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Effectiveness of Group therapy focused on Leisure based executive functional skills training on executive functions among children with Specific Learning Disability

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Abstract

Background: Even though individuals with Specific Learning Disability (SLD), a type of neurodevelopmental disorder, have adequate intelligence and attend school, they often face difficulties in reading, writing, and math. Children with SLD commonly experience challenges in executive functioning, such as controlling impulses, remembering information, planning tasks, organizing activities, managing emotions, and starting tasks. These difficulties affect their ability to participate in leisure activities and excel in academically.

Aim: To study the effectiveness of group therapy focused on Leisure Based executive functional skills training among childrens with Specific Learning Disability**.**

Method: Children are pre diagnosed with SLD were selected from Chettinad Hospital, special schools and rehabilitation centers based on the selection criteria. Subjects were randomly split into experimental and control groups. Baseline assessments were conducted using the Children's Leisure Assessment (CLASS) and the Executive Skills Questionnaire (ESQ). The control group did not receive any therapy continue there usual routine care while the experimental group participated in group-based leisure-focused executive functioning skills training. Data from pre- and post-tests were analyzed using IBM SPSS Version 20.0 with appropriate statistics test.

Results: The Wilcoxon Signed Rank Test showed statistical improvements in all parameters for the experimental group ($p<0.001$). The experimental group demonstrated major improvements in all areas of the Executive Skills Questionnaire (ESQ) and Children's Leisure Assessment (CLASS) domains after the intervention. In contrast, no significant changes were observed in the control group regarding either executive functioning or leisure participation. Between-group comparisons using the Mann–Whitney U Test showed that the experimental groups post-test scores were significantly higher than the control group across all ESQ and CLASS domains improved that indicates a strong effect of the intervention. The results also showed notable increases in variety, frequency, social interaction, and preference scores in the

experimental group, along with significant improvements in Indoor, Outdoor, Self Enrichment, and Sports Related Activities.

Conclusion: Group therapy that focuses on leisure-based executive functioning skills training can help children with SLD improve their executive function skills and their participation in leisure activities. These Findings support the inclusion of such training in educational and therapeutic programs to enhance functional performance and engagement.

Keywords: Group Therapy, Leisure-Based Executive Functional Skills Training, Executive Function Skills, Specific Learning Disabilities, and Leisure Participation**.**

Introduction

A neurodevelopmental disorder with biological roots, specific learning disability is characterized by ongoing challenges with learning and applying academic skills (reading, writing, math) that are inconsistent with the person's chronological age and cannot be better explained by cognitive impairment, perceptual difficulties, or insufficient learning opportunities [1][2]. SLD is a condition affecting around 5%-15% of all children at the school age in the world according to DSM-5. In India, the prevalence is estimated to be between 3%-10%, with an average of 8%, making SLD a significant health issue for children in schools.[3]

A child with SLD frequently has deficiencies in working memory, inhibition, and cognitive flexibility, impairing the performance of academic activities, including comprehension of reading, problem-solving in mathematics, writing, following directions, organization, and executing complex learning activities. Poor executive function skills are closely related to poor academic performance in children with SLD and can be exacerbated by co-existing neurodevelopmental conditions in children with SLD, like ADHD. Thus, executive dysfunction is a key component of SLD and needs to be assessed and addressed during treatment. In addition, it has been found that children with SLD tend to be involved in leisure activities less frequently than their typically developing peers. This results in adverse effects on their social functioning and emotional well-being. [4,5,6]

Individuals with neurodevelopmental disabilities like specific learning disabilities tend to engage in solitary activities without any social interactions. In India, between 5% and 15% of the population between ages 6 and 14 has specific learning disabilities. Internationally, the prevalence of both specific learning disabilities and developmental disabilities ranges between 4% and 8% for children. Leisure participation is considered as one of the components of Activities and Participation (d920) in the International Classification of Functioning, Disability and Health (ICF); however, there are a number of aspects that may influence the aspect of participation, includes attention deficits, executive dysfunction, and cognitive impairment. The lack of leisure participation may negatively affect the development of social competence, adaptability, emotions and self-respect. Therefore, leisure therapy for improving executive function development among individuals with specific learning disabilities is appropriate. [7,8,9].

