

The Functions of Schema in English Reading

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Keywords: Schema; English reading; prediction; selection; inference

Abstract: This paper reports on a study that discusses more specifically the functions of schema in English reading. Pretest and posttest were employed to gather information from 28 students in Class 2208 of Business English major, Guangdong Technology College. Comparative analysis is used for the later data analysis. The findings indicated that with the application of those three schemata (language schema, content schema, and form schema), the students could do better in English reading, especially in predicting, selecting, and inferring, which exactly reflected the three main functions of schema in reading comprehension: prediction, selection, and inference. The study also provides some implications for teachers and students in English reading. It indicates that the application of schema will help a lot in English reading. The teachers should attach importance to the activation of students' existing schemata and the students should try to construct extensive schemata through extensive reading with the aid of the teachers.

1. Introduction

Reading is an important way for people to acquire knowledge and information. Different kinds of English tests has involved it in the assessment. However, there still exist certain gap between students' reading ability and actual competence in practical application. In the process of undergoing English reading, it's usually found that although the reader has no trouble with every single word's meaning or getting the literal meaning, he or she can't get a good grasp of the central theme, let alone work out the related reading assignments. The reason for this phenomenon is that the learners only lay emphasis on the improvement of language knowledge and reading skills, but ignore the accumulation of the background knowledge closely related to the text, namely the accumulation of schemata.

Throughout all the existing studies on schema theory, most of them were conducted theoretically. Chinese scholars Zheng Sujin and Zhang Jun (2008) compare schemata to be a large file system with personal knowledge and experience stored in the brain in different classifications [1]. When referred to the research on the application of schema in reading comprehension, they mainly talks about reading teaching in an extensive way. Yang Yuan and Xu Bing (2020) proposes to design the Japanese reading teaching model from the perspective of Schema Theory [2]. However, only a small number of them pay special attention to English reading comprehension. And there are few researches specific to the functions of schema in English reading. This paper will focus on the functions of schema in English reading and will be instructive to both reading teaching and learning.

In this aspect, this paper is a complement and enrichment to the current researches on schema.

2. The Function of Schema in Reading Comprehension

2.1. Prediction

For prediction, Goodman (1970) mentions, when he talks about reading process, that based on the title, photographs, illustrations, or subtitles, the readers can make predictions about the content of the text. Zhang Haiyan & Wang Liguo (2007) analyzes respectively the predicative function of content schema and form schema, and says that language schema can verify and correct such prediction [3]. As for the effectiveness of prediction, Li Liyun (2016) points out when the interpretation of the information is consistent with the prediction of the text, the reader has a better understanding of the meaning of the text. The psychological mechanism of "predicts before verify" will undoubtedly encourage students to actively participate in the construction of the meaning of the text, and also help to improve the predictive reading effect [4].

2.2. Selection

As to selection, Parviz Ajideh (2003) states reading is a selective process, involving the selection of critical information from the input on the basis of the reader's existing related knowledge [5]. Wang Yunhua (2008) considers schema able to help the readers selectively process the reading materials and choose useful information [6]. Wang Rong (2012) makes a more detailed explanation on selection. The selection is shown in two aspects: one is the confirmation of the former prediction; the other is that schemata will selectively process the input materials [7]. Ma Jide and Li Ke(2022) holds that the difference between English and Chinese schema selection is a direct mapping of cognitive set in language representation and the root difference between Chinese and Western thinking modes is the main reason for this phenomenon [8]. The significance of the input information in our brain exists hierarchically, some in a central position, while others are additional parts. With the application of schemata, the readers will know which information is important and which is not. The selective function of schemata avails the readers of quick and accurate understanding of the reading material.

2.3. Inference

For inference, Wang Yunhua (2008) proposes that making inference with schemata is a predicative process, that's the top-down model, which helps readers make better choices through judgment on various possibilities of the input information [6]. Wang Rong (2012) holds almost the same idea as Wang Yunhua on this point. And he extends this discussion. He says the result of inference makes the readers reorganize the information, and get it stored according to one's own knowledge systems [7]. Sun Wencheng & Li Ang (2013) also states that schemata promote the readers' inference in reading and insufficient schemata will influence inference, thus leading to incomplete understanding [9]. Zhang Zhixiang (2022) inference function of schema theory is helpful to the training of information gap thinking of primary and secondary school students [10]. Inductive inference is common in reading comprehension, from lower-level schemata to higher-level schemata. Accordingly, the reader's understanding develops from details to the part then to the theme. If the readers can't make inference, they can't understand the reading materials deeply.

