

The Effectiveness of the Intervention Program on Reading Fluency and Reading Motivation of Students with Dyslexia

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Abstract

The main purpose of this research is to examine the impact of an intervention program on motivation and reading fluency of dyslexic students. The research is an experimental one. The population included fourth and fifth grade male and female dyslexic students in Ilam, Iran. 64 students were randomly selected using simple random sampling method. The students were equally divided and assigned into a control and an experimental group respectively. The experimental group received the Barton intervention program for three months. The Reading Motivation Scale and Reading Fluency Test were administered for the measurement of motivation and reading fluency pre and post tests. The reliability of the reading motivation and reading fluency was found to be satisfactory. The content validity of the scales was investigated using the judgment of 10 psychology expert. The analysis of the finding through t-test found a significant difference between the control and experimental groups after the intervention program at $p < .01$

Keywords: Intervention program, Reading fluency, Reading motivation, Dyslexia

1. Introduction

Dyslexia is evident when accurate and fluent word reading develops very incompletely or with great difficulty. The focus is on literacy learning at the word level, and this implies that the problem is severe and persistent despite appropriate learning opportunities. It provides a basis for a staged process of assessment through teaching. Dyslexia is an unusual type of severe reading disability that has puzzled the educational and medical communities for many years. It is reported in the American Psychiatric Association's (2000) Diagnostic and Statistical Manual of Mental Disorders (text revision; DSM-IV-TR) that dyslexia affects 4 percent of the population in the United States of America. However, in Iran, there is no precise statistics of dyslexia prevalence. The most important factor in dyslexia is reading downfall; that is, the accuracy and speed of reading that are

measured based on standardized tests which is lower than what is expected with regard to age, measured intelligence and a person's education (American Psychiatric Association, 2000). Learning to read and reading motivation are the most fundamental, cultural, and civilized need for contemporary man and especially for countries like Iran that accentuates on expansion of specialized human power for access to national growth and development.

Morgan's study (as cited in Lyon, Shaywitz, & Shaywitz, 2003) over a century ago, which first described the notion of dyslexia as an unexpected difficulty in reading, has endured as parents, educators, clinicians, and investigators continue to become aware of this learning disability. Dyslexia is a specific learning disability that is neurobiological in origin. It is characterized by difficulties in accurate and or fluent word recognition and decoding abilities. These difficulties typically result from a deficit in the phonological component of language that is often unexpected in relation to other cognitive abilities and the provision of effective classroom instruction (Lyon, Shaywitz, & Shaywitz, 2003). Dyslexia (also referred to as specific reading disability) is a member of the family of learning disability which is by far the most common and affects over 80% of those identified as learning disabled (Lerner, 2006).

Researches have shown that the intervention program not only causes improvement in students with dyslexia but also improves a person's mental system. Shaywitz et al. (2004) hypothesized that the provision of an evidence-based, phonologically mediated reading intervention would improve reading and the development of the neural systems serving reading. The experimental intervention was structured to help children gain phonological knowledge; that is to develop an awareness of the internal structure of spoken words. The study involved two groups of dyslexic readers as well as a control group. One group of dyslexic readers received an experimental intervention where 50 minutes of explicit and systematic daily individual tutoring were provided to these second and third grade poor readers. The experimental intervention was focused on helping these children understand the alphabetic principle and providing them many opportunities to practice applying the letter-sound linkages taught. The other group of dyslexic readers received what the investigators termed as "community intervention" which is a variety of interventions commonly provided within the school. However, specific, systematic, explicit phonologically based interventions comparable to the experimental intervention were not used in any of the reading programs that were provided to the community group. The children were studied on three occasions: pre-intervention, immediately after post-intervention, and one year after the intervention was completed. The findings showed that the children who received the experimental intervention not only improved in their reading but also demonstrated an increase in activation in the anterior system as well as in the parietotemporal and occipitotemporal systems, compared to their preintervention brain activation patterns. Other laboratories have also found that an effective reading intervention influences neural systems in the brain in much the same fashion (Temple et al., 2000).

