

ARTICLE

COMPARISON OF EFFECTIVENESS OF PHONETIC INTERVENTION, HOLISTIC INTERVENTION AND MIXED INTERVENTION ON THE RATE AND ACCURACY OF READING SKILLS OF CHILDREN WITH READING DIFFICULTY IN GRADE 2

Morteza Gholami¹, Tahereh Sima Shirazi², Narjes Nikookar^{3*}, Ali Rahimi⁴

¹Department of Foreign Languages, Jahrom University of Medical Sciences, Jahrom, IRAN

²Department of Speech Therapy, University of Social Welfare and Rehabilitation Sciences, Tehran, IRAN

³Department of Nursing, Jahrom University of Medical Sciences, Jahrom, IRAN

⁴School of Humanities and Tourism Management, Bangkok University, Bangkok, THAILAND

ABSTRACT

Objective: The purpose of this study is the comparison of the effectiveness of phonetic, holistic and mixed methods on reading accuracy and reading speed of students' with reading difficulties in grade two in primary school. **Materials & Methods:** This study is quasi experimental-comparative. The population is students with reading difficulties of the ordinary primary school in grade two in Jahrom and the investigated sample was 12 students with reading problems which were picked up from ordinary schools in access and randomly categorized into three groups, so that each group contained 4 people received one of the interventions in 35 sessions. The participants were investigated and compared regarding accuracy and speed of reading text, accuracy of non-words, and words before, after, and one month after the intervention using diagnostic reading test (Shirazi, Nili Pour 1384). Using software SPSS, descriptive statistics and statistical test were carried out. **Results:** After three interventions, the participants had a significant difference in all indices of reading skills in comparison to pre study ($p < 0.05$). But, after the invention, no significant difference was observed among intervention methods in all indices of reading skills ($p > 0.05$). **Conclusion:** During this study, it was perceived that the three phonetic, mixed and holistic interventions made a significant difference among students with reading difficulties. As the result, reading problems could be treated through three interventions.

INTRODUCTION

Reading is the use of a set of complex and unique skills in human which requires extracting word written data, transforming it into mental representation, and then get to meaning and pronunciation. Thus, it is not surprising that some children have reading difficulties [1,2]. Reading difficulties is defined in various studies as the acquisition of one or two standard deviation below the reading mean of reading standard tests [3]. Reading difficulties is the main cause of failure in schools. These difficulties are, in fact, the most obvious danger signal by which the children failure can be predicted in educational fields, this is why successful reading is considered the foundation of success in other courses [4]. Without the assistance of experts in special education to children with reading difficulties, they would encounter with certain frustrations at school [5]. There are extensive evidences which show that reading difficulties of majority of the children can be prevented through early intensive intervention plans. Consequently, systematic and intensive complementary interventions are required to remove reading difficulties of the students who struggle with reading [6].

Process of reading is one of the basic functions of language which is categorized as one of the perceptive actions (receptive) and has received much attention in recent years. Numerous studies have been conducted to achieve receptive information processing of reading and the outcome was presenting models which are the results of experimental experiences. One of the reading models which absorbs a lot of attention is the dual route model [7]. According to the dual route model, various approaches have been created in reading education. Phonetic method, whole word method, and mixed method are the most popular methods which are applied. Phonetic method highlights the significance of Phonological sounds and the sounds of letters. Whole word method emphasizes encountering the written words, so that the children become familiar with the words and they create lexical thesaurus through frequent exposure to them. In this method, the emphasis is more on meaningful units of language than speech sounds [4]. Also in the mixed method, phonetic strategy is tested simultaneously with the whole reading strategies in a way that grapheme - phoneme correspondence and word phonological awareness skills are taught in which the word were by the whole reading. In this method, children would learn strategies associated with both phonetic and holistic methods and analyzing the structure of the words [8].

Lovett et al compared word reading skills in children with severe reading disabilities using both methods. One group was trained in whole word (holistic) treatment, and the other group in grapheme- phoneme correspondence, and the control group in study skills [10]. Each group received 35 hours of intensive training. In this study, children responded to both treatments. However, both groups failed generalization of what have learned in untrained words. Therefore, it seems that even the children who trained grapheme-phoneme correspondence, require a particular training to generalize learned cases to untrained words [9, 10]. Lovett et al compared two different intensive training of word recognition in children with

KEY WORDS

reading difficulties;
phonetics intervention;
holistic intervention;
mixed intervention.

