研究論文

Identifying Words Difficult for Japanese EFL Learners to Acquire by a Revised Vocabulary Estimation Test

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改訂語彙サイズ推定テストによる習得困難な語の特定

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Abstract

The study examines the Japanese EFL learners' vocabulary at the 1,000- to 6,000-word levels, using my revised vocabulary estimation test (hereafter VET). The study also examines the rank correlation in the success rate. The data are analyzed according to participants' grades and schools. The study attempts to identify words difficult to acquire even for advanced learners (university sophomores). Results show that the average vocabulary of students is much smaller than previously estimated by existing estimation tools. There is a statistically significant difference in the mean vocabulary size among students according to their grades and their schools. There is a relatively or rather strong rank correlation between grades and between schools in the success rate in answering at each level with few exceptions. There are four words whose success rates are less than 50 percent even at the 1,000-word level even for university sophomores: two nouns and two verbs. I conclude that educators should recognize the fact that there are many words difficult for students to acquire in common regardless of grades or schools and should devise ways of teaching these words.

1. Introduction

It is essential for educators to measure students' vocabulary size in order to help

them develop their English skills. Various vocabulary estimation tools exist, but yield somewhat different results. Yashima (2002) estimated the vocabulary size of Japanese EFL high school students, using Mochizuki's (1998) Vocabulary Size Test (hereafter VST) at the 1,000- to 6,000-word levels. The average vocabulary for first-year students was 3,070.84 words while that of third-year students was 3,928.99. Mochizuki's test is a multiple-choice test and has 30 items at each level. However, this may be too small to provide a valid estimation. Yashima's (2003) more exhaustive study yielded much lower estimated vocabulary size (hereafter EVS) across the board.

Yashima (2004) then estimated the vocabulary of Japanese EFL high school and university students, using the VET at 1,000- to 4,000-word levels, chiefly based on the results in Yashima (2003). The test was also a multiple-choice test, but it had 100 items at each level, which is to be appropriate enough to test receptive knowledge (Schmitt: 166). The average vocabulary for first-year students was 1,458.92 words while that of third-year students was 2,826.95. The results are thought to be much more similar to what teachers expect from their experiences than those of Mochizuki's. This paper attempts to find a better estimation of the vocabulary size of Japanese EFL learners, using my revised VET at 1,000- to 6,000-word levels. It also attempts to find difficult words to acquire even for university students.

2. The study

2.1. Purpose

The purpose of this study is to clarify how many words Japanese EFL learners know at the 1,000- to 6,000-word levels receptively. I also examine the rank correlation between school grades and between schools. I also examine (1) the distribution of participants' success rates in answering at 1,000- to 3,000-word levels according to Nation & Waring (1997), and (2) words difficult even for university students to acquire.

2.2. Hypotheses

With the above points in mind, I have constructed the following hypotheses:

(1) The EVS of participants, regardless of school grades or schools, will be much smaller than what estimated by Mochizuki's (1998) VST in Yashima (2002).

(2) There is a strong rank correlation between grades and between schools in the success rate in answering.

(3) The distribution of the success rate for third-year students is similar to that of the rate for university sophomores at each level according to Yashima (2004).

(4) There are some words at the 1,000-word level difficult for university sophomores to acquire.

2.3. Participants

Participants in this study were 128 first-year students (15–16 years olds) from one Tokyo metropolitan senior high schools (School A), 260 second-year students (16–17 years olds) from two Tokyo metropolitan senior high schools and one Yamaguchi prefectural senior high school (Schools A, C, and B), 142 third-year students (17–18 years olds) from one Tokyo metropolitan senior high school (School A), and 56 sophomores (19–48 years olds) from a science university. They had been learning English for 3 to 9 years.

