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**THE EFFECTS OF RHETORICAL ORGANIZATION
IN EXPOSITORY PROSE ON
ESL READERS IN SINGAPORE**

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THE EFFECTS OF RHETORICAL ORGANIZATION
IN EXPOSITORY PROSE ON ESL READERS IN SINGAPORE

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This paper reports an experimental study carried out at the Institute of Education in 1987 to find out the effects of rhetorical organisation in expository prose on ESL readers in Singapore. The study was undertaken mainly to test the findings of a study by Carrell (1984) on ESL readers in USA. As an extension of the earlier study, which used foreign students at an American university as subjects, the present study incorporated three levels of language proficiency: school, college* and university graduates. Results of the study confirm two of the findings in the Carrell study: that different rhetorical organizations have differential effects on the recall of Singapore readers, and that readers who recognized and used the rhetorical organization of the original texts recalled more idea units in their recall protocols. The finding that readers with different native languages showed different recall patterns for the various rhetorical organizations is not confirmed in the present study. The paper discusses the findings with some possible explanations where the results do not confirm those of the earlier study and also implications for further research.

* the word "college" is used to refer to an institution for tertiary education, e.g. the Institute of Education.

INTRODUCTION

Research within the framework of schema theory has shown that reading comprehension is an interactive process between the reader and the text. More specifically, the interaction involves among other things the reader's prior knowledge and the rhetorical organisation of the text. The reader's prior knowledge is seen to be organised as a set of schemata. Of these, two types of schemata have been identified, content schema and form schema.

Earlier studies on prose processing from the schema perspective have employed the activation of relatively specific content schemata derived from a particular domain, for example, the "Washing Clothes" passage from Bransford and Johnson's experiment (1972). While this type of content schema clearly plays an important role in the comprehension and recall of ambiguous and usually artificial texts it was increasingly felt that such specific content schemata might not apply in the case of academic material normally encountered by students at various education levels. Furthermore, it was felt that the processing of academic material would be facilitated more by form or structure schemata than content schemata (Brooks and Dansereau, 1983).

PREVIOUS RESEARCH

Over the last two decades, a great deal of research on prose structure has focused on analysis of narrative passages e.g. story grammar (Stein and Glenn, 1979; Mandler and Johnson, 1977). Empirical studies showed that though the ability to retell well-written stories is acquired at an early age, most children are unfamiliar with non-narrative forms of prose. This realisation has led to an interest in studying the rhetorical structure of expository prose and its effect on readers' comprehension and recall. In particular, Meyer (1975) has gathered empirical evidence that five different types of expository prose structures differentially affect reading comprehension and recall. These five basic rhetorical organisations are: time-order, listing or collection of description, causation, problem/solution, and comparison.

In one study (Meyer, Brandt, and Bluth, 1980), ninth graders read two texts, one written with the comparison structure and the other with the problem/solution structure. The students were asked to write down what they could recall of what they had read immediately and one week later. The analysis of the recall protocols, both immediate and delayed, showed that students who organized their recalls using the original text structure remembered more content, both main ideas and supporting details. In another study (Meyer and Freedle, 1984) involving college

undergraduates as well as graduate teachers, it was found that the more organized text structures of causation, problem/solution and comparison were more facilitative of recall than the more loosely organized text structure of a collection of description.

Carrell (1984) replicated the Meyer and Freedle study with ESL undergraduate readers of varying linguistic backgrounds studying at an American university. The results confirmed that discourse type did have a significant effect on comprehension and recall. In addition, Carrell's study found that the native language group factor (i.e. Spanish, Arabic, Oriental and Other) also had a significant overall effect on the pattern and amount of recall.

