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Exploring the Effects of Metacognitive Strategies on Vocabulary Learning of Japanese Junior High School Students

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Vocabulary learning strategies (VLS) play a crucial role in L2 vocabulary education. Although it is assumed that metacognitive VLS are effective, few studies have empirically investigated this assumption. This paper, therefore, conducted a study in order to establish a comprehensive taxonomy of metacognitive VLS and explored the relationship between the use of metacognitive VLS and vocabulary knowledge. A vocabulary size test and a VLS questionnaire were administered to 132 Japanese junior high school students. The data were analyzed using exploratory factor analysis and multiple regression analysis. The results showed a total of 20 metacognitive VLS and categorized them into six. Among the six metacognitive VLS, *input seeking* was a positive predictor of test scores at any frequency level, while *spaced learning, guessing with confidence,* and *note making* varied in effectiveness depending on word frequency. These results suggest it is important to encourage students to learn vocabulary outside the classroom, teach basic affix knowledge, and facilitate students in making vocabulary notebooks.

Keywords: Japanese EFL learners, vocabulary learning, metacognitive strategies

Introduction

Until the 1980s, vocabulary had been neglected and considered to be poorly related to second language teaching and learning. This might be attributed to the lateness with which semantics entered linguistics and the inherent difficulty of structural and systematic treatment of vocabulary (Maiguashca, 1993; Meara, 1980). In recent years, however, much attention has been paid to vocabulary knowledge because it is indispensable to learners' development of language skills such as reading, writing, listening, and speaking skills (see also Nation, 2001). There is an increasing interest in the teaching and learning of EFL/ESL vocabulary. In most EFL/ESL classes, learners are expected to improve their vocabulary knowledge on their own with their VLS (Oxford & Scarcella, 1994). Numerous studies have suggested that students have difficulty developing effective VLS for themselves and explicit instructions are necessary to help learners efficiently acquire VLS (e.g., Atay & Ozbulgan, 2007). Since it is unrealistic and even ineffective to teach all VLS, it is helpful for learners to know essential VLS.

A number of studies, therefore, have aimed to identify effective VLS. The previous studies can be divided into two types: one focuses on the effects of individual VLS and the other seeks the effective combination of VLS (Schmitt, 1997). The former type of research has dealt with two specific VLS, i.e., keyword method and rote memorization (see Sagarra & Alba, 2006). The keyword method involves associating the novel L2 word with an L1 keyword that is acoustically or orthographically similar, and then connecting the L1 keyword with the L1 translation of the L2 word, while the rote memorization

involves the memorization of an L2-L1 translation of a new L2 word by rehearsal (Sagarra & Alba, 2006). Since activities requiring a deeper, more involved manipulation of information can promote more effective learning (Craik & Tulving, 1975), the keyword method is often believed more effective for L2 vocabulary learning than the rote memorization, and thus has resulted in better retention of new words than the rote memorization under various situations (e.g., Brown & Perry, 1991). However, the effectiveness of the keyword method cannot always be applied to all circumstances, and the rote memorization is more appropriate than the keyword method under some conditions (e.g., van Hell & Mahn, 1997). As represented by these studies, research findings regarding the effects of individual VLS are inconsistent.

These conflicting results have led to the emergence of the latter type of research that attempts to identify the effective combination of VLS. That is because one of the reasons of these inconsistent findings may be due to the fact that learners can possibly use a different set of VLS and this may affect their learning outcomes more than the effects of individual VLS (Gu & Johnson, 1996). To find effective combinations of VLS, the previous studies have compared good and poor learners (Ahmed, 1989; Fan, 2003; Gu & Johnson, 1996; Kojic-Sabo & Lightbown, 1999; Lawson & Hogben, 1996; Lessard-Clouston, 1996; Sanaoui, 1995). According to the results of the studies, the universally valid or useful combination of cognitive or social/affective VLS that can be effective for all learners has not been identified. As one of the reasons for this, the effectiveness of using VLS may be influenced by a number of variables such as learners' proficiency level, L1 background, motivation, personality, purposes for learning the L2, the task and text being used, the nature of the L2 itself, and word frequency (see Schmitt, 1997, 2000).

