#### Method Effects on Reading Comprehension Test Performance: Text Structure

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If tests are to provide accurate measures of the learners' language ability, examiners must minimize the influence of intervening factors. According to Bachman and Palmer (2000), one of these intervening factors is text structure. The purpose of the present study is to investigate the effect of text structure on reading comprehension and also to investigate whether the influence of text structure differences differs for texts with different difficulty levels and learners with different proficiency levels. Tow texts, in cloze form, with two different text structures (descriptive and problem-solution) were given to 30 participants of two proficiency levels. The result indicated that text structure had a significant effect on the scores obtained, with the scores on descriptive texts being higher. The effect of different text structures was not significantly different for different proficiency levels. By paying more attention to these factors, examiners can enhance the validity of their tests.

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#### Introduction

By including method facets as well as trait facets in his discussion of language ability, Bachman (1990), represents a range of factors that can affect test performance and therefore jeopardize test validity. Hence, to increase the validity of a test, intervening factors should be minimized.

Reading itself is a dynamic process that involves the reader and his interaction with the text. According to Foo (1989) current research on reading puts more emphasis on the role of reader than the text. Readers interact with texts; the idea that texts are objective and that they are vital components of the process is no longer valid.

Bachman (1990) has divided method facets to 5 categories:

1- Testing environment,

2-test rubric,

3-nature of the input,

4-nature of expected response, and

5-interaction between input and response.

The present study focuses on the  $3^{rd}$  of these factors: nature of the input. That is the textural structure of the text.

As sharp (2002) believes an understanding of how rhetorical patterns are formed and used help to comprehend texts better. He defines rhetorical pattern as part of the macro structure of a text that contains the logical organization of the text which the writer has used to represent the intended meaning.

Additionally, referring to the definition of micro and macro structure by Kintsch and Yarbrough (as cited in Foo, 1989), Foo mentions that when text was logically organized with its micro and macrostructures in the proper order, readers process it more rapidly. They believe that at the microstructure level the relationship within and between individual sentences are of the main concern; at the macrostructure level, the relationship among ideas represented in complexes of propositions or paragraphs are important. At this level the relationships tend to be logical or rhetorical. Meyer and Roy (1984) contend that discourse can be organized in different ways; discourse types correspond to schemata that vary in their organizational components; these differences are expected to result in differences in processing texts: the more organized they are, the easier it is to process and recall the text. Mever (1978) hypothesizes that skilled readers have a finite number of abstract. subordinate schemata that are used in text comprehension. If the reader recognizes and uses the author's rhetorical structure, he/ she will be able to understand the text better and remember more of it.

The model based on the role of the macrostructure and schemata contends that reading comprehension depends not only on the local properties of the texts and the readers decoding activities at the sentence or paragraphs level, but on the overall organization of the text.

In the content structure analysis by Meyer et al. (1984), idea units are organized in a hierarchical manner on the basis of their rhetorical relationships. The rhetorical relation at the highest level in the hierarchy is called the 'top-level rhetorical organization' and this characterizes the text. The top-level rhetorical structure might be of following type: 'collection', 'causation', 'response (problem-solution)', 'description' and 'comparison'. These five types of

top-level relationships are thought to represent patterns in the way we think.

According to Meyer et al. (1984), the first three types are on a continuum based on time and causality, as summarized in figure 1. The last two of the Meyer's five categories are on a different plane from the others as they are based on a hierarchy or subordination of ideas, (figure 2).

Collection1 Collection2	A,B A then B	Only loosely associated Time sequence		
causation	A==>B	Time sequence + causality		
response	A ==>B ↑ C	Time sequence, causality + response (solution in response to the cause)		

Figure 1. Three types of rhetorical organization: collection, causation and response.

Comparison	A ↑ B	One argument is superordinate and the other argument modifies it		
Description	A >>B ↑ C	There are at least two superordinate arguments, linked with an element of comparison.		

Figure 2. Two types of rhetorical organization, based on hierarchy of subordination of ideas.

'Response (problem-solution)' and 'description' were chosen as representative of each group, for the purpose of the present study. 'Problemsolution' involves more interpretations in ideas than the other two and a solution is suggested in response to the existing causality. In a 'description relation', ideas are arranged in a hierarchical manner: one argument is subordinate and the other modifies this subordinate argument.

