Gender Differences in the Effects of Explicit Vocabulary Learning Strategies Training

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Abstract

Vocabulary knowledge is a building block in language learning, but many students struggle to learn new words regardless of their proficiency level. Various studies have demonstrated the efficacy of explicit instruction of vocabulary learning strategies (VLS). On the other hand, other studies have demonstrated that gender can affect a student's use of language learning strategies including vocabulary learning strategies, and many of them have confirmed that females use a larger variety of strategies more often than their counterparts. The aim of this study was to shed light on gender difference as a variable for the influence of explicit VLS training. The participants were 109 Japanese EFL bioscience majors. They completed a questionnaire on vocabulary learning behavior before and after receiving explicit VLS training for 11 weeks. The questionnaire consisted of nine categories of items, two on metacognitive strategies, six on the use of cognitive and memory strategies, and one on overall use of VLS. The quantitative measures used a 5-point Likert scale and multiple-choice. The VLS training focused on four memory strategies, namely imagery, association, affix and grouping. The results from two-way repeated measures analysis of variance (ANOVA) with VLS training and gender as factors revealed that VLS training was effective in enhancing the participants' use of metacognitive strategies, writing rehearsal, and grouping strategy, although significant gender differences were observed for writing and grouping strategies. The students' written comments gave us insight into their perception of these strategies. Gender difference was also observed in the overall use of strategies.

Keywords: *vocabulary learning strategies; gender; explicit instruction; vocabulary learning behavior; metacognitive strategies; cognitive strategies; memory strategies*

Introduction

Learning vocabulary is a necessary but complex task for L2 learners (Schmitt, 2008). However, instructors can facilitate that task by providing learners with more ways to approach vocabulary learning. One way to do this is by explicitly teaching and integrating vocabulary learning strategies (VLS) into classwork. Among other things, research on

language learning strategies as a whole has found that strategy use correlates with successful learning (Grenfell & Macaro, 2007, p. 27). It has also found some types of learners deploy strategies more often and more successfully than others, but because strategies are teachable, learners can actually become more effective at using them (p. 27). Indeed, regarding VLS use specifically, Kojic-Sabo and Lightbown (1999) found that VLS use and positive learning outcomes strongly correlate.

Nonetheless, employing VLS is not as clear cut as it seems as numerous factors can and do influence an individual learner's preference for and use of particular strategies including gender (Wen & Johnson, 1997; Catalan, 2003; Ng, 2018), age (Schmitt, 1997), culture (Gu, 2002; Schmitt, 2000), cognitive style (Oxford, 1994; Littlemore, 2001), motivation (Horino & Ichikawa, 1997; Schmitt, 1997), learning purpose and task (Gu, 2003), learning context or environment (Oxford & Nyikos, 1989; Gu & Johnson, 1996; Kojic-Sabo & Lightbown, 1999; Gu, 2003), major (Oxford & Nyikos, 1989; Gu, 2002) and proficiency level (Wen & Johnson, 1997). Much VLS research over the past three decades has sought to clarify how these factors, particularly at the tertiary level, influence learners' strategic behaviors. Understanding how these variables affect learners can help instructors tailor VLS instruction to their learners' needs and learning preferences. This study seeks to add to the small but growing body of research into the factors influencing Japanese university ESP learners' VLS behaviors. To be specific, we look at the differences between males and females following explicit VLS training in a compulsory EFL class. For the present study, it should be noted that we used the same dataset examined in Kobayashi and Little (2018a & b); however, the research questions and statistical analyses are completely different. Gender was not mentioned or analyzed as a variable in the previous two studies. Thus, the present study is unique in offering new insight into the data by focusing on how gender influences the effect of explicit VLS training. As this theme has not been investigated with Japanese bioscience majors, we hope to contribute to the field with this new investigation.

Literature Review

Gender and VLS Use

The role of gender in teaching and learning foreign/second language vocabulary has long interested EFL/ESL instructors and researchers (Sunderland, 2010, p. 1). This interest

extends to the area of learning styles and strategies (p. 3). With regard to language learning strategies in general, it has been found that females compared to males tend to be more willing to try language learning strategies (Oxford, Lavine, Hollaway, Felkins, & Saleh, 1996), differ in strategy preferences (Green & Oxford, 1995), use a greater range of learning strategies (Oxford, Nyikos, & Ehrman, 1988), and use them more frequently (Oxford & Nyikos, 1989; Oxford & Ehrman, 1995). Regarding vocabulary learning strategies in particular, Gu (2002) argues that understanding how VLS use differs between males and females will help teachers tailor their instruction to the needs of particular students and encourage them to learn in new ways, thereby becoming more effective vocabulary learners (Gu, 2002, p. 51).

To date, several studies have focused on VLS and the variable of sex, or gender. A study focusing on 242 Chinese EFL students at the tertiary level used the Language Learners Factors Questionnaire and three language proficiency tests to identify which variables, including strategies, affect English achievement (Wen & Johnson, 1997). The questionnaire identified 16 variables, and as the authors had predicted, sex had a strong direct effect on English achievement, with females having significantly higher English proficiency scores than males. They surmised this was because successful female students at Chinese universities are attracted to language courses, whereas successful male students take other courses. Of the 16 variables, sex only affected three, with females placing a higher value on management belief, form-focused strategy, and tolerating-ambiguity strategy than males.

