A Quantitative Corpus Analysis of Word Frequency
And Part of Speech in the English Textbooks
Used in Senior High Schools in Taiwan

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INTRODUCTION

Statement of the Problem

Of all the components involved in English language education--teaching materials, teaching methodologies and approaches, and students' learning strategies and motivation--the materials used may actually have the greatest effect on the student's acquisition of English. That is to say, if the textbook is adequate, teachers can teach their students more effectively and efficiently. As a result, their students may more easily acquire the requisite language skills and linguistic knowledge. Therefore, we need to examine the contents of the textbooks in order to judge whether they are appropriately compiled. The textbooks examined in this study were the six volumes used in all senior high schools in Taiwan. Each of the six textbooks covered one semester of English. The six volumes included in this study were for the 1991 academic year.

We treat these six volumes as our corpus of study. A corpus was defined by Aarts (1991) as "a collection of samples of running text", which "may be in spoken, written or intermediate forms, and the samples may be of any length" (p. 45). And corpus linguistics was described by Aijmer and Altenberg (1991) as "the study of language on the basis of text corpora" (p. 1). During the last three decades, corpus linguistics has expanded rapidly, due to two important events that took place around 1960. One was Randolph Quirk's launching of his Survey of English Usage (SEU) project in 1959. The other was W. Nelson Francis' and Henry Kucera's compilation of the Brown Corpus, "which was to set the pattern for many computer corpus projects" (Johansson, 1991, p. 305). This study is concerned with quantitative corpus analysis, with our efforts especially concentrated on vocabulary, vocabulary acquisition, and the effects of word frequency and part of speech on vocabulary acquisition. The vocabulary items under examination are the words in the 84 reading texts in these six English textbooks, the words in the first volume, and the test words in the monthly English examinations administered in the 1991 academic year at the Kaohsiung Senior High School in Taiwan.

There are at least two concepts for word frequency. One is the frequency with which a word appears in a representative corpus. In this sense, words are usually divided into low-frequency, middle-frequency, and high-frequency words. For example, Thorndike and Lorge (1963) listed the 500 words occurring most frequently in English. And Hofland and Johansson (1982) compared the relative frequencies of the 100 most frequent words in text categories A-J (newspaper, miscellaneous information prose, and learned and scientific English) against those in texts K, L, N, and P (different types of fiction). The other concept is the frequency a target word occurs in the target texts under examination. This study belongs to the latter case. In addition, the former researchers rigorously collected the corpora whose features better represented the parameters of the complete existing corpora than the corpus used in this study, which is specially edited for teaching purpose.

There have been many findings that the presence of low frequency vocabulary in a text has a negative effect on comprehension (Freebody & Anderson, 1983; Kameenui, Carnine, & Freschi, 1982; and Marks, Doctorow, & Wittrock, 1974). Also there have been well-established findings of frequency effects that facilitate the acquisition of
vocabulary (Forster & Chambers, 1973; and Rubenstein, Garfield, & Millikan, 1970). For example, Brown's (1970) experiments provide support for the hypothesis that word frequency is a decisive factor in the ability of non-native as well as native English speakers to spell certain items correctly.

However, other researchers have found that word frequency either does not have any effect or even produces a negative effect in some contexts. Moreover, mixed findings were found in some experiments. For instance, Jastrzembski's (1981) seven experiments with 165 undergraduates examining lexical access of words with multiple meanings revealed that words with many meanings were accessed quicker than words with few meanings. But that effect was achieved independently of word frequency. O'Connor and Forster (1981) conducted six experiments that found higher error rates in a lexical decision task for nonwords that were misspelled versions of higher-frequency words (e.g., brohter) instead of low-frequency words (e.g., bohter). And Smith, Smith, and Jones' (1976) findings showed that some subjects made more mistakes (failures to avoid forbidden words) with high-frequency words, while other subjects made more mistakes with low-frequency words.

