The Effects of Target Language Experience and Scoring Criteria on Recall Protocols of Japanese Students

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ABSTRACT

The present study was designed to investigate the effects of target language experience and two different scoring criteria (strict versus loose) on the written recalls of 154 Japanese EFL high school students (sophomores), 117 undergraduates (freshmen), and 40 graduate students. Results showed that differences in the total quantity of the text recalled and in the recall of main ideas among the high school students, undergraduates and graduate students were affected by different scoring criteria. That is, for either strict or loose scoring criteria, the graduate students recalled not only more idea units of the text, but also more of the main ideas than the undergraduates, followed by high school students. Moreover, differences in paragraph recall were affected by difference in target language experience. Thus target language experience should be taken into account when making comparisons between the idea units of the paragraphs recalled.

KEY WORDS

written recall protocols	target language experience
scoring criterion	EFL reading

INTRODUCTION

Swaffar et al. (1991: 164) states that protocols written in L2 students' native language "reveal how the readers' logical manipulations—their predicting, organizing, and inferencing about textual meaning—interact with their recognition of textual vocabulary and syntax." Previous research has investigated the variables affecting a reader's ability to understand and recall the text written in a first or second language (e.g., Barry and Lazarte, 1992; Brown and Smiley, 1977; Carrell, 1983, 1984a; Hirano, 1998a, 2000; Johnson, 1970; Lee, 1986; Lee and Ballman, 1987; Mandler 1978; Takahashi, 1994;).

Not enough is known about whether differences in grade level or the number of years of target language experience will affect the comprehension and recall of Japanese EFL students when two criteria of scoring recall protocols (a strict versus a loose criterion) are employed. Thus the present study attempts to combine the two variables of target

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language experience and scoring criteria and make a comparison of differences in written recall protocols among three grade levels (i.e., high school students, university freshmen, and first- and second-year graduate students). The research questions were addressed as follows:

(1) What are the differences among Japanese high school students, university freshmen, and graduate students in their written recall protocols? That is, are there differences among the three grade levels in terms of the total number of idea units of the text recalled, the recall of main ideas, and the quantity of paragraph idea units recalled?

(2) Do the different scoring criteria affect the differences in recall among the three grade levels?

METHOD

Participants

A total of 311 Japanese students (164 males and 147 females) served as participants in the study[1]. They were 154 second-year high school students (in their fifth year of studying English), 117 university freshmen (in their seventh year of English studies), and 40 graduate students (first- and second-year English majors). The high school students ranged in age from 16 to 17, while the university freshmen were between 18 and 19 years of age. Since students' target language experience and age difference were important, only the freshmen that had had formal English instruction for six years before entering their universities were analyzed, thus 117 undergraduates were selected. The graduate students had studied English for a minimum of ten years and two or three months up to the point at which they participated in this study. They ranged in age from 23 to 40, as well as in years of target language experience from 10 years and two months to 27 years. They were not controlled for their years of experience studying English, i.e., their ages due to the small size of 40.

The participants reported that they had never read the same or similar text as that used in the study.

Materials

The passage from Hirano (1998a) was used as a measure of reading comprehension. It was an expository text from Mikulecky and Jeffries (1986: 100). It consisted of 243 words and four paragraphs (see Appendix A).

Procedure

The students were given a recall task in which they were informed, before reading, 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 (Hirano 1998a). They were given 20 minutes to read the text, and 15 minutes to write the recall protocols.

Table 1 Correlations between strict criteria and loose
criteria for total recall and total main ideas:
comparisons among the three grade levels

Grade level	n	Total reall	Main ideas
high school	154	.98***	.93***
undergraduate	117	.97***	.83***
graduate	40	.93***	.59***
all	311	.98***	.90***

***$p < .001$

They could not look back at the passage.

Scoring and Data Analysis

The text was parsed into 66 idea units by the researcher and one junior high school teacher (see Appendix A) (see Carrell 1985).