In a large study focusing on 648 university Chinese EFL learners, Gu (2002) examined how gender and academic major affect VLS use. None of the participants were English majors, all were arts or science majors. The instrument used was a questionnaire adapted from one developed by Gu and Johnson (1996) on metacognitive regulation and cognitive strategies. The participants were also given two vocabulary size tests and self-reported their composite scores on a College English Test. The results revealed females had larger vocabulary sizes and higher English proficiency than the males. Regarding the variable of academic major, science students' vocabulary size was slightly larger, but the arts students had slightly higher English scores. Males and females also differed in their beliefs about learning English and in VLS use. Females believed words should be acquired naturally, whereas males believed in

rote memorization (a cognitive strategy). Compared to males, females spent more time studying outside of class, used more metacognitive strategies, and used more of the strategies related to successful learning. The findings on VLS use and academic major, however, were inconclusive.

Another large study focusing on 581 Spanish speakers, aged 11-56, learning either English or Basque (Catalan, 2003) also pointed out that females used more types of strategies than their male counterparts. In this study, the participants were divided into eight groups categorized by L2 as beginning, intermediate, advanced, or English or Basque proficiency, and the differences in the number and range of VLS used by males and females were investigated. For this, the participants self-reported their VLS use on an instrument using Schmitt's VLS taxonomy (1997). Although both males and females used an average of 21.4 strategies, the mean for females was significantly higher. In addition, it appeared there was no difference in range, with both sexes using eight of the ten most frequently used VLS. Close analysis, however, revealed differences, with females reporting greater use of rehearsal, planning, input-elicitation and formal-rule strategies, which are cognitive, metacognitive, social, and memory strategies respectively, while males showed greater use of imagery strategies (memory strategies). Interestingly, this finding for males differed from that of Gu and Johnson (1996), where males preferred rote memorization, a cognitive strategy, to memory strategies.

Using a VLS survey loosely based on Schmitt's taxonomy (1997) as well as Schmitt's (2000) revised version of the Vocabulary Levels Test, Lee (2007) examined the perceived VLS use of 466 EFL Korean university students. His objective was to see which VLS were the most and least frequently used, if there were any gender differences in the patterns or frequency of use, and if VLS use was related to vocabulary size. He found there was no gender effect in the pattern or frequency of VLS use. In fact, the order of the top five most and least frequently used VLS were the same for both genders, leading Lee to conclude there was no gender effect on VLS use. Vocabulary size, however, had a significant effect on memory strategy use, with learners with a larger vocabulary size using more strategies in this category. All learners, regardless of gender or vocabulary size, preferred shallower memory VLS to deeper, more cognitively demanding VLS.

A recent study by Ng (2018) also used a self-report questionnaire based on Schmitt's taxonomy (1997) to determine if gender differences exist in the frequency of VLS used by 15 university-level Thai EFL learners. The study found that females used meaning-focused cognitive strategies and metacognitive planning strategies more often than males, whereas males used more form-focused memory and cognitive strategies as well as metacognitive monitoring and evaluation strategies. These results differed from the expected preference for social strategies by females and for visual strategies (those linked with imagery) by males, prompting the author to surmise that the participants' cultural background made the difference. The majority of previous studies had been conducted in the West rather than Asia. Ng speculates that both male and female Thai students prefer individual learning and reject social and visual VLS.

Explicit VLS Training

Interestingly, the concluding remarks of four of the five studies above stressed the need for VLS training to expand the learners' awareness and use of vocabulary learning strategies (Catalan, 2003; Gu, 2002; Lee, 2007; Ng, 2018). Research indicates strategy instruction can increase learners' performance, motivation, and ability to manage affective and cognitive strategies, while also equipping them with the necessary skills and knowledge to continue learning on their own (Rubin, Chamot, Harris, & Anderson, 2007). In a review of VLS research specifically, Nyikos and Fan (2007) found integrated VLS instruction, especially instruction which included metacognitive strategies, improves student performance and vocabulary acquisition (p. 273). They also note that although it is particularly effective for less proficient students, all learners benefit when provided with in-class opportunities to apply and practice VLS (p. 273).

Rasekh and Ranjbury (2003) examined the effect of explicit metacognitive strategy training on vocabulary knowledge in a study involving of 53 Iranian students in an intensive 10-week EFL course at a tertiary institute. The students were divided into two groups, one of which was the control group. Both groups received VLS training and practice throughout the course, but the experimental group also received explicit training in metacognitive strategies. The metacognitive strategies included were planning, setting goals, choosing appropriate

VLS, monitoring strategy use, combining strategies, managing their time and evaluating. At the end of the course both groups took a vocabulary achievement test. The experimental group achieved superior scores on this test, leading the authors to surmise explicit metacognitive training contributed positively to developing their vocabulary knowledge.

A study by Mizumoto and Takeuchi (2009) examined the effectiveness of explicit VLS training over a 10-week period for 146 female EFL university students enrolled in a TOEIC test preparation course. A survey on VLS use and motivation developed and confirmed by the authors (Mizumoto & Takeuchi, 2008) as well as a vocabulary test were administered at the beginning. The learners were then divided into two comparable groups in terms of vocabulary knowledge, but only the experimental group received VLS training during class. The same survey and test were given at the end of the course. The vocabulary test results showed the experimental group outperformed the control group. In addition, the survey results revealed the training positively influenced the learners' vocabulary learning behaviors, including metacognitive strategy use (i.e., input-seeking and self-management), and this was especially true for low- to moderate-proficiency learners. Participants' feedback also suggested the VLS instruction increased their intrinsic motivation.

Regarding studies in ESP-oriented contexts, Little and Kobayashi (2015) investigated the VLS preferences of high and low proficiency learners in a 9-week study with 38 university students majoring in life science. Students were given supplementary training in 12 VLS strategies as part of an EFL course. Changes in their VLS use were quantified by administering the survey developed by Mizumoto and Takeuchi (2008) at the beginning and end of the study. Qualitative data on the learners' strategy preferences were also collected. Statistical analyses confirmed Mizumoto and Takeuchi's (2009) findings in self-management and input-seeking gains, and revealed learners preferred shallower strategies for learning general science words. However, overall more proficient learners gained more, a significant difference from the findings of Mizumoto and Takeuchi (2009).