There are also psychological experiments conducted to examine how people react to different parts of speech. For example, Olijla (1979) reported the result of his experiment with kindergarten children that showed a highly significant difference between the learning and retaining of nouns and those of nonnouns. More subjects failed to learn the nonnouns than the nouns. Moreover, Kusa (1976) conducted two short-term experiments respectively with 40 girls and 40 boys from the 8th grade. Their performance in both experiments deteriorated from nouns through adjectives to verbs. However, there were also contrary findings achieved in several other experiments. For instance, Danzger and Halpern (1973) examined the relationship of stuttering to parts of speech, finding that there were no significant differences existing among nouns, verbs, and adjectives.

Significance of the Study

The above section indicates that there is no consensus on the effects of either word frequency or part of speech on language learning. In addition, the literature review shows that no longitudinal research has been done on the effect of frequency and part of speech in a country where English is used as a foreign language.

In Taiwan as well as in many other countries where English is learned as a second or foreign language, students engage in massive efforts to acquire a good command of English. However, many students fail to achieve this goal. Since vocabulary plays an essential role in the acquisition of the four language skills: listening, speaking, reading, and writing, it is particularly important to examine the function of vocabulary in foreign language acquisition.

Upon analysis if a one-way ANOVA for a single occurrence and multiple occurrences resulted in a significant difference, trend analysis was carried out with the data so that the relationship patterns between the acquisition of vocabulary and the number of occurrences of vocabulary could be established. A regression analysis was also conducted with the entire language data in Book One.

Besides word frequency, CR-4 ANOVAs (completely randomized design) and the Tukey-Kramer procedure (Kirk, 1982, pp. 119-120) for the post hoc multiple comparisons of means were applied to see what effects such parts of speech as adjective, adverb, noun, and verb had on vocabulary acquisition. Each of the parts of speech contains different distributional rules and function differently in sentences. It was assumed that students might react to and perform differently on them and, therefore, acquire new words from different parts of speech at different rates.

It is hoped that this study will offer useful information for language researchers, curriculum developers and textbook editors, with which they could better understand the
nature of vocabulary acquisition and therefore prepare more effective English teaching materials for students who learn English as a foreign or second language.

There are 14 lessons in each book, each of which usually contains eight parts: a reading text, a vocabulary list, idioms and phrases, paraphrases, questions on the reading, questions for discussion, oral practices, and exercises. The last seven categories are regarded as the supporting texts in this study in order to distinguish them from the reading texts. Each lesson was covered in a week in which there were five fifty-minute class meetings. In addition to these standard textbooks, schools usually adopted another English book for each grade to be used as outside reading.

In order to prompt students to work hard and to evaluate how much they have learned, there are usually four monthly examinations in a semester. That is to say, there will be eight monthly examinations in an academic year for sophomores and juniors. Since senior students graduate in May, they have only three monthly examinations in the second semester. Each senior high school prepares the test questions for the English monthly examination. At the Kaohsiung Senior High School, each English teacher is supposed to write 10 to 20 percent of the test questions in a monthly examination. Since there is an English book used as the outside reading, around 10 to 20 percent of the test questions may come from this English book. After the examination, each teacher grades his or her own students' answer sheets.

Research Questions and Hypotheses

This study will answer the following three questions:

1. Does the number of occurrences for a word in a reading text influence the students' vocabulary acquisition?
2. Is the effect of word frequency in the reading texts different from that in the supporting texts?
3. Do students react to and perform differently on the four parts of speech: adjective, adverb, noun, and verb?

These questions are raised on the basis of the following hypotheses.

1. More occurrences for words in a reading text will significantly favor acquisition of these words.
2. Word frequency in the reading texts predict scores better than that in the supporting texts.
3. Different parts of speech will significantly influence vocabulary acquisition.

