EXAMINING COMPARATIVE EFFECT OF READING METHODS ON READING COMPREHENSION

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Abstract

The present experiment investigated whether different reading methods would have any effect on reading comprehension performance. It was hypothesized that reading comprehensive performance would be better with subvocalization than other reading methods. The independent variable was reading methods and the dependent variable was performance (speed and accuracy). To conduct this experiment, 60 school students were taken with age ranges from 8 to 10 years. The Latin Square design was used to conduct this experiment. Recall scores were obtained for each participant in terms of four reading methods: silent reading, subvocalization, reading aloud and listening music while reading. Results of the One-way ANOVA and Post Hoc test showed that only reading time vary among four reading methods. Multiple comparisons showed that there is a significant difference in reading time between silent reading and reading aloud. So, the result did not support the hypothesis of subvocalization as a better reading method.

Introduction

Reading is typically an individual activity that is done either silently or loudly or using different ways for better comprehension. In the system of learning and being educated, the most important aspect is to read educational materials. There are many ways of reading: oral/loud reading, silent reading, subvocalization or reading with listening music. Oral readers absorb the thought from the printed page, while silent readers absorb the thought from the text. The critical element of oral reading is mental interpretations which are based on eye movements throughout the text associated with vocalization. But silent readers just interpret things through a series of eye movement without delay resulting from vocalization[1-2]. Silent reading aids students' understanding by making them ponder on what they are reading than the articulation of separate words. It also helps to generate mental pictures of the topic being read and discussed[2]. On the other hand, listening music while reading depends on personality and some people find listening to music supportive to their reading process.

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In different circumstances, one of the very common habits among silent readers is subvocalization. While reading silently, uttering words in our head is called subvocalization. It is a natural way of reading which assists the mind to understand the meanings to comprehend and remember what is read, potentially reducing cognitive load. During the articulation of speech, the larynx and other muscles are moved. These movements cannot be detected by the reader without the help of machines. It helps to store information into short-term memory which is one of the components of the phonological loop proposed by Baddeley and Hitch's[3-4]. And the role of subvocalization in memory processes is greatly dependent on its connection with Baddeley's proposed phonological loop[5].

Subvocalization can be mentioned as a function of task complexity in reading comprehensions. It can facilitate immediate understanding slightly or not at all. Generally, it is assumed that subvocalization helps to integrate the past concepts with those currently being processed by turning visual reading information into a more feasible and flexible acoustic code. The role of subvocal practice is also seen in STM. Sub-vocal movements occur when people listen to or rehearse a series of speech sounds, which will help them to sustain the phonemic representation of these sounds in their STM because interfering with the overt production of speech sounds did not disrupt the encoding of the sound's features in STM[6].

Individual differences in reading comprehension performance can be successfully predicted for both adults[7] and children[8] by the capability to store information while simultaneously carrying out processing operations. But there are some controversies. Many studies support the view that variance in reading comprehension is explained by the processing capacities during working memory tasks in both phonological and semantic domain[7]. Whereas, other studies with adults[9] and children with reading comprehension difficulties[10-11] have revealed that there is a connection between reading comprehension and semantic storage. But it is currently unidentified whether semantic storage contributes to reading comprehension or not in normally developing children.

Most of us read the words in the text by subvocalizing (silently speaking to ourselves). But it slows down the speed of reading while helping us remember what we read. Because of limiting the speed of reading to the rate of speaking, we cannot read faster. We have to convert written words into a speech-based code for better performance. A study of suppressing subvocalization by using the reducing subvocalization method showed that the major ideas of the easy and simple material can be remembered without subvocalization[12]. But it is still important to recall detailed information. Although there are many types of research on reading comprehensions using subvocalization, most of them are conducted in western cultures and their reading style and language are different from ours. The speed of reading can be different for

language differences. So, this experiment about different reading methods is important to see whether subvocalization is important for reading or not.

Problem: The problem of the present experiment was to investigate whether different reading methods would have any effect on reading comprehension performance.

Hypotheses: Reading comprehensive performance would be better with subvocalization than other reading methods.

Variables: Independent variable-Reading Methods, Dependent variable- Performance/ Recall (Speed and Accuracy)

Materials and Methods

Sixty students from the different schools of Dhaka city participated in this experiment. They were both boys and girls with the age range from 8-10 years. All of them were from a middle-class family and they were physically fit. For collecting data, reading passages, answer sheets, computers, headphones, and a stopwatch were used.

The Latin Square design was used to examine the effect of reading methods on reading comprehension performance. Participants were randomly divided into four groups. In each group, there were 15 participants. Each group read the passage using 4 strategies namely silent reading, subvocalization, reading aloud and listening music in a counterbalancing way. In this way, the effect of passage difficulty was minimized about measuring the reading comprehension performance of the participants.

