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A Close Look at the Relationship Between Vocabulary Learning Strategies and the TOEIC Scores

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Preface

In spite of the widespread use of the Test of English for International Communication (TOEIC) as a general indication of one's English proficiency in Japan, not much has been revealed as to what contributes to TOEIC scores, especially in terms of individual differences such as those in learning strategies and motivation. The current project was undertaken to clarify the relationships between vocabulary learning strategies and TOEIC scores.

This research report consists of a series of two studies. Both studies are centered around vocabulary learning strategies and TOEIC scores. Study 1 describes the development and validation of a vocabulary learning strategies scale. There were three phases involved in developing and validating the scale. After several validation procedures, it was confirmed that the newly developed 25-item questionnaire could serve to measure six subscales of strategic vocabulary learning: (a) Self-management, (b) Input-seeking, (c) Imagery, (d) Writing Rehearsal, (e) Oral Rehearsal, and (f) Association. A series of statistical analyses demonstrated that the scale has robust psychometric properties as a measure of strategic vocabulary learning behaviors. Although Writing Rehearsal might not function as a sound subscale, the scale as a whole can tap into the learners' overall ability to coordinate vocabulary learning strategies.

Study 2 was undertaken to clarify the relationships between vocabulary learning strategies, motivation, and extracurricular study time in relation to the TOEIC scores. A total of 244 university EFL learners participated in the study where questionnaires asking about (a) vocabulary learning strategies (developed in Study 1) and (b) motivation, were administered. In addition to the quantitative data obtained from the questionnaires, qualitative analyses of study logs and interview sessions were also integrated into the analyses to corroborate the quantitative results. In the correlation analysis, metacognitive strategies, intrinsic motivation, and extracurricular study time showed higher correlations with the TOEIC scores than with other variables. In structural equation modeling (SEM), vocabulary learning strategies as a whole had the greatest influence on TOEIC scores. Subsequent cluster analysis along with qualitative analyses revealed that learners with higher TOEIC scores had clear goals and attended to vocabulary learning strategies in conscious, coordinated, and structured manners. In addition, it was found that learners existed who possessed knowledge of strategies but might not have applied the strategies to their everyday learning situations. Another group of learners without clear objectives who reported less frequent strategy use and low motivation was also identified.

The results of both studies suggest that orchestrating vocabulary learning strategies, with other individual differences such as intrinsic motivation, plays a pivotal role in the TOEIC scores.

1. Introduction

The Test of English for International Communication (TOEIC) has been increasingly employed in Japanese educational settings. For example, as of 2005, a number of universities in Japan (almost 70 percent of 352 universities surveyed) have utilized TOEIC scores (or have planned to do so) as criteria for awarding course credits (TOEIC Steering Committee, 2005). With such an impetus to the TOEIC test, more and more universities are attempting to better prepare their students for the TOEIC test by providing TOEIC preparation courses even within the regular curriculum. After such treatment, some students, despite having initial equivalent proficiency in English, receive high scores, yet others do not in the TOEIC test. The reasons for these discrepancies in achievement have not been fully explained, and consequently, they are commonly attributed to their diligence or test-wiseness. In other words, scientific approaches to revealing the reasons for TOEIC scores have rarely been undertaken.

When discussing the TOEIC scores used in institutions as a way of measurement (e.g., assessing the success of language programs), instructional variances and individual differences should be considered. In terms of instructional variances, Boldt and Ross (1998, 2005) have reported how several variables in teaching - such as training time and course materials - are linked to the outcome, namely, the TOEIC scores in language programs provided at companies. Likewise, Robb and Ercanbrack (1999) investigated the effect of direct test preparation materials on the students' TOEIC scores in a Japanese university setting. From the viewpoint of individual differences, however, few studies have been conducted either in corporate or academic settings.

Numerous studies focusing on individual differences in second/foreign language learning have been carried out (e.g., Dörnyei, 2005; Robinson, 2002; Skehan, 1989;). The list of individual differences includes motivation, learning aptitude, language learning strategies, learning style, personality type, gender, self-efficacy, anxiety, culture or national origin, the language learning environment, career orientation, and age (Cohen & Dörnyei, 2002; Ehrman, Leaver, & Oxford, 2003; Oxford & Nyikos, 1989). Of all these individual differences, because learning strategies involve deliberate and conscious efforts on the part of learners, language learning strategies are the focus of the present study. Thus, it would be of great interest to investigate how learning strategies are related to TOEIC scores, and in fact, a fruitful line of research in the past few decades has investigated the relationship between learning strategies on one hand and learning outcomes on the other (for a review, see Takeuchi, Griffiths, & Coyle, 2007).

Studies on learning strategies date back some three decades and have since flourished as one of the most productive areas in the SLA research (see Cohen, 1998; Cohen & Macaro, 2007; Dörnyei, 2005; McDonough, 1995; O'Malley & Chamot, 1990; Oxford, 1990, for a comprehensive review). As learning strategy research has bore the fruit of practical findings and insightful pedagogical implications, it has come to light that the term "language learning strategies" encompasses very large and rather ambiguous concepts in language learning. In fact, this is the main reason it has been under criticism (Dörnyei, 2005). Tseng, Dörnyei, and Schmitt

(2006) have even suggested that research on language learning strategies should focus only on one particular domain of language learning. Following this suggestion, we chose vocabulary learning strategies in this report. This is because, without doubt, vocabulary learning is one of the major difficulties learners face in acquiring another language. Especially in Japan, an input-poor EFL environment, vocabulary learning tends to be discrete (i.e., not integrated into discourse) in the same way as in other Asian EFL settings (e.g., Gu, 2003a), where once students step out of the classroom, they simply do not need to speak or listen to English. The importance of vocabulary learning strategies in Japan is fully reflected in a study by Takeuchi (2003b), which describes successful EFL learners in Japan. In Takeuchi's study, vocabulary learning strategies emerged among a repertoire of strategies for the four skills, namely, listening, reading, writing, and speaking.

Schmitt (1997) argues that vocabulary learning strategies cover the widest range of categories of all learning strategies proposed and researched thus far. As such, a wealth of research on vocabulary learning strategies has investigated the vocabulary learning strategies learners use and their relationship to success or their relationship to other variables (Ahmed, 1989; Fan, 2003; Gu & Johnson, 1996; Kojic-Sabo & Lightbown, 1999; Lawson & Hogben, 1996; Sanaoui, 1995; Schmitt, 1997). As for variables affecting the use of vocabulary learning strategies, in addition to proficiency levels (e.g., Gu & Johnson, 1996; Maeda, Tagashira, & Miura, 2003), it has been found that learning environments (Nakamura, 2002), motivation (Horino & Ichikawa, 1997), gender differences (Catalán, 2003; Gu, 2002), academic majors or career orientation (Gu, 2002), and task (Gu, 2003b) have an influence on vocabulary learning strategies. The findings from these studies suggest that: (a) successful learners employ a variety of vocabulary learning strategies in structured and coordinated ways, (b) vocabulary learning strategy use varies depending on the learner's proficiency, and (c) the language environment in which individual learners approach a task affects the vocabulary learning strategy use. While these findings present us with a better picture of how learners use different types of vocabulary learning strategies, they have never been applied to studies using the TOEIC scores. Therefore, the current study will attempt to develop a model of the relationship between the vocabulary learning strategies and the TOEIC scores.

In language learning strategy literature, the most often used questionnaire has been *Strategy Inventory for Language Learning* (SILL; Oxford, 1990). SILL (the EFL/ESL version) consists of 50 items measuring six subscales (memory strategies, cognitive strategies, compensation strategies, metacognitive strategies, affective strategies, and social strategies). By averaging the scores for each subscale, the learner's profile of learning strategy can be obtained. Although SILL has been used all over the world (reportedly with over 10,000 students in the middle of the 1990's; Grenfell & Macaro, 2007), the validity of SILL has come under criticism. For example, Dörnyei and his colleagues (Dörnyei, 2005; Tseng, Dörnyei, & Schmitt, 2006) have argued that using a questionnaire asking "specific strategic behaviors and the scale descriptors indicating frequencies of strategy use" is not psychometrically justifiable. They argue that this is because "we cannot assume a linear relationship between the individual item scores and the total scale

scores” (Tseng et al., 2006, p. 83). Thus, they took SILL as an example of a “flawed” assessment instrument of learning strategy. In addition, a study investigating construct validity of SILL with confirmatory factor analysis by Hsiao and Oxford (2002) showed an unsatisfactory model fit to the data, indicating the hypothesized model of SILL does not possess construct validity.

Tseng et al. Dörnyei, and Schmitt (2006) claim that “(t)he same problems also hold true in the more specific area of vocabulary learning strategies (VLS)” (p. 84). Referring to the studies by Schmitt (1997), Gu and Johnson (1996), and Stoffer (1995), they argue taxonomies and subscales used in these studies still have similar validity problems as SILL. In fact, they believe, it is the most important concern of these questionnaires - none of these earlier instruments had been subjected to rigid validation procedures.