Through a systematic process, children with SLDs are evaluated and goals were focused on working memory, inhibition, planning, and cognitive flexibility in executive function intervention. Task analysis, self-monitoring and external prompts are cognitive strategies that can be used in CO-OP intervention, along with the goal–plan–do check model. Also, group interventions aim to broaden the abilities acquired through cooperation and social engagement, as well as to tackle structured assignments that demand organization and control. Evidence suggests that interventions with parental involvement and practical

application of skills can result in an increase in children's executive functioning, adaptive behaviors, and level of involvement are supported by various research. A sequential approach to executive functioning training will be provided, which involves structured individual activities, group participation, and game/puzzle competitions, artwork, or collaborative tasks. It involves application of skills acquired during practice sessions with peers. Children with SLDs can improve their academic performance and social engagement through the integration of parental involvement, as well as through practice at home [10,11,12.13,14,15,16].

As it was mentioned earlier, children with SLD have hinderance in executive function development which in turn affects their academic performance, leisure participation and socialization skills. There are proven studies that group therapy focused on executive functional skill training resulted in effective changes in children with SLD in executive function. However, there are less information on how to work on leisure based executive functional skills in children with SLD. Studies that have been done in this field earlier have not focused specifically on their executive function skills in a group setting during leisure based activities. This study focuses on the effectiveness of group therapy through executive functional skills training using leisure based activities in SLD children.

2. Review of Literature

Several studies have reported that executive dysfunction is a common difficulty among children with Specific Learning Disorder (SLD), affecting academic performance, daily functioning, and social participation. Recent intervention studies have demonstrated effectiveness of structured executive function training in improving cognitive abilities among children with SLD. Tsermentseli et al. (2025) reported significant improvements in working memory, planning ability, and cognitive flexibility following executive function training.[17] Similarly, Di Giusto et al. (2023) found that activity-based interventions enhanced attention, inhibitory control, and planning skills.[18] Ghaffari et al. (2022) further demonstrated that occupation-based interventions improved executive functioning and participation in daily activities. Tamilselvan et al. (2024) reported positive outcomes of occupational therapy interventions targeting executive functions in children with SLD [19,20]. In addition, Punar and Şevgin (2024) highlighted the effectiveness of goal-directed activities in enhancing cognitive and behavioral performance.[21]

3. Aim & Objective of study

3.1 Aim of the study

- To study the Effectiveness of Group Therapy focused on Leisure based Executive Functional Skills Training on Executive Function among children with Specific Learning Disability.

3.2 Objectives of the study

- To determine the Pre-Test values of the Control and Experimental Group using the Children's Leisure Assessment Scale (CLASS) and Executive Skills Questionnaire (ESQ)
- To determine the Post-Test value on the Control and Experimental group using Children's Leisure Assessment Scale (CLASS) and Executive Skills Questionnaire (ESQ)
- To compare Pre-Test and Post-Test values within the Control and Experimental group using Children's Leisure Assessment Scale (CLASS) and Executive Skills Questionnaire (ESQ)
- To compare the Pre- Test and Post - Test values between the Control and Experimental Group using Children's Leisure Assessment Scale (CLASS) and Executive Skills Questionnaire (ESQ)

