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The Comparison Of Self-Regulation, Planning, And Verbal Memory In Students With And Without Learning Disorders

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Abstract

Objective: This study aimed to the comparison of self-regulation, planning, and verbal memory in students with and without learning disorders.
Methods: The statistical population included all elementary school students with learning disorders and normal students. Forty students with learning disorders were selected by convenience sampling method, and 40 normal students were selected by stratified random sampling method. The two groups in terms of age, gender, educational level, and intelligence matched. Data were collected using the Conners (2004) Neuropsychological Learning Disabilities Assessment Questionnaire the Coolidge Neuropsychological Test (2002), Zimmerman and Matinspons (1986) self-regulation, and children's Wechsler intelligence test for verbal memory (1987) was used. Multivariate analysis of variance (MANOVA) was used to analyze the data.
Results: The results indicated that self-regulation and verbal memory in students with learning disorders were lower than in students without learning disorders ($p = 0.001$). also, An independent t-test was used

to analyze the data. Findings showed that planning in students with learning disorders was lower than in students without learning disorders ($p = 0.001$).

Conclusion: Based on the results, it is suggested that to improve self-regulation and verbal memory in students with learning disorders, psychological strategies should be considered, and more attention should be paid to those involved in education. Also, it is suggested that students with learning disorders should pay attention to psychological strategies to improve their planning ability and require more attention from education professionals.

Keywords: learning disorders, self-regulation, verbal memory, Planning.

Introduction

Learning Disorder refers to disorders associated with difficulties in acquiring and using skills (listening, speaking, reading, and writing skills, organizing, planning, reasoning, and math) (Grassman, 2010). According to the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders, Special Learning Disorder is a developmental/neurological disorder of biological origin and is the basis of cognitive disorders and is associated with behavioral symptoms. Learning difficulties are characterized by one of the following symptoms: 1) incorrect and complex reading of words, difficulty in understanding meanings, spelling problems, difficulty in writing, difficulty in calculating numbers, and difficulty in understanding mathematics, 2) this inadequacy in abilities are influenced by a person's chronological age, interfering with academic activities and job performance or personal daily activities, 3) These problems begin during the school years, and 4) Should not interfere with intellectual disability, visual or auditory acuity and other mental or neurological disorders, lack of fluency in the language of university teaching and psychological distress. Students with these disorders are far less successful than expected from their age and level of intelligence and have unsatisfactory performance in visual and auditory information regulation, memory, and attention (American Psychiatric Association, 2013). One of the most important psychological issues in these students that is less considered is selfregulation. According to Bandura (1997), selfregulation is the use of abilities and capabilities of self-direction, self-control, and autonomy. Zimmerman (1990) refers to self-regulation in learning as the learner's active participation (behaviorally, motivational, cognitive, and metacognitive) in the learning process to maximize the learning process. Motivational selfregulation refers to the active use of motivational guides that maximize learning and reduce fear and anxiety. Cognitive self-regulation refers to the active application of cognitive strategies (which are task-specific), and metacognitive selfregulation refers to the active application of metacognitive strategies (supervisory and managerial strategies) that maximize learning. Self-regulatory management is a crucial factor in children, adolescents, and adults (Pajars and Valyanth, 2002; Kaprara, Fyda, Schyvn, Del Bvy, and Barbaranly, 2008). And is associated with health promotion and is of particular importance in health control (Bandura, 2005). The results of Fulk, Brigham, and Lahman (1994) indicated those students with and without learning disorders have significant differences in self-regulation. Lackave, Margalit, Ziv, & Ziman (2006) and Baird, Scott, Deering, and Hamaill (2009) have also shown that students with learning disorders have low social and academic self-efficacy.

Klassen (2010) also demonstrated that students without learning disorders have higher selfregulation than students with learning disorders. Research has also shown that students

with learning disorders show dysfunctions in verbal memory compared to normal students (Beckman and Nyberg, 2010). After the information is received from the sensory channels, these channels are memorized and then reminded. One demonstrates the ability to recall what one has experienced in the past through the senses in various ways, including remembering and writing the alphabet, drawing geometric shapes, and indicating memorizing a word's spelling (Solso and Livery, 2005). A prerequisite for all the above behaviors is that the person knows the names of the letters and can use writing instruments. Still, sometimes it is observed that some students, despite having high intelligence and healthy sensory channels, have visual or verbal memory problems. Verbal memory is not limited to sensory memory, and short-term and long-term memory is their repositories.

