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**Research Paper**

# Impact of Metacognitive Intervention Program Instruction on the Reading Development of Dyslexic Primary School Learners

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## Abstract

This experimental study aimed at discovering the impact of Metacognitive Intervention Program instruction on the reading advancement of Iranian dyslexic primary school learners. The participants consisted of 32 male and female, grade three primary school students, with the age range of 8 to 11 years and 90 to 110 IQ average. They were selected through convenient sampling and divided into two control and experimental groups of equal size. Then, the experimental group was exposed to the Metacognitive Intervention Program instruction for 10 weeks. Wechsler Intelligence Scale for Children (WISC) and Dyslexia and Reading (NEMA) tests were used as instruments. To evaluate the participants' reading progress, a pre-test and a post-test (NEMA) were conducted. The results of covariance analysis showed that the employed program was effective in the reading comprehension development of the participants. The findings of this study suggest that primary school instructors need to think more about using the Metacognitive Intervention Program instruction on different steps of reading comprehension and do more effective activities to assist students in removing their reading difficulties.

**Keywords:** *Dyslexic primary school learners, Metacognitive intervention teaching, Reading development*

**اثرآموزش مداخله فراشناختی بر ارتقاء خواندن دانش آموزان دبستانی ایرانی نارساخوان**

این مطالعه تجربی با طرح پیش و پس‌آزمون با گروه کنترل، آموزش برنامه مداخله فراشناختی جهت ارتقاء خواندن دانش آموزان ابتدایی ایرانی نارساخوان ارائه کرد. در این مطالعه 32 دانش آموز دختر و پسر بایه سوم 8 تا 11 ساله با میانگین ضریب هوشی 90 تا 110 شرکت کردند. انتخاب شرکت کنندگان در این مطالعه به طور تصادفی اتفاق افتاد. دو گروه مساوی شامل یک گروه کنترل و یک گروه آزمایش، پژوهش حاضر را تشکیل دادند. هوش وکسلر کودکان (WISC)، آزمون نارساخوانی و خواندن (نما) و برنامه مداخله فراشناختی ابزارهای مورد استفاده در این مطالعه بودند. برنامه مداخله فراشناختی به مدت 10 هفته برای گروه آزمایش ارائه شد. سپس برای اعتبارسنجی خواندن دانش‌آموزان در مراحل قبل و بعد ار آموزش، آزمون (نما) بین دانش‌آموزان توزیع شد. یافته‌های کوواریانس نشان داد که این برنامه در ارتقای خواندن دانش‌آموزان، کاملاً در مؤلفه درک مطلب، کاربردی است. میانگین، انحراف معیار و تحلیل کوواریانس نیز پس از ارائه برنامه مداخله فراشناختی به میزان $p<0.01$ تفاوت معنی‌داری را بین گروه آزمایش و کنترل نشان داد. یافته‌ها به مربیان دبستان پیشنهاد می‌کند که برنامه مداخله فراشناختی را در مراحل مختلف درک مطلب در نظر بگیرند و فعالیت‌های مؤثرتری برای کمک به دانش‌آموزان در ارتقای مشکلات خواندن خود انجام دهند.

**واژگان کلیدی**: آموزش مداخله فراشناختی، ارتقاء خواندن، دانش‌آموزان دبستانی نارساخوان

## Introduction

Reading difficulty is a process that affects "word reading, text reading, reading comprehension, and other reading components of the students" (Sumner, Connelly & Barnett, 2012, p. 991-1008). In other words, reading difficulty is a learning disability that impacts any component of the reading skill of students including difficulty with word reading, non-word decoding, text, and reading comprehension (Sedaghati, Foroughi & Shafiei, 2010).

Students with Dyslexia usually have a neurological difficulty that affects their brain to process knowledge and information system (Lotfabadi, 2013). In fact, students with reading difficulty have some fundamental problems with reading in different areas related to reading instruction (Casey, 2012).

Reading is one of the most important skills which is affected by the reader's knowledge of metacognitive strategy (Wajuihian, 2011). In other words, "the most important factors which affect reading skill are the quality of the reading material and the kind of suitable instructions" (Duke, 2013. p. 40-44). Furthermore, to reduce such failures, students with reading difficulties can be performed with some types of interventions including metacognitive intervention programs, and instructions that are absolutely effective in developing the kinds of knowledge which are required to improve reading difficulty (Duke, 2013).