Generally speaking, few researches paid special attention to the function of schema in reading comprehension in a specific way. Even if some researchers mentioned it, they just gave a general introduction to it, but didn't conduct quantitative or qualitative researches on it. Thus, this study

may make up for that.

3. Methodology

3.1. Research Questions

This research focuses on the effects of schema applied in English reading comprehension, more specifically, to answer following questions:

- (1) Is there any positive effect of the application of schema on English reading?
- (2) Which aspects does schema contribute to in English reading?
- (3) What are the main functions of schema in English reading?

3.2. Participants

Twenty-eight subjects were involved in this study. They were freshmen of English majors from 28 students in Class 2208 of Business English major, Guangdong Technology College. Among them, 3 were males and 25 were females. Subjects were chosen for three reasons. Firstly, all of them majored in English with reading classes two periods a week, which was enough for a reading test. Secondly, given the subjects might be very busy and the experiment would include two tests, patience and willingness must be taken into consideration. As they were English majors the same as the writer, they and their would be more cooperative and helpful. Thirdly, the study was closely related to their course with meaningful implications for their later reading learning. Based on this benefit, the subjects were more willing to take part.

3.3. Instruments

The data collection instruments used in the study are: pretest and posttest. As the function of schemata in English reading is an abstract notion unable to be studied directly, however, it can be reflected by students' testing effects in reading comprehension. The pretest was carried out without the input of the knowledge about schema, while the posttest was taken on the basis of schema theory. With a comparative analysis of the results of these two tests, the effects of schema on English reading can be summarized, then reflecting the functions of schema.

3.3.1. Pretest

All the subjects were asked to finish reading two texts with related questions within 20 minutes. The two passages were taken from Exercises of College English Test Band 6 (CET6) with one exposition, the other argumentation. Each passage were followed 6 multiple-choice questions (each question valuing 5 scores), among which two were related to predicting, two selecting and two inferring. Before the test, the writer must stress to the subjects that in order to keep the authenticity and reliability of the test, cheating and perfunctoriness were not expected, but needn't tell them about the purpose of the test.

3.3.2. Posttest

Similar to the pretest, all the subjects were asked to finish reading two texts with related questions within 20 minutes. The two passages in this test kept consistent with those in the pretest in genre and the level of difficulty. Thus they were also from exercises of CET6, exposition and argumentation, each with 6 questions (each question valuing 5 scores) respectively related to predicting, selecting and inferring. However, there was something different from the pretest. Before

the test, the writer needed to tell the subjects some knowledge about schema and give a detailed explanation of the new words, main idea and theme, background knowledge, genre and structure of the passages. The reason for this step was that the explanation was a process to simulate to activate students' related existing schemata and construct new schemata. In fact, it would be better to conduct a long-term (one month or more) experiment through classroom teaching with schemata-based reading model, like activating schemata--constructing schemata--activating schemata... However, because of the limitation of research time and impossibility of the subjects' long-term cooperation, the writer adopted such a simulation experiment. And this simulation experiment, a more ideal state, actually achieved the purpose of the research.

3.4. Procedures of the Study

3.4.1. Procedures of Pretest

Step 1 The samples of testing were collected in the first period of the reading class of Class 2208 in April 11, 2023. Each subject was given 20 minutes to finish two reading passages in Appendix A all alone.

Step 2 After collecting the testing papers, they were marked by the writer according to the official answers.

Step 3 The total scores of each kind of questions (three kinds: predicting, selecting, and inferring) were counted in a table and accordingly got the average scores.

Step 4 Descriptive analysis and T-test was based on the data collected from the subjects' testing results.

3.4.2. Procedures of Posttest

Step 1 In the second period of the reading class, the writer gave a detailed explanation of the main knowledge of schema theory, the new words, main idea and theme, background knowledge, genre and structure of each passage to activate the subjects' existing schemata in a simulative way.

Step 2 After the explanation, all the subjects were asked to finish two reading passages all alone in 20 minutes.

Step 3 The testing papers were collected and got marked by the writer according to the official answers.

