

# Lexical Threshold of L2 Reading in the Korean CSAT\*

Chon, Yuah V.

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## I. Introduction

As well known in the educational domain of South Korea, most prestigious universities will require pre-university students to take the state-administered College Scholastic Ability Test (CSAT), better known as the *Suneung*, a high-stakes test used to predicatively assess students' eligibility to study at their universities (Choi, 2008; Lee & Winke, 2012). There has been the effort by the past Korean Ministry of Education, Science and Technology to have another general proficiency test, the National English Ability Test (NEAT), with skills of English speaking and writing sections additionally incorporated to replace the CSAT from 2012 (Kang, 2010). However, this plan has recently been put to an end, one of the reasons being that it will further pressurize stakeholders, such as parents and students alike when they have to rely more on private

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education (Bahk, 2014). The CSAT still continues to be the most significant test as indicators of academic achievement for university administrators to predicatively assess students' ability to study at their universities.

In spite of its influence for over two decades since its first administration in 1993, interest in the linguistic aspect of the test, that is, particularly the lexical features of the test has not received parallel attention compared to the fervor expressed by the stakeholders. This is surprising considering that there is abundance of studies demonstrating the significant contribution of vocabulary to language proficiency (Schmitt 2010; Schmitt, Jiang, & Grabe, 2011; Segalowitz, 2005), and vocabulary as an important predictor of L2 reading ability (Bernhardt & Kamil, 1995; Koda, 2005; Laufer, 1992; Laufer & Ravenhorst-Kalovski, 2010; Martinez & Murphy, 2011; Nation 2001, 2006; Nation & Beglar, 2007; Qian, 2002). This points to how we need an analysis of the lexical aspects so as to inform test-takers on the type and level of vocabulary they need to take the CSAT.

In sum, the purpose of the present research is threefold: One is to be able to examine the lexical profile, such as via calculating lexical variety for the twenty-one years of the English reading section of the CSAT. This will demonstrate to test-takers the extent to which they have to be aware of different words. The passages will also be examined in terms of the length of reading passages so as to ascertain the demand it has made on learners' reading fluency. The second aim of the study is to chart the CSAT vocabulary according to the 14 word families, which have been organized according to headwords of the British National Corpus (BNC), a reputable native-speaker corpus. This is so as to ascertain how the different words have been utilized (i.e., range) over the twenty-one years of the CSAT. This will be referred to as the 'range of words' in the study.

There is virtually no information on this in the domestic context for the identical period, and the analysis may outline how the lexicon in the CSAT reading passages matches up to the native speaker corpus, BNC. A third purpose is a pedagogical one. As proposed by Laufer and Ravenhorst–Kalovski (2010), the researcher tries to derive lexical thresholds at two levels, that is, when readers need minimally 95% word coverage and optimally 98% word coverage in a text (including proper nouns). This type of information is deemed to be helpful since it helps test-takers in setting learning goals for vocabulary. Thus, for example, if the lexical threshold level is found to be 8,000 word families, then to prepare for the test, test takers should try to reach this vocabulary size if they intend to reach high scores.

## II. Background

### 1. Lexical Threshold Levels of L2 Reading

There have been numerous studies that have seen vocabulary as an important component of L2 reading ability (Bernhardt & Kamil, 1995; Droop & Verhoeven, 2003; Koda, 2005; Laufer, 1992, 1997; Laufer & Ravenhorst–Kalovski, 2010; Martinez & Murphy, 2011; Nation 2001, 2006; Nation & Beglar, 2007; Qian, 2002). Droop and Verhoeven (2003) demonstrated a powerful causal effect of vocabulary on the reading comprehension of third- and fourth-grade minority children in the Netherlands. More recently, Qian (2002) found correlations from  $r = .68$  to  $r = .82$  between TOEFL reading and three vocabulary measures. Also dealing with the relationship between vocabulary and reading comprehension, Schmitt, Jiang, and Grabe (2011) focused on the

relationship between percentage of vocabulary known in a text and level of comprehension of the same text. Their results revealed a relatively linear relationship between the percentage of vocabulary known and the degree of reading comprehension.

Regarding our main interest, most researchers agree that general reading skills can operate most efficiently when the reader possesses a critical mass of L2 knowledge referred to as the threshold of L2 knowledge (Bernhardt & Kamil, 1995; Carrell, 1991; Laufer & Ravenhorst-Kalovski, 2010; Lee & Schallert, 1997). Some examples of general reading skills include the competence to be able to infer meaning of unknown words from context, having awareness of discourse structures and distinguishing between main and peripheral information. Here L2 knowledge includes grammatical and lexical knowledge. Regarding lexical knowledge, studies have been conducted to investigate the relationship between L2 vocabulary knowledge and success in reading comprehension, and subsequently, to find the minimal vocabulary that is necessary for the target reading tasks (i.e., lexical threshold for successful L2 reading) (Hirsh & Nation, 1992; Hu & Nation, 2000; Nation, 2006). As such, the interest has been on how many words are really necessary in order to comprehend most texts. While a number of researchers have investigated this relationship, for L2 learners, a reasonable vocabulary goal is the amount of lexis that is necessary to enable them to conduct various forms of communication. Carter (1998) remarks that non-native speakers need to learn 1,000 word families per year to catch up with the level of an educated native speaker. Hu and Nation (2000) reported that knowledge of 98~99% of the lexical items in a written text is required to avoid comprehension problems caused by new words.

Adolphs and Schmitt (2003) also reported that 3,000 word families plus proper nouns are necessary for successful everyday conversation, when a

95% coverage rate is assumed. Nation (2006) has also shown that a 98% lexical coverage of authentic written texts of wide-ranging genres and subject matters translates into a demand of an 8,000~9,000 word family vocabulary. In effect, Nation and Beglar (2007) presented how there is a recognition of a threshold vocabulary size for the different tasks L2 learners may want to conduct; children's movies requires the knowledge of 6,000 word families; the goal of around 8,000 word families is an important criterion for learners who wish to deal with unsimplified spoken and written texts, and a size of 9,000 word families is needed to have 98% coverage for reading novels.