Information based on its nature, whether visual or auditory, is stored and processed in these repositories (Beckman and Nyberg, 2010). One of the characteristics of verbal memory is that the more objective and powerful the word-processed image is, the easier it is to retrieve it (Rodenriz and Quinlan, 2000).

Swanson and German (2006) indicated in their research that the cognitive performance of normal children in verbal problem-solving measures (verbal working memory, spatial-visual working memory) is better than children with math learning disorders. Other results suggest that children with learning disorders in mathematics in solving spatial-visual, verbal working memory perform better than children with learning disorders (learning math and reading). Ramezani and Farazi Golfzani's (2001) results also showed poor performance of students with math disorders in a memory test. Many other studies have also demonstrated a significant relationship between learning disorders and memory (Seif Naraqi and Naderi, 2010; Ahadi and Kakavand, 2004; Abedi, Malekpour, Molavi, Arizi Samani, and Amiri, 2008).

Consumption of cigarettes, alcohol, and other drugs is an important danger. Consumption of these substances is associated with an increased risk of suicide, Killing other people, dangerous accidents in youth and adolescence, and an increased risk of heart disease and cancer in adulthood. The age of onset of drug use in our country has decreased. According to the statistics from the visitors to the rehabilitation centers (self-reported), during1375-1377, the share of those who started using drugs before the age of 10 increased from almost zero in 1375 to 21% in 1377 (Ghobadizadeh, Yousefi, and Ghaderi 2018).

The results of several studies conducted on students show that 14.2% to 33% of Iranian adolescents use psychedelics and 5% to 26% use grass, 37.2% to 80.5% alcohol, and 5% to 47% use cannabis. Gradually, people tended to use synthetic drugs from natural drugs such as heroin, grass, cannabis, etc. The percentage of people addicted to these substances increased and the age of addiction also decreased. One of the most important consumables that quickly spread among young people and adolescents around the world was psychotropic substances 1 or hallucinogens. Hallucinogens contain a large group of chemicals that are unable to perceive consumers about their surroundings. In the past, these substances were taken from some fungi and were known as psychotropic drugs, but in recent years, with the help of new human technologies, we have been able to make new synthetic hallucinogenic chemicals that are stronger than previous materials and pores, much more dangerous than its lead types. Adolescents who use cigarettes, alcohol, and other substances drop out of school more than other students, enter university less and have less academic achievement, and have academic failure like people with reading disorders (Dehghani and Badri Gargari, 1399).

Also One of the most important psychological issues in these students that is less considered is the planning variable. Research has shown that

students with learning disorders in planning are one of the components of executive actions that have shortcomings (Fairleigh and Noame, 2010). The ability to plan as one of the brain's important executive actions and activities, both in terms of the role in performing daily activities of life or its role in coordinating other actions to achieve the purpose, has been considered by various researchers (Shallice, 1982). Since the ability to plan and organize is one of the significant actions of the forehead, it is believed that injury or disruption in the forehead and some subcortical areas of the brain with the child's ability to plan is significantly related (Fuster, 2008). Fairleigh et al. (2010), in their research on the problems of students' executive actions, showed that students with math disorders in many executive actions and students with reading disorders have difficulty in inhibition, planning, and flexibility. Also, Latzman, Elkovitch, Young, and Clark (2010) showed that executive actions extend throughout the developmental process into adolescence and youth; therefore, they are very influential in academic achievement. The results of Blair, Zelazo, and Greenberg (2005) also indicate that education and the development of executive actions play an essential role in the development of social and academic abilities. In general, according to the results of studies, it can be said that comparing students with and without learning disorders is effective in improving the psychological and educational processes of children with learning disorders. On the other hand, considering the long-term consequences of learning disabilities and their increasing prevalence among school students, and the essential role of learning in modern life, proper planning is needed to improve the situation of these students and correct their learning problems. Therefore, the present study aimed at the comparison of self-regulation, planning, and verbal memory in students with and without learning disorders.

