

The Impact of Event Index-based Mapping vs. Shifting the Events in Developing Iranian EFL Learners' Reading Ability

Sara Karimkhanzand

Department of English Language, South Tehran Branch, Islamic Azad University, Tehran, Iran
sarakarimkhanzand@gmail.com

Abstract

Being labeled as the lingua franca since the late 19th century, learning English has been a Herculean task for many people around the world. Among these is the case of less proficient speakers who invest a lot of time and energy in the classroom context, yet, they are faced with a plethora of problems, especially in the case of reading, as they are not able to distinguish between the events. The current study was aimed at examining whether event index-based mapping and shifting had any significant effect on developing learners' reading ability. To this end, 130 students who were studying at the "Kish" language institute were selected. Then a PET placement test was run to verify their level. The participants were divided into three groups with 30 members in each. As the instruments of the study, two tests were used; one reading pretest of PET that was run before the treatment and one posttest of reading PET that was run after the treatment at the end of the term. The result of paired-sample t-tests and one-way ANOVA tests revealed that both event-index-based mapping and shifting statistically significantly promoted learners' reading comprehension ability. Besides, it was found that the Mapping group had significantly outscored the Shifting one. The results are commensurate with the postulations regarding the significant role of the construction of a coherent situation model in the successful comprehension of a text. The findings, in other words, provided empirical backing for the claims made by EIM.

Key words; Index-based Mapping, Shifting the Events, EFL Learners, reading

1. Introduction

According to Segal (1995) when reading a fictional text, most readers feel they are in the middle of the story. They eagerly or hesitantly wait to see what will happen next (Nguyen, et al., 2021; Aelita, et al., 2021). Readers get inside stories and vicariously experience them (Haidar, 2021). They feel happy when good things occur, upset when characters are in danger, feel sad, and may even cry when misfortune strikes (Segal, 1995). Reading narratives is one of the most complex cognitive processes that require the reader to build rich representations of the fictional world (Zwaan, 2003).

Consequently, to properly understand a narrative, readers must be able to walk in the protagonist's shoes, monitoring his/her here and now in the fictional world (Segal, 1995). This requires making inferences about the protagonist's purposes (Young & Saxe, 2009), and goals (Graesser, Singer, & Trabasso, 1994). Sometimes, new information in a text elaborates on the elements of a previously activated event node. This process is mapping, and sometimes new information indicates a break between the previously activated event and new information, this process is called shifting (Traxler, 2012). Based on the event-indexing model, if there is a discontinuity on one or more of the five features, the event node is deactivated and a new node is activated. Discontinuities in the stories should produce measurable processing costs. This process is the same as the shifting process in the structure-building framework (Graesser et al., 1995). The EIM stands for the event-indexing model. The event indexing model is foremost a theory about how people build situation models from narrative texts (Graesser, Lanston, & Zwaan, 1998).

According to the EIM, the purpose of the discourse comprehension system is to understand the "goals

and actions of protagonists and events that unfold in the real world or some fictional world” (Zwaan & Rapp, 2006). To represent these story elements, five central and core elements are traced, and each event in the story is indexed based on the five core features; The time frame over which the event occurs (time), the characters that are involved in the event (protagonists), the causal connection of the current event to preceding and following events causation, The spatial locations where the events occur (space), how the events relate to a protagonists’ goals (motivation). The EIM conceptualizes events as activated memory nodes, and the representation of a story consists of a set of memory nodes and the connections between them. Each memory node is coded for the five previously mentioned features, and as each new piece of the text is processed, it is evaluated as to how it relates to previously activated memory nodes. Therefore, each time a new piece of text is processed, the comprehended updates the situation model to reflect the information provided by the text. Different pieces of text can require updating different features of the event index (Traxler, 2012). The purpose of the present study is to investigate the readers’ capability to unravel the goals and actions of protagonists, and the relationship between the events, in the course of narrative comprehension involving shifting and mapping.

1.1. Research Questions

Considering the goals and objectives of this study, the following research questions were posed:

RQ 1: Does event index-based mapping have any significant effect on developing Iranian EFL learners’ reading ability?

RQ 2: Does event index-based shifting have any significant effect on developing Iranian EFL learners’ reading ability?