Using statistics derived from the British National Corpus, Laufer and Ravenhorst-Kalovski (2010) revisited the lexical threshold for 'adequate reading comprehension' (p. 15). In their study, they explore the relationship between second language (L2) learners' vocabulary size, lexical text coverage that their vocabulary provides and their reading comprehension. They conceptualize 'adequate reading comprehension' to indicate that 'adequate' comprehension has no clear definition since it may refer to different levels of comprehension in different contexts, so that they explain that the lexical thresholds will depend on what is considered adequate. An example is when different university disciplines may require different levels of reading proficiency on an identical university entrance test due to different quantities of reading material in English as L2.

Regarding results, Laufer and Ravenhorst-Kalovski deduce that adequate reading proficiency, and consequently lexical threshold, is going to be different according to target L2 reading purposes and materials. For their target learners, the researchers suggest two thresholds: an optimal one, which is the knowledge of 8,000 word families yielding the coverage of 98% (including proper nouns) and a minimal one, which is 4,000-5,000 word families resulting in the coverage of 95% (including proper nouns).

Apparently, the threshold levels would differ according to different purposes of reading. However, in general terms, Nation (2001) has previously claimed that there needs to be 95% coverage of words (i.e., situation in which only 5 words out of a 100 should be unknown) if we want learners to be able to execute vocabulary guessing strategies (e.g., guessing from context) in the case when the learners meet unknown words while reading.

All in all, it can generally be seen that access to vocabulary knowledge is a key factor that influences learners' reading performance. Previous research has also illustrated how there are going to be different lexical threshold levels required for different reading tasks. In the context of the present study, there is interest in lexical threshold levels that will yield an optimal 98% coverage (including proper nouns) and a minimal 95% coverage (including proper nouns) when having to deal with the reading passage of the CSAT.

## **2. Previous Corpus-based Studies on the Korean CSAT**

Counter to the fervent interest that has been exhibited among the stakeholders of the CSAT owing to strong washback effects (Choi, 2008; Lee & Winke, 2012), the state-run test has received less attention for lexical aspects. The test has received attention for the development of item difficulty prediction models (Chang, 2004; Chon & Shin, 2010; Jin & Park, 2004), relationship between learner variables and the CSAT (Chon & Shin, 2011; Sung, 2004), washback effects of the CSAT (Cho, 2011), analysis of the CSAT and features with respect to curriculum-based textbooks (Kim & Ma, 2012), validations of the CSAT (Kim & Kang, 2012), and analysis of item characteristics regarding CSAT test results (Yun, Lee, & Park, 2010). Corpus-based studies have been conducted by

a number of researchers (Goh & Back, 2010a, 2010b; Joo, 2008; Kim, 2008; Song, 2012), however, on limited sets of the CSAT for which there are now twenty-one years of CSAT to observe the lexical variety of reading passages, and there have been scarcity of studies devoted to analyzing lexical coverage (i.e., how words are used at different word levels) or lexical threshold levels, for instance, minimal 95% coverage or optimum 98% coverage.

Kim (2008) studies the lexical characteristics of the 2001 ~ 2008 CSAT for reading and listening texts. The study focuses on the tokens, types, type/token ratio (TTR), high-frequency words, and collocational pairings. As results, the researcher reports on the difference he finds between the CSAT and the curriculum-based textbooks. The researcher also examines the uses of high-frequency delexicalized words (i.e., have, take, make, and do), but gathers that textbooks are not sufficient in helping students fully use collocational pairs effectively due to the lack of reflection and explanation in textbooks. He emphasizes that there is need for a collocational approach based on a deeper understanding of the lexicon of the curriculum.

While aiming to comparatively analyze the vocabulary in the BEWL (Basic English Word List) of the SCM (School Curriculum Manual) that states the standards of the National Curriculum and the CSAT (the College Scholastic Ability Test), Joo (2008) carried out an analysis for the distribution of words by frequency in the BEWL and CSAT. Joo utilized the CSAT administered from 1993, the first year of the CSAT, to 2006. The researcher found that the SCM should be more specific on the criteria concerning affixes, polysemies, and academic words. He draws the implication on how the CSAT vocabulary should be more carefully designed since the CSAT fails to balance vocabulary difficulty between one set of the CSAT and another.

Goh and Back (2010b) conducted a corpus-based, comparative study of the CSAT English exams in Korea, China, and Japan, and its main goal was to analyze the vocabulary used in these English exams to evaluate the appropriateness of the exams for measuring prospective college students' English proficiency for higher education. The results indicated the Korean CSAT to demonstrate the highest vocabulary level. However, in spite of the relative lexical status of the CSAT, the researchers express doubts on the appropriateness of the Korean English exam in achieving the important evaluative goal, mainly due to its low coverage of college-level vocabulary. The researchers report that a large number of words, which seemed to be beyond college level, in fact, consisted of colloquial expressions and proper nouns, where a substantial portion of those words turned out to be so-called hapax legomena (i.e., words which occur only once in a text).

As a whole, the literature indicates that the restricted number of years of the CSAT utilized demonstrates transient examination of the lexical features of the CSAT (Goh & Back, 2010a; Joo, 2008; Kim, 2008; Song, 2012) without sufficiently analyzing the range of words or proposing a lexical threshold level. The studies have also been limited in the number of CSAT that could be available for the calculations or interpretations on lexical variety or complexity. (See later Methods for how this was measured.) To conduct a lexical analysis of the CSAT reading texts, the study was guided by the following research questions:

1. What is the lexical profile (i.e., type, token, standardized type-token ratio, words per item) of the CSAT across the academic years 1994 ~ 2014?
2. What is the range of CSAT words according to the 14 word families of the British National Corpus for 1994 ~ 2014 CSAT?



