Factors Affecting Guessing Unknown Word Meanings from Context

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Abstract

The purpose of this study is to clarify indications from my previous studies (Yashima, 2000, 2001) showing that a 1:40 ratio of unknown to known words was efficacious to guess word meanings successfully from contextual clues. The study examines differences in success rates among different senior high schools and differences in the use of contextual clue types. Differences in success rates are also examined according to students' vocabulary size. In addition, the study examines the influence of genres on mean success rates. Findings reveal significant differences in the mean success rates among schools and between the different genres used in the experiment. Also there were significant differences in students' use of local and global contextual clues. The study concludes that students with vocabularies exceeding 3,000 words can successfully guess around 60 percent of unknown words.

1. Introduction

The optimal ratio of unknown to known words efficacious for ESL/EFL (hereafter L2) learners to successfully guess unknown word meanings from context has been difficult to determine. Moreover, research into L2 learners' propensity to use different kinds of clue types in guessing has also yielded inconsistent results. This study examines both of these areas along with the influence that different genres may have on success rates in guessing unknown word meanings.

To begin with, let us consider the findings on clue types. We take our point of departure from Nation (1990, 2001). Nation argues that it is more prudent to teach learners strategies for guessing unknown words from context than exhaustively teaching them the plethora of low frequency words found in English. Haynes (1993), however, found such guessing was very difficult for L2 learners. Haynes reported that L2 learners' ability to use contextual clues was
limited. Nonetheless, Haynes also found that L2 learners became good guessers when the context contained immediate clues. Commensurate with these findings, Yamauchi (1995) showed that local clues were used most successfully by L2 learners. In addition, Yamauchi found that among global clues (including backward and forward clues), the use of forward clues was most difficult for L2 learners. In my previous study (Yashima, 2001), the findings also show that L2 learners used forward clues least successfully. However, the findings pertaining to the use of local clues were not entirely commensurate with Haynes and Yamauchi. Local clues were used most successfully in only two out of four passages.

Although Laufer (1997) concludes that there is no definite optimal ratio of unknown to known words in context, for the purposes of this study, I will define the 'optimal ratio' as the level at which L2 learners can guess 60 percent or more of unknown words from context. I base this on Nation and Coady's (1988) claims that it may be possible to expect L2 learners to guess between 60 and 80 percent of unknown words in context if the ratio of unknown to known words is not too high. According to Nation (2001), this level may be 1:50. However, for this study, I used a ratio of 1:40. I chose this level as it is widely used as a benchmark for educational materials designed for L2 learners. Most notably, the Longman Bridge series of adapted readers prepares its materials so that a ratio of 1:40 unknown to known words may be maintained.

The final element addressed by this study is the influence of vocabulary size on successful guessing. Nation and Waring (1997) claim that L2 learners need to know the 3,000 or so high frequency words in English in order to perform functionally in English. In my previous study (Yashima, 2000), the participants' vocabulary level was not directly checked. Instead, an estimate of participants' vocabulary level was made, based on the vocabulary size of the participants studying English in the following academic year. It showed that they needed about a range of 3,000 to 3,500 words in order to guess 60 percent or more of unknown words from context. The findings broadly supported Nation and Waring's claims.

This study then sets out to do three things in relation to the above. Firstly, it seeks to confirm whether L2 learners can guess 60 percent or more of unknown word meanings from passages containing a ratio of 1:40 unknown to known words. Secondly, I seek to examine L2 learners' use of contextual clues and explore the relation between vocabulary levels and successful guessing.

2. The study

2.1. Purpose

The purpose of this study is to determine whether the 1:40 unknown to known word ratio allows participants to guess 60 percent or more of unknown word meanings. I also re-examine the pattern of the use of contextual clues, the influence of vocabulary size on success rates, and the influence of genres on success rates.
2.2. Hypotheses

Based on the above purposes, I have constructed the following hypotheses:

(1) There will be a significant difference in success rates between two different types of genres.
(2) Participants will be able to guess 60 percent or more of unknown words at the 1:40
    unknown to known word ratio.
(3) Participants' propensity to use contextual clues will be affected by contextual clue types.
(4) Participants' success rates will be significantly influenced by their vocabulary size.

