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The impact of reading on three aspects of word knowledge: spelling, meaning and collocation

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Abstract

This study investigates the degree to which intermediate EFL learners can acquire knowledge of spelling, meaning and collocation of 100 target words with different frequency from reading the authentic novel A Little Princess. The results show that the average number of acquired words was 16.52 or 25.54% and that there was improvement in all three aspects of word knowledge: spelling (15.34 words or 24.23%), meaning (16.5 words or 25.97%) and collocation (17.75 words or 26.44%). The word frequency affected the vocabulary learning gains. The biggest gains in all three aspects of word knowledge were found for words which occurred from 11 to 20 times in the novel.

Keywords: vocabulary acquisition, incidental learning, extensive reading, aspects of word knowledge, word frequency;

1. Introduction

Learning a foreign language involves learning a large number of words. However, despite the numerous studies on vocabulary learning it is still not clear how vocabulary is acquired (Schmitt, 1998) and what are the best ways of learning vocabulary. Studies in first language acquisition have shown that children learn vocabulary at a fast rate and that between grades three and twelve they learn about 3.000 new words a year (Nagy et al., 1987: 237). On the other hand, classroom observations have shown that the number of words learned in the classroom could only be a few hundreds a year (Nagy & Herman, 1987: 33), which leads to the conclusion that most of the words are learned incidentally from reading and listening.

A number of studies in first language acquisition have shown considerable vocabulary learning gains from reading (Jenkins et al., 1984; Nagy et al., 1987; Saragi et al., 1978). One of the most cited studies is the study carried out by Saragi et al. (1978) in which twenty native English students read the novel A Clockwork Orange by Anthony Burgess and were subsequently tested on their knowledge of 90 ‘nadsat’ words (Russian slang words). The results of the study showed impressive learning gains of 76% of the target words. The authors concluded that words needed to be encountered at least 10 times in order to be acquired.

Research in second/foreign vocabulary acquisition has also demonstrated that learners can acquire vocabulary while reading for meaning. Horst et al. (1998) found that while reading the simplified version of The Mayor of Casterbridge by Thomas Hardy the participants learned the meaning of 20% of the unknown target words, and that words needed to be repeated at least eight times in order to be learned. Waring and Takaki (2003) investigated the vocabulary learning gains from reading the simplified version of the novel A Little Princess by Frances Hodgson Burnett using three types of tests. The results showed that the participants recognized the word form of 61.2% and the meaning of 40% of the target words immediately after the reading, and were able to provide translation of 18.4%
of the words. However, after three months these figures dropped to 33.6%, 25% and 3.6% respectively. This implies that although learners can acquire a significant number of words from reading, the learning effects may not be long-lasting.

While most of the studies in second/foreign vocabulary acquisition used graded readers or simplified texts, there are a few studies in which the participants read authentic texts. Zahar et al. (2001) investigated the vocabulary gains of 144 grade seven ESL students in Canada who read the text *The Golden Fleece*, which is an original text but graded for intermediate learners. The results showed that on average the participants were able to learn the meaning of 2.16 out of 10.34 unknown words or 22%. A replication of this study with 83 EFL secondary school students in Macedonia showed that the participants learned the meaning of 3.02 unknown words or 25.16% (Daskalovska, 2010). In the study done by Ferris (1988), 51 university ESL students at an intermediate level read George Orwell’s *Animal Farm*. The results of the 50-item multiple-choice test showed that they learned seven words more than the control group. Similar results were demonstrated in Dupuy and Krashen’s study (1993) in which 15 university students enrolled in French courses saw the opening scenes of a French film and then read the script of the next five scenes. They learned six words more than the controls.

While the majority of the studies have focused on the acquisition of meaning, a few studies tried to investigate other aspects of word knowledge besides meaning. Pigada and Schmitt (2006) conducted a case study in order to determine the effect of one month of extensive reading on the knowledge of spelling, meaning and grammatical characteristics. The results showed that there was improvement in the knowledge of all three aspects, and that while the acquisition of the written form did not require a lot of exposures, considerable improvement of the knowledge of meaning was seen for words that appeared at least ten times. Webb (2007) measured the effect of frequency on the acquisition of five aspects of word knowledge: orthography, association, grammatical functions, syntax and meaning and form. The results showed that gains in all aspects tended to increase as the number of presentations increased. Pellicer-Sánchez and Schmitt (2010) investigated the acquisition of spelling, word class, and recognition and recall of meaning from reading the authentic novel *Things Fall Apart*. The results showed that after more than 10 exposures, the meaning and spelling could be recognized for 84% and 76% of the words respectively, while the meaning and word class could be recalled for 55% and 63%. These studies show that reading enables learners to gain knowledge of more aspects of word knowledge at the same time.

