanding of its effectiveness as mentioned above, such studies have a few limitations. First, the studies on memory strategies have focused on isolated strategies such as the keyword method. However, as O'Malley and Chamot (1990) emphasized, our understanding of VLSs instruction might benefit from examining "a training system in which multiple strategies are taught within a single package" (p. 169). Additionally, considering the

aforementioned importance of metacognitive strategies in VLSs instruction, they should be taught in combination with other cognitive strategies.

Second, the instruction period in past VLSs research tended to vary greatly from study to study. The majority of researchers favoring strategy instruction propose that it can be the most successful when incorporated into the regular classroom instruction (McDonough, 1999). If we aim to incorporate VLSs in this manner, the instruction period should span more than a few lessons. No study, however, has addressed this issue thus far. Finally, no previous study has investigated learners' initial repertoire of VLSs and how such instruction has caused them to change their strategies.

Addressing the shortcomings of the past studies on VLSs instruction, the present study aims to answer the following research questions by providing explicit instruction on VLSs in combination with the regular classroom instruction for 10 weeks to Japanese EFL university students.

1. Were there any differences between the experimental group and control group after 10 weeks of VLSs instruction? If any, in which strategies did the differences emerge?

2. Were there any differences within the experimental group that were based on the learners' initial repertoire of VLSs? If so,

3. What are the reasons behind these differences?

II Method

The experimental group received VLSs instruction during the 10-week course; however, the control group only received the regular classroom instruction. In order to answer the first research question, we administered questionnaires to both the groups before and after the course. We then compared the results of the two groups. For the second research question, we focused on the experimental group. First, using a cluster analysis, the experimental group was divided according to the learners' initial repertoire of VLSs. Next, the pretest and posttest scores were compared within the experimental group. The alpha for all statistical decisions was set at .05. Finally, for the third research question, we once again focused on the experimental group and investigated the qualitative data collected from the participants in the group.

1 Participants and Instruments

A total of 204 female EFL learners from two private universities (116 and 88 learners, respectively) in western Japan participated in the current study. Their ages ranged from 18 (first year) to 22 (fourth year), and all were majoring in humanities. Since the participants were divided into an experimental group and a control group based on their institutions,

random assignment of the participants was unfeasible. Therefore, we used a vocabulary test

developed by Mizumoto and Shimamoto (2007) to form the two groups. The rationale behind

the use of this vocabulary test is that lexical competence is a crucial factor in almost all the

aspects of L2 proficiency (e.g., Zareva, Schwanenflugel, & Nikolova, 2005). This is

especially true for an EFL setting, where exposure to English in everyday life is either very

limited or nonexistent. Therefore, the test would enable us to obtain not only the learners'

vocabulary knowledge, but also an overall picture of their proficiency levels. In addition, we

chose this vocabulary test for the current study because Aizawa (1998) pointed out several

problems (e.g., the difficulty of understanding definitions or the high ratio of loan words in

Japanese) related to using the Vocabulary Levels Test (Nation, 1990)—the most widely-used

standardized vocabulary measurement test—for Japanese EFL learners.

The vocabulary test used in the current study originally had 160 items, each with four

multiple-choice options. The target words were selected from the JACET8000 word list

(JACET, 2003), which was compiled specifically for Japanese EFL learners—this is another

reason why we considered this instrument to be more appropriate for the current study. Of the

160 items, 25 items that contained the target words that were taught during the course were

selected and included in the analyses. The same test was readministered at the end of the

course to measure the improvements in vocabulary knowledge.

Based on the results of the pre vocabulary test, a matching procedure (Dörnyei, 2007,

p.118), which identifies participants with the same or similar test scores in the two comparison groups, was used to divide the participants into two groups—an experimental group ($n = 76$) and a control group ($n = 70$). The mean scores of the vocabulary test were 15.80 ($SD = 2.91$) for the experimental group and 15.41 ($SD = 2.99$) for the control group. A two-tailed independent t-test confirmed that a statistically significant difference did not exist between the results of the two groups ($t = 0.79$, $df = 144$, $p = .43$, $r = .07$). Therefore, they were considered to be equal in terms of vocabulary knowledge.

The program in which they were enrolled was a TOEIC (Test of English for International Communication) test preparation course, and both the experimental and taught identical content with identical materials. The study took place between September 2006 and January 2007 for approximately four months, which is the typical period spanned by one semester in Japanese universities. The participants' proficiency was measured by their TOEIC IP (Institutional Program)[2] scores (experimental group: $n = 69$, $M = 436.38$, $SD = 105.16$; control group: $n = 54$, $M = 429.38$, $SD = 118.09$).[3] According to the TOEIC Steering Committee (2006), the mean TOEIC scores for university students majoring in humanities and engineering are 474 and 397, respectively. Therefore, the participants of this study can be regarded as average or lower-level university EFL students.

A VLSs questionnaire was administered to all the participants at both the beginning and end of the course. This questionnaire was developed to measure learners' intentional

vocabulary learning behaviors while they are in the process of memorizing new vocabulary

(cognitive strategies) and coordinating their strategic behaviors (metacognitive strategies). It

was confirmed in a previous study (Mizumoto & Takeuchi, 2008) that the questionnaire could

function as a psychometrically valid scale. The substrategies (subscales) of the overall

intentional vocabulary consolidation learning strategies include the following: (a)

Self-management, (b) Input-seeking, (c) Imagery, (d) Writing Rehearsal, (e) Oral Rehearsal,

and (f) Association. These categories were established using Rasch analysis and

exploratory/confirmatory factor analysis (Mizumoto & Takeuchi, 2007) and were named

based on a previous line of studies (e.g., Fan, 2003; Gu & Johnson, 1996; Schmitt, 1997).

