The Effects of Reading Ability and Sex Difference on Recall Protocols of Japanese University Students

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ABSTRACT

This study investigates the concurrent validity of a recall test as a measure of reading comprehension and the effects of the level of reading ability and sex difference on the written recalls of 70 Japanese EFL university students. Results showed that there were moderate significant correlations between a recall test and a standardized reading test (i.e., FCE): for all the students, \( r = .64, p < .01 \); for males, \( r = .61, p < .01 \); for females, \( r = .67, p < .01 \), suggesting that a recall test is moderately valid as a measure of reading comprehension. Sex difference did not affect the concurrent validity of a recall test and recall test scores. Reading ability affected total recall, main ideas recalled, the recall of each paragraph, and paragraph main ideas recalled. Irrespective of sex difference, the students with high reading ability recalled the overall text, all main idea units, paragraphs and paragraph main ideas better than those with low reading ability. However, no significant difference was found between male and female students regarding the recall of total idea units, total main ideas, and the recall of paragraphs and of paragraph main ideas, although their reading ability was found to be equivalent.

The lack of a significant interaction between reading ability and sex difference in terms of 1) total recall, 2) the recall of main ideas, 3) paragraph recall and 4) the recall of paragraph main ideas indicates that sex difference did not affect the differences between the students with high and low reading ability in these four kinds of recall: 1), 2), 3) and 4).

KEY WORDS

recall protocols EFL reading ability
concurrent validity sex difference

1. INTRODUCTION

One measure of reading comprehension in L2 is the recall task. Bernhardt (1991: 200) claims that the recall protocol is a purer measure of reading comprehension. Many variables affect comprehension measured by recall: background knowledge (e.g., Carrell, 1983), awareness of text structure (e.g., Carrell, 1992), the reading of recall (native versus

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target) (e.g., Lee, 1986), pre-reading instructions given (e.g., Lee, 1986), story schema (i.e.,
the order of text presentation) (e.g., Mandler 1978; Carrell, 1984b), the level of language
proficiency (e.g., Lee and Ballman, 1987; Takahashi, 1994; Hirano 2000a, 2000b), scoring
criteria (e.g., Hirano, 1998; Hirano 2000), and target language experience (Hirano 2002).

To date, very little research has investigated the concurrent validity of a recall test
as a measure of reading comprehension. Is a recall test valid in measuring reading
comprehension? That is, is there any relationship between recall test scores and reading
ability as measured by a standardized reading comprehension test? Do recall test scores
differ between students with different levels of reading ability?

Previous studies of foreign/second language learners have revealed that there are
significant sex differences in a number of areas, such as the use of language learning
strategies (e.g., Oxford, Nyikos and Ehrman, 1988), learners’ attitudes and beliefs in
language learning (e.g., Bacon and Finnemann, 1992) and actual learning outcomes (e.g.,
Nyikos, 1990). However, no research has examined whether or not reading ability and sex
difference affect an EFL/ESL reader’s ability to comprehend and recall the text. Is there
any difference in recall test scores between male and female students when reading
comprehension as measured by a standardized reading test is found to be equivalent?

The present study attempts to investigate the concurrent validity of a recall test as a
measure of reading comprehension and to determine the effects of reading ability and sex
difference on recall protocols of Japanese university students’ EFL reading comprehension.
The following research questions are addressed:
1) Is a recall test valid in measuring reading comprehension?
2) Does reading ability have significant effects on: a) the total number of idea units of the
text recalled; b) the recall of main ideas; c) the quantity of paragraph idea units
recalled; and d) the quantity of paragraph main ideas recalled?
3) Does sex difference have significant effects on: a), b), c) and d) in 2)?
4) Does sex difference affect differences in recall between the two levels of reading ability?

2. METHOD

2.1. Participants

Seventy Japanese undergraduates participated in the study. They were freshmen who
were non-English majors. They were made up of 38 male and 32 female students. The
participants were assigned to one of two reading ability levels: high or low on the basis of
their scores on a standardized reading test, i.e., the Cambridge First Certificate in English
(FCE). The FCE has a maximum possible score of 35. The FCE scores ranged from 28 to
3 with a mean of 16.24 (SD = 6.13). As indicated in Table 1, male students had a mean of
16.82 (SD = 6.19) and female students 15.56 (SD = 5.89). Students at the high-ability level,
who consisted of 31 students, had a mean score of 22.19 (SD = 3.04), with scores of 17 and
above. The low-ability level students (N = 39) had a mean score of 11.51 (SD = 2.93),
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Table 1  Means and SDs of the reading comprehension scores