On the other hand, the findings from the studies on the effective combination of VLS have generally agreed that successful learners are likely to use a variety of VLS with initiative and independence, and that metacognitive VLS are assumed to be crucial as a commander of the other VLS. This assumption, however, has not been empirically investigated because a detailed list of metacognitive VLS has not been clarified. Thus, this paper intends to compile an inclusive taxonomy of metacognitive VLS and identify effective ones for practical vocabulary instruction. The research questions are as follows:

1. What do metacognitive VLS consist of?
2. What type of metacognitive VLS would be effective?

Literature Review

Definition and Categorization of VLS

Although a number of studies are available on VLS, few studies have clearly defined VLS. In this paper, VLS are defined with reference to O'Malley and Chamot's (1990) definition of learning strategies because they include both conscious and unconscious learning strategies in their definition and they are representative researchers who attempt to explain the effectiveness of learning strategies from the cognitive psychology perspective. On the basis of their definition of learning strategies, VLS are defined as "the special thoughts or behaviors that individuals use to help them comprehend, learn, or retain new vocabulary."

Researchers have categorized VLS from different perspectives. Several studies have identified and categorized VLS employed by EFL/ESL learners with reference to the categorization of learning strategies (Fan, 2003; Gu & Johnson, 1996). Learning strategies are divided into three types: metacognitive, cognitive, and social/affective strategies (O'Malley & Chamot, 1990; O'Malley, Chamot, Stewner-Manzanares, Kupper, & Russo, 1985; Oxford, 1990). Metacognitive strategies refer to "the learning process, planning for learning, monitoring of comprehension or production while it is taking place, and self-evaluation after the learning activities have been completed" (Brown & Palinscar, 1982, cited in O'Malley & Chamot, 1990, p. 8). Cognitive strategies are defined as the strategies that are "more

directly related to individual learning tasks and entail direct manipulation or transformation of the learning materials" (Brown & Palinscar, 1982, cited in O'Malley & Chamot, 1990, p. 8). Social/affective strategies represent "a broad grouping that involves either interaction with another person or ideational control over affect" (O'Malley & Chamot, 1990, p. 45). Among these three strategies, metacognitive strategies seem to be a higher level concept and play an important role to oversee, monitor, control, and evaluate the other two strategies (Oxford, 2011).

Fan (2003), and Gu and Johnson (1996) divide VLS into metacognitive and cognitive strategies; social/affective strategies are included within both categories. From another perspective, Schmitt (1997) establishes two categories of VLS: discovery and consolidation strategies. The former is used when learners discover the meaning of new words, whereas the latter is used when learners memorize and retain it. In his taxonomy, metacognitive and cognitive strategies are categorized in consolidation strategies and social/affective strategies are included in both discovery and consolidation strategies.

As for metacognitive VLS, some researchers divide them into subcategories while others do not. Gu and Johnson (1996) propose the subcategories of *selective attention* and *self-initiation*. Mizumoto and Takeuchi (2008) also employ two subcategories, *self-management* and *input-seeking*. Wang (2009) uses four subcategories: *plan-making and plan-implementing*, *selective attention*, *learner autonomy*, and *reviewing/testing*. Schmitt (1997) and Fan (2003) do not identify any subcategories. The subcategories, however, are not established by empirical data and a decisive VLS categorization system has not led to complete agreement yet.

Effective VLS

A number of studies have attempted to identify effective cognitive VLS. However, the universally valid or useful cognitive VLS that can be effective for all learners has not been identified. As one of the reasons for this, the effectiveness of cognitive VLS may be influenced by a number of variables such as learners' proficiency level, L1 background, motivation, personality, purposes for learning the L2, the task and text being used, the nature of the L2 itself, and word frequency (see Schmitt, 1997, 2000).

It has been believed that metacognitive VLS are useful for all learners beyond the individual differences. Some attempts have been made to explore the relationship among metacognitive VLS, vocabulary knowledge, and overall English proficiency; however, the results of empirical studies are inconsistent.