In another study, Kobayashi and Little (2018a) examined the effect of explicit VLS instruction on memory strategies over an 11-week period on the vocabulary learning behaviors of 109 second-year university EFL students majoring in biology. The students were divided into two
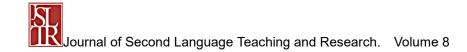
groups based on their vocabulary size as measured by Mochizuki's Vocabulary Size Test (1998). Changes in the learners' strategic behaviors were quantified using Mizumoto and Takeuchi's (2008) VLS questionnaire, which was administered at the beginning and end of the training period. The results revealed VLS instruction was effective for both groups, with increased use in self-management, input-seeking, shallower memory strategies, and intrinsic motivation.

During a 12-day ESP course for Turkish pilots, Atay and Ozbulgan (2007) examined the effects of VLS instruction on contextualized learning. The treatment group received an hour of VLS training per day on the memory strategies in Schmitt's taxonomy (1997) in addition to five hours of contextualized learning. Gains were measured for both groups by using a pre- and post-vocabulary test in conjunction with Schmitt's VLS survey (2000). The researchers found that the treatment group gained significantly more vocabulary than the control group, leading them to recommend that learners be taught an array of memory strategies as part of contextualized vocabulary learning.

The studies mentioned here are representative of the handful of studies that have investigated gender difference in VLS use and the impact of integrated explicit VLS training. While the findings on gender difference in terms of VLS use have been contradictory, studies on VLS training show that explicit VLS training has a positive impact on the learners' strategy use. To the authors' knowledge, however, to date no studies examining explicit VLS training and gender in an ESP context have been conducted. In an attempt to address that gap and shed more light on gender difference in VLS use, the present study seeks to understand the impact of explicit VLS instruction on the strategic vocabulary behaviors of males and females.

Research Questions

1. Did explicit memory VLS training have the same effect on the vocabulary learning behavior of male and female students? How did the students feel about the usability of each strategy?
2. Is there any difference between males and females in strategy use?

Methodology

Participants

A total of 109 students (41 males and 68 females, within the age range of 19-22) participated in the study. These students were all native Japanese speakers majoring in bioscience who had received seven years of EFL education (three years in junior high school, three years in high school, and one year in university). The average score of the Mochizuki Vocabulary Size Test (Mochizuki, 1998), which was developed for Japanese EFL students, indicated that their vocabulary sizes (male average: 5130; female average: 5078) are equivalent to university-level Japanese students whose average TOEIC scores are 400-450. At the start of the study, they all voluntarily signed a consent form which provided them with details of the purpose of the study. The form clearly stated that they could refuse to participate in the study or withdraw at any time without any consequences.

Memory VLS Training and Students' Comments

The VLS training students received consisted of four types of memory VLS: imagery, association, affix and grouping strategies. Unlike mechanical cognitive strategies such as oral/written rehearsal that are already popular with Japanese students (Schmitt, 1997, p. 219), these are memory strategies that require "significant active manipulation of information" and deeper processing which leads to long-term retention of the word (Schmitt, 2000, p. 132).

Imagery strategies included drawing a picture or creating a mental image of the word, linking the meaning of the word to the student's personal experience, using the visual image of the spelling and keyword method (Schmitt, 1997, pp. 212-214). Association strategies included creating a semantic network, associating the word with synonyms and antonyms, and using hyponymy (Oxford & Crookall, 1990; Schmitt, 1997, p. 212). Although the strategy of using affixes to learn a word is popular with Japanese high school students, the students are seldom taught the affixes of terms in their academic majors once they enter university. This is because the focus of college English education in Japan is academic English, not ESP. However, using the affix strategy to learn new terms is especially efficient in biology, where many terms have roots and affixes that are commonly used in the field (Herr, 2007, p. 5). In the present study, since the participants were all bioscience majors, the students were

introduced to root words, prefixes and suffixes commonly used in biology terms and were taught how to divide the word into word parts. Grouping strategy is described as a strategy that aids recall (Schmitt, 1997, p. 213) and has been found to be used by EFL students with larger vocabulary sizes (Gu & Johnson, 1996). Therefore, the students in the current study were instructed to learn the target word with words belonging to the same meaning category, or by making a sentence using the word.

A handout was developed for each strategy to aid the explicit instruction. It gave the rationale behind the strategy, step-by-step instructions for putting it into practice, and an example of the usage. A list of six target words, all biology terms, with a context for each word was attached to each handout. The words on the list had been pilot-tested before the study with another group of students of the same level to confirm that they would be unknown to the students. Originally, there were 42 words. The pilot test asked the students to write the definitions of the words they knew. Based on the results, 24 words that no students were able to define correctly were chosen. There was also a formatted study report for each strategy, and the students were asked to write how they used the strategy to learn each word on the list.

In order to see how the students felt about the usability of each strategy, a questionnaire was prepared to be administered after the students learned the target words with each strategy. It consisted of two parts: 1) rating the usefulness of the strategy, and 2) an open-ended question which asked the students to assess the usability of the strategy by writing positive and/or negative comments. The results of the first part of the questionnaire were reported in our article (Kobayashi and Little, 2018b). The students' comments were used in the present study to supplement the statistical analyses of the VLS Questionnaire introduced below to answer the first research question.