THE STUDY

The present study was undertaken to test the findings of the Carrell (1984) study using Singapore readers at the school, college and university graduate levels of English language proficiency. To facilitate valid comparison of results, the experimental texts used in Carrell's study, based in turn on the Meyer and Freedle study, were adapted for use. The study addressed the following three research questions:

1. Do the four types of rhetorical organization* of expository prose (collection of descriptions or listing, causation, problem/solution, and comparison) have different effects on the reading and recalls of Singapore readers at the three levels?
2. Are there any differences among the various home language groups (Chinese, Malay, Tamil) related to the rhetorical organization of the texts?
3. Is there any relationship between the readers' ability to recognize and utilize the rhetorical organization of the texts and the amount of information recalled from the texts?

Method

Subjects

A total of 240 subjects participated in this study, 80 subjects for each of the three educational and language proficiency levels: school, college and post-graduate. The 80 subjects at the school level were drawn from two secondary four classes (Express Stream) in an average government school in the East Zone. The 80 college level subjects were first-year students in the 2-year

Certificate in Education programme for 'A' Level holders at the Institute of Education. The 80 post-graduate subjects were university graduates undergoing the Diploma in Education programme at the Institute of Education, and were all enrolled in the English Methods course.

As the subjects in all the three levels were members of naturally occurring classes, it was not possible to control the sample for the home language factor (Chinese, Malay, Tamil) within each level. Because the number of subjects representing the Others category in each sample was very small (1 in the school sample, 4 in the college sample, and 3 in the post-graduate sample) it was decided not to include them in the experiment, as not every one of the text-type will receive one such subject at each level. The home language distribution within each sample is thus shown in Table 1 below.

Table 1: Distribution by home language

Level	Home Language			
	Chinese(N)	Malay(N)	Tamil(N)	Total
School	51	18	11	80
College	41	20	19	80
Post-graduate	57	7	16	80

Materials

Four texts dealing with a common topic, the danger of excessive loss of body water to athletes, but each written with a different discourse structure (collection of description, causation, problem/solution, comparison) were used. These were adapted versions of the texts used in the Carrell (1984) study.

Procedures

The 80 subjects in each level were assigned randomly to one of the four texts. The test was administered during regular class hours. The subjects were instructed through written instructions to read the text at their own pace. The texts were then collected and the subjects were asked to write down as much as they could recall of the text. They were asked to use their own words and write in complete sentences, not just points in note form. The subjects were instructed to write a second recall one week later.

They had not been told in advance that they would be required to write this second recall. The same procedure was followed for all the three levels, except that for the school level, the written instructions were supplemented by oral explanations when necessary.

Scoring

The recall protocols were scored using a list of 21 idea units common to all four text versions (see Carrell, 1984, p455). Each script was scored twice, once by the author and once by a graduate assistant. A reliability coefficient of $r=.91$ was obtained for the two scoring. Each protocol was also scored for the rhetorical organisation (or macrostructure) used. A protocol was awarded 2 points if it utilized the same rhetorical organisation as the original text (collection of descriptions or listing, causation, problem/solution or comparison), 0 if it did not. A score of 1 was awarded to a protocol which used only partially the original text structure. Examples of partial use of macrostructure are: use of the listing structure, with "firstly" but no follow through "secondly" etc; stating a problem but no mention of solution. Examples of recall protocols are found in the Appendix.

RESULTS

Data on the immediate and delayed recall of the 21 identical units for the four discourse types and three proficiency levels were subjected to a three-factor analysis of variance (Recall Condition X Discourse type X Proficiency Level). The procedure used was the General Linear Models (GLM) procedure of the SAS package of statistical programmes. All the three main effects were significant at the $p<.05$ level (see Table 2).

As would be expected, there are statistically significant effects of Recall Condition (immediate versus delayed) across the three proficiency levels (Table 3). The overall difference between immediate and delayed recall varies between 30% and 20% of the total possible score of 21 for the school level, 42% and 31% for the college level and 55% and 37% for the post-graduate level. More importantly, there is a distinct difference in the recall pattern for the four discourse types: The recall for the comparisons text type is consistently better than those for the other three text types (listing of descriptions, causation and problem/solution) across the three proficiency levels. This is depicted graphically in Figure 1.