2. Background of the study

2.1 Reading Fluency

Reading fluency is dependent on the first two areas described, which are phonemic awareness and understanding of the alphabetic principle, in that it requires rapid and automatic decoding of unknown words (Levy, Abello, & Lysynchuk, 1997). Students with learning disability demonstrate difficulty in the area of fluency. A common core problem is the ability to read sight words, decode words, and read phrases and sentences automatically and rapidly. Thus, reading fluency is an essential skill for all students. However, students with learning disability are most at risk in presenting difficulty in fluency (Meyer & Felton, 1999). Research has demonstrated that some students with learning disability can be characterized as having a specific deficit in naming speed, and this distinguishes them from students with learning disability that stem from phonological processing deficits (Wolf & Katzir-Cohen, 2001). Wolf and Bowers (2000) have referred to this distinction as a double deficit model of reading disability. This model has led to the conjecture that interventions should be specifically tailored to address fluency deficits for those students who are phonologically aware and able to decode accurately but remain not fluent. Nevertheless, these specific intervention practices warrant further investigation and validation (Wolf & Katzir-Cohen, 2001).

Fluency is an important but often neglected element of reading programs (Kameenui et al., 2001). This is likely due in part to the fact that effective interventions for improving fluency are not widely known. For example, whereas there is a consensus that fluency is dependent on adequate word recognition skills, there is also an understanding that word recognition proficiency may not always yield fluent readers (National Reading Panel, 2000). Many of the approaches in improving fluency could be categorized as focusing on repeated reading (Meyer & Felton, 1999). Clinical examinations have reported on the efficacy of improving reading fluency in

children with developmental dyslexia. Meta-analysis by Chard, Vaughn, and Tyler (2003) identified 24 studies on interventions to improve reading fluency in students with learning disability from 1975 to 2000, including both group studies and case studies. According to Cohen's (1988) criteria, the mean effect sizes for the different intervention categories were in the moderate range (.68 for repeated reading without a model; .71 for repeated reading with multiple features). However, it is important to note that few studies used standardized instruments to document their results. The same problem was observed in Kuhn and Stahl's (2003) review of remedial practices for fluency with both low-achieving children and children with learning disability.

2.2 Motivation

Motivation is the force that energizes and directs one's drive to accomplish goals. Students need a strong desire to learn in school because much of academic learning requires persistent, hard work over a long period of time (McGrady, Lerner, & Boscardin, 2001). The study of motivation has a long tradition. The topic of motivation became particularly predominant during the 1980s when several models and theories were proposed. The longstanding interest in reading motivation and its implications in learning has remained strong, especially in the areas of reading acquisition (Gambrell, 1996; Wigfield & Guthrie, 1997). Although the conceptualizations and definitions of motivation are varied, numerous salient commonalities can be found among them. According to Guthrie and Wigfield (1999), motivation researchers are concerned with what moves people to act. Thus, motivation is related to the initiation, direction, intensity and persistence of behavior (Geen, 1995).

Students with learning disability may appear to be unmotivated, but their lack of motivation may actually result from chronic academic failure. The process of losing motivation begins when students first doubt their intellectual ability. They then start to view their achievement efforts as futile, eventually asking themselves - Why try if you know you are going to fail? After encountering repeated failure in the classroom, these students develop negative and defeatist attitudes about school learning. As a consequence, they have fewer opportunities to experience personal control over learning outcomes and eventually begin to doubt if they are in control of their academic destinies (McGrady, Lerner & Boscardin, 2001).

In a review of 14 studies on motivation, Bender and Wall (1994) reported that elementary students with learning disability have less motivation. Furthermore, they reported that students with learning disability exhibit the capacity to use coping strategies to compensate for their processing and skill deficits. Given the repeated failure that many students with learning disability experience, it is not surprising that they are less motivated to perform than their peers without disability. When early attempts to succeed in school meet with failure, it is common for students to believe that success is beyond their ability and efforts. Consequently, they develop a learned helplessness and lose their intrinsic motivation to prove their competence. Thus, they become externally motivated because they believe that success is dependent on external factors and is beyond their control (Smith, 1994).

For students with dyslexia, it is especially challenging to motivate them to want to read for pleasure and for lifelong learning. Gambrell et al. (1996) cited research that compared reading motivation for struggling readers with above-average readers with surprising results - struggling readers are motivated by the same three major factors that also motivate highly proficient readers: 1) choice in reading materials 2) sharing reading aloud, and 3) receipt of affirmation or positive recognition for reading accomplishments. In contrast, the work of Burden and Burdett (2005) focused upon the "affective" aspects of dyslexia such as self image or the risk of reduced motivation or learned helplessness.

The aim of the present study is to compare between the experimental and the control group of dyslexic students after an intervention program. The research questions are as follows:

1. Does the Barton intervention program improve the dyslexic children's motivation?
2. Does the Barton intervention program improve the dyslexic children's reading fluency?

In addition, this study is guided by the following research hypotheses:

1. There is a statistically significant difference in motivation between the control and experimental group of students with dyslexia after the Barton intervention program.
2. There is a statistically significant difference in reading fluency between the control and experimental group of students with dyslexia after the Barton intervention program.