Kojic-Sabo and Lightbown (1999) empirically investigated these relationships in a population of 90 ESL and EFL students. The participants completed a VLS questionnaire, a vocabulary test, and a test assessing overall English proficiency. The participants were categorized into seven groups according to the set of their VLS use. Comparing test scores between groups revealed that self-initiated efforts to encounter and practice new words outside the classroom and the amount of extracurricular time spent on language (and vocabulary) learning correlated to higher levels of achievement.

This result is in accordance with Gu and Johnson's (1996) study. The study participants were 850 university students in China. Each completed a VLS questionnaire and two vocabulary tests and declared the test scores assessing overall English proficiency. The data were analyzed by multiple regression with the frequency of the use of VLS as independent variables and the test scores as dependent variables. It was concluded that learners' self-initiation and the skills to selectively pay attention to words addressing their individual needs or interests were positive predictors of general English proficiency. In addition, self-initiation and willingness to spend extracurricular time practicing newly learned items were positive predictors of vocabulary tests.

By contrast, other studies suggest that the effectiveness of metacognitive VLS is open to question. Lessard-Clouston (1996) conducted a case study that aimed to investigate whether the use of VLS predicted learners' overall English proficiency. The participants were 14 ESL students. The participants completed a VLS questionnaire, a vocabulary test, and a test assessing overall English proficiency. The participants were categorized into three groups according to the extent of their self-initiated approach to

English learning: structured, semi-structured, and unstructured. The structured group spent more time on self-initiated learning outside and in class; they kept written records of English words they wanted to learn and often reviewed them. Comparing test scores of the groups showed that learners' approach was not indicative of their language proficiency because the most proficient learners in the study were in the semi-structured and unstructured groups.

Fan (2003) described an empirical study to identify the relationship among frequency of use, perceived usefulness, and actual usefulness of VLS. The participants of her study were 1,067 first-year, English majors from seven Hong Kong universities, all advanced English learners. The participants completed a vocabulary test and a VLS questionnaire. The data showed that metacognitive VLS were seldom used although they were perceived as useful. Moreover, their use was found to be neither a positive nor negative predictor of vocabulary test scores.

One possible reason for these mixed results is that there is no clear taxonomy or subcategorization system of metacognitive VLS. Therefore, the questionnaire items representing metacognitive VLS and what is included in each subcategory vary from study to study. To solve this problem, Yamada (2009) conducted an empirical study that attempted to identify the effective VLS. VLS questionnaires and two types of vocabulary size test were administered to 162 first-year university students. The VLS questionnaire data were analyzed by exploratory factor analysis. The results showed that the factor related to metacognitive VLS was not extracted and metacognitive VLS were included into the factors representing some cognitive or social/affective VLS. This might be because metacognitive VLS manage the other two types of VLS and are highly related with them. Therefore, the relationship between metacognitive VLS and the vocabulary test was not revealed.

Considering these issues, this study proposes to investigate the effectiveness of metacognitive VLS by using a questionnaire that discusses these strategies exclusively. In so doing, this study attempts to identify the repertoire of metacognitive VLS and effective ones.

The Study

Participants

A total of 132 Japanese EFL learners (68 male and 64 female) participated in the present study. They were all in the third grade in a junior high school and aged 14 to 15. Participants who had lived in English-speaking countries for more than 10 months were excluded from the sample, because learning environment, culture, experience, and learners' proficiency level have been found to influence the effectiveness of using VLS (Mizumoto & Takeuchi, 2008). All participants in this study therefore learned English in a genuine EFL setting.

Measuring Vocabulary Knowledge

Vocabulary knowledge encompasses various aspects (Nation, 2001). It is difficult, however, to assess all the aspects of vocabulary knowledge at once. The present study focused on the number of form-meaning links of a word (i.e., vocabulary size) because this metric is assumed to be a good predictor of language skills or academic success (Laufer, 1997; Meara & Jones, 1988; Saville-Troike, 1984).

The present study used a vocabulary size test developed by Aizawa and Mochizuki (2010). The test format required selecting an L2 target word that was directly equivalent to a given L1 word (see Appendix A). Considering the participants' levels, the test contained words of five frequency levels from the 1,000-word level to the 5,000-word level. There were 26 items at each level and a total of 130 test items were included.

