THE EFFECTIVENESS OF GROUP POSITIVE THINKING TRAINING ON SOCIAL ADJUSTMENT AND REDUCTION OF INTERPERSONAL SENSITIVITY IN STUDENTS WITH MATHEMATICAL LEARNING DISABILITY

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Abstract. The purpose of this study was to investigate the effectiveness of group positive thinking training on social adjustment and reducing interpersonal sensitivity in students with mathematical learning disability. The research method was quasi-experimental with pre-test and post-test with control group. The statistical population of the study consisted of all students aged 13-15 years who suffered from mathematical disorders referring to educational and clinical centers of Karaj in the educational year 2021-2022. Thirty students were selected through convenience sampling from the statistical population, and then each of them was replaced by random sampling in two experimental (n = 15) and control (n = 15) groups. Research tools included the Keymath Mathematics Test, California Social Adjustment Scale, Boyce and Parker Interpersonal Sensitivity measure Scale, and Positive Thinking Training. Positive thinking training was provided to the experimental group for ten 75- minute sessions but the control group received no training. Research data were analyzed using multivariate analysis of covariance. Findings: The results of post-test analysis showed that positive thinking training was effective in improving social adjustment and reducing interpersonal sensitivity in the experimental group (P <0.005). Based on the results of this study, it is suggested that positive thinking training be considered as one of the effective methods of improving social adjustment and reducing interpersonal sensitivity of students with mathematical disorders.

Keywords: Positive thinking training, social adjustment, Interpersonal Sensitivity, learning disability

1. INTRODUCTION

Learning disabilities are a heterogeneous group of disorders that lead to significant problems in the areas of listening, speaking, reading, writing, reasoning, and mathematics (Gartland & Strosnider, 2017). Neurophysiological foundations of learning disorders are still unclear (Jäncke et al., 2019) and learning problems can have wider implications than educational deficits (Waber et al., 2019). One type of learning disability is mathematical learning disability, which is associated with difficulties in numerical comprehension, memorizing mathematical rules, precision, fluent computation, and precision in mathematical reasoning. A Mathematical learning disability can be diagnosed at about age 8 using educational performance tests and screening (American Psychiatric Association, 2013). The prevalence of mathematical learning disability is estimated at between five and eight percent (Wong & Tang, 2015). Learning disabilities cause problems for students in social, emotional, and educational contexts (Freilich, & Shechtman, 2010). One of the social variables hampered by learning disabilities in students with mathematical disorders is social adjustment. Social adjustment involves the adaptation of the individual to his or her social environment, which may be achieved by changing oneself or the environment (Shernoff, 2010). Social adjustment, such as physical, emotional, and intellectual growth, is a continuous quantity and is gradually attaining perfection and is naturally obtained in the course of life through dealing with experiences (Punia, & Sangwan, 2011). Numerous studies indicate the existence of social problems including adjustment in people with learning disabilities (Emadi et al., 2016; Klassen & Lynch, 2011; Sideridis, 2010; Zahed et al., 2012).

Students with learning disabilities are believed to be often neglected and socially rejected

by their teachers and peers. On the other hand, they may not be able to understand social situations like other teens and as a result, they do not understand how others are trying to influence them in what they want to do, or how they see them (Petti et al., 2003). The result of these social and behavioral deficiencies is greater interpersonal sensitivity in this group of people (Narimani et al., 2015). Interpersonal sensitivity has been defined as unnecessary and excessive consciousness and sensitivity to the behaviors and feelings of others (Otani et al, 2014). Individuals with these traits have been described as individuals with extreme mental occupation about interpersonal relationships, keeping their ear on the ground, and being sensitive to interpersonal interactions (Boyce & Parker, 1989). In contrast, individuals with higher levels of distress tolerance may be more capable of adaptive responding to distress or distress-inducing situations (Zvolensky et al., 2011). Narimani et al. (2015) in a study showed that students with learning disabilities are more interpersonal sensitive than their normal peers.