Published: 30Oct 2016

*Corresponding Author

Email:

n.nikou1@yahoo.com
Tel.: +989177078395

severe reading disabilities [11]. One of the plans highlighted phonological awareness and syllable segmentation (through direct training of grapheme-phoneme correspondence) and the other emphasized the training of visual words. The results indicated that phonological training program was led to more generalization in phonological domain and reading visual words training program to learning transfer of real words [11]. In another study conducted by Gustafson et al the effects of three intervention methods on reading skills of children with reading difficulties in grade two of primary school were investigated [8]. The first method was based on processing in word and sentence levels and the second one emphasized decoding and phonological skills, and the third method was a combination of the first both methods. After 25 sessions of intensive treatment sessions, the results indicated the improvement of reading skills in three groups. However, the group who completed mixed intervention method had obtained the best results comparing other groups.

Most studies concentrate on word recognition since it is proved that the largest hindrance in most children with reading disorder is difficulty in fluent acquisition of off-context word recognition skills. The results of this study show that both phonological oriented approaches and whole word methods are effective fashions to improve word recognition skills in children with learning disabilities. Also, according to the results, mixed approach which in fact is a combination of two holistic and phonological approaches, reveal remarkable improvement in reading skills. As the result, these three approaches lead to improvement in reading learning [4]. However, conducting numerous studies in reading difficulties, there would be some contradictions considering various studies to each other in reading training [12,13]. In addition, since this study is language and culture dependent and no study in this field has been carried out in Persian language, the necessity of more studies on the effects of each method and comparing various studies with each other seems essential.

Considering the high population of students in Iran and widespread prevalence of reading difficulties, we encounter a high population of children with reading difficulties and this issue gives the studies a new dimension toward purposes of reading studies. Consequently, using the best methods and programs in reading learning is one of the most vital requirements in these children. The studies revealed that the gap of reading level between skillful and poor readers would be widen in the case they do not receive appropriate treatment and reading difficulty improvement is increasingly demanding after grade four of primary school. Also, the long term negative effects of reading difficulties have been proved on literacy skills [14]. Most children with reading difficulties and their families encounter a lot of psycho-emotional problems, and in some cases these children are transferred to exceptional schools which makes the situation more complicated and devastate the these students psychologically.

Although the symptoms of reading difficulties (such as inability to distinguish between letters or the connection between phonemes and the correspondent grapheme) might occur before the schools, they are rarely understood before preschool or in grade one of primary school since formal training of reading has not begun yet in most schools [15]. Thus, the best treatment method to remove the problems of these children in short term seems essential to abandon further effects of reading difficulties in other courses. This, in fact, avoids economic loss on the family and economy.

Considering the above descriptions, this study is an attempt to compare the effects of different intervention, holistic, and mixed methods on accuracy and reading rate in the students with reading difficulties.

MATERIALS AND METHODS

This study is a quasi-experimental comparative study. The samples were 12 students with reading difficulties in grade two of primary school. Inclusion criteria to this study were as followings: being monolingual of Persian language, possessing normal intelligence, auditory in normal range, student of grade two of ordinary primary school, obtaining standard score of -2 or less in diagnostic reading test. Exclusion criteria were using medications due to ADHT, and a history of epilepsy. The participants of this study were suffering from reading difficulties regardless of hearing or intellectual problems or other reasons.

Initially, the participants were introduced to the researcher according to their I.Q sampling among students of grade two on the behalf of the teachers as those who have reading difficulties. Then, reading test was taken from them [adopted from diagnostic reading test of Nilipour [16]. If the scores of students' reading test of two standard deviations were lower than normal scores, the students would refer to audiometric centers. Also, in the case there was no Weschler test in the academic record of the students, they would refer to psychologist to evaluate their I.Q. Finally, if the lack of hearing problems and overall natural I.Q were approved (over 85), the participants were picked up. Then, cooperating with the principal, an interview meeting was arranged with the children's families and teachers to present a brief introduction of the study and the required time and number of sessions to perform it. Meanwhile, in an interview with the students' parents, the interviewer was assured that children have no history of ADHT. Finally, if the parents were consent with their children participation, consent form was completed. After diagnosing reading difficulties in students, evaluation of reading difficulties was performed by one of the diagnostic reading test, non-word reading, and irregular words [16] as the baseline.