<table>
<thead>
<tr>
<th>Ability</th>
<th>Male</th>
<th></th>
<th>Female</th>
<th></th>
<th>All</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>M</td>
<td>SD</td>
<td>N</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>High</td>
<td>19</td>
<td>22.26</td>
<td>2.71</td>
<td>12</td>
<td>22.08</td>
<td>3.50</td>
</tr>
<tr>
<td>Low</td>
<td>19</td>
<td>11.37</td>
<td>3.13</td>
<td>20</td>
<td>11.65</td>
<td>2.71</td>
</tr>
<tr>
<td>All</td>
<td>38</td>
<td>16.82</td>
<td>6.19</td>
<td>32</td>
<td>15.56</td>
<td>5.89</td>
</tr>
</tbody>
</table>

Note: Maximum possible score = 35

Table 2  Results of a two-way ANOVA

<table>
<thead>
<tr>
<th>Ability Level</th>
<th>Sex Difference</th>
<th>Ability Level × Sex Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>F</td>
</tr>
<tr>
<td>High</td>
<td>203.09**</td>
<td>0.00</td>
</tr>
<tr>
<td>Low</td>
<td></td>
<td>0.09</td>
</tr>
</tbody>
</table>

**p < .01

scoring between 16 and 3. A two-way analysis of variance (ANOVA) was conducted and found no significant main effect for sex difference \( F(1, 66) = 0.00, \text{ns} \) or no significant interaction between reading ability and sex difference \( F(1, 66) = 0.09, \text{ns} \) (see Table 2). That is, there was no significant difference between male and female students in their average scores on the reading comprehension test. Reading ability had a significant main effect \( F(1, 66) = 203.09, p < .01 \), indicating that ignoring sex difference, the students with high reading ability scored significantly \( p < .05 \) higher than those with low reading ability.

2.2. Materials

2.2.1. The reading comprehension test

The Cambridge First Certificate in English (FCE) (Test 3: Reading) (Version 4, 1998) was used as a standardized reading comprehension test. It consisted of 35 multiple-choice questions. The items were scored 'right' or 'wrong'. One mark was given for each correct answer.

2.2.2. Recall test

The passage for the recall test was taken from Blanton (1993, p.63). The expository text contained 229 words with four paragraphs (see APPENDIX A).

2.3. Procedure

First, the students took the FCE within 80 minutes. Then, they were given a recall test. They were asked to read and comprehend the text (Appendix A). Prior to reading, they were informed that later they would be asked to write in Japanese as much as they could remember from the text, as accurately as they could, and in as much detail as possible.
They were given 30 minutes to read the text and write recall protocols in Japanese at their own paces. They were not allowed to look back at the passage when writing recalls. Later analysis of the students' responses in a questionnaire showed that they had no prior knowledge about the content of the text.

2.4. Scoring and data analysis

Following Carrell (1985), the text was first parsed into 67 idea units by the researcher and one expert in reading (see Appendix B). A strict criterion was used to score recall protocols. One point was given for the idea unit only if the content of the idea unit recalled was semantically identical or synonymous to that in the original text.

The main ideas of paragraphs were determined based on judgments by three researchers including one native English speaker. The total possible score was 10 for main ideas. One point was awarded for each of the 10 main idea units. The four paragraph main ideas can be seen in Appendix C.

The researcher and one expert in reading independently scored the whole recall protocols against the a priori list of idea units to check for inter-rater reliability. The correlation between raters was .99 in the strict criterion.

3. RESULTS

3.1. Test reliability

The overall Cronbach's alpha for the 35 items on the FCE was .81. This indicates acceptable internal consistency reliability.

3.2. Concurrent validity of a recall test

The significant correlation coefficient between all idea units and the standardized reading comprehension test (i.e., FCE) was moderate for all the students: \( r = .64, p < .01 \). For the male and female students, similar significant correlation coefficients were found between total recall and reading comprehension as measured by the FCE: for male students, \( r = .61, p < .01 \); for female students, \( r = .67, p < .01 \). The difference in the correlations between male and female students was not statistically significant.