VLS Questionnaire and Strategy-Use Questionnaire

In order to evaluate the effectiveness of the VLS training on the students' vocabulary learning behavior, we created a vocabulary learning strategies questionnaire (VLS Questionnaire) based on one by Mizumoto and Takeuchi (2008). The questionnaire (Appendix) consisted of 26 items in eight categories, each representing an aspect of vocabulary learning behavior.

These items were used to answer the first research question. The eight categories were self-management (seven items), input-seeking (four items), writing rehearsal (three items), oral rehearsal (three items), imagery (five items), association (two items), affix (one item), grouping (one item). All the questionnaire items for these categories used a 5-point Likert scale from 1 for "strongly disagree" to 5 for "strongly agree." Cronbach's alphas for the categories with multiple items are shown in Table 1. The values are relatively low for imagery and association, but we consider them acceptable because they are above 0.6, the lower limit of acceptability (Hair, Black, Babin, & Anderson, 2010, p. 90).

Table 1: *Cronbach's Alphas for Each Category of VLS Questionnaire*

Category	Item	Cronbach's α
Self-management	Items 1-7	0.86
Input-seeking	Items 8-11	0.88
Writing rehearsal	Items 12-14	0.88
Oral rehearsal	Items 15-17	0.8
Imagery	Items 18-22	0.63
Association	Items 23-24	0.73
Affix	Item 25	-
Grouping	Item 26	-

For research question two, we prepared a "Strategy-Use Questionnaire" (Appendix). It was an open-ended question which asked the participants about how they use VLS. For this question, the participants wrote down up to three combinations of specific strategies they favored to learn a new word, for example, oral rehearsal and association strategy. If the student did not have the habit of using two or more VLS when learning a word and always used one strategy, for example, writing rehearsal only, he/she wrote which strategy it was.

Procedure

The study was carried out in a required English reading course using science-related materials taught by one of the authors. The class was held once a week, and the study was conducted on a weekly basis and lasted for 11 weeks. In the first week, the VLS Questionnaire and the Strategy-Use Questionnaire were administered. In the second week, using a handout, the instructor explicitly taught how to use the first strategy in Japanese spending 30 to 40 minutes of the class time. During this session, the students experienced

using the strategy to learn the words on the first word list. The instructor made sure that all the students used the strategy correctly. In the following week, the students took a quiz on the words and submitted the study report. This was to ensure that the students learned the target words with the strategy. Then, the questionnaire on which the students wrote their comments about the usability of the strategy was administered. This process was repeated three times until the students had learned how to use all four strategies and had submitted their comments about the usability of the final strategy in the ninth week. In the eleventh week, the VLS Questionnaire and the Strategy-Use Questionnaire were administered for the second time to see whether the students' vocabulary learning behavior changed after the memory VLS training.

Results

Data Analysis

For the first research question, the eight categories (Items 1 to 26) of the VLS Questionnaire administered before and after the VLS training were used. The mean score of the items in the same category of the questionnaire was calculated for males and females for pre- and post-questionnaires. In order to see the effects of the VLS training and gender on the students' vocabulary learning behavior, two-way repeated measures analysis of variance (ANOVA) was conducted on the influence of two independent variables, the VLS training and gender. The students' positive and negative comments about each memory strategy were sorted to see the gender difference in the students' impressions for each strategy.

For the second research question, the Strategy-Use Questionnaire was used, and the numbers of responses for the four types of strategy use were counted. These four types were always using only one strategy, always using only one combination of more than two strategies, using either of two combinations of strategies depending on the word to learn, using one of more than three combinations of strategies. Interestingly enough, those who wrote that they used one or more combinations of strategies did not report using any strategy by itself. A Chi-square test of independence was carried out to see if there is a significant difference between males and females in the choice of these four types of strategies use before and after the training. IBM SPSS Statistics Version 24 was used for all the statistical analyses in the present study.

Research Question 1: Gender Differences in the Effects of VLS Training

The descriptive statistics of the eight categories of the VLS Questionnaire carried out before and after the VLS training are given in Table 2. Results from two-way repeated measures ANOVA (Table 3) revealed a significant effect of the VLS training in self-management ($F(1,107) = 15.786$, $p < .001$, $\eta^2 = .15$), input-seeking ($F(1,107) = 7.393$, $p = .008$, $\eta^2 = .07$), writing rehearsal ($F(1,107) = 23.370$, $p < .001$, $\eta^2 = .22$) and grouping ($F(1,107) = 5.360$, $p = .023$, $\eta^2 = .05$) for both males and females. In these categories, a significant difference was observed between males and females in writing rehearsal. For this category, the females' score was significantly higher than that of males in both pre- and post-questionnaires ($F(1, 107) = 26.126$, $p < .001$, $\eta^2 = .24$). A significant interaction effect between males and females was observed for grouping ($F(1,107) = 5.360$, $p = .023$, $\eta^2 = .05$). Table 2 shows that the means of the pre- and post-questionnaires for grouping were the same for females indicating that the training was effective for males only.

Table 2: *Means and Standard Deviations of Pre- and Post- Questionnaires for Each Category*

Category		Pre M (SD)	Post M (SD)
Self-management	Male (n = 41)	1.99 (0.860)	2.25 (0.963)
	Female (n = 68)	2.05 (0.805)	2.28 (0.738)
Input-seeking	Male (n = 41)	2.19 (1.114)	2.42 (1.201)
	Female (n = 68)	2.41 (1.026)	2.67 (0.880)
Writing rehearsal	Male (n = 41)	2.98 (1.478)	3.59 (1.038)
	Female (n = 68)	3.97 (0.913)	4.37 (0.731)
Oral rehearsal	Male (n = 41)	2.86 (1.111)	2.89 (1.007)
	Female (n = 68)	3.15 (1.044)	2.93 (0.863)
Imagery	Male (n = 41)	2.53 (0.906)	2.40 (0.779)
	Female (n = 68)	2.61 (0.766)	2.67 (0.808)
Association	Male (n = 41)	3.23 (1.184)	3.24 (1.013)
	Female (n = 68)	3.34 (0.853)	3.42 (0.937)
Affix	Male (n = 41)	3.54 (1.567)	3.73 (1.025)
	Female (n = 68)	3.62 (1.159)	3.59 (1.237)
Grouping	Male (n = 41)	1.66 (0.965)	2.05 (1.094)
	Female (n = 68)	2.00 (0.810)	2.00 (0.792)

Note. M and SD are used to represent mean and standard deviation, respectively.