3. What is the lexical threshold level necessary of test takers to obtain minimal 95% or optimal 98% coverage for the reading passages of the CSAT?

### III. Methods

#### 1. Corpus for the Korean College Scholastic Ability Test

The corpus used for the present study consisted of reading passages from the Korean College Scholastic Ability Test (CSAT) for academic years 1994 through 2014, which are labelled according to academic entrance years, and totaled 190,442 words. For corpus compilation, the listening scripts were excluded due to the different characteristics of discourse. The corpus consisted of reading texts from the main CSAT, which totaled 23 tests, and resulted in 89,514 words. The corpus for the tests were downloaded from <http://suneung.re.kr/board.do?BoardConfigNo=62&menuNo=238>.

#### 2. WordSmith Tools

For lexical variety, WordSmith Tools 3.0 (Scott, 1999) was utilized to calculate tokens, types, and standardized type–token ratios (STTR). ‘Type–token ratio’ is a measure to analyze the variety of words within a text (Read, 2000). When a text is 1,000 words long, it is regarded to have 1,000 ‘tokens’, while ‘type’ refers to the number of different words within the number of ‘tokens.’ As such, a text of 1,000 words with 400 different words would produce a ‘type–token ratio’ of 40%. However, as pointed out

by Scott (2010), this calculation is problematic since many of words (e.g., functions words) will be repeated with larger texts so that this produces a lower type–token ratio. To resolve this, ‘standardized type/token ratio (STTR)’ is computed every n word as Wordlist at the program goes through each text file. By default, n = 1,000. In other words the ratio is calculated for the first 1,000 running words, then calculated afresh for the next 1,000, and so on to the end of the text or corpus. A running average is computed, which means that an average type/token ratio based on consecutive 1,000–word chunks of text will be calculated, which is a STTR.

### 3. BNC RANGE Program

The words in the reading passages of CSAT were analyzed with the RANGE program (from <http://www.vuw.ac.nz/lals/staff/paul-nation/nation.aspx>) to produce word family frequency figures (i.e., the total number of times the word and its family members occur in texts) which was compared to a word list of the BNC from the 1<sup>st</sup> 1,000 to the 14<sup>th</sup> 1,000 word families (Heatley, Nation, & Coxhead, 2002) so as to find the coverage of a text by the word list (i.e., word coverage).

The BNC, with more than 100 million words, is considered one of the largest corpora of present–day English usage in speech and in publications in the United Kingdom (Leech, Rayson, & Wilson, 2001). With the program, the 14,000 high–frequency word families are divided into fourteen base word lists, each containing 1,000 word families, so that analysis of the corpus is possible at fourteen different levels.

#### 4. Data Collection and Analysis

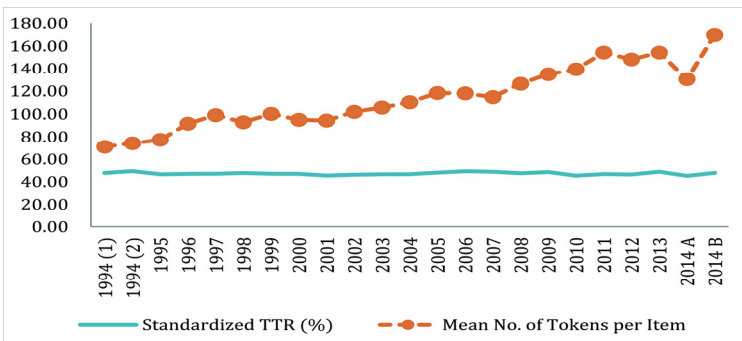
Prior to analysis of the English reading passages of the 1994 ~ 2014 CSAT, there was first need to compile the corpus of the tests. Among the items, only the reading items were of interest, which consisted of reading passages, options and sometimes figures, which were excluded. The compilation of the corpus produced twenty-three separate text files, consisting of twenty-one years of the main CSAT, and one extra version respectively for academic years 1994 and 2014 CSAT (i.e., 1994[1], 1994[2]; 2014[A], 2014[B]). Before submitting the text files for analysis, the files had to be data cleaned. This consisted of spacing the hyphenated words, eliminating any figures which may be the cause of errors in the analysis (i.e., ①~⑤), or those that could not be identified by the vocabulary analysis program (i.e., RANGE), such as directions in Korean. Measures were taken to also spot and correct any spelling errors so as to maximize accuracy. In the final stages of the analysis, the results and interpretation were cross-checked with another researcher, who is a university faculty member in the Department of English Literature, to establish reliability and validity of the calculation of the vocabulary measures and in calculating the minimum 95% and optimal 98% threshold levels. One of the agreements that was made is that the consideration of 'proper nouns' should be included in calculating the threshold levels since knowledge of them by the test-takers can be hypothesized due to their cognitive level, who are high school learners (Laufer & Ravenhorst-Kalovski, 2010), and guidance in the test when a glossary with an asterisk (\*) is provided in the CSAT for these type of words.

## IV. Results and Discussion

### 1. Lexical Profiles of CSAT

Examination of the reading passages for the main CSAT administered for the past twenty-one years, that is for academic years 1994 through 2014, was conducted for lexical measures in order to gather the trend of the tests. That is, values were obtained for tokens, types, standardized type-token ratios (STTR), and the number of reading comprehension (R/C) items were counted so as to calculate the average number of tokens per item that had appeared on the tests. Figure 1 and Table 1 indicate data on the lexical features.

FIGURE 1: Lexical Profile for Mean No. of Tokens/Item and STTR for CSAT



Uniquely, the main CSAT was administered twice in 1994, and the recent CSAT in 2014 was administered for the easier A version and the more difficult B version. In concert with Figure 1, Table 1 records STTR figures, which is an indicator of lexical richness (Scholfield, 1995), and reflects greater use of different words. Here STTR rather than TTR

(type–token ratio) was used to reconcile for the different number of words appearing in each CSAT text (Cheng, 2012) since TTR varies in accordance with the length of the text.