RQ3: Is there any significant difference between shifting and mapping in their effect on reading ability?

2. Methodology

2.1. Participants

The sample population of this study included 130 female EFL learners in the age range of 13 to 40 years old ($M = 23.54$, $SD = 6.63$). They were studying at a private English language institute in Tehran, Iran, named Kish. The aforementioned institute was selected partly because it enjoyed diversity regarding levels and partly because it included students from a variety of age ranges. The participants were all selected from among the learners studying the first level of the Intermediate course.

The learners were enrolled to study English in a language institute. Consisting of 38 learning hours, the course was aimed at promoting all four skills (i.e. speaking, reading, writing, and listening). For the sake of this study, apart from their course book, the Intermediate book of the *New Headway* series, the *Steps to Understanding*, which is to be elaborated in the instrument section of this thesis, was also employed. The classes were held three days a week, and each session lasted for 90 minutes.

2.2. Instruments

The researcher adopted a quantitative approach in terms of instruments to strengthen both the validity and reliability of the findings. It helps to get assistance from the depth and breadth of quantitative instruments (Dörnyei, 2007). The quantitative data were gathered through Preliminary English Test (PET) the 2015 version. PET is a Cambridge ESOL's respected exam used to determine the participant’s level of English proficiency. The test enjoyed three parts: Reading and Writing (90 minutes), listening (30 minutes), and Speaking (10 minutes) (www.cambridgeesol.org). In this study, the PET test served two purposes. Not only was it employed to determine whether the participants were homogenous in terms of proficiency before the treatment, but also it was applied to gather data about the reading comprehension ability of the learners in the pretest. In other words, in this study,

the first part, the reading section, in which participants needed to answer 35 reading questions, was used as the reading comprehension performance of the learners in the pretest.

2.3. Procedure

As mentioned earlier, this study attempted to gauge EFL learners' reading ability, based on mapping and shifting the events of the texts. To this end, a sample population of 90 EFL learners' all of whom were female English learners with intermediate proficiency levels at Kish Language Institute were chosen. The participants were studying in six intact intermediate classes. Although they had all been placed at intermediate levels through the institute-level tests, a sample PET test was administered to verify their levels. The sample PET test was distributed among intermediate learners that took 90 minutes for participants to answer. The reading part, which consisted of 5 parts and 35 questions, was distributed among the participants. Having analyzed the results of these tests ($M = 63.55$, $SD = 16.75$), the researcher selected fifteen learners whose scores fell between one standard deviation from the mean from each class to participate in the current study. Next, each class was randomly assigned to one group of mapping, shifting, or control. All classes were taught by the researcher. After some time intervals, the participants in all three groups were post-tested. Another version of the reading Pet test was distributed to the participants, which contained 35 questions and 5 parts. Both groups had to answer the questions in 30 minutes. The administration of the pretest lasted for 40 minutes. Moreover, the posttest was conducted in each class in the final session of the class. The tests lasted 40 minutes.

Both experimental groups were given reading texts throughout the term. The reading texts that contained a mapping for the first group elaborated on the elements of a previously activated event node. 10 reading texts were chosen from a textbook called "Steps to Understanding." The participants were supposed to answer the reading comprehension questions. They also worked in groups and described the events in the texts, based on the event-indexing model.

The texts that contained shifting the events of a story were distributed to the other group. The information in the texts that contained shifting indicated a break between the previously activated event and the new information. 10 short stories were distributed to students from Steps to Understanding. The control group received some placebos, and the participants were assessed by asking them to retell the stories and reading comprehension tests. Furthermore, gap-filling texts were organized for both groups.

The researcher asked the participants in both groups of mapping and shifting to continue the stories. Moreover, the speed at which the participants do the tasks was recorded. The texts consisted of 10 short stories, which included mapping and shifting of the protagonists, time, causality, and space. The short stories were distributed to the participants during 10 sessions of the class. After passing some time intervals, the participants were post tested. The Pet reading tests were distributed to the participants, which contained some gap-filling exercises and comprehension questions. They contained 35 reading comprehension questions.

1. The students in both groups were given a word related to the characters which they had to complete using the information they have in mind about each character in the text.

2. Matching tasks: the students were given two rows of sentences; they had to match, based on the information in the tests.