2.3. Participants

Participants in this study were all second-year students (16-17 years olds) from four Tokyo
metropolitan senior high schools (Schools A to D) and one Saitama prefectural senior high school
(School E). They had been learning English for 4 years. School A had 25 students, School B 136,
School C 87, School D 74, and School E 54. Their proficiency level was intermediate.

2.4. Materials

2.4.1. Selection of materials

There were two kinds of passages, taking into consideration the background knowledge of the
participants. One passage of 350 words was adapted from Lesson 7 in A. Ueda et al.,
EVERYDAY ENGLISH 3, and the other passage of 353 words was adapted from REVIEW
READING in T. Shimaoka et al., SUNSHINE ENGLISH COURSE 3. These two passages were
adapted from these authorized textbooks used for third-year students of a junior high school. As
the study tries to explore L2 learners' ability to guess word meanings, the level of the passages
was set intentionally lower than that of the participants' ability as in the case of my previous
studies. Moreover, in order to explore whether the types of passages affect guessing, the genres
are different: One passage is a detective story, and the other is a tale. These two passages are as
follows (see Appendix):

(1) Passage A: A 350-word passage in Lesson 7: The Broken "T" in EVERYDAY ENGLISH 3
(2) Passage B: A 353-word passage in REVIEW READING 1: The Wisest Man in the World in
    SUNSHINE ENGLISH COURSE 3

2.4.2. Selection of target words

In this study, nine words in both passages were selected as target words. The unknown to
known word ratio of these passages was 1:40. Both the ratio and the target words were the same
for all the participants. Based on Liu Na and Nation (1985) and Yashima (1999), the parts of
speech of the target words selected were nouns and verbs. The nine words consisted of five
nouns and four verbs in Passage A and four nouns and five verbs in Passage B.

Moreover, these target words were selected according to contextual clues: local and global clues.
They were further classified according to the three contextual guessing strategies: local, backward,
and forward clues. The nine words were classified into these three strategies: three local, backward, and forward clues. The passage was arranged so that the different clue types influenced one another as little as possible.

These selected target words were replaced by nonsense words. Their shape was controlled and looked like verbs or nouns so that participants could recognize their parts of speech. These words were inspected whether they existed in English or not (see Appendix).

2.4.3. Glossary

A glossary of terms was provided to ensure that the participants knew all the terms. This, of course, excluded the target words for guessing.

2.5. Vocabulary size test

In order to measure participants' vocabulary size, Mochizuki's (1998) Vocabulary Size Test was used. It is made up of 7 levels: 1,000 to 7,000 word-levels and there are 30 questions at each level. Taking into account the participants' level, I used 1,000 to 6,000 word-level tests.

2.6. Procedures

This study required three lessons. In the first phase of the study, all the participants were given a copy of Passage A with a glossary. Before focusing on word guessing, all the participants were asked to skim the passage for general meaning for 10 minutes. After that, they were given an answer sheet and asked to reread it, guess the meanings of the nine words underlined, and translate them into Japanese. The time limit was 35 minutes.

In the second phase of the study, the same procedure was carried out, with the second passage. All the participants were given Passage B with a glossary and asked to guess the nine words.

In the last phase of the study, all the participants were given Mochizuki's (1998) Vocabulary Size Test. As the test consisted of as many as 180 items (30 questions at each level), they were instructed not to get bogged down with difficult questions, and to answer as many as possible.

As mentioned above, in this study, three days were needed. Therefore, participants who were absent on the first or second day of the study were excluded from the analysis. Participants who knew the content of the passages or had read them in their junior high school days were also excluded.

