

Effects of Brain Gym Exercises and Filial Play Therapy on Emotion Management Skills of Students with Specific Learning Disorder

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Abstract

Background: Students with learning disabilities experience cognitive, emotional, behavioral, and social problems. The present study aimed to investigate the role of brain gym exercises and filial play therapy on students with specific learning disorders (SLD) emotion management skills.

Methods: This quasi-experimental study was conducted through a pretest-posttest–follow-up design with a control group. The statistical population included all students with SLD and their mothers in Tehran, Iran within 2020-2021 period. The convenience sampling method was employed to select 45 students with SLD, who were then randomly assigned into two experimental groups and one control group. The participants in the first experimental group received brain gym exercises, whereas those in the second experimental group attended a filial play therapy intervention. The participants in the control group received no intervention. The Children's Emotional Management Scale (CEMS) was used to collect data. The ANCOVA was then adopted for data analysis.

Results: The mean±SD of the post-test scores of inhibition, dysregulation, and coping in the brain gym exercises group were 21.73±2.84, 20.00±2.82, and 23.13±3.37, respectively. Moreover, the mean±SD of the post-test scores of inhibition, dysregulation, and coping in the filial play therapy group were 20.53±3.44, 21.53±2.10, and 22.80±3.74, respectively, which were significantly different from the control groups. The results showed that both brain gym exercises and filial play therapy were effective in improving emotion management skills (i.e., inhibition, dysregulation, and coping) in students with SLD ($P < 0.001$). Furthermore, these two interventions had no significant differences regarding their effects on emotion management skills.

Conclusions: It can be concluded that brain gym exercises and filial play therapy help improve emotion management skills in students with SLD.

Keywords: Specific learning disorder, Emotions, Brain, Play therapy, Students

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1. Introduction

Specific learning disorder (SLD) in children is a neurodevelopmental disorder caused by a combination of hereditary and environmental factors (1). SLD affects the brain's ability to perceive or process verbal or non-verbal information effectively. Learning disabilities are not merely limited to academic problems (2). Until 1962, students with learning disabilities were thought to be afflicted with conditions such as mild cerebral palsy, Churg-Strauss syndrome, or brain damage. Such children differ from those whose learning problems originate from vision, hearing, movement or emotional problems, cultural limitations, or general mental disabilities (3). Studies have shown that the prevalence of SLD among school-age children ranges from 3 to 16.5 percent, and is higher among boys than girls with a ratio of 2:1 to 4:1, respectively (3, 4). The prevalence of SLD in Iran has been reported to be 3.83%, and most children

afflicted with this disorder are elementary school students (5). SLD can be a lifelong challenge for children because it affects nearly different aspects of their lives, such as education, self-esteem, and self-efficacy (6).

Students with learning disabilities experience cognitive, emotional, behavioral, and social problems (7). They have difficulty controlling or managing their emotions. Individuals with learning disorders generally experience a high level of negative emotions and low self-esteem (8). Therefore, emotion management in students with learning disorders should be addressed seriously. Emotion management attempts to influence the type, time, duration, and intensity of emotions' behavioral, experimental, or physical processes and how to express and experience them consciously or unconsciously using emotion management strategies (9). Studies have shown that a learning disability can be a risk factor for emotional

problems (10, 11). Several studies on students with learning disabilities have also reported that such students show behavioral problems in school, have difficulty in socialization, and exhibit emotional and behavioral disorders (12, 13).

It is necessary to improve the conditions of students with learning disabilities through psychological interventions such as brain gym exercises and filial play therapy. Brain gym exercises, commonly known as motor skills training exercises, stimulate the brain's ability to balance the stress caused by specific memories, situations, individuals, places, and skills. Brain gym exercises can improve academic and behavioral performance by activating both hemispheres of the brain through neural re-patterning to strengthen the learning process of the whole brain (14). The brain gym exercises intervention is usually performed for students with developmental disabilities such as attention deficit hyperactivity disorder (ADHD), dyspraxia, dyslexia, and autism spectrum disorder (ASD). According to the research literature, this intervention can dramatically improve concentration, memory, reading scientific and educational resources, writing, mathematics, taking tests, physical coordination, relationships, personal responsibility, and organizational attitudes and skills (15).