2.4. Materials

190 participants (140 high school students and 50 university sophomores) were tested on 1,233 words at the 5,000- and 6,000-word levels (588 and 645 words respectively) taken from the *JACET List of 8000 Basic Words* (hereafter JACET 8000) as in Yashima (2003; 2004) as a pilot study. 100 target words were then selected in accordance with the results as in Yashima (2004). Each target word had two distractors at each level, based on Shizuka's (2003) study. Words which were almost the same in percentage terms at each level were selected as a target word and its two distractors, and words whose percentage was in the middle of the three words were selected as target words in principle. Only nouns, verbs, and adjectives were used. Participants were required to select one of three English words that were closest in meaning to two Japanese words.

2.5. Procedure

This study required two 50-minute sessions. Participants were given the test at the 1,000- to 6,000-word levels. Participants were told to answer as many questions as possible in order of numbers and levels.

2.6. Scoring

If participants could answer 1 question at each level, they were regarded as having 10 words regardless of levels. However, there were two cases where participants could choose the correct answer if they didn't know it. Therefore, if participants put a circle round the number at the side of the item, they could answer it at a guess with a

probability of one in three, so they were regarded as having 3.3 words. Moreover, if they put a triangle round it, they could answer it because they knew the other two options, so they were regarded as having 6.7 words.

3. Results

3.1. Estimated vocabulary size (EVS)

Table 1 shows the means and standard deviations in scores and EVS at the 1,000- to 6,000-word levels. The means vary according to grades. A one-way ANOVA revealed a significant main effect for grades in scores at the 1,000- to 6,000-word levels ($F(3, 582)=63.98$, $p<.001$, $F(3, 582)=70.79$, $p<.001$, $F(3, 582)=86.81$, $p<.001$, $F(3, 582)=152.19$, $p<.001$, $F(3, 582)=107.58$, $p<.001$, $F(3, 582)=92.61$, $p<.001$, respectively) and a significant main effect for grades in EVS ($F(3, 582)=129.55$, $p<.001$). A multiple comparison analysis using Tukey HSD's multiple range test revealed a significant difference between the means in scores and EVS for first- and second-years, first- and third-years, first-years and university sophomores, second- and third-years, and second-years and university sophomores at $p<.001$ respectively at each level and overall. There was also a significant difference between the means for third-years and university sophomores at $p<.01$ at the 1,000-word level and at $p<.05$ at the 5,000-word level and overall. However, there was no significant difference between them at the other 4 levels.

Table 2 also shows the means and standard deviations in scores and EVS at the 1,000- to 6,000-word levels. The means vary according to schools. The one-way

Table 1

Means and Standard Deviations in Scores and EVS for First- to Third-Year Senior High School Students and Sophomore University Students

Word level		*1,000*	*2,000*	*3,000*	*4,000*	*5,000*	*6,000*	*EVS*
1st years	*Mean*	765.91	571.88	299.39	101.17	142.59	144.28	2,025.23
n=128	*SD*	99.95	107.95	117.17	109.84	71.45	97.47	440.02
2nd years	*Mean*	820.15	646.12	438.39	267.92	294.70	271.92	2,739.20
n=260	*SD*	109.85	154.82	171.29	128.93	126.53	143.66	694.39
3rd years	*Mean*	926.61	802.85	614.08	454.35	424.13	408.31	3,630.32
n=142	*SD*	83.11	134.38	184.98	165.17	157.34	143.66	775.94
Sophomores	*Mean*	876.29	761.97	545.77	397.50	370.28	370.07	3,321.87
n=56	*SD*	118.05	169.89	187.62	191.06	185.45	166.17	943.19
Total	*Mean*	839.49	678.96	460.86	289.05	300.06	286.47	2,854.87
n=586	*SD*	115.74	166.08	199.61	188.86	164.45	164.93	898.70

ANOVA revealed a significant main effect for schools in scores at the 2,000- to 4,000-word levels for second-years ($F(2, 257)=5.86$, $p<.01$, $F(2, 257)=5.68$, $p<.01$, $F(2, 257)=6.72$, $p<.001$, respectively) and a significant main effect for schools in EVS for second-years ($F(2, 257)=4.90$, $p<.001$). However, there was no significant main effect for schools in scores at the 1,000-, 5,000- and 6,000-word levels. The multiple comparison analysis revealed a significant difference between the means in scores and EVS for Schools A and C and Schools B and C at $p<.01$ respectively at the 2,000- to 4,000-word levels. There were also a significant difference between the means in EVS for Schools A and C and Schools B and C at $p<.01$. There was also a significant difference between the means in scores for Schools A and B at $p<.05$ at the 4,000-word level. There was, however, no significant difference between them at the other levels or overall.