Different approaches have emerged to solve psychological problems. Among these new approaches in the last decade, we can mention the positive psychology approach. A Positive view is a view that focuses more on positive stimuli and less on negative ones, leads to creating a good feeling, building valuable relationships with others, making logical decisions, persistence in confronting problems, resolving life's challenges, and more resistance person, prioritize tasks and reduce adolescent behavioral problems (Tetzner & Becker, 2018). Positive thinking training does not mean activities focused on the negative aspects, treatment, or pathology, but rather it means an emphasis on improving well-being and mental health through activities that lead to the rise of positive cognitive and behavioral effects (Baños et al., 2017). There is now considerable evidence that positive thinking training for people, especially children, and adolescents, to strengthen and improve positive communication with others, promote positive emotions, positive behaviors, positive cognition and, perception, enhance people's well-being and, treat some mental disorders is very useful (Nick Manesh & Zand Vakili, 2015). Research by Saffar Hamidi et al. (2017) showed that positive thinking training is effective in the perception of competence and social skills of children without caretakers and children with irresponsible parents. Dehghannejad et al. (2017) in a study showed that positive thinking training was effective in increasing students' adjustment and resulted in improvement of psychological capital in all its components. Bordbari Taremrsarayi (2012) in his study showed that positive thinking skills training was effective on the emotional and social adjustment of high school girls in sacrificing families. Chaing et al. (2015) showed in a study that positive thinking training is effective on improving students' adjustment skills. Baños et al. (2014) in a study concluded that positive thinking training is effective in enhancing positive mood. Research by Marie et al. (2011) showed that positive psychology training leads to practicing many of the positive psychology values including openness, kindness, honesty, and cooperation. Despite recent research, the effectiveness of positive thinking on social adjustment and interpersonal sensitivity of students with learning disabilities, especially those with a mathematical disability, has not been yet studied.

Because learning disabilities affect many aspects of one's life, most of these students are identified as cloistered, depressed, and lacking in social adjustment students (AL Zyoudi, 2010). On the other hand, due to the importance of social adjustment, the inability to social adjust can negatively affect the educational and social performance of students with learning disabilities affect personal interpersonal relationships, and lead to exclusion, isolation and, increased interpersonal sensitivity (Krapic et al., 2015).

Teaching positive thinking skills to children and adolescents seems to be beneficial to strengthen and improve their positive relationship with themselves, positive relationships with others and life, increase their self-esteem, and academic success. Given the importance of positive thinking and its broad aspects, including its role in adolescent adjustment, the purpose of this study was to investigate the effectiveness of group positive thinking training on social

adjustment and reducing interpersonal sensitivity in students with mathematical disability.

2. METHOD

The present study is a quasi-experimental study with a pretest-posttest design with a control group.

2.1 Population, sample, and sampling method

The statistical population of the study included all students with learning disability referred to educational and clinical centers of Karaj in the educational year 2021-2022. Thirty students were selected through convenience sampling from the statistical population, and then each of them was replaced by random sampling in two experimental (n = 15) and control (n = 15) groups. Inclusion criteria included the presence of subjects in educational and clinical learning disability centers, the age range of 13-15 years, the ability to communicate with other members of the group, parental consent, a low score on the social adjustment measure and, high score on interpersonal sensitivity scale and being interested in participating in research. Exit criteria included receiving the positive thinking training program, and subjects' previous responses to the social adjustment and interpersonal sensitivity questionnaires.

Before and after the intervention, interpersonal sensitivity and social adjustment questionnaires were given to students in both groups. This intervention was implemented outside of the teacher's teaching hours and was conducted in person.

2.2 Research tools

Keymath Mathematical Test: To measure mathematical learning disability, the Keymath Mathematical Test, prepared and conducted by Connolly (1988) was used. This test, which is widely used to identify students with mathematical learning disabilities, was standardized in Iran by Mohammad Ismail and Hooman in 2002. The range of content validity, discriminant validity, predictive validity and, concurrent validity of this test was determined between 0.55 and 0.67. Test reliability in five bases using Cronbach's alpha method was reported between 0.80 and 0.86 (Mohammad Ismail & Hooman, 2002).

California Social Adjustment Measure: The California Personality Inventory consists of two major measures self-adjustment and social adjustment. This scale measures one's personal and social adjustment profile and has been published for the first time by Thorb, Clark, and Tiggs (1989, quoted by Khodayari Fard et al., 2002). In this research social adjustment section of this scale is used. This part of the test has three sub-scales: social skills, antisocial tendencies, and school relationships. The answer to the 45 questions of the social adjustment scale is yes and no. Factor analysis was used to evaluate the validity of this test. The results indicated three factors that explained 0.68 of the total variance.