Reading development of dyslexic primary learners has always been one of the main educational problems of Iranian primary school students and has attracted the attention of many teachers over the years. Accordingly, primary school trainers have considered some practical intervention programs for removing the reading difficulties of Iranian primary school students. Yet, they have not focused much on the impact of metacognitive intervention teaching on the reading development of dyslexic students. Thus, the present study aimed at discovering the possible impact of a Metacognitive Intervention Program instruction on the reading development of Iranian primary school students. It has, in particular, focused on the impact of metacognitive intervention programs on the reading comprehension component. The following research questions were therefore addressed:

Q1. Is Metacognitive Intervention Program instruction effective for the reading development of Iranian dyslexic primary school students?

Q2. Which component of the reading is more affected by the metacognitive intervention program?

## Review of Literature

### Reading Difficulty

Reading difficulty is an appropriate kind of learning disorder that was coined for the first time by Rudolf Berlin in the 20th century (Wagner, 2011). It is a learning disability that impacts the learning process and different reading components including word reading, word decoding, reading speed, fluent word recognition, reading text, and reading comprehension (Sumner, Connelly & Barnett, 2012).

Students with reading disabilities have neurological difficulties that prevent them to handle and understand knowledge and information. These students also read the text and understand it at a level that is usually lower than the expected level for the suitable age of the students (Palfiova, Dankulinocova & Bobakova, 2017). Students with reading disabilities have difficulty understanding rapid instructions. These students also have some difficulty with hearing and meeting differences and similarities in sounds, letters, words, and text comprehension as significant aspects of reading components (Anderson & Meier-Hedde, 2011).

Students with reading difficulty reveal specific learning problems with the phonological components of language learning that are obvious in any activity which involves the pairing of the orthography symbol sequence to the corresponding phonemes, letters, words, nonsense words, chain words, letter marks, and other components of reading (Moats & Lyon, 2013). These language learning difficulties "impact the student's increased reading experience and significant adversities in new vocabulary, knowledge, reading comprehension, and development of deeper background information" (Moats & Lyon, 2013, p. 282-294).

**Dyslexic Learners**

- They have trouble learning common rhymes and similar sounds (Reid and Green, 2014).
- They have trouble learning, memorizing, and remembering the names of letters in the alphabet (Rose, 2009).
- They are unable to realize sounds and letters in their own names.
- They mispronounce similar and familiar words
- They don't realize rhyming patterns such as bat, cat, and rat
- They usually have a family history of reading words, meanings of words, texts, and spelling difficulties (Moats & Lyon, 2013).

**Metacognitive Abilities and Reading Development**

Students with reading difficulty have some problems in the metacognitive aspects of learning. These students require to be indicated to learn through identifying connections between different learning tasks. Therefore, the emphasis should be on the content or the product of learning (Long & MacBlain, 2007). Metacognitive abilities, "are essential for instructors to guide their students to a deeper understanding of the topics taught and their own understanding of how they learn"(Waldie, Austin, Hattie & Fairbrass, 2014). Metacognitive abilities "as the mental processes of our brains help students comprehend, organize, store, and manipulate information"(Moore & Hammond, 2010, p.85-110). In fact, by developing metacognitive abilities students help their brains to complete this process more quickly and efficiently. Therefore, students cannot be good readers without them (Wheldall & Rothwell, 2015).

To provide the possible impact of Metacognitive Intervention Program instruction on the reading development of Iranian dyslexic primary school learners Solaimani, Sehpehrian Azar a, and Immandost (2019) provided the impact of metacognitive and cognitive strategies with the speed of information processing and reading based on the Stroop test in students with learning disabilities. Based on the findings of this study, they concluded that providing an intervention based on teaching cognitive and metacognitive strategies has been effective in improving information processing and reading.

Ladonifard, Shojaee, and Alamdarloo (2017) a conducted study called the impact of metacognitive game program teaching on reading development of dyslexic students in primary school students and included hat the metacognitive game program teaching was effective in reading development of dyslexic male students.