In Japan, Horino and Ichikawa (1997) compiled a questionnaire of VLS used by Japanese high school students. With factor analysis, they distinguished organization, imaging, and repetition strategies, and since then several studies have been conducted utilizing this questionnaire, and its validity has been established (e.g., Maeda, Tagashira, & Miura, 2003). However, this questionnaire only covers the cognitive aspect of VLS, and metacognitive strategies, which involve planning, monitoring, and evaluation of one’s learning (O’Malley & Chamot, 1990), are not included. Considering the importance of metacognitive strategies in vocabulary learning (as reviewed in Rasekh & Ranjbar, 2003), we are still in need of a questionnaire covering metacognitive strategies as well.

It is true that “the area of VLS is still in need of an instrument which is truly psychometrically valid” (Tseng et al., 2006, p. 85). We therefore developed and validated a scale of strategic vocabulary learning, which possesses psychometrically sound construct in Study 1.

2. Study 1

In Study 1, a psychometrically valid questionnaire (scale) on strategic vocabulary learning was developed for Japanese EFL learners, university students in particular. There were three phases involved in developing and validating the scale. First, items were pooled from the relevant literature on vocabulary learning strategies and ideas from target learners. Second, an initial field test was conducted with 410 university learners. Subsequent item analyses retained 25 items. Third, the reliability and validity of the final version of the instrument were examined thoroughly with a different sample of learners ($N = 283$). In addition, validity of the new instrument was further examined in relation to the TOEIC scores and (a) the subscales and (b) the overall strategic vocabulary learning capacity.

2.1 Method

2.1.1 Development of the Item Pool: First Phase

A list of strategic vocabulary learning behaviors was developed following the procedures detailed below. Following the guidelines suggested by Dörnyei (2003), first, an inventory of VLS was compiled from a literature review (especially, Fan, 2003; Gu & Johnson, 1996; Horino

& Ichikawa, 1997; Schmitt, 1997). Next, in order to gather qualitative and exploratory data from the target informants, a total of 122 Japanese EFL university students at a private university in western Japan (humanities majors, all females, aged 18-21) were asked in an open-ended manner to list the strategies they use. At the time of the survey, an inventory listing VLS extracted from the literature review was also provided as a reference. This is because students sometimes feel difficulty in describing the strategies they use because they might use them without much awareness. At the same time, a specific vocabulary learning task was given since it is reported that learners respond in different ways depending on whether or not the task is clearly presented (Ikeda & Takeuchi, 2000; Oxford, Cho, Leung, & Kim, 2004). The vocabulary learning task was to learn vocabulary both in context and a word list. The participants were asked what kind of strategies they use in order to memorize the words provided in the task within one week (until the next lesson). A simple background survey confirmed that (a) none of the students had experience studying abroad more than 10 months, and (b) they started studying English in junior high school in the same way as ordinary Japanese EFL learners did.

After revising the item pool by adding strategies reported by the learners, wording of the items was examined and modified where necessary by two university associate professors and a high school teacher, all of whom have an MA in TESOL. According to Dörnyei (2005, p. 164), the most fundamental problem in the learning strategy literature is its inability to distinguish “ordinary learning activity” and “strategic learning activity.” Thus, we defined strategic vocabulary learning in this study as follows:

Learners’ *intentional* vocabulary learning behaviors while they are in the process of memorizing new vocabulary (cognitive strategies) and coordinating their strategic behaviors (metacognitive strategies).

Following this definition, among the 89 strategies listed altogether, 47 strategies pertaining to either cognitive or metacognitive strategies defined by Dörnyei (2005, p. 169) were consequently chosen through the cooperation of the three EFL instructors. It should be noted that social strategies and affective strategies were rarely reported by the informants; therefore, they were excluded from the list. In addition, strategies included in previous studies (e.g., Ahmed, 1989; Gu & Johnson, 1996; Kojic-Sabo & Lightbown, 1999) such as inference from context, dictionary use, and note-taking strategies were not included. Whereas we believe these strategies are important for vocabulary learning, including different constructs in one questionnaire would result in too many constructs and items to be measured at one time. That, in turn, may produce a “fatigue effect” (Dörnyei, 2003, p.14) on the side of respondents. Moreover, those without intentions to learn vocabulary are also likely to infer from context, use dictionaries to look up vocabulary, and take notes without much awareness toward learning. For example, Folse (2004) gives concrete examples that guessing from context does not necessarily guarantee learning in terms of vocabulary acquisition. Thus, we excluded these strategies, which have some elements of “unintentional” or “ordinary” learning behaviors.

2.1.2 Piloting the Instrument: Second Phase

The new vocabulary questionnaire with 47 items was field tested with 410 university EFL learners at four universities in western Japan. The participants at these four institutions majored in humanities and engineering (137 males and 273 females, aged 18-22). Although in the pilot study proficiency measures were not available for the learners, the authors confirmed, based on observations and in-house examinations, that these participants seemed to have about the same proficiency level as the pilot sample. In the survey, the participants were given a vocabulary learning task immediately before filling out the questionnaire. On a 5-point scale—with 1 indicating 0%, or not at all true of me, and 5 being 100%, or very true of me—they were asked to indicate how they usually deal with vocabulary learning.

The participants' English proficiency was investigated via a background questionnaire that asked for their TOEIC scores only from those who had taken TOEIC before ($n = 384$, $M = 373.72$, $SD = 102.69$). It should be noted here that the TOEIC scores reported were self-reported; thus, the potential problems with this approach have to be taken into account. The TOEIC Steering Committee (2006) reports the mean scores of TOEIC for university humanities majors are 474 and engineering 397. Therefore, it was assumed that the participants in this study were at the false-beginner/average level of Japanese EFL university learners.

After the administration of the questionnaire, item analyses were carried out based on the following criteria: (a) checking the descriptive statistics to eliminate items with a floor or ceiling effect (the mean \pm the standard deviation); (b) examining the item-total correlations to determine whether the figures were over 0.3 (Wintergerst, DeCapua, & Itzen, 2001, p. 391); (c) using exploratory factor analysis to investigate which items belong together (i.e., construct validity); (d) scrutinizing Cronbach's alphas to verify the internal consistency of the subscales; and (e) employing Rasch analysis to see if all the items in the developed scale measure a single underlying construct, which is "strategic vocabulary learning" in the current study.

SPSS 14.0 was used for both exploratory factor analysis and calculation of the internal consistency. In exploratory factor analysis, principal axis factoring extraction with promax rotation was performed. As for deciding the number of factors, first by looking at the scree plot, a distinctive slope between any of the two factors and factors with the eigenvalues greater than 1.0 was checked. Then, items showing factor loadings above 0.4 on only one factor were adopted.

The advantage of utilizing the Rasch model is that it presupposes the instrument's unidimensionality along a latent trait. This means that if some items in the questionnaire are tapping a different construct from the other items, or responses of some learners are inconsistent for some reason (e.g., respond haphazardly, misinterpret the wording, or skip some items), they can be detected. Those items detected are called misfit items, which show a departure from the meaningful psychometrical property of the construct. Based on these theoretical grounds, the obtained data were analyzed with the Rasch Rating Scale model (Andrich, 1978) using WINSTEPS 3.63.0 (Linacre & Wright, 2000). Furthermore, the Rasch model can place each item according to its difficulty in a single measure scale by changing ordinal scales (i.e., raw

scores in a questionnaire) into interval scales. That is, with interval scales, we can confirm that a certain item in a questionnaire is more difficult than others (and how much more) for the respondents to endorse.

After going through these screening processes, strategies Japanese EFL learners rarely employ, such as “I draw a picture to remember the word,” and “I use a gesture to remember the word,” were deleted from the questionnaire. Also, reportedly overused strategies such as visual repetition did not make the list. This is because strategies many learners use too often may no longer constitute “strategic learning” and thus they do not reflect the element of choice (Cohen, 1998). These analysis procedures resulted in the final version of the questionnaire having 25 items (see Appendix A to refer to each item).

2.1.3 Administering the Final Instrument: Third Phase

In order to further investigate the reliability and validity of the newly developed instrument, the 25-item questionnaire was once again administered to a new group of 283 Japanese EFL students (126 males and 157 females, humanities and engineering majors, aged 18-22) at two private universities. In checking the biographical data of the participants, the same criteria in the first and second phases of the questionnaire development were applied. The participants’ proficiency levels—measured by reported TOEIC scores ($N = 283$, $M = 364.15$, $SD = 97.99$)—were confirmed as being close to those of the learners in the second phase.