TABLE 1: Lexical Profiles of Main CSAT for Reading (1994~2014)

	No. of R/C Items	Tokens	Types	TTR (%)	Standardized TTR (%)	Mean No. of Tokens per Item
1994 (1)	42/50	2,987	1,079	36.12	47.85	71.12
1994 (2)	42/50	3,119	1,182	37.90	49.47	74.26
1995	42/50	3,247	1,111	34.22	46.60	77.31
1996	40/50	3,664	1,229	33.54	47.00	91.60
1997	38/55	3,764	1,232	32.73	47.07	99.05
1998	38/55	3,528	1,233	34.95	47.70	92.84
1999	38/55	3,808	1,232	32.35	47.03	100.21
2000	38/55	3,609	1,170	32.42	46.97	94.97
2001	33/50	3,112	1,025	32.94	45.43	94.30
2002	33/50	3,366	1,122	33.33	46.20	102.00
2003	33/50	3,486	1,133	32.50	46.57	105.64
2004	33/50	3,639	1,183	32.51	46.73	110.27
2005	33/50	3,903	1,365	34.97	48.07	118.27
2006	33/50	3,894	1,395	35.82	49.30	118.00
2007	33/50	3,784	1,359	35.91	48.90	114.67
2008	33/50	4,172	1,421	34.06	47.53	126.42
2009	33/50	4,450	1,551	34.85	48.60	134.85
2010	33/50	4,599	1,458	31.70	45.38	139.36
2011	33/50	5,094	1,640	32.19	46.80	154.36
2012	33/50	4,890	1,617	33.07	46.40	148.18
2013	33/50	5,092	1,705	33.48	48.84	154.30
2014 A	23/45	3,001	993	33.09	45.15	130.48
2014 B	23/45	3,906	1,387	35.52	47.83	169.83

Note: R/C = Reading Comprehension

Ranging between 45.15% and 49.47%, the STTR indicates that the variety of words employed over the years has been controlled for its lexical variety, which is advisable for high-stakes tests such as the CSAT. However, the recent 2014A CSAT experienced a sharp fall at 45.15% when the test was designed for easier vocabulary. In comparison, the more difficult 2014B CSAT reached an STTR of 47.83%. Even though both tests were designed to have 23 R/C items, there is evidently a difference in lexical variety that the student-testees will have experienced. As a whole, the trend may allow us to predict how the STTR in future tests is likely to remain within the range of +/-50(%), a case where there are +/-1,000 types for 2,000 tokens in a reading passage. Incidentally, how large a vocabulary size at different word bands (e.g., high-frequency and low-frequency words) is needed to deal with the English section of the CSAT, that is the L2 vocabulary coverage estimate, will be discussed in the subsequent, *2. Range of Words and Vocabulary Coverage* for the CSAT.

Regarding the mean no. of tokens per test item (Refer to previous Table 1 and Figure 1), academic years 1994 through 2014 overall evidenced noticeable increases. There was a sharp rise in the 2011 CSAT before reaching its pinnacle of 169.83 tokens in the 2014B, which was targeted towards the advanced-level students. The 2014B apparently seems to have put a burden on reading fluency, which consists of the ability to read rapidly with ease and accuracy, and to read with appropriate expression and phrasing (Grabe, 2009). Previous observations (Kuhn & Stahl, 2003; Segalowitz, 2000) have revealed that it is automaticity as a part of fluency that allows readers to attend to the meaning of the text, the textual context, and required background knowledge without being slowed down by attentional word-recognition demands, thus leading to increased reading comprehension.

Considering the general trend over the years, the increasing number of tokens that the students have had to deal with on the CSAT can be deemed exceedingly demanding for an average Korean high school EFL senior. Whereas it was only 148.18 tokens/item in 2012, the number of tokens observed for 2014B, in fact, reached almost 170 tokens (i.e., 169.83) per item, and when this is for 23 items, this actually totals up to an increase of 497.95 more words (21.65 words x 23 items). As indicated in Table 1, the 2014B CSAT, in effect, indicates the greatest number of words ever presented on the CSAT since administration. Among those who took the 2014B, the experience may have been quite overwhelming if they had been used to reading 130~150 words (inclusive of options) for each item on practice CSAT.

The findings on the total number of words in relation to the number of items on the most recent 2014B indicates that the item writers of future tests may need to check if increasing the number of words will actually improve the construct validity of the reading items. That is, item writers will need to check for themselves in the forthcoming CSAT whether the number of words students will have to read, during which students are expected to meet various lexical problems, are provided with reasonable amount of time to tackle the language problems they meet in the process of reading. Learners under testing situations will be placed under drastically different emotive situations from their usual reading tasks. The findings provide a reminder that “[r]eading comprehension is critically dependent on the reader’s fluency and in identifying printed words, as reflected in the reader’s accuracy and speed in identifying words in a passage” (Vellutino & Scanlon, 2003; p. 60). Thus, item writers of the CSAT would need to establish a balance regarding the acceptable level of lexical variety (STTR) and the expected time needed for pre–university EFL students to deal with test items. For instance, in the case of the

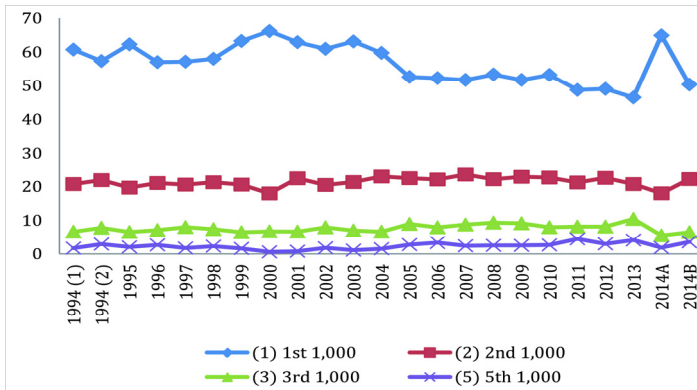
2014B CSAT, since no more than about 30 minutes was allotted to the listening section, this would have left 40 minutes for the learners to attend to the 23 R/C items, which leaves around 1 minute 44 seconds for the 170 words that the students have to comprehend for each item. The aforementioned features of a test item, in particular, the number of words allotted to each item, and the time needed to decode words, will need to be considered and piloted to see that the high-stakes exam aims for a valid goal.