In addition to the VLSs questionnaire, as a measure of extrinsic and intrinsic motivation,

nine items from the questionnaire developed by Noels, Pelletier, Clément, and Vallerand

(2000)[4] were utilized. Motivation measures were included primarily because in related

literature, motivation is considered to have the strongest influence on the choice of learning

strategies (Oxford & Nyikos, 1989).

Both the questionnaires used a 5-point Likert scale, with 1 indicating "not at all true of me"

and 5, "very true of me." The items of each questionnaire are presented in Appendixes A and

B. The score for each substrategy was calculated by averaging each item's score. Since we

were using a questionnaire established in a previous study, the construct validity of the

questionnaires was investigated through a confirmatory factor analysis (Tabachnick & Fidell,

2006). According to the result, the model for VLSs showed an acceptable fit to the data ($\chi^2 =$ 419.55, $df = 260$, CFI = .906, GFI = .817, RMSEA = .065).[5] The model for motivation was also within the acceptable range ($\chi^2 = 69.19$, $df = 26$, CFI = .964, GFI = .934, RMSEA = .085). All the analyses in this study were conducted using SPSS 14.0 and AMOS 5.0. Table 1 presents the descriptive statistics of the pretest instruments.

Table 1
Descriptive Statistics of the Pretest Instruments (N = 146)

	No. of Items	Possible Range	*M*	*SD*	Skewness	Kurtosis	α
Self-management (VLSs)	7	1-5	2.57	0.75	0.46	0.53	.80
Input-seeking (VLSs)	4	1-5	3.16	0.94	-0.03	-0.50	.87
Imagery (VLSs)	5	1-5	3.08	0.80	0.15	0.16	.79
Writing Rehearsal (VLSs)	3	1-5	3.72	0.92	-0.31	-0.52	.77
Oral Rehearsal (VLSs)	3	1-5	3.17	1.00	0.19	-0.63	.87
Association (VLSs)	3	1-5	2.55	0.88	0.13	-0.04	.88
Extrinsic Motivation	3	1-5	3.53	0.89	-0.15	-0.57	.74
Intrinsic Motivation	6	1-5	3.50	0.87	-0.21	-0.46	.87
Vocabulary Test	25	0-25	15.62	2.95	-0.33	-0.10	.66

2 Qualitative data collection procedures

Some researchers (e.g., Denzin, 1997; Dörnyei, 2007) recommend method triangulation wherein the findings are based on not only a primary source but also a secondary source of information. Following this recommendation, we incorporated qualitative analyses into this study in order to clarify the causes of the findings obtained through the quantative data

sources, namely, the questionnaires and vocabulary test. Specifically, the learners in the experimental group were asked to maintain study logs throughout the course, and interview sessions were conducted with them at the end of the course. The participants were directed to record the details of their daily study of English and the VLSs and materials that they used each day. In addition, follow-up interview sessions were conducted to determine the strategies that the participants employed outside the classroom during the course. A total of nine individuals, who were randomly chosen from among the participants in the experimental group, were interviewed. Participation in the interview sessions was completely voluntarily. Furthermore, since the interview sessions took place outside of the regular class time, the participants were presented with a bookstore gift certificate (valued at ¥1,000). At least two students were interviewed in each session, and due to the semi-structured nature of the interviews, the participants were able to exchange ideas on how they felt about the various strategies. All the interviews were conducted in Japanese, and each session lasted approximately 45 minutes (about 20 minutes per individual). The questionnaires and study logs submitted by the participants were provided at each interview session to help the participants recall what they actually had done during the course. With the participants' consent, the interviews were recorded with an IC recorder and subsequently transcribed by one of the authors of this article.

After the administration of the VLSs and motivation questionnaires and the vocabulary test at

the beginning of the course, the participants in the experimental group were grouped using a

cluster analysis, which was based on their initial repertoire of VLSs. The Ward method with

the squared Euclidean distance technique was used in applying the cluster analysis. This

particular method was chosen because the combination has been known to "combine clusters

with a small number of observations, and produce clusters with approximately the same

number of observations," (Hiromori, 2006) and thus, it is highly suitable for revealing

individual differences (Yamamori, Isoda, Hiromori, & Oxford, 2003).

Figure 1 illustrates the cluster profiles of the three groups, and Table 2 presents the scores,

standard deviations, and results of the post hoc tests (Tukey's multiple comparison technique).

All the scores of the variables investigated (those in Table 1) were first transformed into

z-scores and then entered into the cluster analysis. This is because the unit of measurement for

the vocabulary test results was different from that of the questionnaires. Based on a

dendogram, which is a tree-like graphic display of the distances between each combining

cluster, it was decided that the participants could be divided into three groups. This decision