Cronbach Alpha coefficients of six subscales in the final version of VLS questionnaire were computed in the same way as the second phase. In order to explore the construct validity of the final instrument, the questionnaire was submitted to confirmatory factor analysis (CFA). With confirmatory factor analysis, we can test the hypothesized factor structure obtained in exploratory factor analysis. In other words, one of the biggest advantages of confirmatory factor analysis, according to Hair, Black, Babin, Anderson, and Tatham (2006), is “its ability to assess the construct validity of a proposed measurement theory” (p. 776). As such, confirmatory factor analysis is often used in validation of a research instrument. In confirmatory factor analysis, we tested the two models: (a) a six-factor model consisting of interrelated factors (First-order CFA model) and (b) first-order factors explained by a single overarching factor of “strategic vocabulary learning” (Second-order CFA model). The differences of these two models are described in detail in Byrne (2001).

Bachman and Palmer (1996) argue that “construct validation is an on-going process.” As part of validation process, correlations with TOEIC scores were examined because previous research on VLS has reported that there is a relationship between the use of VLS and proficiency measured by paper-and-pencil tests (e.g., Gu & Johnson, 1996; Kojic-Sabo & Lighbown, 1999; Maeda et al., 2003). The current study also investigated their relationship with simple correlation analysis looking into correlations between VLS and proficiency measures, namely TOEIC scores.

The TOEIC consists of the listening section (100 items) and the reading section (100 items). The full score for each section is 495, making 990 the total full score. According to Educational

Testing Service (2006), the test developer, “TOEIC has been used to measure the English proficiency of non-native English-speaking people.” Thus, the TOEIC scores were used in this study to indicate the participants’ English proficiency.

In addition, the effect of VLS as a whole on proficiency measures was examined using structural equation modeling (SEM). The rationale behind this particular analysis is that in language learning strategies, it is often reported that using not only one strategy but also several strategies in an orchestrated fashion is important (e.g., Oxford, 1990; Vandergrift, 2003). If the coordinated use of strategies is of our interest, we will have to look into how the overall latent trait, strategic vocabulary learning, contributes to proficiency, and not a one-to-one simple correlation. In such an analysis, structural equation modeling can be a powerful tool because it can deal with latent variables in the model. Structural equation modeling including confirmatory factor analysis was conducted using Amos 5.0.

3. Results and Discussion

3.1 Item Analyses of the Instrument: Second Phase

Table 1 summarizes the results of exploratory factor analysis, factor names, and the Cronbach Alpha coefficients for the final set of items (the descriptive statistics of each item is listed in Table 2). Overall, six distinct factors accounting for 61.37% of the variance explained were gleaned from exploratory factor analysis, and their underlying factor structure was supported by moderately high reliability coefficients. Each factor was named after empirical research findings proven in the literature of VLS, especially referring to those by Fan (2003), Gu and Johnson (1996), Horino and Ichikawa (1997), and Schmitt (1997). The comparison of the subscales in the current study with those of past research is summarized in Table 3. The comparison table shows that the new instrument covers the constructs of interest it was intended to measure. By computing the mean scores of each item, scale scores were formulated.

Next, by making use of the advantages of the Rasch model (i.e., detecting unidimensionality in the mixed constructs), the existence of misfit items was checked. The absence of such items is proof that the instrument possesses a meaningful psychometrical property. Presented in Table 2 are the results of the Rasch analysis ($N = 410$). According to McNamara (1996, p. 173), a conventional rule of thumb for checking acceptable items is the infit mean square ranging from 0.75 to 1.3. He also notes that “(M)ore accurately, for n sizes of 30 or more, the range is the mean \pm twice the standard deviation of the mean square statistics” (p.181). Based on this criterion, acceptable infit mean square for the sample of learners in this study was calculated (0.65-1.38). As figures of the infit mean square in Table 2 indicate, no item in the VLS questionnaire was a misfit, and the obtained data conformed to the Rasch model.

The main principle of the Rasch model is that “each item and person is located along the logit scale according to its estimated value: More positive (higher) persons are more able, and more positive (higher) items are more difficult” (Bond & Fox, 2001, p.34). As such, with Rasch analysis, it is possible to diagnose that a learner with the person estimate of -0.5 in Table 2 is highly unlikely to choose “very true of me” in item 5 (Self-management) in the questionnaire

because their strategic vocabulary learning ability is lower than the item difficulty estimate (0.79). In this way, Rasch analysis can give some feedback on the learners' current ability to use specific vocabulary learning strategies and on the types of strategies they have not mastered yet.

In Table 2, metacognitive strategies (Self-management and Input-seeking) tend to have a higher item difficulty estimate than cognitive strategies (Imagery, Association, Oral Rehearsal, and Writing Rehearsal). As the literature of the learning strategies emphasizes, the result proves that "metacognitive strategies are higher order executive skills" (O'Malley & Chamot, 1990, p. 44), and they require much more effort on the learners' side.

Table 1 *Results of Exploratory Factor Analysis (N = 410)*

Item	Factor name	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	α	
Item 1	Factor 1 Self-management	.72	-.07	.05	.00	-.04	.04	.83	
Item 2		.70	-.26	.01	-.05	.08	.02		
Item 3		.69	-.05	.05	-.03	.00	-.03		
Item 4		.64	.19	-.06	.02	-.01	.02		
Item 5		.57	.13	-.01	-.01	.00	.01		
Item 6		.55	.32	-.10	.02	-.05	-.05		
Item 7		.54	.03	.08	.11	.03	-.03		
Item 8	Factor 2 Input-seeking	.03	.81	-.07	.02	.03	.00	.82	
Item 9		-.02	.79	.02	-.08	.02	-.02		
Item 10		-.11	.69	.06	.04	.00	.02		
Item 11		.05	.62	.07	-.02	.02	.00		
Item 12	Factor 3 Imagery	-.06	.01	.80	-.02	.01	-.08	.73	
Item 13		.04	.11	.61	-.02	-.08	.00		
Item 14		.03	-.03	.57	.09	.09	-.04		
Item 15		.15	-.15	.49	-.08	.03	.06		
Item 16		-.05	.16	.45	.03	-.06	.12		
Item 17	Factor 4 Writing Rehearsal	-.01	-.04	-.01	.86	.04	-.05	.78	
Item 18		.02	-.01	-.01	.75	-.06	.00		
Item 19		-.01	.01	.02	.63	.00	.09		
Item 20	Factor 5 Oral Rehearsal	.02	-.04	.01	.03	.92	-.07	.79	
Item 21		-.07	.17	.03	.00	.66	.02		
Item 22		.08	-.01	-.04	-.06	.62	.10		
Item 23	Factor 6 Association	-.04	-.02	-.06	.02	.04	.83	.79	
Item 24		-.03	.06	.01	-.01	.03	.77		
Item 25		.12	-.05	.07	.01	-.06	.61		
Interfactor correlation matrix		Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	<i>M</i>	<i>SD</i>
1. Self-management		—						2.37	0.82
2. Input-seeking		.48	—					2.51	1.01
3. Imagery		.32	.30	—				2.81	0.84
4. Writing Rehearsal		.24	.17	.11	—			3.84	0.96
5. Oral Rehearsal		.31	.38	.29	.21	—		2.88	1.06
6. Association		.51	.36	.33	.16	.23	—	2.56	0.87

Table 2 *Results of Rasch Analysis in the Order of Difficulty Estimate (N = 410)*

Item No.	Category	Difficulty Estimate (in logits)	Infit Mean Square	<i>M</i>	<i>SD</i>
Item 5	Self-management	0.79	0.80	1.96	0.96
Item 3	Self-management	0.56	1.25	2.16	1.19
Item 2	Self-management	0.48	1.17	2.23	1.24
Item 11	Input-seeking	0.41	0.92	2.30	1.14
Item 8	Input-seeking	0.33	0.96	2.37	1.22
Item 13	Imagery	0.33	1.14	2.38	1.21
Item 9	Input-seeking	0.32	1.17	2.38	1.29
Item 1	Self-management	0.28	0.83	2.43	1.13
Item 22	Oral Rehearsal	0.26	1.07	2.45	1.20
Item 24	Association	0.25	0.66	2.46	0.99
Item 6	Self-management	0.20	0.86	2.51	1.16
Item 25	Association	0.20	0.79	2.51	1.04
Item 4	Self-management	0.18	0.74	2.53	1.14
Item 23	Association	0.01	0.77	2.71	1.06
Item 15	Imagery	0.00	1.17	2.73	1.22
Item 7	Self-management	-0.04	0.93	2.77	1.25
Item 16	Imagery	-0.04	1.14	2.77	1.28
Item 21	Oral Rehearsal	-0.18	1.11	2.93	1.31
Item 10	Input-seeking	-0.23	1.17	2.99	1.35
Item 14	Imagery	-0.28	0.97	3.05	1.17
Item 12	Imagery	-0.34	0.96	3.11	1.14
Item 20	Oral Rehearsal	-0.47	1.05	3.27	1.26
Item 18	Writing Rehearsal	-0.92	1.30	3.75	1.21
Item 17	Writing Rehearsal	-1.03	1.31	3.86	1.19
Item 19	Writing Rehearsal	-1.09	1.04	3.92	1.05

Note. Refer to Appendix A for each item.

