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### **Authors**

Do, Kyung Soo

Lee, Eun-Jo

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# Effects of Text Types and Working Memory on Children's Comprehension

Kyung Soo Do (ksdo@skku.edu)  
Eun-Ju Lee (imfedra@korea.com)

Department of Psychology & Interdisciplinary Program in Cognitive Science, Sungkyunkwan University  
Seoul 110-745, KOREA

It has been well known that working memory is important in comprehending written texts. More specifically, of the three components of the working memory, the central executive and the phonological loop are important in comprehending written texts, not only in adults but also in children (Swanson, 1998). In this paper, we report two experiments that showed that reading deficient children suffered more with expository texts than narrative texts, and that visual working memory seemed to be involved in children's comprehension of narrative texts.

## Methods

Twenty normal and twenty reading deficient 3rd grade children in a Korean elementary school, located at a suburban area near Seoul, participated in the two experiments. In Experiment 1, the children read two narrative stories and two expository texts, and were asked to answer four comprehension questions for each story. They were tested after they finished reading each story. In Experiment 2, the dual task paradigm (e.g., Robinson & Molina, 2002) was used to test the possible involvement of visual working memory in comprehending narrative texts. After the children finished reading a story, they were asked to perform one of the two memory tests, an auditory memory test and a visual memory test, prior to the comprehension test. Each participant had done the four combinations of text types and the intervening memory tests: narrative-auditory memory, narrative-visual memory, expository-auditory memory, and expository-visual memory. All experimental procedures were controlled by a PC. The texts and the visual memory test items were presented on the monitor screen. Auditory memory test items were presented through earphones.

## Results and discussion

The number of correct answers for the comprehension questions was analyzed. In Experiment 1, the average number of correct answers for the normal children were 6.40 (sd=.99) and 6.85 (sd=.88) for the expository and the narrative texts, respectively, and did not differ each other. For the reading deficient children, the averages were 4.05 (sd=1.43) and 5.25 (sd=1.62) for the expository and the narrative texts, respectively. Unlike the normal children, the reading deficient children suffered more with expository texts than narrative texts ( $F(1,19)=6.43, p<.02$ ). The results of Experiment 1 suggested that the reading deficient children might use visual working memory when they read narrative texts.

The possibility of involvement of visual working memory on comprehension was tested in Experiment 2. In comprehending expository texts, both normal children and reading deficient children suffered when they had to do auditory memory test. The interference effect of the auditory memory test was in good agreement with the idea that the verbal working memory as well as the central executive was involved in comprehension. However, the pattern of interference of memory test was quite different in the narrative text conditions ( $F(1,38)=4.21, p<.05$ ). Only the reading deficient children suffered comprehending narrative texts when they had to answer visual memory test.

The results of two experiments suggested that (1) normal children did not use visual working memory when they read texts, and that (2) the reading deficient children, on the other hand, seemed to use the visual working memory when they read narrative texts which usually had visuospatial aspects more than the expository texts.

Table 1. Average number of correct answers: Experiment 2.

		normal	deficient
Expository	Visual	3.50	2.30
	Auditory	2.45	1.65
Narrative	Visual	2.45	1.65
	Auditory	2.65	2.55

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