A separate three-factor analysis of variance was carried out with the Language Group replacing the Proficiency Level as the third factor (Recall Condition X Discourse Type Language Group).

Of the three main effects, only the Recall Condition and Discourse Type are statistically significant at the $p < .05$ level. The Language Group effect is not statistically significant (see Table 4). In other words, the language group factor (Chinese, Malay or Tamil) did not have a significant effect on the recall for the four discourse types. This was consistently so across the three proficiency levels.

Organisations of Recall

Table 5 shows the relationships between the discourse type of the original text and that used in the recall protocols for the three proficiency levels. It can be seen that for both the recall conditions (immediate and delayed), protocols which were organised using the text structure of the original discourse type also show a higher number of idea units recalled. In other words, recognising and utilizing the discourse structure of the original text has a positive effect on the amount of information recalled from the original text.

A second point that can be noted from Table 5 is that there is a significant difference in the ability to recognize and utilize the discourse structure of the original text between the school level and the college/post graduate level samples. In the school level sample, only 14 out of the 80 subjects (roughly 18%) did recognize and utilize the discourse structure in the immediate recall, and only 8 (10%) did so in the delayed recall. In the college level sample, the corresponding figures are 38 (roughly 47%) and 30 (roughly 37%) respectively, and in the post-graduate level sample, 39 (roughly 49%) and 33 (roughly 41%). This shows that recognizing and utilizing the discourse structure of a text is relatively a more difficult task for school level readers than for college or post-graduate level readers, while there is practically no difference between college level readers and post-graduate readers in their ability to recognize and utilize the discourse structure in recalling the original text.

Table 2
 Recall Condition X Text X Level
 General Linear Models Statement
 and F Values

Recall Condition	Text	Level	Recall Condition X Text	Recall Condition X Level	Text X Level	Recall Condition X Text X Level
*F=363.14 P=.0001	*F=13.15 P=.0001	*F=56.20 P=.0001	F=2.15 P=.0949	*F=12.51 P=.0001	F=0.68 P=.6653	F=1.05 P=.3938

Exact p values are reported

*p = <.05

Table 3
 Mean Recall Scores on Immediate and Delayed
 Free Recall Tests for 21 Identical Idea Units
 by Four Different Discourse Types

Discourse Types	Time of Free Recall Test		Grand Means
	Immediate	Delayed	
<u>Level 1 (School)</u>			
1 Collection of Descriptions	6.00	4.20	5.10
2 Causation	4.95	3.25	4.10
3 Problem/Solution	5.75	3.35	4.55
4 Comparison	8.45	6.15	7.30
Grand Means	6.29	4.24	
<u>Level 2 (College)</u>			
1 Collection of Descriptions	8.33	5.80	7.06
2 Causation	7.66	5.90	6.78
3 Problem/Solution	8.41	5.41	6.91
4 Comparison	11.05	8.76	9.90
Grand Means	8.86	6.47	
<u>Level 3 (Post-graduate)</u>			
1 Collection of Descriptions	10.40	7.65	9.02
2 Causation	11.30	7.35	9.32
3 Problem/Solution	11.50	7.65	9.57
4 Comparison	13.00	8.65	10.82
Grand Means	11.55	7.82	

Max score = 21.

