

The Role of Schemata in ESL Learner's Reading Strategies

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Abstract

While the problem of ESL/EFL reading comprehension has long been considered to lie in difficulty of vocabulary or syntax, a number of recent studies based on schema theory have revealed that the reader's background knowledge or schema is as important as their linguistic knowledge to the comprehension process, and that the main problem derives from inadequate activation of this schema.

Foreign language teachers or theorists, however, have long known the fact that cultural knowledge plays an important part in the comprehension process, while they have not been concerned with gathering evidence about the effect of cultural knowledge, and teaching methods and materials have not always reflected this idea.

The aim of this study is twofold. First, it aims to measure the effect of cultural specific knowledge on the reading process, and an experiment designed to measure this effect will be described. Second, it examines the relationship between cultural specific knowledge and knowledge in general, and clarifies the problems of Japanese ESL learners concerning schemata.

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1. Introduction

While the problem of ESL/EFL reading comprehension has long been considered to lie in difficulty of vocabulary or syntax, a number of recent studies based on schema theory have revealed that the reader's background knowledge or schema is as important as their linguistic knowledge to the comprehension process, and that the main problem derives from inadequate activation of this schema. According to Anderson(1978), schemata allow the reader to make inference and fill in "slots" with specific pieces of information not explicitly included in the text when a text is processed.

This emphasizes on the importance of the contribution of background knowledge on the part of the reader. When a reader fails to activate an appropriate schema during reading, he cannot comprehend the text to various degrees. Rumelhart(1980) and Carrell and Eisterhold (1988) show that this failure may be due either to the fact that the reader does not have the appropriate schema or to the fact that the writer has not provided sufficient clues in the text for the reader to effectively utilize a bottom-up processing mode to activate schemata the reader may already possess.

Foreign language teachers or theorists, however, have long known the fact that cultural knowledge plays an important part in the comprehension process, while teaching methods and materials have not always reflected this idea. As Steffenson and Joag-Dev(1984) show, this may be attributed to some factors such as the complexity of teaching features of culture compared with teaching specific linguistic features of the text, and their underestimation of the value of this effect.

The aim of this study is twofold. First, it aims to measure the effect of cultural specific knowledge on the reading process. Second, it examines the relationship between cultural specific knowledge and knowledge in general. As Alderson and Urquhart(1984:xix) state, the reading process is different from the reading product. Research focused on the product does not inform us "what actually happens when a reader interacts with a text." It is important for us to know how ESL learners have or have not comprehended texts and to provide information about how their reading ability might be improved, and this is possible only if we clarify the strategies of the reading process.

2. Experiment (1): The effect of culture-specific knowledge

The purpose of the study was to determine how the reading comprehension of ESL students would be improved when they were given culture-specific hints.

2.1. Subjects

Two groups of college juniors attending two different private universities participated in the experiment. The first group consisted of 27 advanced learners of ESL, who are majoring in English Literature. The second group consisted of 47 intermediate learners of EFL, who are majoring in Nursing.

2.2. Materials

As materials, a passage which requires Jewish culture-specific knowledge was chosen whereby a reader would have to draw culturally appropriate inferences in order to comprehend the text. Please look at the first passage in the handout.

- 1 Late one rainy afternoon, when he saw no other customers inside, Mr. Finkelstein walked into an elegant but not kosher delicatessen.
- 2 He bought some tomatoes, and, pretending indifference, asked (for the first time in his life) "By the way how much costs that-bacon?"

- 3 Came a terrific flash of lightning and clap of thunder.
- 4 Finkelstein looked up to the heavens, protesting, "I was only asking!"
(Rosten 1968, p. 197)

2.3. Procedures

In order to test the effect of culture specific knowledge, we took the following four steps:

1st step: After reading the first and second sentences, the subjects were asked the first two short questions: (1) Why did Mr. Finkelstein go into the shop when no one was there?, (2) Why did he ask bacon for the first time in his life? and they were asked to write any reasons for their responses. Next, after reading the third and fourth sentences, the subjects were asked another short questions: 3) Why did lightning and thunder come?, (4) Why did he protest the heaven? Lastly, the subjects were asked to write down anything about Finkelstein they inferred, such as his age, nationality, etc., that is, (5).

2nd step: After reading the whole story and being given Japanese equivalents of four words, pretend, indifference, thunder, and protest, the subjects were asked the same short questions again.