The main ideas of paragraphs were determined based on Mikulecky and Jeffries (1986: 264). Since the total main ideas consisted of ten idea units, the total possible score was 10 for main ideas. The main idea of each paragraph can be seen in Appendix B.

The researcher and a junior high school teacher independently scored 47 recall protocols (15% of a total of 311) against the a priori list of idea units. The inter-rater reliability was above .90 in both the strict and the loose criterion. All other protocols were scored by the researcher.

Two different criteria of scoring recall protocols, i.e., a strict and a loose criterion were employed. According to Carrell (1983: 189), the strict criterion disallows slight distortions and additions in meaning. On the other hand, the loose criterion includes some distortions of the original meaning (for the definitions and examples of the strict and loose criterion used in this study, see Hirano 2000). For the strict criterion, one point was given for the idea unit correctly recalled. For the loose criterion, one point was awarded for the idea unit if approximately two-thirds of the semantic content was correctly recalled or paraphrased.

RESULTS

Correlation Coefficients

Regarding total recall, very high correlations were found between the strict and the loose criterion for high school, undergraduate and graduate students: $r = .98, p < .001$; $r = .97, p < .001$; and $r = .93, p < .001$, respectively (see Table 1). For the total main ideas recalled, there were also very high correlations between these two scoring criteria for high school and undergraduate students: $r = .93, p < .001$; and $r = .83, p < .001$, respectively. However, for the graduate students, the significant correlation was lower in

Table 2 Means and SDs of all idea units recalled

Criterion	Grade level	n	M	(SD)	Range
Strict	high school	154	21.90	(13.10)	0-53
	undergraduate	117	33.86	(8.97)	11-58
	graduate	40	39.68	(5.38)	31-50
Loose	high school '	154	26.39	(15.39)	1-58
	undergraduate	117	40.69	(9.77)	14-61
	graduate	40	48.13	(5.88)	37-57

Table 3 Results of two-way ANOVA: all idea units recalled

Factor	F	
Grade Level (A)	55.13**	
Criterion (B)	1099.69**	
AxB	33.52**	(a) Strict Criterion ⋯ Graduate > Undergraduate > High School* $(F = 51.26, p < .01)$ Loose Criterion ⋯ Graduate > Undergraduate > High School* $(F = 57.44, p < .01)$ (b) High School, Undergraduate and Graduate Students ⋯ Loose > Strict*

*$p < .05$ **$p < .01$

the total main ideas recalled ($r = .59, p < .001$).

Total Recall

Table 2 presents the descriptive statistics for the participants' performance on the recall protocol test. For the strict and the loose criterion, the means of the recall test were: for high school students, 21.90 ($SD = 13.10$) (out of a possible 66) and 26.39 ($SD = 15.39$), respectively; for undergraduate students, 33.86 ($SD = 8.97$) and 40.69 ($SD = 9.77$), respectively; for graduate students, 39.68 ($SD = 5.38$) and 48.13 ($SD = 5.88$), respectively.

As shown in Table 3, the results of a two-way analysis of variance (ANOVA) revealed that the main effects for grade level and for scoring criterion were significant: for grade level, $F(2, 308) = 55.13, p < .01$; and for scoring criterion, $F(1, 308) = 1099.69$, $p < .01$. The interaction of grade level and scoring criterion was also significant ($F(2, 308) = 33.52, p < .01$). The significant interaction indicated that for either scoring criterion, the graduate students recalled a larger number of idea units of the text than the undergraduate students, followed by the high school students: graduate students > under-graduate students > high school students. Moreover, for each grade level, the loose criterion produced a larger number of idea units of the whole text recalled than the strict

Table 4   Means and *SDs* of all main idea units recalled

Criterion	Grade	n	M	(SD)	Range
Strict	high school	154	4.09	(2.21)	0-9
	undergraduate	117	5.11	(1.56)	1-8
	graduate	40	6.23	(1.37)	4-9
Loose	high school	154	5.21	(2.78)	0-10
	undergraduate	117	7.03	(1.92)	1-10
	graduate	40	8.13	(1.14)	5-10