3. Method

3.1 Procedure

In this study, a questionnaire called “Dyslexia Screening Instrument” was used to identify fourth and fifth grade students with dyslexia. Two 100-word passages with 10 comprehension questions from the students’ book were selected and were assigned to the students to read. Their marks were also scrutinized in the first semester and it was found that their marks in the reading skills were lower than students without dyslexia. To examine their IQ, Raven’s test was performed, and the students with the average IQ higher than 90 made up the population of this research. For this research, 138 dyslexic students in fourth and fifth grades in Ilam, Iran were selected. The population of dyslexic students consisted of 40 male and 38 female fifth grade students, and 37 male and 22 female fourth grade students. Their age ranged from 10 to 12 years. The researcher used the table of random numbers to select 64 dyslexic students and assigned them into a control and an experimental group, each with 32 students. “Motivation to Read” and “Reading Fluency” tests were conducted on both groups. The children were given verbal instructions on how to complete the Motivation for Reading Scale (Wigfield and Guthrie, 1997) and Reading Fluency Scale (Woodcock, Mather & Schrank, 2004). The measures were used individually in a classroom by the researcher, who read the items aloud and walked around in the classroom observing the students’ understanding of the instrument and providing assistance when necessary. Demographic variables such as age, gender, and IQ were obtained as well. When the students had completed the measure (approximately 40 minutes later), they returned to their classroom.

3.2 Treatment

The Barton intervention program (2000) was used in this study. The Barton Reading and Spelling System includes ten levels. Each level is broken into lessons and each lesson, in turn, is further broken into procedures. In this study, only level one and two are taught with some adjustments. Considering the fact that in Persian, there are 26 consonants, 6 vowels, one digraph and a few exceptions, 6 lessons were specified for level two. Similar to the Barton Program (2000), in the adjustment program, teaching procedures started with the easy level and gradually moved on to the difficult level. Since instruction tools were not available in Persian, the researcher provided the necessary tools based on the Barton Program. Instruction tools included: 1) color coded letters tiles, 2) word lists, 3) cards, on which one word is written in blue consonants and red vowels. 4) whiteboard, 5) blue and red markers, and 6) a notebook for dictation along with red and blue pencils, erasers and sharpeners. According to the Barton Program (2000), level one is taught first. Then, 6 consonants, and one vowel were taught in each session of level two. Sometimes, due to the difficulty of some consonants or vowels, some lessons were repeated for 2 to 4 sessions. Therefore, one by one instruction was carried out for 36 sessions in 12 weeks, each week with three sessions and each session lasting 45 minutes. The students received the treatment in their school and in an empty class which was arranged by the principle. Instruction time was set by the tutors. If the students could not learn a lesson properly, the lesson would be repeated till she/he learned it.

3.3 Pilot Study

The purpose of carrying out the pilot study is to evaluate the suitability and appropriateness of the use of the instruments. For the pilot study, 30 dyslexic students from the population of dyslexia in Ilam, Iran with similar characteristics to that of the participants in this study were selected randomly. The students consisted of 19 males and 11 females. This pilot study was carried out from 1st March to 5th March, 2010. Then, the collected data were entered into SPSS version 17 for Windows software to determine the reliability of the scales. The reliability test was applied by calculating the Cronbach’s alpha on most variables to measure the inter-item reliability. There was consistency in the following variables: Reading Motivation and Reading Fluency. Internal consistency is usually measured with Cronbach’s alpha, a statistic calculated from the pair-wise correlation between items. Internal consistency ranges between zero and one. Cronbach’s alpha coefficient of reliability and alpha of 0.70 is normally considered to indicate a reliable set of items (De Vaus, 2002). The reliability coefficient for each instrument used in this pilot study was tabulated. Cronbach’s alpha reliabilities of the Motivation for Reading and Reading Fluency are 0.86 and 0.85 respectively. The results of the reliability coefficient showed that there is a high reliability for these instruments, so these instruments are considered appropriate to be employed in this study.

3.4 Validity

To ascertain the validity of the Motivation for Reading and the Reading Fluency scales used in this study, 10 psychology experts were asked to grade the scales from 1 to 5. The acceptable degree figures are shown in Table 1. Although there is no statistics for content validity, a statistical figure, namely mean has been introduced in

Table 1. It should be stated that what is presented in Table 1 is the acceptability degree criteria among the judges.