3rd step: The subjects were given multiple-choice questions. The contents of the questions were the same as those of the short questions. Multiple-choice questions:

- Q1. Mr. Finkelstein went into the shop when no one was there because
 - a. he wanted to talk to the owner of the shop personally.
 - b. he did not want to be seen by anyone.
 - c. he planned to steal something in the shop.
 - d. he knew there was going to be thunder.
- Q2. Mr. Finkelstein asked for bacon for the first time because
 - a. he was always too poor to get bacon.
 - b. he did not like bacon himself.
 - c. he never had a chance to shop for food alone.
 - d. he was not allowed to have bacon.
- Q3. Lightning and thunder came because
 - a. God got mad at him.
 - b. God started to laugh.
 - c. Mr. Finkelstein got mad at the price of the bacon.
 - d. Mr. Finkelstein made some English mistakes.
- Q4. Mr. Finkelstein looked up to the heaven, protesting, "I was only asking!", because
 - a. he planned to steal something in the shop, but in fact he did not steal anything.
 - b. he did not buy bacon.
 - c. he did not talk to the owner of the shop personally.
 - d. he just hoped that lightning and thunder would stop soon.
- Q5. What is Mr. Finkelstein?

4th step: We gave the subjects two hints concerning Jewish culture.

Hint 1. Finkelstein is a typical Jewish family name.

Hint 2. Bacon is a kind of pork.

Afterward, the subjects were asked to answer the same multiple-choice questions quoted above.

2.4. Results and discussion

2.4.1. Comparison of test scores for four different steps at two levels

Figure 1 shows the means of test scores on a scale of 100 held in four different steps for each of the two groups, advanced and intermediate students

indicated in Table 1. Two things can be pointed out. First, at both levels, giving the appropriate cultural background knowledge helped the students activate the appropriate schema and promoted reading comprehension to a great degree. That is, even advanced students cannot understand the text if they do not have the necessary cultural schema. Therefore, readers will understand the text better, if we give some cultural clues for comprehending the text beforehand.

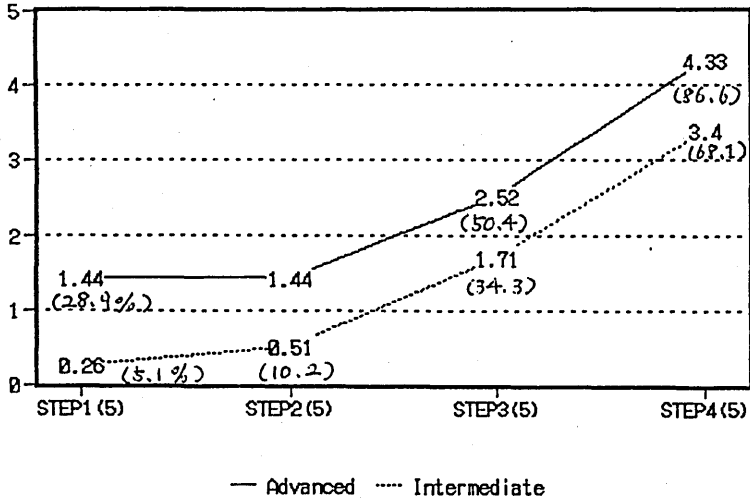
Second, while vocabulary assistance, when provided to intermediate students, seems to have affected the degree of comprehension ,it cannot be a factor to facilitate reading comprehension, when provided to advanced students. The reason might be due to the fact that most of the intermediate students did not know the meanings of indifference and protest, while only three of the advanced students misunderstood the meaning of protest and all of them knew the meaning of indifference. The word indifference was important for students to infer the reason why Mr. Finkelstein asked for bacon for the first time.

Table 1:Mean Scores for Four Different Steps (Finkelstein)

Level	STEP1(5) ¹ Reading	STEP2(5) Vocabylary	STEP3(5) Multiple Q	STEP4(5) Culture
Advanced [27] ²	1.44 (28.9%)	1.44 (28.9%)	2.52 (50.4%)	4.33 (86.6%)
Intermediate [47]	0.26 (5.1%)	0.51 (10.2%)	1.71 (34.3%)	3.4 (68.1%)

¹Figures in parentheses () are maximum scores.
²Figures in square brackets [] indicate number of students.