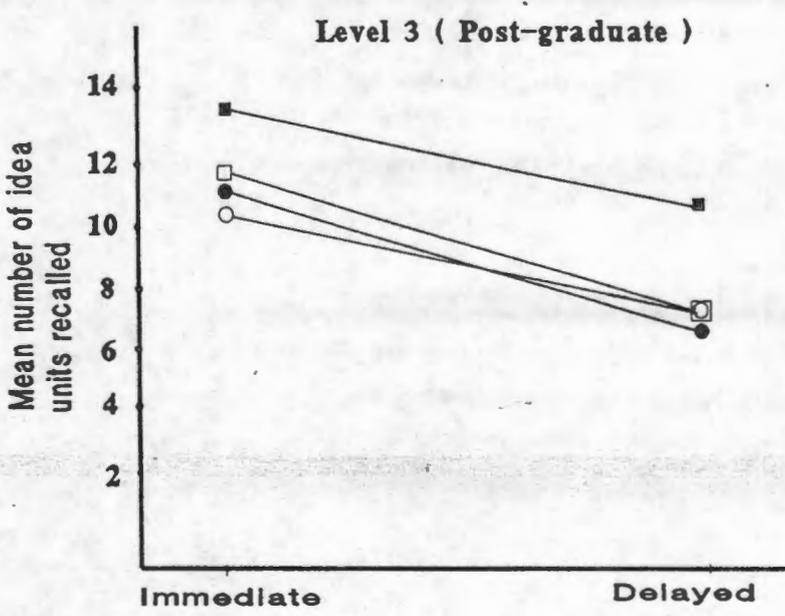
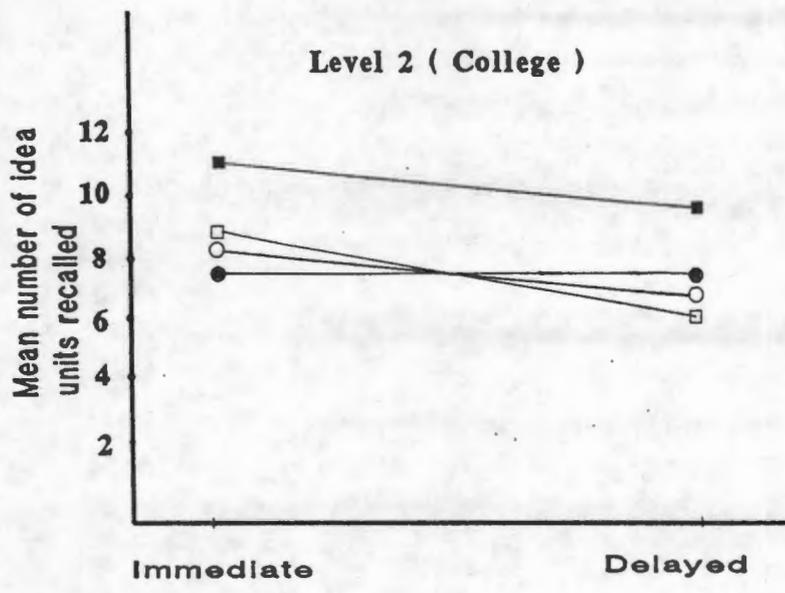
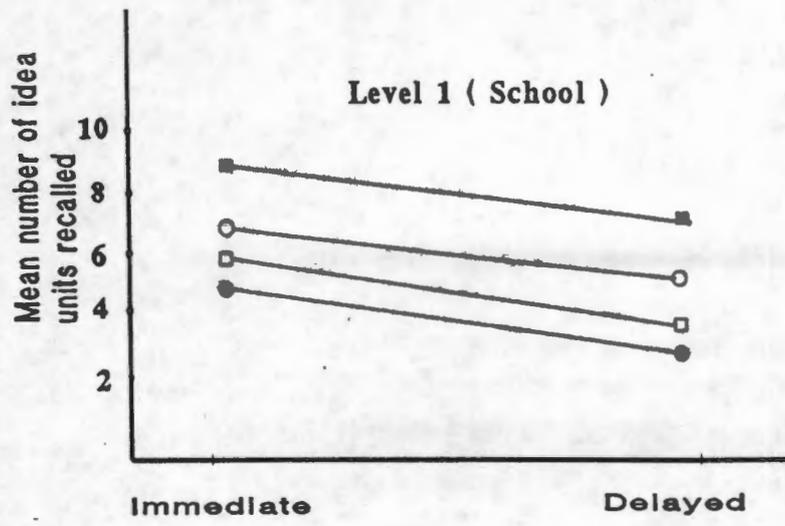
N = 80 for each level
 (20 for each discourse type)