3. Sentence Completion Task: the students in both mapping and shifting groups were given some incomplete sentences in which they had to fill in the blanks.

4. Clustering task: the students read a list of verbs and placed the verbs inside a set of boxes. The students were told to place two verbs in the same box if they thought the verbs belonged together.

The control group did not receive any treatment. The students worked on some regular speaking and listening exercises in their books. They were not given any texts. The students worked on some listening and speaking tasks that were included in their textbook Head Way Intermediate.

The students in the experimental groups received two types of treatment depending on their group: mapping the events of the stories or shifting the events of the stories.

The students in the mapping group had access to texts which were from Steps to Understanding. Parts of the texts that contained some mapping of the events were tested. Some tasks that were used by this type were as follows:

1. The students in this group were given reading comprehension questions about each character, also the events in this story. They had to choose the correct answer.
2. Matching Tasks: the students were given two rows of sentences; they had to match, based on the information in the tests.
3. Sentence Completion Tasks: the students in the mapping group were given some incomplete sentences in which they had to fill in the blanks.
4. Clustering Task, the students read a list of verbs and placed the verbs inside a set of boxes. The students were told to place two verbs in the same box if they thought the verbs belonged together. For example: dragging and crying.

The students or participants in the shifting group received some texts which contained shifting the events of the story. The texts were from steps to understanding. Some tasks that were used by this type were as follows:

1. Matching tasks: the students were given several pieces of information that they were supposed to match. The questions were in the form of tests.
2. Continuing the story: they were given several short stories that were incomplete. The students were supposed to continue the texts based on some clues given by the instructor.

2.4. Design

The design of the study is a quasi-experimental, pretest, and posttest design. According to Farhady (2012), the main aim of all researchers was to show the relationship between the variables. Although, in social sciences in general and in applied linguistics in particular, it is not realistic to limit the research and generalize a few cases to all. Therefore, due to some limitations in true experimental methods, quasi-experimental methods are the ideal methods. Quasi-experimental methods are practical compromises between true experimental and the nature of the human language behavior to be investigated (Farhady, 2012).

It does not concern the manipulation of variables. Quantitative procedures including questionnaires, reading comprehension tests, and gap-filling questions were exercised to assess learners' ability in reading tasks. This study consisted of two independent variables. The independent variables are two mapping and shifting processes based on the event indexing model. The dependent variable is the student's reading development based on the event indexing model. As randomization is not possible this study is quasi-experimental and as there are exams and reading comprehension tests, this study is quantitative. Initially pretests (O1, O3, and O5) were administered; then experimental treatments (X1, X2) were applied, and finally, groups were post-tested (O2, O4, and O6) at the end of the treatment period. C is a regular process that the control group experienced. The control group did not receive any specific treatments. They worked on some exercises in their books.

The scheme of this study was as follows:

O1	X1	O2
O3	X2	O4
O5	C	O6

2.5. Data Analysis

To answer the first research question and to find out whether event index-based mapping has any significant effect on developing learners' reading ability, the researcher ran a paired-sample t-test. This was done to probe into the difference between the performance of the learners in the mapping group before and after the treatment. According to Farhady (2012), paired sample t-tests are for

research designs where we want to compare two sets of scores, that is two variables, obtained from the same group.

Next, to answer the second research question and to determine whether event index-based shifting had any significant effect on developing learners’ reading ability, the researcher ran another paired-sample t-test. The performance of the learners in the shifting group before and after the treatment was compared via this paired-sample t-test. Finally, to answer the third question posed in the current study which was aimed at investigating whether event index-based mapping was significantly more effective than event index-based shifting in developing learners’ reading ability, a one-way Analysis of Variance (ANOVA) was employed.

ANOVA is very similar to t-test but in this case, we assess the significance of the differences in means of more than two groups, for example, the mean achievement of three different class groups” (Dornyei, 2011, p. 218). Therefore, ANOVA was utilized to analyze the data. In the case of the sample placement tests, the descriptive statistics of the results were computed. The ANOVA test was aimed at comparing the gain score of mapping and shifting groups and control groups.