4. Methodology

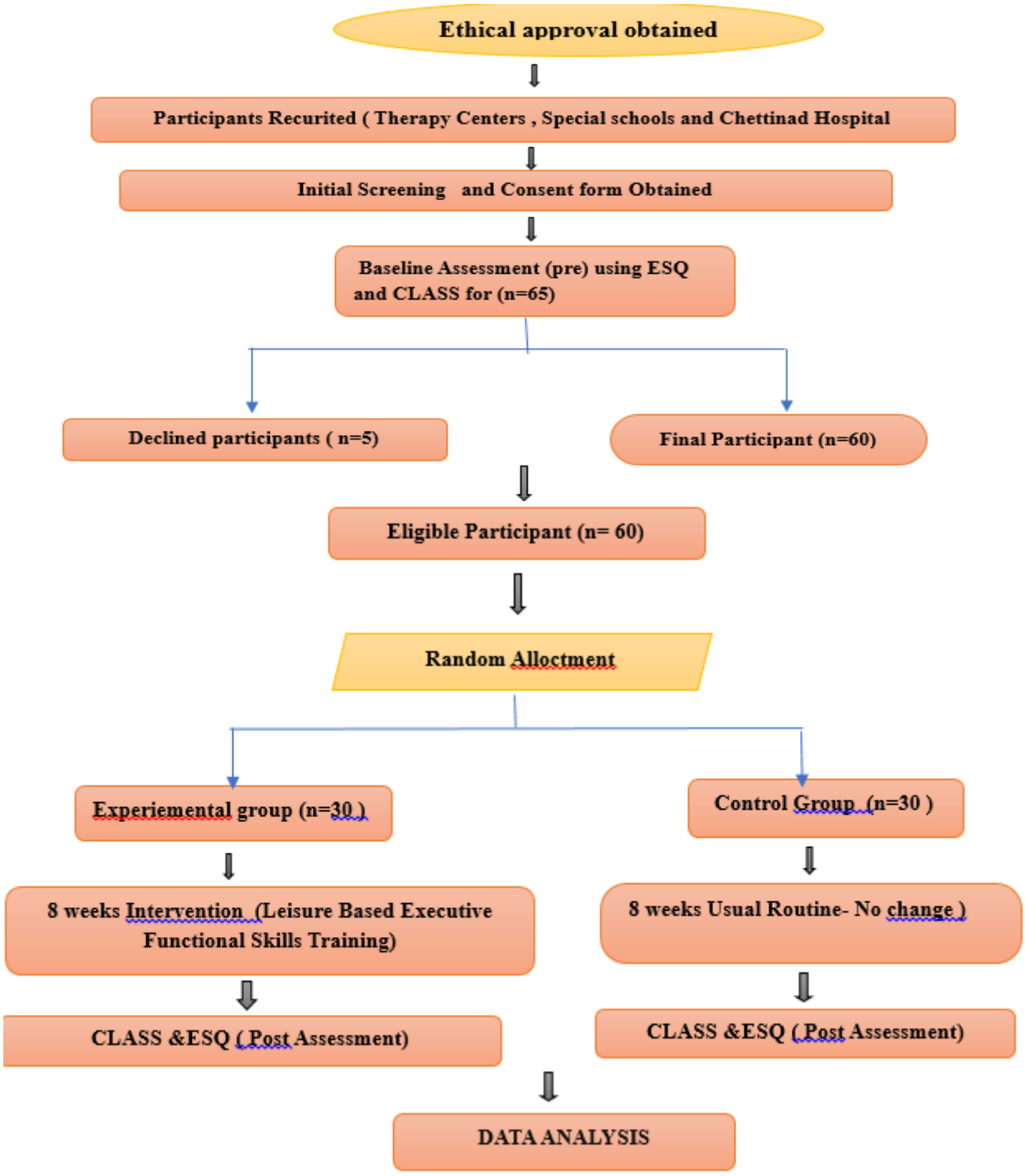
The research aimed to assess how well the group therapy focused on Leisure based Executive Functional Skills Training on executive function in patient with specific Learning Disability This study used a Randomised Control Trial design which required participants to be divided into control and experimental groups. The researcher acquired, ethical approval from CARE-IHEC while they registered their study in the CTRI before starting their research work.