3.5 Measures

Motivation for Reading Scale: The Motivation for Reading Scale was developed by Wigfield and Guthrie (1997). This 54-item questionnaire is designed to assess the 11 different dimensions of reading motivation. Children answered each item on a 1 to 4 scale, with 1=never, 2=seldom, 3=often and 4= always. The Motivation for Reading Scale was designed to assess the reading motivation of students in grades 3 to 6. Validity evidence includes an accumulation of research results that support hypotheses consistent with the construct being measured (Messick, 1995). Test-retest reliability for the Motivation for Reading Scale ranged from 0.69 to 0.97. For this study, Cronbach's alpha reliability for the Motivation for Reading Scale ranged from 0.76 to 0.88 and the test-retest reliability ranged from 0.76 to 0.90.

Reading Fluency Test: The Reading Fluency Test measures a person's ability to read simple sentences quickly, decide whether the statement is true or false and then circle Yes or No in the Subject Response Booklet. The difficulty of the sentences gradually increases to a moderate level. The individual attempts to complete as many items as possible within a 3-minute time limit. The Reading Fluency Test has a median reliability of 0.90 in the age range of 6 to 19, and 0.90 in the adult age range. This test is a measure of reading speed, rate, and fluency. The test necessitates the ability to read and comprehend simple sentences quickly. Low performance on the reading fluency test may be a function of limited basic reading skills, comprehension difficulties, and or an inability to sustain concentration (Woodcock, Mather & Schrank, 2004). For this study, Cronbach's alpha reliability of the scale is 0.87 and the test-retest reliability for the Reading Fluency scale is 0.86.

Dyslexia Screening Instrument (DSI): Dyslexia Screening Instrument (DSI) consists of checklists of basic neuropsychological skills designed by Coon, Waguespack, and Polk in 1994. This instrument is a rating scale designed to describe the cluster characteristics associated with dyslexia and to discriminate between students who display the cluster characteristics and students who do not. It is designed to measure "entire populations of students who exhibit reading, spelling, writing, or language-processing difficulties" (Coon, Waguespack, & Polk, 1994). The DSI is designed to be used with students in grade 1 through 12 (age 6 to 21). Internal consistency reliability coefficient is 0.99 for elementary students which was determined by using Cronbach's coefficient alpha; and inter rater reliability of the DSI for elementary students is 0.86 that was assessed by determining the homogeneity of the statements and the consistency of ratings across examiners. Coon et al. (1994; p. 20) stated that "content was based on an extensive review of relevant literature and on experts in the field of dyslexia". Construct validity is supported by the discriminant analysis classifications which placed elementary and secondary students accurately (98.2% and 98.6% respectively). The DSI Scale should be completed by a classroom teacher who has worked directly with the students for at least four months. This will result in a rating that is more accurate because the teacher has observed the students over a lengthy period of time and thus, can compare the student's performance with other classmates. For an elementary student, the preferred rater is the teacher who instructs the student in a variety of subjects. The teacher needs to complete the DSI form based on the questionnaire's five-point scale: Never exhibits, Seldom exhibits, Sometimes exhibits, Often exhibits and Always exhibits. In this study, Cronbach's alpha reliability for the DSI scale is 0.89.

Raven's Standard Progressive Matrices Test: Raven's Standard Progressive Matrices (SPM) test was constructed to measure the educative component of g (general IQ) as defined in Spearman's theory of cognitive ability (Raven, Raven & Court, 1998). Kaplan and Saccuzzo (1997) stated that "research supports the SPM as a measure of general intelligence". The advanced form of the matrices contains 48 items, presented as one set of 12 (set I), and another of 36 (set II). Items are again presented in black ink on a white background, and become increasingly difficult as progress is made through each set. These items are appropriate for the age range from 5 to 65. Lynn and Vanhanen (2002) summarized a considerable number of studies for the test based on normative data which have been collected in 61 countries. The internal consistency reliability estimate for the Raven Progressive Matrices total raw score is 0.85 in the standardization sample of 929 individuals. This reliability estimate for the revised SPM indicates that the total raw score of the SPM possesses "good" internal consistency reliability as provided in the guidelines of the U.S. Department of Labor (1999) for interpreting a reliability coefficient. The SPM has been widely used for decades as a measure of educative ability or "the ability to evolve high level constructs which make it easier to think about complex situations and events" (Raven, Raven & Court, 1998). In an extensive analysis of the cognitive processes that distinguishes between higher scoring and lower scoring examinees on the Standard Progressive Matrices and Advanced Progressive Matrices, Carpenter, Just, and Shell (1990) described the Raven's test as "a classic test of analytic intelligence". In this study, the Cronbach Alpha value for the *Raven's Standard Progressive Matrices Test* is 0.83.