Step 4 The total scores of each kind of questions (three kinds: predicting, selecting, and inferring) were counted in a table and accordingly got the average scores.

Step 5 Descriptive analysis and T-test was based on the data collected from the subjects' testing results.

3.5. Data Collection and Analysis

In this research, all the data were quantitative data. They were collected by pretest and posttest concerning the effects of schemata in English reading, including multiple-choice questions and were further analyzed with the aid of the Office Excel and SPSS.

3.6. Research Results and Discussion

The results obtained for the three research questions addressed in the study are reported in Table 1-6. Table 2 displays the results of Independent Sample Test of predicting. The Sig. (2-tailed) is 0.001 (< 0.05), which suggests that there exists obvious differences between the grade of the subjects, in predicting, in pretest and that in posttest. Similarly, Table 4 and Table 6 indicates

respectively the obvious differences in selecting and inferring. Thus, from Table 2, Table 4 and Table 6, these two tests are found relatively suitable for related analysis.

3.6.1. The Function of Prediction

Table 1: Group Statistics of Predicting

Group Statistics					
	Group	N	Mean	Std. Deviation	Std. Error Mean
Pretest/ posttest	2	28	14.2857	3.77964	.71429
	1	28	9.6429	5.43115	1.02639

(In Table 1, Group 1 represents pretest and Group 2 represents posttest.)

Table 2: Independent Sample Test of Predicting

Independent Sample Test										
		Levene's Test for quality of Variance		T-test for Equality of Means						
				t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
		F	Sig.						Lower	Upper
Pretest/ posttest	Equal variance assumed	3.176	.080	3.713	54	.000	4.64286	1.25047	2.13581	7.14990
	Equal variance not assumed			3.713	48.184	.001	4.64286	1.25047	2.12886	7.15685

From the results of Table 1, it can be found that the mean of predicting in the pretest is 9.6429, while that in the posttest is 14.2857. The Std. Deviation in the pretest is 5.43115 and in the posttest is 3.77964. There is an obvious gap between these two results and the subjects' scores are more concentrated in the posttest, indicating that it is comparable between these two tests and the application of schema in reading did have positive effects on the subjects' ability to make prediction. This result is most likely to be attributed to the fact that before the posttest, the author has instilled related background knowledge (i.e. schemata) into the subjects' mind. Then with schema, the readers can guess the type of the text, have different anticipation towards the topic of different types of texts, and especially, the readers can guess the latter context with the help of the former context of the text. But in the pretest, the subjects didn't know the schema theory in general. Their previous related schema were not be activated or not fully activated. Thus, the subjects performed better in prediction in the posttest.

To be more credible, Table 2 is very important. From the "Independent Sample Test" in Table 2, it can be seen in the Levene's Test that the p-value (Sig.) is 0.080 (> 0.05), which means that the variances are not significantly different. The related p-value in the t-test is 0.000 (< 0.05), indicating that there indeed exists significant difference in prediction between the pretest and the posttest. Then that can be concluded to be the function of prediction of schemata.

3.6.2. The Function of Selection

Table 3: Group Statistics of Selecting

Group Statistics					
	Group	N	Mean	Std. Deviation	Std. Error Mean
Pretest/ posttest	2	28	15.1786	3.72234	.70346
	1	28	9.6429	5.43115	1.02639

(In Table 3, Group 1 represents pretest and Group 2 represents posttest.)

Table 4: Independence Sample Test of Selecting

Independent Sample Test										
		Levene's Test for quality of Variance		T-test for Equality of Means						
				t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
		F	Sig.						Lower	Upper
Pretest/ posttest	Equal variance assumed	3.741	.058	4.449	54	.000	5.53571	1.24432	3.04101	8.03042
	Equal variance not assumed			4.449	47.780	.000	5.53571	1.24432	3.03355	8.03788

Similar to the analysis of Table 1 and Table 2, from Table 3, it can be found that the mean of selecting in the pretest is 9.6429 and in the posttest is 15.1786, displaying an apparent gap between the two tests. The Std. Deviation in the pretest is 5.43115, but only 3.72234 in the posttest, demonstrating a more concentrated distribution of the subjects' scores. All of them can manifest the positive effects of schema in selecting in reading comprehension. As the author explained the basic knowledge around the theme in the posttest, the learners can choose essential information more quickly and precisely and can selectively make processing of the input information. On the one hand, the readers can make selections based on the prediction; on the other hand, they can selectively process the input material. Perhaps just because of this, the subjects gained better grades in selection in the posttest.