Table 4
 Recall Condition X Text X Home Language
 General Linear Models Statement
 and F Values

Recall Condition	Text	Home Language	Recall Condition X Text	Recall Condition X Home Language	Text X Home Language	Recall Condition X Text X Home Language
F=202.36*	F=7.21*	F=1.26	F=1.40	F=2.42	F=0.41	F=.55
P=.0001	P=.0001	P=.2857	P=.2434	P=.0912	P=0.8707	P=.7710

Exact p values are reported

*p < .05



- Legend**
- Comparison
 - Collection of description
 - Problem/Solution
 - Causation

Figure 1 : Effects of the Four Discourse Types on Immediate and Delayed Recal

Table 5: Relationship between the Discourse Types of the Original Text and those used in the Recall Protocols

	No. of Recall Protocols with Same Structure	No. of Recall Protocols with Partial Structure	No. of Recall Protocols with No Structure
Level 1 (School)			
<u>Immediate Recall</u>	(N=14)	(N=2)	(N=64)
Collection of descriptions	2	0	18
Causation	1	0	19
Problem/Solution	3	0	17
Comparison	8	2	10
Mean No. of Idea Units	8.58	8.00	5.58
<u>Delayed Recall</u>	(N=8)	(N=4)	(N=68)
Collection of descriptions	1	0	19
Causation	1	0	19
Problem/Solution	1	1	18
Comparison	5	3	12
Mean No. of Idea Units	6.40	4.33	3.97
Level 2 (College)			
<u>Immediate Recall</u>	(N=38)	(N=14)	(N=28)
Collection of descriptions	5	1	15
Causation	6	7	8
Problem/Solution	9	3	5
Comparison	18	3	0
Mean No. of Idea Units	10.42	9.65	6.19
<u>Delayed Recall</u>	(N=30)	(N=10)	(N=40)
Collection of descriptions	3	1	17
Causation	4	4	13
Problem/Solution	5	3	9
Comparison	18	2	1
Mean No. of Idea Units	7.43	7.00	5.32

Table 5 (cont'd)

	No. of Recall Protocols with Same Structure	No. of Recall Protocols with Partial Structure	No. of Recall Protocols with No Structure
<u>Level 3 (Post graduate)</u>			
<u>Immediate Recall</u>	(N=39)	(N=14)	(N=27)
Collection of descriptions	3	3	14
Causation	10	5	5
Problem/Solution	11	4	5
Comparison	15	2	3
Mean No. of Idea Units	13.90	11.14	9.08
<u>Delayed Recall</u>	(N=33)	(N=6)	(N=41)
Collection of descriptions	3	0	17
Causation	5	2	13
Problem/Solution	10	2	8
Comparison	15	2	3
Mean No. of Idea Units	10.32	6.00	6.60

DISCUSSION

As can be seen from Table 2, all three of the main effects are statistically significant at the $p < .05$ level. In other words there are statistically significant effects of Recall Condition and Level, as would be expected. There are also statistically significant effects of Text or Discourse type, thus answering affirmatively the first research question. The finding of the Carrell Study (1984) that there are differential effects of the four types of rhetorical organization of expository prose on reading recalls of ESL readers is confirmed by the present study.

The answer to the second research question, whether the home language group factor made any significant difference is in the negative. As is shown in Table 4, the Home Language factor $F(3,237)=1.26$ is not statistically significant at $p < .05$. The finding in the Carrell study is thus not confirmed in the present study. Several reasons can be advanced for this. In the original study, the native language (Spanish, Arabic, Korean, Japanese and Malay) was very probably the true native language of the various groups, actively in use alongside English as a second language.

In the case of the present study, though Chinese, Malay and Tamil may be designated the 'home language', it refers more to the ethnic origins of the subjects who might speak the language at home but who, in most cases, were not highly literate in the language concerned. Another explanation is that all the subjects at the three proficiency levels were attending institutions in which English was the medium of instruction. The homogeneity of the language environment could have exerted a levelling effect and neutralised any home language effects if they existed.