Reading text: The reading texts were developed based on the content of fourth and fifth grade texts. The developed test was based on only 80 percent of the Persian text books as just 80 percent of the text book had been taught at the time of the administration of the research. The tests were evaluated by the fourth and fifth grade teachers and after 3 times revisiting, they evaluated it as convenient. The test included a story of one-hundred related words understandable to each education level, followed by 10 questions which indicated the students' level of understanding. The students were required to read out the tests aloud and answer the questions. To determine reliability, Cronbach's coefficient was employed. The reliability coefficients for the fourth and fifth grades' reading tests are 0.87 and 0.90 respectively.

4. Results

Quantitative data were analyzed using SPSS Version 17.0. The pretest and posttest results using the Motivation for Reading and Reading Fluency standardized tests are presented in Table 2, 3, 4 and 5 respectively. As described in Section 2.2, the first research question investigated whether the Barton intervention program improves the dyslexic children's motivation. The results from the descriptive statistics such as mean and standard deviation are presented in Tables 2 and 3. This tables shows that most of the means for the experimental group after the intervention program are higher than those of the control group.

The result from the t-test is presented in Table 4. The difference between the experimental and control groups were found to be statistically significant on ten dimensions: Work-avoidance ($t(0.123)=3.749, \rho=0.001$), Self-efficacy ($t(0.423)=2.172, \rho=0.034$), Challenge ($t(0.346)=3.58, \rho=0.001$), Importance ($t(-0.179)=5.73, \rho=0.000$), Involvement ($t(-0.085)=5.75, \rho=0.000$), Recognition ($t(0.031)=4.288, \rho=0.000$), Competition ($t(-0.062)=4.868, \rho=0.000$), Social ($t(-0.154)=2.771, \rho=0.007$), Compliance ($t(-0.62)=5.71, \rho=0.000$) and Grades ($t(0.115)=3.79, \rho=0.000$). The experimental group obtained higher scores than the control group on Work-avoidance, Self-efficacy, Challenge, Importance, Involvement, Recognition, Competition, Social and Grades.

As described in Section 2.2, the second research question investigated whether the intervention program improves the dyslexic children's reading fluency. The results of the descriptive statistics such as mean and standard deviation are presented in Table 5. This table shows that the means for the experimental group after the intervention program are higher than the control group. The result from the t-test shows that statistically there is a significance difference between the experimental and the control group in Reading Fluency ($t(-0.199)=2.268, \rho=0.02$).

5. Discussion

The results of the research show that the Barton intervention program has an impact on the reading fluency and reading motivation of students with dyslexia. Students who received the intervention program not only improved their reading, but could do better than the control group. The group receiving the intervention program showed higher motivation with regards to reading fluency and had fewer problems and could read more fluently. The control group had more problems with reading motivation and their reading fluency was weak. The results revealed that the intervention program helped the dyslexic students in their reading fluency and facilitated their attainment of lesson objectives. The first hypothesis reveals that there is a statistically significant difference in motivation between the control and experimental groups of students with dyslexia after the intervention program. The first hypothesis is supported at $\rho<0.000$. Motivation in the experimental group after the intervention program is higher than the control group. It can be concluded that the treatment is effective. This study shows that motivation is important in learning.

Students' motivation to read is a critical factor for the success of reading interventions because lack of motivation adversely affects students' abilities to enhance their vocabulary and to develop powerful reading strategies (Roberts et al., 2008). Due to serious problems with processing of information and consequently frustration, students with learning disability often exhibit low motivation to read (NJCLD, 2008). A number of studies have investigated the correlation between students' motivation to read and students' success in reading (Morgan & Fuchs, 2007; NJCLD, 2008). Since students' motivation to read may predict reading achievement, reading interventions therefore need to utilize strategies to improve motivation, and researchers should examine whether current reading interventions are increasing students' motivation. In fact, motivation to read requires mental readiness and dedication to acquire knowledge through reading, and eventually, extend perception and appreciation. Motivation provides the necessary guidance and power for reading (Guthrie & Humenick, 2004). Consequently, a strong connection exists between motivation and success in school (Marzano, 2003). Students who are highly motivated to read are more likely to successfully complete their education whereas students with low motivation are more likely to fail in school (Guthrie, 2008).