Bemana, Ghamarani, and Naderi (2018) investigated the effect of response to metacognitive intervention on the reading performance of students with reading disabilities results of this study indicated that the educational method based on the response to metacognitive intervention improved reading skills, particularly reading comprehension and vocabulary as well as other components of reading skills by teaching metacognitive intervention programs

In a conducted study Azhar, Nissawan, and Khalidi (2015) considered the impact of metacognitive strategies on dyslexic primary students' awareness and reading comprehension. The results of this study showed that students who received the metacognitive reading

intervention showed greater levels of reading comprehension and phonological awareness. The results also indicated that teaching metacognitive intervention on reading stabilities can promote the reading of dyslexic students.

Zafiropoulou and Mati-Zissi (2020) in a study investigated the impact of a Metacognitive Intervention Program instruction on the reading disabilities of primary school students. The results of this study showed that after receiving the Metacognitive Intervention Program instruction, the reading fluency of students was improved. The findings also indicated that there was a statistically considerable difference between the control and experimental groups after receiving the metacognitive intervention program.

## Methodology

### Participants

The participants of this study comprised 32 male and female, grade three primary school students, with an age range of 8 to 11 years and 90 to 110 IQ average. They were selected through convenient sampling and divided into two control and experimental groups of equal size. They were all identified as dyslexic students by the Intelligence Assessment Center of Education.

### Instruments

The following instruments were utilized to achieve the purposes of the present study:

**1.Wechsler Intelligence Scale for Children (WISC)**

WISC is a type of intelligence test which was first put forward by Wechsler in 1949 to evaluate children's intelligence (Zangiabadi, Sadeghi & Ghadampour, 2018). This instrument is divided into Verbal and non-Verbal sub-scales such as general knowledge, vocabulary treasure, similarities, comprehension, picture completion, and picture adjustment. Since then, the test was revised in 1995 to measure the intelligence of children between 6 and 12 years of age. Alpha reliability of the two sub-scales of the test was found 0.88 and 0.85 respectively (Sharifi & Rezaie, 2018).

**2. Reading and Dyslexia Test (NEMA)**

NEMA is the test that was first designed by Noori and Moradi in 2008 to evaluate Iranian dyslexic primary school students in grades one to five. The final revised sample of the test was provided with 1646 primary school students in Iran (Sharifi & Rezaei, 2018). This test contains some subtests covering Reading Comprehension, Reading Words, Picture Naming, Non-or-Quasi-Word, Sound Elimination, Letter Mark, and Category Mark (Sharifi & Rezaei, 2018). Alpha reliability of the test was found 0.83 in this study.

**3. Metacognitive Intervention Program instruction (MCIP)**

The Metacognitive Intervention Program instruction used in this study covers:

Introducing an experienced primary school teacher to the students in the classroom

Practicing content organizing strategies including converting lesson text to sketches, apps, and categories (Skeja,2014).

Teaching tree layout to summarize the main ideas of content and show the relationships between them

Using charts a tour to explain a complex production process for complex content

Teaching planning strategies include determining the purpose of the study to predict the time required for the study and learning (Washburn and Mulcahy,2014).

Determining the speed of study, analyzing how dealing with the subject of learning

Planning and choosing cognitive strategies

Training control and monitoring strategies include evaluating progress, monitoring your attention asking questions while studying and learning, controlling the time and speed of reading

Teaching regulation strategies including speed adjustment (Meadoss and Cashdan,2019).

Performing post- test

**Procedures**

**Data Collection Procedure**

To collect the data, firstly, using Wechsler Intelligence Scale for Children (WISC), the dyslexic students were recognized and equally divided into a control and an experimental group. The reading and Dyslexia Test **(**NEMA) designed by Noori and Moradi (2008) was then administered to both groups to measure the participants' reading difficulties. Then, the participants were given verbal instructions on how to complete the Reading and Dyslexia Test (NEMA). The time allocated to provide this session was 50 minutes. After computing the mean and standard deviation of the control group and experimental group in the pre-test, the experimental group received the Metacognitive Intervention Program instruction for 10 sessions. The treatment lasted 5 weeks Then, the reading and Dyslexia Test (NEMA) was distributed for the measurement of reading development of the two groups in the post-test. Descriptive statistics were utilized to provide the impact of the metacognitive intervention on the reading development of dyslexic students. Then, to consider the differences between the control group and the experimental group in reading development before and after receiving the metacognitive intervention teaching a covariance analysis was used.