Random method was performed to divide the children into three intervention groups. It is worth noting that sampling stopped when the number of male and female students reached to 6. Then, each group of male and female student was randomly divided into three intervention groups. Each child received one of the three intervention methods (phonetic, holistic, and mixed) during 35 sessions in groups of 4 for 50 minutes. Once intervention was done, accuracy and rate evaluations were carried out immediately with the participants. This data was compared with the primary evaluation. Also, the results of the three interventions were compared with each other. In addition, accuracy and reading rate of non-words and irregular words were compared for one month after the interventions. This data was also compared with the previous data.

In holistic intervention method, intervention is in a way that the words are written on separate cards and the therapist asked the children to pronounce the words and then repeat them. The primary words are usually written frequent words. During this study the words were picked up from the books of let's read and write grades one and two of primary school. The children learned to identify word features by their whole words and associated pictures (drawn back of the word cards) and they gather a set of visual words. In fact in this training method, phoneme-grapheme rules are ignored. During this study, the words which have been used in tests before and after the intervention to evaluate students' reading level were removed from the training word list.

Phonetic intervention method was based on phoneme-grapheme correspondence. In this method, children were trained with some limited letters (grapheme), their corresponding phonemes, and corresponding grapheme with its corresponding phoneme which they were able to make various words. Gradually, some more words were added and more combinations were given to them. In fact, distinguishing words from each other (they were trained to assign each letter to a common word which began with that word), the relationship between sounds and letters (they were trained to assign each letter to natural sounds or animals) and combination of sounds (they were trained by playing with the environmental sounds or animal sounds) was highly significant in this approach. Once the students were trained the letters of a certain word, the word was presented to the student to read and through doing so, the number of were added gradually. The order of word training was based on the order of the book of grade one of primary school "let's read".

Once the students were trained the letters of a certain word, the word was presented to the child to read and gradually the number of words were added. The order of letter training was based on the order of presented letters in grade one of primary school.

In mixed approach, the words which have been chosen from the books "let's read and write" courses of grade one and two, were written on cards. Then, through holistic training, particular letters and letter correspondence with that phoneme were emphasized. Word choice was also based on words so that the words were chosen in which certain letters were repeated. The order of word training was based on the presented order of the book "let' read" of grade one. In fact, this training method focused on decoding skills in word level in combination with decoding skills in letter level and as it is obvious from its name, this method is a combination of two holistic and phonological methods.

Case history questionnaire (including demographic characteristics, medical history, and students' rehabilitation) and also diagnostic reading test [16] were used in this study. To analyze the data, initially, the data was entered into the computer, then using software SPSS version 16, descriptive statistics and frequency distribution of the samples were reported. Later, the Wilcoxon test, Kruskal-Wallis and Friedman (frequent measure analysis) were used. Considering the protocols approved by the research council of University of Welfare and Rehabilitation Sciences, families became aware of ethical purposes and different training stages. Also, consent was obtained from the families of students participating in the study and all students' information remained confidential throughout the study.

RESULTS

The objective of this study was comparing the efficiency of three intervention approaches in reading levels of the students with reading difficulties in grade two of primary school. It is worth noting that three states were supposed to read irregular words: holistic reading of irregular word (the words that takes the child less than 1 second to read), phonological reading of irregular word (the words that takes the child more than 1 second to read), or failed reading of irregular word (the words that the child is not able to read correctly). [Table 1] demonstrates the effects of holistic, phonological, and mixed intervention methods on reading rate and accuracy of the text, reading accuracy of non-words and irregular words after the intervention.

Table 1: the effect of three intervention methods on reading rate and accuracy, reading accuracy of non-words and irregular words after the intervention method

Intervention method	Phonological method		Holistic method		Mixed method	
	Test criterion	p. value	Test criterion	p. value	Test criterion	p. value
Reading rate	6.5	0.039	8	0.018	6.5	0.039
Reading accuracy	6	0.05	8	0.018	8	0.018
Non-word reading accuracy	5.2	0.074	7.4	0.025	5.63	0.06
Holistic reading accuracy of irregular words	6.53	0.038	8	0.018	7.6	0.022
phonological reading of irregular words	2	0.386	14.5	0.076	6	0.05

As [Table 1] indicates, all three intervention methods showed significant difference in reading rate and accuracy and holistic reading accuracy of irregular words. Holistic method in reading accuracy non-words and mixed method in phonological reading accuracy of irregular words had significant difference.