Figure1:Mean Scores for Four Different Steps (Finkelstein)



2.4.2. Analysis and comparison of answers to the short questions and the multiple choice test

In order to analyze the responses to the short questions in the 1st step, they were categorized and it was recorded which of the responses was given by each subject. For example, there were fourteen different categories of answers to why Mr. Finkelstein asked for bacon for the first time in his life and what he was.

- O. Wrong-when subjects could not understand the meanings of the questions properly.
- A. Indefinite-when subjects said they had no clear idea.
- B. Foreigner-when subjects believed he used English for the first time because he was a foreigner.
- C. Angel-when subjects believed he was an angel or a thunder god from heaven
- D. Child-when subjects believed he was a child and that he went shopping for the first time.
- E. Rich person-when subjects believed he was such a wealthy person, or a person of high rank like a king or a nobleman, that he had had no chance to shop for food alone.
- F. First experience-when subjects believed he shopped for the first time because his wife had died or that he started to live by himself.
- G. Shy-when subjects believed he was too shy to have a chance to shop alone.
- H. Excuse-when subjects believed he had wanted to become friends with a salesgirl in the shop, and that he was talking to her for the first time.
- I. Distaste-when subjects believed he had a distaste for meat or that he was a vegetarian.
- J₁.Forbidden-(correct answer) He was not allowed to have bacon because of his religion.
- J₂.Forbidden-when subjects believed he was not allowed to have bacon because of some reason other than but his religion.
- K. Poor-when subjects believed he was too poor to get bacon.
- L. Thief-when subjects believed he was a thief who was going to steal something, pretending to be a customer.

Figure 2 illustrates the patterns of responses observed from 74 subjects who read the story. Figure (a) and (b) illustrate those of advanced students and intermediate students respectively. Each line on the graph represents a pattern of responses. The number on the line represents the number of subjects showing the pattern. The lower case letters in the right column of the figure represent multiple-choice items, and the figures in square brackets [] in the far right column indicate the number of subjects. The numbers on the bottom of the Figure 2 correspond to the four steps we took.

There was a big difference at each step between the set of paths of advanced students and those of intermediate students.