A study recruited 60 subjects aged between 10-14 years of children with Specific Learning Disability, through convenient sampling method from Chettinad Hospital and Research Institute , special schools , developmental therapy centers in and around Chennai .who were pre-screened with an IQ range greater than 70 and children who were pre- diagnosed according to DSM-5 criteria with mild to moderate SLD who were able to understand, read and write in English were included. The children with seizures, severe musculoskeletal challenges and other co-morbid conditions were excluded

The researcher used the chit method to assign participants into experimental and control group because this method used sealed envelopes to hide the randomization sequence. The researches designed the study to operate as a single-blinded experiment which prevented participants from knowing their assigned treatment. The subjects are randomly allocated to experimental and control group using opaque sealed in a single blind procedure. All the participants are underwent the baseline assessment which took place before the intervention**.** The pre and post-test measures were taken using Executive Skills Questionnaire (ESQ) and Children's Leisure Assessment (CLASS).

The experimental group underwent Group therapy focused on Leisure Based Executive Functional Skills training The Therapeutic Program consists of Orientation, Leisure Based Motor Warm up Activity, Graded Creative Group activities, Parental query and guidance for 8 weeks where the training consists of 8 session per week 1 session for 45 minutes – 1 hour session. Meanwhile the Control Group proceeded with the usual routine care or existing treatment without receiving the new intervention during the study period**.** Data for pre and post tests were obtained and were statistically analyzed to compare between both the Experimental and Control groups. In order to find out whether the intervention program was effective on executive function skills among children with Specific Learning Disability.

4.1 Flow Chart



5. Result and Analysis

This randomized controlled trial investigated the effectiveness of Group Thearpy Focused On Leisure Based Executive Functional Skills Training on Executive Functions among Children with Specific Learning Disability.

Table 5. 1: Descriptive analysis of Gender in control group and Experimental group:

Parameter	Groups	Male (n, %)	Female (n, %)
Gender	Control	15 (50%)	15 (50%)
	Experimental	15 (50%)	15 (50%)

At the baseline, both groups were similar in terms of gender homogeneity distribution, which led to bias and ensured group compartibility for further analysis.

Table 5.2: Descriptive analysis of age in Control group and Experimental group:

Parameter	Groups	Mean± Std. deviation	Minimum (Year)	Maximum (Year)
Age	Control	12 ± 1.43	10	14
	Experimental	12 ± 1.43	10	14

In Gender-specific demographic distribution data, a total of sixty children were recruited into the groups, and the similarity of the age range mean score (12 ± 1.43) between the groups indicates that the participants were age-matched at baseline, offering a comparable demographic profile for assessing the intervention's efficacy.

Table 5.3a: Descriptive analysis of Executive Skills Questionnaire of Pre and Post-test Mean comparison for (Control Group)

Parameter	Pre Test	Post Test	Z Value	P Value
	Mean ± Std. D	Mean ± Std. D		
Response Inhibition	9.43 ±1.07	11.53 ±1.01	-4.340	.177
Working Memory	9.50 ±1.04	9.77 ±0.94	-2.828	.282
Emotional Control	8.50 ±1.04	8.77 ±0.94	-2.828	.243
Sustained Attention	7.00 ±0.79	7.37 ±0.76	-2.598	.148
Task Initiation	7.50 ±1.04	7.70 ±0.99	-2.449	.093
Plaining / Prioritization	6.57 ±1.10	7.13 ±1.04	-1.750	.080
Organization	5.17 ± 0.75	5.47 ±0.73	-2.714	.073
Time Management	6.53 ±1.01	6.80 ±0.96	-2.530	.051
Goal Directed Persistence	6.57 ±1.10	7.13 ±1.04	-1.750	.080
Flexibility	5.70 ±0.79	5.90 ±0.88	-1.897	.058
Metacognition	5.27 ±0.74	5.53 ±0.78	-2.530	.211

The Wilcoxon Signed-Rank Test was used to compare the pre test and post test ESQ domain scores of individuals in the control group. None of the executive skill domains showed statistically significant differences ($p > 0.05$). The post test mean scores showed modest increase, but these changes were not statistically significant. The results show that the control group's executive skills did not significantly alter between the pre-test and post-test evaluations.