was supported by a one-way ANOVA, which revealed statistically significant differences
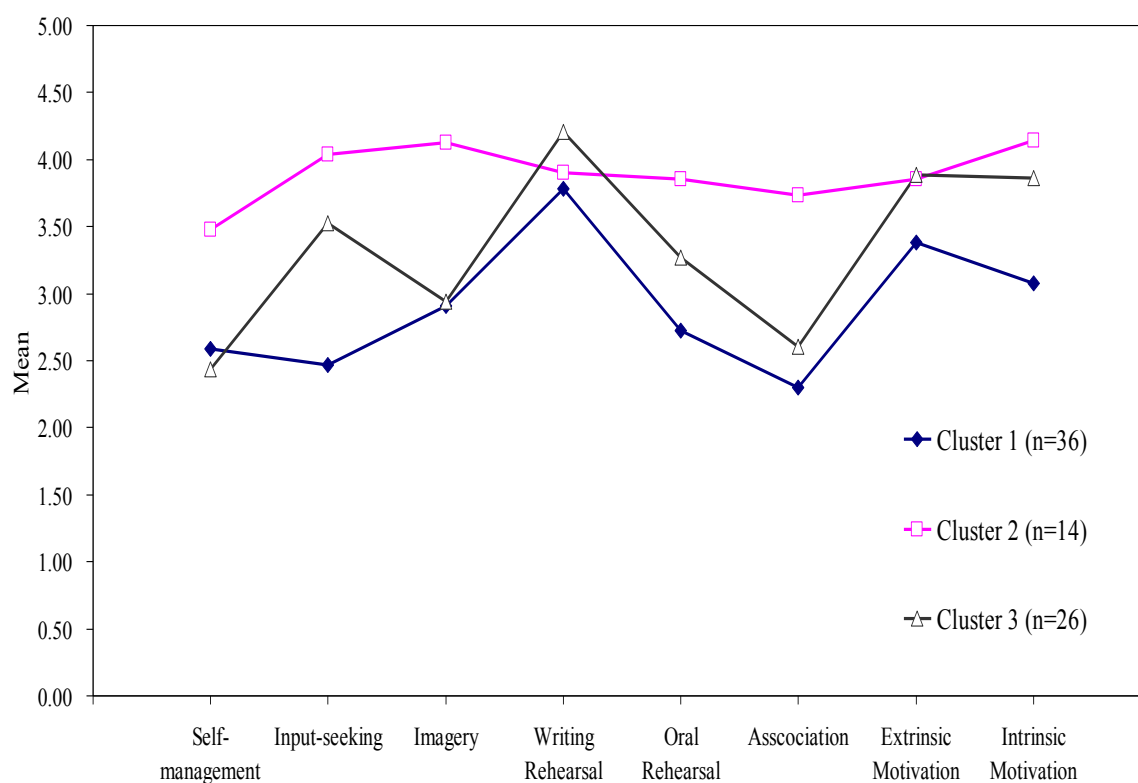
among the three groups ($p < .05$).

Figure 1. Cluster profiles of VLSs among the three groups before treatment.

Table 2
Descriptions of Each Cluster

	Cluster 1 (*n* = 36)	Cluster 2 (*n* = 14)	Cluster 3 (*n* = 26)	Significant in post hoc test
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	
Self-management	2.59 (0.63)	3.48 (0.82)	2.43 (0.58)	Clusters 1-2, 2-3
Input-seeking	2.47 (0.74)	4.04 (0.61)	3.53 (0.77)	Clusters 1-2, 1-3
Imagery	2.91 (0.73)	4.13 (0.64)	2.94 (0.54)	Clusters 1-2, 2-3
Writing Rehearsal	3.78 (0.79)	3.91 (1.06)	4.21 (0.78)	—
Oral Rehearsal	2.72 (0.85)	3.86 (1.04)	3.27 (0.78)	Clusters 1-2, 1-3
Association	2.30 (0.78)	3.74 (0.72)	2.60 (0.57)	Clusters 1-2, 2-3
Extrinsic Motivation	3.38 (0.77)	3.86 (0.79)	3.88 (0.86)	Clusters 1-3
Intrinsic Motivation	3.08 (0.77)	4.14 (0.63)	3.86 (0.93)	Clusters 1-2, 1-3
Vocabulary Test	14.42 (2.16)	16.43 (3.78)	17.38 (2.43)	Clusters 1-2, 1-3

Note. For all significant pairs in post hoc test: *p* < .05

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The learners belonging to Cluster 1 can be referred to as the "less frequent strategy users." Compared with the other two groups, their overall use of strategies was lower, and they mostly relied on writing rehearsal strategies. On the other hand, the learners in Cluster 2 were "active strategy users." They reported coordinating several strategies more often than did the learners in Clusters 1 and 3. They used the self-management and input-seeking strategies—which are metacognitive strategies—more frequently, and they had the highest intrinsic motivation of the three groups. Those in Cluster 3 were "moderate strategy users." As can be seen in Figure 1, the profile of their strategy use lies just between those of Clusters 1 and 2. From these results, it was assumed that the three groups were different in terms of their strategy use at the beginning of the course.

4 Instruction of vocabulary learning strategies

In the experimental group, students whose strategy use differed were instructed to sit near each other in the classroom so that they could interact and exchange their ideas and opinions about the strategies being taught during the training session. This type of interaction was included to help promote scaffolding in the Zone of Proximal Development (e.g., van Lier, 2004) wherein learners with different types of strategies can help each other by sharing how they approach the task at hand.

Both the experimental and control groups attended one class per week (90 minutes). For the

experimental group, the set of the cognitive and metacognitive strategies presented in Table 3

was taught explicitly during the regular class, with each VLSs instruction lasting

approximately 30 minutes. The instruction took place in the first 30 minutes of a 90-minute

class. On the other hand, the control group spent the same amount of time on other activities

such as reviewing the previously taught contents not related to vocabulary learning.

Table 3

Schedule of VLSs Instruction

Week	Cognitive Strategies		Metacognitive Strategies
1	Pre-questionnaire and vocabulary test		
2	Vocalization of the words, phrases, and sentences	+	Conscious preview
3	Use of collocations or phrases	+	Start of vocabulary learning with a preview
4	Imagery strategies	+	Expansion of one's own way of learning vocabulary
5	Writing and oral rehearsal	+	Conscious input of English vocabulary
6	Grouping of semantically-related words	+	Target-setting in vocabulary learning
7	Mnemonics (keyword methods)	+	Aim of designating time for vocabulary learning
8	Association of the target words with familiar synonyms or antonyms	+	Attempts to actually use new words while learning new vocabulary
9	Use of prefixes and suffixes (or stems)	+	Testing vocabulary regularly
10	Effective use of vocabulary notes or cards	+	Goal to remember a certain number of words
11	Review & post-questionnaire and vocabulary test		

Note. The students were instructed in both cognitive and metacognitive strategies.