All the indices in this study were compared intergroup intervention prior to the intervention and they did not show any significant difference considering the indices ($p < 0.05$). This means that they could be compared with each other after the intervention.

[Table 2] shows the comparison of reading indices in the three groups after the intervention.

Table 2: The comparison of three intervention methods after the intervention in reading rate and accuracy, reading accuracy of non words and irregular words Evaluation time

Evaluation time	Post intervention	
	Test criterion	p. value
Reading rate	0.731	0.694
Reading accuracy	1.209	0.542
Reading accuracy of non-words	2.53	0.28
Holistic reading accuracy of irregular words	1.29	0.59
Phonological reading accuracy of irregular words	0.27	0.87

As the [Table 2] shows, the changes made by these three methods in reading accuracy and rate, reading accuracy of non-words and irregular words had no significant difference. Three intervention methods had no significant difference with each other in all reading indices after the intervention.

DISCUSSION

According to the theory of reading dual route, there are two separate courses for reading (lexical and non-lexical). If one of these courses is damaged or encounters a problem, the other course stays intact and operates naturally. This separation between reading courses leads in the separation between reading methods of irregular words and non-words and eventually the separation between reading rate and accuracy which indicate that the courses do not necessarily develop simultaneously and with the same rate [46].

According to reading dual route, if the lexical route (holistic) is damaged or do not develop normally, then the reading rate will not develop in the child since lexical route emphasizes the word reading as a general unit, and comparing non lexical route this would lead to faster decoding. And also the child is unable to read irregular words emphasizing non lexical route which is based on the corresponding principals of grapheme- phoneme and this would lead to increasing error and decreasing reading accuracy. On the other hand, if the non-lexical route (phonological) of a child is damaged, they cannot improve in reading accuracy of less familiar and less frequent regular words. On the other hand, if the child is able to read the words just through lexical route, they are expected to encounter problem reading non words or less familiar and less frequent words and reading accuracy is reduced in them. Consequently, this would lead to generalized errors in reading non words (for example reads apple as apple) [7, 17, 18].

When the child experiences from the correct words decreases, then he is not able to create sufficient visual representations from the written words in his mind and this reduces the rate of reading, since his visual lexical thesaurus is not enriched yet.

But as it was seen in this study, three holistic, phonological, and mixed groups showed remarkable improvement in all reading indices. According to reading dual route, and as it was explained before, when

a child is trained, it affects the whole reading process and all of the reading indices whether it is based on phonological, holistic, or mixed route. It is worth noting that the students participating in this study were picked up from the ordinary schools and were not necessarily dyslexic and had a combination of various reading difficulties (except reading difficulties resulted from low I.Q, hearing loss, and low vision). Consequently, the results of this study revealed that if any of these methods is presented thoroughly, correctly, and on time could be effective in removing reading difficulties.

Numerous proofs support this idea that two lexical (holistic) and non-lexical (phonological) routes in reading dual model two distinct and different mathematical method could be applied to extract pronunciation and meaning. Two routes can interact with each other. As it was considered in this study, holistic intervention method obtained higher score in reading non words. One of the reasons could presumably be attributed to the interaction of phonological and holistic routes in pronunciation of the word [19]. On one hand, different improvement in individuals to respond to different interventions may arise from individual differences particularly since all the participants of this group were not exactly suffering from a certain reading difficulty. Some children responded simply to the treatment while some were treated hard. Eventually, the results of the three intervention showed that all children benefited from these interventions. But some were resistant against treatment in three groups and improved less comparing other group members. These could be the reasons why despite significant progress in all reading indices in three groups, this progress showed no significant difference comparing three groups with each other (table 2) [19, 7].

According to reading dual route, since in phonetic method the training is based on increasing awareness of grapheme-phoneme correspondence, it is expected that reading accuracy rises. By increasing the child positive experiences in accurate reading of words, and increasing reading rate in holistic reading, it is expected to increase the students' understanding from the text and consequently reducing reading errors and increasing reading accuracy, since the student gradually reaches finer awareness from written units and is able to decode words in smaller units than single words. Also, according to reading dual route, in mixed method, both lexical and non-lexical route is activated and reading accuracy increases.