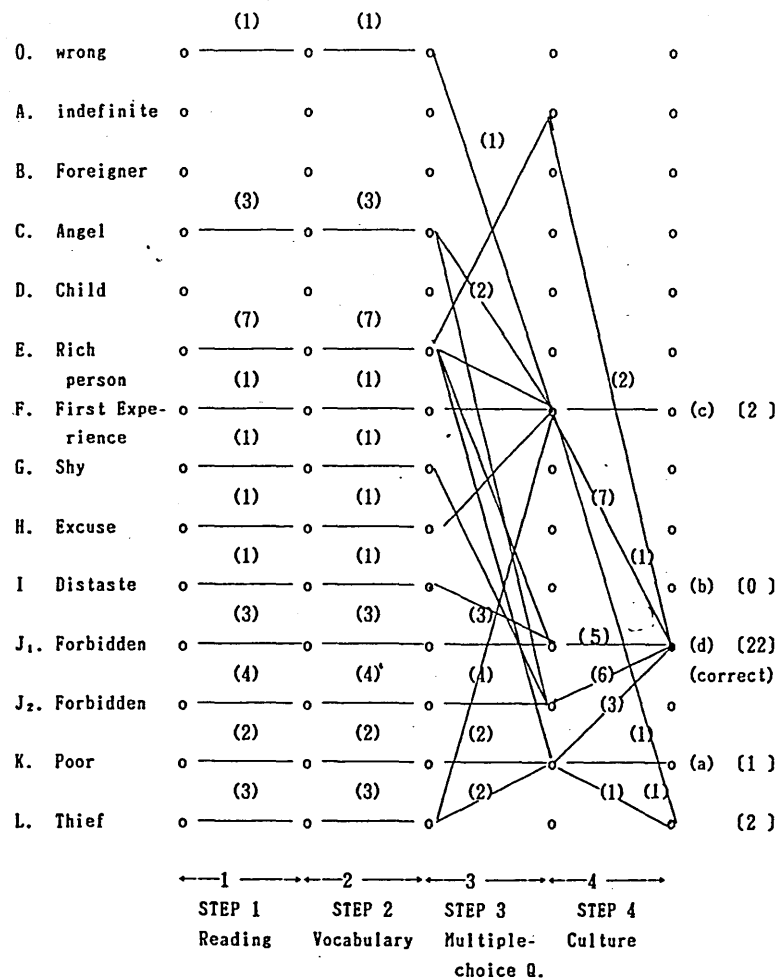


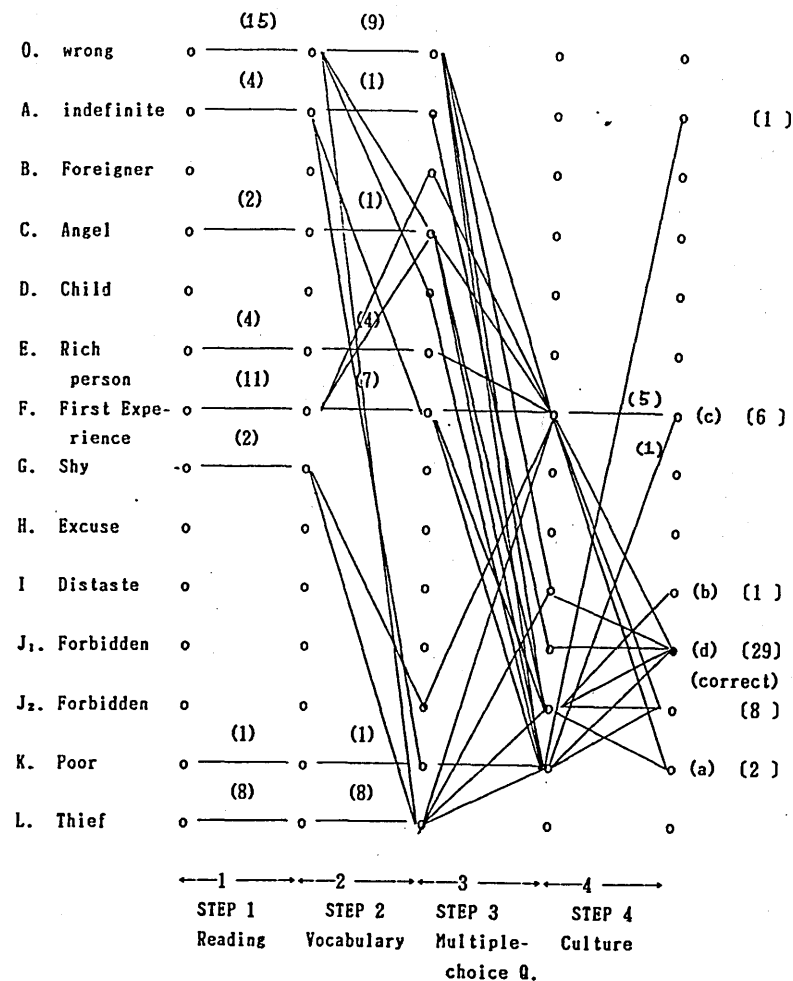
Figure 2

Figure(a): Set of paths for the short questions. (Advanced level)

Cultural hints:

Hint 1. "Finkelstein" is a typical Jewish family name.

Hint 2. Bacon is a kind of pork.



Figure(b): Set of paths for the short questions. (Intermediate level)

In the 1st step, among the advanced level students, we can see that except for one student who belongs to category "O. Wrong" there was no student who had no clear idea why Mr. Finkelstein asked for bacon for the first time in his life. In addition, there were seven students who thought from the start that it was because he was forbidden due to some reasons such as religious reasons, and 23 other subjects thought of nine other answers from C to L. On the contrary, the results for the intermediate level indicate that 19, that is, 40% of the students belonged to category "O. Wrong" or category "A. Indefinite." There was no student who had a clear idea from the start why Finkelstein asked for bacon, and 28 other subjects thought of six other possibilities. The varieties of categories that intermediate students selected were far fewer than the ones advanced students selected, and the intermediate students' responses centered on category "F. First Experience", where most of these students did not show clear reasons why it was the first experience for Finkelstein to ask for bacon.

In the second step, after being taught vocabulary, while none of the advanced students changed their opinions, 10 of the intermediate students changed their opinions and thoughts, for example, that it was because Mr. Finkelstein was an angel or a thunder god and it was his first time to speak in human language. In other words, intermediate students activated inappropriate schemata.

In the 3rd step, that is, multiple-choice tests, 80% of advanced students' responses were concentrated on Category "F. First experience" or "J. Forbidden."