3.3. Total recall

The means and standard deviations of recall scores for each ability level in male and female students are shown in Table 3. A 2×2 (ability level x sex difference) analysis of variance (ANOVA) was conducted on the data in the protocols. The results of the ANOVA (reported in Table 4) indicated that there was a significant main effect for ability level with respect to the recall of the total number of idea units for the text: \( F(1, 66) = 42.92, p < .01 \). However, there were neither a significant main effect for sex difference nor significant interaction between ability level and sex difference: for sex difference, \( F(1,
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Table 3 Means and SDs of all idea units recalled

<table>
<thead>
<tr>
<th>Ability Level</th>
<th>Male</th>
<th></th>
<th>Female</th>
<th></th>
<th>All</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>M</td>
<td>SD</td>
<td>N</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>High</td>
<td>19</td>
<td>36.63</td>
<td>11.12</td>
<td>12</td>
<td>37.67</td>
<td>8.77</td>
</tr>
<tr>
<td>Low</td>
<td>19</td>
<td>21.42</td>
<td>11.59</td>
<td>20</td>
<td>19.05</td>
<td>8.81</td>
</tr>
</tbody>
</table>

Note: Maximum possible score = 67

Table 4 Results of a two-way ANOVA for total recall

<table>
<thead>
<tr>
<th>Ability Level</th>
<th>Sex Difference</th>
<th>Ability Level × Sex Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td>42.92**</td>
<td>0.06</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.43</td>
</tr>
</tbody>
</table>

**p < .01

Table 5 Means and SDs for the recall of main idea units

<table>
<thead>
<tr>
<th>Ability Level</th>
<th>Male</th>
<th></th>
<th>Female</th>
<th></th>
<th>All</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>M</td>
<td>SD</td>
<td>N</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>High</td>
<td>19</td>
<td>5.37</td>
<td>2.64</td>
<td>12</td>
<td>5.50</td>
<td>1.44</td>
</tr>
<tr>
<td>Low</td>
<td>19</td>
<td>3.42</td>
<td>2.28</td>
<td>20</td>
<td>2.45</td>
<td>1.56</td>
</tr>
</tbody>
</table>

Note: Maximum possible score = 10

Table 6 Results of a two-way ANOVA for main idea units recalled

<table>
<thead>
<tr>
<th>Ability Level</th>
<th>Sex Difference</th>
<th>Ability Level × Sex Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td>22.65**</td>
<td>0.63</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.10</td>
</tr>
</tbody>
</table>

**p < .01

66) = 0.63, ns; for ability level × sex difference, F(1, 66) = 1.10, ns. That is, irrespective of sex difference, the high-ability students recalled significantly more idea units for the total text than low-ability students. Moreover, the difference in total recall between the high- and low-ability levels was not affected by sex difference.

3.4. The recall of all main idea units

The means and standard deviations for the main idea units are reported in Table 5. As indicated in Table 6, the results of the two-way ANOVA showed that neither main effect for sex difference nor interaction between ability level and sex difference were significant: F(1, 66) = 0.63, and F(1, 66) = 1.10, respectively. There was no significant difference in total main ideas between male and female students. Furthermore, sex
Table 7  Mean percentages of the recall of each paragraph

<table>
<thead>
<tr>
<th>Ability Level</th>
<th>Paragraph</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>$M$ (SD)</td>
<td>$M$ (SD)</td>
</tr>
<tr>
<td>High</td>
<td>Paragraph 1</td>
<td>52.11% (22.85)</td>
<td>51.67% (21.54)</td>
</tr>
<tr>
<td></td>
<td>Paragraph 2</td>
<td>56.88% (17.50)</td>
<td>60.90% (11.73)</td>
</tr>
<tr>
<td></td>
<td>Paragraph 3</td>
<td>58.17% (20.95)</td>
<td>58.33% (14.49)</td>
</tr>
<tr>
<td></td>
<td>Paragraph 4</td>
<td>46.49% (29.03)</td>
<td>46.53% (28.56)</td>
</tr>
<tr>
<td>Low</td>
<td>Paragraph 1</td>
<td>30.00% (22.71)</td>
<td>27.50% (18.41)</td>
</tr>
<tr>
<td></td>
<td>Paragraph 2</td>
<td>36.84% (24.21)</td>
<td>34.81% (14.10)</td>
</tr>
<tr>
<td></td>
<td>Paragraph 3</td>
<td>30.75% (22.86)</td>
<td>27.11% (19.92)</td>
</tr>
<tr>
<td></td>
<td>Paragraph 4</td>
<td>25.00% (22.30)</td>
<td>17.50% (22.19)</td>
</tr>
</tbody>
</table>

Table 8  Results of a three-way ANOVA for mean percentages of the recall of each paragraph

<table>
<thead>
<tr>
<th>Ability Level</th>
<th>Sex Difference</th>
<th>Paragraph</th>
<th>$F$</th>
<th>$F$</th>
<th>$F$</th>
<th>$F$</th>
<th>$F$</th>
<th>$F$</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A)</td>
<td>(B)</td>
<td>(C)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40.50**</td>
<td>0.14</td>
<td>7.34**</td>
<td>0.37</td>
<td>0.21</td>
<td>0.48</td>
<td>0.08</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**$p < .01$**

difference did not affect the difference in main idea units recalled between the high- and low-ability students.