Table 5   Results of two-way ANOVA for main ideas recalled

Factor	F	
Grade Level (A)	28.37**	
Criterion (B)	516.12**	
AxB	13.01**	(a) Strict Criterion ⋯ Graduate > Undergraduate > High School* ($F = 23.66, p < .01$) Loose Criterion ⋯ Graduate > Undergraduate > High School* ($F = 29.83, p < .01$) (b) High School, Undergraduate and Graduate Students ⋯ Loose > Strict*

*$p < .05$ **$p < .01$

criterion.

The Recall of All Main Idea Units

Table 4 displays the means and standard deviations for the main idea units recalled. As in the case of total recall, the results of the two-way ANOVA (see Table 5) revealed that not only main effects for grade level and scoring criterion but also the interaction between grade level and scoring criterion was significant for the total number of main idea units recalled: for grade level, $F(2, 308) = 28.37, p < .01$; for scoring criterion, $F(1, 308) = 516.12, p < .01$; and for grade level x scoring criterion, $F(2, 308) = 13.01, p < .01$. The significant interaction indicates that the differences in main ideas recalled among the three grade levels were affected by scoring criteria. That is, for both scoring criteria, the graduate students recalled significantly more main idea units than any other group, followed by undergraduate students, and then high school students: graduate students > undergraduate students > high school students. Furthermore, the students recalled more main idea units when the loose scoring criterion was employed than when the strict criterion was.

Table 6　Mean percentages and *SDs* of recall for each paragraph using the strict criterion and the loose criterion

Grade level	Paragraph	Strict criteiron		Loose criterion	
		M	*(SD)*	*M* .	*(SD)*
high school students	Paragraph 1	60.25%	(26.22)	67.02%	(27.33)
	Paragraph 2	36.82%	(25.37)	43.70%	(28.45)
	Paragraph 3	28.22%	(25.01)	39.01%	(31.91)
	Paragraph 4	16.09%	(19.18)	20.48%	(23.32)
undergraduates	Paragraph 1	77.84%	(15.10)	85.10%	(13.68)
	Paragraph 2	53.24%	(16.69)	61.44%	(17.98)
	Paragraph 3	49.44%	(19.09)	68.38%	(22.46)
	Paragraph 4	34.03%	(19.07)	42.93%	(21.01)
graduate students	Paragraph 1	77.32%	(9.70)	86.43%	(8.87)
	Paragraph 2	64.85%	(11.20)	75.30%	(12.56)
	Paragraph 3	59.62%	(12.84)	81.92%	(14.75)
	Paragraph 4	45.80%	(17.11)	57.16%	(10.50)

Paragraph Recall

Paragraphs Recalled Using the Strict Criterion

　　Table 6 shows the mean percentages and standard deviations of the recall for each paragraph scored by the strict criterion and the loose criterion. For the strict criterion, the results of the two-way ANOVA indicated that there were significant main effects for grade level and paragraph: for grade level, $F(2, 308) = 48.98$, $p < .01$; for paragraph, $F(3, 924) = 313.29$, $p < .01$ (see Table 7). The interaction between grade level and paragraph was significant ($F(6, 924) = 5.14$, $p < .01$). This indicates that the graduate students recalled each paragraph significantly ($p < .05$) better than the undergraduate students, followed by the high school students: graduate students > undergraduates > high school students. However, for the first paragraph, there was no significant difference in recall between the graduate and undergraduate students, though these two grade levels performed significantly ($p < .05$) better on paragraph recall than the high school students: graduate students = undergraduates > high school students. The multiple comparisons by the least significant difference (LSD) revealed that for the high school and graduate students, there were significant differences between all four adjacent paragraphs recalled using the strict criterion: Paragraph 1 > Paragraph 2 > Paragraph 3 > Paragraph 4. For the undergraduates, however, there was no significant difference between Paragraph 2 and Paragraph 3 using the strict criterion: Paragraph 1 > Paragraph 2 = Paragraph 3 > Paragraph 4.