To be more reliable, from Table 4, in the Levene's Test and the equal variance assumed, the p-value is 0.058 (> 0.05), suggesting it is the case that the variances are not significantly different. Seen in this case, p-value in the t-test for equality of means is 0.000 (< 0.05), indicating the obvious difference between pretest and posttest in the aspect of selecting. That exactly reflects the positive effects of schema in reading comprehension especially in the aspect of selecting.

3.6.3. The Function of Inference

Table 5: Group Statistics of Inferring

Group Statistics of Inferring					
	Group	N	Mean	Std. Deviation	Std. Error Mean
Pretest/ posttest	2	28	14.1071	4.09462	.77381
	1	28	9.4643	4.78022	.90338

(In Table 5, Group 1 represents pretests and Group 2 represents posttest.)

Table 6: Independence Sample Test of Inferring

Independent Sample Test of Inferring										
		Levene's Test for quality of Variance		T-test for Equality of Means						
				t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
		F	Sig.						Lower	Upper
Pretest/ posttest	Equal variance assumed	.462	.500	3.903	54	.000	4.64286	1.18948	2.25809	7.02763
	Equal variance not assumed			3.903	52.756	.000	4.64286	1.18948	2.25680	7.02892

In Table 5, it's can be found the mean of inferring in the pretest is 9.4643 and in the posttest soars to 14.1071. The Std. Deviation in the pretest is 4.78022 and in the posttest is 4.09462. This result indicates a significant difference of the subjects' performance in the pretest and the posttest in

inferring. In Table 6, the p-value in the Levene's Test is 0.500 (> 0.05). Thus the p-value in the t-test for equality of means should be read in the case of equal variance assumed, with the value 0.000 (< 0.05). Then the author can say the results of the pretest and the posttest are statistically different. The schemata applied in the posttest really have helped the subjects to make inference.

Reading is not a process in which the words, phrases, and sentences are simply reflected in our mind, but a complex one in which the meanings of the words, phrases, and sentences are integrated. Then language comprehension depends heavily on inference. Choosing related background knowledge is, in some sense, a kind of inference to link the reading materials to the existing knowledge and then go on other inferences. The process that the author explained related background knowledge to the subjects was just to link the reading materials to the existing knowledge. On this basis, the readers can make better and more inferences. That may be why the subjects can perform better in inference in the posttest. It's the schema's function of inference worked.

To sum up, with the combination of the data and related analysis, there is no doubt that the application of schema has positive effects on reading comprehension. The hypothesis proposed in the former part is proved true. The schema has the functions of prediction, selection, and inference. It can help readers make prediction of the context, fast selection of the critical information, and inference of the implied meaning.

3.7. Pedagogical Implications

The results of this study have some implications for teachers and learners. At first, background knowledge plays a very important role in the process of reading comprehension. In order to enable the students to connect their knowledge and experience of the world to the reading materials, English teachers need to take the component of background knowledge into consideration when they are selecting reading materials. Moreover, English teachers are encouraged to provide reading activities (like previewing, brainstorming, discussion, etc) to compensate for the lack of appropriate cultural schemata when culturally unfamiliar reading texts are presented in the language class. Providing background knowledge is a good way to make it possible for the teacher to lessen his or her part to increase students' comprehension, and of course it will greatly facilitate students' reading accomplishment. In addition, students should try to establish extensive schemata through reading widely with the aid of teachers.

4. Conclusion

This study, conducted on the basis of the previous studies on the schema theory, is a complement and enrichment to the current researches on schema. Most of the previous studies on the application of schema theory in reading comprehension focuses on its classification, implications for teaching or whether the schema theory has positive effects on reading comprehension. However, few studies are found figuring out the specific functions of schema. Having a better command of the functions of schema may guarantee a better application of this theory. The learners may consciously analyze a text according to the three functions of schema. And the teachers may also help the students activate the related schemata through predicting the context, selecting useful information, and inferring implied meanings so as to make full use of the schema theory. Thus, this study is, at the same time, instructive and helpful for both language teachers and students.

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