In examining the item difficulty estimate, it has become clear that even within the same subscale, the item difficulties among all items are different from one another. For example, items in the subscale of Input-seeking relatively rank higher in Table 2; however, Item 10 ranks much lower than other Input-seeking items. This means that Item 10, “I try to make use of the media (TV, radio, Internet, mobile phone, or movies) to learn vocabulary,” is much easier to endorse. In contrast, in the Imagery subscale, Item 13 “When I try to remember vocabulary, I link my personal experiences to it” is much harder than other Imagery items for the respondents to use.

Table 3

Comparison of the Subscales/categories of the New Questionnaire with Those of Past Studies

Subscale/category of this study	Gu & Johnson (1996)	Schmitt (1997)	Horino & Ichikawa (1997)	Fan (2003)
Self-management	•Metacognitive Regulation: Self-initiation	•Metacognitive	N/A	•Management
Input-seeking	•Activation	•Metacognitive	N/A	•Sources
Imagery	•Memory: Encoding	•Memory	•Imagery	•Association
Association	•Memory: Encoding	•Memory	•Organization	•Association •Grouping
Writing Rehearsal	•Memory: Rehearsal	•Cognitive	•Repetition	•Repetition
Oral Rehearsal	•Memory: Rehearsal	•Cognitive	•Repetition	•Repetition
N/A	•Beliefs •Metacognitive Regulation: Selective attention •Guessing •Dictionary •Note-taking	•Determination •Social	N/A	•Guessing •Dictionary •Analysis •Known Words

Note. N/A indicates that the subscale/category is not applicable.

3.2 Validity of the Instrument: Third Phase

3.2.1 Confirmatory Factor Analysis (CFA)

Table 4 presents the Cronbach Alpha coefficients of the six subscales administered to another sample of 283 students in the third phase. The internal consistency reliability of the six subscales was satisfactorily high.

Table 4 *Descriptive Statistics of the Final Administration (N = 283)*

Subscale	No. of Items	<i>M</i>	<i>SD</i>	Skewness	Kurtosis	α
Self-management	7	2.36	0.81	0.38	-0.40	.84
Input-seeking	4	2.54	1.01	0.38	-0.59	.83
Imagery	5	2.87	0.87	0.23	-0.39	.78
Writing Rehearsal	3	3.79	0.95	-0.42	-0.61	.79
Oral Rehearsal	3	2.87	0.99	-0.26	-0.67	.78
Association	3	2.61	0.88	0.37	-0.14	.84

Figure 1 shows the results of two hypothesized models tested in confirmatory factor analysis, and Table 5 lists goodness-of-fit statistics for them. It is suggested that several goodness-of-fit statistics be reported to assess the adequacy of model fit (Byrne, 2001). We therefore have reported several standard indexes and their respective acceptable fit criteria in Table 5. The first-order CFA (a six-factor model consisting of interrelated factors) and second-order CFA (first-order factors explained by a single overarching factor of “strategic vocabulary learning”) showed good fit indexes, indicating that the hypothesized model can be reproduced with new observed data and be judged as valid.

As can be seen in the second-order CFA in Figure 1, however, the factor loading from the higher factor “strategic vocabulary learning” to Writing Rehearsal is unexpectedly low (.28). This means that using writing rehearsal strategies is not strongly related to strategic vocabulary learning. For example, those learners with less ability to employ strategic vocabulary learning use writing rehearsal more often than those with more strategic ability do. As a result, it is not reflected in the overall strategic vocabulary learning. At the same time, since all path coefficients are significant ($p < .001$), there is a possibility that even those with higher strategic vocabulary learning competence may use writing rehearsal in the same way as less competent ones do. Therefore, we deleted Writing Rehearsal from the second-order CFA model and reanalyzed it. The result in Table 5 suggests that it yields better fit to the data because lower AIC indicates a better model among several competing models. Nevertheless, other goodness-of-fit statistics did not show much improvement. In addition, this type of trial-and-error approach to finding a model with a better fit is known as “specification search,” and it is not recommended (Hair, et al., 2006, p. 797). Accordingly, we decided to retain Writing Rehearsal in the model.

Overall, these confirmatory factor analyses suggest that the scale formed by 25 items in the questionnaire does provide a reasonable basis for measurement of a latent trait, namely, “strategic vocabulary learning.”

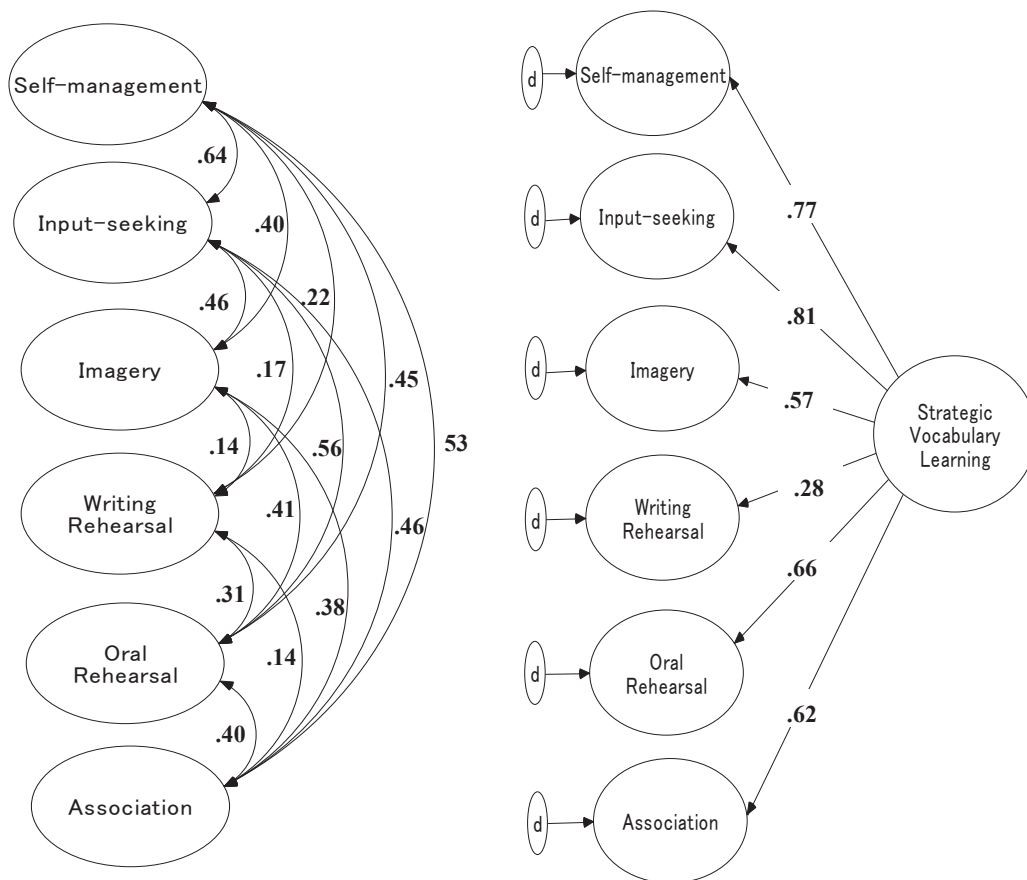


Figure 1. First- and second-order confirmatory factor analysis.
Observed variables are not shown for simplicity.

Table 5 Goodness-of-fit Statistics for the First- and Second-order CFA

	χ^2/df	GFI	AGFI	CFI	TLI	IFI	NFI	RMSEA	AIC
acceptable fit	< 3	>.9	>.9	>.95	>.9	>.9	>.9	<.08	—
First-order model	1.76	.89	.86	.93	.92	.93	.85	.05	587.55
Second-order model 1	1.76	.88	.86	.93	.92	.93	.84	.05	584.76
Second-order model 2(without Writing Rehearsal)	1.81	.90	.87	.93	.92	.93	.86	.05	467.14

Note. GFI = Goodness of fit index, AGFI = Adjusted goodness of fit index, CFI = Comparative fit index, TLI = Tucker-Lewis index, IFI = Incremental fit index, NFI = Normed fit index, RMSEA = Root mean square error of approximation, AIC = Akaike information criterion

3.2.2 Relationship with the TOEIC Scores

Table 6 shows the correlations among subscales in the VLS questionnaire and the total score of TOEIC. Relatively low but statistically significant correlations were observed in the combination of VLS and scores of proficiency measures ($N = 283$). Dörnyei (2001) claims that “in L2 motivation studies, the usual strength of the meaningful relationships detected is between 0.30 and 0.50” (p. 224); therefore, in this type of study which utilizes questionnaires, the correlation coefficients close to these figures can be considered worth paying attention to.

