

## The Effect of Cognitive Strategies on Reading Performance of Students with Specific Learning Disability

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### Abstract

The aim of this study was to investigate the effect of cognitive strategies on reading performance of students with special learning disabilities. The research method was quasi-experimental with pretest-posttest design with control group. The statistical population of this study included students with normal learning disabilities of which 20 were randomly selected and divided into experimental and control group. The results of statistical analysis of covariance showed that the mean scores of post-tests in both reading and comprehension test were significantly different in two groups. The mean post-test of the experimental group was improved compared to the control group. It can be concluded that teaching cognitive strategies had a positive and significant effect on reading and comprehension of children with special learning disabilities. Designing and implementing cognitive strategic programs for other students with developmental neurological disorders, as well as holding in-service training courses on cognitive strategies, is recommended for teachers.

**Keywords:** Cognitive strategies, comprehension, reading skills, specific learning disability.

### Introduction

Specific learning disorder is a neurodevelopmental disorder that continuously affects academic learning. Special learning disorder including reading disorder, writing disorder and math disorder (American Psychiatric Association, 2013). Various approaches have been designed to help people with developmental disabilities, one of which is cognitive strategies (Fabio, et al., 2021). Cognitive strategies are strategies that students use to learn, remember and understand material (Núñez, et al., 2020). Cognitive strategy is classified into three general categories: a) repetition, b) expansion of meaning, c) organization (Barbieri, et al., 2020). People with special learning disorders have impairments in auditory memory, verbal memory, maintaining attention, inhibition of impulses, motor coordination, clear auditory and visual perception, generalization and organization, active memory, perception of role from the context and information processing learning style (Hendriks, et al., 2020). Research evidences show that working memory is one of the most essential cognitive facilities that, in reading, keeps the sounds and related speech concepts necessary for the successful recognition of words and their understanding (Rosenshine, et al., 2013). Research findings show that many children have special learning problems, without the skill of revising

understanding (Wexler, 2021). Also, research evidence shows the effectiveness of strategic cognitive components such as: keyword method, creating a connection between information and mental imagery on learning and retrieving information from students' memory. The review of research literature related to special learning disorder in Iran in the field of the effect of cognitive and metacognitive strategy training in improving learning (comprehension of material, mathematics and second language) indicates a research gap regarding the effect of cognitive strategy on improving special learning disability. The hypothesis was cognitive strategies have an effect on reading performance (reading and reading comprehension skills) of students with special learning disabilities.

## Method

The current research was a semi-experimental design with a pre-test and post-test design with a control group. The subjects studied in this research included fifth and sixth grade female participant with reading and comprehension disorders. The training program was implemented for 10 sessions of 1 to 1.5 hours. After the completion of the training sessions, a post-test was taken from both experimental and control groups simultaneously and under the same conditions. To analyze the data at the descriptive level of mean and standard deviation and at the inferential level, to test the main hypothesis of the research, univariate covariance analysis method was used in order to control the pre-test effect.

The following tools were used in the present study:

**Standard Reading and Dyslexia Test:** This test was developed by Hosaini, et al (2016). This test includes 10 sub-tests. The total validity of the test with the internal consistency method (Cronbach's alpha) was 0.83. In the present study, the reliability of the tool was 0.78.

**Implementation method:** The educational and intervention program is designed based on strengthening active memory and teaching cognitive strategies. Working memory training sessions were modeled after the training program developed by Dan in 2008.

## Results

The results of Table 1 show that the mean and standard deviation of the scores. According to these results, the average of the experimental group increased more than the control group after the intervention.

**Table 1: Mean and standard deviation of control and experimental groups in pre-test and post-test**

Test	Variable	experimental group		control group	
		M	SD	M	SD
	<b>Overall</b>	1.50	0.52	1.60	<b>0.65</b>
<b>Pre-test</b>	<b>Reading words</b>	0.86	0.25	0.85	<b>0.42</b>
	<b>Reading meaningless words</b>	1.12	0.63	1.11	<b>0.95</b>

	<b>Understanding words</b>	0.65	0.27	0.69	<b>0.65</b>
	<b>Chain of words</b>	0.69	0.39	0.87	<b>0.45</b>
	<b>Understanding the text</b>	0.86	0.52	0.84	<b>0.24</b>
	<b>Naming pictures</b>	0.87	0.49	0.96	<b>0.41</b>
	<b>Remove the sounds</b>	1.34	0.57	1.31	<b>0.52</b>
	<b>letter sign</b>	1.24	0.24	1.41	<b>0.74</b>
	<b>Sign words</b>	0.59	0.25	0.69	<b>0.23</b>
	<b>rhymes</b>	0.65	0.19	0.68	<b>0.24</b>
	<b>overall</b>	1.60	0.48	9.72	<b>1.85</b>
	<b>Reading words</b>	0.85	0.39	7.62	<b>1.65</b>
	<b>Reading meaningless words</b>	1.36	0.26	6.65	<b>1.25</b>
	<b>Understanding words</b>	0.69	0.61	7.63	<b>1.36</b>
	<b>Chain of words</b>	1.31	0.52	9.86	<b>1.45</b>
<b>Post-test</b>	<b>Understanding the text</b>	1.25	0.74	8.68	<b>0.95</b>
	<b>Naming pictures</b>	0.96	0.41	7.36	<b>1.16</b>
	<b>Remove the sounds</b>	0.48	0.46	6.57	<b>1.14</b>
	<b>letter sign</b>	1.34	0.45	8.36	<b>1.67</b>
	<b>Sign words</b>	1.02	0.36	4.36	<b>1.32</b>
	<b>rhymes</b>	0.59	0.51	7.69	<b>1.26</b>

The results of Table 2 showed that there is a significant difference between the research groups (experimental and control) in the post-test scores. The obtained F is equal to 15.24, which is statistically significant ( $P \geq 0.001$ ). So, it can be said that the educational package of cognitive strategy has been effective in improving reading performance.

**Table 2: Mean and standard deviation of control and experimental groups in pre-test and post-test**

<b>Variable</b>	<b>SS</b>	<b>DF</b>	<b>MS</b>	<b>F</b>	<b>Sig</b>
<b>Pre-Test</b>	4.825	1	4.825	3.065	0.099
<b>Group</b>	24.126	1	24.126	15.24	0.001
<b>Error</b>	329.25	16	1.583		

## **Discussion and Conclusion**

The findings of various researches have shown that children with special learning disorders have a poor performance in cognitive strategies. They learn them and this leads to an improvement in their performance in reading. Also, poor memory performance is one of the characteristics of children with special learning disorders, and teaching cognitive strategies to students with reading disorders has a positive effect on improving academic performance, and teaching cognitive strategies, learning management methods,

remembering and thinking, which can be strengthened with education learning and raising the level of academic performance. One of the limitations of the research is the lack of control of variables such as motivation and learning styles. It is also suggested that programs that are based on cognitive strategies should be considered by educational planners, especially students with developmental disabilities. It is suggested to teach about cognitive strategies and their components and the importance of these strategies in learning and how to strengthen them in the training courses while serving the teachers.

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## Conflicts of interest

Authors found no conflict of interests.



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