Assessing VLS

There have been at least seven methods to assess VLS: written questionnaires, interviews, observations, think-aloud protocols, diary and dialogue journals, recollective narratives, and computer tracking. This study used a written questionnaire, which allows for the collection of a large amount of data and encourages learners to develop a better awareness of their own VLS (Cohen, 1998; Mizumoto, 2018; Oxford, 1996).

The questionnaire included two sections. Section 1 collected students' background information, such as age, gender, and experience of living abroad, and Section 2 included items borrowed from previous studies (Fan, 2003; Gu & Johnson, 1996; Mizumoto & Takeuchi, 2008; Schmitt, 1997; Wang, 2009).

Of the 33 items used in the previous studies, 10 duplicate items showing the same VLS were removed, and thus, the total number of items became 23 in this study (see Appendix B). All items were translated into Japanese and the participants were asked to rate each strategy on a 5-point Likert-type scale (5 = strongly agree, 4 = agree, 3 = neither agree nor disagree, 2 = disagree, 1 = strongly disagree).

Procedure

The vocabulary size test and the VLS questionnaire were administered during English classes. Both the written and oral instructions for the vocabulary size test were given at the beginning of the test. After the vocabulary test, the participants completed the VLS questionnaire. Five minutes were given for each section of the vocabulary size test, and five minutes were given for the VLS questionnaire; a total of 30 minutes were allotted to participants.

Data Analyses

The VLS questionnaire data were analyzed by factor analysis, followed by varimax rotation. Factor analysis reduced the large number of VLS questionnaire items to a small number of factors that still represented the information found in the original items by identifying characteristics that the original items had in common. Varimax rotation is often employed to make the factors uncorrelated with each other.

After the factor analysis, forward stepwise multiple regression was administered to look for VLS that were especially relevant to vocabulary knowledge. The orthogonal factors extracted by factor analysis were used as independent variables and each of the test scores at five word frequency levels was used as dependent variables. By doing so, word frequency could be taken into consideration. Word frequency discussed in this paper refers to "the frequency of occurrence of a word" (Schmitt, 1997, p. 202). High-frequency words are taken to mean the words that occur in all kinds of uses of the language and cover around 80% of most texts, while low-frequency words are the words that occur very infrequently and cover only a small proportion of any text (Nation, 2001). The previous studies on word frequency revealed that word features and learning difficulty of words varied according to word frequency. Schmitt (2000) suggests that most high-frequency words are polysemous words, and that technical words increase beyond the 5,000-word level. In addition, it is assumed that more frequently occurring words can be easily learned than less frequently occurring words because the more frequently a word is used, the more opportunities learners have to meet it (Laufer, Elder, Hill, & Congton, 2004). For Japanese learners, however, it is indicated that this relationship between learning difficulty and word frequency becomes unclear beyond 4,000-word level because the learning difficulty of a word can be affected by whether the word is used as a technical word (Aizawa, 2006; Aizawa & Iso, 2007).

Regarding the relationship between VLS and word frequency, it is generally assumed that high-frequency words should be taught in the classroom, so learners need to use VLS for reviewing, such as *repetition* or *grouping*, whereas it would be hard to teach all the low-frequency words in the classroom, so learners initially need to use VLS for determining their meaning in reading or listening, such as

guessing (Nation, 2001; Schmitt, 2000). Some researchers conducted empirical studies to investigate this assumption (Fan, 2003; Yamada, 2009). They found the effectiveness of using VLS varied according to word frequency although the results were a little different from the assumption. The findings indicated that word frequency should be taken into consideration in an attempt on effective VLS. Therefore, in this study, five regression analyses were performed using test scores at each word frequency level.[1]

Results

Learners' VLS: Factor Analysis of VLS Questionnaire Data

The means and standard deviations (SDs) for the items on the VLS questionnaire are shown in Table 1.