Table 2

Means and Standard Deviations in Scores and EVS for Second-Year Senior High School Students according to Schools

Word level		*1,000*	*2,000*	*3,000*	*4,000*	*5,000*	*6,000*	*EVS*
School A	*Mean*	840.14	666.28	453.79	309.00	314.84	295.49	2,868.55
n=72	*SD*	77.91	121.69	150.50	129.12	134.78	157.11	648.08
School B	*Mean*	815.37	656.61	453.19	260.30	292.31	276.02	2,753.79
n=148	SD	128.85	156.92	168.80	131.43	126.83	148.80	731.44
School C	*Mean*	801.84	571.07	355.91	222.15	267.31	232.31	2,450.58
n=40	*SD*	73.09	180.18	194.87	97.23	105.30	81.62	550.76
Total	*Mean*	820.15	646.13	438.39	267.92	294.70	271.92	2,739.20
n=260	*SD*	109.85	154.82	171.29	128.93	126.53	143.66	694.39

3.2. Rank correlation between grades in the success rate in answering

Table 3 shows the rank correlation between grades in the success rate in answering. The correlation coefficients were calculated using Kendall's tau and Spearman's rho. They were relatively or rather high: Kendall's tau was .59 to .84 at each level between any grades except at the 4,000-word level between first- and second-years and at the 4,000- and 5,000-word levels between first-years and university sophomores (.57 respectively). Spearman's rho was .77 to .96 at each level between any schools regardless of levels except at the 4,000-word level between first- and second-years and at the 4,000- and 5,000-word levels between first-years and university sophomores (.76, .76 and .74 respectively). Both Kendall's tau and Spearman's rho were highest at the 1,000- or 2,000-word level regardless of grades except between third-

years and university sophomores.

Table 3

Rank Correlation between Grades in the Success Rate in Answering

Word level				*1,000*	*2,000*	*3,000*	*4,000*	*5,000*	*6,000*
1st	vs	2nd	Kendall	.84**	.81**	.75**	.57**	.66**	.71**
(128)		(260)	Spearman	.96**	.95**	.90**	.76**	.82**	.88**
1st	vs	3rd	Kendall	.75**	.84**	.68**	.60**	.59**	.65**
(128)		(142)	Spearman	.87**	.92**	.86**	.78**	.77**	.83**
1st	vs	Soph	Kendall	.80**	.77**	.70**	.57**	.57**	.66**
(128)		(56)	Spearman	.93**	.93**	.87**	.76**	.74**	.83**
2nd	vs	3rd	Kendall	.80**	.77**	.71**	.73**	.77**	.68**
(260)		(142)	Spearman	.89**	.93**	.89**	.90**	.92**	.85**
2nd	vs	Soph	Kendall	.77**	.78**	.68**	.65**	.66**	.67**
(260)		(56)	Spearman	.91**	.93**	.86**	.83**	.83**	.84**
3rd	vs	Soph	Kendall	.70**	.74**	.69**	.72**	.70**	.79**
(142)		(56)	Spearman	.85**	.91**	.88**	.89**	.86**	.94**