Also, according to Kobayashi (2002), these five types of rhetorical structures represent the degree of interconnectedness of ideas, from loosely organized to tightly organized. If coherence is defined as the degree of unity, then this classification can identify the distinguishing features of coherent texts. A well organized text would be better recalled and comprehended because the ideas in the texts are closely interlinked. Hence, in this study, it is assumed that the learners perform better in 'description' relation than in 'problem-solution' relation.

Some researches have been done in this area. For example Sharp (2002), Foo (1989), Goh (1990), and Kitsch & Yarbrough (1982) have confirmed that difference in rhetorical organization leads to difference in comprehension and recall. Readers who recognized and used the rhetorical organization of the original texts recalled more idea units. This was further investigated by Meyer (1978), and Carrell (1992). In addition Flick & Anderson (1980) and Davis (1988) have investigated the effect of rhetorical difficulty in the comprehension and recall of scientific texts. Consequently, the strategies applied by readers differ. Foo (1989) demonstrated that skilled readers approach a text with knowledge of text organization. They selected from their repertoire the schemata that best matches the text that should be processed. They also have an effective strategy for perceiving top-level structure.

Meyer (1980) has come up with the same results by 'problem-solution' and 'comparison' relation. This was further proved by Leon & Carretero (1995).

The interactions of knowledge of text structure and other factors like background knowledge (Roller, 1990; Birkmire, 1982), and response format (Kobayashi, 2002) have been investigated. Also the importance of instruction of structural knowledge has been investigated and proved by several researchers: (Carrell, 1985; Armbruster, Anderson & Ostertag, 1987; Mason & Kendall, 1978; Lee & Riley, 1990; Meyer, 1980; Taffy, 1986; and Williams, 2004). Englert and Hiebert (1984) took the difference of text structure types as granted and investigated children's developing awareness of text structure in expository materials.

### **Objectives of the study**

The purpose of the present study is to investigate whether different text structures will cause differences in comprehension in learners, and whether the difference in comprehension (if it exists) is the same or differs for learners with different proficiency levels; in other words, if there is any interaction between the proficiency level and text structure in the comprehension of written texts.

In order to handle the aforementioned purpose, and relying on the available literature, the following hypotheses are proposed:

1. Different rhetorical organizations will cause differences in comprehension.

2. This difference is most noticeable for students with higher proficiency levels.

### Method

30 students participated in this study. Based on a proficiency test they were divided to two groups. Two passages were given to each participant. One of them was about "healthy eating" and the other was on "the loss of body water". They were tried to be related to the general knowledge and to be of interest to the participants. Each passage had a different text structure: one was descriptive and the other was problem-solution.

Two sets of tests were used; in one set, the first passage was in descriptive form and the second passage in problem-solution form. The second set was vice versa, with the first passage being in problem-solution form, and the second passage in descriptive form. Each subject was presented with one of these two sets of tests. And each set was distributed randomly among participants. The purpose of applying diverse text structures for one set was to ensure that the result is due to differences in textual structures, and not the individual differences.

Tests were in the cloze form, based on fifth word deletion procedure of cloze-making; However, if the omitted word was a key, content word, it was kept and the nearest, following, possible word was omitted, in order that, the subjects would not run into the problem of comprehension. In addition, one topic was provided for each text to facilitate comprehension and enhance performance.

# Statistical analysis

The cloze tests were marked by the semantically and syntactically acceptable word scoring method. The results were analyzed using SPSS. While entering the data, there was a test the scores of which were remote from the rest. As the number of the sample was low, this was regarded as a missing data and the means of the relevant groups were used instead of it. The mean scores of each passage, text structure type and proficiency level were calculated. Then, the General Linear Model was used to see if language proficiency, text-structure types and the passage (as they might be of different difficulty levels), had significant interactions. Also, separate ANOVAs were run to see if the interactions between scores and text types, scores and the passage, and scores and the proficiency level were significant. The significance level was set at p<0.05.