## 2. Range of CSAT Words

With regard to research question 2, this section deals with analyzing the CSAT words of the reading passages that has been utilized at each of the fourteen word bands of the BNC. Ultimately, scrutiny of this is necessary to be able to calculate the cumulative percentages to estimate lexical threshold levels for minimal 95% and optimal 98% coverage.

As a basis, the first step of the analysis involved obtaining frequencies and percentages on range of word families according to the fourteen BNC word bands. Twenty-one years or twenty-three sets of the main CSAT corpus was utilized for this purpose and Table 2 illustrates the full range of word families at the different bands with inclusion of calculation on proper nouns, exclamatory words, and 'not in the list' words which do not belong in any of the fourteen word families of the BNC. For examination on the trend of high-frequency words (i.e., 1<sup>st</sup>~5<sup>th</sup> word bands), Figure 2 was produced based on Table2 with percentages of words at the different word bands. Here the 1<sup>st</sup>~3<sup>rd</sup> 1,000 word bands refer to high-frequency vocabulary, and the 5<sup>th</sup> 1,000 word band refers to the upper limit of high-frequency vocabulary(Read, 2000).



FIGURE 2: Word Range with BNC for 1<sup>st</sup>~5<sup>th</sup> 1,000 Word Bands

For the 1<sup>st</sup> 1,000 word band, there is evidently a fall in the number of word families that has been utilized over the years. This has given relatively more opportunity for words to be retrieved at the lower frequency bands. For instance, as indicated in Figure 2, this generated more words at the 3<sup>rd</sup> and 5<sup>th</sup> 1,000 word bands albeit not seeming drastic. The rise at the 3<sup>rd</sup> 1,000 word band indicates an increase of those words which are used in upper secondary school and university texts from a wide range of subjects, however, which are not in the first 2,000 words of English. At this level, the percentage of these words were as low as 6.48% for the 1999 CSAT and as high as 10.45% for the 2013 CSAT (with the exception of 5.52% for the 2014A CSAT which by intent was easier than the 2014B CSAT). On the other hand, the 5<sup>th</sup> 1,000 word band can be noted for its steady increase; it was only 0.59% in the 2000 CSAT whereas its highest was at 4.46% in the 2011 CSAT. Figure 3 and Table 2 will also be examined to see how the percentages for word coverage have developed for the more challenging low-frequency word bands.

TABLE 2: Word Coverage with BNC for 1<sup>st</sup>~14<sup>th</sup> 1,000 Word Bands by No. of Word

Word Level	1994 (1)	1994 (2)	1995	1996	1997
(1) 1 <sup>st</sup> 1,000	504/60.72	513/57.32	522/62.29	536/57.02	536/57.14
(2) 2 <sup>nd</sup> 1,000	172/20.72	196/21.90	165/19.69	198/21.06	193/20.58
(3) 3 <sup>rd</sup> 1,000	55/6.63	70/7.82	55/6.56	67/7.13	75/8.00
(4) 4 <sup>th</sup> 1,000	36/4.34	37/4.13	29/3.46	44/4.68	38/4.05
(5) 5 <sup>th</sup> 1,000	14/1.69	26/2.91	17/2.03	25/2.66	16/1.71
(6) 6 <sup>th</sup> 1,000	9/1.08	7/0.78	11/1.31	15/1.60	14/1.49
(7) 7 <sup>th</sup> 1,000	6/0.72	9/1.01	4/0.47	8/0.85	5/0.53
(8) 8 <sup>th</sup> 1,000	7/0.84	7/0.78	8/0.95	6/0.64	2/0.21
(9) 9 <sup>th</sup> 1,000	3/0.36	4/0.45	1/0.12	3/0.32	4/0.43
(10) 10 <sup>th</sup> 1,000	2/0.24	4/0.45	2/0.24	2/0.21	3/0.32
(11) 11 <sup>th</sup> 1,000	3/0.36	0/0.00	0/0.00	1/0.11	3/0.32
(12) 12 <sup>th</sup> 1,000	1/0.12	1/0.11	0/0.00	0/0.00	4/0.43
(13) 13 <sup>th</sup> 1,000	1/0.12	2/0.22	0/0.00	4/0.43	1/0.11
(14) 14 <sup>th</sup> 1,000	3/0.36	1/0.11	1/0.12	0/0.00	2/0.21
Proper Nouns	6/0.72	8/0.89	15/1.79	12/1.28	17/1.81
Exclamations	1/0.12	1/0.11	1/0.12	7/0.74	7/0.74
Not in the lists	7/0.84	9/1.01	7/0.84	12/1.28	18/1.92
<b>(1)+(2)+...(14)</b>	<b>816/98.31</b>	<b>877/97.99</b>	<b>815/97.26</b>	<b>909/96.70</b>	<b>896/95.52</b>
Total	830/100	895/100	838/100	940/100	938/100