Data Collection

There were three sources of data used in this study: the 84 reading texts from the six English textbooks used in senior high schools in Taiwan, the entire book for the first semester of sophomores, and the vocabulary test results in the 1991 academic year from the Kaohsiung Senior High School. The six textbooks were used for sophomore, junior, and senior students during the 1991 academic year, with 14 lessons in each book for one semester's use. Usually, each lesson consisted of eight parts: the main lesson text for reading, a vocabulary list, idioms and phrases, paraphrases, questions on the reading, questions for discussion, oral practice, and exercises. However, there were 17 lessons that did not contain paraphrases, six lessons that did not include idioms and phrases, one lesson that did not have questions on the reading, and one lesson that did not have questions for discussion. In this study, the main lesson text for reading will be called the "reading text", and the other parts of a lesson will be called the "supporting text".

As for the vocabulary test results, they were collected from the English monthly examinations administered during the 1991 academic year at the Kaohsiung Senior High School. For the 1991 academic year when the test results were collected, there were 23 sophomore classes, 24 junior classes, and 22 senior classes in the Kaohsiung Senior High
School with approximately 50 students in a class. The vocabulary test results were collected from two classes at each grade level for each monthly English examination. Since there were in a year eight monthly examinations for sophomore and junior students and seven monthly examinations for senior students, there were altogether 46 classes of vocabulary test results included in this research.

Research Design

To test the hypotheses posited above, the frequencies of vocabulary in the 84 reading texts were tabulated for each monthly examination. For example, the first sophomore monthly examination covered the first four lessons in the first textbook; therefore, the word frequencies for the test words were derived from the four reading texts. Moreover, vocabulary test scores were also calculated for each target word in percentages.

For the effect of word frequency, the scores for the test words were divided into two groups according to the frequencies with which the new words occur in the text: a single occurrence and multiple occurrences. These formed two different treatment levels. The rationale for dividing the test words into these groups is that we hypothesized that new words with greater frequencies were easier to acquire. If words with a frequency of 2 are easier for students than those with a single occurrence, those with a frequency of 3 or more should also be easier than those with a frequency of 1. A one-way ANOVA was conducted for each grade. If an ANOVA resulted in a significant difference in the treatments, the scores would be divided into the following four groups to further examine the relationship patterns between word frequency and score. Group 1 contains the new words for that monthly examination that appear only once in the texts, Group 2 includes the new words that occur twice in the texts, Group 3 consists of the new words that have three occurrences in the texts, and Group 4 is composed of the new words that appear more than three times in the text. A trend analysis will be administered to the four groups to examine the relationship patterns between word frequencies and test scores.

In order to compare the effect of the word frequency in the reading texts with that in the vocabulary list, and exercise descriptions and prompts, a regression analysis was performed to predict the vocabulary test scores by word frequency. It was hypothesized that word frequency in the reading texts predict scores better than that in the supporting texts. The association of meanings for a new word in the reading text might promote more effective learning; therefore, it can be more easily acquired. Later, the results for sophomores from the ANOVA and this regression analysis were compared in terms of significance level.

In Chinese, the mother tongue for the students in our study, there are no obvious inflectional forms to distinguish different parts of speech. This may hinder the students' acquisition of English vocabulary. Moreover, since different parts of speech act and function differently in sentences, the students may react to and perform differently on different parts of speech. In order, therefore, to test this, CR ANOVAs and the Tukey-Kramer procedure for the post hoc multiple comparisons of means were applied to examine the discrepancy of effects on vocabulary acquisition for different parts of speech. First, the test scores in each grade were grouped into three (for sophomores) and four (for juniors and seniors) categories according to such parts of speech as adjective, adverb, noun and verb. Then a CR ANOVA was conducted for the means in each grade. Since there was a significant difference among the means in each grade, two post hoc multiple comparisons of means for sophomores and three post hoc multiple comparisons of means for juniors and seniors were conducted to examined which pair means were significantly different from each other.

