

An Analysis of Japanese University Entrance Exams Using Corpus-Based Tools

S. Kathleen Kitao* and Kenji Kitao**

** Department of English*

*Doshisha Women's College, Kyotanabe, Kyoto 610-0395, Japan
kkitao@dwc.doshisha.ac.jp*

*** Faculty of Culture and Information Science*

*Doshisha University, Kyotanabe, Kyoto 610-0394, Japan
kkitao@mail.doshisha.ac.jp*

While many factors go into a valid and reliable test, the foundation for a test is the level of difficulty of the vocabulary used and the readability of the passages used for reading comprehension. In Japan, the majority of students enter universities through written exams which include an English section which primarily tests reading comprehension and knowledge of grammar and vocabulary. Individual universities write exams, and in addition, there is an exam offered throughout Japan by The National Center for University Admissions (Center Exam). In a previous study, we looked at vocabulary frequency and readability of the entrance exams of tests of four major private universities in the Kansai region of Japan as well as the Center Exam. We found that the difficulty of the university entrance exams may have been a problem, although the Center Exam was easier. In this paper, we compared the previous results with those for 2008 exams for the same universities, and found that this continues to be a problem.

1. Introduction

A great many factors go into making a valid and reliable exam, including an appropriate level of lexical difficulty and an appropriate level of readability for reading passages. While appropriate levels of lexical difficulty and readability are not sufficient for a valid and reliable test, they are the foundation for the exam. Therefore, it is useful to look at lexical difficulty and readability of reading passages to evaluate that aspect of their validity.

In a previous study (Kitao & Kitao, 2006) we looked at lexical difficulty and readability of reading passages in the 2005 entrance exams of four major private universities in the Kansai area as well as with a national exam over a period of 16 years from 1990 to 2005. In this study we will compare those results with the 2008 exams.

2. Background on the Japanese University Entrance Exam System

The majority of university students enter universities through written exams. There are two types of exams. One is a centralized exam given by The National Center for University Admissions ("Center Exam") on the same day throughout Japan. It includes an English exam and content-area exams and is used by national universities and some private universities, either alone or with interviews or another test. In addition, many universities give individual exams. In these exams, the English

section makes up a high percentage of the total exam score, though it varies from university to university and major to major. Most private universities make their own exams. There are different exams for different majors or given on different days. These exams are usually made by professors of the university, who may not have any background in testing.

English exams include reading comprehension items, which make up the largest part of most tests. In most cases, reading comprehension is tested with multiple choice items or multiple choice cloze-type questions. Cloze items may test grammatical or vocabulary knowledge or understanding of the relationship between pieces of information. There may also be grammar and vocabulary questions, translation questions, or questions to test students' knowledge of English pronunciation.

3. Previous studies

A number of studies have been done on the vocabulary frequency and readability of reading passages in the English sections of entrance exams. Hasegawa, Chujo, and Nishigaki (2006) looked at trends in exams and found that there has been an increase in the use of reading passages and dialogues for comprehension and also in the length of those passages. Their review of the literature indicated that there were problems with difficulty levels of vocabulary due to a low cover ratio

(percentage of vocabulary used in the tests covered in junior high and high schools).

In their own study, they evaluated the cover ratio of university exams and of the Center Exam from 1989 to 1998 and found a cover ratio of about 95% for the Center Exams and about 90% for the university exams.

Similarly, Chujo and Hasegawa (2004) examined Center Exams from 1993-2002 and 40 faculties at 26 universities from 2002 for cover ratio and readability and found the cover ratio and readability was appropriate for the Center Exams, but that only four faculties had a cover ratio of 95%, which they considered appropriate, and only 12 faculties had an appropriate level of readability.

4. Research Questions

We considered two research questions.

1. What is the level of difficulty of words used in the English entrance exams of four major private universities in 2008, and how has this changed between the 2005 and 2008 exams?
2. What is the level of readability of reading passages used to test reading comprehension, and how has this changed between the 2005 and 2008 exams?

5. Methodology

We used word frequency counters and measures of readability to analyze English sections of university entrance exams. In our analyses, we included exams from four major private universities. These universities are identified as University A (7 exams), University B (8 exams), University C (8 exams), and University D (8 exams).

In order to do vocabulary frequency analysis, we removed Japanese instructions, question numbers and letters, etc. For readability analysis, we separated out reading passages, excluding dialogues. For cloze passages, we filled in the blanks.