The experiment was conducted in a laboratory. The students were randomly assigned into four groups and the groups were welcomed one by one in the laboratory. They were given both verbal and written instructions about what to do. Each group read a passage on the computer screen using each of the four different reading methods - silent reading, subvocalization, reading aloud and reading with listening music. In the case of reading with listening to music, the participants were given headphones through which they could listen to soft music and parallelly read the passages in their way. The participants were asked to read the passage one time from the computer as soon as possible. Then they were told to press the space bar and see the white screen on the computer. At this time, they were given the answer sheet representing true-false statements. Each passage was followed by five true-false statements. The participants were asked to write either true or false and answers were collected in the answer sheet. All the correct answers, reading time and response time were collected. After completing the procedure, the participants were thanked off for giving their valuable time. To analyze the data of the present study One-Way ANOVA and the Post Hoc test were used.

Results and Discussion

The results (One Way ANOVA and Post Hoc test) of the present study are depicted serially in the following tables. Table 1 provides mean differences between reading methods and performance. It is found that only reading time varies among four reading methods. From Table 2, it can be seen that there is a significant difference in time between silent reading and reading aloud.

Results (Table 1) indicate that there are no significant differences among the four reading methods in terms of correct responses (F = 1.651, p = 0.178) and response time (F = .564, p = .639) which doesn't seem to be in line with previous research which showed that subvocalization aids the mind to access meanings to comprehend and recollect what is read, possibly decreasing cognitive load[13]. But there is a significant difference among the four reading methods in terms of reading time (F = 3.113, p< .05). Although we can comprehend the meaning of words without subvocalization, the complete remembrance of a text is facilitated by it[12]. But in the present experiment, participants perform almost the same in all of the four methods. Although the passages using in the experiment are not so easy and the true-false statements are also contradictory, the participants get average scores. Most of them correctly recall all the true-false statements whatever the reading method is. So, the result of the present experiment indicates that there is no significant difference among the four reading methods in terms of accuracy but is significant in terms of reading time. The major ideas of the relatively simple material which do not require complete recall can be remembered without subvocalization. Nevertheless, subvocalization simplifies the recognition of more subtle changes like replacing a word with a more similar word[14].

The results of multiple comparisons among the reading methods (Table 2) indicate that there is a significant difference between silent reading and reading aloud regarding reading time (p < .05). Past studies support this finding[15-17]. In the present experiment, all reading methods required different times to read the passages. Subvocalization limits the reading speed while helping us remembering what we read. Therefore, we don't convert written words into a speech-based code[18]. Subvocalization facilitates retaining words in STM till they can be united with other words in the sentence or paragraphs[19].

One possible limitation of the present experiment is the small number of participants. The larger population group is more appropriate to generalize the findings. Moreover, most of the data collection was conducted at the end of the class lecture the participants attended. The participants may have been fatigued at the end of the class which may have affected the results of the experiment. Therefore, some distractions were presented in the immediate environment such as noise from the outside of the laboratory. As participation in the experiment was voluntary, the participants may not have been properly representative of the whole population.

Table 1. Mean, standard deviation and results of f-test of four reading methods and performance.

	Silent			Subvocalization			Reading aloud			Music			F	Sig
	N	$\bar{x}$	SD	n	$\bar{x}$	SD	n	$\bar{x}$	SD	n	$\bar{x}$	SD		
No. of correct response	60	4.250	.985	60	4.483	.791	60	4.516	.700	60	4.266	.880	1.651	.178
Reading time	60	77.26	30.17	60	94.50	52.79	60	101.2	45.25	60	91.53	45.78	3.113	.027*
Response time	60	33.20	7.55	60	31.96	9.25	60	34.01	10.29	60	32.71	8.10	.564	.639

Note. *p < .05

Table 2. Multiple comparisons among the reading methods according to reading time.

Dependent Variable	(I) Mode of reading	(J) Mode of reading	Mean Difference (I-J)	Std. Error	Sig.	95% confidence interval	
						Lower bound	Upper bound
Reading time	Silent	Subvocalization	-17.23	8.08	.146	-38.15	3.68
		Reading aloud	-23.93*	8.08	.018	-44.85	-3.01
		Music	-14.27	8.08	.293	-35.18	6.65
	Subvocalization	Silent	17.23	8.08	.146	-3.68	38.15
		Reading aloud	-6.70	8.08	.841	-27.61	14.21
		Music	2.97	8.08	.983	-17.95	23.88
	Reading aloud	Silent	23.93*	8.08	.018	3.01	44.85
		subvocalization	6.70	8.08	.841	-14.21	27.61
		Music	9.67	8.08	.630	-11.25	30.58
	Music	Silent	14.27	8.08	.293	-6.65	35.18
		Subvocalization	-2.97	8.08	.983	-23.88	17.95
		reading aloud	-9.67	8.08	.630	-30.58	11.25

Note. *p < .05

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