Since the sample size might be too small for each grade, two further significance tests were conducted with the statistics from the three grades combined together. That is to say, a one-way ANOVA and a CR ANOVA were conducted respectively for word frequency and part of speech. Since the CR ANOVA produced a significant result, the
Tukey-Kramer procedure was used for the post hoc multiple comparisons of means among the four parts of speech.

**RESEARCH RESULTS AND DISCUSSION**

**Findings**

This section is divided into three parts. First, it presents the vocabulary frequency distributions for the 84 reading texts. The second section provides the statistics for vocabulary tests. It also reports and analyzes subjects' test performances for sophomores, juniors, and seniors, and the three grades combined. Finally, it presents the results of the hypothesis tests. They include the proportion of total variation in scores that is predictable using regression analysis where word frequency is the predictor variable, the proportion of total variation caused by word frequency, the proportion of total variation accounted for by parts of speech, and differences in effects of word frequency and part of speech in terms of grade differences.

**Vocabulary Frequency Distributions**

We divided the analysis of the word frequency distribution into two parts: the individual books and all six books combined. We computed the total word frequencies for the 14 reading texts in each book and for the 84 reading texts in the six books combined. The percentages for words occurring with a single occurrence in each book range from 63.830 percent to 72.648 percent while those for words occurring with a frequency of 2 vary from 27.352 percent to 36.170 percent. These figures indicate that most of the new vocabulary items to be learned appear only once in one reading text.

**Statistics of Vocabulary Tests**

The vocabulary test results of the monthly English examinations were detailed in this section. Altogether 2,196 answer sheets were used in this study: 807 from sophomore students (36.75 percent), 723 from junior students (32.92 percent), and 666 from Senior students (30.33 percent). Altogether, 238 test words were included in this study.

Word frequencies and parts of speech were the independent variables used in the significance tests conducted in this study. For sophomores, there were 54 words with a frequency of 1, 14 words with a frequency of 2, and 13 words with a frequency of 3 or more. For juniors, there were 61 words with a frequency of 1, 11 words with a frequency of 2, and 16 words with a frequency of 3 or more. For seniors, the test words consisted of 43 words with a frequency of 1, 14 words with a frequency of 2, and 12 words with a frequency of 3 or more. Altogether, 66.39 percent of the test words had a single occurrence. This percentage almost conforms to that for all the words with a single occurrence in the six textbooks (67.55 percent).

As for parts of speech, the test words were composed of 21 adjectives, 1 adverb, 44 nouns, and 15 verbs. For juniors, there were 11 adjectives, 7 adverbs, 52 nouns, and 18 verbs for sophomores. And for seniors, the test words consisted of 11 adjectives, 4 adverbs, 33 nouns, and 21 verbs. Totally, there were 43 adjectives, 12 adverbs, 129 nouns, and 54 verbs in the test words. Nouns make up the highest percentage of test words (54.20 percent) while adverbs comprised the smallest percentage (5.04 percent).
Test Scores

Since the numbers of answer sheets selected from each monthly examination range from 80 to 103, the scores were changed into adjusted scores. For example, there were 101 answer sheets selected from the first monthly examination of sophomores; therefore, the original score for the word "image" was 86 in terms of correct responses and the adjusted score for it was 85.15 (= 100x86/103). That is, each adjusted score is the percent of examinees who got the correct answers.

Scores are tabulated under a single occurrence and multiple occurrences. For each grade and all three grades combined, students had higher scores for test words with a frequency of 2 in the reading texts than for those that had a single occurrence in the reading texts: 83.02 vs. 76.99 for sophomores, 72.16 vs. 70.43 for juniors, 79.38 vs. 72.02 for seniors, and 78.17 vs. 73.10 for all three grades combined. As to parts of speech, students scored highest with noun test words and lowest with verbs: 82.39 vs. 67.98, 74.56 vs. 62.72, 79.90 vs. 66.22, 78.63 vs. 65.50 respectively for sophomores, juniors, seniors, and all three grades combined.