6. Results

6.1 Levels of Vocabulary Frequency

In order to analyze the vocabulary frequency of the exams, we used the Japan Association of College English Teachers 8000 (JACET) word list (<http://www01.tcp-ip.or.jp/~shin/j8web/j8web.cgi>). This list is based on the British National Corpus, but adjustments have been made to reflect the vocabulary knowledge of Japanese students. It is divided into 8 levels of 1000 words each. We used a program that calculated the percentage of total words and unique words at each level. It also counts contractions, proper nouns, and non-words. We

looked at the percentage of words at each of the eight levels, and words not included in the 8 levels but excluded contractions, proper nouns, and non-words from the analysis. We used the results to calculate the number percentage of words over the 4000-word level for total words and unique words. According to Barrow, Nakanishi, and Ishino (1999), the average Japanese college freshman has a vocabulary of 2304 words. Private university exams are probably taken by better-than-average students, so we used the 4000-word level for our evaluation.

The following tables show the percentages of total words (Table 1) and unique words (Table 2) over the 4000-word level at each university and for the Center Exam. They include the range of percentages of each university's tests, comparing the results of the 2005 exams with the 2008 exams.

Table 1. Percentage of words over 4000 (total words)

University	2005		2008	
	Range	mean	range	Mean
A	4.22-5.95	4.93	6.29-9.88	8.12
B	3.06-4.58	3.69	2.24-5.92	4.04
C	3.65-7.68	5.05	3.40-7.74	4.96
D	4.58-7.04	5.57	3.23-8.71	5.31
Center	1.84-5.12	3.08		

Table 2. Percentage of words over 4000 (unique words)

Uni.	2005		2008	
	Range	mean	range	mean
A	9.73-13.99	11.68	14.27-18.04	16.29
B	8.11-11.97	9.43	7.32-13.15	10.45
C	9.64-14.26	11.33	11.14-12.97	11.82
D	10.67-16.02	13.23	8.75-15.73	11.45
Center	5.89-10.68	7.28	≠	≠

Research has shown that if there are 2-5% unknown words out of the total words in a reading passage, comprehension is difficult (Chujo, n.d.). While some words might be able to be guessed from the context, not all words can be, and with a relatively large number of unknown words, passages become incomprehensible.

The Center Exam uses an easier level of vocabulary than the four private universities, although the Center Exams with the highest level of lexical difficulty are a potential problem. Except for University B, the universities had exams where difficult vocabulary could be a problem, and University A showed an increase in 2008 over 2005.

We also looked at the number of words that were glossed in each of the test compared to the unique

words over the 4000-word level, shown in Table 3.

Table 3. Number of words glossed out of unique words over 4000 in reading passages

	2005		2008	
University	glossed	unique	glossed	unique
A	22	515	22	1064
B	24	393	19	723
C	6	428	*19	749
D	55	515	115	683
Center	4	404		

*defined rather than translated

There is no standard we know of to indicate how many glossed words readers can easily handle. However, it seems that it would be difficult for readers to handle 8-10 glossed words in a reading 4-800 words long, as some of the reading passages have, in addition to other unknown words. At University A, the number of glossed words remained the same, even though the number of difficult unique words had doubled.

6.2 Readability

Next, we looked at readability of the reading passages in the exams. In Table 4, the mean percentages of the total number of words in reading passages in the exams are shown.

Table 4. Percentage of Total Words in Reading Passages (means)

	2005			2008		
Uni.	readings	total %	readings	total %		
A	1,372	2,750	50	1,768	2,957	59
B	1,790	2,874	62	2,089	3,568	59
C	1,317	2,308	58	1,428	2,539	56
D	1,543	2,577	50	1,406	2,105	67
Ctr	1,092	2,889	38			

The percentages indicate the importance of reading comprehension in the exams, particularly in the exams of the private universities. In two universities, the percentages increased.

For readability, we used software to calculate three readability scales, the Flesch Reading Ease scale, the Flesch-Kincaid Grade Level, and the Fog Index. We also report the number of words and the number of words/sentence.

Readability scales make use of sentence length (as a measure of grammatical complexity) and either word length or the number of syllables in words (as a measure of lexical difficulty). To give an idea of the level of difficulty, American news

magazines *Time* and *Newsweek*, which are quite difficult for most Japanese university students to handle, are around 10 or 11 on the Fog Index. On the Flesch Reading Ease Scale, the higher the score, the easier the reading passage. For native English speakers, a FRE score between 30-49 indicates a very difficult reading, and 50-59 is fairly difficult. *Time* has a FRE score of about 52, and the *Harvard Law Review* has a score in the low 30s.