The target strategies were chosen based on the findings of previous VLSs research (e.g.,

Fan, 2003; Gu & Johnson, 1996; Schmitt, 1997) and on the vocabulary that was to be taught

in each lesson. With regard to the instruction method, we chose explicit strategy instruction

because the existing strategy instruction models place much emphasis on its importance

(Chamot et al., 1999; Cohen, 1998; Oxford, 1990; Wenden, 1991). Among the various

strategy training frameworks (Dornyei, 2005, p.174), we based our method of instruction on

the model proposed by Chamot et al. (1999) due to its simplicity and the ease with which

learners can follow it.[6] The order of instruction was as follows: (1) preparation, (2)

presentation, (3) practice, (4) expansion, and (5) evaluation.

In each lesson, the instructor prepared a handout containing certain target words taken from

the course textbook and corresponding example sentences. Gu (2003b) states that "the choice,

use, and effectiveness of VLSs depend on the task, the learner, and the learning context."

Correspondingly, the participants' task in this study was to learn the target words by using the

strategies introduced in each lesson. In addition to the handout, a slideshow introducing and

explaining the effectiveness of each vocabulary learning strategy was shown during the

presentation phase.

During the practice stage, the instructor explicitly introduced and demonstrated the target

strategies, and the students applied them to learning vocabulary while discussing their use

with classmates. They also had an opportunity to discuss whether they used such strategies

often while they learned and how they felt about the target strategies or the possible

applications of the strategies being taught. Following the practice stage, as an initial

evaluation, the participants were asked to answer the following questions according to a

five-point scale: (a) whether they were already using the strategies, (b) how useful they felt

the strategies were, (c) how suitable they thought the strategies were to them, and (d) whether

they felt that they would like to try using the strategies.

For the expansion and the second evaluation phases, the learners applied the strategies

introduced for an assignment and recorded their evaluation of the strategy's usefulness in the

study logs. They were directed to experiment with the introduced strategy and then report in

the study log whether or not they thought that the VLS would suit them. For the assignments,

they were allowed to use other VLSs in addition to the one introduced in the previous lesson.

However, the use of the target VLS was mandatory. In the following lesson, the students were

required to submit their study logs and take a review quiz of the target vocabulary.

With respect to the control group, another instructor conducted regular classes with the

same materials as the ones used by the experimental group. Thus, the learners also received

handouts containing target words from the course textbook and corresponding example

sentences; however, they were not required to maintain a study log. Moreover, caution was

taken to ensure that the control group was not taught anything related to VLSs during the

lessons. Thus, the differences in treatment between the experimental and control groups were

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whether or not (a) the participants were required to maintain a study log, and (b) they received VLSs instruction in the classroom.

III Results and discussion

1 Were there any differences between the experimental and control groups after 10 weeks of VLSs instruction? If any, in which strategies did the differences emerge?

Table 4 summarizes the scores and corresponding standard deviations for all the variables investigated before and after the course for both the groups and the gains with regard to their scores after the treatment. The gains in the scores were tested with the Bonferroni adjustment to control for Type I error inflation.

In order to examine whether there were significant differences with respect to the VLSs questionnaire or the vocabulary test based on the intervention, a 2 (Group) × 2 (Time) repeated measures multivariate analysis of variance (MANOVA) was conducted. To use MANOVA, the following three conditions must be satisfied (Weinfurt, 1995, p. 253): (a) multivariate normality, (b) homogeneity of the covariance matrices, and (c) independence of observations. Therefore, prior to carrying out the MANOVA, we confirmed that the data met these conditions.

The result of the MANOVA revealed a significant multivariate main effect for both Group

[Wilks's Λ = .85, $F(9, 136)$ = 2.73, $p < 05$, η^2 = .15] and Time [Wilks's Λ = .67, $F(9, 136)$ = 7.54, $p < .05$, η^2 = .33]. More importantly, there was a significant Group × Time interaction [Wilks's Λ = .80, $F(9, 136)$ = 3.75, $p < 05$, η^2 = .20]. This interaction effect indicates that a difference does exist between the experimental and control groups based on the linear combination of all the dependent variables investigated.

Follow-up univariate repeated ANOVAs for each dependent variable revealed that the main effect of time (gain before and after the treatment) was significant for all the variables, with the exception of Writing Rehearsal and Extrinsic Motivation. The most important finding in this particular analysis was that the interaction between group and time was significant for Input-seeking [$F(1, 144)$ = 4.98, $p < .05$, partial η^2 = .03] and Oral Rehearsal [$F(1, 144)$ = 11.69, $p < .05$, partial η^2 = .08]. This interaction effect (illustrated in Figure 2) strongly suggests that the change in these two dependent variables over time is associated with the intervention, namely, the instruction of VLSs. In addition, the interaction between group and time was significant for the vocabulary test [$F(1, 144)$ = 14.40, $p < .05$, partial η^2 = .09], indicating that the experimental group outperformed the control group after receiving VLSs instruction.

From these results, it can be concluded that the instruction of VLSs produced the difference in results between the experimental and control groups, specifically with respect to the input-seeking and oral rehearsal strategies and the vocabulary test. Even though an interaction

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effect was not found, the gains in terms of the use of imagery and association strategies for the control group were also statistically significant. A possible interpretation of this result is that the course content, i.e., the TOEIC preparation material, may have affected the use of these strategies.