As mentioned previously, the words in the supporting texts including vocabulary lists, and exercise descriptions and prompts found in the textbooks were added to the data for analysis in order to see whether better prediction would result. The word frequencies range from 1 to 19 and the numbers of words for the word frequencies vary from 1 to 6. Figure 1 indicates that the linear assumption was met, which is illustrated by a horizontal band of residuals mainly contained with + or - standard errors across the values of frequency. The standard error is 17.41, the square root of the mean square (303.19). Therefore, 2 standard errors are 34.82.

![Figure 1. Data Plot of Residuals.](image)

Inferential Statistics

In this section, inferential statistics will be presented. Word frequency was used as predictor of scores in the one-way ANOVAs and the simple linear regression analysis. These significance tests were performed to find whether more word frequencies contributed to better vocabulary acquisition and whether better prediction would result when the words in the supporting texts were added to the data for analysis. The first part shows the results of one-way ANOVAs, which indicate that there were no significant differences in terms of word frequency between the means of a single occurrence and multiple occurrences across the three grades and also for the three grades combined. The second part demonstrates the
results of CR ANOVAs and the Tukey-Kramer procedure for part of speech, which show that there was a significant difference between the means of nouns and verbs for sophomores only. However, the three grades combined indicated the significant differences for the means of nouns and verbs as well as for adjectives and verbs. The third part illustrates the result of a simple linear regression, which indicates that the coefficient of determination is almost equal to zero (0.0036). This ratio tells us the proportion of total variation in scores that is predictable using word frequency as the predictor. That is to say, word frequency is far from a good predictor for students' vocabulary acquisition. As such, word frequency might not be the main factor that influenced students' vocabulary acquisition. In the last part, differences in effects of word frequency and part of speech in terms of grade differences will be discussed.

Results of One-way ANOVAs for Word Frequency as Predictor of Scores

Across the three grades, there was no significant difference in the scores between a single occurrence and multiple occurrences (F = 1.89, p = 0.116; F = 0.14, p = 0.709; F = 2.41, p = 0.098 respectively for sophomores, juniors, and seniors), although the mean differences (83.02 vs. 76.99, 72.16 vs. 70.43, 79.30 vs. 71.90 respectively for sophomores, juniors, and seniors) may indicate that students scored better with higher frequency words than lower frequency words. Among the three grades, word frequency shows the greatest effect for seniors and the least effect for juniors, although the differences between a single occurrence and multiple occurrences were not significant. Moreover, even after we increased the sample size by combining the scores in the three grades for each category, there was no significant difference between a single occurrence and multiple occurrence.

Results of CR ANOVAs and the Tukey-Kramer Procedure for Part of Speech

There was only a significant result of a CR ANOVA for sophomores among adjective, noun, and verb. In order to examine which pair or pairs of means contributed to the significant variation, the Tukey-Kramer procedure was conducted. There was only a significant difference between the two categories of noun and verb. For seniors, when the test scores 5.26 for the word "dawned" and 18.95 for the word "extent" were treated as outliers and deleted, a different result was achieved. That is, there was a significant difference between the categories of noun and verb for seniors when we deleted the two outliers.

Since the CR ANOVAs for sophomores, for seniors when we deleted the two outliers, and for all three grades combined were significant, the Tukey-Kramer procedure was conducted respectively for each of the three significant groups. The Tukey-Kramer procedure was conducted to examine which pair or pairs of means were significantly different from each other. There was a significant difference between nouns and verbs for sophomores. The means of nouns and verbs for seniors were significantly different from each other when the two outliers were deleted. For the three grades combined, there were significant differences between the means of nouns and verbs and also between the means of adjectives and verbs.

Results of a Simple Linear Regression in Book One

As shown in the previous section, more occurrences for words did not significantly favor acquisition of these words. However, the mean differences did show that more occurrences resulted in better vocabulary test scores. Therefore, it was hypothesized that
the information of word frequency increased by adding the supporting texts would help better predict students' scores on vocabulary tests.

