On The Effect of Background Knowledge and IQ on Reading Comprehension and Recall Process of a Group of Iranian Advance Students

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Abstract

The study reported here sought to find further evidence of the role of background knowledge as well as IQ in EFL reading comprehension and recall. The study was conducted in three succeeding phases. First, 90 subjects took the TOEFL test. The results enabled the researcher to select 20 subjects in advance level for the study. In the second phase, an IQ test was administered to measure the intelligence level of the subjects. In the third phase, a questionnaire and four reading comprehension texts were administered. The students were supposed to read the questions on the questionnaire and answer them to decide their level of familiarity with the texts. Then, based on their answers two texts were considered familiar and two unfamiliar. The subjects were supposed to read the texts and write their recalls on a separate sheet of paper. Finally, the recall protocols were analyzed. The result of the t-tests showed that background knowledge had effects on reading comprehension and the recall of the texts. The correlation procedures further showed that IQ and recall were correlated but it was not significant.

Key Words: Background knowledge, Reading comprehension, Recall process, IQ

1. Introduction

By far, reading is perhaps the most important of the four skills, particularly in EFL/ESL situation. In language classes, particularly in advanced level, reading occupies the most class time for a variety of purposes. Thus, the ability to read well and comprehensibly has been recognized as a prerequisite to advanced proficiency English. Quite simply, without having reading proficiency, second language learners are not capable of performing well communicatively. As a result, theoreticians have generally attempted to devise new plans and approaches to meet such educational needs.

Early work in second language reading, assumed a passive, bottom-up view of second language reading. This view holds that the reader reconstructs the intended meaning by recognizing the printed letters and words and builds up meaning from smallest units in the text or at “bottom” to larger units at the “top”. In 1970, background knowledge was recognized to have a great role in second language reading. Specially the lack of cultural familiarity with reading texts influences negatively the total comprehension. According to Fries (in Patricia L. Carrell, 1988), a failure to relate the linguistic meaning of reading passages to cultural factors would
result in deficiency in comprehension. This is cultural-specific knowledge which is now known as “schemata”.

About a decade ago, the emergence of psycholinguistic models of reading had a strong influence on second language learning. According to this model, the reader predicts meaning and then confirms the predictions by relating them to his past experiences and knowledge of the language. This is in line with what schema theory has suggested.

Different studies show the crucial role of background knowledge in comprehension and recall of the text. In relation to comprehension and retrieval of a text, Orasana (1986) states that “the knowledge a reader brings to a text is a principle determiner of how that text will be comprehended, and what may be learned and remembered” (P. 32). He also mentions that “schema theory would predict that propositions which are rated as important in light of the schema are more likely to be learned and remembered” (P. 41). Anderson et al. (1983) concluded “a schema influences learning and memory when activated before reading and retrieval when accessed after reading” (P. 43). Hammadou (1991) reported “ readers with more knowledge about the topic showed more logical (correct) inferences based on the text and fewer illogical (incorrect) inferences” (P: 178).

Background knowledge as a predictor of successful comprehension and recall of the texts has been investigated through various procedures; one most prevalent technique is recall protocols. Recall protocol is a technique by which the amount of comprehension is measured by analyzing the idea units retrieved from the text. Bernhardt (1983, 1991) and Swaffar et al. (1991), among others (Carrell, 1983, 1984a, 1984b; Wells, 1986), suggest the use of recall protocols as a measure of holistic or overall reading comprehension.

The study reported here designed to find further evidence on the effect of background knowledge and IQ on reading comprehension and recall of the texts. Quite a number of studies have been carried out with reference to reading and in particular to reading in a foreign language. Moreover, many studies have been carried out regarding the processes and factors which affect the reading comprehension among which is the role of background knowledge in retrieval of the text. In spite of these studies the role of background knowledge and IQ in retrieving expected information is not yet known to the best of knowledge of present researcher. So, it can become a significant research topic to be investigated through this study. So many students especially at university levels have comprehension problems. More studies regarding the comprehension problems are needed to provide both the teacher and learners with a good understanding of the nature of the problem and factors involved with it. So to serve this purpose and also due to few studies in relation to the effect of schema theory and IQ on recall of the text in Iran, this study has been carried out.

The positive finding related to the effect of background knowledge on reading comprehension and retrieval of the texts led the researcher to consider one main positive directive hypotheses and one subsidiary hypothesis for this study.

H: There is a positive relationship between background knowledge and recall of the text in advance learners.
H: There is a positive relationship between IQ and recall of the texts in advance learners.

2. METHOD

Participants

The subjects for this study were 90 EFL students at the Iran Language Institute (ILI). These students have been studying English as a foreign language for at least three years. On the basis of a sample TOFEL proficiency test 20 subjects with the score above 525 were considered at advance level. Both sexes – about 50 girls and 40 boys- took part in this study. To have a check over probable intertwining variables, only subjects whose native language was Persian and their age level was between 18 to 30 were selected.

Instrumentations:

In this study, the following tests have been used.