TABLE 1
Means and SDs for the Items on the VLS Questionnaire

Item No.	*M*	*SD*	Item No.	*M*	*SD*	Item No.	*M*	*SD*
1	2.17	0.90	9	2.68	1.35	17	2.64	1.09
2	2.65	1.07	10	2.65	1.23	18	3.68	1.19
3	2.92	1.28	11	2.77	1.24	19	2.33	1.04
4	2.86	1.20	12	2.58	1.15	20	2.70	1.12
5	3.30	1.14	13	3.42	1.00	21	2.71	1.18
6	2.36	0.96	14	2.98	1.15	22	2.45	1.23
7	2.80	1.21	15	3.42	1.25	23	2.89	1.12
8	2.17	1.05	16	2.37	1.14			

As indicated, there were no items that suggested a ceiling effect or a floor effect, so all items were taken forward into an exploratory factor analysis. Table 2 presents the factor matrices produced by the varimax rotation, the communality of each variable, and the number of each item.

By means of a minimum-eigenvalue criterion of 1.0 (Kaiser's criterion), an exploratory factor analysis (maximum likelihood method), followed by varimax rotation, extracted six orthogonal factors. Two items (items 8 and 23) that had a low loading (less than 0.4) on all factors were removed to facilitate interpretation of each factor. For the same reason, one item (item 17) that had high loading (0.4 and above) on more than one factor was also removed. The total percentage of variance accounting for six factors was 51.73%. Let us now take a close look at each of the six factors.

TABLE 2
Factor Analysis Results

Item No.	Factor Loading						Communalities
	F1	F2	F3	F4	F5	F6	
11	**0.850**	0.183	0.094	0.097	0.099	0.092	0.792
12	**0.791**	0.234	0.089	0.164	0.149	0.116	0.751
9	**0.678**	0.075	0.120	0.079	0.042	0.321	0.590
10	**0.482**	0.325	0.181	0.344	0.238	0.205	0.588
2	0.071	**0.679**	0.048	0.342	0.118	-0.026	0.599
1	0.213	**0.642**	0.074	0.331	0.005	-0.112	0.586
16	0.190	**0.557**	0.156	-0.019	0.096	0.136	0.400
17	0.147	**0.513**	0.091	-0.004	0.073	**0.444**	0.495
3	-0.073	**0.490**	0.054	0.162	0.339	0.201	0.430
22	0.349	**0.456**	0.230	0.154	-0.041	0.025	0.408
8	0.150	0.285	0.132	0.122	-0.091	0.096	0.153
20	0.135	0.107	**0.710**	0.107	0.224	0.122	0.610
19	0.081	0.176	**0.668**	0.094	0.059	0.029	0.497
21	0.070	0.079	**0.651**	-0.105	0.222	0.133	0.513
23	0.298	0.239	0.326	0.261	0.165	0.280	0.426
6	0.281	0.205	0.051	**0.741**	0.006	0.100	0.684
5	-0.010	0.331	-0.050	**0.590**	0.333	0.204	0.613
4	0.203	0.283	0.159	**0.421**	0.208	0.151	0.389
13	0.217	-0.074	0.212	-0.014	**0.678**	0.025	0.558
15	-0.068	0.202	0.094	0.150	**0.611**	0.173	0.480
14	0.194	0.050	0.281	0.135	**0.525**	-0.061	0.417
18	0.137	0.052	0.066	0.114	0.135	**0.690**	0.534
7	0.277	0.077	0.171	0.129	-0.033	**0.508**	0.387
Rotation Sums of Squared Loadings	2.721	2.570	1.855	1.697	1.655	1.401	
Total % of Variance	11.831	11.175	8.063	7.380	7.195	6.090	
Cumulative %	11.831	23.006	31.069	38.449	45.644	51.734	

As shown in Table 3, a total of 20 metacognitive VLS were categorized into six factors. Factor 1 received loadings from four items concerned with looking for opportunities to learn vocabulary outside of the classroom. These items were referred to as input-seeking strategies in Mizumoto and Takeuchi (2008). Therefore, this factor could be also termed *input seeking*. Factor 2 received higher loadings from the items that referred to planning to learn vocabulary. Therefore, this factor could be termed *planning*. Factor 3 represented VLS that were used to judge whether the words were important. All the items in this factor fell under the category of *selective attention*, as established by Gu and Johnson (1996). Therefore, this factor could be named *selective attention*. Factor 4 appeared to be related to practicing words at stated intervals; therefore, this factor could be named *spaced learning*. Factor 5 was relevant to guessing strategies. Those who ranked high frequency on these items seemed confident at guessing word meanings. Thus, this factor could be labeled *guessing with confidence*. Factor 6 referred to the strategies used in encountering new words. This factor was associated with looking them up and making a note of them. Therefore, it could be labeled *note making*.