Interpersonal Sensitivity: This questionnaire was developed by Boyce and Parker in 1989 to measure interpersonal sensitivity or social rejection sensitivity. It has 36 questions that are rated on a 4-point Likert scale from completely false to completely correct. It consists of 5 subscales: interpersonal awareness, need for approval, separation anxiety, timidity, and fragile self-esteem. Boyce and Parker reported a total reliability coefficient of 0.85 and subscales ranged from 0.55 to 0.76 (Boyce & Parker, 1989). The reliability of this questionnaire through Cronbach's alpha was 0.78.

3. INTERVENTION

Positive group thinking training was conducted twice a week for ten 75-minute sessions.

The content of each session was as follows:

Session One: Introduction, clarifying the main frameworks of the group, introducing the

nature and goals of the program.

Session 2: How to think about an event, how to deal with it, identify positive thinking signs and symptoms

Session 3: getting to know and teaching thought-catching skills speaking about positive beliefs and self-talk and fighting negative thoughts for students

Session 4: teaching the skills to change the subjective imagery and positive internal imagery and presenting the relevant training table and pictures and language use training

Session 5: Assessment of beliefs. Teaching to assess attitudes and training to look positive at fears and ward them off self and confronting beliefs surrounding that fear

Session 6: familiarizing students with the personalization dimension, one of the styles of thinking expressed by Seligman.

Session 7: Conflicting and dealing with disastrous attitudes.

Session 8: Familiarizing students with the inclusive thinking style proposed by Seligman.

Session 9: Providing the skill of creating optimism through optimistic thinking and acting on it

Session 10: Examine the effectiveness of the presented positive thinking skills, explain how the students apply the skills learned in daily life, terminate the session, and thank and appreciate the participants for the sessions.

3.1 Data analysis

Data analysis was performed using SPSS. v22 software; The normality of the score distribution was tested using the Kolmogorov-Smirnov test, and the data had a normal distribution. multivariate analysis of covariance (MANCOVA) was used with a significance level of less than 0.05.

4. RESULTS

The overall mean of the interpersonal sensitivity scores for the experimental group in pre and post-test was 73.69± 5.15 and 61.39±7.11, respectively; in the experimental group, a greater decrease in scores was observed in the post-test compared to the pre-test. This mean score in pre and post-test was similar (72.09±6.16 and 68.76±6.88, respectively) (Table 1).

Table 1. Statistical Description of Interpersonal Sensitivity Scores in Two Measurement Stages by Experimental and Control Groups

Variable	**Experimental**				**Control**			
	Post-test		Pre-test		Pre-test			
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
interpersonal awareness	2.535	12.08	14.71	3.023	14.53	3.543	15.27	4.274
need for approval	1.379	9.02	11.11	1.888	10.16	0.445	10.29	0.468
separation anxiety	5.486	11.33	14.27	5.021	13.67	5.394	14.87	5.527
timidity	2.667	12.40	14.87	2.669	13.27	3.035	13.80	2.678
fragile self-esteem	2.882	16.56	18.73	2.712	17.13	3.044	17.87	3.420
Total score of Interpersonal Sensitivity	7.118	61.39	73.69	5.158	68.76	6.887	72.09	6.614

In the experimental group, an increase in mean score of social skills (11.07±2.54 vs 9.03±3.72) and mean school relations scores (10.40±2.87 vs 8.53±3.06) and a decrease in mean antisocial tendencies scores (9.37±3.76 vs 8.53±3.06) were observed in the post-test compared to the pre-test (Table 2). The mean scores of the control group in the pre-test and post-test did not change significantly (Table 2).