What is clear from Table 6 is that only Input-seeking shows a reasonably high correlation coefficient ($r = .39$), while the other strategies demonstrate low correlation coefficients. Items included in the Input-seeking strategies (e.g., “I try to read and listen to English as much as possible in order to expose myself to English vocabulary”) seem more or less related to overall language proficiency, which can explain why they are more correlated with general proficiency measures. Other VLS subscales, Self-management, Oral Rehearsal, and Association, exhibited relatively low correlations, and Writing Rehearsal was uncorrelated. These results correspond to past studies. For example, investigating vocabulary learning strategies and a proficiency measure (CET Band 2), Gu and Johnson (1996) reported the same patterns as the current study did. Also, Pintrich, Smith, Garcia, and McKeachie (1993), using the Motivated Strategies for Learning Questionnaire (MSLQ), found that in general learning strategy scales, Metacognitive Self-Regulation showed the highest correlation ($r = .30$) with the final course grade, and lower figures with other strategies: Rehearsal ($r = .05$), Elaboration ($r = .22$), and Organization ($r = .17$). Since the correlations obtained in the current study are in the expected directions and consistent with these studies, the strategic vocabulary learning scale consisting of six subscales can be judged as a valid measure for assessing strategic vocabulary learning behaviors.

Table 6 *Correlations with TOEIC (N = 283)*

Subscale	r with TOEIC
Self-management	.18**
Input-seeking	.39**
Imagery	.11
Writing Rehearsal	-.04
Oral Rehearsal	.17**
Association	.13*

* $p < .05$, ** $p < .01$

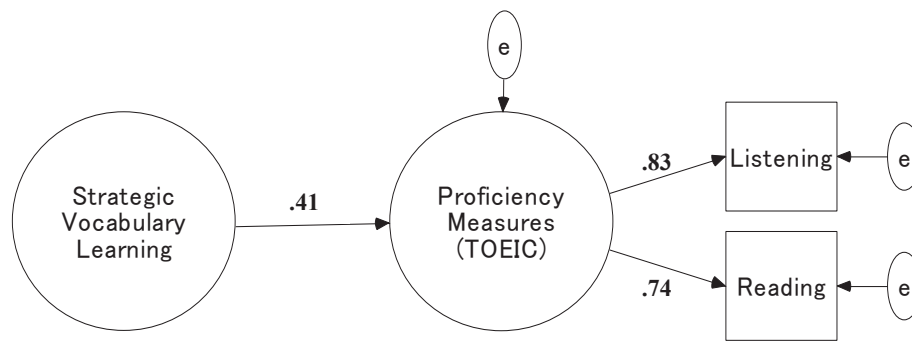


Figure 2. Effect of strategic vocabulary learning on proficiency measures. Subscales of the VLS are not shown for simplicity. All paths are significant ($p < .001$).

Next, the effect of VLSs as a whole, namely, the overall latent trait—strategic vocabulary learning, on proficiency measures (TOEIC) was examined using structural equation modeling (SEM). For proficiency measures, listening and reading scores of TOEIC were entered into the model. Figure 2 illustrates the hypothesized model of the relationship between VLS as a whole and proficiency measures. The goodness-of-fit indexes show that the model fit the data satisfactorily ($\chi^2/df = 1.78$, GFI = .87, AGFI = .84, CFI = .92, RMSEA = .05).

Standardized path coefficient from strategic vocabulary learning to TOEIC is .41 ($p < .001$), meaning VLS statistically affect proficiency measured by TOEIC. Considering that prior correlation studies using SILL (Oxford, 1990) reported explained variation of proficiency tests, 60% reported in Takeuchi (1993), and 45% in Dreyer and Oxford (1996), this figure is high because it is a relationship between VLS and proficiency only. This implies that VLS may play some role in learning and it is a major player in overall proficiency for the average proficiency level of learners in the current study.

The result of SEM suggests that the strategic vocabulary learning scale developed in the current study has more predictive power of proficiency measures than only one strategy (subscale). The combination of strategies, therefore, can be considered crucial in strategic vocabulary learning and developing the learners' proficiency.

4. Summary of Study 1

Study 1 was conducted to develop and validate a strategic vocabulary learning scale for Japanese university EFL learners with average proficiency level. With three development and validation phases, it was found that the newly developed 25-item questionnaire could serve to measure six subscales of strategic vocabulary learning: (a) Self-management, (b) Input-seeking, (c) Imagery, (d) Writing Rehearsal, (e) Oral Rehearsal, and (f) Association. A series of elaborate

statistical analyses demonstrated that the scale has robust psychometric properties, especially reliability and validity, as a measure of strategic vocabulary learning behaviors. Although Writing Rehearsal might have an extraneous structure, the scale as a whole can tap into the learners' overall ability to coordinate vocabulary learning strategies.

The current study explored a one-to-one correspondence of strategies and proficiency measures as part of validation process, but, because the use of VLSs is affected by a number of factors (Gu, 2003b), exploring the effects of other variables, especially individual differences, on the VLSs will be necessary in Study 2. In addition, since a self-report instrument provides only one source of information about the learners' actual use of strategies, incorporating qualitative methodology such as triangulation research procedures (Takeuchi, 2003a) will be useful in unveiling the complex structure of learning strategies. Study 2 was thus carried out against these backgrounds.

5. Study 2

Study 2 addresses the interrelations of TOEIC scores, vocabulary learning strategies, and other related variables. Of the variables, which may affect the choice and use of vocabulary learning strategies, motivation and extracurricular time were chosen in the current study. This is because other variables, for example, learning environments, gender differences, academic majors, age, and nationality, can be controlled in the research design. As for motivation, Oxford and Nyikos (1989) reported that motivation was the strongest influence on the choice of learning strategies. Cohen and Dörnyei (2002) refer to motivation as follows: "Motivation is often seen as the key learner variable because without it, nothing much happens. Indeed, most other learner variables presuppose the existence of at least some degree of motivation" (p. 178). From this perspective, motivation can be regarded as the variable which should be investigated along with vocabulary learning strategies. At the same time, extracurricular time was also included as a variable because study time outside the classes should vary from person to person, and longer extracurricular study time can be regarded as a characteristic of successful learners (Kojic-Sabo & Lightbown, 1999).

6. Method

6.1 Participants

Approximately 300 students participated in the study at two private universities in western Japan. One institution was an all female university, and the other was an all male university. The participants were those who took a four-month (one semester) TOEIC preparation course provided in their school curriculum. These two institutions were chosen because, in the learning strategies literature, it is reported that gender has a strong influence on strategy use (e.g., Oxford & Nyikos, 1989). Hence, it was considered desirable to make the proportion of males and female almost equal. The age of the participants ranged from 18 (first year) to 22 (fourth year). Through a background questionnaire, learners who began learning English much earlier than others and who have lived overseas more than 10 months were excluded from the sample group.

6.2 Instruments and Data Collection Procedures

6.2.1 TOEIC IP Test

The participants were required to take the TOEIC Institutional Program (TOEIC IP) within one month of finishing the course and to report their scores. Since some of the participants failed to take the test or respond to the questionnaires described in the following section, listwise deletion left 244 participants (females, $n = 118$, humanities majors; males, $n = 126$, engineering majors). Table 6 shows the results of the TOEIC IP test. As can be seen in Table 7, The participants in the current study were false-beginner level learners ($M = 349.02$, $SD = 89.48$).

Table 7 *Results of the TOEIC IP Test (N = 244)*

	<i>M</i>	<i>SD</i>
TOEIC IP Total	349.02	89.48
TOEIC IP Listening	206.70	53.42
TOEIC IP Reading	142.32	45.79

6.2.2 Questionnaires

The vocabulary learning strategies questionnaire developed in Study 1 was administered to the participants at the end of a four-month course. As a measure of motivation, nine items from the questionnaire developed by Noels, Pelletier, Clément, and Vallerand (2000) were used.¹ Subscale scores were calculated by averaging the scores of the items in the same subscale (category). Table 8 summarizes the descriptive statistics and Cronbach's alpha coefficients (See Appendix A and B for each questionnaire item). Reliability for all the subscales was relatively high. Since the decisions about factor models were made a priori, the construct validity of the questionnaires was investigated with confirmatory factor analysis (Tabachnick & Fidell, 2006). As a result, the model of vocabulary learning strategies showed a good fit to the data ($\chi^2/df = 1.62$, GFI = .88, AGFI = .85, CFI = .94, RMSEA = .05). The model for motivation was within the acceptable range ($\chi^2/df = 3.44$, GFI = .93, AGFI = .87, CFI = .94, RMSEA = .09). All the analyses in this study were conducted with SPSS 14.0 and AMOS 5.0.

Table 8 *Descriptive Statistics of the Subscales in the Two Questionnaires (N = 244)*

Questionnaire (Scale)	Subscales	No. of Items	<i>M</i>	<i>SD</i>	α
Vocabulary Learning Strategies	Self-management	7	2.36	0.87	.85
	Input-seeking	4	2.23	0.95	.81
	Imagery	5	2.80	0.87	.76
	Writing Rehearsal	3	3.80	1.02	.86
	Oral Rehearsal	3	2.69	1.07	.82
	Association	3	2.55	0.90	.83
Motivation	Extrinsic Motivation	3	3.96	0.77	.73
	Intrinsic Motivation	6	3.15	0.86	.88

6.2.3 Study Logs and Interview Sessions

As Nation (2001) shrewdly points out, self-report questionnaire data do not always show what learners actually do and how well they use the strategies. Hence, qualitative analysis was included to forestall these limitations. Throughout the duration of the course, the participants were asked to keep study logs, which were later used to validate the results from the quantitative analysis. At the beginning of the course, the participants were explicitly taught how to write the log. They were specifically directed to record their everyday study time for learning English and the way they had studied (e.g., what kind of strategies or materials they had used).