Only ability level had a significant main effect, $F(1, 66) = 22.65$, $p < .01$, indicating that ignoring sex difference, the students with high reading ability recalled more main idea units than those with low reading ability.

3.5. Comparisons of the recall of idea units across paragraphs

Table 7 presents the mean percentages and standard deviations of the recall for each paragraph. A $2 \times 2 \times 4$ (ability level x sex difference x paragraph) ANOVA was conducted in order to determine the effects of ability level and sex difference on the recall for each paragraph. The results of the ANOVA (Table 8) found a significant main effect for ability level, $F(1, 66) = 40.50$, $p < .01$, indicating that the students with high reading ability recalled more idea units for each paragraph than those with low reading ability. Furthermore, the main effect for paragraph was significant, $F(3, 198) = 7.34$, $p < .01$. That is, there were significant differences in mean percentages of the recall across paragraphs. The pattern of differences in the mean percentages of idea units recalled among the four paragraphs was the same for the two different ability groups: paragraph 2 = paragraph 3 = paragraph 1 > paragraph 4 and paragraph 2 > paragraph 1 ($p < .05$).

There was no significant interaction between ability level and sex difference, $F(1,$
Table 9  Mean percentages of the recall of each paragraph main idea

<table>
<thead>
<tr>
<th>Ability Level</th>
<th>Paragraph Main Idea</th>
<th>Male ( M (SD) )</th>
<th>Female ( M (SD) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Paragraph 1</td>
<td>51.32% (28.65)</td>
<td>56.25% (29.09)</td>
</tr>
<tr>
<td></td>
<td>Paragraph 2</td>
<td>39.47% (20.38)</td>
<td>37.50% (21.65)</td>
</tr>
<tr>
<td></td>
<td>Paragraph 3</td>
<td>73.68% (44.03)</td>
<td>66.67% (47.14)</td>
</tr>
<tr>
<td></td>
<td>Paragraph 4</td>
<td>59.65% (42.69)</td>
<td>61.11% (38.09)</td>
</tr>
<tr>
<td>Low</td>
<td>Paragraph 1</td>
<td>42.10% (26.97)</td>
<td>41.25% (27.70)</td>
</tr>
<tr>
<td></td>
<td>Paragraph 2</td>
<td>23.68% (29.77)</td>
<td>25.00% (25.00)</td>
</tr>
<tr>
<td></td>
<td>Paragraph 3</td>
<td>31.58% (46.48)</td>
<td>20.00% (40.00)</td>
</tr>
<tr>
<td></td>
<td>Paragraph 4</td>
<td>31.58% (35.00)</td>
<td>3.33% (14.53)</td>
</tr>
</tbody>
</table>

Table 10  Results of a three-way ANOVA

<table>
<thead>
<tr>
<th>Ability Level</th>
<th>Sex difference (A)</th>
<th>Paragraph (C)</th>
<th>( A \times B )</th>
<th>( B \times C )</th>
<th>( A \times C )</th>
<th>( A \times B \times C )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( F )</td>
<td>( F )</td>
<td>( F )</td>
<td>( F )</td>
<td>( F )</td>
<td>( F )</td>
</tr>
<tr>
<td></td>
<td>26.28**</td>
<td>0.89</td>
<td>4.70**</td>
<td>0.68</td>
<td>0.99</td>
<td>5.81**</td>
</tr>
</tbody>
</table>

**\( p < .01 \)

66) = 0.37, ns, and between sex difference and paragraph, \( F(3, 198) = 0.21 \), ns, and between ability level x paragraph, \( F(3, 198) = 0.48 \), ns. Nor was there any triple interaction (ability level x sex difference x paragraph), \( F(3, 198) = 0.08 \), ns.