Table 4

Scores, Standard Deviations, and Gains in the Two Groups

	Experimental (n =76)			Control (n =70)		
	Pretest	Posttest	Gain	Pretest	Posttest	Gain
	M (*SD*)	*M* (*SD*)		*M* (*SD*)	*M* (*SD*)	
Self-management	2.70 (0.75)	2.85 (0.79)	0.15	2.42 (0.74)	2.54 (0.80)	0.12
Input-seeking	3.12 (0.97)	3.41 (0.89)	0.29*	3.21 (0.92)	3.24 (0.99)	0.03
Imagery	3.14 (0.80)	3.23 (0.94)	0.09	3.02 (0.80)	3.20 (0.82)	0.18*
Writing Rehearsal	3.95 (0.85)	3.91 (0.99)	-0.04	3.46 (0.93)	3.60 (1.10)	0.13
Oral Rehearsal	3.12 (0.96)	3.60 (0.90)	0.48*	3.22 (1.05)	3.19 (1.04)	-0.03
Association	2.67 (0.87)	3.00 (0.94)	0.33*	2.41 (0.87)	2.63 (0.88)	0.21*
Extrinsic Motivation	3.64 (0.83)	3.53 (0.93)	-0.11	3.40 (0.94)	3.41 (1.00)	0.01
Intrinsic Motivation	3.54 (0.92)	3.68 (0.86)	0.14	3.51 (0.82)	3.58 (0.95)	0.07
Vocabulary Test	15.80 (2.91)	18.42 (3.86)	2.62*	15.41 (2.99)	16.10 (2.96)	0.69

Note. Gain is the mean difference (posttest minus pretest). *$p < .05$ with the Bonferroni adjustment.
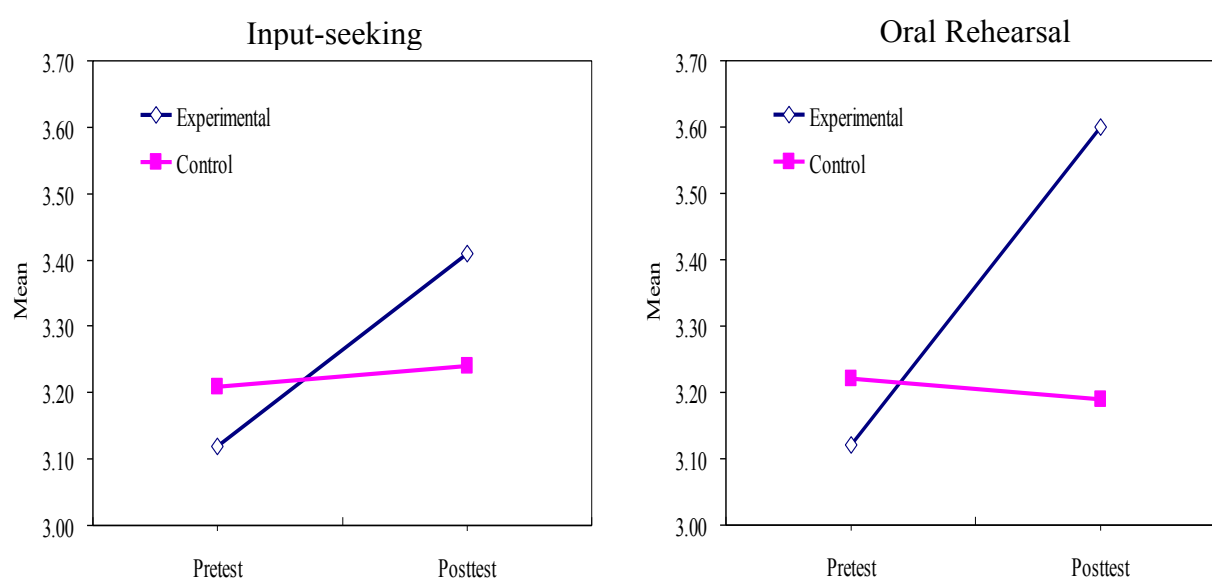

Figure 2.   Visual representation of the interaction effects of the two dependent variables.

2 Were there any differences within the experimental group that were based on the learners'

initial repertoire of VLSs?

In order to answer this question, we compared the mean scores of the pretest and posttest

among the clusters, with the Bonferroni adjustment ($p < .05$). It should be noted that the

number of participants in Cluster 2 ($n = 14$) was rather small; therefore, there was a

possibility that it would violate the assumption of parametric tests. For this reason, a

non-parametric test, i.e., the Wilcoxon signed-rank test, was conducted to double-check the

results. This procedure yielded the same results.

Figure 3 and Table 5 present the results of this analysis. Of the three clusters, the learners

in Cluster 1 demonstrated the greatest improvement. In particular, they significantly gained in

Input-seeking ($M_{diff} = 0.63$), Oral Rehearsal ($M_{diff} = 0.70$), Association ($M_{diff} = 0.52$), and

Intrinsic Motivation ($M_{diff} = 0.35$). The same tendency was observed for the learners in Cluster

3 (Oral Rehearsal: $M_{diff} = 0.36$; Association: $M_{diff} = 0.31$). An interesting difference between

Clusters 1 and 3 was the difference in their Intrinsic Motivation scores. Specifically, Intrinsic

Motivation increased for the learners in Cluster 1, but not for the learners in Cluster 3. The

fact that Intrinsic Motivation was enhanced for the learners in Cluster 1 might suggest a

possibility that their motivation increased due to the instruction of VLSs. This result is in line

with previous studies that reported that strategy instruction improves learners' motivation

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(e.g., Nunan, 1997).

In general, the gains that Cluster 1 exhibited are in line with the findings obtained from the comparison between the experimental and control groups, i.e., the experimental group demonstrated greater increases in the use of the input-seeking and oral rehearsal strategies. In contrast, the scores for Cluster 2 did not exhibit any increase in any of the variables, with the exception of the vocabulary test (M_{diff} = 3.64). Interestingly, this group of learners marked the largest gains with respect to the vocabulary test.