Method

The current study is a descriptive causalcomparative (retrospective study) type. The statistical population includes all students aged 7 to 12 years with and without learning disorders in Gonbad E Kavoos. They were studying in 20152016, of which 40 students with learning disorders used the method available sampling and 40 normal students were selected as a comparison group using the cluster random sampling method from neighboring schools. (80 people in total) the two groups were matched based on the variables of gender (boy), age (7 to 12), intelligence (85115), and educational level (fifth). The following instruments were used to collect data:

Conners Psychiatric Neuroscientific Learning Disabilities Assessment Questionnaire:

This test was developed by Conners (2004) to assess neuropsychological skills, including attention, executive functions, memory, sensorymotor activities, and visual-spatial processing in children 5 to 12 years old, which evaluates the opinion of the respondents on a 4-point Likert scale (not observed to severe). Jadidi et al. (2011) have translated and standardized this questionnaire. Internal reliability coefficients with a range of 0.75 to 0.90 and retest reliability coefficients with an interval of eight weeks of 0.60 to 0.90 have been reported. The validity of the structures of Conners forms was obtained by using the methods of factor analysis, and their differential validity was confirmed by statistically examining the ability of the questionnaire to distinguish between people with hyperactivity-impulsivity disorder from normal and other clinical groups. Jadidi et al. (2011) evaluated the construct validity of this tool as appropriate and reported the reliability of this tool as Cronbach's 0.72.

Wechsler Intelligence Scale for Children:

This scale was developed by David Wexler in 1969 and had 12 subscales that have six verbal scales and six practical scales and give three types of verbal intelligence benefits: practical and total. In the simultaneous validity study, the correlation coefficients of verbal, practical, and total IQs were 0.84, 0.74, and 0.85, respectively (Heidari, Amiri, and Molavi, 2012). Seter (1992) stated that the correlation between this test and group intelligence tests is 0.66. The Stanford Binet test is 0.78, and the academic achievement test is 0.71 (Marnat, 2003; translated by Pasha Sharifi and Nikkho, 2008), which indicates the high validity of this test.

Student Self-Regulation Questionnaire:

This tool was developed by Zimmerman and Matinspons (1986) and had 15 items. Fourteen self-regulated learning strategies include selfassessment, organizing and transmitting information, breaking down goals and planning, information search, recording and selfmonitoring, organizing the environment, selfconsequence, hierarchy and memorizing, peer help, Getting help from a teacher, getting help from adults, reviewing previous exams, reviewing notes and booklets, and reviewing textbooks are included in this questionnaire. The subject is asked to rate the use of the above strategies in six learning situations according to a four-point Likert scale from very low(rarely) to high (most of the time). In addition to the fourteen strategies, a question of 15 is also used, which does not refer to a strategy but allows the student to answer creatively in a creative way from the above. Scores range from 15 to 60. Zimmerman and Martinez (1986) reported the convergent validity of the instrument at 0.7. Mahmoudi (1998) said the face validity of the questionnaire through the approval of acceptable experts and reported the reliability of this tool through retesting and internal consistency with Cronbach's alpha method of 0.68 and 0.56, respectively. Also, Samadi (2004) noted the reliability of this questionnaire through retest and internal consistency methods of 0.64 and 0.62, respectively (Barazdan, 2012).

Neuropsychological and personality questionnaire:

This test was developed by Coolidge (2002). This test detects several neurological and behavioral disorders in children and adolescents aged 5 to 17 years. Each disorder has a distinct subscale two of these subscales evaluate executive actions(functions) with 19 items. These two subscales measure executive actions in the organization's three areas: decision-making, planning, and inhibition. The reliability was 0.85 for the Organizational and Decision-Making Scale and 0.66 for the Inhibition Sub-Scale. The researchers also obtained the internal consistency of the two subscales using Cronbach's alpha (on a separate 50-person sample) of 0.91. The obtained internal consistency was also calculated separately and was 0.81 for organization, 0.82 for decision-making, and 0.52 for inhibition (Alizadeh and Zahedi-Pour, 2005).