3.6. Comparisons of the recall of paragraph main ideas

The mean percentages and standard deviations of the recall for each paragraph main idea are shown in Table 9. A 2 x 2 x 4 (ability level x sex difference x paragraph) ANOVA was conducted in order to determine the effects of ability level and sex difference on the recall for each paragraph main idea. The results of the ANOVA (Table 10) found significant main effects for ability level and for paragraph: for ability level, \( F(1, 66) = 26.28 \), \( p < .01 \); for paragraph, \( F(3, 198) = 4.70 \), \( p < .01 \). Furthermore, the ability level x paragraph interaction was significant, \( F(3, 198) = 5.81 \), \( p < .01 \). That is, there were significant differences in mean percentages of the recall of paragraph main ideas between the two ability levels (Table 11).

There was no significant interaction between ability level and sex difference, \( F(1, 66) = 0.68 \), ns, and between sex difference and paragraph, \( F(3, 198) = 0.99 \), ns. Nor was there any triple interaction (ability level x sex difference x paragraph), \( F(3, 198) = 0.94 \), ns.

The significant interaction between ability level and paragraph revealed that for paragraphs 2, 3 and 4, the high-ability students recalled a significantly greater percentage
of paragraph main idea units than the low-ability students: $F(1, 66) = 5.16, p < .05$; $F(1, 66) = 15.96, p < .01$; $F(1, 66) = 25.64, p < .01$, respectively (for the mean percentages, see Table 9). In paragraph 1, however, the difference in mean percentages of paragraph main idea units between the two groups was not significant, $F(1, 66) = 2.95$, ns. The post hoc analyses using the Least Significant Difference (LSD) procedure revealed that the pattern of differences in the mean percentages of main idea units recalled among the four paragraphs was different in the two groups. The high-ability students were least able to recall main idea units of paragraph 2, while the low-ability students recalled those of paragraph 1 best: for the high-ability students, paragraph main idea 3 = paragraph main idea 4 = paragraph main idea 1 > paragraph main idea 2 (paragraph main idea 3 > paragraph main idea 1); for the low-ability students, paragraph main idea 1 > paragraph main idea 3 = paragraph main idea 2 = paragraph main idea 4 ($p < .05$).

4. DISCUSSION

As for the concurrent validity of a recall test, there were moderate significant correlations between a recall test and the standardized reading test (i.e., FCE): for all the students, $r = .64, p < .01$; for males, $r = .61, p < .01$; for females, $r = .67, p < .01$, suggesting that a recall test is moderately valid as a measure of reading comprehension. The lack of significant difference in correlations between male and female students reveals that sex difference did not affect the concurrent validity of a recall test.

The results of the present study show that it was the level of reading ability, not sex difference, that played an important role in the recall of all idea units, all main idea units, the recall of paragraphs and paragraph main ideas recalled. Reading ability level proved to have significant effects on recall. Thus, a recall test has been affected by language proficiency (Takahashi, 1994; Hirano, 2000), and target language experience (Hirano, 2002) as well as reading ability in this study.

Of interest to the study are the results that show that sex difference did not have a significant influence on the differences between the students with high and low reading ability in the total amount of the passage recalled, main ideas recalled, the recall of paragraphs and paragraph main ideas recalled. The differences between the two levels of ability did not vary due to sex difference. Thus, it is suggested that we should not be overly concerned with sex difference in a testing situation when discriminating between different
levels of reading ability.

Furthermore, the difference in the pattern of recall of paragraph main ideas was also a function of reading ability level (for the effect of language proficiency and grade level on the pattern of paragraph recall, see Hirano (2000a, 2000b, 2002)). Although the pattern of the recall of idea units across paragraphs was the same for the two ability groups, the difference in reading ability affected the difference in students' recall of paragraph main ideas. That is, the ability level x paragraph interaction was significant for paragraph main ideas, while no significant interactions were found between ability level and sex difference and between sex difference and paragraph. The high-ability students recalled more idea units in three paragraphs (not in the first paragraph) than the low-ability students. Hirano (2000, 2002) reports that selecting which paragraph is used should be carefully considered when assessing reading comprehension. Moreover, for the low-ability students, only the first paragraph main idea was recalled better than any other paragraph main idea: paragraph main idea 1 > paragraph main idea 3 = paragraph main idea 2 = paragraph main idea 4 (p < .05). For the students with high reading ability, the recall of paragraphs 1, 3, and 4 was better than that of paragraph 2: paragraph main idea 3 = paragraph main idea 4 = paragraph main idea 1 > paragraph main idea 2, and paragraph main idea 3 > paragraph main idea 1.

