



## The role of memory in phonological and syntactic processing in the process of reading in normal and dyslexic Persian children

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### 1. Introduction

This article aims to investigate the correlation between the memory skill with syntactic and phonological awareness in the process of reading comprehension both in normal and dyslexic Persian speaking children. Working memory is an important factor for reading process having an important role in phonological and syntactic processing during reading comprehension process. There are different approaches and models of memory. But the common fact of all of them is that memory is a multicomponent system and the roles of which is the storage and the processing of different kinds of information. This investigation is done based on Baddely (1999) and Jackendoff (2002) models of memory. Jackendoff (2002) believes that memory can be considered as a table on which different processors including phonological, morphological, syntactic and semantic processors are processing linguistic structures.

### 2. Materials and methods

To investigate the role of working memory for syntactic and phonological awareness in reading process, three kinds of correlations were investigated: 1- The correlation between the phonological awareness with memory skill 2-The correlation between the syntactic awareness with memory skill and 3- The correlation between memory skill with reading comprehension ability. Four tasks were designed to measure these variables: phonological awareness test, syntactic awareness test, memory test (reading span test) and reading comprehension test. The subjects were 40 normal and 20 dyslexic Persian-speaking children with normal IQs. They were all in grade 2 and 3, monolingual, all between 8-9.5 years of age.

The subjects were assessed by four tests: 1-The memory task which was a kind of memory reading span test, constructed based on Haarman investigations including sets of sentences which increased in numbers and length. The subjects were supposed to read sets of sentences and remember the last words of each sentence. 2-The Phonological awareness task, designed based on the views of Yuppe (1988), Hatcher and Snowling (2002), McCormic (2003), Snowling and Stockhouse and some Persian phonological tests including Shirazi (1375), Dastjerdi and

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Soleymani (1382) and Ashtari (1383). The task consisted of six subtests including blending, segmentation, omission of the first phoneme, omission of final phoneme, omission of middle phonemes and substitution of phonemes. 3-Syntactic awareness test which was built based on the investigations of Moktarabadi (2008), Nematzaded (2005), Shankweler and crain (1986), Barshaloom etal(1993), Smith et al. (1989), Tsung and Stock (2001), Nation and Snowling (2000), Tavakolian (1981) and Goodluck and Tavakolian (1982). The main syntactic criterion for assessing syntactic awareness was both simple sentences and sentences with relative clauses of subject-subject type. The task consisted of two subtests including grammaticality judgment test and syntactic correction.4-Reading comprehension task consisted of two story texts entitled “The first day of school” including 203 words and “The meadow” including 158 words, the texts were made by investigation on suitable Persian s tory books for children and elementary school text books. The readability scale was measured for each text to make sure that the texts were suitable for children. The subjects should answer the questions after reading each text.

### 3.Results and discussion

The data were analyzed by using descriptive and inferential statistics i.e., regression correlation analysis. The results indicated that normal children performed better than dyslexic children in all tests. As indicated in tables 1 and 2, the regression analysis showed that in both groups of children there is a positive correlation between working memory test performance and phonological processing. Also, the data in tables 3 and 4 show a positive correlation between memory and syntactic awareness. Another important result was a positive correlation between reading comprehension ability and working memory skill in both groups.

**Table1: Regression coefficient related to the correlation between “syntactic awareness” and “memory” in normal children**

Independent variable	Predictor variable	<i>B</i>	Beta Coefficient	t	p-value
Syntactic awareness	Memory	1.37	0.62	4.87	0.001

**Table 2: Regression coefficient related to the correlation between “syntactic awareness” and “memory” in dyslexic children**

Independent variable	Predictor variable	<i>B</i>	Beta Coefficient	t	p-value
Syntactic awareness	Memory	3.53	0.63	3.48	0.003

**Table 3: Regression coefficient related to the correlation between “phonological awareness” and “memory” in normal children**

Independent variable	Predictor variable	<i>B</i>	Beta Coefficient	t	p-value
Phonological awareness	Memory	0.82	0.29	2.78	0.008

**Table 4: Regression coefficient related to the correlation between “phonological awareness” and “memory” in dyslexic children**

Independent variable	Predictor variable	<i>B</i>	Beta Coefficient	t	p-value
Phonological awareness	Memory	1.66	0.66	3.79	0.001

#### **4. Conclusion**

The fact that there was a positive meaningful correlation between working memory ability and syntactic awareness and also between working memory and phonological awareness shows that working memory plays an important role in phonological and syntactic processing in the process of reading comprehension in both groups and it is a place for active and online processing of phonology and syntax in the process of reading. With regard to this finding improving working memory abilities can lead to more effective phonological and syntactic processing and it is suggested that working memory abilities be improved especially in dyslexic children.

**Keywords:** dyslexic children, memory, phonological processing, reading comprehension, syntactic processing