A simple linear regression was conducted for Book One. The coefficient of determination is almost equal to zero (0.0036). On the one hand, this indicates that word frequency is far from a good predictor of students' vocabulary test scores, let alone a main factor influencing vocabulary acquisition or retention. On the other hand, compared with the previous one-way ANOVAs, this regression analysis shows that the facilitation of word frequency in the reading texts was better than that in the supporting texts where new words appear in isolated sentences or even by themselves. The poor association provided did not facilitate the acquisition of new vocabulary. Furthermore, the ceiling effect might partly cause this poor prediction.

**Significant Issues Addressed in This Study**

In this study, word frequency and part of speech were examined for their effects on students' vocabulary acquisition as shown through vocabulary test performances. Analyses of the findings from students' test performances clearly demonstrated that there was no significant difference between a single occurrence and multiple occurrences even when we increased the sample size. For part of speech, there was a significant difference between nouns and verbs only for sophomores. Since outliers may greatly affect a significance test, the two outliers for seniors were deleted. As a result, there was a significant difference between nouns and verbs in this reduced sample for seniors. In addition, significant differences between nouns and verbs and between adjectives and verbs were derived from the sample composed of all three grades. These results support the hypotheses of this study in the following aspects:

First, compared with a single occurrence, multiple occurrences did show better effect in terms of mean score differences, although none of these differences was statistically significant. That is, the students more effectively acquired vocabulary terms with more frequencies. Second, students reacted to and performed on parts of speech differently. Verbs were the most difficult while nouns the easiest for them. Third, there was discrepancy among the grades in the effects of word frequency and part of speech among the grades. Sophomores and seniors were more sensitive to these effects and scored higher than juniors.

The results also showed that longitudinal effect and psychological effect might be different. There might be a ceiling effect for longitudinal learning but not for immediate reaction. Although no significant difference was found for word frequency, a somewhat high discrepancy between a single occurrence and multiple occurrences was shown for sophomore and senior students. Considering the probable ceiling effect caused by students' reading the text again and again, it may be reasonable to regard the differences of mean scores (6.03 and 7.36 respectively for sophomore and senior students) as large, especially when the sample sizes for this study were not very big. However, for juniors, the mean score is slightly higher for multiple occurrences than for a single occurrence (1.73 higher). These results do indicate that there was no significant word frequency effect on the students' acquisition of vocabulary. What is more, it was apparently demonstrated that the facilitation of word frequency in the parts other than the reading text was not as good as that in the reading text. In the reading text, word frequency might also benefit from the association of meanings, which facilitated students' acquisition of the new words. In the supporting texts, new words only appeared in isolated sentences. Therefore, the linear regression analysis of the data indicated that word frequency could hardly predict students' vocabulary test performances.

Among the four parts of speech examined in this study, verbs were more difficult for students than nouns, adjectives, and adverbs. This may be due to the fact that morphologically English verbs are much more complicated than nouns, adjectives, and adverbs. Students may be confused or distracted by different verb forms, especially when
there is no verb form change in Chinese (the native language of the subjects). Moreover, compared with adjectives and adverbs, nouns are easier for students to learn. This may be because nouns are more semantically concrete.

The study also found that there was a higher effect discrepancy from word frequency than from part of speech for the three grades. For word frequency, senior and sophomore students benefited much more from word frequency effect than junior students. However, it is clear that junior students did have higher mean scores with multiple occurrences than with a single occurrence. As for part of speech, its effect was more consistent in terms of mean differences across three grades than the effect of word frequency. Students did better with nouns, adjectives and adverbs than with verbs.