2.7. Scoring

For each of the nine words, one point was awarded for a correct or acceptable definition for the meaning of each underlined word. Each written definition was scored by the present writer. After the marking, the scores were calculated on a percentage scale as success rates in guessing. As for Mochizuki's (1998) test, if participants could answer one question at each level, they are regarded as having 33.33 words regardless of levels.
3. Results

3.1. Success rates in guessing in the 1:40 ratio

Table 1 shows the means and standard deviations in success rates in the two passages in percentages for second-year students in the five different schools in the 1:40 ratio. As shown in the table, participants could guess word meanings more successfully in Passage B than in Passage A in every school. They could guess more than 60 percent of the meanings of the replaced nonsense words successfully in Passage B on average in total, but not in Passage A. In Passage A, participants in Schools A and D were able to guess more than 60 percent of unknown word meanings successfully on average. In Passage B, however, participants in four out of five schools were able to do this.

Table 1. Means and Standard Deviations in Success Rates in the Two Passages in Percentages for Second-Year Students

<table>
<thead>
<tr>
<th>Passage</th>
<th>School A</th>
<th>School B</th>
<th>School C</th>
<th>School D</th>
<th>School E</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=25</td>
<td>N=136</td>
<td>N=87</td>
<td>N=74</td>
<td>N=54</td>
<td>N=376</td>
</tr>
<tr>
<td>Passage A</td>
<td>Mean 64.89%</td>
<td>58.58%</td>
<td>50.06%</td>
<td>61.26%</td>
<td>54.73%</td>
<td>57.00%</td>
</tr>
<tr>
<td></td>
<td>SD 25.99</td>
<td>15.21</td>
<td>18.16</td>
<td>18.96</td>
<td>16.28</td>
<td>18.17</td>
</tr>
<tr>
<td>Passage B</td>
<td>Mean 67.11%</td>
<td>64.54%</td>
<td>52.11%</td>
<td>63.21%</td>
<td>60.08%</td>
<td>61.02%</td>
</tr>
<tr>
<td></td>
<td>SD 24.11</td>
<td>20.18</td>
<td>16.89</td>
<td>20.96</td>
<td>22.38</td>
<td>20.78</td>
</tr>
</tbody>
</table>

Further analysis was carried out, using a t test to see if there was a statistically significant difference in the results of the two passages. The results showed that there was a significant difference between the means in success rates in percentages in the two passages in all the five schools in total as well as in each school individually (t = 7.03, df = 375, p < .001), except in School A. Moreover, a one way analysis of variance (ANOVA) was carried out to see if there was a statistically significant difference in the results of participants in the five schools. The results revealed that there was a significant main effect for schools in both Passages A and B (F(4, 371) = 6.15, p < .001, F(4, 371) = 6.35, p < .001 respectively). Then, a multiple comparison analysis using Tukey HSD's multiple range test was conducted and revealed that there was a significant difference between the means for participants in School C and participants in the other schools except in School E in both passages at p < .01.

3.2. Types of contextual clues

Table 2 shows the means and standard deviations of raw scores in the two passages according to types of contextual clues. The general picture gotten from the table is that participants could use local clues most frequently, backward clues second, and forward clues least although there are
two exceptions in Passage B in Schools A and C: forward second, and backward least.

Table 2. Means and Standard Deviations of Raw Scores in the Two Passages according to Types of Contextual Clues for Second-Year Students