The answer to the third research question, whether there is any relationship between the readers' ability to recognize and utilize the rhetorical organization of the texts and the amount of information recalled, is strongly affirmative, confirming the finding of the earlier study. As can be seen from Table 5, the mean number of idea units recalled for both the immediate and delayed recall conditions at all three levels was significantly higher for the recall protocols organised with the same structure as the original texts than those without the structure of the original texts.

FUTURE RESEARCH

The generally accepted notion that the more tightly organised cause and effect, problem/solution, and comparison rhetorical structures are more facilitative of comprehension and recall than the more loosely organised collection of descriptions or listing structure, which was shown to be true in the Carrell (1984) and the Meyer and Freedle (1984) study is only partially confirmed in the present study. As is seen in Figure 1, while the comparison structure is clearly the most facilitative of comprehension and recall at all three levels, the picture is not at all clear for the other rhetorical structures. The listing structure, which ought to be the least facilitative of recall appears to be slightly ahead of the cause and effect and problem/solution structures for the school and the college level subjects. One possible explanation is that the subjects (specially at the school level) applied rote memory to help them in their recall in both the immediate and delayed conditions. Further research is required to throw more light on this important issue in the context of ESL reading instruction in Singapore.

Another question that could be taken up in future research is that of the effects of the native language or Mother tongue of the subjects on ESL readers. With the phasing out of Chinese/Malay/Tamil language medium schools in the Singapore education system, it will be extremely difficult to match groups

which use these languages exclusively as the actual home languages. However, it is possible to select subjects who are proficient in their mother tongue or native language. In the context of bilingualism and bilingual education in Singapore, the question of the differential effects of a person's mother tongue or first language on his/her reading comprehension, recall, and cognitive processes would provide an important area for ESL research.

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Appendix

SAMPLE RECALL PROTOCOLS

Comparison/Contrast

Athletics coaches often required sportmen such as judo contestent, boxers, karate contestants and football team members to lose body water to reach a specified weight. This specified weight is often below the normal. This is in contrast to the American Medical Association which states that a loss of body water could effect the cardio-vascular action and works of the body. A loss of 3% could result impairment of cardio vascular motion. A 5% loss mean heat exhaustion. A 7% body water loss could cause hallucinations. A 10% leads to heat stroke, coma and death and result.

Problem/Solution

The problem with atheletic coaches of games such as judo, wrestling, foot-ball players is that they expect them to lose body-water to gain specified weights of players. The players will have to lose their body-water to gain specified weights which are lesser than their actual weights. School administrators should suspend such coaches, as this practice, would cause problems in their cardio-vascular movements. The loss of 3 percent of body-water would cause problems in physical movement, 5 per cent would cause heat-exhaustion, 7 percent would cause hallucinations, and 10 percent would cause, coma, heat-stroke and paralyze them which would lead to death.

Cause and Effect

It is true that coaches of wrestlers, boxers, judo contestants, karate contestants and football team members require their athletes to lose some body water in order to maintain a specified body weight. More often than not, this specified body weight is lower than the athlete's usual weight. Tragedies often result when the coaches desired this. More specifically, a loss of three per cent body water impairs physical performance and five per cent loss results in heat exhaustion. More seriously, a loss of ten per cent or more will result in heat stroke, deep coma and convulsions; if not treated, death will result.

Listing

Several aspects of the loss of body water are discussed. Firstly, athletic coaches demand that the wrestlers, swimmers and other athlete to lose body water in order to attain specified body weight. The specified body weight is below the individual's weight. Secondly a 150 pound individual requires to lose about 3 pint of water. Thirdly, loss of body water can cause cardiovascular impairment. The degree in the loss of body water resulted in different impairment. Loss of body water can cause as much as physical impairment and as extreme as death.