In sum, the results suggest that the learners who were less frequent strategy users (Cluster 1) and moderate strategy users (Cluster 3) benefited the most from the VLSs instruction, whereas the active strategy users (Cluster 2) did not show any gains in terms of VLSs use and motivation. The following are noteworthy findings that require further investigation: (a) the improvements of the learners in Clusters 1 and 3 in their use of input-seeking, oral rehearsal, or association strategies, (b) the absence of an increase in the use of other strategies by the same learners, (c) the increase in Intrinsic Motivation of the learners in Cluster 1 before and after the intervention and (d) why the absence of an increase in the use of VLSs by the learners in Cluster 2. These questions are discussed further in the following section along with the results of the qualitative analyses of the study logs and interview sessions.
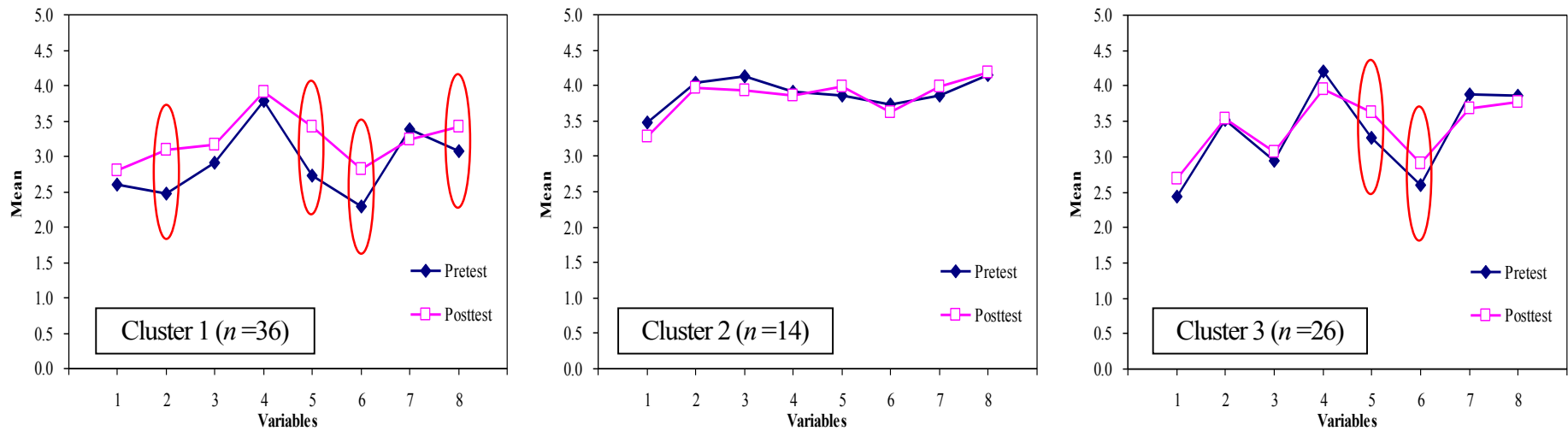
Figure 3   Visual representation of each cluster. The circles in the figure demonstrate that the difference is significant at *p* < .05. Refer to Table 5 for each variable.

Table 5   *Scores, Standard Deviations, and Gains in Each Cluster before and After the Intervention*

	Cluster 1 (*n* = 36)			Cluster 2 (*n* = 14)			Cluster 3 (*n* = 26)		
	Pretest	Posttest	Gain	Pretest	Posttest	Gain	Pretest	Posttest	Gain
Variables	*M* (*SD*)	*M* (*SD*)		*M* (*SD*)	*M* (*SD*)		*M* (*SD*)	*M* (*SD*)	
1. Self-management	2.59 (0.63)	2.80 (0.79)	0.21	3.48 (0.82)	3.29 (0.99)	-0.19	2.43 (0.58)	2.68 (0.60)	0.25
2. Input-seeking	2.47 (0.74)	3.10 (0.91)	0.63*	4.04 (0.61)	3.96 (0.75)	-0.07	3.53 (0.77)	3.54 (0.77)	0.01
3. Imagery	2.91 (0.73)	3.16 (0.94)	0.26	4.13 (0.64)	3.92 (0.80)	-0.21	2.94 (0.54)	3.06 (0.84)	0.12
4. Writing Rehearsal	3.78 (0.79)	3.91 (1.01)	0.13	3.91 (1.06)	3.86 (0.98)	-0.05	4.21 (0.78)	3.95 (1.01)	-0.26
5. Oral Rehearsal	2.72 (0.85)	3.43 (0.90)	0.70*	3.86 (1.04)	3.98 (0.79)	0.12	3.27 (0.78)	3.63 (0.92)	0.36*
6. Association	2.30 (0.78)	2.81 (0.95)	0.52*	3.74 (0.72)	3.62 (1.06)	-0.12	2.60 (0.57)	2.91 (0.73)	0.31*
7. Extrinsic Motivation	3.38 (0.77)	3.24 (0.92)	-0.14	3.86 (0.79)	3.98 (0.76)	0.12	3.88 (0.86)	3.68 (0.92)	-0.2
8. Intrinsic Motivation	3.08 (0.77)	3.43 (0.77)	0.35*	4.14 (0.63)	4.18 (0.73)	0.03	3.86 (0.93)	3.77 (0.94)	-0.09
Vocabulary Test	14.42 (2.16)	17.22 (3.38)	2.81*	16.43 (3.78)	20.07 (4.21)	3.64*	17.38 (2.43)	19.19 (3.89)	1.81*

Note. Gain is the mean difference (posttest – pretest). **p*< .05 (Significant with the Bonferroni adjustment)

3 What are the reasons behind these differences?

An examination of the study logs and interviews of the learners in Clusters 1 (less frequent strategy users) and 3 (moderate strategy users) revealed two reasons for the increased use of input-seeking, oral rehearsal, or association strategies. The qualitative analysis demonstrated that they "realized the effectiveness of the existing repertoire of strategies" and were "trying the strategies that they thought are useful for them."