Paragraphs Recalled Using the Loose Criterion

　　The data was submitted to the 3 x 4 (grade level x paragraph) ANOVA in order to determine the effects of grade level on the recall of each paragraph. The results of the

Table 7 Results of ANOVA for mean percentages of the recall of each paragraph using the strict criterion

Factor	F	
Grade Level (A)	48.98**	
Paragraph (B)	313.29**	
A x B	5.14**	(a) Paragraph 1 ⋯ Graduate = Undergraduate > High School* ($F = 16.95, p < .01$) Paragraph 2 ⋯ Graduate > Undergraduate > High School* ($F = 33.47, p < .01$) Paragraph 3 ⋯ Graduate > Undergraduate > High School* ($F = 40.74, p < .01$) Paragraph 4 ⋯ Graduate > Undergraduate > High School* ($F = 46.57, p < .01$) (b) Multiple comparisons by LSD (Mse = 196.28, $p < .05$) High School ⋯ Paragraphs 1 > 2 > 3 > 4* Undergraduate ⋯ Paragraphs 1 > 2 = 3 > 4* Graduate ⋯ Paragraphs 1 > 2 > 3 > 4*

*$p < .05$, **$p < .01$

ANOVA for the loose criterion (Table 8) revealed significant main effects for grade level and paragraph: for grade level, $F(2, 308) = 55.44, p < .01$; for paragraph, $F(3,924) = 240.62$. There was also a significant interaction between grade level and paragraph ($F(6, 924) = 8.64, p < .01$). The significant interaction indicates that the difference in grade level had a significant effect on the differences in mean recall scores among the four paragraphs. That is, for Paragraphs 2, 3, and 4, the graduate students recalled a significantly greater percentage of idea units than the undergraduates, followed by high school students. In Paragraph 1, however, the difference in mean percentages of idea units between the graduate and undergraduate students was not significant, though they recalled better than the high school students. The *post hoc* analyses using the Least Significant Difference (LSD) procedure revealed that the pattern of differences in the mean percentages of idea units recalled among the four paragraphs was different for each grade level. For the undergraduates, they produced a significantly higher percentage of idea units in Paragraph 1 than in any other paragraph: Paragraph 1 > Paragraph 3 > Paragraph 2 > Paragraph 4 (p < .05). In contrast, for the graduate students, there was no significant difference in the quantity recalled between Paragraph 1 and Paragraph 3, though these two paragraphs were recalled best while paragraph 4 was the least recalled: Paragraph 1 = Paragraph 3 > Paragraph 2 > Paragraph 4 ($p < .05$). For the high school students, Paragraph 1 significantly outscored Paragraphs 2, 3, and 4, though there was no significant difference in recall between Paragraph 2 and Paragraph 3. The pattern of recall across the four paragraphs was Paragraph 1 > Paragraph 2 = Paragraph 3 > Paragraph 4 (Mse =

Table 8 Results of ANOVA for mean percentages of the recall of each paragraph using the loose criterion

Factor	F	
Grade Level (A)	55.44**	
Paragraph (B)	240.62**	
A x B	8.64**	(a) Paragraph 1 ··· Graduate = Undergraduate > High School* ($F=19.37$, $p < .01$) Paragraph 2 ··· Graduate > Undergraduate > High School* ($F=34.30$, $p < .01$) Paragraph 3 ··· Graduate > Undergraduate > High School* ($F=49.46$, $p < .01$) Paragraph 4 ··· Graduate > Undergraduate > High School* ($F=51.83$, $p < .01$) (b) Multiple comparisons by LSD (Mse= 243.13, $p < .05$) High School ··· Paragraphs 1 > 2 = 3 > 4* Undergraduate ··· Paragraphs 1 > 3 > 2 > 4* Graduate ··· Paragraphs 1 = 3 > 2 > 4*

*$p < .05$, **$p < .01$

243.13, $p < .05$) for the loose criterion.