<table>
<thead>
<tr>
<th>Passage</th>
<th>Clue Type</th>
<th>School A</th>
<th>School B</th>
<th>School C</th>
<th>School D</th>
<th>School E</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passage A</td>
<td>local</td>
<td>Mean</td>
<td>2.36</td>
<td>2.38</td>
<td>2.11</td>
<td>2.47</td>
<td>2.19</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>.86</td>
<td>.74</td>
<td>.84</td>
<td>.73</td>
<td>.80</td>
<td>.79</td>
</tr>
<tr>
<td></td>
<td>backward</td>
<td>Mean</td>
<td>1.96</td>
<td>1.52</td>
<td>1.34</td>
<td>1.70</td>
<td>1.61</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>1.06</td>
<td>.80</td>
<td>.85</td>
<td>.86</td>
<td>.83</td>
<td>.86</td>
</tr>
<tr>
<td></td>
<td>forward</td>
<td>Mean</td>
<td>1.52</td>
<td>1.37</td>
<td>1.05</td>
<td>1.36</td>
<td>1.13</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>.82</td>
<td>.96</td>
<td>1.00</td>
<td>1.00</td>
<td>.95</td>
<td>.98</td>
</tr>
<tr>
<td>Passage B</td>
<td>local</td>
<td>Mean</td>
<td>2.20</td>
<td>2.07</td>
<td>2.01</td>
<td>2.32</td>
<td>1.93</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>.91</td>
<td>.94</td>
<td>1.04</td>
<td>.81</td>
<td>1.13</td>
<td>.97</td>
</tr>
<tr>
<td></td>
<td>backward</td>
<td>Mean</td>
<td>1.80</td>
<td>1.97</td>
<td>1.17</td>
<td>1.77</td>
<td>1.63</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>1.04</td>
<td>.90</td>
<td>.84</td>
<td>.88</td>
<td>1.03</td>
<td>.96</td>
</tr>
<tr>
<td></td>
<td>forward</td>
<td>Mean</td>
<td>2.16</td>
<td>1.77</td>
<td>1.51</td>
<td>1.59</td>
<td>1.85</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>.62</td>
<td>.77</td>
<td>.66</td>
<td>.94</td>
<td>.76</td>
<td>.79</td>
</tr>
</tbody>
</table>

An ANOVA was carried out to see if there was a statistically significant difference in the results. The results revealed that there was a significant main effect for types of contextual clues although there was two schools in which there was not a significant main effect in Passage B—Schools A and E: in Passage B, \( F(2, 72) = 1.58, \) n.s., \( F(2, 405) = 4.02, \) \( p < .05, \) \( F(2, 258) = 20.96, \) \( p < .001, \) \( F(2, 219) = 13.90, \) \( p < .001, \) and \( F(2, 159) = 1.32, \) n.s. respectively, while in Passage A, \( F(2, 72) = 5.21, \) \( p < .01, \) \( F(2, 405) = 54.64, \) \( p < .001, \) \( F(2, 258) = 32.77, \) \( p < .001, \) \( F(2, 219) = 31.67, \) \( p < .001, \) and \( F(2, 159) = 20.14, \) \( p < .001 \) respectively. The multiple comparison analysis using Tukey HSD's multiple range test was conducted and revealed that there was a significant difference between the use of local and backward clues in Passage A except for participants in School A at \( p < .001. \) There was also a significant difference between the use of local and forward clues in Passage A at \( p < .001. \) In School A, however, this finding was only significant at \( p < .01. \) In contrast, in Passage B, there were only two cases where there was a significant difference between the use of local and backward clues at \( p < .05. \) And there were three cases where there was a significant difference between the use of local and forward clues in Passage A at \( p < .05. \)

3.3. Vocabulary size

Table 3 shows the means and standard deviations in vocabulary size. As shown in the table, although all the participants were second-year students, the means were quite different from one another. The ANOVA was carried out to see if there was a statistically significant difference in
the results. The results revealed that there was a significant main effect for schools \(F(4, 371) = 53.65, p < .001\). The multiple comparison analysis using Tukey HSD’s multiple range test was conducted and revealed that there was a significant difference between the means for participants in School C and all the other schools at \(p < .001\), between School E and all the other schools at \(p < .01\), and between School B and all the other schools at \(p < .05\).