Filial play therapy is another psychological method for improving the relationships of students with learning disabilities. Play therapy generally makes a connection between children's inner thoughts and the outside world to allow them to control the objects and the external environment. It also allows children to express bad experiences, thoughts, emotions, and tendencies to improve their psychological status in different dimensions, such as anxiety, helplessness, and resilience (16, 17). Due to the low level of abstract thinking, students with learning disabilities fail to express their emotions and feelings. Emotional suppression or poor skills of expressing emotions, especially negative ones, threaten children's mental health, cause anxiety and psychological tension, and reduce their positive emotions and adaptability (18). Researchers believed play therapy is the most common way to cause behavioral changes in children and reduce their emotional and social problems (19, 20). Filial play therapy is an intervention that takes advantage of the parent-child relationships to practically train parents in play therapy. Parents and games

are among the components emphasized in this intervention to treat children's problems (21, 22).

Most previous studies have analyzed the effects of only one of the abovementioned interventions on emotion management skills (14, 15, 21). Hence, it is necessary to conduct more studies to compare the impact of different interventions and identify the most effective and appropriate ones. Accordingly, the present study aimed to investigate the effects of brain gym exercises and filial play therapy on the emotion management skills of students with SLD in Tehran, Iran.

2. Methods

This quasi-experimental study was conducted through a pretest-posttest-follow-up design with a control group. The statistical population included all students with SLD aged 6–12 in Tehran, Iran and their mothers between 2020–2021. For sampling, a list of 14 educational and rehabilitation centers for students with SLD was prepared, and five centers were randomly selected. After arrangements were made with the officials of the selected centers and mothers of students with SLD, some students with medical records were selected as the sample. Their parents were then asked to fill out Children's Emotional Management Scales (CEMS). Based on the inclusion criteria, 45 students were selected as participants through convenience sampling. We included 15 students with SLD in each group using G-power statistical software with a test power of 0.90 and $\alpha=0.05$ (effect size=1.23) (23). Fifteen students with SLD were randomly assigned to two experimental groups and a control group (15 students in each group) using a simple random sampling and a table of random numbers. First, the participants were divided into three groups using the table of random numbers. In the following, two groups were randomly selected as experimental groups and one as a control group. The participant drop rate was zero in this study. The parents of participants were asked to provide informed consent forms as part of ethical considerations. In addition, the interventions were performed intensively for the control group at the end of the trial.

2.1. Measurement Tools

Children's Emotional Management Scale (CEMS): Developed by Zeman and colleagues (24),

this scale consists of 38 items in three subscales (i.e., inhibition (12 items), dysregulation (13 items), and coping (13 items)) scored on a 3-point Likert scale (1: rarely, 2: sometimes, and 3: often). This tool measures how children manage emotions, such as anger, sadness, and worry. The Content Validity Ratio (CVR=0.92) and Content Validity Index (CVI=0.89) confirmed the CEMS's content validity. The reliability of this scale was confirmed by Tahmouresi and colleagues (25) ($\alpha=0.76$). Moreover, we measured the reliability of this scale with a Cronbach's alpha coefficient of 0.87.

2.2. Intervention Programs

Brain gym exercises: Brain gym exercises include 26 attractive and simple movements that aim to activate both hemispheres of the brain to improve learning skills. These exercises have also been claimed to improve mental and physical development (26). The brain gym exercises intervention was performed for participants in the first experimental group in eight 30-minute sessions once a week. A list of 26 movements performed in the brain gym exercises intervention is presented in Table 1.