5. SUMMARY AND CONCLUSION

Using the strict criterion of scoring recalls, the present study has attempted to investigate the concurrent validity of a recall test as a measure of reading comprehension and to determine the effects of reading ability and sex difference on (1) the total amount of a passage recalled, (2) the recall of main ideas (3) the recall of idea units for each paragraph and (4) paragraph main ideas recalled at two levels of reading ability. The major findings indicate that a significant moderate correlation was found between a recall test and a standardized reading comprehension test (i.e., the FCE): \( r = .64, \ p < .01 \). Moreover, reading ability, not sex difference, proved to be a significant factor affecting the total amount of the text recalled, the recall of total main ideas and idea units of paragraphs and paragraph main ideas recalled. In addition, the differences between the students with high and low reading ability were not affected by sex difference in terms of total recall, the total main ideas recalled, paragraph recall and the recall of paragraph main ideas. That is, regardless of sex difference, students with high reading ability recalled both the total text and main ideas significantly better than those with low reading ability. Furthermore, although the difference in the level of reading ability did not affect the differences in the recall of idea units across paragraphs, it affected differences in the recall of paragraph main ideas.

Further research is necessary to investigate the validity of a recall test as a measure of reading comprehension from a variety of perspectives.
REFERENCES


**APPENDIX A (Passage)**

Some people giggle quietly. Others let loose with hearty laughter, sometimes called a "belly" laugh. However we laugh, laughter is a necessary ingredient of a healthy, happy life. We can easily recognize laughter, but what exactly is it?

First of all, laughter is a physiological expression. This expression is, in part, what we see and hear. According to medical researchers, laughter is a series of movements of the facial muscles and the respiratory system. These movements give the diaphragm, abdomen, heart, lungs, and liver a thorough massage during a hearty laugh. They also cause the production of adrenaline and increase the flow of blood to the heart and brain. The results are a feeling of pleasure and well-being.

Laughter is also a psychological expression. According to psychologists, laughter expresses our mastery over fear and worry. Picture what happens when a parent takes a young child into a swimming pool. At first, the child probably doesn't laugh and may even cry or appear frightened. However, once the child is sure that the parent will not let go, he or she is free to laugh, splash, and enjoy the water.

Laughter, then, measures our adjustment to the world around us. If we can laugh when we are afraid, we will be able to gain control over our fears; if we are secure and in control, then we can laugh and enjoy life.

**APPENDIX B (Idea Unit Analysis )**

1. Some people giggle quietly.
2. Others let loose
3. with hearty laughter,
4. sometimes called a "belly" laugh.
5. However we laugh,
6. laughter is a necessary ingredient
7. of a healthy... life,
8. happy.
9. We can easily recognize laughter,
10. but what exactly is it?
11. First of all,
12. laughter is a physiological expression.
13. This expression is,
14. in part,
15. what we see
16. and hear.
17. According to medical researchers,
18. laughter is a series
19. of movements
20. of the facial muscles
21. and the respiratory system.
22. These movements give the diaphragm, a thorough massage
23. abdomen,
24. heart,
25. lungs,
26. and liver
27. during a hearty laugh.
28. They also cause the production
29. of adrenaline
30. and increase the flow
31. of blood
32. to the heart
33. and brain.
34. The results are a feeling
35. of pleasure
36. and well-being.
37. Laughter is also a psychological expression.
38. According to psychologists,
39. laughter expresses our mastery
40. over fear
41. and worry.
42. Picture
43. what happens
44. when a parent takes a young child
45. into a swimming pool.
46. At first,
47. the child probably doesn't laugh
48. and may even cry
49. or appear frightened.
50. However, once the child is sure
51. that the parent will not let go,
52. he or she is free
53. to laugh,
54. splash,
55. and enjoy the water.
56. Laughter, then, measures our adjustment
57. to the world
58. around us.
59. If we can laugh
60. when we are afraid,
61. we will be able
62. to gain control
63. over our fears;
64. if we are secure
65. and in control,
66. then we can laugh
67. and enjoy life.

APPENDIX C (Paragraph Main Ideas)

(1) (Paragraph 1) However we laugh, / laughter is a necessary ingredient /of a healthy, / happy life.
   (4 idea units)
(2) (Paragraph 2) First of all, /laughter is a physiological expression.
   (2 idea units)
(3) (Paragraph 3) Laughter is also a psychological expression.
   (1 idea unit)
(4) (Paragraph 4) Laughter, then, measures our adjustment /to the world/ around us.
   (3 idea units)