1998	1999	2000	2001	2002	2003
540/58.01	556/63.25	560/66.19	482/62.92	506/60.96	524/63.13
198/21.29	181/20.59	152/17.97	172/22.45	170/20.48	177/21.33
69/7.42	57/6.48	57/6.74	51/6.66	66/7.95	58/6.99
43/4.62	28/3.19	19/2.24	18/2.35	29/3.49	27/3.25
21/2.26	14/1.59	5/0.59	6/0.78	15/1.80	9/1.08
12/1.29	9/1.02	5/0.59	6/0.78	10/1.20	8/0.96
7/0.75	2/0.23	1/0.12	2/0.26	6/0.72	4/0.48
5/0.53	8/0.91	2/0.24	1/0.13	6/0.72	1/0.12
3/0.32	3/0.34	2/0.24	2/0.26	1/0.12	2/0.24
3/0.32	1/0.11	1/0.12	0/0.00	0/0.00	2/0.24
2/0.21	1/0.11	2/0.24	1/0.13	0/0.00	2/0.24
0/0.00	0/0.00	0/0.00	0/0.00	0/0.00	0/0.00
2/0.21	0/0.00	0/0.00	0/0.00	0/0.00	1/0.12
2/0.21	1/0.11	0/0.00	2/0.26	0/0.00	0/0.00
10/1.08	6/0.68	23/2.72	14/1.83	6/0.72	10/1.20
0/0.00	1/0.11	0/0.00	0/0.00	1/0.12	0/0.00
13/1.40	11/1.25	17/2.01	9/1.17	14/1.69	5/0.60
<b>907/97.53</b>	<b>861/97.95</b>	<b>806/95.27</b>	<b>743/97.00</b>	<b>809/97.47</b>	<b>815/98.19</b>
930/100	879/100	846/100	766/100	830/100	830/100

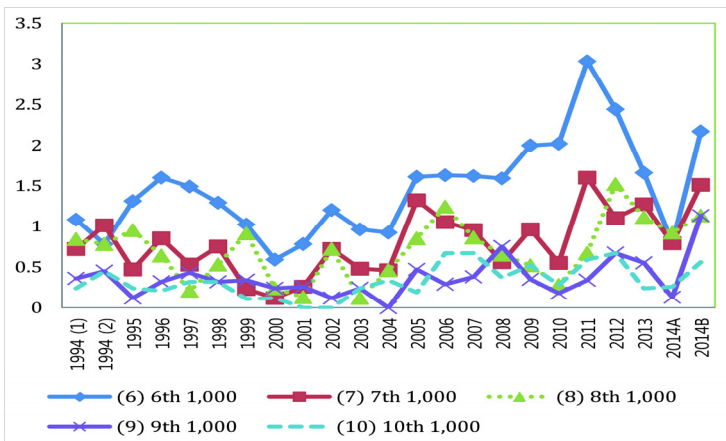
2004	2005	2006	2007	2008	2009
522/59.73	557/52.60	546/52.25	542/51.72	570/53.32	594/51.70
201/23.00	238/22.47	231/22.11	247/23.57	237/22.17	263/22.89
58/6.64	95/8.97	83/7.94	92/8.78	100/9.35	105/9.14
38/4.35	39/3.68	55/5.26	51/4.87	53/4.96	50/4.35
13/1.49	29/2.74	35/3.35	25/2.39	27/2.53	29/2.52
8/0.92	17/1.61	17/1.63	17/1.62	17/1.59	23/2.00
4/0.46	14/1.32	11/1.05	10/0.95	6/0.56	11/0.96
4/0.46	9/0.85	13/1.24	9/0.86	7/0.65	6/0.52
0/0.00	5/0.47	3/0.29	4/0.38	8/0.75	4/0.35
3/0.34	2/0.19	7/0.67	7/0.67	4/0.37	6/0.52
1/0.11	3/0.28	2/0.19	0/0.00	2/0.19	3/0.26
1/0.11	1/0.09	1/0.10	0/0.00	2/0.19	3/0.26
1/0.11	1/0.09	2/0.19	0/0.00	5/0.47	3/0.26
0/0.00	0/0.00	2/0.19	1/0.10	0/0.00	0/0.00
5/0.57	27/2.55	18/1.72	27/2.58	7/0.65	25/2.18
0/0.00	1/0.09	0/0.00	1/0.10	0/0.00	2/0.17
15/1.72	21/1.98	19/1.82	15/1.43	24/2.25	22/1.91
<b>854/97.91</b>	<b>1010/95.37</b>	<b>1008/96.46</b>	<b>1005/95.90</b>	<b>1038/97.10</b>	<b>1100/95.74</b>
874/100	1,059/100	1,045/100	1,048/100	1,069/100	1,149/100

2010	2011	2012	2013	2014A	2014B
580/53.21	579/48.74	582/49.03	587/46.48	494/64.91	534/50.33
247/22.66	252/21.21	268/22.58	262/20.74	137/18.00	236/22.24
87/7.98	97/8.16	97/8.17	132/10.45	42/5.52	69/6.50
66/6.06	73/6.14	65/5.48	95/7.52	30/3.94	62/5.84
29/2.66	53/4.46	35/2.95	52/4.12	14/1.84	38/3.58
22/2.02	36/3.03	29/2.44	21/1.66	6/0.79	23/2.17
6/0.55	19/1.60	13/1.10	16/1.27	6/0.79	16/1.51
3/0.28	8/0.67	18/1.52	14/1.11	7/0.92	12/1.13
2/0.18	4/0.34	8/0.67	7/0.55	1/0.13	12/1.13
3/0.28	7/0.59	8/0.67	3/0.24	2/0.26	6/0.56
4/0.37	3/0.25	4/0.34	7/0.55	1/0.13	4/0.38
4/0.37	3/0.25	3/0.25	7/0.55	2/0.26	4/0.38
4/0.37	4/0.34	2/0.17	5/0.40	0/0.00	5/0.47
1/0.09	1/0.08	5/0.42	3/0.24	0/0.00	2/0.19
9/0.83	19/1.60	15/1.26	23/1.82	5/0.66	14/1.32
0/0.00	1/0.08	1/0.08	0/0.00	0/0.00	0/0.00
23/2.11	29/2.44	34/2.86	29/2.30	14/1.84	24/2.26
<b>1058/97.06</b>	<b>1139/95.88</b>	<b>1137/95.79</b>	<b>1211/95.88</b>	<b>742/97.50</b>	<b>1023/96.42</b>
1090/100	1188/100	1187/100	1263/100	761/100	1061/100