Research has shown that reading motivation is an important determinant of success in students because lack of motivation impedes students' willingness to improve critical reading skills and strategies to be successful in school (Roberts et al., 2008). Findings of this study indicate that there is a significant change in motivation to read for students with dyslexia over the 12-week intervention program. These results theoretically corroborate and are linked to constructs from the general motivation literature, suggesting that learning disability students have low reading motivation. These results also corroborate other findings that students with learning disability experience low motivation (NJCL, 2008; Morgan & Fuchs, 2007; Roberts et al., 2008). As Guthrie & Humenick (2004) mentioned, there should be more discussions on increasing students' motivation after the intervention program.

Chapman et al., (2000) argued that dyslexic students' failure causes them to be less motivated in reading tasks. Bender and Wall (1994) reported that elementary students with learning disability have lower motivation, given the repeated academic failure that many students with learning disability experience; thus, it is not surprising that they are less motivated. The finding from the work of Burden and Burdett (2005) revealed that the experience of dyslexia may lead to a major challenge to the self-esteem of some students with dyslexia or even to a negative impact upon their general self-development. Furthermore, the current study by Morgan, Fuchs, Compton, Cordray & Fuchs (2008) suggests marked differences in motivation and reading practice between skilled and unskilled readers.

The second hypothesis that there is a statistically significant difference in reading fluency among the control and experimental groups of students with dyslexia after the intervention program is supported. It is significant at $p < 0.027$. Reading fluency in the experimental group after the intervention program is higher than the control group, revealing that the intervention program has improved reading fluency in the dyslexic students. Many dyslexic students have difficulty in reading fluency; they do not possess an adequate sight vocabulary and must work hard to decode many of the words in the reading passages. Fluency appears to be particularly important for students with dyslexia because they often try reading with many pauses, which results in slow and disconnected oral reading. This effortful reading is problematic because it focuses reading at the decoding and word level, which makes comprehension virtually impossible.

The National Reading Panel (2000) summarized findings about guided repeated oral reading as a means to improve fluency and indicated that the overall weighted effect size produced a moderate effect for repeated oral reading. The National Reading Panel presented the case that instruction in guided oral reading is an important part of a reading program and is associated with gains in fluency. Oral reading interventions were found to be superior to instruction encouraging students to read silently. Furthermore, the National Reading Panel reported that good and poor readers both benefited from the repeated guided reading, even though they may benefit differentially from different aspects of the treatment (Faulkner & Levy, 1999). The goal was to locate all intervention studies published and all dissertations conducted within the past 32 years that evaluated the effects of fluency intervention on elementary students with learning disability. In common, the findings from this study suggested that repeated reading interventions for students with dyslexia are associated with improvement in reading speed, and comprehension.

Many researchers have argued that fluency is enhanced when reading addresses the meaning of the text (Anderson, Wilkinson, & Mason, 1991). In any case, for struggling readers and students with dyslexia in the third grade, a fluency intervention and a comprehension intervention were both associated with gains in fluency and comprehension (Vaughn, Gersten & Chard 2000). Intervention research on fluency development for students with dyslexia has been dominated by research on repeated reading. Reading fluency occurs phase by phase. After systematic learning of words and their sounds, the children employ it for the analysis of words (Shaywitz, 2003). The main objective of this research is the provision of an educational method for the improvement of reading fluency. As for motivation for reading, it was found that the dyslexic students have improved their reading fluency. Since many factors like IQ, age, gender have been controlled in this research, the difference between the two groups revealed the success of the intervention program.

6. Conclusion

The better performance of the experimental group shows the importance of reading motivation and reading fluency in dyslexic student's reading. It can be suggested that the Barton intervention program is a good alternative for the traditional methods. Since the result of this study has been based on a limited sample, care should be taken in over generalizing these results. For future research, it is suggested that this study be carried out on a wider scope and applied to students with other disabilities.

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Table 1. Juror Rank

Juror	Mean Fluency	Mean Comprehension	Mean Letter
1	4.61	4.85	4.59
2	4.3	4.7	4.9
3	4.65	4.75	4.82
4	4.45	4.92	4.9
5	4.66	4.78	4.85
6	4.7	4.9	4.94
7	4.45	4.7	4.6
8	4.75	4.8	4.9
9	4.75	4.8	4.75
10	4.75	4.87	4.94

Table 1: Juror rank given by experts (Based on Hambleton, 1984)

Table 2. Mean and standard deviation for motivation and motivation subscales (experimental group)

Experimental group				
Test	Pretest Mean	Posttest Mean	Pretest SD	Posttest SD
Motivation	120.002	148.52	16.62	16.57
Work				
avoidance	8.935	10.67	1.948	2.68
Grades	8.64	12.129	2.65	2.45
Social	15.258	17.67	4.041	3.399
Self-efficacy	9.225	10.9	2.011	1.79
Challenge	11.548	13.83	2.188	2.91
Importance	4.064	6.709	1.34	1.46
Involvement	11.032	16.29	1.663	2.957
Curiosity	15.58	15.8	3.063	3.198
Competition	13.387	16.93	2.74	2.707
Compliance	11.354	14.64	2.73	2.558
Recognition	10.7	12.9	3.17	2.857

Table 2 shows the means and standard deviation for the motivation and motivation subscales pre-intervention program and post-intervention program. This table shows that the mean score for motivation and motivation subscales in the pretest is lower than the posttest.