2.6. Ethical considerations

In the present study, attempts were scrupulously made to ensure the obligations imposed by ethical considerations were fulfilled. First, to protect and ensure the dignity and welfare of all participants, additional free sessions were held for the learners in the control group. The design of the study was in such a way that the learners in the control group did not work on reading comprehension texts. Therefore, to ensure their reading comprehension ability would not be adversely affected by the design of this study, the researcher held four additional sessions for them in which she worked on reading comprehension sections of the learners’ course book.

Furthermore, to make sure that the participants would not be affected by the results of the current study, they were all asked to sign consent forms and told that no pedagogical decisions would be made based on the obtained results.

3. Results

3.1. Preliminary Checks

To find out whether parametric tests such as paired sample t-tests and one-way ANOVA could be employed to analyze the data, the researcher ran the preliminary checks. Preliminary checks included the examination of the normality of the pre and post-test scores and homogeneity of variances. Table 1 demonstrates the test of normality for pretest scores.

Table 1. Test of Normality for the Pretest.

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	Df	Sig.
Pretest	.108	89	.021	.960	89	.008

In the pretest, there was no violation of the normality assumption as tested by the Kolmogorov-Smirnov and Shapiro-Wilk tests. The error variance was equal across groups, and there was no violation of the assumption, indicating that parametric tests could be applied to compare the differences among the groups in the pretest.

Next, preliminary checks including the examination of the normality of the scores and homogeneity of variances were done for posttest results. In the posttest, similar to the pretest, there was no violation of the normality assumption as tested by the Kolmogorov-Smirnov and Shapiro-Wilk tests. The error variance was equal across groups, and there was no violation of the assumption, indicating that parametric tests could be applied to compare the differences among the groups in the pretest.

3.2. Reading Skill Homogeneity Test

Even though, all the participants in all six classes comprising the three groups of the study had been selected based on the results of a PET test, to further ensure the homogeneity of the learners in all groups in terms of reading ability the results of the pretest scores in the three groups were compared using a one-way ANOVA test. Table 2 shows the Mean and Standard Deviation for all the groups in the pretest.

Table 2. Mean and Standard Deviation for all the Groups in the Pretest.

Group	N	Mean	Standard Deviation
Mapping	30	12.26	1.85
Shifting	30	12.50	2.40
Control	30	12.20	1.88
Total	90	12.32	2.04

As can be seen in Table 2, all groups had almost the same mean score in the reading comprehension pretest measured by a PET test. Table 3 depicts the results of the ANOVA for the pretest scores.

Table 3. Pretest Analysis of Variance.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.48	2	.74	.17	.84
Within Groups	370.16	87	4.25		
Total	371.65	89			

As illustrated in Table 3, the results of the one-way ANOVA yielded no significant difference in mean scores, $F(2, 87) = .175, p = .84$, indicating that the participants in all groups were homogeneous in terms of reading comprehension skills before the treatment.

3.3. Research Question One

Given the results of the preliminary checks, it was concluded that parametric tests could be used to analyze the data. The first research question in the current study examined whether event index-based mapping had any significant effect on developing learners’ reading ability. To find the answer to this question, the researcher ran a paired-sample t-test to find the difference between the performance of the learners in the mapping group before and after the treatment. Based on the results, a statistically significant increase could be detected in the Mapping group ($M = 16.43, SD = 1.30$) when pretest scores were compared against the ones obtained on the posttest, $t(29) = 68.98, p = .00$. Thus, it was concluded that event index based mapping statistically significantly increased learners’ reading comprehension ability. Thus, the first null hypothesis was rejected.

3.4. Research Question Two

The second research question in the present study examined whether event index-based shifting had any significant effect on developing learners’ reading ability. To answer this question, the researcher ran another paired-sample t-test to find the difference between the performance of the learners in the shifting group before and after the treatment. According to the results, a statistically significant increase could be detected in the Mapping group ($M = 7.96, SD = 1.21$) when pretest scores were compared against the ones obtained on the posttest, $t(29) = 35.84, p = .00$. Thus, it was concluded

that event-based shifting statistically significantly increased learners’ reading comprehension ability. Therefore, the second null hypothesis was rejected.

3.5. Research Question Three

The third research question posed in this study was aimed at finding out whether event-index-based mapping had an advantage over shifting in promoting learners’ reading comprehension skills. To answer this question, firstly, the descriptive statistics for the posttest were calculated. Figure 1 illustrates the mean scores of the groups in the posttest.