Table 5.3b: Descriptive Analysis of Pre-Test and Post-Test Mean Comparison of Total Score of Children's Leisure Assessment Scale (CLASS) Scores in the Control Group

Pre Test	Control Group	Experimental group	Z Value	P Value
	Mean ± Std.D	Mean ±Std.D		
Total Variety	60.3 ±3.11	62.2 ±3.16	-5.260	.282
Total Frequency %	64.1 ±4.19	65.7 ±4.43	-4.928	.243
Total Sociability%	52.8 ±3.68	54.6 ±3.82	-5.069	.148
Total Preference %	67.7 ± 3.33	68.9 ± 3.68	-4.882	.093

The Wilcoxon Signed-Rank Test was used to compare the experimental group's participants' pre-test and post-test CLASS domain scores. Total Variety, Total Frequency, Total Sociability, and Total Preference scores all showed a highly significant improvement after the intervention ($p < 0.001$). In every domain, the post test mean scores exceeded the pre test mean scores, suggesting improved patterns of leisure engagement.

Table 5.4a: Descriptive analysis of Executive Skills Questionnaire Pre and Post test Mean comparison for Experimental group:

Parameter	Pre Test	Post Test	Z Value	P Value
	Mean ± Std. D	Mean ± Std. D		
Response Inhibition	10.6 ± 1.00	12.5 ±1.04	-5.203	p < 0.001
Working Memory	9.4 ± 1.00	10.5 ±1.04	-5.203	p < 0.001
Emotional Control	8.2 ± 0.76	9.5 ± 1.04	-5.007	p < 0.001
Sustained Attention	6.9 ±0.71	9.0 ±0.79	-5.260	p < 0.001
Task Initiation	7.4 ±1.00	9.5 ±1.04	-5.203	p < 0.001
Plaining / Prioritization	7.5 ±1.01	8.5 ±1.01	-5.477	p < 0.001
Organization	4.8 ± 0.43	5.8 ±0.43	-5.477	p < 0.001
Time Management	6.0 ± 0.64	7.0 ±0.64	-5.477	p < 0.001
Goal Directed Persistence	7.3 ± 0.74	8.5 ±1.01	-5.035	p < 0.001
Flexibility	5.2 ± 0.73	6.5±1.01	-5.007	p < 0.001
Metacognition	4.8 ± 0.41	6.0± 0.64	-5.108	p < 0.001

A highly significant improvement was observed in all ESQ domains in the experimental group ($p < 0.001$). Post test scores were significantly higher than pre test scores across all executive function domains. This indicates that the intervention was effective in improving executive functioning.

Table 5.4b: Descriptive Analysis of Pre Test and Post Test Mean Comparison of Total Score of Children's Leisure Assessment Scale (CLASS) Scores in the Experimental Group

Parameter	Pre Test	Post Test	Z Value	P Value
	Mean ± Std.D	Mean ± Std.D		
Total Variety	64.3± 2.90	83.1 ±3.32	-5.396	p < 0.001
Total Frequency%	64.4 ±4.55	84.0 ± 3.84	-4.847	p < 0.001
Total Sociability%	52.4 ± 3.98	72.1 ±3.94	-4.863	p < 0.001
Total Preference %	67.6 ±4.03	81.8 ±3.60	-4.845	p < 0.001

A highly significant improvement was observed in all CLASS domains in the experimental group ($p < 0.001$). Post test scores were significantly higher than pre-test scores across all leisure domains. This indicates that the intervention effectively improved leisure participation and engagement.

Table 5.5 a: Descriptive analysis of Executive Skills Pre-test Mean comparison for Control group and Experimental group: (Mann-Whitney U test performed)