Table 3. *Two-Way Repeated Measures ANOVA for the Effects of VLS Training and Gender*

	Factor	*F*	*p*	*η2*
Self-management	VLS training	15.786**	<0.001**	0.15
	VLS training x Gender	0.083	0.774	0
	Gender	0.089	0.767	0
Input-seeking	VLS training	7.393**	0.008**	0.07
	VLS training x Gender	0.032	0.859	0
	Gender	1.671	0.199	0.02
Writing rehearsal	VLS training	23.370**	<0.001**	0.22
	VLS training x Gender	0.925	0.338	0.01
	Gender	26.126**	<0.001**	0.24
Oral rehearsal	VLS training	1.257	0.265	0.01
	VLS training x Gender	2.278	0.134	0.02
	Gender	0.841	0.361	0.01
Imagery	VLS training	0.134	0.715	0
	VLS training x Gender	1.27	0.262	0.01
	Gender	1.719	0.193	0.02
Association	VLS training	0.238	0.627	0
	VLS training x Gender	0.13	0.719	0
	Gender	0.701	0.404	0.01
Affix	VLS training	0.481	0.49	0
	VLS training x Gender	0.882	0.35	0.01
	Gender	0.021	0.885	0
Grouping	VLS training	5.360**	0.023*	0.05
	VLS training x Gender	5.360**	0.023*	0.05
	Gender	0.886	0.349	0.01

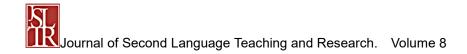*Note.* * = $p < .05$; ** = $p < .01$

Students' Comments on Imagery

The students' study reports indicated that the majority of both male and female students drew an image of the target word while a few used the keyword method. All the percentages are rounded percentages. Regarding the comments, 66% of male students (27) and 75% of female students (51) wrote positive comments about the strategy.

More than 60% of both males (63%, 26) and females (63%, 43) wrote that the strategy helps them to learn the word. Among these comments, the three most common were the same for male and female students.

> *Imagery strategy makes it easy to learn the word.*

32% or 13 males; 12% or 8 females

I can create a better image of the word.

20% or 8 males; 15% or 10 females

Imagery strategy leads to better retention of the word.

10% or 4 males; 10% or 7 females

Some students in both groups enjoyed using the strategy.

This strategy is fun to use.

2% or 1 male; 7% or 5 females

On the other hand, 63% of both males (26) and females (43) wrote negative comments. The most common negative comments in both groups pointed out the time-consuming aspect of the strategy.

It takes time to draw an image of the word.

34% or 14 males; 28% or 19 females

Some female students, however, took advantage of this aspect.

Spending time helps me create an image of the word and makes it easy to learn the word.

4% or 3 females

Some students in both male (20%, 8) and female (19%, 13) groups pointed out that the strategy is neither appropriate for learning every word nor for learning every aspect of a word.

Not all the words can be learned with this strategy.

17% or 7 males; 18% or 12 females

I cannot learn the spelling.

2% or 1 male; 1% or 1 female

There were students who said this strategy is not one they can use because they cannot draw well.

I am not good at drawing.

5% or 2 males; 10% or 7 females

Some students in both groups pointed out that a drawing can distort the true meaning of the word.

I can be biased by my own drawing.

2% or 1 male; 1% or 1 female

Among female students, both positive and negative comments were observed for the

keyword method and pronunciation.

Keyword method is useful in learning the pronunciation.

1% or 1 female

Keyword method is ineffective in learning the pronunciation.

1% or 1 female

Students' Comments on Association

About half of both male and female students wrote positive (56% or 23 males; 54% or 37 females) and negative (56% or 23 males; 41% or 28 females) comments about the strategy.

The most common positive comment in both male (46%, 19) and female (35%, 24) groups mentioned the strategy is helpful in expanding their word knowledge.

I can learn/recall/review the word from the related words.

44% or 18 males; 35% or 24 females

Some students (5% or 2 males; 15% or 10 females) pointed out that this strategy is helpful to learn the word.

I can create a better image of the word

9% or 6 females

Learning a word with this strategy leads to the retention of word.

5% or 2 males; 6% or 4 females

Again, the most common negative comment in both male and female groups was about the time-consuming aspect of the strategy.

It takes time to associate words.

27% or 11 males; 15% or 10 females

There were also students (20% or 8 males; 10% or 7 females) who pointed out the inapplicability of this strategy to every word or every aspect of a word.

Not all the words can be learned with this strategy.

17% or 7 males; 6% or 4 females

I cannot learn the spelling.

2% or 1 male; 3% or 2 females

I cannot learn the pronunciation.

1% or 1 female

Some comments (10% or 4 males; 15% or 10 females) indicated the lack of vocabulary knowledge in the students.

I end up having to learn many words.

<div align="right">10% or 4 males</div>

Associating the words is difficult.

<div align="right">7% or 5 females</div>

I focus too much on associating the word with other words and cannot focus on learning the word.