**Data Analysis Procedure**

To analyze the data, descriptive statistics were used to consider the impact of Metacognitive Intervention Teaching on the Reading Development of dyslexic students. Then, by running covariance analysis the range of development between the control and experimental groups concerning dyslexia and reading development was determined.

## Results

To consider the possible impact of metacognitive intervention teaching on the reading development of dyslexic students and also to show the impact of metacognitive intervention teaching on reading different elements in this study, descriptive statistics and covariance analysis were used. Table 1 below shows the obtained results concerning the first research question restated below:

Is Metacognitive Intervention Program instruction effective for the reading development of Iranian dyslexic primary school students?

**Table 1**

*Mean and Standard Deviation in the Control group*

| | **Pre –Test** | | | **Post-Test** | |
|---|---|---|---|---|---|
| **Components** | N | Mean | Std. Deviation | Mean | Std. Deviation |
| **Reading words** | 16 | 15.75 | 2.02 | 15.69 | 1.92 |
| **Reading Non-Words** | 16 | 15.94 | 1.81 | 16 | 1.71 |
| **Words Chain** | 16 | 15.38 | 1.71 | 15.06 | 1.61 |

| | | | | | |
|---|---|---|---|---|---|
| **Word comprehension** | 16 | 15.94 | 2.14 | 15.88 | 1.71 |
| **Rhyme** | 16 | 15.94 | 1.48 | 15.38 | 1.59 |
| **Text comprehension** | 16 | 15.69 | 2.09 | 15.75 | 1.81 |
| **Sound Elimination** | 16 | 15 | 1.86 | 14.49 | 1.48 |
| **Letter Mark** | 16 | 15.31 | 2.75 | 15.19 | 2.37 |
| **Category Mark** | 16 | 15.38 | 2.12 | 15.63 | 1.54 |
| **Picture Naming** | 16 | 15.38 | 1.99 | 15.81 | 1.91 |
| **Total Mean** | 16 | 155.71 | 19.97 | 154.88 | 17.65 |

According to table 1, non-word reading (mean =15.94), word comprehension (mean =15.94), and rhyme components (mean = 15.94) have the highest means in the pre-test in the control group whereas, in this group, sound elimination has the lowest one (mean=15). On the other hand, based on this table, the non-word reading component in the post-test in the control group has the highest mean (mean=16the), and the chate in a component in the post-test has the lowest mean (mean= 15.06). The table also indicates that the total mean in the control group in pre-and post-tests was found 155.71 and 154.88. This means that there is no meaningful difference between the means of the two groups.

**Table 2**

*Mean and Standard Deviation in the Experimental group*

| **Pre-Test** | | | **Post-Test** | |
|---|---|---|---|---|
| **N** | Mean | Std. Deviation | Mean | Std. Deviation |
| **16** | 15.81 | 2.43 | 21.81 | 2.79 |
| **16** | 15.44 | 2.45 | 19.13 | 2.68 |
| **16** | 14.25 | 1.69 | 20.5 | 2.25 |
| **16** | 15.19 | 1.72 | 21.69 | 1.78 |
| **16** | 15.19 | 2.51 | 19.31 | 2.65 |
| **16** | 14.63 | 1.99 | 20.25 | 2.44 |
| **16** | 15.63 | 1.59 | 19.81 | 1.97 |
| **16** | 14.69 | 1.92 | 18.13 | 2.12 |
| **16** | 15.13 | 2.22 | 19.19 | 1.91 |
| **16** | 15.88 | 1.59 | 19.94 | 2.29 |
| **16** | 151.84 | 20.11 | 199.76 | 22.88 |

On the basis of Table 2 above, picture naming (mean=15.88) in the experimental group has the highest mean in the pre-test while word chain has the lowest one (mean=14.25). This table also indicates that word reading has the highest mean (mean=21.81) in post-test in the experimental group and letter mark has the lowest one (mean=18.13) in post-test in this group. As it appears, the total mean of elements in the pre-and post-test of the experimental group was found 151.84 and 199.76. It is meaning that the mean for the experimental group is higher than the control group.