Addiction Scale

Has been standardized by Kurd Mirza (2002). This questionnaire is designed based on studies that besides people addicted to one of the types of drugs, there are a significant number of people who are prone to drug addiction in terms of personality. The present questionnaire is based on the above research and aims to prepare and evaluate the diagnostic value of the three subscales of addiction, addiction readiness, and revised scale, which is derived from the clinical scales of the Minnesota Multidimensional Questionnaire. It should be noted that this scale will not be used in this study. After a research study, this questionnaire was jointly prepared in the form of a 90-item form and was standardized on 108 addicts volunteering for treatment, as well as 500 students. In this study, Cronbach's alpha values in the scales of admission to addiction, fertility, and readiness for addiction were

reported to be 0.75, 0.48, and 0.29, respectively. The Addiction Recognition Scale was developed to measure respondents' propensity to accept problems related to alcohol and drugs, using the retest method in the normative sample for men and women to be 0.89 and 0.84, respectively. The validity coefficient of the Addiction Readiness Scale has been reported to be 0.62 and 0.78, respectively, using the retest method in the normative sample for men and women (Dehghani and Badri Gorgi, 2020).

Verbal Paired Associates Test:

This test is one of the revised forms of the Voxler Memory Scale (Wechsler, 1987), which has eight-word pairs. After reading these words, the examiner says the first word of each pair, and the subject should remember the second word. The test can be repeated up to six times but ends after the correct reminder of eight pairs in each test stage. The maximum test score is 24. Mirabi (2003) has studied the psychometric parameters of the Wechsler Memory Scale, and based on the results of the research, the validity coefficient of the scale has been estimated to be 0.63 using Kuder-Richardson Formula 20. The validity of the test construct has also been shown by factor analysis through principal component analysis indicating that the set of scale materials is saturated with five general factors.

Procedure

Gonbad E Kavoos city has 253 primary schools, of which about 54 are nomadic schools, and the rest include urban and rural schools. These schools are scattered into six educational poles. After coordination with the education of Gonbad E Kavoos city and satisfying the parents of the school and the sample students, the sample was selected, and the questionnaires were delivered to them. The completion of each questionnaire took about 10 to 20 minutes.

Results

The statistical characteristics of the subjects in terms of two variables of self-regulation and verbal memory separately in students with and without learning disorders are presented in Table 1.

Table 1. Mean and standard deviation of self-regulatory and verbal memory variables in students with and without learning disorders

Variables	Students without Learning disorders		Students with Learning disorders	
	M	SD	M	SD
self-regulatory	34.025	3.58406	20.525	3.82962
verbal memory	11.5	1.92154	6.225	1.59305

According to the information presented in Table 1, the average score of self-regulation and verbal memory of students without learning disorders is higher than students with learning disorders. Multivariate analysis of variance was used to compare the research variables in the two groups. Before performing a multivariate analysis of variance, the hypotheses of this test were tested. The Kolmogorov-Smirnov test tested the normality of the dependent variables of self-regulation and verbal memory. The test results showed that neither of the two variables of self-

regulation (p = 0.195) and verbal memory (p = 0.304) was significant, so both variables have a normal distribution, and analysis of variance can be used.

Leven test was also used to test the same variance of the research variables, and the results showed that the level of significance for both variables, self-regulation (sig = 0.483) and verbal memory (sig = 0.214), is higher than 0.05, so the assumption of homogeneity of variances is observed for both variables. In addition, M Box test results confirmed the homogeneity of the covariance matrix of dependent variables at all levels of the independent variable (groups) (P = 0.06, F = 47.2 and Box = 62.7).

Given that the preconditions of the multivariate analysis of variance test, the normality of the distribution, and the assumption of homogeneity of variance and the same variance-covariance matrix are observed for both variables to analyze the data from the analysis variance test, Multivariate was used. The results of this test are presented in Table 2.

Table 2. Results of multivariate analysis of variance for the main effect of group variable on dependent variables

Variable	Tests	Value	F	P	Eta squared
Group	Pilaei-Bartlett	0.852	221.624	0.001	0.852
	Lambda Wicks	0.148	221.624	0.001	0.852
	Hotelling effect	5.756	221.624	0.001	0.852
	The largest root	7.756	221.624	0.001	0.852

As shown in Table 2, the results of multivariate analysis of variance indicated a significant difference between students with and without learning disorders in both variables. Thus, the score of self-regulation and verbal memory in students without learning disorders is significantly higher than students with learning disorders.