Through strategy instruction, the learners became more aware of the effectiveness of the strategies they were already using. One learner provided the following comment at the interview (all the following excerpts were translated by the authors):

> [Excerpt 1: T3NY]
>
> *When I memorize words, I always read them aloud as I write them. I have been using this way of learning since I was a junior high school student. Even when other people tell me about other strategies, somehow I always keep using this one. I think this suits my learning style. After the instruction, I once again realized the effectiveness of vocalizing the words.*

Most of the other interviewees made similar comments. The idea that the VLSs instruction increased awareness toward the strategies that the learners were already using may also hold true with respect to input-seeking strategies. In fact, many learners expressed this view, as seen in the following excerpt:

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[Excerpt 2: T4NR]

During the course period, I tried to expose myself to the English language as much

as possible because this was emphasized during the instruction. I watched English

TV programs and movies on DVDs with English subtitles again and again.

Simultaneously, the learners also gained awareness of the usefulness of the strategies that

they had *NOT* been using before the strategy instruction. They understood the usefulness

and importance of the strategies that they were taught and attempted to employ them.

This was particularly effective with respect to association strategies. The following is a

remark that was echoed in many other study log entries:

[Excerpt 3: T2SY]

I had never used strategies such as associating the target words with familiar

synonyms or antonyms, using prefixes and suffixes, and grouping

semantically-related words before. I used to try to remember the meaning of a word

through one-to-one correspondence, namely, between the English and Japanese

words, by just repeatedly writing them on a piece of paper. After I learned the newly

introduced strategies, I was able to feel that there are several ways to make the

process of vocabulary learning easier.

While the VLSs instruction increased the use of the strategies described above, the

same is not true for the other strategies. The reason for this is that either the learners were

already using them (writing rehearsal strategies) or that some of the strategies were

difficult for them to use even though they seemed useful when they were taught (imagery

strategies). Most of the learners stated in the interview sessions and also wrote in the

study logs that they had encountered difficulties while attempting to put imagery

strategies such as the keyword method into practice. Initially, they had held the

impression that imagery strategies were promising for facilitating their vocabulary

learning. However, they subsequently realized that it would not be worth the effort

considering the amount of time required to use them. This cost-effectiveness trade-off

was echoed in the interviews and study logs as follows:

[Excerpt 4: T3MS]

I cannot think of a mental image or mnemonics for the target vocabulary. I'm bad at

making them by myself. Also, imagery or mnemonics are not suitable for all the

words. I'd rather spend my time on writing or vocalizing the target words.

The reasons for the increase in intrinsic motivation for the learners in Cluster 1 may

not be easily explained because a language course involves numerous variables. With this

limitation in mind, we provide the following comments made by two learners in Cluster

1:

[Excerpt 5: W2OS]

Since I felt I was able to remember vocabulary more easily with all the strategies

taught, now I feel I can be better at learning English. The teachers should have

taught them to me when I first started learning English in junior high school.

[Excerpt 6: W3IK]

At the moment, I'm not studying English so seriously, but now that I've learned

effective ways, I think I can learn more vocabulary when it becomes necessary. If I

can learn vocabulary more easily, I might begin to like English as a result.

These comments suggest that the instruction of VLSs more or less contributed to the

increase in intrinsic motivation. However, this increase was observed only for the

learners in Cluster 1, namely, the less frequent strategy users. From this phenomenon

stems the following rationale for incorporating VLSs instruction in regular classroom

teaching: Strategy instruction may have not only improved the use of some strategies, but

also enhanced the learners' motivation (Cohen & Dörnyei, 2002; Nunan, 1997).

The learners in Cluster 2 (active strategy users) did not exhibit any increase in their

VLSs use. The analyses of the study logs and interview sessions revealed that these

learners seemed to have already established their own methods for learning vocabulary,

and thus, the instruction did not bring about any changes. To some extent, their use of

VLSs may have already reached saturation point before the intervention was conducted.

This phenomenon was reflected in one interviewee's comment as follows:

[Excerpt 7: T4TS]

I felt surprise at each lesson because the strategies introduced were the ones I had

already been using. In fact, it was reassuring to see the strategies being introduced

as "effective" approaches to learning vocabulary. Sometimes I felt that I was not

using some of the strategies very efficiently, so it was a good opportunity to review

them.

When the learners in Cluster 2 examined their actual use of strategies at the time of the interviews, they generally reported more frequent use of strategies than did the learners in Clusters 1 and 3. This active use of VLSs may account for the former exhibiting the largest increase in their vocabulary test scores. In this regard, strategy instruction was useful for directing them in using the VLSs more effectively. Furthermore, in general, their reaction to the strategy instruction was positive. Accordingly, it can be suggested that strategy instruction is as useful for such learners as it is for those whose scores did not change after the intervention. In fact, this can be the answer to the main concern about allocating class time for strategy instruction, which is best summarized by Dörnyei (2005) as follows: "It is not clear whether the benefits of their explicit employment warrant the time and effort spent on them in comparison to spending the same amount of creative energy designing 'ordinary' learning activities" (p.176).

IV Conclusion and implications

In this study, we explored the effectiveness of explicit instruction of VLSs with Japanese EFL learners. With regard to the results of the current study, it may well be concluded that the current study demonstrates the effectiveness of explicit VLSs instruction in combination with regular classroom instruction. The results can be summarized as follows:

    1. Explicit teaching of VLSs results in improved vocabulary test scores.

    2. Explicit teaching of VLSs results in increases of strategy use among learners with

lower and moderate levels of such use.

3. Explicit teaching of VLSs may result in little change among learners with high levels of use; however, their teaching can confirm already held beliefs about their effectiveness.