TABLE 3
Items with High Loading on Each Factor

Factor No.	Item No.	Factor Loading	Statement	α
1	11	0.850	I try to expose myself to English vocabulary by reading or listening a lot.	0.861
	12	0.791	I try to manage the learning environment so as to expose myself to English vocabulary.	
	9	0.678	Besides textbooks, I make use of the media (songs, movies, Internet, etc.) to learn vocabulary.	
	10	0.482	I try to learn extra vocabulary in addition to what I am taught in class.	
2	2	0.679	I plan my schedule so that I have enough time for learning vocabulary.	0.741
	1	0.642	I plan my vocabulary learning (e.g., "I will memorize 10 words a day").	
	16	0.557	I find out how to improve vocabulary learning by reading books on vocabulary learning and asking teachers or my classmates.	
	3	0.490	I test myself with word tests.	
	22	0.456	I consciously set aside time to study vocabulary in order to prepare for tests (such as TOEIC, TOEFL, or Eiken: English Proficiency Test).	
3	20	0.710	I know which words are important for me to learn.	0.764
	19	0.668	I know when a new word or phrase is essential for adequate comprehension of a passage.	
	21	0.651	When I meet a new word or phrase, I have a clear sense of whether I need to remember it.	
4	6	0.741	I regularly review the vocabulary I learned to check if I remember it.	0.724
	5	0.590	I continue to study word over time.	
	4	0.421	I use spaced word practice.	
5	13	0.678	I have a sense of which word I can guess and which word I can't.	0.685
	15	0.611	I use my own methods for remembering, checking, or reviewing vocabulary.	
	14	0.525	I know what cues I should use in guessing the meaning of a particular word.	
6	18	0.690	I look up words that I'm interested in.	0.617
	7	0.508	I make a note of words that seem important to me.	

Correlation between VLS and Word Frequency

As reported in Section 3.5, five separate forward stepwise multiple regression analyses were conducted using the six VLS factors as independent variables and the test scores of each word frequency level as dependent variables (see Appendix C). As summarized in Table 4, the results revealed that four of the six VLS factors (66.7%) had a positive correlation with the vocabulary test scores. None of the factors had a negative correlation.

As Table 4 shows, *input seeking* was a positive predictor of test scores from the 1,000- to the 4,000-word levels. *Spaced learning* was a positive predictor of test scores for the 2,000- and 3,000-word levels. *Guessing with confidence* was also a positive predictor of test scores for the 2,000- and 5,000-word levels. Regarding test scores for the 5,000-word level, the other positive predictor was *note making*.

TABLE 4
A Summary of the Positive Predictors of the Vocabulary Test Scores

Factor No.	VLS	Word Level				
		1,000	2,000	3,000	4,000	5,000
1	*Input seeking*	+	+	+	+	
2	*Planning*					
3	*Selective attention*					
4	*Spaced learning*		+	+		
5	*Guessing with confidence*		+			+
6	*Note making*					+

Note. + means a positive predictor. A blank cell means being neither a positive nor negative predictor.

Discussion

In this study, a total of 20 metacognitive VLS were abstracted and categorized into six factors. Some factors had a positive correlation with the vocabulary test scores, and no factors had a negative correlation. This could be a comprehensive taxonomy of metacognitive VLS. The more subcategories could be established, the more detailed investigation could be conducted. The effectiveness of each factor is discussed as follows:

The items included in *input seeking* showed that this strategy was quite similar to self-initiated learning (Gu & Johnson, 1996; Kojic-Sabo & Lightbown, 1999; Lessard-Clouston, 1996). In previous studies, this strategy was effective for EFL learners although it did not show effectiveness for ESL learners. In this study, the participants were all EFL learners and the result was in accordance with the previous studies. Especially in Japan, this strategy would be effective because there are numerous signs and announcements in English all over the country. Moreover, there are many English-based loanwords in Japanese (Daulton, 2008). Young learners like to use PCs or mobile phones that involve a number of English technical terms. Thus, they can incidentally encounter such words many times in their daily lives.