The lines in Figure 3 again was based on the percentages as indicated in Table2. Different from Figure 2, Figure 3 needs to be interpreted with

caution since the graph makes an impression that the differences are larger than the actual percentages. Although the lines are steep and volatile within the graph, there is generally an indication of an eventual increasing trend for all of the low-frequency word bands, and this can be attributed to the lower portion of words used at the higher frequency bands (e.g., 1<sup>st</sup> 1,000 words) that we saw previously in Figure 2. In particular, words utilized at the 6<sup>th</sup> 1,000 word band reached a peak of 3.03% in the 2011 CSAT, while it was only 0.59% in the 2000 CSAT. The sharp dip evidenced for the 2014A CSAT at the 6<sup>th</sup>, 7<sup>th</sup> and 8<sup>th</sup> 1,000 word bands is due to the intentional easier standard of the test. All in all, the trend noted for the twenty-years of the CSAT suggest how we will continue to experience higher portion of words utilized at the lower frequency bands (i.e., 6<sup>th</sup> ~ 10<sup>th</sup> 1,000 words) while expecting sustained or reduced percentage of words at the higher frequency bands (i.e., 1<sup>st</sup> ~ 5<sup>th</sup> 1,000 words). However, the learning of the low-frequency words should not be at the cost of neglecting the high-frequency words.

FIGURE 3: Word Range with BNC for 6<sup>th</sup>~10<sup>th</sup> 1,000 Word Bands



### 3. Lexical Thresholds of the CSAT

Regarding our main query (i.e., research question 3) on the lexical threshold levels, cumulative percentages for the 1<sup>st</sup>–14<sup>th</sup> 1,000 word bands were calculated. However, in the calculation for the average of the word coverage levels, 2014A CSAT was eliminated due to the different type of test items and its level of words. As seen in Table 3, when calculated, the mean word coverage for the reading section of the CSAT reached almost 97% (i.e., 96.74%) for academic years 1994 through 2014. It was only with the inclusion of the ‘proper nouns,’ ‘exclamations’ and ‘not in the list’ that the cumulative percentages produced 100% coverage (96.74 + 1.45 + 0.12 + 1.69; See Table 3). Here a majority of ‘not in the list’ words refer to those that are not included within the 14 word families of the BNC.

TABLE 3: Mean and Cumulative Percentages of Word Coverage (1994 ~ 2014)

Word Band	1st	2nd	3rd	4th	5th	6th	7th	8th	
		[21.53]	[7.75]	[4.47]	[2.36]	[1.49]	[0.79]	[0.70]	
Cum. %	56.28	77.81	85.56	90.02	92.38	93.87	94.67	95.37	
	9th	10th	11th	12th	13th	14th	Proper Nouns	Excl–mtns	‘Not in the list’
	[0.38]	[0.33]	[0.21]	[0.15]	[0.19]	[0.12]	[1.45]	[0.12]	[1.69]
	95.74	96.08	96.29	96.43	96.62	96.74	98.19	98.30	100

Note: [ ] indicate mean percentages; Cum.% = Cumulative Percentages

With regard to our primary concern on the threshold vocabulary knowledge that would produce minimal 95% and optimal 98% coverage for the 1994 ~ 2014 CSAT, it was minimally knowledge of 6,000 words that

learners needed for 95% coverage when ‘proper nouns’ were included ( $93.87 + 1.45 = 95.32\%$ ). For 98% coverage, it was knowledge of 13,000 words, again when ‘proper nouns’ were included ( $96.62 + 1.45 = 98.07\%$ ). As conducted by Laufer and Ravenhorst–Kalovski (2010), the inclusion of proper nouns can be claimed to be fair in the calculation since most readers, such as those test takers of the CSAT who are mainly high school learners, are likely to be able to recognize proper nouns.

For a more detailed analysis, there was examination of word coverage, as demonstrated in the most recent 2014B CSAT. It was found that for minimal 95% coverage (which actually reached 94.62%), there was need to know 8,000 word families ( $93.3 + 1.32$ ; See previous Table 2) with inclusion of proper nouns. This is 2,000 more word families compared to mean threshold level for 95% coverage during 1994 ~ 2014 (i.e., 6,000 word families). In the 2014B CSAT, it was knowledge of 14,000 words that produced almost 98% coverage (97.73%). To reach target lexical threshold levels, the results apparently indicate that prerequisite vocabulary knowledge is far beyond what has been stated in the 2009 National Curriculum of English, which sets the maximum lexical standard at “Within 3,500 word families” as in Advanced English Reading II (2011, Ministry of Education, Technology, Science & Technology).

All in all, the minimal lexical threshold of 6,000 words for the CSAT 1994 ~ 2014 indicates that exposure to materials merely set at the standards by the National Curriculum of English would not suffice. In fact, the analysis on vocabulary coverage draws our attention to how we may need to re-establish a target vocabulary size of at least 6,000 word families for minimal 95% coverage (rather than the maximum lexical standard of “within 3,500 word families” stated by the National Curriculum). In a similar vein, Nation (2006) has also stated that a 98% lexical coverage of authentic written texts of wide-ranging genres and



subject matters, (which often become the source of CSAT) requires knowledge of 8,000~9,000 word families. The overall results on estimating the lexical threshold levels point to how it is minimally 6,000 words (for 95% coverage), but probably more, such as, at the 8,000 word level, that is needed for improved coverage of the CSAT.

## V. Conclusion

Analysis on the reading passages of the CSAT for 1994 through 2014 yielded relatively constant figures for lexical variety over the years, ranging between 45.15% and 49.47%, when STTR was calculated. The analysis indicates that the CSAT as a high-stakes, nationally administered test, has been steady and well controlled for lexical variety over the years. However, the recent CSAT 2014B allowed us to see that there has been an abrupt increase of words to be decoded by the student-testees for each test item. Although we can expect the CSAT to be targeted towards Korean high school learners' general level of English proficiency in the academic year 2015 when versions A and B become unified (Bahk, 2014), the findings on the most recent 2014B CSAT act as a reminder that we may need to consider if this is the valid rate of reading expected of general Korean EFL learners. Some may argue that the students had less number of R/C items to attend to since there were 45 items in total for the 2014 CSAT compared to the previous 50 item test, but this was with the increased number of listening items (i.e., from 17 to 22 items) while the allotted time has normally been 70 minutes.