Categories from B to H can be included in category F or J, that is (c) or (d) of multiple-choice items in Question 2, so these subjects maintained their opinions formed in the 2nd step. On the contrary, only 40% of intermediate students selected category F or J, and other students still chose other possibilities. 7 students even changed their opinions, for example, from Angel to Poor, Thief to Distaste, Thief to Poor in this step. We might be able to say that they could not reconstruct the story from the text, activating the schema they had so far, and they might be just processing the new information given by multiple-choice questions and affected by their contents easily.

In the 4th step, after giving hints of Jewish-culture specific knowledge, 22, that is, 80% of advanced students selected category J, "Forbidden because of his religion" as the correct answer. In the case of intermediate students, only 29, that is, 60% of the students selected J, as the correct answer, and there were 8 students who selected the right category but still could not find the reasons why Mr. Finkelstein was forbidden to have bacon.

Finally, the results of the experiments shows the schema-directed process used by good readers. In the first sentence, readers can understand either that Finkelstein was ashamed to be seen in such a place (Category "Shy") or that he planned to do something secret in the place (Category "Secret") because he went into the shop when no one was there. Then, the students selecting category "Shy" activate the schema of a man being wealthy or a person of high rank like a king or a nobleman who had had no chance to shop for food alone. The students selecting category "Secret" activate the schema of a man trying to do a very important thing which he had never done before or the schema of a man stealing something. The third sentence includes the phrase "Came a terrific flash of lightning and clap of thunder" which shows a God's anger, and it weakens the "Shy" hypothesis. On the other hand, the hypothesis about a thief and a man trying to do something secret and important is still adequate. The last items of Jewish culture-specific knowledge about the Jewish name and pork make the students discard the thief hypothesis. Thus, good readers can bridge the gap between schemas organized by events acquired through their experience, that is, existing knowledge in general, for example, a flash of lightning and clap of thunder which shows a God's anger, and new knowledge, for example, the Jewish name and pork, new culture-specific knowledge in this case, activating

the adequate schemata among a repertoire of schemata that are relevant to the situation, and so understand the text.

3. Experiment (2): The interactive process of reading

Let's talk about the second experiment. The materials and multiple questions are based on the experiment by Noda (1989), one of the members of our research group.

While the previous study illustrates the important effect of teaching culture background knowledge to activate appropriate schema for reading, the second experiment shows the role of general schema and clarifies the relationship between general schema and culture-specific schema again.

3.1. Subjects

Two groups of university students were chosen. One group consisted of 43 advanced-level college juniors, who are majoring in English Literature. The other group consisted of 33 intermediate learners of ESL, who are majoring in engineering.

3.2. Materials

A passage taken from "A Christmas Memory" by Truman Capote, was chosen which contained not only some American culture-specific knowledge Japanese students were not usually familiar with, for instance, the custom of baking fruitcakes for Christmas and buying of bootleg liquor during the Prohibition era but also unfamiliar facts which are not necessarily culture-specific. For example, the narrator and his friend are a little boy and an elderly lady.

3.3. Procedure

We took the same four steps as the first experiment. In the 1st step, however, the subjects were asked to complete the written recall task in Japanese instead of answering the short questions. After the multiple-choice tests in the 2nd step, in the 3rd step, Japanese equivalents of eight words, glower, Satan-tilted, sober, frown, demonstrate, retreat, jangling, and fistful, were given, and in the 4th step, the following two culture hints were provided:

Hint 1: The season is winter.

Hint 2: This story is set in America during the Prohibition era.

3.4. Results and discussion

After the data was collected, the total scores of the multiple-choice questions were computed for all the subjects to obtain mean scores for each group and the percentages of correct answers. The recall tests were measured by parsing the text into 15 idea units which were significant for the analysis and scoring the number of 15 specific ideas which the answers included.

3.4.1. Results of multiple-choice test scores at three different steps

Figure 3 shows the mean scores on multiple-choice tests held at three different steps for each of the two groups indicated in Table 2. Two things can be pointed out. One is that though vocabulary assistance seems to have affected the degree of comprehension to some extent (because multiple-choice question 4 included unfamiliar word frown), it was not a big factor in the activation of schemata. The second notable point is that though culture-specific clues affected the degree of comprehension at both levels, the effects seemed to be far less here than in the first experiment. We will return to this point in the discussion.