In addition, follow-up semi-structured interview sessions were held to determine what participants actually did outside the classroom during the course period. A total of 33 individuals were randomly chosen from the participants, and they were interviewed at the end of the course. The participation of the interview sessions was on a completely voluntarily basis. Since the interview sessions took place outside the regular class time, the participants were presented a bookstore gift certificate (valued at ¥1,000). Two or three students were present at a time, and because the interview was carried out in a semi-structured manner, sometimes the participants were able to exchange ideas about how they felt about the questions. It was therefore possible for the interviewer to ask further questions through spontaneous exchange of ideas between the learners. This is why the interview sessions were held by interviewing two or three students at the same time, rather than interviewing them individually. The interview was conducted entirely in Japanese and each session lasted approximately 60 minutes (about 30 minutes for each individual). The questionnaires and the study logs submitted by the informants were provided at each interview session in order to help them recall what they had actually done during the course.

7. Results and Discussion

7.1 Analysis of Correlation Coefficients

Literature has repeatedly reported that there are positive correlations between the learning strategies and achievements measured with paper-and-pencil tests (e.g., Dreyer & Oxford, 1996; Gu & Johnson, 1996). Therefore, in an attempt to examine the relationship among TOEIC scores and other variables, the data set was analyzed using correlation coefficients. Presented in Table 9 is the result of Pearson correlation coefficients of all the variables investigated.

Table 9 *Intercorrelations among TOEIC Scores and Other Variables*

	1	2	3	4	5	6	7	8	9	10	11	12
1	—											
2	.92**	—										
3	.86**	.63**	—									
4	.20**	.15*	.23**	—								
5	.39**	.37**	.34**	.46**	—							
6	.03	.02	.03	.27**	.24**	—						
7	-.10	-.14*	-.04	.17**	.14*	.07	—					
8	.12	.10	.12	.29**	.34**	.24**	.19**	—				
9	.15*	.15*	.12	.39**	.30**	.27**	.05	.18**	—			
10	-.02	-.02	-.02	.06	-.02	.04	.12	-.05	-.03	—		
11	.34**	.31**	.30**	.28**	.44**	.17**	.08	.20**	.18**	-.02	—	
12	.29**	.24**	.28**	.21**	.34**	.06	.13*	.02	.12	.08	.35**	—

Note. $N = 244$; * $p < .05$, ** $p < .01$; each number represents variables as follows:

1. TOEIC Total	4. Self-management (VLS)	7. Writing Rehearsal (VLS)	10. Extrinsic Motivation
2. TOEIC Listening	5. Input-seeking (VLS)	8. Oral Rehearsal (VLS)	11. Intrinsic Motivation
3. TOEIC Reading	6. Imagery (VLS)	9. Association (VLS)	12. Study Time

VLS stands for the subscales of vocabulary learning strategies.

As a result, moderate levels of correlation were found between TOEIC (total, listening, and reading) scores and Self-management (VLS), Input-seeking (VLS), Intrinsic Motivation, and Study Time. These results are consistent with many previous studies that have reported some degree of relationship between proficiency/achievement measures and motivation (e.g., Gardner, Trembaly, & Masgoret, 1997), metacognitive strategies (e.g., Nisbet, Tindall, & Arroyo, 2005), or extracurricular study time (e.g., Kojic-Sabo & Lightbown, 1999).

7.2 Structural Equation Modeling

For the purpose of exploring in detail the relationship of a set of observed variables, latent variables, and measurement error simultaneously, structural equation modeling (SEM) was employed. Prior to conducting SEM, two assumptions of SEM, normal distribution and multivariate normality of the data were checked based on the criteria suggested by Kunnan (1998). For checking normal distribution of the data, skewness and kurtosis were examined and both were within ± 2 for all the variables, indicating that the data are normally distributed. Next, multivariate normality was checked; however, Mardia's Multivariable Kurtosis Test showed that the assumption of multivariate normality was violated. Thus, seven multivariate outliers were detected and removed from the data set by examining Mahalanobis Distance. In the reanalysis with the remaining 237 individuals, the assumption of multivariate normality was found to be tenable (Mardia's Multivariable Kurtosis Test = 1.70).²

Figure 3 illustrates a hypothesized model of the relationship among TOEIC scores (proficiency), vocabulary learning strategies as a whole, two motivation subscales, and

extracurricular study time. This model is based on the notion that motivation is the prerequisite for learning (Cohen & Dörnyei, 2002). The fit index figures indicate that the model fit the data moderately ($n = 237$, $\chi^2/df = 1.59$, GFI = .82, AGFI = .80, CFI = .91, RMSEA = .05). In this analysis, the overall latent trait of strategic vocabulary learning, instead of six subscales, was used in the model because this second-order confirmatory factor analysis model was validated in Study 1. It should be noted that, among VLS constructs, “Input-seeking” has the highest path coefficient to strategic vocabulary learning. Input-seeking includes items asking how the learners attempt to seek vocabulary input from materials other than textbooks used in the classroom instruction. Input-seeking therefore might lead to incidental vocabulary learning, such as through extensive reading. This result shows that learners who intentionally seek a source of vocabulary input are those engage in strategic vocabulary learning.

The resulting model exhibits that when looking at the paths to the TOEIC scores, the path from Vocabulary Learning Strategies is the strongest among the four (standardized path coefficients = .31). This exemplifies that committing oneself to learning vocabulary results in higher scores in the TOEIC. With extremely small correlation coefficients all paths from Extrinsic Motivation were not significant, indicating that those who feel they were forced to study did not produce any tangible outcomes. Two paths from Intrinsic Motivation to vocabulary learning strategies (standardized path coefficients = .50) and extracurricular study time (.27) were significant. This finding might suggest that learners with higher intrinsic motivation use more vocabulary learning strategies and spend more time learning English, which of course is likely to be reflected in the TOEIC scores.

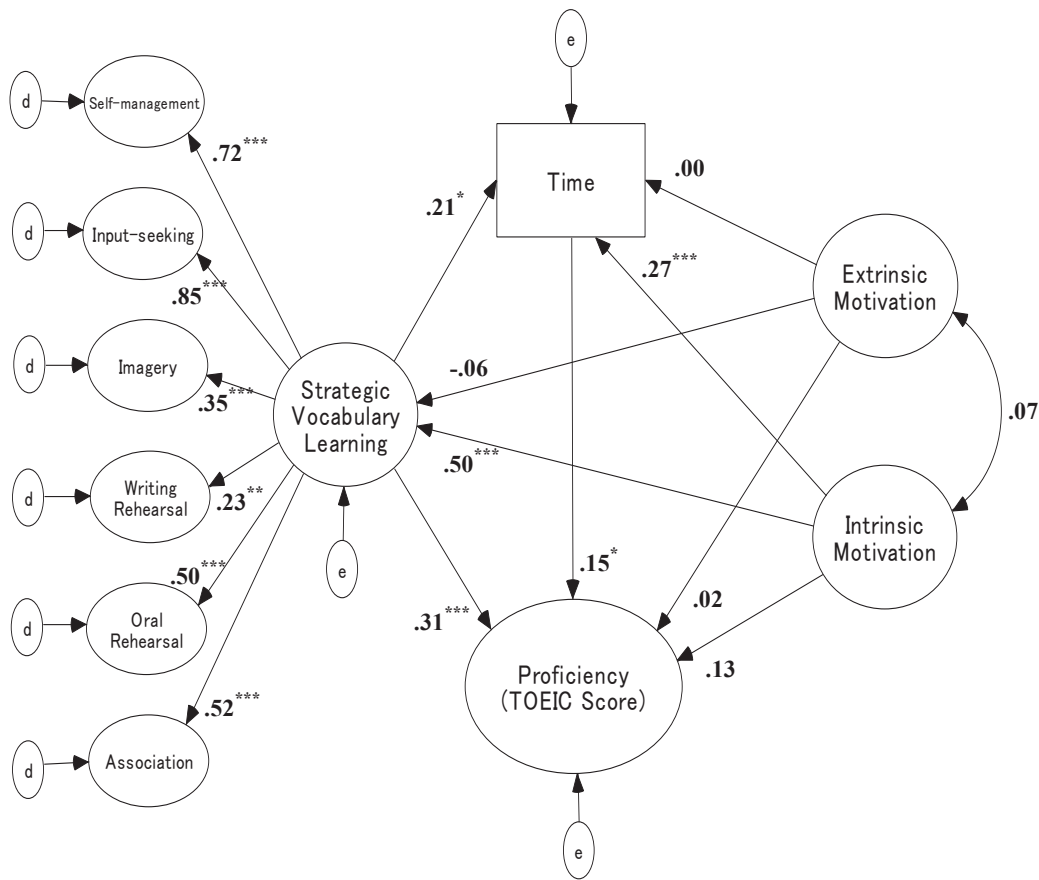


Figure 3. Relationships among the scores and the variables ($n = 237$). * $p < .05$, ** $p < .01$, *** $p < .001$. Numbers on each path are standardized estimates. Observed variables are omitted in this figure.