Spaced learning was associated with how often the learners reviewed the new words that they had learned. This strategy is considered to be useful for all learners; ESL students can be exposed to newly learned words in their daily lives, while in an EFL context, directed and deliberate review activities are essential (Kojic-Sabo & Lightbown, 1999). This study showed the same results. Since the average of the participants' vocabulary size was 2953.4, the vocabulary tests at the 2,000-word and 3,000-word levels included approximately the same level of words as they were studying. As is often the case with junior high school students in Japan, participants were given a word book and had regular in-class tests. Thus, they could review the words repeatedly and regularly.

As to *guessing with confidence*, a number of studies have revealed the effectiveness of guessing strategies. Guessing word meanings from their affixes is especially useful (Yamada, 2009). As shown in Table 5, the tests at the 2,000- and the 5,000-word levels included more words whose meanings could be guessed from the basic affix (Sasao & Webb, 2017). Therefore, learners who could confidently monitor their process of guessing would get higher scores on the tests at those levels.

TABLE 5
The Numbers of the Words with Basic Affix in the Vocabulary Size Test

Word Level	1,000	2,000	3,000	4,000	5,000
Number of Words	0	4	1	3	8

Note making was connected with managing important or interesting words. The words included in the test at the 5,000-word level were difficult for most participants. Thus, it would be essential that learners take notes and look up the words beyond their levels when encountering them. Some studies on the use of vocabulary notebooks state that writing new words in a notebook helps learners develop both lexical competence and learner autonomy (Fowle, 2002; Schmitt & Schmitt, 1995).

Planning and *selective attention* were neither positive nor negative predictors for test scores. This result is also in accordance with previous studies. The effectiveness of VLS involved in planning, looking for useful VLS, self-testing, and goal-setting are not clarified in previous studies (Fan, 2003; Mizumoto & Takeuchi, 2008; Wang, 2009). *Selective attention* is not highly correlated with vocabulary size, although it positively predicts overall English ability (Gu & Johnson, 1996).

As a whole, there were no negative predictors, which means using metacognitive VLS does work as an effective way of learning. In this study, the participants were all junior high school students, and thus younger than those in the previous studies. It is suggested that metacognitive capacity develops as students get older and the useful metacognitive strategies vary depending on students' maturity (Schoonen, Hulstijn, & Bossers, 1998). The results of this study suggested, however, that the effectiveness of metacognitive VLS might not be affected by students' maturity, but depended instead on word frequency. Therefore, as the previous studies state, metacognitive VLS should be used in appropriate situations by

considering which levels of words are learned.

Conclusion

The study suggests three pedagogical implications for VLS instruction. First, it would be important to make students pay attention to English vocabulary outside the classroom. In Japan, especially, there are many English-based loanwords in the native language and students encounter numerous English words in daily life. To learn vocabulary through English-based loanwords would be effective because students can directly tie the English word to the concept including the context and community in which the word is used without the intervention of their native language. Some studies show the effectiveness of using English-based loanwords for vocabulary instruction (e.g., Daulton, 2008). Teachers, however, should be careful to note that the English-based loanwords are sometimes slightly different from the originals in meaning or pronunciation (Aizawa & Mochizuki, 2010).

Second, it would be important to help the students gain confidence in guessing word meanings from their affixes. Although several studies suggest that affix knowledge does help students learn vocabulary (Nation, 2001), none of the studies have shown how it should be taught effectively. Referring to the previous studies showing the acquisition order of affix knowledge (Mochizuki & Aizawa, 2000) and affix knowledge test (Sasao & Webb, 2017), it is necessary to develop an effective teaching method to affix knowledge.

Third, it would be useful for students to create vocabulary notebooks with words they are interested in. In Japan, there are many kinds of vocabulary books and teachers give them to students and they take regular vocabulary tests at school. Teachers seldom teach how to create a vocabulary notebook, although several studies suggest that this is an effective strategy for boosting both lexical competence and learner autonomy (Fowle, 2002; Schmitt & Schmitt, 1995). This study has empirically shown that making a notebook is effective for learning vocabulary that is not taught in the school textbook. Therefore, it would be important to integrate how to make a vocabulary notebook into classroom English teaching.