Table 3. Means and Standard Deviations in Vocabulary Size for Second-Year Students

<table>
<thead>
<tr>
<th>School</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>School A</td>
<td>3742.67</td>
<td>423.23</td>
</tr>
<tr>
<td>School B</td>
<td>3449.02*</td>
<td>443.92</td>
</tr>
<tr>
<td>School C</td>
<td>2788.12***</td>
<td>504.65</td>
</tr>
<tr>
<td>School D</td>
<td>3792.79</td>
<td>445.45</td>
</tr>
<tr>
<td>School E</td>
<td>3159.88**</td>
<td>575.98</td>
</tr>
<tr>
<td>Total</td>
<td>3341.76</td>
<td>597.69</td>
</tr>
</tbody>
</table>

*p < .05  **p < .01  ***p < .001

Table 4. Means and Deviations in Success Rates on Two Passages in Percentages for Participants according to Vocabulary Size

<table>
<thead>
<tr>
<th>Vocabulary size</th>
<th>School A</th>
<th>School B</th>
<th>School C</th>
<th>School D</th>
<th>School E</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passage A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>less than 3,000</td>
<td>Mean</td>
<td>45.96%</td>
<td>45.01%</td>
<td>38.89%</td>
<td>45.56%</td>
<td>45.08%</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>18.24</td>
<td>17.92</td>
<td>26.45</td>
<td>15.67</td>
<td>17.69</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>22</td>
<td>59</td>
<td>4</td>
<td>20</td>
<td>105</td>
</tr>
<tr>
<td>3,000 or more</td>
<td>Mean</td>
<td>64.89%</td>
<td>61.01%</td>
<td>60.71%</td>
<td>62.70%</td>
<td>60.13%</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>25.99</td>
<td>13.32</td>
<td>13.69</td>
<td>17.75</td>
<td>14.24</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>114</td>
<td>28</td>
<td>70</td>
<td>34</td>
<td>271</td>
</tr>
<tr>
<td>Passage B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>less than 3,000</td>
<td>Mean</td>
<td>48.99%</td>
<td>47.46%</td>
<td>58.33%</td>
<td>42.78%</td>
<td>47.30%</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>18.36</td>
<td>16.74</td>
<td>18.98</td>
<td>20.79</td>
<td>17.97</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>22</td>
<td>59</td>
<td>4</td>
<td>20</td>
<td>105</td>
</tr>
<tr>
<td>3,000 or more</td>
<td>Mean</td>
<td>67.11%</td>
<td>67.54%</td>
<td>61.90%</td>
<td>63.49%</td>
<td>70.26%</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>24.11</td>
<td>19.17</td>
<td>12.62</td>
<td>21.16</td>
<td>16.35</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>25</td>
<td>114</td>
<td>28</td>
<td>70</td>
<td>34</td>
</tr>
</tbody>
</table>

Table 4 shows the means and standard deviations in success rates in two passages in percentages for participants according to vocabulary size. The most salient feature of the table is the difference in success rates between the participants with a vocabulary size greater than 3,000 words compared with those of participants with a vocabulary size below 3,000. In both passages, there is a striking difference in the success rates between vocabulary levels. Moreover, across schools in each vocabulary level, and for each passage, there seems to be no clear difference in the means of success rates in guessing.

The ANOVA was again carried out to see if there was a statistically significant difference in
the results. The results revealed that there was no significant main effect for schools in either passage according to whether participants’ vocabulary size was below or above 3,000 words: in Passage A, $F(3, 101) = .18$, n.s., $F(4, 266) = .47$, n.s. respectively, and in Passage B, $F(3, 101) = .99$, n.s., $F(4, 266) = 1.22$, n.s. respectively.

4. Discussion

There was a significant difference in successful guessing of unknown words between Passage A (a detective story) and Passage B (a folk tale). Participants could guess 57.00 percent of word meanings in Passage A in total, and 61.02 percent in Passage B. The results of the $t$ test show that there was a significant difference in the means of the success rates in all the five schools in total as well as in each school individually, except in School A. Based on these findings, I am able to accept my first hypothesis that the type of genres affects success rates.

My second hypothesis that participants would be able to guess 60 percent or more of unknown word meanings at the 1:40 unknown to known word ratio could not be accepted. Although participants from some schools were able to guess more than 60 percent of unknown words, the grand mean across schools was only 57.00 percent in Passage A, as mentioned above.