**Table 3**

*Normal Distribution of Scores in the Control and Experimental Groups*

| | ***Control Group*** | | ***Experimental Group*** | |
|---|---|---|---|---|
| **Degrees** | Statistic Level | Sig. | Statistic Level | Sig. |

| | | | | |
|---|---|---|---|---|
| **Pre-Test** | 0.969 | 0.84 | 0.979 | 0.96 |
| **Post-Test** | 0.938 | 0.36 | 0.909 | 0.13 |
| **Pre-Test** | 0.965 | 0.77 | 0.934 | 0.31 |
| **Post-Test** | 0.952 | 0.56 | 0.949 | 0.51 |
| **Pre-Test** | 0.914 | 0.155 | 0.969 | 0.84 |
| **Post-Test** | 0.944 | 0.44 | 0.64 | 0.38 |
| **Pre-Test** | 0.941 | 0.38 | 0.951 | 0.55 |
| **Post-Test** | 0.891 | 0.07 | 0.974 | 0.92 |
| **Pre-Test** | 0.954 | 0.59 | 0.885 | 0.06 |
| **Post-Test** | 0.956 | 0.63 | 0.886 | 0.06 |
| **Pre-Test** | 0.926 | 0.234 | 0.924 | 0.22 |
| **Post-Test** | 0.924 | 0.221 | 0.917 | 0.17 |
| **Pre-Test** | 0.975 | 0.92 | 0.962 | 0.72 |
| **Post-Test** | 0.954 | 0.59 | 0.951 | 0.54 |
| **Pre-Test** | 0.941 | 0.38 | 0.951 | 0.55 |
| **Post-Test** | 0.891 | 0.07 | 0.974 | 0.92 |
| **Pre-Test** | 0.954 | 0.59 | 0.885 | 0.06 |
| **Post-Test** | 0.956 | 0.63 | 0.886 | 0.06 |
| **Pre-Test** | 0.926 | 0.234 | 0.924 | 0.22 |
| **Post-Test** | 0.924 | 0.221 | 0.917 | 0.17 |

The results obtained in Table 3 reveal that the variables' distribution is normal. In other words, the normality of this type of distribution is found at <0.05.

**Table 4**

*Leven's Test in Pre and Post-Test Stages*

| **Pre-Test Stage** | | **Post-Test Stage** | |
|---|---|---|---|
| **Statisic Level** | Sig. | Statisic Level | Sig. |
| **0.764** | 0.39 | 3.39 | 0.08 |
| **2.24** | 0.14 | 3.16 | 0.09 |
| **0.002** | 0.97 | 3.05 | 0.09 |
| **0.37** | 0.55 | 0.22 | 0.64 |
| **1.62** | 0.21 | 0.212 | 0.65 |
| **1.25** | 0.25 | 0.073 | 0.79 |
| **0.159** | 0.69 | 0.428 | 0.52 |
| **1.27** | 0.27 | 3.07 | 0.09 |
| **0.034** | 0.86 | 0.671 | 0.42 |
| **0.671** | 0.42 | 0.825 | 0.37 |

According to Table 4, the amount of significant level in F is higher than 0.05 ($p \geq 0.05$), consequently, the homogeneity assumption of variances is completely established. This is to say that running the covariance analysis test is logical and acceptable perfectly.

**Table 5**

*Metacognitive Intervention Teaching on the Reading Development along with the impact of Pre-Test*

| **Changes** | **df** | **Mean** | **F** | **Sig** | **Eta** |
|---|---|---|---|---|---|
| **Scores** | 1 | 7.18 | 55.9 | 0.001 | 0.66 |
| **Impact of Variable** | 1 | 125.9 | 981.4 | 0.001 | 0.97 |
| | 27 | 0.128 | --- | --- | --- |

Covariance analysis indicated that the impact of the Metacognitive Intervention Program instruction is significant and it is practical on the reading development of dyslexic students according to Eta which is equal to $\eta^2 = 0.97$, P = 0.001, and $F_{1, 29} = 981.4$.

The second research question was to see which component of the reading development of Iranian dyslexic primary school students is more affected by Metacognitive Intervention Program instruction.