It is generally assumed that for foreign language learners it is better to read graded readers as they offer better conditions for learning new words and consolidation of previously met words (Nation, 2001; Wodinsky and Nation, 1988). However, Hu and Nation (2000) have found that in order to understand and use the language properly learners need to know 6,000-7,000 word families for spoken discourse and 8,000-9,000 word families for written discourse. On the other hand, most graded reader series end at around 3,000 word families. This implies that in order to learn the less frequent words learners would need to read authentic texts.

This study addresses three issues:

1. How much vocabulary can EFL secondary school students learn while reading an authentic novel?
2. What is the effect of reading on three aspects of word knowledge: spelling, meaning and collocation?
3. What is the relationship between the word frequency in the text and the vocabulary learning gains?

2. Methodology

Several researchers have pointed out that there are methodological problems with some of the studies on vocabulary acquisition from reading (Coady, 1997; Horst et al., 1998; Nation, 2001). Pigada and Schmitt (2006) maintain that many of these studies were not implemented in extensive reading conditions because the texts and the reading time were short, the measuring instruments were not sensitive to small amounts of learning, the number of target words was small. Moreover, most of the studies used simplified texts and focused on the acquisition of meaning, neglecting the other aspects of word knowledge. This study is trying to avoid these limitations by using an authentic novel and investigating three aspects of lexical knowledge of a large number of words. Furthermore, the measuring instruments used in the study enable the participants to show partial knowledge of words, which is very important if we consider the incremental nature of vocabulary learning.
2.1. Participants

The participants in this study were 240 secondary school students from Macedonia, who had studied English for eight years and were at an intermediate level. They were divided in two groups: experimental and control group based on their wish to read the book. The data of the participants who were absent from one of the phases in the study or who did not finish reading the book were omitted from the analysis, thus the study was completed with 122 participants: 63 in the experimental group, 59 in the control group.

2.2. Materials and target words

The text used in this study was the authentic novel *A Little Princess* by Frances Hodgson Burnett (1996) which contains 66,938 words. The same novel was used in Waring and Takaki’s study (2003), but in a simplified version. In order to understand a text, learners need to know at least 95% of the words (Laufer, 1989). In order to determine the level of difficulty of the text, several participants were given one page of the book chosen randomly and were told to underline all the unknown words. The number of unknown words ranged from 1 to 15 out of 505 words, which meant that the participants were familiar with more than 97% of the vocabulary and that the text would not be difficult for reading.

The whole text was run through the vocabulary profiler AntConc 3.2.1. (Anthony, 2007) which generated a list of all the words with their frequency. A hundred words were chosen as target words and were divided in six groups according to their frequency. Thus, in the first group there were twenty words which appeared between 11-20 times, and sixteen words in each of the other five groups: 9-10, 7-8, 5-6, 3-4, 1-2 times. The target words and their frequency are given in Table 1.

<table>
<thead>
<tr>
<th>Group</th>
<th>Target words</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>sight, square, stare, fairy, gasp, carriage, fortune, slip, errand, grate, mean, bear, set, dull, frock, pale, glow, blazing, ridiculous, grand</td>
<td>11-20</td>
</tr>
<tr>
<td>2</td>
<td>bare, delightful, glance, part, rest, entire, forlorn, rage, spoil, occur, delighted, demand, ribbon, confess, banquet, adopt</td>
<td>9-10</td>
</tr>
<tr>
<td>3</td>
<td>burst, dingy, faint, flat, severe, splendid, acquaintance, anxious, dreadful, solemn, glowing, curious, shabby, hamper, scold, shuffle</td>
<td>7-8</td>
</tr>
<tr>
<td>4</td>
<td>affectionate, charge, disagreeable, quaint, timid, battered, sigh, tie, tumble, wretched, coaxing, curiosity, aghast, ravenous, horrid, paw</td>
<td>5-6</td>
</tr>
<tr>
<td>5</td>
<td>desolate, impudent, mount, snatch, wreath, countenance, garment, insolent, invalid, conceal, chief, rapturous, cease, vaulted, slender, appealing</td>
<td>3-4</td>
</tr>
<tr>
<td>6</td>
<td>ascend, apparent, bundle, calamity, attain, enlightened, peril, nest, profound, illuminate, haggard, reproachful, vacant, ponder, lingering, encounter</td>
<td>1-2</td>
</tr>
</tbody>
</table>