<div align="right">6% or 4 females</div>

I have to know many words to use this strategy.

<div align="right">1% or 1 female</div>

Students' Comments on Affix

The students' comments showed about 60% of both male (59%, 24) and female (65%, 44) students felt positive and less than 30% of both male (20%, 8) and female (26%, 18) students felt negative about the affix strategy.

The most common positive comments in both male (37%, 15) and female (43%, 29) groups pointed out the strategy leads to the expansion of word knowledge.

Learning affixes helps me guess the meaning of unknown words.

<div align="right">20% or 8 males; 12% or 8 females</div>

I can associate the word with other related words.

<div align="right">7% or 3 males; 29% or 20 females</div>

I can categorize the words using affixes.

<div align="right">2% or 1 male; 1% or 1 female</div>

Other positive comments in both groups (15% or 6 males; 21% or 14 females) pointed out that the strategy is helpful to learn the word.

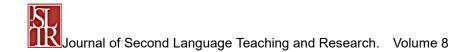*The strategy makes it easy to learn the word.*

<div align="right">2% or 1 male; 12% or 8 females</div>

I can create a better image of the word.

<div align="right">7% or 3 males; 3% or 2 females</div>

Dividing the word into word parts helps me deepen the understanding the word.

<div align="right">2% or 1 male; 3% or 2 females</div>

The time-consuming aspect was among the most common negative comment in both groups.

Dividing the word into word parts takes time.

7% or 3 males; 7% or 5 females

The comments of some students (5% or 2 males; 16% or 11 females) indicated that the students are not familiar with biology affixes.

I have to learn the affixes first.

2% or 1 male; 15% or 10 females

There are too many affixes.

2% or 1 male

I cannot look up affixes in the dictionary.

1% or 1 female

Again, there were students that pointed out the inapplicability of the strategy to learn either every word or every aspect of a word.

Not all the words can be learned with this strategy.

2% or 1 male; 1% or 1 female

Students' Comments on Grouping

The students' study reports indicate that both male and female students chose to make a sentence using the word. Both positive and negative comments were observed more in females (positive: 60%, 41; negative: 51%, 35) than in males (positive: 41%, 17; negative: 34%, 14).

The most commonly observed positive comments in both males (37%, 15) and females (28%, 19) related to production using the word.

I can improve my production skills.

15% or 6 males; 10% or 7 females

I can learn the usage of the word.

15% or 6 males; 10% or 7 females

I can review/learn other words.

2% or 1 male; 1% or 1 female

I can review grammar.

2% or 1 male; 6% or 4 females

I can use the sentence I made when conversing in English.

2% or 1 male

Other positive comments (5% or 2 males; 21% or 14 females) pointed out that the strategy is useful to learn the word.

This strategy leads to the retention of the word.

9% or 6 females

I can create a better image of the word.

6% or 4 females

I can deepen the understanding of the word before making a sentence.

6% or 4 females

The strategy makes it easy to learn the word.

5% or 2 males

Some female students (10%, 7) pointed out that the strategy is useful in expanding word knowledge.

I can learn other words by using the word in a context.

10% or 7 females

The most commonly observed negative comments in both males (17%, 7) and females (32%, 22) pointed out the time-consuming aspect of the strategy.

It takes time to make a sentence using the word.

17% or 7 males; 26% or 18 females

I put too much effort in making a sentence, not in learning the word.

6% or 4 females

A larger percentage of female than male students pointed out that they are not comfortable using sentences they made to learn words because they were not sure if the sentences were correct.
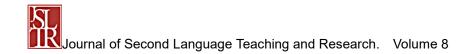
I don't know if my sentence is correct.

2% or 1 male; 10% or 7 females

It's better to learn sample sentences given in the dictionary.

2% or 1 male;1% or 1 female

This strategy was not an exception in being criticized for its inapplicability (2% or 1 male; 4% or 3 females).

It's difficult to make a sentence with a noun.

3% or 2 females

This strategy is not suitable for every word.

1% or 1 female

One male student (2%) pointed out that lack of word knowledge prevents him from using the word.

I can't make a sentence without knowing the usage of the word.

2% or 1 male

Research Question 2: Gender Differences in Strategy Use

Tables 4 and 5 show the number of students who used one strategy and no combination of strategies, only one combination of strategies, two combinations of strategies, and more than three combinations of strategies before and after the training, based on the students' responses to the Strategy-Use Questionnaire. The result of a Chi-square test revealed that the difference between males and females was significant before the training (X^2 (3, n = 109) = 8.447, p = .038) with more females using more combinations of strategies. Although there was no statistical difference between males and females after the training, Table 5 shows that the percentage of females who used more than two combinations was larger than that of males after the training. A closer look at Tables 4 and 5 indicates that a shift from no combination or a single combination to more than two combinations seems to have occurred in both genders especially in males.

Table 4. *Number of Students for Each Number of Combinations of Strategies Before VLS Training*

	Male (n = 41)		Female (n = 68)	
	Number	Percentage	Number	Percentage
0 combination	16	39%	17	25%
1 combination	15	37%	17	25%
2 combinations	4	10%	22	32%
3 or more combinations	6	15%	12	18%

Note. All the percentages are rounded percentages.

Table 5. *Number of Students for Each Number of Combinations of Strategies After VLS Training*

	Male (n = 41)		Female (n = 68)	
	Number	Percentage	Number	Percentage
0 combination	8	20%	9	13%
1 combination	16	39%	21	31%
2 combinations	9	22%	22	32%
3 or more combinations	8	20%	16	24%

Note. All the percentages are rounded percentages.

