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The effectiveness of matching the visual learning style and the brain information processing style in students with dyslexia

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ABSTRACT

Background and Aim: Special learning disorders include a heterogeneous group of children and adults who have problems in the areas of cognitive, academic and communication-social skills, and work. The purpose of this research is to investigate the effectiveness of matching the visual learning style and the brain information processing style in students with dyslexia, boys and girls in the first year of elementary school. **Methods:** The current research was quasi-experimental and pre-test, post-test, follow-up and control group design. After receiving the code of ethic Among the male and female students in the first, second and third grade of elementary school in Qom and referred to government and non-government disorder centers in the academic year 2018-19, through targeted sampling, 102 people who met the criteria for entering the research were selected and randomly placed in two experimental groups (51 people) and control group (51 people). The treatment sessions were conducted in 16, 45-minute sessions (two sessions per week) using Eishiner's model and walking learning style in the experimental group. In order to collect data from the Wechsler Children's Intelligence Scale, 4th Edition, Checklist for the assessment of the superior side of the brain, Walk Learning Styles Questionnaire, Chapman and Edinburg Hand Excellence Questionnaire, Delacato's brain development table And the analysis of the content of the Persian book of the first grade of elementary school was used with the visual index (the basis of the content of the textbooks is based on three visual, auditory and movement styles). Data using spss 23 software and the statistical method of covariance analysis and GEE (Estimation of generalized equations) and paired t was analyzed. **Results:** The findings showed that the effect of consonance in the group with the superior right visual style of consonance in the score of orientation, visualization, listening accuracy, visual accuracy, motor accuracy and writing is significant ($P<0.05$). The effect of consonance in the group with superior left visual style of consonance is significant in visualization score, movement accuracy, writing, orientation, auditory accuracy and visual accuracy. Congruent effect in the group with superior right visual style, there is a significant difference in the score of orientation and motor accuracy. The effect of congruence in the group with incongruent superior right visual style is not significant in the writing score and visualization dimensions, listening accuracy and writing accuracy and total writing score. The effect of congruence in the group with superior left visual style of incongruent in the writing score and its dimensions is significant ($P<0.05$) and the two-month follow-up of the results showed the stability of the results. **Conclusion:** Consonant is an effective intervention method on the conflict between superior visual learning style and cerebral information processing style in insufficient writing.

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Introduction

Specific learning disabilities, unlike other disabilities, are hidden disabilities because there are no obvious symptoms that can be immediately recognized in many cases. Therefore, it seems that some of these problems are caused by the lack of awareness of parents and teachers with educational, developmental and neurological methods and the use of learning styles. Identifying them will become a treasure that will change both their world and the world around them. Knowing these factors can significantly prevent the occurrence of this failure (Rahimi, 2013). One of the factors that can be effective in improving or preventing these disorders is learners' learning styles. This term has been used in the literature and scientific texts for the past 30 years, which have relatively scattered and different concepts. (Bideford, 2006) learners have their preferred learning styles. These styles include visual style (learning through charts, tables, and diagrams), listening style A (learning through lectures), R reading and writing style (learning through reading and writing), and functional or kinetic movement style K (learning is through touching, hearing, smelling, tasting, seeing) (Zamani & Kabudi, 2017). Moreover, the lateralization of the brain in humans means creating a difference in the function of the two hemispheres of the brain, which most researchers use to measure lateral superiority, the opinion of lateralization of action and the superiority of the brain hemispheres. Side superiority means more habit in using the foot, hand, eye, and ear of one side of the body, which happens simultaneously with the specialization of one hemisphere for language, which is an important element in the level of students' learning ability (Zamani & Kabudi, 2016). Papadato Pesto and his colleagues (2018) conducted research titled Educational Neuromatic Learning Styles: Disagreement between Teachers' Judgment, Self-Evaluation and Students' Intelligence. The results of self-evaluation and teachers' evaluation show that teachers need to determine the learning style of knowledge to evaluate students accurately. Also, there was no correlation between students' intelligence and teachers' learning style assessment.