Filial play therapy: This intervention was performed in ten 90-minute sessions once a week by the method proposed by Ariapooran and Gorji Chalsepari (16). **Session 1:** Parents identified themselves, and the generalities of filial play therapy were described. The intervention logic was described, and the therapist tried to win the parents' trust. The therapist' and parent's duties were explained. Positive and negative parenting experiences were described. Assignment: recognition of the child's negative and positive emotions and reflective answer to the assignment. Homework: recognition of relevant emotions and behaviors and listening reflectively to the child. **Session 2:** Parents prepared themselves for the first

interactive game. The homework was reviewed, and empathetic responses were modeled for the child through games and performance based on the principles of filial play therapy. Parents entered the playroom to become familiar with toys, how to use them, and the rules of games. They were given a list of toys. They also selected the right time and place for playing sessions at home. **Session 3:** Parents explained the toys they used at home and places of play therapy. Doing homework "do not disturb me", the therapist encourages parents to role-play in two important cases: do not do (not criticizing the child's behavior, not praising the child, not asking questions, not interrupting the game, not giving information and training the child, not giving advice and preaching, not doing a new activity, not being passive or calm) and do (setting the game stage, allowing the child to lead the game, following behavior, reflecting the child's feelings, setting limits, validating the child's strengths and efforts, joining the game as a child's follower, and being verbally active). **Session 4:** Parents presented a report of the game played at home along with feedback from the therapist and other parents. Parental emotions and experiences of games were focused on the reflections of emotions modeled by the therapist. Parents were encouraged to watch a video of an interactive game between parents and children. A couple of parents volunteered to video-record the procedure for playing with their children at home. It was emphasized that a couple of parents should video-record the procedure for playing with their children at home to be reviewed in the next session. **Sessions 5-9:** The previous session was reviewed. The activities of the fourth session were repeated based on the points mentioned in the third session. Parents were encouraged to play different games with their children and use different toys. A report of the previous session was presented. The procedure for playing with children video-recorded by two parents was reviewed. The therapist and the group member provided

Table 1: A list of 26 movements performed in the brain gym exercises intervention

Sessions	List of 26 movements				
Session 1	Drinking water	Cross-crawl	Sit-up cross-crawl	Belly breathing	Think of an "X"
Session 2	Drinking water	8 th alphabet	The elephant	Belly breathing	Double doodle/Thinking cap
Session 3	Drinking water	The owl	The rocker	Belly breathing	Thinking cap
Session 4	Drinking water	Arm activation	Foot flex	Belly breathing	Calf pump
Session 5	Drinking water	The grounder	8 th lazy	Belly breathing	Brain buttons
Session 6	Drinking water	Balance buttons	Space buttons	Belly breathing	Energy yawn
Session 7	Drinking water	Hooks-up	Positive points	Belly breathing	Gravity glider
Session 8	Drinking water	The energizer	Neck rolls	Belly breathing	Earth buttons

their feedback. The problems and obstacles in playing with children were discussed (especially in Sessions 5 and 6). The group members and the therapist proposed their solutions to the discussed problems. It was emphasized that parents should establish a relationship without interfering in the game or controlling the child's behavior. Parents were asked to give their feedback while playing with their children. **Session 10:** Parents presented their reports of playing sessions. The procedure for playing with children video-recorded by other parents was watched and reviewed, and then the group members and the therapist provided their feedback. The beneficial effects of mother-child interactive games were emphasized. The usefulness of games and children's emotional tools during the games were evaluated. Changes in the parenting styles of group members were evaluated. The post-test was conducted.

2.3. Statistical Analyses

The data were statistically analyzed using the covariance (ANCOVA) analysis in SPSS version 27.

3. Results

The participants in the present study included 45 boys and girls students with SLD with an average age of 9.08 ± 2.21 years. The inclusion criteria were students with SLD aged 6-12 years, informed consent of parents, being under no drug therapy,

and non-affliction with autism, mental disabilities, mental disorders, and psychiatric disorders. In addition, the exclusion criteria were being under drug therapy, affliction with seizures, and absence in more than two intervention sessions. Table 2 presents the demographics of students with SLD, and Table 3 provides the pretest and post-test mean and standard deviation of the dependent variable in the experimental and control groups.