Table 3. Mean and standard deviation for motivation and motivation subscales (control group)

Control group				
Test	Pretest Mean	Posttest Mean	Pretest SD	Posttest SD
Motivation	120.37	121.43	14.78	16.96
Work avoidance	8.866	8.568	2.417	1.959
Grades	8.83	9.86	2.06	2.19
Social	15.4	15.43	3.08	2.89
Self-efficacy	9.433	9.6	1.813	2.799
Challenge	11.333	11.1	2.656	3.055
Importance	4.133	4.533	1.655	1.479
Involvement	11.066	12.233	1.507	2.528
Curiosity	15.366	15.566	2.189	2.329
Competition	13.431	13.533	3.11	2.968
Compliance	11.766	10.8	2.43	2.67
Recognition	1.73	10.2	2.79	1.93

Table 3 shows the means and standard deviation for the motivation and motivation subscales in the control group.

Table 4. Results for motivation and motivation subscales

		t-value	df	sig	Mean difference	std.Error Difference	Lower	Upper
Pretest	Motivation	-0.091	59	0.928	0.366	4.035	-8.43	7.702
	Self-efficacy	-0.423	59	0.674	-0.207	0.49	-1.189	0.774
	Challenge	0.346	59	0.731	0.215	0.622	-1.03	1.46
	Curiosity	0.313	59	0.755	0.213	0.683	-1.154	1.582
	Importance	-0.179	59	0.859	-0.068	0.385	-0.839	0.701
	Grades	0.115	59	0.909	0.069	0.61	-1.151	1.29
	Competition	-0.062	59	0.951	-0.046	0.75	-1.548	1.455
	Social	-0.154	59	0.878	-0.141	0.922	-1.987	1.703
	Compliance	-0.62	59	0.537	-0.411	0.663	-1.74	0.916
	Work-avoidance	0.123	59	0.903	0.068	0.561	-1.054	1.191
	Involvement	-0.085	59	0.933	-0.034	0.406	0.848	0.779
	Recognition	-0.031	59	0.975	-0.023	0.766	-1.557	1.509
Posttest	Motivation	6.306	59	0.000	27.082	4.29	18.48	35.67
	Self-efficacy	2.172	59	0.034	1.303	0.60	0.102	2.503
	Challenge	3.585	59	0.001	2.738	0.763	1.21	4.267
	Curiosity	0.334	59	0.74	0.239	0.718	-1.197	1.677
	Importance	5.773	59	0.000	2.176	0.377	1.421	2.93
	Grades	3.799	59	0.000	2.262	0.595	1.07	3.453
	Competition	4.68	59	0.000	3.402	0.726	1.947	4.856
	Social	2.771	59	0.007	2.244	0.809	0.623	3.864
	Compliance	5.71	59	0.000	3.845	0.673	2.497	5.192
	Work-avoidance	3.495	59	0.001	2.11	0.603	0.902	3.319
	Involvement	5.75	59	0.000	4.056	0.705	2.64	5.46
	Recognition	4.28	59	0.000	2.703	0.63	1.441	3.964

The results in Table 4 show the t-value, df, significance, mean difference, Std. Error Difference, Lower and Upper for motivation scale and subscales motivation before the intervention program and after the intervention program. Table 4 shows that there is a significant difference in the motivation scale and subscales such as importance, grades, competition, social, compliance, work-avoidance, involvement and recognition after the Barton intervention program. This table confirms that there is a significant difference statistically after the Barton intervention program ($t=6.30, 2.17, 3.58, 5.773, 3.799, 4.68, 2.77, 5.71, 3.49, 5.75$ and $4.28, p<0.000$ until $p<0.03$); however, this table also shows that there is no significant difference in the motivation sub-scale 'curiosity' after the Barton intervention program ($t=0.334, p>0.74$).