**p<.01

Table 4

Rank Correlation between Schools in the Success Rate in Answering

Word level				*1,000*	*2,000*	*3,000*	*4,000*	*5,000*	*6,000*
School A	vs	School B	Kendall	.71**	.68**	.63**	.62**	.67**	.74**
(72)		(148)	Spearman	.87**	.86**	.80**	.82**	.84**	.91**
School A	vs	School C	Kendall	.73**	.69**	.70**	.68**	.74**	.77**
(72)		(40)	Spearman	.88**	.87**	.85**	.86**	.89**	.92**
School B	vs	School C	Kendall	.72**	.75**	.77**	.80**	.86**	.82**
(148)		(40)	Spearman	.88**	.91**	.92**	.94**	.97**	.95**

**p<.01

3.3. **Rank correlation between schools in the success rate in answering**

Table 4 shows the rank correlation between schools in the success rate in answering, using Kendall's tau and Spearman's rho. These were relatively or rather high: Kendall's tau was .62 to .86 at each level between any schools. It was .80 or more at the 4,000- to 6,000- word levels between Schools B and C. Spearman's rho was .80 to .97 at every level between any schools. It was more than .90 at each level between Schools B and C except at the 1,000-word level. Both Kendall's tau and Spearman's rho were highest at the 6,000-word level between Schools A and B and between Schools A and C.

3.4. Distribution of the success rate in answering

Figures 1 to 3 show the distribution of the success rate in answering at the 1,000- to 3,000-word levels. All the distributions were rather similar to one another at a rate of 0 to 80 percent, but the distribution for university sophomores was quite different from the others at a rate of 90 to 100 percent at the 1,000-word level. As for the 2,000-word level, the distribution for first-years was quite similar to that of second-years, and it was roughly similar to that of university sophomoress especially at a rate of 40 to 100 percent. However, the distribution for third-years was quite different from the others especially at a rate of 80 to 100 percent. It was roughly similar to that of the same year students at the 1,000-word level. Concerning the 3,000-word level, although the distribution for first-years was roughly similar to that of second-years, the distribution for third-years was quite different from the others. Moreover, the distribution for third-years was quite different from that of university sophomores, and it was rather similar to that of second-years at the 2,000-word level.

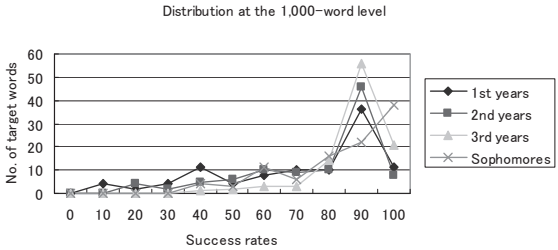

Figure 1. Distribution of the success rate in answering at the 1,000-word level.

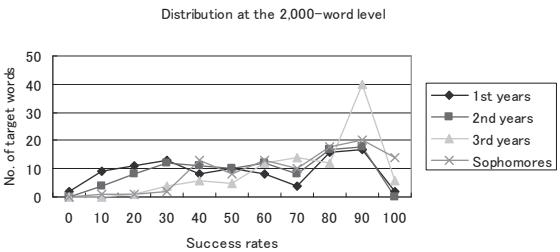

Figure 2. Distribution of the success rate in answering at the 2,000-word level.

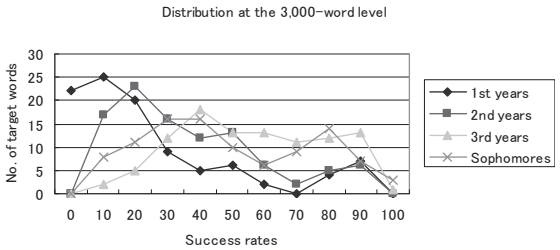

Figure 3. Distribution of the success rate in answering at the 3,000-word level.