ANCOVA assumptions were examined before data analysis to ensure that the research data would meet these assumptions. Since Z-value in the Smirnov-Kolmogorov test was statistically significant, it was concluded that data on "emotion management skills" followed a normal distribution ($Z=0.102$, $P=0.200$). Levene's test was then conducted to examine the homogeneity of variances (to ensure that the variances of the two experimental groups and the control group were the same), and the results ($F=1.874$, $P=0.064$) showed that the homogeneity of variances was established. Therefore, it was possible to perform an analysis of covariance. The homogeneity of the regression slope was also tested through ANOVA. Since the results ($F=2.53$, $P=0.330$) were not statistically significant, it was concluded that the homogeneity of the regression slope was established; as a result, it was possible to employ ANCOVA.

The results demonstrated significant differences between the brain gym exercises, filial play therapy,

Table 2: Demographic variables of students with specific learning disorders

Groups	Age (years)	Gender	
		Girl	Boy
Brain gym exercises	9.16±2.28	8 (53.33%)	7 (46.67%)
Filial play therapy	8.87±2.11	6 (40.00%)	9 (60.00%)
Control	9.21±2.34	7 (46.67%)	8 (53.33%)
P	0.953	0.471	

Table 3: Mean and standard deviation (SD) of the dependent variable in experimental and control groups

Variables	Groups	Pretest	Post-test	P (within group)	P (between group- pretest)	P (between group, post-test)
Inhibition	Brain gym exercises	26.73±3.51	21.73±2.84	0.001	0.580	0.003
	Filial play therapy	25.80±4.05	20.53±3.44	0.001		
	Control	25.93±4.28	25.93±4.11	0.995		
Dysregulation	Brain gym exercises	25.80±3.12	20.00±2.82	0.001	0.434	0.001
	Filial play therapy	26.67±3.30	21.53±2.10	0.001		
	Control	26.60±2.35	25.93±2.40	0.446		
Coping	Brain gym exercises	18.93±2.67	23.13±3.37	0.007	0.348	0.001
	Filial play therapy	18.73±2.71	22.80±3.74	0.002		
	Control	18.00±2.67	18.98±3.09	0.360		

Table 4: Results of pairwise comparison of the research variables across time series

Variables	Groups	Mean difference	SE	P
Inhibition	Brain gym exercises - Control	3.97	0.55	0.001
	Filial play therapy - Control	4.16	0.92	0.001
	Brain gym exercises - Filial play therapy	0.19	0.40	0.641
Dysregulation	Brain gym exercises - Control	6.19	1.04	0.001
	Filial play therapy - Control	4.72	1.12	0.001
	Brain gym exercises - Filial play therapy	1.47	0.75	0.059
Coping	Brain gym exercises - Control	5.23	0.71	0.001
	Filial play therapy - Control	5.01	0.77	0.001
	Brain gym exercises - Filial play therapy	0.23	0.52	0.665

SE: Standard Error

and control groups in terms of at least one of the dependent variables ($P < 0.001$). According to the results, the F-value of the univariate ANOVA was equal to 32.36 ($P < 0.001$) for “inhibition”, 18.16 ($P < 0.001$) for “dysregulation”, and 28.37 ($P < 0.001$) for “coping”. These results revealed significant differences between the brain gym exercises, filial play therapy, and control groups in related variables (i.e., subscales of emotion management skills).

Fisher’s least significant difference (LSD) was then employed to compare the experimental groups in the mean, standard error, and significance level of subscales of emotion management skills (Table 4). According to Table 4, both brain gym exercises and filial play therapy effectively improved the subscales of emotion management skills ($P < 0.001$). However, the post-test results showed no significant differences between these two interventions.