7.3 Cluster Analysis

Next, cluster analysis, which can shed light on individual differences (e.g., Skehan, 1989), was conducted. In applying cluster analysis, the Ward method with the squared Euclidean distance technique was used because this combination has been referred to as the most suitable to reveal individual differences (Yamamori, Isoda, Hiromori, & Oxford, 2003). The following variables were first transformed into z -scores and then entered in cluster analysis: (a) the TOEIC listening score, (b) the TOEIC reading score, (c) Vocabulary Learning Strategies (VLS): Self-management, (d) VLS: Input-seeking, (e) VLS: Imagery, (f) VLS: Writing Rehearsal, (g) VLS: Oral Rehearsal, (h) VLS: Association, (i) Extrinsic Motivation, (j) Intrinsic Motivation, and (k) Extracurricular Study Time.

By examining the dendrogram, which is a tree-like graphic display of the distances between each combining cluster, it was decided that the participants could be divided into three groups. The judgment was then confirmed with one-way ANOVA, in which statistically significant differences were found among the three groups ($p < .05$).³ Figure 4 describes the results of

cluster analysis, illustrated in *z*-scores (0 being the average). In addition, the descriptive statistics of each cluster and the results of post hoc tests (Tukey's multiple comparison technique)⁴ are presented in Table 10 with raw scores.

The learners in Cluster 1 attained the highest TOEIC reading and listening scores in the three groups. Even though their use of Imagery in vocabulary learning strategies is less frequent, the dichotomy can be explained with their high scores in Input-seeking (VLS), Intrinsic Motivation, and Time. This means that they are superior in exercising their metacognitive strategies with high motivation and spend a lot of time on learning English.

The learners in Cluster 2 had average TOEIC scores. While these learners reported active use of vocabulary learning strategies, in some cases the most frequent in the three groups (Imagery; $M = 3.46$), that was not reflected in the outcomes—the TOEIC scores. One possible interpretation of this result is that while they do use strategies, they are not using them effectively (e.g., Yamamori et al., 2003, p. 384) or earnestly. Their extracurricular study time, which is about average among the three groups, more or less proves this point. That is, they might not be trying hard enough to improve their proficiency in spite of having knowledge of learning strategies.

Learners in Cluster 3, whose TOEIC scores are not statistically different from those in Cluster 2, can be regarded as low-motivated, poor strategy users. Also, their scores of Extrinsic Motivation are about the same as those of learners in Cluster 2. This shows that they externally feel they need to study English, but they may actually not try or simply do not know how to study in the first place.

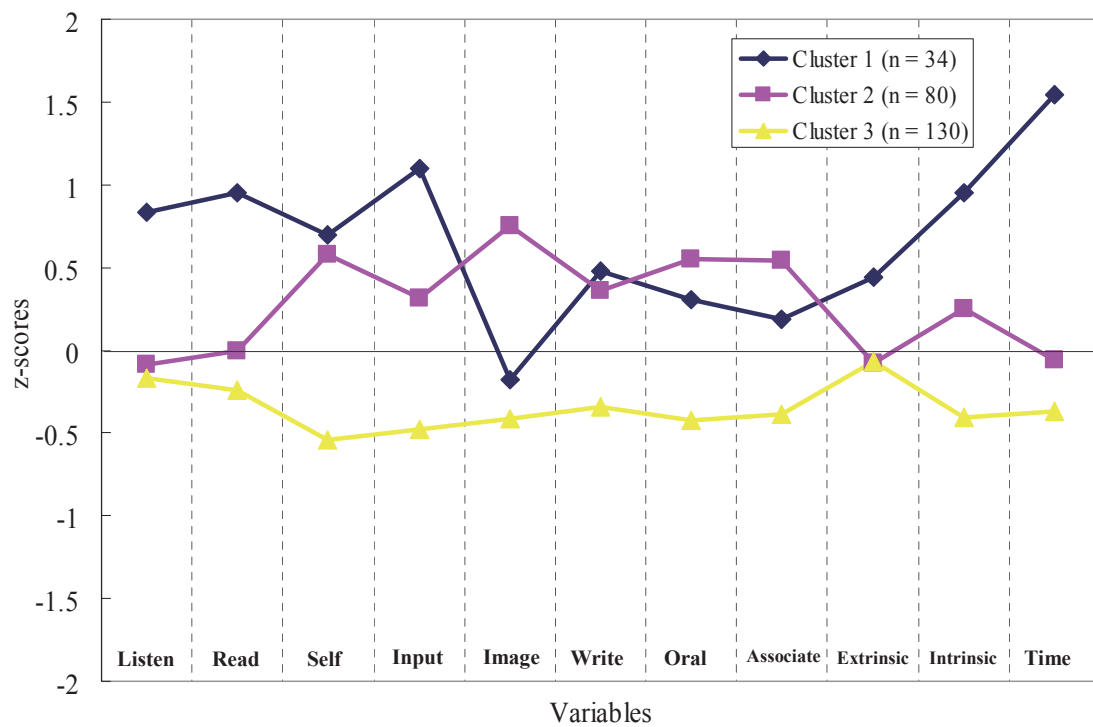


Figure 4. Cluster profiles of four groups expressed in z-scores (for each variable, refer to Table 9).

Table 10 Descriptions of Each Cluster

	Cluster 1 (n = 34)	Cluster 2 (n = 80)	Cluster 3 (n = 130)	Significant in post hoc test (Clusters)
TOEIC Listening	251.47 (58.60)	202.31 (46.03)	197.69 (50.76)	1-2, 1-3
TOEIC Reading	185.88 (42.31)	142.06 (44.96)	131.08 (40.33)	1-2, 1-3
Self-management	2.96 (0.92)	2.87 (0.79)	1.89 (0.59)	1-3, 2-3
Input-seeking	3.34 (0.97)	2.59 (0.86)	1.83 (0.68)	1-2, 1-3, 2-3
Imagery	2.65 (0.68)	3.46 (0.81)	2.44 (0.71)	1-2, 2-3
Writing Rehearsal	4.30 (0.81)	4.17 (0.93)	3.45 (1.00)	1-3, 2-3
Oral Rehearsal	3.02 (0.94)	3.28 (1.00)	2.24 (0.93)	1-3, 2-3
Association	2.72 (0.64)	3.04 (1.02)	2.21 (0.73)	1-3, 2-3
Extrinsic Motivation	4.30 (0.64)	3.90 (0.91)	3.91 (0.68)	1-2, 1-3
Intrinsic Motivation	3.97 (0.67)	3.37 (0.69)	2.81 (0.81)	1-2, 1-3, 2-3
Study Time	9.92 (2.97)	4.85 (2.31)	3.89 (2.39)	1-2, 1-3, 2-3

Note. Mean (Standard Deviation); For all significant pairs in post hoc test, $p < .05$

7.4 Analyses of Study Logs and Interview Sessions

Qualitative analyses were then conducted in an attempt to examine more detailed, true learning behaviors of the participants. 33 individuals were randomly chosen from the participants (Cluster 1, $n = 6$; Cluster 2, $n = 12$; Cluster 3, $n = 15$). Their study logs, along with their utterances at the interview sessions, which were recorded with their permission and later transcribed, were analyzed especially to interpret the characteristics found in cluster analysis.

Learners of Cluster 1 can be classified as “learners with clear goals” according to cluster analysis. In the interview, many participants commented that they had a specific career orientation in the future and hoped to get a job, which requires some degree of English proficiency (e.g., a cabin attendant or a hotel clerk). The number of descriptions in their study logs was larger than those made by learners in other clusters. Their study logs show that they were consciously engaged in learning English, independently studying with materials not used in the course. They especially seemed to feel learning vocabulary was the first and foremost priority in preparing for the TOEIC test. One interviewee stated:

Vocabulary learning is the most important thing in learning English. I can make out the meaning of a sentence if I know the meaning of the words. If I can translate the sentences, that means I can answer the questions on the test. ... To remember the meaning of the words, first I write them on a vocabulary card and read them out repeatedly. If that does not work out, I use a keyword mnemonic technique. When it comes to remembering words, I think I should use many stimuli. (T4-TC2, translation ours.)