While this study contributes to identifying useful metacognitive VLS for learning one aspect of vocabulary knowledge (i.e., form-meaning links of a word), future research should address other aspects of vocabulary knowledge (e.g., word association). In addition, it is necessary to clarify the relationships between the use of metacognitive VLS and overall English ability assessed through some communicative tasks so that the effectiveness of metacognitive VLS can be better understood.

Note

[1] In the present study, according to Uchida (2007), the independent variables ($F > 2.00$) were entered into the multiple regression models and interpreted as positive or negative predictors.

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Appendix A

Vocabulary Size Test Example

....
1. 丸い入れ物　　　　　　　2. クッションのある長椅子
(1) bath　　　　(2) lamp　　　　(3) phone　　(4) pot　　　(5) sofa　　　(6) stove
....

Appendix B

Vocabulary Learning Strategies Questionnaire

1. I plan my vocabulary learning (e.g., "I will memorize 10 words a day").
2. I plan my schedule so that I have enough time for learning vocabulary.
3. I test myself with word tests.
4. I use spaced word practice.
5. I continue to study word over time.
6. I regularly review the vocabulary I learned to check if I remember it.
7. I make a note of words that seem important to me.
8. I keep a vocabulary book or word list to check the vocabulary anytime I wish.
9. Besides textbooks, I make use of the media (songs, movies, Internet, etc) to learn vocabulary.
10. I try to learn extra vocabulary in addition to what I am taught in class.
11. I try to expose myself to English vocabulary by reading or listening a lot.
12. I try to manage the learning environment so as to expose myself to English vocabulary.
13. I have a sense of which word I can guess and which word I can't.
14. I know what cues I should use in guessing the meaning of a particular word.
15. I use my own methods for remembering, checking, or reviewing vocabulary.
16. I find out how to improve vocabulary learning by reading books on vocabulary learning and asking teachers or my classmates.
17. I use various means to make clear vocabulary items that I am not quite clear of.
18. I look up words that I'm interested in.
19. I know when a new word or phrase is essential for adequate comprehension of a passage.
20. I know which words are important for me to learn.
21. When I meet a new word or phrase, I have a clear sense of whether I need to remember it.
22. I consciously set aside time to study vocabulary in order to prepare for tests (such as TOEIC, TOEFL, or Eiken: English Proficiency Test).
23. I study vocabulary with the intention of using it.

Appendix C

Forward Stepwise Multiple Regression Models

Dependent Variable: the Test Score at 1,000-word Level

Independent Variables	*B*	*SE*	*Beta*	*t*	*p*	Tolerance	VIF
Factor 1	0.336	0.160	0.181	2.101	0.038	1.000	1.000
						R squared = .033	

Dependent Variable: the Test Score at 2,000-word Level

Independent Variables	*B*	*SE*	*Beta*	*t*	*p*	Tolerance	VIF
Factor 1	0.727	0.313	0.196	2.324	0.022	0.998	1.002
Factor 4	0.648	0.345	0.158	1.877	0.063	0.995	1.005
Factor 5	0.639	0.346	0.156	1.849	0.067	0.996	1.004
						R squared = .094	

Dependent Variable: the Test Score at 3,000-word Level

Independent Variables	*B*	*SE*	*Beta*	*t*	*p*	Tolerance	VIF
Factor 1	0.846	0.297	0.241	2.850	0.005	0.998	1.002
Factor 4	0.531	0.327	0.137	1.622	0.107	0.998	1.002
						R squared = .079	

Dependent Variable: the Test Score at 4,000-word Level

Independent Variables	*B*	*SE*	*Beta*	*t*	*p*	Tolerance	VIF
Factor 1	0.587	0.334	0.153	1.760	0.081	1.000	1.000
						R squared = .023	

Dependent Variable: the Test Score at 5,000-word Level

Independent Variables	*B*	*SE*	*Beta*	*t*	*p*	Tolerance	VIF
Factor 5	0.800	0.395	0.173	2.025	0.045	0.997	1.003
Factor 6	0.815	0.406	0.171	2.008	0.047	0.997	1.003
						R squared = .063	