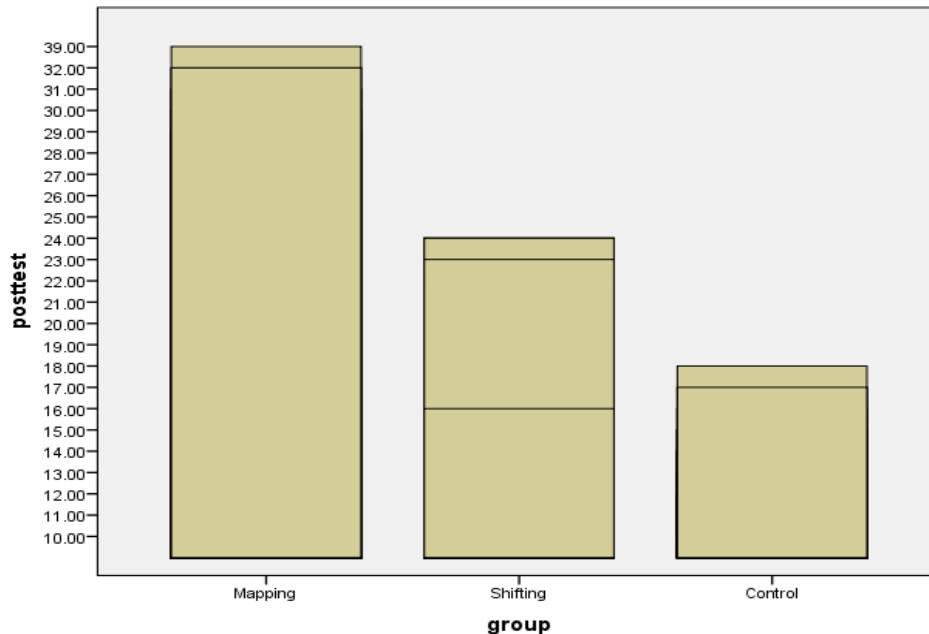


Figure 1. Posttest Mean Scores.

As shown in Figure 1, in the posttest, the mean score gained by the two experimental groups was higher than that of the control group. Besides, the Mapping group’s mean score was higher than that of the Shifting group. To find out whether the difference between the mapping ($M = 28.70, SD = 2.64$) and shifting ($M = 20.46, SD = 2.16$) and control ($M = 13.76, SD = 1.95$) groups was statistically meaningful, the researcher ran a one-way ANOVA to compare the mean scores in the posttest. Table 4 depicts the results of the ANOVA for the post-test scores.

Table 4. Posttest Analysis of Variance.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3356.82	2	1678.41	325.11	.00
Within Groups	449.13	87	5.16		
Total	3805.95	89			

As shown in Table 4, the results of the one-way ANOVA in the posttest yielded a significant difference in mean scores, $F(2, 87) = 325.11, p = .00$. A post hoc Scheffe’s test was run to determine where the differences existed. The results of the post hoc Scheffe’s test illustrate that the difference between the two experimental groups (i.e. mapping ($M = 28.70, SD = 2.64$) and shifting ($M = 20.46, SD = 2.16$)) was detected to be statistically significant. Besides, both experimental groups were found to statistically significantly outperform the control group ($M = 13.76, SD = 1.95$).

Besides, to ensure the Mapping group had superiority over the Shifting one, the researcher ran a one-way ANOVA to compare the gains in the groups. The gains were calculated by subtracting the pretest scores from the posttest ones. Figure 2 illustrates the gain mean scores of the groups when pretest scores when subtracted from the posttest scores.