**Table 6**

*Changes of Reading Components in the Experimental and control groups*

| Groups | Mean & Std. Deviation | | Change (Percent) | Dependent T-test | Sig |
|---|---|---|---|---|---|
| | Pre-Test | Post- Test | | | |
| **Experimental** | 15.81±2.43 | 21.81±2.79 | +37.95 | -19.82 | 0.001 |
| **Control** | 15.75 ± 2.02 | 15.69±1.92 | -0.38 | 0.194 | 0.85 |
| **Experimental** | 15.44± 2.45 | 19.13±2.68 | +23.89 | -13.68 | 0.001 |
| **Control** | 15.94± 1.81 | 16±1.71 | +0.38 | -0.251 | 0.81 |
| **Experimental** | 14.25± 1.69 | 20.5±2.25 | +43.86 | -9.03 | 0.001 |
| **Control** | 15.38± 1.71 | 15.06±1.61 | -2.06 | 1.32 | 0.21 |
| **Experimental** | 15.19±1.72 | 21.69±1.78 | +42.79 | -16.33 | 0.001 |
| **Control** | 15.94±2.14 | 15.88±1.71 | -0.38 | 0.212 | 0.84 |
| **Experimental** | 15.19±2.51 | 19.31±2.65 | +25.91 | -13.11 | 0.001 |
| **Control** | 15.94±1.48 | 15.38±1.59 | -3.51 | 1.71 | 0.11 |
| **Experimental** | 14.63±1.99 | 20.25±2.44 | +38.41 | -13.82 | 0.001 |
| **Control** | 15.69±2.09 | 15.75±1.81 | +0.38 | -0.212 | 0.84 |
| **Experimental** | 15.63±1.59 | 19.81±1.97 | +26.78 | -13.69 | 0.001 |
| **Control** | 15±1.86 | 14.49±1.48 | -3.4 | 0.235 | 0.82 |
| **Experimental** | 14.69±1.92 | 18.13±2.12 | +23.42 | -13.34 | 0.001 |
| **Control** | 15.31±2.75 | 15.19±2.37 | -0.78 | 0.368 | 0.72 |
| **Experimental** | 15.13±2.22 | 19.19±1.91 | +26.83 | -13.75 | 0.001 |
| **Control** | 15.38±2.12 | 15.63±1.54 | +1.63 | -0.845 | 0.41 |
| **Experimental** | 15.88±1.59 | 19.94±2.29 | +25.57 | -13.75 | 0.001 |
| **Control** | 15.38±1.99 | 15.81±1.91 | +2.79 | -0.861 | 0.403 |

In connection with the second research question, covariance analysis indicated that the impact of the Metacognitive Intervention Program instruction is statistically more significant on Word reading, Word Chain, Word Comprehension, and Text Comprehension components in the experimental group.

## Discussion

After providing the impact of Metacognitive Intervention Program instruction on the reading development of Iranian dyslexic primary school students, the findings indicated that the metacognitive intervention teaching is practical for the reading development of dyslexic students. Accordingly, the findings of this study manifest the concept that different reading components will be influenced by metacognitive intervention teaching. Therefore, the findings approximate previous studies such as Solaimani, Sehpehrian Azar, and Immandost (2019), Ladonifard, Shojaee and Alamdarloo (2017), Bemana, Ghamarani, and Naderi (2018) who all concluded that

providing Metacognitive Intervention Program instruction is practical on the reading development of dyslexic primary school students.

This study's findings also show that Metacognitive Intervention Program instruction to some extent is considerable on the reading development of dyslexic students because dyslexia is a difficulty in learning that affects reading components including difficulty with picture naming, reading words, word decoding, and reading comprehension (Sedaghati, Foroughi & Shafiei, 2010). This means that Metacognitive Intervention Program instruction is considerable for reading disabilities (Duke, 2013).

Primary dyslexic learners often are not able to penetrate rapid instructions. It is also hard for this group of students to understand similarities and differences in words as one important aspect of reading comprehension (Anderson & Meier-Hedde, 2011). In addition, the findings of this study also deliberated that metacognitive intervention teaching is effective for the dyslexic students who received the metacognitive intervention teaching in the experimental group (tables 1, 2, & 6). In fact, the effectiveness level between the control and experimental groups after providing the Metacognitive Intervention Program instruction was found $p<0.01$.