The third hypothesis that participants’ propensity to use contextual clues was affected by clue types could be accepted. The results of the ANOVA confirm that there was a significant difference in the use of different clue types. There were, however, two exceptions in Schools A and E in Passage B. Also of interest in the findings on clue usage is that there was a significant difference in the use of local and global clues. As may be seen in Table 2, for Passage A, local clues were most used, backward clues were second most used, and forward clues least used. These results are in line with previous findings in the field, most notably Chern (1993), Yamauchi (1995), and Yashima (2001). In Passage B, however, the findings were not so clearly supportive. We may see from Table 2 that, in the case of Passage B, local clues were most used, forward clues were second most used, and backward clues were least used. These results, however, may reflect a flaw in the experimental design. Upon close examination of the clue type designation, it became clear that a clue originally tagged as a forward clue may perhaps better have been tagged as a local clue.

As may be seen from Tables 1 and 3, the success rates of participants from School C was significantly lower in both passages than those of participants from every other school except School E. The results also revealed that there was a significant difference between the means in vocabulary size for participants in School C and the other school. Overall, these results support my previous study that conclude that vocabulary size is an important predictor of success in guessing unknown word meanings (Yashima, 2000). I am, therefore, able to accept my fourth hypothesis that vocabulary size would have a significant influence on success rates. In Table 4, moreover, we may see that participants with vocabularies greater than 3,000 words were able to
guess more than 60 percent of unknown words on average in every school. In contrast, participants whose vocabulary size was less than 3,000 words were unable to guess more than 60 percent of unknown word meanings in either passage on average in each school. These findings indicate that a vocabulary size of 3,000 words is the key to success in guessing. It is also important to note here that even though a glossary of terms was provided to ensure the 1:40 unknown to known word ratio was maintained, vocabulary size had a big effect on successful guessing. It can be said that 45 minutes provided in the trials was not good enough for participants with smaller vocabulary sizes to assimilate the glossary words sufficiently well for them to use them as clues for guessing unknown word meanings.

5. Conclusion and implications

It is interesting to note that the genre of the passage seemed to have an influence on success rates. This is an area L2 educators may prudently keep in mind when they design reading curricula. It may also represent a productive area of future research. Specifically, testing for differences in success rates among different ethnic groups and different genres may yield instructive results for educators.

The findings on clue types for Passage A support previous studies that local clues are more frequently used than global clues, and that, among global clues, backward clues are more frequently used than forward clues. In Passage B, there were some cases where this pattern of clue usage was not seen. I attribute this to an error in designation of clue types. In Passage B, a local clue was mistakenly designated as a forward clue.

The findings on vocabulary size are perhaps the most significant in this study. We may see that vocabulary size was the main predictor for success in guessing in spite of the fact that a glossary of terms was provided. In future research, it may be prudent to give participants more time to assimilate glossary words so that the influence of the participants' vocabulary size on success in guessing may be minimized. This could be done by giving participants homework on the glossary material. More generally for educators, we may conclude that aiming to teach the 3,000 or so high frequency words in English will assist L2 learners to guess the meanings of lower frequency words from contextual clues.

References

Cambridge University Press.

Appendix

Passage B

Long, long ago there lived a king in the country of Israel. His name was Solomon. He was so wise that he could even speak the language of every (1) _decoration_.

One day the King caught a little bee that had flown into his room. The bee was too scared to fly away when the King came up to it.

"Oh, King, (2) _berert_ me, please," it said. "Please let me go! I’m sure I can work for you some day."

King Solomon smiled and opened the curtains. "You may go. I want nothing in return from a little bee like you."

Through the open curtains, the King saw a great caravan. There were many animals (3) _fulmed_ with jewels and gold. And at the head of the (4) _paundness_, the proud and beautiful Queen of Sheba was riding.

Key: (1) insect (F) (2) forgive (F) (3) decorated (L) (4) caravan (B) (以下省略)