Table 3. Results of multivariate analysis of variance on the mean of self-regulatory and verbal memory variables in students with and without learning disorders

Dependent Variable	S.S	d.f	M.S	F	P	Eta squared
Self-regulatory	3645	1	3645	264.98	0.001	0.773
Verbal Memory	556.513	1	556.513	178.652	0.001	0.696

The results of Table 3 indicate that the analysis of each of the dependent variables alone using Bonfroni modulated alpha also showed that selfregulation (F = 264.98, P = 0.001, Eta squared = 0.773) and There was a significant difference for verbal memory (F = 178.652, P = 0.001, Eta squared = 0.696).

The statistical characteristics of the subjects in terms of planning variables separately in students with and without learning disorders are presented in Table 4.

Table 4. Mean and standard deviation of planning variable in students with and without learning disorders

Variables	Students without Learning disorders		Students with Learning disorders	
	M	SD	M	SD
Planning	9.125	3.22003	15.05	3.15375

According to the information presented in Table 4, the average planning score of students without learning disorders is lower than students with learning disorders.

An independent t-test was used to compare the research variable in the two groups. Before performing the independent t-test, the hypotheses of this test were tested. The normality of the dependent variable and planning was tested through the Kolmogorov-Smirnov test. The test results indicated that planning ($p = 0.74$) is not significant, so the variable has a normal distribution, and an independent t-test can be used.

Also, the Leven test was used to test the uniformity of variance of the research variable, and the results showed that the significance level for the planning variable (sig = 0.99) is higher than 0.05, so the assumption of homogeneity of variances for the variable has been observed. Considering that the preconditions of the independent t-test, normality of distribution, and the assumption of homogeneity of variances for the variable have been observed, an independent t-test was used to analyze the data. The results of this test are presented in Table 5.

Table 5. Results of independent t-test on the mean of planning in students with and without learning disorders

Dependent Variable	T Independent	Degree of Freedom	Level of Significance	Effect Size
Planning	8.314	78	0.001	0.46

As shown in Table 5, the independent t-test indicates a significant difference between students with and without learning disorders in the planning variable. Thus, the planning score of students without learning disorders is significantly higher than students with learning disorders.

Discussion and Conclusion

The present study was conducted to compare students' self-regulation, planning, and verbal memory with and without learning disorders. The results indicated that students without learning disorders had higher self-regulation ability and verbal memory than students with learning disorders. Finding that students with learning disorders have lower self-regulatory skills than students without learning disorders, according to Falk, Brigham, and Lahman (1994), Graham and Harris (2003), Wong et al. (2003), Klassen (2007), and Klassen (2010) agree that the difference between students with learning disorders and students without learning disorders is consistent.

Explaining this finding, we can say that self-regulation is an essential factor for human learning (Chen, 2002; quoted in Ao ManChin, 2006). Successful students develop adaptive self-regulated learning strategies and show motivational patterns (such as striving for success, enjoying activity challenges, using learning strategies appropriately, setting specific goals, and developing a high level of self-efficacy) when doing homework.

In contrast, unsuccessful students make less effort to learn and are less interested in doing activities. They cannot set specific goals and learning strategies, have low self-efficacy, and rarely achieve high levels of success (Bembenutty, 2008). Students with learning disorders have low self-regulated learning because they cannot regulate performance and maintain their learning objectives. Zimmerman (2002) believes that students benefit from selfregulatory strategies that are aware of such strategies, use their ability to achieve specified goals in learning activities, and monitor themselves in completing a task. These students make more use of cognitive and metacognitive strategies, are more likely to be referred to by their peers, and have longer perseverance than others (Pintrich and Dergroot, 1990). At the same time, the development of self-regulatory skills is influenced by cognitive factors, such as Metacognitive knowledge, awareness and work memory, motivation, and emotional factors, such as interest and value of work, and behavioral factors, such as time, effort, and management (Klassen, 2010). These cases are weak in students with learning disorders.