2.3. Instruments

In order to measure three aspects of word knowledge, two types of tests were used as pretests and posttests. The first one was a spelling test in which the participants had to write down the words they heard read by their English teacher. The second test was based on the Word-associates Test (Read, 2003) with the aim of measuring two other aspect of word knowledge: meaning and collocation. For each target word there were two boxes of four words: in the left box were 1-3 synonyms and in the right box were 1-3 collocates of the target word, plus 1-3 distractors in each box. For each item there were four correct answers with three possible combinations: a) two correct answers in each box, b) one correct answer in the left box and three correct answers in the right box, and c) three correct answers in the left box and one correct answer in the right box.
In designing the test, three dictionaries were consulted for the synonyms and two corpora (BNC and COCA) and one dictionary for the collocations, taking into account the meanings and collocations of the words used in the text. The test was sent to three native English speakers who were asked to do the test and give suggestions if they found some of the options unsuitable. In order to obtain information about the participants’ experience from reading the book, they were asked to complete a questionnaire which consisted of 14 questions.

2.3.1. Scoring
For the spelling test, each correctly written word was given 1 point, so that the maximum was 100 points. The scoring of the second test was more complex. For each item there were four correct answers. Each correctly chosen option was given 1 point, while each chosen distractor was given -0.5 points. This means that if there were two correct answers in one box, and the participants chose one correct answer and one distractor, they were given 0.5 points which indicates that the participants may have some knowledge of the word, but it is not complete. But, if they chose one correct answer and two distractors, they were given 0 points because it was assumed that two wrong answers and one correct answer did not give indication of the knowledge of the word and the correct answer may have been due to guessing. Even though the synonyms and collocations in the test did not cover all the possible meanings and collocations of the target words, so that we cannot claim that the participants had a full knowledge of the word if they had chosen the four correct answers, in order to differentiate between partial and full knowledge of the words, if the participants had chosen all four correct answers, the knowledge of that word was categorized as full knowledge, while if they had at least 0.5 points for one aspect of word knowledge, the knowledge of that aspect was categorized as partial knowledge.

2.4. Procedure
The participants were asked for their consent to take part in the study, but they were not told the aim of the study. The two pretests were conducted on the same day. The spelling test did not require a lot of explanation. The participants were told to write down the words they heard. The second test needed a more detailed explanation. The participants were told that there were four correct answers for each target word and were explained the three combinations, but they were asked not to guess. After the pretests, the participants were asked if they would like to read a book as part of the study. The participants who agreed were placed in the experimental group, and the rest in the control group. One week after the pretests, the experimental group were given the books and were told that they had one month to read the book in their free time. After one month the same tests were conducted with both groups. The next day the experimental group were given the questionnaire.

3. Results
The pretests showed that the experimental group knew the spelling of 36.98, the meaning of 36.63 and the collocations of 32.32 of the target words. Table 3 shows that the participants acquired a significant number of the unknown target words, and that the learning gains were similar for all word knowledge aspects. The average number of acquired words was 16.52 or 25.54%, with he largest gains in the knowledge of collocations (26.44%). The next best learned aspect was meaning (25.97%), and the last was spelling (24.23%). A t-test for paired samples showed that the difference between the pretests and the posttests was significantly greater than chance (spelling: t=12.76,
p<0.01; meaning: t=10.88, p<0.01; collocations: t=11.28, p<0.01). However, it has to be emphasized that the tests measured the productive knowledge of spelling and the receptive knowledge of the other two aspects: meaning and collocation. Since acquiring productive knowledge is more difficult than acquiring receptive knowledge, we may assume that a receptive test of spelling would have produced a higher score.

Table 3. Results by word knowledge aspect

<table>
<thead>
<tr>
<th>Group</th>
<th>Spelling %</th>
<th>Meaning %</th>
<th>Collocation %</th>
<th>Mean %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>15.34</td>
<td>16.5</td>
<td>25.97</td>
<td>26.44</td>
</tr>
<tr>
<td>Control</td>
<td>1.98</td>
<td>2.65</td>
<td>2.15</td>
<td>2.25</td>
</tr>
</tbody>
</table>

The results of the control group show a small increase in knowledge of all three aspects, but a t-test for paired samples showed that except for the spelling (t=4.55, p<0.01), the difference between the pretest and posttest for the other two aspects was not statistically significant (meaning: t=1.38, p>0.05; collocations: t=1.75, p>0.05). The small but statistically significant difference between the pretest and posttest means for the written form of the words may be explained by the fact that immediately after the spelling test the participants took the second test where they could see the target words. Since they had to choose the correct meanings and collocations of the target words, they must have paid attention to them at least twice. Pigada and Schmitt’s study (2006) showed some learning gains in the knowledge of spelling of words that appeared only once, which leads to the conclusion that context does not play an important role in the acquisition of spelling and that improvement of this aspect of word knowledge can occur with fewer encounters than are needed for the acquisition of the other aspects of word knowledge.