The fact is that children who encounter reading difficulties gradually make gap in reading (reading rate) psychologically from their normal peers this process is kept on by increasing age. These children are deprived from facing numerous vocabularies and practicing reading words while their peers regularly increase their visual vocabularies through accurate reading of words. This lack of reading practice for children with reading difficulties keeps them behind from their normal peers more and more particularly in reading rate. In fact the normal children promote decoding rate of words through increasing visual representation. Obtaining low scores in evaluating reading rate at the beginning of this study is for this reason. Since the individuals' responses are different due to personal differences, considering reading rate, some of the students were not placed in normal range even after group intensive intervention and were located more than -2standard deviation with the students without reading difficulties. However, probably the test conditions and the students' attempt to read with high accuracy brought on failure of reading rate. It is better to evaluate reading rate of the students regardless of test conditions. But totally, despite all these issues, the students' status was better in this index.

In this study it was observed that the three intervention groups had demonstrated better performance in evaluating reading non words based on the number of accurate non words. In phonological intervention which in fact was the direct phoneme-grapheme training, increasing reading abilities could be attributed to these trainings. The surprising result of this study was the positive changes of scores of non-words in holistic reading comparing two other groups which was different from our expectations according to reading dual model. One of the reasons in holistic reading according to reading dual model is possibly increasing reading rate of words and lexical decoding skills which could lead to increasing lexical decoding skills in smaller units and rising reading accuracy. The fact that how many words can make this improvement is different in individuals [7]. Since it was a group study, the rate of facing with visual words was much higher than individual intervention, since each word is practiced for each student consequently the student encounters other practices of his peers. Therefore, it is expected that the children gradually discover the correspondence and gradually reach the decoding abilities of words in phoneme and grapheme levels. It is worth noting that the researcher believes that after the intervention which lasted 35 sessions for an hour each were not sufficient for training the whole alphabet rules which is the aim of phonological group. In mixed method which concentrated on two units of the whole word and phonemes, we expected to encounter improvement in reading non words which achieved in this study.

The results show that three intervention methods in this study reduced the reading errors in irregular words and facilitate holistic process of irregular words. According to dual reading method, as the reading rate and accuracy increases, it is expected to have reduction of reading errors and increase of scores in holistic reading of irregular words. Rising percentage of phonological scores during phonological intervention method also could be the direct training results of grapheme-phoneme units and their correspondence which is the focus of this intervention since, according to dual path reading model, rising awareness of grapheme-phoneme correspondence would lead to decoding words phonologically. Lovett et al also found these results; however, they did not investigate the reading methods of irregular words separately [11].

Perhaps one reason why reading scores improved in all participants was enhancing the overall level of awareness of parents about their children's reading problems and exercises. As previously mentioned, all parents were aware of their children's problems, or in the case of awareness, they associated their children's problems to lack of classroom excursions. During interview with the parents whom the problems were explained to them by the researcher, Parents found that systematic and timely exercise can help them to overcome problems. Fortunately, during this study, except the participants' parents of 4, all parents worked well with the researcher to improve the intervention goals. Certainly, rising awareness of parents had a great impact on children's behavior and attitudes of parents toward children and consequently increased self-confidence in children. Meanwhile, each of these intervention methods in all three methods cannot be quietly net due to reading route interaction on each other and this factor can also be a cause of reading achievement scores of all students and is not a significant difference between the intervention methods. Since this study was carried out intensively and in groups of 4, and during intensive interventions, it was not possible to increase the number of samples in each group and this reduces the number of participants in each group comparing similar studies.

Perhaps the lack of significant differences between the three groups is due to the low number of participants. Also, since the study was conducted during the participants' study, it seems that the simultaneous training of the teacher at school and the researcher could be considered as the confounding variable of the results, however, since all the students were trained in three groups and also all the teachers used that same educational system, thus, it does not seem that these factors has affected the results.

It should be noted that all participants in this study were not examined in terms of having dyslexia; therefore, this factor (of course if there is dyslexia in one or more participants) can influence the research process and its results. But if the participants comprised solely of individuals with dyslexia, different results might be obtained. In other words, participants in this study comprised the people who had reading difficulty in ordinary schools. But, according to the results of this study and considering the inclusion and exclusion criteria, if in every person with reading problems (who has reading problem for any reason other than mental disability, hearing, and vision problems) any of the phonetic, holistic, and mixed interventions was conducted properly and timely, significant progress in all reading indices could be observed.

The last point is the impact of the group in which each strategy was carried out in group in this study. During this process, if one of the group member acquired a particular strategy later for any reason, or missed the session, the whole group had to wait for him to learn the strategy skillfully. Thus, this both wastes the time of the whole group and also lowers the scores of them. But, group practices could be considered as a positive point in this study, since these conditions were close to the class conditions [8].