4. Discussion

This study aimed to investigate the role of brain gym exercises and filial play therapy on the emotion management skills of students with SLD in Tehran, Iran. The research findings showed that both brain gym exercises and filial play therapy effectively improved the emotion management skills of students with SLD. However, there were no significant differences between these two interventions in the post-test. This finding is consistent with the research results of previous studies (15, 16, 27). To justify this finding, it can be stated that executive attention acts are among the prerequisites of learning. In other words, brain gym exercises are a set of excellent cognitive, metacognitive, and self-management abilities, including self-initiation, planning, cognitive flexibility, working memory, organization, dynamic perception of time, future prediction,

and problem-solving that help the individual with daily activities and learning assignments. Some studies have shown that brain gym exercises boost learners’ cognitive functions and improve their working memory performance (14, 26). Studies on brain functioning and its effects on learning have emphasized the major roles of working memory, attention, and the brain’s executive function. These three cognitive functions, which have strong mutual relationships, play key roles in learning (14, 26). Working memory can improve the functionality of attention networks and executive functions, affecting academic performance and emotion management skills (27).

The general principles of brain gym exercises posit that emotional and learning problems and poor academic performance are caused by brain-body disharmony, and brain exercises can help harmonize the body and the brain. Brain exercises can lead to effective learning in most activities by training both the mind and the body (14, 15). Brain exercises improve the learning process and harmonize both hemispheres of the brain by keeping the brain alert and increasing the range of emotion regulation, concentration, and attention. Moreover, since brain exercises cause rapid and profound changes in the learning process, students can simultaneously receive and express information after performing these exercises (14).

Filial play therapy improves the emotion management skills of children by focusing mainly on mother-child relationships and affecting family communication. Therefore, it can be said that filial play therapy can effectively improve children’s emotion management skills by strengthening mother-child relationships. In addition, filial play therapy makes parents interact with their children, reflects children’s emotions, and facilitates verbal

and non-verbal communication between children and their parents. As a result, such an intervention can positively affect children's emotion management skills and abilities to understand emotions, listen to others and empathize with them, express and manage emotions, and respond to the emotions of others (28). The positive mother-child interaction helps children properly express and use emotions, correctly understand their own and their mothers' emotions while playing, and apply better emotion management skills. Hence this intervention improves the mother-child interaction and makes them understand each other's emotions and express their emotions properly to improve the emotion management and self-regulation skills of children. Filial play therapy allows children to interact with their mothers and probably gain an understanding of their own and their mother's negative and positive emotions, which enables them to regulate their own and others' emotions during games or other interactive situations, as well as control how intense their emotions are at different times (16).

Parents are instructed to refrain from criticizing their child's behavior and refrain from preaching or advising them during filial play therapy. In addition, parents are asked to encourage their children to participate actively in the game. (21). Therefore, when mothers repeat the same actions during the game, children can better communicate with their mothers, peers and other people. The acceptance-based mother-child communication while playing games can help children effectively learn social skills and how to use them in interpersonal relationships. These findings can explain the positive effects of brain gym exercises and filial play therapy on components of emotion management skills (i.e., inhibition, dysregulation, and coping).

4.1. Limitations

A limitation of this study was related to the research sample, which included students with SLD aged 6–12 years in Tehran, Iran and their mothers. Future studies are recommended to analyze students with SLD in other age groups. Another research limitation, which resulted from the small sample size, was the control of SLD through difficulty in mathematics, reading, and writing. Therefore, future studies are recommended to consider this point.

5. Conclusions

Generally, the research findings showed that brain gym exercises and filial play therapy improved emotion management skills in students with SLD. The results emphasized the application of brain gym exercises and filial play therapy for improving emotion management skills (i.e., inhibition, dysregulation, and coping) in SLD-afflicted children. Therefore, gym exercises and filial play therapy are recommended to improve emotion management skills and their components in students with SLD. In addition, it is recommended to plan and organize training courses and workshops for child therapists and counselors to enhance their knowledge and skills for mitigating the psychological problems of students with SLD, especially honing their emotion management skills. A comparison of the effects of these interventions on male and female students with SLD is recommended for future studies. This will enable us to examine the moderating role of gender in the research variables.

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Ethical Approval

The Ethics Review Board of Islamic Azad University, Ahvaz branch, approved the present study with the code of IR.IAU.AHVZ.REC.1399.103. Also, written informed consent was obtained from the participants.

Conflict of Interest: None declared.

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