3.5. Words difficult for university sophomores to acquire

Tables 5 and 6 show parts of speech and words whose success rates were less than 50 percent for university sophomores. As can be seen in Table 5, there were four words whose success rates were less than 50 percent even at the 1,000-word level, and there were 17 words at the 2,000-word level. Moreover, for more than half of the target words at the 3,000-word level participants' success rate was less than 50 percent. Concerning parts of speech, as words were decreasing in frequency, verbs and adjectives were more difficult to acquire. Especially, there were no adjectives in which participants' success rates were less than 50 percent at the 1,000-word level and there were two at the 2,000-word level, there were 14 adjectives at the 3,000-word level, which means that half of the target words were acquired at a rate of less than 50 percent. Table 6 shows that *aid* was the word which was the most difficult to acquire regardless of grades except second-years, and that it was the only word acquired at a rate of less than 50 percent regardless of grades. *Attempt* was, on average, the second most difficult word for participants to acquire, though second- and third-years were not the case.

Table 5

Parts of Speech whose Success Rates Were Less than 50 Percent for University Sophomores

	1,000	*2,000*	*3,000*	*Total*
Noun	2 (58)	7 (58)	22 (52)	31 (168)
Verb	2 (28)	8 (18)	15 (24)	25 (70)
Adjective	0 (14)	2 (24)	14 (24)	16 (62)
Total	4 (100)	17 (100)	51 (100)	72 (300)

Note. The number in parentheses shows the total number of the target words.

Table 6

Words whose Success Rates Were Less than 50 Percent for University Sophomores at the 1,000-Word Level

	1st years	*2nd years*	*3rd years*	*Sophomores*	*Average*
aid (n)	13.27%	29.23%	45.04%	41.64%	31.27%
attempt (n)	16.09%	28.39%	58.67%	45.84%	34.30%
represent	29.62%	29.74%	53.02%	48.80%	36.78%
describe	25.48%	38.23%	63.84%	48.21%	42.04%

4. Discussion

As can be seen in Tables 1 and 2, there is a clear difference in scores and EVS among grades and schools at each level and overall with few exceptions. The results of the ANOVA confirm that there was a statistically significant difference among grades at each level and overall except the case between third-year students and university sophomores at the 2,000- to 4,000-, 6,000-word levels and overall and the case between Schools A and B at the 1,000- to 3,000-, 5,000- to 6,000-word levels and overall.

In comparison with Mochizuki's (1998) VST in Yashima (2002), the means in EVS estimated by the current test are much smaller. Mochizuki's VST yielded a mean of 3,070.84 for first-years and 3,928.99 for third-years. In the current study, the means are 2,025.23 for first-years and 3,630.32 for third-years. The means in EVS are much larger than Yashima's (2004) because 5,000- and 6,000-word levels are added, but the means in EVS did not increase so much especially for first-years. My first hypothesis could be accepted.

Tables 3 and 4 show that there is a relatively or rather strong rank correlation in both Kendall's tau and Spearman's rho between grades and between schools at each level with few exceptions. This suggests that although, as mentioned in 3.1, there is a statistically significant difference in scores and EVS among grades and among schools, there are many words easy or difficult for Japanese EFL learners to acquire in common regardless of grades or schools at each level, especially at the 1,000- and 2,000-word levels. These results are not so surprising because many words at the 1,000-word level have already been acquired in junior high school and many words at the 2,000-word level are first learned in the 10th year. So there are many words even first-years acquire. There is, however, a stronger correlation in both Kendall's tau and Spearman's rho between Schools B and C at the 4,000- to 6,000-word levels than at the other levels. Both Kendall's tau and Spearman's rho were highest at the 6,000-word

level between Schools A and B and between Schools A and C. Moreover, these were also highest at the 6,000-word level between third-years and sophomores. This suggests that in the case of the same grade or similar EVS, these are higher at lower frequency levels than at higher ones. Anyway, my second hypothesis could also be accepted.