Table 2. Statistical Description of Social Compatibility Scores in Two Measurement Stages by Experimental and Control Groups

Variable	Experimental				Control			
	Post-test		Pre-test		Pre-test			
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
social skills	11.07	2.549	9.03	3.728	9.40	3.334	9.93	2.604
Anti-social tendency	9.37	3.766	11.13	4.627	10.80	4.004	11.25	3.790
School relationships	10.40	2.874	8.53	3.067	8.27	2.789	8.93	2.187

Multivariate analysis of covariance (MANCOVA) was used to evaluate the effectiveness of group positive thinking training on social adjustment and interpersonal sensitivity of students with mathematical disability. Before performing this test, the statistical assumptions of normality of the scores the distribution using the Kolmogorov-Smirnov test, the homogeneity of variances using the Levin test, and covariance matrix homogeneity using the MB box test were evaluated. Given the above assumptions didn't violate related rules, using multivariate analysis of covariance is permissible.

Table 3. Results of Multivariate Covariance Analysis of Comparing Social Adjustment of Experimental and Control Group

trace	tests	values	F	Degree of freedom	Degree of freedom of error	Significance level	Value of trace
group	Pillais Trace	0.615	12.253	3	23	0.001	0.615
	Wilks Lambda	0.385	12.253	3	23	0.001	0.615
	Hotelling trace	1.598	12.253	3	23	0.001	0.615
	Roy's largest root	1.598	12.253	3	23	0.001	0.615

As can be seen, the significance level of all four relevant multivariate statistics, namely, Pillais Trace, Lambda Wilks, Hotelling trace, and Roy's largest root, was less than 0.01 ($p < 0.01$). Thus, the null hypothesis is rejected and it is clear that there is a significant difference between the level of distress tolerance in the experimental and control groups in the post-test. On this basis, it can be said that group positive thinking training programs have been effective in social adjustment. To examine the differences between the experimental and control groups in each of the social adjustment subscales, the within-subject effects test was used. The results are presented below.

Table 4. Within-subject effects test for comparison of experimental and control group social adjustment subscales at post-test

Value of trace	Significance level	F	Mean squares	Degree of freedom	Sum of squares	source	variable
0.253	0.008	8.462	14.507	1	14.507	Inter group	Social skills
			1.714	25	42.858	Intrergro up	
0.374	0.001	14.910	33.546	1	33.546	Inter group	Anti-social tendency
			2.250	25	56.248	Intra group	
0.207	0.017	6.512	12.269	1	12.269	Inter group	School Relationship
			1.884	25	47.105	Intra group	

Table 4 presents the results of the within-subject effects test for comparison of social adjustment subscales in the experimental and control groups at the post-test stage. According to the presented results, the F value was significant for all subscales at 0.05 level (P <0.05). Therefore, the null hypothesis is rejected and the research hypothesis is confirmed. By comparing the mean scores of the two groups, it is observed that scores of social skills and school relations of the experimental group increased in the post-test and the mean scores of the anti-social tendency decreased.

Table 5. Results of multivariate analysis of covariance for comparing interpersonal sensitivity of experimental and control groups

trace	**tests**	**values**	**F**	**Degree of freedom**	**Degree of freedom of error**	**Significance level**	**Value of trace**
group	Pillais Trace	0.556	4.756	5	19	0.006	0.556
	Wilks Lambda	0.444	4.756	5	19	0.006	0.556
	Hotelling trace	1.251	4.756	5	19	0.006	0.556
	Roy's largest root	1.251	4.756	5	19	0.006	0.556

As can be seen, the significance level of all four relevant multivariate statistics, namely, Pillais Trace, Lambda Wilks, Hotelling trace, and Roy's largest root, was less than 0.01 (p <0.01). Thus, the null hypothesis is rejected and it is determined that there is a significant difference between the interpersonal sensitivity of the two groups in the post-test. On this basis, it can be said that group positive thinking training programs have been effective in interpersonal sensitivity. To examine the differences between the experimental and control groups in each of the interpersonal sensitivity subscales, the within-subject effects test was used. The results are presented below.