Caemmerer and his colleagues (2018) conducted research titled the effects of cognitive abilities on the academic success of children and adolescents: according to the evidence of the Wechsler Five Intelligence Test and the Wechsler Individual Achievement Test. This research aimed to investigate the relationship between the cognitive abilities of children and adolescents and their reading, writing, and math skills. The findings show that comprehension has a direct effect on all reading and writing skills, while fluid reasoning has a direct effect on writing and math skills. Also, processing speed directly affects reading skills, math mastery, and math calculation skills. Also, the results showed that the effect of general intelligence on all achievement skills is significant. However, the effect of broad cognitive abilities is indirect and overlaps with fluid reasoning. Also, reading, math, and writing in children and teenagers are affected by their cognitive abilities, which can be affected by age of people. Ali Al-Jamal and Mezi Mustafa (2017), in a study titled "The Effects of Learning Styles on Students' Academic Performance," showed that learning styles effectively improve students' reading and writing performance. The results of the research by Anakamacho and Alvis (2016) showed that the effect of writing problems on students' motivation to learn to read and write effectively is one of the most necessary and important goals in elementary schools. However, writing is much more complicated and can cause demotivation for first-grade students.

The results of the research based on theoretical transformational therapy, Dadkhah et al. (2015) showed that cognitive rehabilitation therapy could be used as a new and attractive method for children along with other common methods for spelling disorders, taking into account individual differences to improve the performance of students in writing spelling. This research investigates the effectiveness of combining visual learning and cerebral information processing styles in students with dyslexia, boys and girls, in the first year of elementary school.

Method

The present research method was a semi-experimental type with a pre-test-post-test design with a control group. The statistical population includes all the students of the third grade of the first period of elementary school who referred to government and non-government learning disorders centers in 4 centers in four districts of Qom province in the academic year of 2017-2018. The sample of the study was 102 boys and girls with an age range of 7-10 years, using the

purposeful sampling method, who met the criteria for entering the study, and were randomly divided into two experimental (51 people) and control (51 people) groups.

Tools

1. Wechsler IQ test for children, 4th edition: this test has 15 scores, of which ten scores are equal to the main tests, five scores are included in the substitute tests, as well as five process scores are obtained under the title of supplementary information in the fourth edition, which information It provides application for clinical professionals. The general ability scale is obtained from the sum of the two factors of verbal comprehension and perceptual reasoning. From the sum of the two factors of active memory and processing speed, cognitive dominance is obtained, and general intelligence is calculated from the total of ten main subtests. This scale was validated by Kamkari, Shekarzadeh, Afrooz, & Halet (2012) in Tehran province.

2. Checklist for observation of cerebral laterality superiority: including assessment of laterality superiority of all four limbs, hands, eyes, ears, and feet by two-hand superiority evaluation questionnaires of Chapman and Edinburg (1987) as well as brain neurodevelopmental table to calculate the laterality superiority score of hands and feet, ear and eye, the basic formula of Kgodel filed.KQ-(Σ-RΣL)/(ΣL+ΣR)×100 was used. The validity of the Chapman questionnaire in Alipour's research (2006) Cronbach's alpha is 0.94, the physical questionnaire of its two halves is 0.94, and its retrieval reliability is 0.92. Its two halves were approved by 0.92.

3. Assessment of learning style: by analyzing the content of the Persian book of the first three elementary courses, which has three indicators of visual, auditory, and movement, it was determined through two axes of verbal and non-verbal reasoning in the form of pictures, written words in a matrix. Walk Learning Styles Questionnaire: This questionnaire is used to determine how to understand information from three sensory modes: visual, auditory and kinesthetic. This questionnaire, which was adapted from Lilienfeld (2011) and translated, reliability of this questionnaire is calculated by Cronbach's alpha with a validity of 0.86 and has qualitative content validity. In order to carry out the research, therapy sessions were conducted in 16 45-minute sessions (two sessions per week) using Eishiner's model and the learning style of walking for the visual style in the experimental group, while it was not implemented in the control group. At the end of the treatment sessions and during 8 weeks. After the intervention, the students of the experimental group were again evaluated in the field of dyslexia.

Results

The mean and standard deviation of age in the experimental group was (0.80±15.89), and the control group was 0.79±16.10. The Chi-square test showed no significant difference in age between the two research groups (P>0.05). In the experimental group, 5 (31%) were girls, and 11 (69%) were boys. In the control group, there were 6 (37.5%) girls and 10 (62.5%) boys. The data related to the dependent variables in the pre-test, post-test, and follow-up with descriptive indicators of average and standard deviation are reported in the table below.