The findings of this study are also in line with previous studies including those by Solaimani, Sehpehrian, Azar, and Immandost (2019), Ladonifard, Shojaee, and Alamdarloo (2017), Bemana, Ghamarani, and Naderi (2018), Azhar, Nissawan and Khalidi (2015), Zafiropoulou and Mati-Zissi (2020) who provided the impact of the Metacognitive Intervention Program instruction with the reading development of dyslexic students. The findings indicated that students who received a Metacognitive Intervention Program instruction showed a higher level of reading comprehension and the other important components. This is to say that the first research question is approved.

In addition, the findings of the covariance analysis between the control group and the experimental group indicated that the Metacognitive Intervention Program instruction is considerable on the reading development of dyslexic students. The findings are in line with previous studies by Solaimani, Sehpehrian, Azar, and Immandost (2019), Ladonifard, Shojaee, and Alamdarloo (2017), Bemana, Ghamarani, and Naderi (2018), Azhar, Nissawan and Khalidi (2015) and Zafiropoulou and Mati-Zissi (2018) who claimed that the students who received the Metacognitive Intervention Program instruction were improved with respect to their reading fluency. The results of this study deliberated those students who received a Metacognitive Intervention Program instruction revealed high abilities in word reading and reading comprehension. The results also revealed that there was a statistically significant difference between the control and experimental groups after providing the metacognitive intervention. Thus, the second research question is approved (table 6).

## Conclusion

This pre-test, post-test experimental study with a control group proved the impact of Metacognitive Intervention Program instruction on the reading development of Iranian dyslexic primary school students. The findings of this study indicated that Metacognitive Intervention Program instruction is significant in the reading difficulty of primary school students. This significance level was considered $p\leq0.05$. In addition, the findings of the covariance analysis showed that the reading components of Iranian dyslexic primary school students involving reading words, word chain, words, and text comprehension are more impacted by metacognitive intervention programs.

The findings of this study approximate previous studies including those of Solaimani, Sehpehrian, Azar and Immandost (2019), Ladonifard, Shojaee and Alamdarloo (2017), Bemana, Ghamarani, and Naderi (2018), Azhar, Nissawan and Khalidi (2015), Zafiropoulou and Mati-Zissi (2018) who all indicated providing Metacognitive Intervention Program instruction is considerable with the reading development of dyslexic primary school students, absolutely, on

reading words, word chain, words, and text comprehension. In another language, the findings of the study also showed that there was a considerable significant difference between the control and the experimental students after receiving the Metacognitive Intervention Program instruction reading development.

According to the findings of this study, developing such strategies as practicing content organizing, determining the speed of study, training control, and monitoring and teaching regulation strategies in teaching and learning processes can contribute to both primary school instructors and dyslexic learners to be familiar with Metacognitive Intervention Program instruction and different strategies. The findings of this study have specific implications both for primary school teachers and dyslexic students. As a matter of fact, primary school instructors are needed to provide systematic metacognitive strategies to dyslexic students to motivate them to learn the essential elements of reading skills. This is an innovative procedure that contributes to the learners in the classroom learning words, non-words, and texts which are the most considerable elements in reading development. As a matter of fact, providing Metacognitive Intervention Program instruction reinforces dyslexic learners to be happy in real contact through reading. This confesses dyslexic students to divine the goal of reading. In fact, providing the impact of metacognitive strategies with teaching forces primary school teachers to think about how the learning process happens for dyslexic students.

The findings of this study indicate that each student who has some symptoms of dyslexia can learn reading because Metacognitive Intervention Program instruction is one of the considerable factors which contributes dyslexic learners to accelerating their reading skill effectively. Therefore, providing Metacognitive Intervention Program instruction and strategies in the classroom with respect to learning skills involving evaluating progress, monitoring attention, asking questions while studying and learning, controlling the time, speed of reading, speed adjustment, and their impact on reading scores are all of paramount significance.

The findings of this study also reveal that becoming acquainted with the key role of the Metacognitive Intervention Program instruction can be constructive for dyslexic students as well as primary school instructors who study metacognitive teaching to have deeper undressing of the concept of dyslexia in primary school students.

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