In summary, the results in this study did not support all three hypotheses. First, the results did not find any significant difference in the effects between a single occurrence and multiple occurrences. However, in terms of mean differences, more occurrences for words in a reading text somewhat favors acquisition of these words, although not significantly. Second, it was also found that the information of word frequency in the reading text predicted scores much better than that in the supporting text. Third, students reacted to and performed on nouns, adjectives, adverbs, and verbs differently. Nouns were easier than the other three categories and verbs were most difficult for students to learn. There was a significant difference between nouns and verbs only for sophomores. For all three grades combined, there were significant differences between nouns and verbs and also between adjectives and verbs. Moreover, senior and sophomore students benefited more from word frequency effect than junior students.

**CONCLUSION**

There were four purposes in this study. First, it was intended to provide insights into the frequency distribution of vocabulary in the 84 reading texts. Second, it was to examine the relationship between vocabulary test results and word frequencies in the reading texts was examined. The relationship between part of speech and vocabulary test results was to be explored. Moreover, the differences of achievements among grades were to be discussed. Third, this study was to provide useful suggestions for improving the English textbooks used at the senior high schools in Taiwan. Finally, it was intended to better understand the essentials of vocabulary and vocabulary acquisition.

**Summary of Results**

There were two main aspects examined in this study. They were the effects of word frequency and part of speech on vocabulary acquisition. And there were three main corpora collected for this study: the 84 texts in the six books compiled by the National Institute of Compilation and Translation, the whole book for the first semester of sophomore English, and the vocabulary test results from the monthly English examinations administered in 1991 at Kaohsiung Senior High School to all three grades of students. In order to know how word frequency and part of speech influence senior high school students' acquisition of vocabulary in Taiwan where Chinese is their mother tongue and English is taught to them as a foreign language, there were four hypotheses posited at the beginning of this research. Not every hypothesis was supported by the significance test results and descriptive statistics.

First, the results of this study did not find any significant difference in the effects between a single occurrence and multiple occurrences. Across all three grades, however, the mean scores did show that students better acquired new words with more occurrences in the reading text than those with only one occurrence.

Second, it was also found that the facilitation of word frequency for vocabulary acquisition in the supporting texts was not as good as that in the reading text, which was illustrated by the ANOVA tests and the regression analysis. The reason may be due to the
fact that there were better association cues for words in the reading text than for those in the supporting texts where new words appeared only in isolated sentences or even without any context. To explain the discrepancy of effects between sophomores and seniors, and juniors, further research may be needed. However, one reason for it may be that sophomores and seniors worked harder than juniors, which made word frequency effect more manifest for the former two grades. In Taiwan, sophomores and seniors usually spend more time on school studies because the former have just started to study in a new school and the latter are preparing for the coming of the college entrance examinations. This may be also confirmed by the fact that sophomores and seniors achieved higher mean scores (80.01 and 77.06 respectively) than juniors (71.30).

Third, the results from the three grades combined strongly supported the hypotheses that students reacted to and performed on parts of speech differently. It was clearly shown that the students had more difficulty with verbs, which was manifested by the lowest mean scores, and that nouns were the easiest category for them, which was indicated by the highest mean scores. There was a significant difference between nouns and verbs and also between adjectives and verbs for the sample consisting of all three grades combined. Although there was no significant difference between adverbs and verbs, the mean score of adverbs was higher than that of verbs. Since there was only one adverb included in the study for sophomores, this category was not examined for this grade. Therefore, the phenomenon just mentioned was only referred to for juniors and seniors. And the discrepancy between the effects of adjectives and adverbs was trivial.

Recommendations for Further Research

Linguistically speaking, this study was more morphological and syntactical in nature. Phonological and semantic features were not examined. However, these aspects should be of great interest, especially since Chinese (the subjects' native language) is a tone language in which the tone carried by a word is an essential feature of the meaning of that word. For example, the word 'tou' when pronounced in a level tone may mean 'steal', and in a rising tone may mean 'head'. What is more, the stress, the numbers of syllables, and the length in English words may also influence students' acquisition of vocabulary. Therefore, future research should investigate the relationship between vocabulary acquisition and phonological and semantical features.
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