Table 5. Mean and SD on Reading Fluency

	Group	M	SD	t-value	sig
Pretest	Experimental Group	52.58	9.82	0.199	0.843
	control Group	52.03	11.55		
Posttest	Experimental Group	59.67	8.81	2.268	0.027
	control Group	53.33	12.73		

The result in Table 5 shows the means and standard deviation for reading fluency, pre and post intervention program. This table shows that there is a significant difference in the posttest means of reading fluency for the experimental and the control group of students with dyslexia after the Barton intervention program.

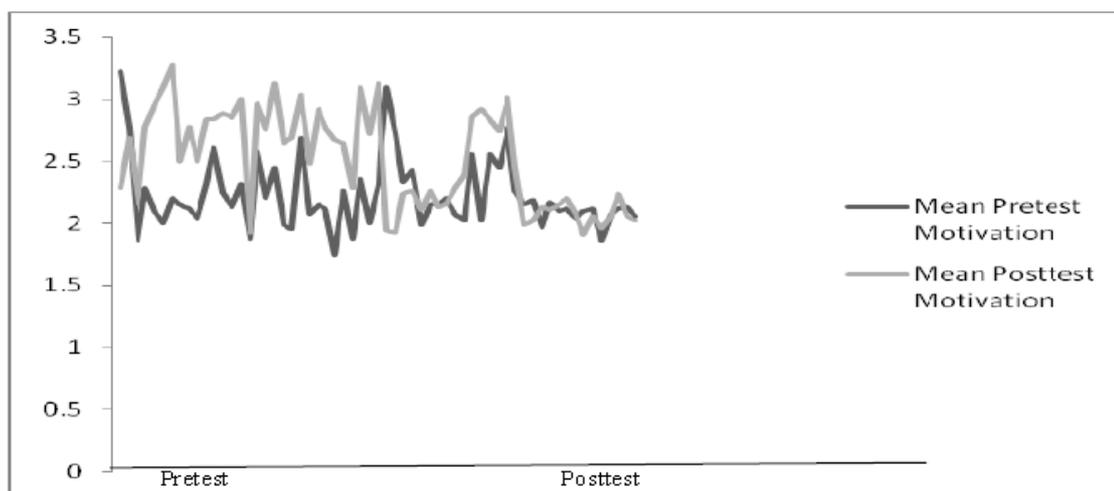


Figure 1. Mean for motivation in the pretest and posttest

Figure 1 shows the mean score for motivation in the pretest and posttest. This figure shows that the mean score for motivation in the pretest is lower than the posttest in the Standard Motivation Scale (Wigfield & Guthrie, 1997).

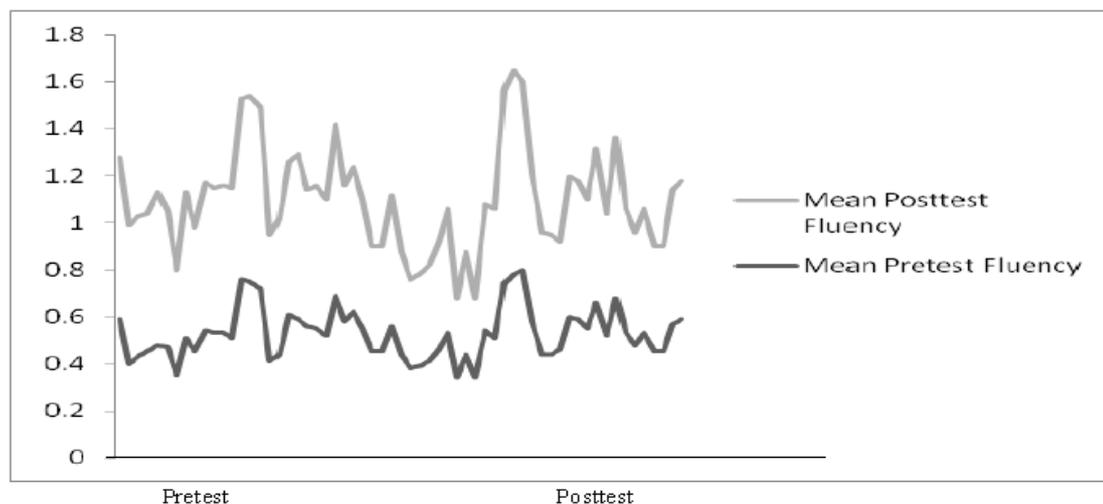


Figure 2. Reading Fluency

Figure 2 shows the mean scores for the pretest and posttest in the Standard Reading Fluency Scale (Woodcock, Mather & Schrank, 2004). This figure confirms that the mean for reading fluency in the pretest is lower than the posttest.