# Results

The result of the GLM analysis shows that there are significant relationships neither between text structure and passage, nor between text type and proficiency level, and nor between passage and proficiency level, with the significance being 0.37, 0.57 and 0.74 respectively (table 1). However, the result of ANOVA shows that there is a significant difference in scores for different text structure types. The mean score of the descriptive type was 13.42 and the mean score of the problem-solution type was 10.21. This difference in means shows that the descriptive texts had been easier than the problemsolution texts.

Source	F	Mean Square	Type III Sum of Squares	Sig.
ТҮРЕ	1.634	35.336	35.336	.211
PASSAGE	2.918	63.114	63.114	.098
LEVEL	3.125	67.605	67.605	.087
TYPE * PASSAGE	.824	17.827	17.827	.371
TYPE * LEVEL	.315	6.818	6.818	.579
PASSAGE * LEVEL	.104	2.250	2.250	.749
TYPE * PASSAGE * LEVEL	.447	9.679	9.679	.509

Dependent Variable: SCORE

Table 1. The result of the GLM.

Also, the difference in scores of the two passages was significant (0.03). The mean score of the first passage (on healthy eating) was 13.4, and the mean score of the second passage (on the loss of body water) was 10.05. This indicated that the first passage had been easier than the second one.

The mean score of the second level of proficiency (higher proficiency level students) was 12.57 and the mean score of the first level of

proficiency (lower proficiency level students) was 9.7. This shows that the more proficient students performed better on tests; however, the difference was not significant (p=0.12).

The results of the ANOVAs are presented in table 2 and the bar graph of the scores, based on the text structure type is shown in figure 3. Having a look at the graph, one would notice the difference in scores due to the text structure type.

	Mean Square	Sum of Squares	F	Sig.
Score-type Between Groups	97.921	97.921	4.218	.047
Within Groups	23.216	835.789		
Total		933.711		
Score-passage Between Groups	105.966	105.966	4.609	.039
Within Groups	22.993	827.744		
Total		933.711		
Score-level Between Groups	60.753	60.753	2.505	.122
Within Groups	24.249	872.957		
Total		933.711		





Figure 3. Scores and text structure.

# Discussion

The results of the study confirm the hypothesis that students would perform differently on texts with different structures. It was also indicated that performance on descriptive texts is better than on problem-solution texts. As was stated by Meyer et al. (1984), problem-solution and descriptive texts belong to two different texts structure types; that is, problemsolution type is situated in the first category of text types: 'collection', 'causation' and 'problemsolution' that are on a continuum based on time and causality. In 'problem-solution' a solution is proposed to an existing causality; however 'descriptive type' is in the second category of text type that includes 'comparison' and 'description'. These are based on hierarchy or subordination of ideas. In 'description', ideas are arranged in a hierarchical manner: one argument is superordinate and the other modifies the superordinate argument. According to the result of this research, it can be concluded that when arguments are presented in a hierarchical manner, they are easier for the students to comprehend and handle than when they are presented as the effect of an existing cause. This might further prove the distinction of the two text structure types, proposed by Meyer et al. (1984).

The difference in test scores due to different text passages showed that the second passage had been more difficult than the first one. This was further supported with the informal interviews with the participants, after the test administration. One can take further advantage from this significant difference in the difficulty level of texts by verifying whether this would indicate the same degree of significant difference between text structure types. Therefore, again, two other ANOVAs were run. The results showed that for the first passage the difference was 0.05 but for the second passage it was not significant (p= 0.4). This indicated that when the difficulty level increased, the distinction between the two types of text structure would not be conspicuous.

The result of one of the ANOVAs reflected that there is no significant relationship between scores based on the proficiency level, although more proficient students performed better. While it was indicated by Kobayashi (2002) that clear text structure affected the performance of more proficient learners more than the less proficient ones.

### Conclusion

It can now be concluded that the first hypothesis can be confirmed; that is different rhetorical organizations will cause differences in comprehension. However, the results showed no significant difference for different proficiency levels. Hence, the second hypothesis is not confirmed.

As was discussed, this experiment further confirmed that text structure had an effect on test performance. Hence according to Bachman (1990), in order to make a valid test, the text structure should be taken care of as an effective variable because it affects the nature of the input as one characteristic of test method facets.

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