Figures 1 to 3 show the distribution of the success rate in answering at the 1,000- to 3,000-word levels. All the distributions were rather similar to one another at a rate of 0 to 80 percent, but the distribution for university sophomores was quite different from the others at a rate of 90 to 100 percent at the 1,000-word level. This means that there are more words thoroughly acquired for university sophomores than those of the other grades. As for the 2,000-word level, the distribution for first-years was quite similar to that of second-years, and it was roughly similar to that of university sophomores especially at a rate of 40 to 100 percent. However, the distribution for third-years was quite different from the others especially at a rate of 80 to 100 percent. It was roughly similar to that of the same year students at the 1,000-word level. This means that only third-years acquired the target words at the 2,000-word level as at the 1,000-word level. Concerning the 3,000-word level, although the distribution for first-years was roughly similar to that of second-years, the distribution for third-years was quite different from the others. Moreover, the distribution for third-years was quite different from that of university sophomores, and it was rather similar to that of second-years at the 2,000-word level. Therefore, although, as mentioned in 3.1, there was no significant difference between third-years and university sophomores at each level except 1,000- and 5,000-word levels, the distributions for both grades were quite different regardless of word levels. My third hypothesis was rejected.

With regard to hypothesis 4, Tables 5 and 6 show that there were four words whose success rates were less than 50 percent at the 1,000-word level. Concerning parts of speech, as words were decreasing in frequency, verbs and adjectives were more difficult to acquire. In fact, there were no adjectives but two nouns and two verbs at the 1,000-word level. Table 6 shows that *aid* was the word which was the most difficult to acquire regardless of grades except second-years, and that it was the only word acquired at a rate of less than 50 percent regardless of grades. *Attempt* was, on average, the second most difficult word for participants to acquire, though for second- and third-years this was not the case. The results suggest that the length of a word does not affect its receptive acquisition and that abstract words are difficult for Japanese EFL learners to acquire. Anyway, my fourth hypothesis could be accepted.

5. Conclusion and implications

This study shows that the vocabulary size of Japanese EFL learners is much smaller than previously estimated by Mochizuki's (1998). The means in EVS for first-year students, on average, were 2025.23. The results suggest that although it seems to Japanese teachers of English that this reflects their real vocabulary size much more, this is not good enough to perform functionally in English. The means in EVS for second-years and university sophomores, on average, were 2,739.20 and 3,321.87, which were the minimum vocabulary size to perform functionally. This study also shows that there is a relatively or rather strong rank correlation in both Kendall's tau and Spearman's rho between grades and between schools at each level with few exceptions. Kendall's tau is .59 to .86 and Spearman's rho is .77 to .97 in almost all cases. The results indicate that at each level, there are words easy or difficult for learners regardless of grades or schools. These findings suggest that educators should recognize the fact and that they should devise ways to teach these difficult words.

The findings on the distribution of the success rate in answering at the 1,000- to 3,000-word levels indicate that only third-years acquire the target words at the 2,000-word level as at the 1,000-word level, and that although there is no significant difference between third-years and university sophomores at each level with some exceptions, the distributions for both grades are quite different regardless of word levels. As authorized textbooks are not written just in the order of word frequency, there is a chance that these words don't or rarely appear in them. So these words are difficult to acquire. Therefore, these findings suggest that educators should encourage their students to read and listen to additional materials, taking word frequency into consideration.

The findings on words that are difficult to acquire indicate that there are still four words difficult for sophomores to learn, even at the 1,000-word level, which are two nouns and two verbs. These nouns are short in length but abstract words, and as words are decreasing in frequency, verbs and adjectives are more difficult to acquire. Therefore, these findings suggest that educators should recognize the fact and that they should teach vocabulary to their students, taking the nature and parts of speech of a word into account.

The results show that the current revised VET can be administered by other schools. However, the order of the arrangement of some target words should be

changed, and in order to specify words difficult for Japanese EFL learners to acquire, the success rates in answering of the two distractors of each item at the 1,000- to 3,000-word levels should be examined. After changing the point and preparing three versions at each level, I would like to measure learners' vocabulary size again.

Notes

1. This paper is based on the contents of a presentation titled "Identifying Words Difficult for Japanese EFL Learners to Acquire by a Revised Vocabulary Estimation Test" given at the 31st JASELE annual convention in Sapporo. Some of the data has been updated since the presentation.
2. All participants gave the author their consent to use any information gathered in this study.

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