Discussion

VLS Training Enhances Metacognitive Strategies for Both Males and Females

This study found that VLS training is effective in enhancing metacognitive strategies, namely self-management and input-seeking, for both male and female students. This corroborates Mizumoto and Takeuchi (2009), who concluded that VLS training increased self-management and input-seeking behaviors in Japanese female college-level students. Little and Kobayashi (2015) also found that the use of metacognitive strategies increased after explicit VLS training. In Gu's study (2002), which did not include explicit VLS training, females used more metacognitive strategies than males. Whereas in Ng's study (2018), males used more metacognitive strategies than females. Had training been included in these studies, perhaps this imbalance would not have been observed. Indeed, Chamot (2005) noted that explicitly teaching learners how to use strategies promotes their metacognitive strategy awareness as well as "their ability to understand their own thinking and learning processes" (p. 123). This self-knowledge and the attendant increase in metacognitive strategies is desirable because, as Nyikos and Fan (2007) point out, using metacognitive strategies and specific VLS in combination is the more effective way to approach vocabulary learning than the isolated use of either one (p. 173).

VLS Training is Not Effective for All the Strategies for Both Sexes

The results showed that VLS training was not effective for oral rehearsal, a shallow strategy, or for strategies involving deep processing, namely imagery, association, and affix strategies. According to the students' comments, these strategies are perceived as time-consuming, which is a major drawback for busy students. Little and Kobayashi (2015) also found that

students do not use oral rehearsal. We surmised that this is because they feel embarrassed to say the words out loud. As for association strategies, the students' comments showed that these strategies were difficult because they lacked sufficient knowledge of other words to easily form associations, and therefore had to learn many words, or could not focus on learning the target word. The students' comments also indicated that there were multiple problems with using the affix strategy. The following are some of the problems they mentioned: there are too many affixes; they cannot be looked up in a dictionary easily; some students felt they had to learn affixes first before they could apply the strategy effectively; and finally some noted that the strategy was not suitable for every word. Nevertheless, the fact that the percentage of positive comments was almost triple that of negative comments for both males and females indicates that they do appreciate the utility of the strategy. One comment even indicated that the strategy is similar to learning a kanji in the sense that many complex kanji are constructed of several semantic units. Despite their positive perceptions, lack of affix knowledge prevented the students from employing the strategy easily enough to be effective. However, their comments show that if the students were given time to learn common prefixes, roots, and suffixes in the field of biology, they may find the strategy less time-consuming. Nonetheless, as Kojic-Sabo and Lightbown (1999) point out "we must be careful not to consider all strategies as universally valid or useful to all learners (p. 190)."

Gender Seems to Correlate with Preferences for Particular VLS

This study confirmed some gender differences in strategy preferences as had all the studies in the literature review except for Lee's (2007). Surprisingly, the post-treatment questionnaire on VLS use indicated that explicit VLS training had enhanced a preference for writing rehearsal in both genders, and especially for females whose scores were higher than for males in both the pre- and post-questionnaires. We surmise that the increased use of this strategy might be due to the learners' greater awareness of the time-consuming nature of deeper memory strategies. In addition, in Asian cultures, students routinely use this strategy to learn kanji and are encouraged to use the strategy to learn English spelling in junior and senior high school. This corroborates findings by Lee (2007) as well as Little and Kobayashi (2015), who found that Korean and Japanese students respectively prefer shallower strategies, of which writing rehearsal is one. As for the greater preference among females for writing rehearsal that was observed, this could be due to cultural and social expectations as

noted by Gu (2002, p. 44). He states that in Chinese culture, females "are expected to succeed in language learning" (p. 44), and we surmise this may also be true to some extent in Japanese culture. In addition, we speculate that some females may have a greater propensity to resort to tried and true strategies when learning vocabulary to have a greater chance of succeeding.

Gender difference was also statistically observed in the grouping strategy, where males showed an increase in use from the pre- to the post-questionnaire, whereas females' use remained the same. Surprisingly, females gave more positive and negative comments about the strategy than males. The students' comments also indicated that their positive perceptions of the strategy are quite different. Among the males, a majority saw the value of the strategy for improving their production skills and learning the usage of the word, while a majority of females saw the strategy's value for retention and deepening their understanding of the word. As for negative perceptions, the majority of comments in both groups indicated its time-consuming nature. Interestingly, the percentage of females who voiced anxiety about their inability to create a correct sentence was twice as high as that of males. Some researchers theorize that women are perhaps more prone to having feelings of stress and anxiety (Ellis, Hershberger, Field, Wersinger, Pellis, Geary, Palmer, Hoyenga, Hestroni & Karadi, 2008, pp. 259).

VLS Training Encourages Students to Combine Strategies with Some Gender Differences

Finally, explicit VLS training appeared to have encouraged the students to combine strategies. For both sexes, the percentage of students who used more than two strategies at the same time increased after training. The percentage was larger for females than for males in both pre- and post-questionnaires. However, the increase from pre- to post-questionnaire was larger for males. This echoes the findings of previous studies that found: 1) females used language learning strategies in general more frequently than males (Ehrman & Oxford, 1988; Green & Oxford, 1995; Oxford & Nyikos, 1989); 2) females used more VLS and used them more frequently than males (Catalan, 2003; Gu, 2002); and 3) female students used strategies more adeptly than their male counterparts (Wen & Johnson, 1997, p. 34). One reason for the outcome in the present study could be due to the students' increase in the use
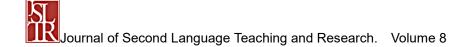
of metacognitive strategies. As we noted earlier, our explicit VLS training fostered metacognitive strategy awareness and use for both groups, and we surmise this led to increased strategy use in combination, especially in males. However, we must remember that quality is more important than quantity, especially for some students in determining success (Kojic-Sabo & Lightbown, 1999, p. 190).