Table 2: Mean Scores for three Different Steps (Haha Jones)

Level	RECALL(30)	STEP1(11) Original	STEP2(11) Vocabulary	STEP3(11) Culture
Advanced [43] ²	18.53 (61.8%)	5.98 (54.3%)	6.16 (56.0%)	6.49 (60.0%)
Intermediate [33]	7.73 (25.8%)	4.24 (38.6%)	4.36 (39.7%)	4.85 (44.1%)

¹Figures in parentheses () are maximum scores.

²Figures in square brackets [] indicate number of students.

Figure 3: Mean Scores for Three Different Steps (Haha Jones)

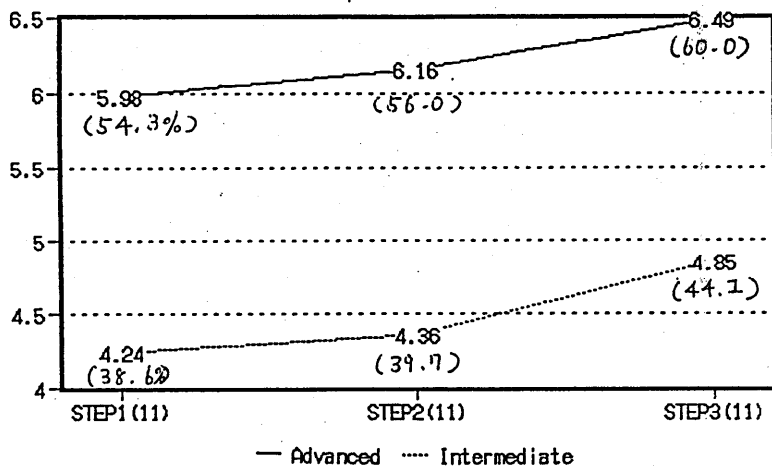


Table 3: Mean Scores in Two Different Tests

Level	Multiple-Choice(11)	Recall(30)
Advanced [43]	5.98 (54.3%)	18.53 (61.8%)
Intermediate [33]	4.24 (38.6%)	7.73 (25.8%)

Figures in parentheses () are maximum scores.

Figures in square brackets [] indicate number of students.

Table 4: Number for Each Answer (Total = 76)¹

Q	1	2	3	4	5	6	7	8	9	10	11
A	8	1	23	4	17	19	12	9	10	41	9
B	3	3	27	20	9	39	8	5	7	4	4
C	64	25	8	44	30	6	23	13	40	1	6
D	1	76	15	3	15	6	29	45	18	28	55
O*	0	1	3	5	5	6	4	4	1	2	1

¹Shaded squares indicate correct answers.

*0 = omitted

3.4.2. Analysis of the recall test and multiple-choice test results

First, we would like to show the top five ideas according to the order of the story that the students of both levels recalled best out of the total 15 ideas.

Advanced level students' ideas:

Part 3: He is a giant with scars and doesn't smile.

Part 6: My friend half-finds her voice, a whispery voice at best: "If you please, we'd like a quart of your finest whiskey."

Part 8: "Which one of you is a drinkin' man?" "It's for making fruitcakes."

Part 12: We pay him with nickels and dimes and pennies.

Part 14: Pouring the money back into our bead purse, he proposes, "Just send me one of them fruitcakes instead."

Intermediate level students' ideas:

Part 1 :We hear footsteps and the door opens.

Part 2 :Our hearts overturn when we see that it's Mr. Haha Jones himself.

Part 3 :He is a giant with scars, and he doesn't smile.

Part 7 :Haha is smiling and even laughing.

Part 8 : "Which one of you is a drinkin' man?" "It's for making fruitcakes."

These results indicate that while advanced students were able to reconstruct the stream of a plot, intermediate students stated just the opening parts and the series of separate statements.