Learners in Cluster 2 and Cluster 3 show very similar TOEIC scores; however, their strategy use was considerably different. Learners in Cluster 2 reported more frequent use of vocabulary learning strategies. In the interviews, many students mentioned that they had some knowledge of vocabulary learning strategies from their previous learning experience, such as preparing for entrance examinations when they were high school students. However, it was observed from their study logs that most of their efforts during the course period consisted of nothing but the assigned homework. Thus, they simply did not apply their knowledge of strategies consistently or earnestly towards improving their proficiency. One learner commented at the interview:

When it is necessary to study English, I can try harder, but at the moment, I am busy with my part-time work and assignments of other classes. I wish I could spend more time on learning English. (T2-MM4, translation ours.)

This comment shows the importance of planning one’s learning, and just knowing strategies is not enough - learners must apply them consciously. The important thing is setting specific learning goals and making efforts to achieve them. This idea is in line with “structured approach” reported by Sanaoui (1995), which was the main characteristic of successful learners in her study. Learners in Cluster 3 made very few entries in their study logs. In the interview, many of them commented that they were taking the course because they thought they would need to use English at work in the future. However, they repeatedly remarked that when and

where they would need to do so was ambiguous. One participant noted:

*I want to be a public servant. I think it will be necessary to get a high score in TOEIC.
I study for TOEIC only because it is required, and I find it something unlikable.*
(M4-SH1, translation ours.)

Most of them reported that they would not study outside the classroom because they thought by attending the TOEIC preparation course they could get a higher score. These attitudes were mirrored in their less-frequent strategy use, low motivation, and modest study time outside the classroom.

8. Summary of Study 2

The present study examined the relationships among vocabulary learning strategies, motivation, study time, and TOEIC scores. The results of this study show that among vocabulary learning strategies, metacognitive strategies (Self-management and Input seeking) were more highly correlated with the TOEIC scores. Intrinsic Motivation and extracurricular study time showed higher correlations with the TOEIC scores as well. In SEM, these findings were reconfirmed; furthermore, vocabulary learning strategies as a whole had the greatest influence on the TOEIC scores. It was also found that Intrinsic Motivation contributed heavily to vocabulary learning strategies.

In cluster analysis, three distinct groups emerged as a result. From their cluster profiles and qualitative analyses using study logs and interviews, it was found that (a) learners with higher TOEIC scores had clear goals and attended to vocabulary learning strategies in conscious, coordinated, and structured manners, (b) even though some learners possessed knowledge of strategies, they did not apply them to their everyday learning situations, and (c) learners without clear objectives were those who reported less frequent strategy use and low motivation.

The above-mentioned results suggest that orchestrating vocabulary learning strategies, in tandem with other individual differences such as intrinsic motivation, plays a pivotal role in promoting the proficiency measured by the TOEIC test.

9. Conclusion

The current project composed of two studies was undertaken to clarify the relationships between vocabulary learning strategies (as indicators of the learners' intentional vocabulary learning behaviors) and TOEIC scores (as proficiency measures). Before making concluding remarks, one limitation should be pointed out. As the TOEIC scores indicated, the participants of this study were composed mostly of homogeneous and false-beginner level learners. Therefore, studies with more proficient learners should be conducted to corroborate the findings in the current studies.

In Study 1, we designed and developed a psychometrically sound scale for measuring the learners' latent traits for strategic vocabulary learning. Dörnyei (2005, p. 165) claims that "research on learning strategies in reality may be much more complex than conceptually

hypothesized in that the definition of strategies can be hardly operationalized in an actual research design.” Nonetheless, from the results of Study 1, we can argue that continuing our endeavors is warranted, at least with the targeted proficiency (as measured by the TOEIC scores) of learners.

The results of Study 2 stress the importance of vocabulary learning strategies in the proficiency measured by the TOEIC test. Especially, since vocabulary learning strategies as a whole had a greater influence on proficiency (with TOEIC scores) than intrinsic motivation or study time alone had, the significance of vocabulary learning strategies in enhancing the proficiency level was confirmed. Individual variables such as intrinsic motivation per se might not lead to better learning outcomes; they thus should be accompanied by strategic vocabulary learning behaviors. In other words, how learners approach vocabulary learning strategically matters in their development of proficiency. As it was found that learners with higher TOEIC scores had clear goals and attended to vocabulary learning strategies in conscious, coordinated, and structured manners, teaching vocabulary learning strategies along with these characteristics will be useful for our students in improving their proficiency.

In light of the findings from the two current studies, further studies should be conducted especially on instruction of vocabulary learning strategies. Since a number of studies have reported the success of strategy instruction (e.g., Cohen, Weaver, & Li, 1995; Ikeda, 2007; Rasekh & Ranjbary, 2003), it can be hypothesized that giving such strategy instruction to learners (as the ones in the current studies) could make them more conscious, effective, and consistent users of learning strategies. Moreover, for those who use fewer strategies, it could be a good starting point for them to become more empowered learners.

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Notes

1. We used the items translated into Japanese by Tanaka and Maeda (2004). This questionnaire was originally based on the self-determination theory (see Hiromori, 2006). In the taxonomy of Noels et al. (2000), the three items for extrinsic motivation used in the current study are termed as “External Regulation” and the six items for measuring intrinsic motivation are categorized into “Intrinsic Motivation - Knowledge” and “Intrinsic Motivation - Accomplishment.”
2. If the Mardia’s Multivariable Kurtosis Test is less than 1.96, the data can be regarded as possessing multivariate normality (In’nami, 2006, p. 326).
3. Specifically, TOEIC Listening: $F(2, 241) = 15.77, p < .01, \omega = .33$; TOEIC Reading: $F(2, 241) = 22.76, p < .01, \omega = .39$; Self-management: $F(2, 241) = 60.37, p < .01, \omega = .57$; Input-seeking: $F(2, 241) = 57.42, p < .01, \omega = .56$; Imagery: $F(2, 241) = 47.31, p < .01, \omega = .52$; Writing Rehearsal: $F(2, 241) = 19.34, p < .01, \omega = .36$; Oral Rehearsal: $F(2, 241) = 31.70, p < .01, \omega = .45$; Association: $F(2, 241) = 26.45, p < .01, \omega = .42$; Extrinsic Motivation: $F(2, 241) = 4.02, p < .05, \omega = .16$; Intrinsic Motivation: $F(2, 241) = 36.82, p < .01, \omega = .48$; Extracurricular Study Time: $F(2, 241) = 81.88, p < .01, \omega = .63$.
4. Since the sample sizes were different, the results were also reconfirmed with the Games-Howell procedure (Field, 2005, p.341).

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Appendix A:
Strategic Vocabulary Learning Scale for Japanese EFL Learners
(Originally in Japanese)

Self-management

1. I regularly review the vocabulary I learned to check if I remember it.
2. I keep a vocabulary book or word list to check the vocabulary anytime I wish.
3. I try to make it a rule to memorize a certain number of words in a specific time period (e.g., “I will memorize 10 words a day”).
4. I try to learn extra vocabulary in addition to what I am taught in class.
5. I try to take time for vocabulary learning.
6. I consciously set aside time to study vocabulary in order to prepare for tests (such as TOEIC, TOEFL, or Eiken: English Proficiency Test).
7. I use my own methods for remembering, checking, or reviewing vocabulary.

Input-seeking

8. I try to expose myself to English vocabulary by reading or listening a lot.
9. I try to manage the learning environment so as to expose myself to English vocabulary.
10. I try to make use of the media (TV, radio, Internet, mobile phone, or movies) to learn vocabulary.
11. I study vocabulary with the intention of using it.

Imagery

12. When I try to remember vocabulary, I make a mental picture of what can be associated with a word’s meaning.
13. When I try to remember vocabulary, I link my personal experiences to it.
14. When I try to remember vocabulary, I create an image of the spellings or orthographic forms.
15. When I try to remember vocabulary, I use the keyword method (keyword mnemonic technique).
16. When I try to remember vocabulary, I imagine whether the meaning of the word is negative or positive.

Writing Rehearsal

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

Oral Rehearsal

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

Association

23. When I try to remember vocabulary, I associate it with the synonyms (e.g., begin and start) or antonyms (e.g., positive and negative) I already know.
24. When I try to remember vocabulary, I also memorize the synonyms or antonyms of the word.
25. When I try to remember vocabulary, I memorize words similar to it (in meaning, sound, or shape) or the related words in a group.

Appendix B:
Motivation Questionnaire (Originally in Japanese by Tanaka & Maeda, 2004)

I study English...

Extrinsic Motivation

1. Because I need to get school credits to graduate.
2. In order to get a prestigious job in the future.
3. In order to have a better salary later on.

Intrinsic Motivation

4. For the pleasure I experience when surpassing myself in my English studies.
5. For the enjoyment I experience when I can grasp the meaning of words if I keep studying.
6. For the satisfaction I feel when I am in the process of accomplishing difficult exercises in English.
7. For the “high” I feel when hearing English spoken.
8. For the “high” feeling that I experience while speaking English.
9. For the pleasure I get from hearing English spoken by native speakers of English.

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