CONCLUSION

In this study, it seems that by performing intensive, daily and group interventions, reading level of students' with reading problems could be improved. During this study it was observed that the three groups of phonological, holistic and mixed interventions created a significant difference in reading levels of the students with reading difficulty in 35 sessions. Consequently, reading problems can be solved in different ways if in any case, the sequences of steps are followed and we ensure that the skills of students at each stage of intervention are achieved. It should be noted that this is almost impossible in crowded classes. These results can be practical for the teachers of grade one and two and the authorities associated with educational lesson planning.

CONFLICT OF INTEREST

There is no conflict of interest.

ACKNOWLEDGEMENTS

The students participating in this study and their families, Mr. Shadmehr and Jahrom Bahar Language Institute, and Jahrom Department of Education are appreciated earnestly in the implementation of this study.

REFERENCES

FINANCIAL DISCLOSURE

None.

REFERENCES

- | | |
|--|---|
| <p>[1] King BA. [2006] Semantic priming in deep dyslexia:investigating the integrity of the symantic system. Ontario: University of Winder.</p> <p>[2] Westwood P. [2002]Reading and learning difficulties: Approaches to teaching and assessment: Acer Press.</p> <p>[3] .Bowyer-Crane C, Snowling MJ, Duff FJ, Fieldsend E, Carroll JM, Miles J, et al. [2008] Improving early language and literacy skills: Differential effects of an oral language versus a phonology with reading intervention. <i>Journal of Child Psychology and Psychiatry.</i> 49(4):422-423</p> | <p>[4] Reid G.[2009] <i>Dyslexia: A practitioner's handbook</i>: Wiley;. Helland T, Tjus T, Hovden M, Ofte S, Heimann M. [2011;]Effects of bottom-up and top-down intervention principles in emergent literacy in children at risk of developmental dyslexia: A longitudinal study. <i>Journal of Learning Disabilities.</i> 44(2):105.</p> <p>[6] Justice LM. [2006] Evidence-based practice, response to intervention, and the prevention of reading difficulties. <i>Language, Speech, and Hearing Services in Schools</i> 37(4):284.</p> |
|--|---|

- [7] Coltheart M.[2006] Dual route and connectionist models of reading: An overview. *London review of education*.4(1):5-17
- [8] Gustafson S, Fälth L, Svensson I, Tjus T, Heimann M.[2011] Effects of three interventions on the reading skills of children with reading disabilities in grade 2. *Journal of Learning Disabilities* 44(2):123.
- [9] Fälth L, Svensson I, Tjus T. [2011]The Effects of Two Training Programs Regarding Reading Development among Children with Reading Disabilities. *Psychology*. 2(3):173-180.
- [10] Lovett MW. [1991]Reading, writing, and remediation: Perspectives on the dyslexic learning disability from remedial outcome data. *Learning and Individual differences*. 3(4):295-230.
- [11] Lovett MW, Borden SL, Deluca T, Lacerenza L, Benson NJ, Brackstone D. [1994]Treating the core deficits of developmental dyslexia: Evidence of transfer of learning after phonologically-and strategy-based reading training programs. *Developmental Psychology*. 30(6):805.
- [12] Metsala JL, Ehri LC.[1998] Word recognition in beginning literacy; Lawrence Erlbaum.
- [13] O'Shaughnessy TE, Lee Swanson H. [2000] A comparison of two reading interventions for children with reading disabilities. *Journal of Learning Disabilities*. 33(3):257.
- [14] Al Otaiba S, Fuchs D. [2002]Characteristics of children who are unresponsive to early literacy intervention. *Remedial and Special Education* 23(5):300.
- [15] Spitzer RL. [2002]DSM-IV-TR case book: American Psychiatric Pub.
- [16] Shirazi S, Nilipour R.[2006] Diagnostic reading test. Tehran: University of welfare and rehabilitation..
- [17] Rehner K, Poulacheck A.[2000] Reading psychology. Translated by Keivani, M. Tehran. University Press Center.
- [18] Ehri LC.[2005] Learning to read words: Theory, findings, and issues. *Scientific Studies of reading*. 9(2):167-188.
- [19] McDougall P, Borowsky R, MacKinnon G, Hymel S. [2005]Process dissociation of sight vocabulary and phonetic decoding in reading: a new perspective on surface and phonological dyslexias brain and language.92(2):185-203.