These readability scales were developed for native English speakers, and the grade levels reflect this. However, Greenfield (2004) found high correlations between the Flesch Reading Ease scale and the Flesch-Kincaid Grade Level and measures of results of cloze tests with Japanese university students. This indicates that while the grade levels are not the same as for native English speakers, these readability scales do reflect the relative difficulty of reading passages for Japanese readers.

Tables 5-9 show the range and the mean for the number of words in reading passages, the number of words/sentence, and the readability based on the Flesch Reading Ease scale, the Flesch-Kincaid Grade Level scale, and the Fog Index.

Table 5. University A

	2005		2008	
	range	mean	range	mean
# of wds	1,280-1,557	1,372	1,622-2,386	1,768
wds/sen	17.22-25.70	21.47	19.01-24.29	21.97
FRE	37.15-50.46	43.48	36.97-46.14	42.91
F-K GL	10.50-14.46	12.53	11.55-13.80	12.73
Fog	12.17-16.54	14.54	12.81-15.88	14.44

Table 6. University B

	2005		2008	
	range	mean	range	mean
# of wds	1,528-1,809	1,698	1,476-2,620	2,089
wds/sen	12.14-17.31	15.62	12.37-20.24	17.33
FRE	61.93-68.61	66.29	50.16-66.45	61.16
F-K GL	6.70-8.51	7.89	7.24-11.08	9.03
Fog	8.27-10.83	9.73	8.79-12.71	10.78

Table 7. University C

	2005		2008	
	range	mean	range	mean
# of wds	929-1,814	1,317	812-1,646	1,428
wds/sen	14.20-23.83	16.68	15.38-26.19	19.05
FRE	37.07-63.24	53.38	38.85-64.63	52.64
F-K GL	8.89-14.01	10.54	8.07-12.47	10.65
Fog	10.50-16.46	12.54	10.26-14.40	12.49

Table 8. University D

	2005		2008	
	range	mean	range	mean
# of wds	1,406-1,922	1,543	1320-1,473	1,406
wds/sen	14.67-19.80	17.21	17.86-27.50	21.14
FRE	57.37-68.68	61.68	26.00-66.92	56.86
F-K GL	7.51-10.18	8.93	8.86-16.46	11.02
Fog	9.66-12.13	10.88	10.45-18.61	12.91

Table 9. Center Exam

	2005	
	range	mean
# of wds	757-1,338	1,092.25
wds/sen	11.19-18.22	14.74
FRE	59.39-73.84	68.14
F-K GL	4.94-9.43	7.42
Fog	6.19-11.05	9.1

Many of the tests for the individual universities have reading passages that are comparable in difficulty to *Time* and *Newsweek*, publications that are very difficult reading for many Japanese students, and some that are considerably more difficult. In fact, some of the reading passages were comparable to difficult graduate-level reading for native English speakers. The situation did not improve between 2005 and 2008, and in fact, University B and University D showed an increase in the difficulty of the reading passages they used.

7. Conclusions and Recommendations

In some of the tests, particularly those of the private universities, the level of difficulty would be difficult for most students to handle, and this situation has not improved between 2005 and 2008. This calls into question the validity of these tests, since incomprehensible reading passages would lead students to guess and to use test-taking strategies rather than an understanding of the reading passages to choose their answers.

The JACET 8000 list is useful as a standard to check vocabulary. There are programs available online for making use of this frequency list. One (<http://www01.tcp-ip.or.jp/~shin/j8web/j8web.cgi>) shows the percentage of words at each level, both in terms of total words and unique words. It also provides a list of the words at each level, with the number of occurrences. In addition, the JACET 8000 Level Marker (<http://www01.tcp-ip.or.jp/~shin/J8LevelMarker/j8lm.cgi>), produces a text with words color coded according to their level of difficulty.

Some tests have readability ratings that indicate that they may be too difficult for most students. Online calculators of readability are available for the purpose of checking the readability of reading passages. For example, the one available at http://www.online-utility.org/english/readability_test_and_improve.jsp calculates various statistics about a reading passage, such as the number of words per sentences, as well as several readability scales. It also lists sentences that might be problematic. This would make it easy for test makers to identify long sentences that would give test takers difficulty.

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