The analysis on range of CSAT words, on observing how words are distributed across the fourteen word bands of the BNC, indicated that student-testees have experienced a fall in the number of words utilized at

the 1<sup>st</sup> 1,000 word band, increasing the likelihood of words to be employed at the lower frequency bands. One of the reasons may be due to the increasing number of students with overseas experience in the domestic context of Korea and the awareness of a student population at Special Purposes High Schools where a good portion of them have received concentrated hours of instruction in English. However, the major criticism that can be gained from this is that there is an obvious mismatch between what has been stated in the National Curriculum of English and the range of words of the CSAT, which increasingly seems to require knowledge at the lower frequency bands. Even while we voice concern on this issue, the consequence will probably lead to sustained demand for private education, decontextualized learning of words for immediate and short-term learning gains, and interest in 'test-wiseness skills' (Cohen & Upton, 2006). What we need is a feasible and a realistic goal to be set in the curriculum of English that will match up with the lexical aims of the CSAT.

With regards to our main query on finding the lexical threshold levels for CSAT reading passages, cumulative percentages for the range of words demonstrated that it is minimally vocabulary knowledge of 6,000 word families (proper nouns included) that is necessary for 95% text coverage (i.e., being able to understand 95 words out of a 100). For 98% word coverage, there seems to be need for lexical knowledge as large as 13,000 word families (proper nouns included). However, this evidently does not seem like a viable goal since, for instance, previous research has found Korean high school learners to have a receptive vocabulary size of only around 6,000 word families (Shin, Chon & Kim, 2011) so that the gap would be too large and unreachable for many Korean high school learners. Accordingly, for standard of minimally acceptable comprehension, we propose 95% coverage (Laufer, 1992) to be a probabilistic threshold for adequate comprehension of a text. To make up for the unresolved 5%

coverage, teachers and L2 learners should be sensitized and trained on vocabulary guessing strategies (Nation & Coady, 1988; e.g., guessing from context). Again however, guessing from context will work only when a majority, that is, 95% of words are known to the reader (Liu & Nation, 1985). This makes sense since learners will not have a chance to show their guessing skills if the density of unknown words is too great.

As for vocabulary learning, there has been a thorough elaboration of vocabulary learning strategies (Schmitt, 1997), and it should be within the interest of teachers to bring these strategies to attention to make learners improve their metacognitive awareness (O'Malley & Chamot, 1990) since teachers themselves may not have the time or energy to expend on vocabulary teaching. More importantly, learners and teachers should become more sensitized to the concept of frequency-based learning of vocabulary, particularly when teachers and learners cannot make judgements on word selection; the learning of low frequency words should not be at the cost of not knowing the high-frequency words (Nation, 2001), and vocabulary items that are more frequently used in native-speaker corpora should generally receive more attention. For instance, there are lists such as those covering 1<sup>st</sup>~20<sup>th</sup> 1,000 word families from the BNC (at [http://conc.lectutor.ca/list\\_learn/](http://conc.lectutor.ca/list_learn/)) that will help guide teachers and learners to see which words deserve more attention than others. The site provides access to headwords at each of word bands for those interested in increasing vocabulary size.

Last but not least, the study ends with recommendations for future research. The CSAT lexical items would deserve closer scrutiny for their coverage in relation to pedagogic materials that are being used in the Korean context for L2 teaching (e.g., Educational Broadcasting System test booklets, National Curriculum-based textbooks). This, as a result, will be able to explain if the materials are giving sufficient exposure to

vocabulary at various levels. Also, the research was limited to utilizing a small corpus from the main exams of the CSAT, but subsequent research could be conducted for a more comprehensive analysis by also including the practice CSAT conducted in June and September (administered by the Korea Institute for Curriculum and Evaluation). The lexical analysis can be conducted for not only estimating a more comprehensive lexical threshold level for the test itself, but also for the different types of items that there are (e.g., fill-in-the blank, main idea). We may be able to observe if there are different lexical threshold levels for different item types to speculate how the range of words influence learners' rate of errors on the test items. However, these type of studies warrant a different kind of corpus compilation and novel research topics so that these are left for future studies.

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Abstract

## Lexical Threshold of L2 Reading in the Korean CSAT

Chon, Yuah V.

For over two decades in Korea, no other English exam has been able to replace the high-stakes Korean College Scholastic Ability Test (CSAT). From a lexical perspective, there has been transient analysis of the reading passages, however, without sufficient attention it deserves as the nationally administered exam. Twenty-one years of the main CSAT of English reading texts for academic years 1994 through 2014 were utilized to compile a specialized, small corpus. For analysis, lexical richness (STTR) was calculated, and distribution of the CSAT words across the fourteen word bands of the British National Corpus (BNC) was searched with RANGE to propose a lexical threshold level. By STTR, lexical variety indicated to be steady over the twenty-one years of the CSAT. However, the recent 2014B CSAT exhibited a noticeable increase of words compared to the CSAT in previous years, pressuring test-takers to improve reading fluency. The range and the percentage of CSAT words across the 14 word bands of the BNC indicated test-takers to minimally need a threshold of 6,000 word families for 95% coverage (including proper nouns) of the CSAT reading passages. The study ends with implications for L2 vocabulary learning.

**Key Words:** College Scholastic Ability Test, corpus, vocabulary, word coverage, lexical threshold

대학수학능력시험, 말뭉치, 어휘, 어휘 범위, 어휘 한계점

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이름 : 전 유 아

소속 : 한양대학교 사범대학 영어교육과

주소 : 133-791 서울시 성동구 왕십리로 222

이메일 : vylee52@hanyang.ac.kr