DISCUSSION

The results indicate that there were very high correlations between the strict and the loose criterion (ranging from .93 to .97, $p < .001$), for the total quantity of the text recalled. For the main idea units recalled, the correlations were also very high except the modest correlation ($r = .59$, $p < .001$) for graduate students: for high school students, $r = .93$, $p < .001$; and for undergraduate students, $r = .83$, $p < .001$. Therefore, it is suggested that there is no need to be concerned with which criterion should be used when assessing reading ability of Japanese students by using the recall of the total text and main ideas recalled.

One particularly interesting finding made in this study is that the interactions between scoring criterion and grade level were significant for the recall of all idea units of the text and the recall of main ideas. That is, the two different criteria of scoring recall did affect the differences among the three grade levels in the total amount of recall (i.e., total recall) and main ideas recalled.

Though the pattern of the recall of the whole text was the same for each criterion (i. e., graduate students > undergraduate students > high school students), the significant interaction of scoring criterion and grade level is due to the larger difference in total recall between the strict and loose criterion for the graduate students than any other grade level.

The loose criterion led to a greater dispersion, i.e., a higher discrimination between adjacent levels than did the strict criterion. This suggests that since the recall task requires students to rely on the recall of details of the text, graduate students' total recall was poorer for the strict criterion and better for the loose criterion. Though the high school and undergraduate students were good at recalling even the details of the text by relying on bottom-up processing, the graduate students, who tended to develop top-down processing, seemed to focus more on main ideas than the details of the text.

In addition, different scoring criteria had a significant effect on the differences in the recall of main ideas among the three grade levels. The significance of the interaction is due to the fact that the differences in the recall of main ideas between the strict and the loose criterion were smaller for the high school students than any other level. The reason for the smallest difference may be that since the high school students were poorer at understanding main ideas, they did not increase the number of main idea units recalled as well as the other grade levels, even though the loose criterion was used. On the other hand, the students' scores on main ideas improved more at the undergraduate stage for the loose criterion than the strict criterion. Since the undergraduate students' ability to understand the main ideas of the text improved, they increased the number of main idea units when the loose criterion was employed.

The results of this study indicate that target language experience had a significant effect on students' recall of the total ideas, the total main ideas, and the ideas for each paragraph.

It is worth noting that for each scoring criterion, Japanese students' English language experience had a significant effect on their reading comprehension as measured by total recall. That is, the results indicate that there were significant developmental differences in total recall among the three grade levels, suggesting that as students' grade level increased and their reading ability improved, their total recall increased.

The findings also reveal that for each scoring criterion, English language experience was an important factor facilitating the recall of main ideas. As years of their study increased, the students' ability to comprehend and recall main ideas improved with target language experience. This result supports Takahashi's (1994) and Hirano's (2000) findings that high-proficiency students recalled significantly more main ideas than the low-proficiency students. This result, however, is not consistent with the findings by either Lee and Ballman (1987) on FL students or by Brown and Smiley (1977) involving L1 readers. These conflicting research findings suggest that further research on main ideas should be conducted (Hirano 2000: 75).

Analyses of the interaction of grade level and paragraph reveal that the difference in students' grade level affected the difference in the recall of idea units of each paragraph. For both the strict and the loose criterion, the graduate students recalled more idea units in three of the four paragraphs (i.e., Paragraphs 2, 3 and 4) than any other grade level, followed by undergraduate students, and then by graduate students. However, for each

scoring criterion, no significant difference existed between the undergraduate and graduate students in the recall of idea units in the first paragraph. Because not all of the paragraphs discriminated between the recall of the adjacent grade levels, we should carefully consider which paragraph to use in a testing situation when assessing reading comprehension.