4. Some VLSs are quickly rejected due to their time-consuming nature or being perceived as inefficient in other ways.

5. Explicit teaching of VLSs may result in more intrinsically motivated learners.

These results corroborate past findings related to strategy instruction, which reported that it led to greater strategy use, higher self-efficacy, increased motivation, wider strategy knowledge, and more positive attitudes (Chamot, Barnhardt, El-Dinary, & Robbins, 1996; Nunan, 1997). Moreover, the current study proves that strategy instruction is more beneficial to less effective learners (Wenden, 1986). On these grounds, it can be argued that the instruction of VLSs should be further employed and expanded in normal classroom settings.

Although this study's findings contribute to a better understanding of VLSs instruction, a few limitations should be taken into consideration. First, this study spanned only one semester (four months), whereas a more longitudinal study could have produced more extensive results. Second, the proficiency levels of the participants were rather homogeneous (mostly average or lower-level EFL learners in Japan), and they were all females. Since proficiency and gender have been reported to influence the choice and use of strategies (e.g., Gu & Johnson, 1996; Oxford & Nyikos, 1989), the results of this study might have been slightly different had we included more proficient learners and male participants in the research design. Third, although we incorporated in-depth qualitative

analyses, the results of the current study were mainly based on self-reported questionnaires, i.e., pre-post gains. Therefore, we might not have accurately captured how well the learners actually deploy and employ strategies.

Future research projects should be directed at improving the quality of teaching various methodologies. In particular, now that the research on learning strategies has become rather mature (Cohen & Macaro, 2007), we are better equipped with theoretical and empirical research findings that can help us construct concrete examples of better strategy instruction, such as the Styles and Strategies-Based Instruction (SSBI) developed by Cohen & Weaver (2005). Through the collective efforts of our colleagues in this field, we will be able to formulate better instruction models of VLSs for the purpose of developing more autonomous, self-regulated learners.

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Appendix A

VLSs Questionnaire for Japanese EFL Learners (Originally in Japanese)

Self-management

1. I regularly review the vocabulary I learned to check if I remember it.

2. I keep a vocabulary book or word list to check the vocabulary anytime I wish.

3. I try to make it a rule to memorize a certain number of words in a specific time period

   (e.g., "I will memorize 10 words a day").

4. I try to learn extra vocabulary in addition to what I am taught in class.

5. I try to take time for vocabulary learning.

6. I consciously set aside time to study vocabulary in order to prepare for tests (such as

   TOEIC, TOEFL, or Eiken: English Proficiency Test).

7. I use my own methods for remembering, checking, or reviewing vocabulary.

Input-seeking

8. I try to expose myself to English vocabulary by reading or listening a lot.

9. I try to manage the learning environment so as to expose myself to English

   vocabulary.

10. I try to make use of the media (TV, radio, Internet, mobile phone, or movies) to learn

    vocabulary.

11. I study vocabulary with the intention of using it.

Imagery

12. When I try to remember vocabulary, I make a mental picture of what can be

    associated with a word's meaning.

13. When I try to remember vocabulary, I link my personal experiences to it.

14. When I try to remember vocabulary, I create an image of the spellings or orthographic

   forms.

15. When I try to remember vocabulary, I use the keyword method (keyword mnemonic

   technique).

16. When I try to remember vocabulary, I imagine whether the meaning of the word is

   negative or positive.

Writing Rehearsal

17. When I try to remember vocabulary, I write it repeatedly.

18. When I try to remember vocabulary, I write it on a note or a card.

19. When I try to remember vocabulary, I remember not only the meaning but also the

   spelling of the word by writing it.

Oral Rehearsal

20. When I try to remember vocabulary, I say it aloud repeatedly.

21. When I try to remember vocabulary, I vocalize it to remember not only the meaning

   but also the pronunciation of the word.

22. When I try to remember vocabulary, I say the sample sentence aloud.

Association

23. When I try to remember vocabulary, I associate it with the synonyms (e.g., begin and

   start) or antonyms (e.g., positive and negative) I already know.

24. When I try to remember vocabulary, I also memorize the synonyms or antonyms of

the word.

25．When I try to remember vocabulary, I memorize words similar to it (in meaning,

sound, or shape) or the related words in a group.

Appendix B

Motivation Questionnaire (Originally in Japanese)

I study English…

Extrinsic Motivation

1. Because I require school credits to graduate.

2. In order to get a prestigious job in the future.

3. In order to receive a better salary later on.

Intrinsic Motivation

4. For the pleasure I experience when I surpass myself in my English studies.

5. For the enjoyment I experience when I can grasp the meaning of words if I keep

   studying.

6. For the satisfaction I feel when I am in the process of accomplishing difficult

   exercises in English.

7. For the "high" I feel when hearing English spoken.

8. For the "high" feeling that I experience while speaking English.

9. For the pleasure I get from hearing English spoken by native speakers of English.

Acknowledgements

Notes

[1] An earlier version of this paper was presented at the Korea TESOL (KOTESOL) International Conference on October 27, 2007, at Sookmyung Women's University, Seoul, South Korea.

[2] The TOEIC IP consists of a listening section (100 items) and reading section (100 items). The maximum score for each section is 495 and that for the entire test is 990. According to Educational Testing Service (2006), "TOEIC has been used to measure the English proficiency of nonnative English-speaking people."

[3] The number of participants from whom TOEIC scores were obtained was smaller than the actual number of the participants in the study ($N = 146$). This is because we only took into consideration the scores of those who had taken this test in the last one-year period.

[4] In the taxonomy of Noels et al. (2000), the three items for measuring extrinsic motivation used in the current study are collectively termed as "External Regulation," and the other six items for measuring intrinsic motivation are categorized as either "Intrinsic Motivation-Knowledge" or "Intrinsic Motivation-Accomplishment."

[5] For a detailed description of the fit index, see Tseng, Dörnyei, and Schmitt (2006).

[6] The superiority of this model over other models in the Japanese educational setting is discussed by the JACET Learning Strategy Special Interest Group (2005).