The test format that was used to determine the knowledge of word meanings and collocations enabled the learners to show partial knowledge, i.e. the knowledge of one, two or three synonyms and collocations depending on the given options for each target word. Table 4 shows the difference between the pretests and posttests scores in relation to the partial and full knowledge of the target words.

Table 4. Partial and full knowledge gains in word meaning and collocation

<table>
<thead>
<tr>
<th>Aspects of word knowledge</th>
<th>Partial knowledge</th>
<th>Full knowledge</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meaning</td>
<td>8.65</td>
<td>7.88</td>
<td>16.5</td>
<td>25.97</td>
</tr>
<tr>
<td>Collocation</td>
<td>9.68</td>
<td>8.98</td>
<td>17.75</td>
<td>26.44</td>
</tr>
<tr>
<td>Total</td>
<td>18.33</td>
<td>15.91</td>
<td>34.25</td>
<td>26.20</td>
</tr>
</tbody>
</table>

The results show that the participants demonstrated greater partial than full knowledge of the target words. A detailed analysis of several tests showed that the transition was not always from unknown through partially known to fully known words. Some of the words for which full knowledge was demonstrated on the posttest, were either partially known or unknown on the pretest. On the other hand, some of the words which were partially known on the pretest, remained partially known on the posttest as well. This indicates that some words require more encounters in different contexts in order to be acquired, while other words are easier for learning and do not need so many repetitions. Furthermore, these results show that the type of tests used in research on vocabulary learning have a great influence on the results, and that in order to gain a more accurate picture of the acquisition of vocabulary from reading more sensitive instruments need to be used.

In reference to the relationship between the word frequency in the text and the vocabulary learning gains, the results show that even though there are many other factors which may influence the acquisition of the words such as the context, the importance of the words for understanding the sentence, the inherent difficulty of the words, the amount of time and attention devoted to them, etc., the frequency of the words in the text plays an important role. In order to determine the relationship between the acquisition rate and the number of times the words were encountered in the text, a relative gain percentage was calculated based on a method devised by Shefelbine (1990, cited in Horst et al., 1998), using the formula: 

\[ \text{Gain} = \frac{(\text{post-pre})/(63-pre)} \times 100 \]

While absolute gain scores show the number of participants who were able to acquire the word during reading, relative gain scores show the word’s availability for learning in the group of 63 participants. Table 5 shows that the greatest learning gains in all three aspects of word
knowledge were demonstrated for the words which occurred between 11-20 times in the text. These findings confirm the results of previous studies which have also found proportional relationship between the learning gains and the word frequency (Pigada and Schmitt, 2006; Saragi et al, 1978; Webb, 2007).

### Table 5. Results by word knowledge aspect and word frequency in the text

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Spelling Mean</th>
<th>Relative gain %</th>
<th>Meaning Mean</th>
<th>Relative gain %</th>
<th>Collocation Mean</th>
<th>Relative gain %</th>
</tr>
</thead>
<tbody>
<tr>
<td>11-20</td>
<td>5.65</td>
<td>34.36</td>
<td>6.6</td>
<td>43.42</td>
<td>6.85</td>
<td>44.01</td>
</tr>
<tr>
<td>9-10</td>
<td>4.56</td>
<td>29.02</td>
<td>3.40</td>
<td>23.59</td>
<td>5.18</td>
<td>32.18</td>
</tr>
<tr>
<td>7-8</td>
<td>5.65</td>
<td>27.78</td>
<td>6.65</td>
<td>29.56</td>
<td>5.99</td>
<td>25.95</td>
</tr>
<tr>
<td>5-6</td>
<td>5.46</td>
<td>23.29</td>
<td>5.99</td>
<td>26.69</td>
<td>6.4</td>
<td>27.41</td>
</tr>
<tr>
<td>3-4</td>
<td>3.84</td>
<td>17.15</td>
<td>3.43</td>
<td>15.49</td>
<td>4.09</td>
<td>17.4</td>
</tr>
<tr>
<td>1-2</td>
<td>2.59</td>
<td>12.72</td>
<td>5.52</td>
<td>22</td>
<td>5</td>
<td>18.78</td>
</tr>
</tbody>
</table>