As can be seen in the above table, the descriptive statistics of the total writing score have changed according to the brain processing style in the pre-test and post-test in the experimental group -40.43 and the control group -0.20. Based on the above table, its results were presented in the form of two sets of variables for which the conditions of covariance analysis were available and the set of variables for which the analysis was based on GEE. At the error level of 0.05, the consonance effect is significant in the group with the superior right visual style of the consonance in the orientation score .

At the error level of 0.05, the effect of consonance in the group with the superior right visual style of consonance is significant in visualization score, listening accuracy, visual accuracy, movement accuracy, and meaningful writing. At the error level of 0.05, the congruence effect is significant in the group with the superior left visual style of congruence in the visualization, motor accuracy, and writing score. At the error level of 0.05, the effect of congruence in the group with superior left visual style is significant in orientation, auditory accuracy, and visual accuracy. There is a significant movement difference. At the error level of 0.05, the effect of congruence in the group with the superior right visual style of incongruent in writing score and dimensions of visualization, listening accuracy, writing accuracy, and total writing score is insignificant. At the error level of 0.05, the congruence effect is significant in the group with incongruent left

superior visual style in the writing score and its dimensions.

Conclusion

This study aimed to measure the effectiveness of combining visual learning style and brain processing style in dyslexic students. The findings showed that matching superior learning style and brain processing style significantly affects the performance of students with poor writing ability. No study about the effectiveness of matching visual learning style and cerebral information processing style in students with dyslexia was found in domestic and foreign studies. However, the present study's findings align with Lipuska and his colleagues (2019) research results on phonological processing, as the mediating relationship between central auditory and visual processing is consistent with significant effects on reading and writing skill development. Moreover, these findings are in agreement with the results of the research of Kitno, Mori Shiro, and Merio Vano (2018) about investigating left-handed agronia with disorders in the left upper parietal region without lesions. Their result showed that left upper parietal disorders without upper left lesions, without head and neck lesions, the possible accuracy of left-handed agraphia and the neural mechanism for writing with the left or right hand are aligned at the level of performed dissection, and are consistent with the results that specific learning disorders as a heterogeneous group. They are known to have problems in language processing (speech and writing). These people's problems manifest in understanding, speaking, reading, writing, spelling, thinking, and performing mathematical calculations. Learning disability refers to children's problems in academic fields and develops over time and cognitive dimensions (Kohli, Sharma, & Padhy, 2018).

In line with the current study, the effect of writing problems on students' motivation to learn to read and write effectively and its quality improvement is one of the most necessary and important goals in elementary schools. However, writing is much more difficult and can be demotivating for first-grade students (AnaCamacho & Alvis, 2016). It is also in line with Sissions et al., (2016) study that students' writing skills provide a path for students to be more successful in university and later in career advancement. From a linguistic point of view, students' spelling problems are caused by script problems, the influence of students' local accents and dialects, and the phonetic processes of deletion, conversion, increase, and heart, but from a psychological point of view, they originate from the following things: weakness in auditory sensitivity, weakness in auditory memory, weakness in visual memory, weakness in visual sequence memory, alliteration, reverse writing, inaccuracy, poor writing (Tabrizi, 2018) is in line with this study learners have their preferred learning styles, these styles include visual style (learning through graphs, tables, and diagrams), listening style (learning through lectures), reading and writing style (learning through reading and writing) and functional or kinetic movement style (learning is through touching, hearing, smelling, tasting, seeing) by (Zamani & Kabudi, 2017). A common point of view about writing is that writing is the communication and transmission of information and ideas through a system of written signs. However, of course, this definition does not pay attention to the existential nature of writing and only observes its dynamics. Writing includes discovering what we want to express through writing, arranging and organizing the message in the form of language, putting the message on paper, revising and making the necessary corrections, and finally presenting it to the reader in a suitable way. These steps are separate from tasks such as preparing the pen, incomplete starters, and other activities necessary for some writers. In fact, writing is a complete creation and creativity, on one side of which is the creation of thoughts and ideas, and on the other side, the creation and ordering of these thoughts in the desired language formats (Zarei, 2017) have been carried out in line with the research. One of the limitations of this research is that due to some problems, it was not possible to follow up and implement the research with groups with larger samples. Therefore, it is suggested that researchers conduct this research with larger groups to increase the generalization power.

Conflict of Interest

According to the authors, this article has no financial sponsor or conflict of interest.

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