Table 6. Within-subject effects test to compare the interpersonal sensitivity subscales of the experimental and control groups in the post-test

Value of trace	Significance level	F	Mean squares	Degree of freedom	Sum of squares	source	variable
0.229	0.016	6.826	19.312	1	19.312	Inert-group	interpersonal awareness
			2.829	23	65.075	Intra-	

						group	
0.286	0.006	9.200	10.849	1	10.849	Inert-group	Need for approval
			1.179	23	27.123	Intra-group	
0.214	0.020	6.262	25.837	1	25.837	Inert-group	separation anxiety
			4.126	23	94.900	Intra-group	
0.216	0.019	6.324	16.567	1	16.567	Inert-group	timidity
			2.620	23	60.253	Intra-group	
0.168	0.042	4.655	15.224	1	15.224	Inert-group	fragile self-esteem
			3.270	23	75.219	Intra-group	

Table 6 presents the results of the within-subject effects test for comparing the interpersonal sensitivity subscales in the experimental and control groups at the post-test stage. According to the presented results, the F value was significant for all subscales at 0.05 level ($P < 0.05$). Therefore, the null hypothesis is rejected and the research hypothesis is confirmed. Given the lower mean scores of the experimental group in the post-test phase, it seems that the group positive thinking training program was effective and reduced interpersonal sensitivity in students with a mathematical learning disability.

5. DISCUSSION AND CONCLUSION

The purpose of the present study was to investigate the effectiveness of group positive thinking training on social adjustment and reducing interpersonal sensitivity in students with mathematical learning disability. To achieve the results of this study, some hypotheses were formulated that will be described below. The results of the first hypothesis analysis showed that the mean scores of the experimental group were significantly higher in the social adjustment variable after the intervention compared to the control group. As a result, it can be said that positive thinking training has been effective in improving the social adjustment of students with mathematical learning disabilities. This finding is in line with the research of Saffar Hamidi et al (2017), Dehghan Nejad, et al. (2017), Bordbari Taremarsaraie (2012) and Chaing et al. (2015). The results of each study showed that positive thinking training is effective in improving social skills and its components including social adjustment. In explaining this finding, it can be concluded that positive thinking training has been able to develop a positive view of life and self in students with mathematical learning disabilities, and that has led to a better relationship to the school's social environment and through it, students have been able to interact more positively and rationally with their classmates and teachers. Because, according to proponents of the positivist approach, such as Karademas (2006) and Karademas et al. (2007), having a positivist attitude helps the person to look more closely and with more intuition at interpersonal communication and social relationships and solve problems in this area logically and respond more reasonably to different environments and social condition. This is an important factor in creating their social adjustment. However, the results of the analysis of another research hypothesis also showed that positive thinking training is effective in reducing the interpersonal sensitivity of students with mathematical learning disorders. In other words, positive thinking training was able to significantly reduce the interpersonal sensitivity of the experimental group in comparison with the control group. The results of the analysis of this research finding can be in line with the research of Baños et

al. (2014) and Marie, Thomas, Barbara & Pherson (2011). In explaining this research finding, it can be said that a positive attitude is a view that, with more attention to positive stimuli and less focus on negative ones, leads to creating a good feeling, building valuable relationships with others, resulting in reduced interpersonal sensitivity and increased interactions among them (Tetzner & Becker, 2018). It can also be said that during training, the experimental group can identify positive and good experiences and use these emotions to promote respect and self-esteem. In fact, after training, these people get a realistic view of life, and when they feel good about themselves, they participate in more activities and this leads to reducing their sense of inferiority and communicating with more people and showing less sensitivity in their relationships with others. However, as with any research, the current research was not without limitations, and as a result, generalization of the findings must be done with more precaution. Among the limitations of this study were the limited domain of this study to the specific educational and age groups, the lack of study on both sexes, and the lack of control over variables such as families' cultural level, income, and parental consent. Therefore concerning the limitations of this study, it is suggested to use other clinical tools such as interviewing, observation, etc. while conducting positive thinking training in other groups with learning and psychological disorders. For more generalizing the findings, it is also recommended that positive thinking training be applied to girls with mathematical learning disability. Finally, the results of this study showed that positive thinking training is effective in improving social adjustment and reducing interpersonal sensitivity in students with mathematical learning disabilities. Therefore, according to the findings of this study, it is suggested to use positive thinking as one of the effective treatments for improving social adjustment and reducing interpersonal sensitivity in students with a mathematical learning disability.

5.1 Limitations

In the present study, convenience sampling was used, which could have an impact on the results of the study; it is suggested that simple random sampling be used in future studies; another limitation of the present study was the lack of follow-up, which makes it impossible to say whether this intervention has long-term effects. Therefore, it is suggested that the follow-up period be considered in future studies.

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