The difference in the pattern of recall of paragraphs was also a function of grade level. That is, for the graduate and high school students, there were significant differences between all four adjacent paragraphs recalled for the strict criterion: Paragraph 1 > Paragraph 2 > Paragraph 3 > Paragraph 4, while for the undergraduates, significant differences were not found for all paragraphs: Paragraph1 > Paragraph 2 = Paragraph 3 > Paragraph 4. In addition, the pattern of recall of paragraphs that emerged varied according to grade level for the loose criterion, too. That is, for both undergraduate and graduate students, Paragraph 3 was recalled better for the loose criterion than Paragraph 2. On the other hand, for the high school students, no significant difference was found between Paragraphs 2 and 3. Therefore, target language experience proved to be a significant factor affecting the percentage of correct recall for each paragraph as well as all idea units and all main ideas recalled.

CONCLUSION

The present study has attempted to determine the effects of target language experience and scoring criteria on (1) the total quantity of a passage recalled, (2) the recall of main ideas and (3) the recall of idea units for each paragraph. The findings of the present study indicate that as years of language study increased, students' total recall and their recall of main ideas improved, using both scoring criteria. In addition, the different scoring criteria of recall affected the differences in the quantity recalled due to the amount of target language experience in terms of total recall and in the total main ideas recalled. Furthermore, differences in the recall of idea units among paragraphs were affected by the difference in target language experience when both the strict and the loose criterion were employed. The effects of grade level and the order of paragraphs should be taken into account when a comparison of the quantity recalled among paragraphs is made.

Further studies should be carried out with different texts and a larger sample of graduate students in order to investigate whether the age or the number of years of studying English will affect students' recall.

[1] The participants from Hirano (1998b) were used.

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APPENDIX A (Idea Unit Analysis)

(Paragraph 1)

1. American cities changed 2. in many ways 3. after World War II. 4. Many people moved 5. out of the city. 6. They moved 7. to the suburbs, 8. the areas around a city. 9. Most of the people ... were rich. 10. who moved 11. Poor people usually did not have enough money 12. to move. 13. They stayed 14. in the cities.

(Paragraph 2)

15. During the 1950s 16. and 60s 17. there was another important change 18. in American cities. 19. Businesses began ..., too. 20. to leave the city 21. They left 22. because the people ... were poorer. 23. in the city 24. Poor people did not have much money 25. to buy things. 26. So, many shops 27. and restaurants moved out 28. to the suburbs. 29. People ... had more money 30. in the suburbs 31. to spend.

(Paragraph 3)

32. Cities began 33. to have many serious problems. 34. The rich people 35. and the businesses did not pay city taxes anymore. 36. The poor people could not pay much money 37. in taxes. 38. So cities had less money 39. for schools 40. and housing. 41. Sometimes they could not pay their police officers 42. or firefighters. 43. And they could not take good care of their streets 44. and parks.

(Paragraph 4)

45. But money was only part 46. of the problem. 47. Many people believed 48. that American cities were dying. 49. They had good reason 50. to believe this. 51. City streets were sadly empty. 52. Many neighborhoods ... were dirty 53. and parks 54. and dangerous. 55. In some places 56. buildings were even falling down. 57. And nobody seemed 58. to care. 59. This was the real problem. 60. Most of the people 61. and businesses ... were 62. with money 63. in the suburbs. 64. They did not care 65. what happened 66. to the cities.

APPENDIX B (Paragraph Main Ideas)

(1) (*Paragraph 1*) Many people moved / out of American cities / after World War II (3 idea units). (2) (*Paragraph 2*) American businesses (also) left the city / during the 1950s / and 60s (3 idea units). (3) (*Paragraph 3*) Cities began / to have money problems (2 idea units). (4) (*Paragraph 4*) Many people believed / that American cities were dying (2 idea units).