Conclusion and Implications

This study asked whether explicit VLS instruction was equally effective on the vocabulary learning behaviors of male and female students. The answer is no. Although it was effective for both groups in enhancing self-management, input-seeking, writing rehearsal and grouping strategies, there was a significant difference for grouping and for writing rehearsal. Males increased in their use of grouping strategies whereas females did not. Regarding writing rehearsal, although both groups increased their use of the strategy, females' use of the strategy was statistically higher in both the pre- and post-questionnaires. On the other hand, the changes in oral rehearsal, imagery, association, and affix strategies for both genders were insignificant. However, the students' comments showed that their perceptions of the strategies were more positive than negative for both sexes. This does not mirror their actual use of strategies, and this gap between use and perceived usefulness is something Fan (2003, p. 234) also noticed with Chinese students.

The second question asked whether there was any difference between males and females in strategy use. Although both genders increased their use of strategies in combination, we found that the increase was greater for males, which may indicate their awareness of the efficacy of using a combination of strategies grew more than females' due to the explicit VLS training.

One important pedagogical implication of teaching VLS explicitly as an integrated part of a course is not only that students should be taught a range of strategies, but that they should also be encouraged to reflect on their own use of strategies to assess whether they are effective for their own vocabulary learning. This builds metacognitive awareness and will lead to greater and more effective strategy use. As Kojic-Sabo and Lightbown (1999) noted, since not all strategies are effective for all learners, learners should be encouraged to find the ones

that fit their personal learning styles best (p. 190). By doing this we can empower language learners and enable them to continue learning vocabulary in other contexts; this will also enable them to adapt to their own changes in proficiency.

The study also confirmed the students' need to learn biology affixes, revealing another important pedagogical implication. Although the students' comments indicated that they were positive about using affix strategy, they could not actually benefit by using the strategy themselves due to a lack of affix knowledge. Thus, teaching major biology affixes should be of value to the students.

Before concluding, we must address the limitations of this study. First, we might have gleaned a deeper and more nuanced understanding of gender difference in terms of VLS usage if we had included more items on the questionnaire. For example, questions that asked about social expectations or future plans to use the language for specific purposes might have deepened our understanding about the social and cultural background of gender differences as mentioned in Gu (2002, p. 44). Second, another limitation is that we could not tell conclusively whether or not the participants had actually used the strategy being taught to learn the word as we only had the students' written self-reports. Interviews with each student might have increased the reactivity and veridicality of students' responses to each strategy. In line with this, interviews may have uncovered affective factors associated with learning new VLS and the reasons for them, such as why some learners felt stress and anxiety. Third, along with a more detailed questionnaire and interviews, future studies should involve a larger number of participants and include cluster analyses. This would give us a greater understanding of the patterns of VLS use between genders and across proficiency levels. Finally, it would have been ideal if we could have asked the participants about their VLS use in a follow-up questionnaire some months after the study to see how time had influenced their use of the strategies.

Acknowledgements

Biodata

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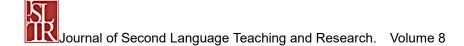
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Appendix

VLS Questionnaire for Japanese EFL Learners (originally in Japanese)

Use the following scale for Items 1-26.

1	2	3	4	5
Strongly disagree.	Disagree.	Neither agree nor disagree.	Agree.	Strongly agree.

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.

Writing Rehearsal

12. When I try to remember vocabulary, I write it repeatedly.
13. When I try to remember vocabulary, I write it on a note or a card.
14. When I try to remember vocabulary, I remember not only the meaning but also the spelling of the word by writing it.

Oral Rehearsal

15. When I try to remember vocabulary, I say it aloud repeatedly.
16. When I try to remember vocabulary, I vocalize it to remember not only the meaning but also the pronunciation of the word.
17. When I try to remember vocabulary, I say the sample sentence aloud.

Imagery

18. When I try to remember vocabulary, I pair the term with a picture of its actual meaning, or create a picture in my mind.

    e.g.: monkey   =

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

    Example: zoo = My grandparents took me to "Zoorasia" when I was small.

20. When I try to remember vocabulary, I create an image of the spellings or orthographic forms.
21. When I try to remember vocabulary, I use the keyword method (keyword mnemonic technique).

    e.g.: "math" = We used *100 "mazu" keisan* (100-cell calculation exercise sheet) in math.
22. When I try to remember vocabulary, I imagine whether the meaning of the word is negative or positive.

    e.g.: "bacteria" = negative; "medicine" = positive.

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 try to associate it with related words.

    e.g.: "pathogen": disease, antibody, virus, bacteria.

Affix

25. When I try to remember vocabulary, I associate it with other words with the same affix or root.

    e.g.: "biology" = "bio" (prefix meaning "relating to life") + "logy" (suffix meaning "the study of").

Grouping

26. When I try to remember vocabulary, I make a sentence using the word.

Strategy-Use Questionnaire (originally in Japanese)

Write down the combination of the strategies you often use. If you are using one particular strategy, write it down. Use the list of strategy below.

► Zero combination (single use of one particular strategy) [   ].

► One combination only [   ][   ].

► Two combinations [   ][   ][   ].

► Three combinations [   ][   ][   ][   ].

e.g.: a + f, d + h, a + b + e.

a. Oral rehearsal (Items 15-17)   b. Writing rehearsal (Items 12-14)

c. Looking at the word   d. Looking at the word while repeating it silently.

e. Pairing the word with a picture or a mental image of the term.

f. Linking the word with my personal experience.

g. Associating the word with the synonyms or antonyms.

h. Associating the word with related words

i. Make a sentence using the word.

j. Other (Specify).