The Pearson Product Moment Correlation Coefficient for the correlation between the word frequency in the text and the relative gains was 0.30 for spelling, 0.45 for meaning and 0.41 for collocation, which confirms the importance of the number of encounters of the word for their acquisition. The questionnaire that was completed by the experimental group at the end of the study revealed that for some participants the novel was a little difficult for reading and that some of them used a dictionary while reading the novel. Most of the participants paid more attention to the meaning of the words, less attention to the written form of the words and very little attention to the surrounding words. This is interesting because the results of the study show that the greatest learning gains were in the knowledge of collocations. As Ellis (2005: 310-311) points out, implicit learning may result from stimuli that are attended and automatically processed, even though the level of attention may not be sufficient for awareness and seeing the stimulus. The answers of the participants in this study show that reading enables acquisition of aspects of word knowledge for which there is no special attention, effort or intention to learn them. Another insight from the questionnaire is that most of the participants recalled some of the target words while reading the novel. Almost all the participants felt that reading the novel had positive effect on their vocabulary knowledge, which shows that by reading of only one novel learners can become aware of the benefits of reading which may increase their motivation to read in order to learn the language better. The average time needed to read the book was 8.5 days. Several researchers suggest that in order to benefit from reading, learners need to read one graded reader per week (Nation, 1997; Nation & Wang, 1999). Considering that graded readers are shorter and easier for reading than authentic novels, it is quite possible for learners to read 3-4 graded readers or 1-2 authentic novels per month.

### 4. Discussion

The aim of the study was to investigate the effects of reading an authentic novel on the acquisition of three aspects of word knowledge. The results show that the average number of acquired words was 16.52 or 25.54 % of the unknown target words, which is similar to other studies that examined vocabulary acquisition from reading (Dupuy and Krashen, 1993; Horst et al., 1998; Zahar et al, 2001). Considering that the novel contains 66,938 words, and the number of target words was 100, of which the participants knew 35 words, we may assume that the participants gained some knowledge of many other words besides the target words. We have to take into account the fact that the participants recalled some of the target words while reading the novel and probably paid more attention to these words, which may have affected the learning gains. On the other hand, the insight that the participants remembered some of the words that they saw one week before reading the book indicates that combining explicit and implicit vocabulary learning may lead to a significant improvement of vocabulary knowledge.

In relation to the second question, the study showed that there was improvement in all three aspects of word knowledge, which confirms the results of other studies which have investigated the acquisition of several aspects of word knowledge (Pellicer-Sánchez and Schmitt, 2010; Pigada and Schmitt, 2006; Webb, 2007). An important contribution of this study is the insight into gaining knowledge of collocations, an aspect of word knowledge that has not been investigated in the studies on vocabulary acquisition. The results showed that the participants learned...
the collocates of 26.44% of the target words. Several studies which have compared the effects of direct vocabulary learning and learning from context have shown that explicit learning is more effective and more long-lasting than implicit learning (Norris & Ortega, 2000). However, having in mind that collocation and some other aspects of word knowledge are better learned from context (Krashen, 1989; Nation, 2001), in order to enable learners to gain deeper knowledge of the words, language learning programmes need to include an extensive reading component.

This study demonstrated that multiple exposures can enhance the knowledge of several aspects of word knowledge. There were significant learning gains for the words which occurred between 11 and 20 times in the novel. The results confirm the suggestions that words need to be encountered at least 10 times in order that significant learning can occur (Pellicer-Sánchez and Schmitt, 2010; Saragi et al, 1973; Waring and Takaki, 2003), but they also show that even one or two encounters in context enable learners to gain some knowledge of previously unknown words (Rot, 1999; Webb, 2007).

5. Conclusion

Several researchers maintain that explicit vocabulary learning is more effective (Lightbown & Spada, 1990; Norris & Ortega, 2000) and that the process of incidental vocabulary learning from context is slow and it is hard to predict which words will be learned and to what degree (Paribakht & Wesche, 1997). However, explicit instruction cannot cover the amount of vocabulary learners need to acquire and cannot provide acquisition of all aspects of word knowledge such as collocations, associations, register, shades of meaning, etc., which can only be acquired by multiple exposures of the words in different contexts.

This study supports the results of other studies which have shown that extensive reading can contribute to incidental vocabulary learning. Most researchers agree that a well-structured language learning programme should provide opportunities for explicit vocabulary learning and incidental learning from context (Coady, 1997; Nation & Newton, 1997; Schmitt, 2000: 145-146). After learning the initial vocabulary explicitly, learners should start reading graded readers or authentic books for children, depending on the age of the learners, but in later stages graded readers should be replaced with authentic novels which will enable learners to see the words in natural contexts, to encounter less frequent words and to gain deeper knowledge of the words, which will help them to become more competent users of the language they are learning.

References