Second, the multiple-choice test results that required cultural knowledge were low at both levels. Table 4 shows the number of students for each answer. Multiple-choice Questions 5, 7, 8, 9 and 10 belong to the group that require such knowledge, and the percentages of correct answers for these questions were low except for Question 8. (These questions are written in the handout p.3 and p.4.) One of the lowest percentage of correct answers, Question 5, for example, asks why Haha Jones had to go behind the shop to get the whiskey instead of taking a bottle from his shop and the correct answer A, "he was not supposed to sell whiskey", requires some background knowledge about American history, because this story is set during the Prohibition era (Noda 1989). In fact, 53% of advanced students who had selected the wrong answer were able to respond correctly after being given culture hints. In the case of Question 8 and 10, however, the results were different from that of Question 5. Q8 asks when this story took place and Q10 asks for whom we are going to make some fruitcakes and the correct answers Ds, "sometime before Christmas" and "for our friends", respectively, require some culture knowledge about America. In Japan, recently, many people make "Christmas cakes" at home or buy them on Christmas Day and eat them with their family at home, so it was rather easy for many of the subjects, especially at advanced girls' students, to make the association between fruitcake-making schema and Christmas, but at the same time it was difficult for them to understand a schema to make Christmas cakes for friends. Japanese students know that Christmas originates in Western culture, but once their knowledge about Christmas rely on data of personal experience or biased information, it might be developed to a general schema culturally linked, which might not be able to be influenced by culture hints. Thus, Culture-specific knowledge does not always help students activate the appropriate schema. In the case of Question 2, "Why did my friend say, 'If you please,' in a whispery voice, 17% of advanced students who had selected the right answer D "she was too afraid to speak in a normal voice" changed their opinions and responded wrongly after being given hints about culture. They elected the answer C "she didn't want anyone to know that she was there." In other five multiple-choice tests, the percentages of correct answers were also lower after being given hints about culture at advanced level. This culturally biased tendency shows that once students are given new culture-specific knowledge and have a well-developed schema on a given topic, they often lose confidence in their own judgement and

rely too much on the hints about culture. They are sensitive to "script based processes". The reason why the effects of culture-specific hints in the second text of Haha Jones were far smaller statistically than those in the text of Finkelstein is due to the fact that while the cultural clues facilitated reading comprehension in the case of Finkelstein, they acted both positively and negatively in the case of Haha Jones.

Lastly, the results indicate that not only the culture-specific knowledge but also the knowledge in general can be factors that make the text difficult to comprehend. The question with the lowest percentage of correct answers was Question 9 which asked what kind of people (sex and age) the narrator and his friend were. The correct answer is "a little boy and an old lady", and only 7 subjects, that is, 9% of the subjects answered correctly. Selling alcoholic beverages to children is prohibited by law in the U.S. even now, no less so than Prohibition (Noda 1989), and the answer "two little girls", for example, selected by 53% of the subjects is eliminated as a possible answer. The answer "a young girl and a middle-aged man" is also eliminated because Haha Jones asks, "Which one of you is a drinkin' man?" (Noda 1989). If the reader processed the incoming information above properly, they would be able to infer the answer easily. A lot of students, however, ignore these items of bottom-up information and preserve their strong general schema that "making fruitcakes" is something women or girls are likely to do and that the concept of "friend" refers to a person in the same age group (Nod 1989). In sum, when students, especially advanced level students, with strong prior beliefs or general schema, encounter inconclusive evidence, they may interpret the evidence as if it were support for their schema and cause their interpretation to persevere (Fiske and Taylor, 1984).

4. Conclusion

The results of the experiments clearly show (1) that intermediate level students are partially using a bottom-up strategy of processing of vocabulary, but teaching vocabulary is not a big factor in improvement of reading comprehension at either of the levels : advanced students can reconstruct the stream of a plot without vocabulary assistance, activating the adequate schemata among a repertoire they had, and intermediate students may derive the wrong or inappropriate schemata even if they are provided with sufficient vocabulary assistance, (2) that providing brand-new cultural specific knowledge has a great effect on the reading process, and even good readers cannot comprehend the concept being communicated if they do not have the necessary culture schema, (3) that there is a notable difference between culture schema, for example that people bought bootleg liquor during Prohibition, and general schema, that is, social schema, for example that a "friend" is generally someone around the same age or they have Christmas cakes with their family on Christmas day : while advanced students are especially likely to be culturally biased when given new culture-specific knowledge and their judgements rely too much on the hints about culture, they may wish to preserve the general (social) schema they have acquired through their experience and assimilate contradictions in the stories that were caused from the bottom-up information in the texts. "Experience may promote conservative processing strategies" (Fiske and Taylor, 1984) (Taylor and Winkler, 1980).

We have revealed in our study a basic fact about strategies of EFL learners' reading process and the role of schemata, and we get some implication. Intermediate students should be more encouraged to activate their background knowledge, that is, the general social schema they have and infer the story using their general schema instead of depending on linguistic aids such as vocabulary. Advanced students, as Lord, lepper, & Thompson (1980) suggests, should be told and taught to "think carefully about how they are evaluating the evidence" and to watch their cultural or social bias as they interpret the data

and comprehend the text properly.

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