Students with learning disabilities show reluctance towards their peers, especially in academic activities (Plate and Glasgow, 2005), have low self-monitoring and self-efficacy, and undoubtedly have useless metacognitive strategies. These students consider the task as a threat and do not show the necessary endurance and stability. In general, self-regulated learning leads to self-efficacy and independence (Wolters, 2003). While students with learning disorders have low self-efficacy and low self-esteem (Baird et al., 2009), the rate of self-regulated learning in them is much lower than in students without disorders. Another finding of the study was that students with learning disorders had lower verbal memory than students without learning disorders, has consistent with the results of Swanson (1993), Swanson, Ashbaker & Lee (1996), Manis et al. (1997), Marshall, Snowling, and Bailey (2001). Also, a group of studies compared the free memory of people with learning disabilities with normal people. Vellutino and Seanlon (1985) compared free reminders for objective and abstract terms in the two groups. Assuming that memory for abstract words requires more linguistic coding ability than memory for objective words. The results showed that this hypothesis was valid in the second grade of elementary school, but in the sixth grade, the degree of group differences in objective words was equal to abstract words. In general, research has shown that people with learning disorders perform poorer in free recall tasks than normal individuals and do not use cognitive strategies effectively. In addition to the fact that the developmental strategy more than the mental review (repetition) strategy differentiates the performance of groups, also the more severe the learning disability, the more failure is observed in both general memory and long-term memory (Buserman & Obrzut, 1981; Swanson, 1983).; Torgeson and Goldman, 1977). Ormrod and Lewis (1985) also compared the memory skills of adolescents with and without reading disabilities and adolescents with poor reading ability. The scores of the three groups on memory tasks (numbers, pictures, related and irrelevant words of associative pairs and phrases) in each auditory, verbal, and visual aspect were examined. The results showed that people without disorders in all tasks had significantly better performance than disorders. The performance of people with poor reading ability in some cases was like the performance of people with disorders. Still, in other subjects and primarily most visual tasks, no significant difference was observed. Explaining this finding, we can say that verbal memory is an essential issue for learning, information processing,

and speech (Lerner, 1997; Das, Mensink, and Mishwa, 1990; Cutter et al., 2002). The results also showed that students with learning disabilities have a lower planning ability than students without learning disabilities, according to Reynolds (1984), Holboro and Bery (1986), Dengelaa (2003), Bohm, Smedler and Forssberg (2004), Valera and Sidman (2006), Firch and Noam (2010), Qamarigivi, Narimani and Rabiee (2009). Getterk, Alovi, Willis, & Adams (2006), McLean, and Hitch (2001) also found that students with learning disorders in executive actions (functions) (planningorganizing) performed poorer than children without learning disorders. Students with written expression learning disorders initiate and change performance functions lower than students without written expression disorders. Studies show considerable evidence that teaching executive actions (functions) positively affects children's writing (Melterz, 2007). Blayers and Greenberg (2005) also showed that students with learning disorders scored lower than other students in the areas of executive function. Diamond (2000) also showed that the underdevelopment of executive actions (functions) during the growth phase is closely related to communication and social disorders and learning disorders. Students have the most significant weakness in planning and organizing (Tochi and Lang, 2005; Jefrey and Orat, 2004). In explaining the present finding, it can be said that these students have difficulty in planning, which is an essential part of purposeful behavior and includes setting actions for strategic and effective progress (Anderson, Godber, Smibert, Weiskop, and Ekert, 2000). And students with learning disorders have weak planning (Riter, Tucha, & Lange, 2005; Jeffrey & Orat, 2004). In general, according to the results of this study, it can be said that self-regulation and verbal memory are two essential abilities that, unfortunately, students with learning disorders in these two abilities have a lot of weaknesses compared to normal students. Still, this disability can be compensated by proper planning and training and working with these students. One of the limitations of this study was the specified sample of male primary school students in Gonbad E Kavoos, limiting the generalizability of the results. Therefore, it is suggested that such research be conducted on female students in other cities as well. Also, due to students' lower selfregulation and verbal memory scores with learning disorders than normal students, educational and intervention programs are recommended to focus on improving these variables in students with learning disorders.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author, [MB], upon reasonable request.

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