(1) TOFEL TEST:
The experimental TOFEL published by Browns was used to determine the proficiency level. The statistical features of the test relating to reliability and validity have been reported by the publisher and it is claimed to be highly valid and reliable. This test was administered to decide the level of subjects for this study and on the base of this test the subjects were considered intermediate learners. The score on this test has been calculated based on the method available in the BROWN TOFEL book available in the market. It includes three sections; listening comprehension (50 questions), vocabulary and structure (40 questions), and reading comprehension and vocabulary (60 questions). The total time is 120 minutes. All three sections of the test were administered simultaneously.

(2) IQ TEST:
The Advanced Progressive Matrices Sets one and two (or APM) was used as a measure of IQ level. It is constructed in 1943 and in 1947 a revision was prepared for general use. In 1962 edition, twelve problems have been taken out so the total scores on the revised set advanced from 0 to 36. These 36 problems increase in difficulty more steadily and become considerably more complex.

The test showed a high retest reliability of 0.91 with adults of more than average intellectual capacity and above 18. This test is also quite suitable for eliciting the higher intellectual
functions and for assessing superior intellectual efficiency, as the publisher declares (Test Manual, 1962).

(3) FOUR READING COMPREHENSION TEXTS:

These texts were chosen from some reading comprehension books available in the market. The length and the readability of these texts are almost the same (see table 1. below). Many factors have been established to measure the readability but in fact their aim, construction and validity are not very different (Alderson & Urquhart, 1987). A typical readability is the Fog Index which is used in this study.

\[
\frac{\text{No. word}}{\text{No. sentences}} + \frac{\text{no. 3 syllable words}}{\text{no. words}} \times \frac{100}{1} \times 0.4
\]

And the result is interpreted as 12- = easy, 13-16 = undergraduate, 16+ = postgraduate. This formula is based on the number of words in a sentence.

These texts were to be read and recalled by the students. Two of these texts –Robin Hood (RH) and Family Size and Economic Development (FSED)- were hypothesized to be familiar and the other two –Professional Sport (PS) and Earth Day (ED)- were hypothesized to be unfamiliar.

Table 1.

The readability and length of the texts

<table>
<thead>
<tr>
<th>Texts</th>
<th>Text length</th>
<th>Readability</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROBBIN HOOD</td>
<td>330 Words</td>
<td>22.7</td>
</tr>
<tr>
<td>FAMILY SIZE AND ECONOMIC DEVELOPMENT</td>
<td>319</td>
<td>21.5</td>
</tr>
<tr>
<td>PROFESSIONAL SPORTS</td>
<td>321</td>
<td>20.3</td>
</tr>
<tr>
<td>EARTH DAY</td>
<td>322</td>
<td>20</td>
</tr>
</tbody>
</table>

(4) A Questionnaire:

To determine the amount of familiarity of subjects with the texts, the researcher gave a questionnaire with 10 questions on the reading passages –three questions on Robin Hood, three questions on Professional Sports, two questions on Earth Day, and two questions on Family Size And Economic Development- was used. The results were used to once again divide them into homogeneous groups in relation to familiarity and unfamiliarity with the texts.
Procedure:

In the first phase of the study, a TOFEL exam was given to about ninety students at the ILI. Before the exam, the students were provided with enough information about the test. Based on the results 20 students with the score above 525 were considered advance learners.

In the second phase of this study which was held on a separate session, these twenty subjects took an IQ test. The subjects were briefed on the content and the way to answer the questions. The time limit was announced and the results were collected. This test was corrected based on the number of correct answers as suggested by the test developers. The range of scores was between zeros to 36.

In the third phase of this study which was also held on a separate day, first a questionnaire was given to each subject and they were told to answer the questions on the paper. They were also told that they can easily leave blank any questions they did not know. The purpose of this was to determine how familiar the subjects had been with the text. After completing this questionnaire, they were supplied with the first reading text. An empty sheet was also given to them to write their recalls on it. They were already informed of what they were supposed to do. The subjects were asked to consider the following points when writing the recalls.

1. The students should not read the text longer than ten minutes and they should not go back to the text while they are writing the recalls.
2. The subjects should write their recalls on a separate sheet.
3. They should write their recalls in full sentences.
4. They should write their recalls in English.
5. They should write whatever they remember about the text.
6. They have enough time to write their recalls.
7. Grammatical and spelling mistakes are not important.

The same procedure was followed for the rest of the texts. Then, the questionnaires and the recall protocols were collected. The questionnaires were rated. The score above 50 was considered familiar and below that unfamiliar. The two texts –Robin Hood and Family Size and Economic Development were proved to be familiar as it was hypothesized and the other two texts –Earth Day and Professional Sports- were also proved to be unfamiliar.