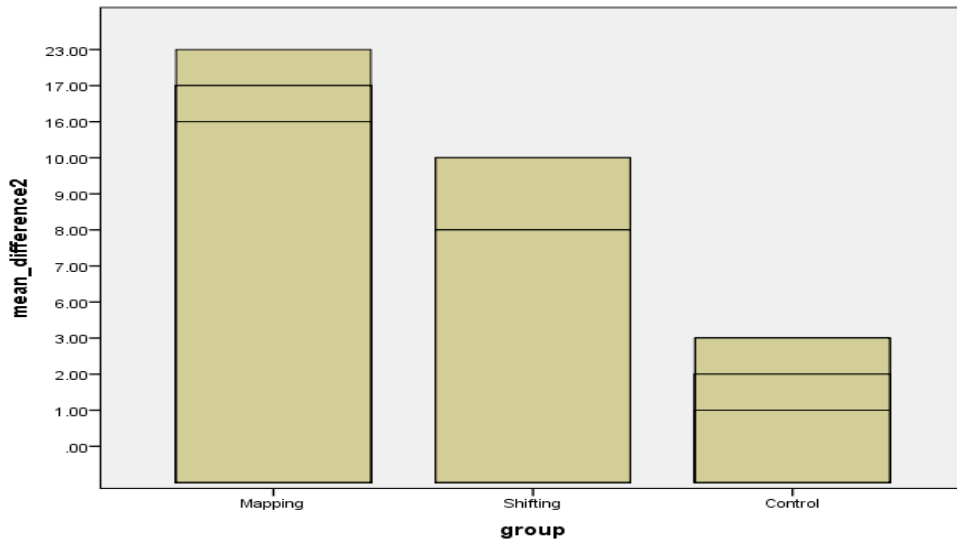


Figure 2. Gained Mean Scores.

As illustrated in Figure 2, when the gains were compared, the mean score gained by the two experimental groups was higher than that of the control group. Moreover, the Mapping group's mean score was higher than that of the Shifting group. To find out whether the difference between the mapping ($M = 16.43, SD = 1.30$) and shifting ($M = 7.96, SD = 1.21$), and control ($M = 1.56, SD = .77$) groups were statistically meaningful, the researcher ran a one-way ANOVA to compare the mean scores in posttest-pretest differences. The results of the one-way ANOVA, when the gains were compared, yielded a significant difference in mean scores, $F(2, 87) = 1322.09, p = .00$. A post hoc Scheffe's test was further run to find out where the differences existed. Table 5 depicts the results of the post hoc Scheffe test.

Table 5. Posttest Post hoc Scheffe's Test.

Group	Shifting	Control
Mapping	8.46*	14.86*
Shifting		6.40*

*The mean difference is significant at the 0.05 level.

As Table 5 displays, the difference between the mapping ($M = 16.43, SD = 1.30$) and shifting ($M = 7.96, SD = 1.21$) groups was detected to be statistically significant. Besides, both experimental groups were found to have obtained mean scores statistically significantly higher than the control group ($M = 1.56, SD = .77$).

Given the results of the two one-way ANOVA tests run to compare the mean scores in the posttest and the gains, it was concluded that the event index-based mapping was significantly more effective than event index-based shifting in developing Iranian EFL learners' reading ability. Thus, the third null hypothesis was rejected.

4. Discussion and Conclusions

The current study was aimed at examining whether event index-based mapping and shifting had any significant effect on developing learners' reading ability. Besides, the present study investigated whether event index-based mapping was significantly more effective than event index-based shifting in developing learners' reading ability. The result of paired-sample t-tests and one-way ANOVA tests revealed that both even-index-based mapping and shifting statistically significantly promoted learners' reading comprehension ability. Besides, it was found that the Mapping group had significantly outscored the Shifting one.

The results are commensurate with the postulations regarding the significant role of the construction of a coherent situation model in the successful comprehension of a text (Traxler, 2012). The findings, in other words, provide empirical backing for the claims made by EIM. EIM of text comprehension makes claims about online comprehension and processing load as well as the resulting representation in the long-term memory of the reader.

The findings of the present study are congruent with those supporting EIM. Therefore, the findings are matching with those of Zwaan et al. (1995) who showed that discontinuity imposes an additive processing load and lengthened the time of the comprehension of short stories. Similarly, the findings are in line with the ones reported by Zwaan (1996). He reported that the chronological distance between 2 consecutively narrated story events affected the online comprehension and mental representation of these events.

The findings of the present study also echo those hinting at the impact of the nature of the described situation on the readers' memory (Bransford et al., 1972; Kives et al., 2015). Like those studies, the current study highlighted the role of events in a narrative in making the narrative comprehensible for the readers.

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