As put forward by Alderson (1984), the idea unit is the unit of text analysis and widely used in reading comprehension oriented research. Thus, as a test of comprehension students can be asked to write a recall protocol of a text they have read which in turn is scored in terms of the number of idea unit it contains. So in order to correct the recall protocols, each text was parsed into idea units. For the ease of scoring, an effort was made to establish a unit in which there was only one bit of information expected to be significant for the analysis as recommended by
Alderson (1984). It was also set that every parallel or paraphrased sentence are to be accepted. So all recall protocols were analyzed and graded based on these idea units. In RH text which was 330 words in length, there were 36 idea units; in FSED text which was 319 words in length, there were 28 idea units; in PS text which was 321 words in length, there were 30 idea units; in ED text which was 322 words in length, there were 28 idea units (see Table 2). These idea units were verified by two independent judges.

<table>
<thead>
<tr>
<th>Texts</th>
<th>Length</th>
<th>Number of Idea Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>RH</td>
<td>330</td>
<td>36</td>
</tr>
<tr>
<td>FSED</td>
<td>319</td>
<td>28</td>
</tr>
<tr>
<td>PS</td>
<td>321</td>
<td>30</td>
</tr>
<tr>
<td>ED</td>
<td>322</td>
<td>28</td>
</tr>
</tbody>
</table>

Examples of idea units are given as follows.

Robin Hood text (2 idea units)

Robin Hood is a legendary hero/ who lived in Sherwood Forest, in Nottingham, with his band of followers. / (As illustrated above the sentence contains 2 idea units as separated off by two virgules.)

Family Size and Economic Development (1 idea unit)

Poor people often have larger families than middle class and upper class people./

Based on this criterion, any sentence presented in this way was given a point. For example one of the students recalled the first idea unit in Robin Hood this way; “Robin Hood was a hero and he lived in Nottingham with his friends.” Or for the second text one wrote; “there are more children in poor families than high-class families”. Both of these students got a point for their recall. Two scorers scored the recall protocols and using Pearson Product-Moment Correlation, the inter-rater reliability was found to be .85.
3. DATA ANALYSIS

The data gathered were analyzed using the SPSS statistical software. At first, descriptive data for the IQ and recall protocols were computed. As stated already, the main aim of this study was to confirm that the background knowledge of the subjects had a role on their reading comprehension and recall protocols. The design of the study made the application of one matched t-test necessary. The aim was to compare the means of two familiar and unfamiliar texts. The value of the t-observed for the comparisons of means and that of t-critical were calculated and tested for the significance of the comparisons. The alpha for achieving significance was set at 0.05. Finally, correlation procedures were used to examine the direction and magnitude of the relationship between IQ and the recall protocols.

Result and Discussions

To investigate the probable effect or background knowledge on reading comprehension and recall of the Iranian EFL students, four reading texts were selected- two familiar and two unfamiliar.

Table 3. indicates the mean score for two familiar and unfamiliar texts turned out to be 1.136 which is not greater than the t-critical. Table 4. illustrates the correlation matrix for IQ and recall protocols.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>$\bar{X}$</th>
<th>SD</th>
<th>T</th>
<th>d.f.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advance</td>
<td>20</td>
<td>13.3</td>
<td>3.9</td>
<td>1.136</td>
<td>19</td>
</tr>
</tbody>
</table>

Table 4. Correlations between IQ and recall protocols

<table>
<thead>
<tr>
<th>RECALL</th>
<th>RH</th>
<th>FSED</th>
<th>PS</th>
<th>ED</th>
</tr>
</thead>
<tbody>
<tr>
<td>IQ</td>
<td>0.4745</td>
<td>0.42</td>
<td>0.3781</td>
<td>0.27</td>
</tr>
</tbody>
</table>
4. Conclusions

As it can be seen in the fourth table, the observed t is 1.136 with the d.f. of 19 is not significant at 0.05 level; therefore this hypothesis is rejected. The advance students did not remember the familiar texts better than the unfamiliar ones. This finding is not in line with the previous findings regarding the role of background knowledge in reading comprehension and their recall of the texts. The researcher believes that one probable explanation for this rather strange result may be due to the advance level of the subjects. In other words, advance learners are capable of using other skills such as reading comprehension strategies for better comprehending the texts and therefore better recalling. When confronting the unfamiliar texts, advance learners attempt to use other skills other than their background knowledge they are familiar with to comprehend and recall the texts. This can be a good explanation to the reason that their recall of the unfamiliar texts were not that much different from familiar ones.

In addition, the researcher found an additional result. As it is indicated in table 5, the correlation between IQ and recall are to some extent interesting and a bit strange since no significant relation is shown. In other words, the subjects’ intelligence has no role or effect on comprehension and recall of the texts. This finding is not in line with previous findings. Jacobsons (1996) gave a series of IQ and achievement tests to 212 children. The children with low average IQ scores are likely to be at least two years behind in reading comprehension. The researcher believes that there can be three main reasons for this finding: the first reason is the number of the subjects; with a greater population of subjects the result can be more reliable. Better results can be obtained in correlation with a population above 30. The second reason can be the unfamiliarity of the subjects with the test. This lack of subjects’ familiarity with the test format can also affect their performance to a great extent and therefore, on their performance on IQ test. The third reason can be the time limitations. The subjects were supposed to take the test in forty minutes. According to test developers, this can be considered as a kind of speed test of measuring intelligence. If more time had been given to the subjects, the results could have been different.

References