Pre Test	Control Group	Experimental group	Z Value	P Value
	Mean ±Std.D	Mean± Std.D		
Response Inhibition	9.43 ±1.07	10.6 ±1.00	-3.909	.254
Working Memory	9.50 ±1.04	9.4 ±1.00	-.531	.596
Emotional Control	8.50 ±1.04	8.2 ±0.76	-1.119	.263
Sustained Attention	7.00 ±0.79	6.9 ±0.71	-.500	.617
Task Initiation	7.50 ±1.04	7.4 ±1.00	-.531	.596
Plaining / Prioritization	6.57 ±1.10	7.5 ±1.01	-3.125	.458
Organization	5.17 ±0.75	4.8 ±0.43	-2.387	.017
Time Management	6.53 ±1.01	6.0 ±0.64	-2.180	.029
Goal Directed Persistence	8.20 ± 0.76	7.3 ±0.74	-4.038	.778
Flexibility	5.70 ± 0.79	5.2± 0.73	-1.896	.058
Metacognition	5.27 ±0.74	4.8 ±0.41	-2.885	.080

No statistically significant differences were observed between control and experimental groups at baseline ($p > 0.05$). Both groups were comparable in executive function scores before intervention. This confirms baseline equivalence of the groups.

Table 5.5 b : Descriptive analysis of Children's Leisure Assessment (Domain Wise CLASS) Pre-test Mean comparison for Control group and Experimental group: (Mann-Whitney U test performed)

Pre Test	Control Group	Experimental group	Z Value	P Value
	Mean ± Std. D	Mean ± Std. D		
Total Variety	60.3 ± 3.11	77.5 ± 4.36	-.282	.778
Total Frequency	64.1 ± 4.19	84.0 ± 3.84	-.289	.773
Total Sociability	52.8 ±3.68	72.1 ± 3.94	-.341	.733
Total Perference	67.7± 3.33	81.8 ±3.60	-.104	.917

No statistically significant differences were found between control and experimental groups at baseline ($p > 0.05$). Both groups were comparable in CLASS scores before intervention.This confirms baseline equivalence in leisure participation patterns**.**

Table 5.6 a : Descriptive analysis of Executive Skills Questionnaire Post-test Mean comparison for Control group and Experimental group. (Mann-Whitney U test performed)

Post Test	Control Group	Experimental group	Z Value	P Value
	Mean ±Std.D	Mean ±Std.D		
Response Inhibition	11.53 ±1.01	12.5 ±1.04	-3.184	.001**
Working Memory	9.77 ±0.94	10.5 ±1.04	-2.514	.012*
Emotional Control	8.77 ±0.94	9.5±1.04	-2.514	.012*
Sustained Attention	7.37 ±0.76	9.0 ±0.79	-5.775	.000**
Task Initiation	7.70 ±0.99	9.5 ±1.04	-5.206	.000**
Plaining / Prioritization	7.13 ±1.04	8.5 ±1.01	-4.363	.000**
Organization	5.47 ±0.73	7.8 ±0.43	-1.813	.020*
Time Management	6.80 ±0.96	9.0 ±0.64	-.717	.041*
Goal Directed Persistence	8.33 ±0.71	10.5 ±1.01	-.736	.024*
Flexibility	5.90 ±0.88	6.5 ±1.01	-2.374	.018*
Metacognition	5.53 ±0.78	6.0 ±0.64	-2.313	.021*

A statistically significant difference was observed between groups in post-test ESQ scores ($p < 0.01$).The experimental group showed higher executive function scores compared to the control group.This indicates the effectiveness of the intervention.

Table 5.6 b : Descriptive analysis of Children's Leisure Assessment (Total -CLASS) Post-test Mean comparison for Control group and Experimental group. (Mann-Whitney U test performed)

Post Test	Control Group	Experimental group	Z Value	P Value
	Mean ±Std.D	Mean ±Std.D		
Total Variety	62.2 ±3.16	77.5 ±4.36	-6.658	$p < 0.001$.
Total Frequency%	65.7 ±4.43	84.0 ±3.84	-6.658	$p < 0.001$
Total Sociability%	54.6 ±3.82	72.1 ±3.94	-6.658	$p < 0.001$
Total Preference %	68.9 ±3.68	81.8 ±3.60	-6.658	$p < 0.001$

The statistically significant difference was observed between groups in post-test CLASS scores ($p<0.001$).The experimental group showed significantly higher leisure participation scores compared to the control group. This indicates the effectiveness of the intervention on leisure-related outcome.

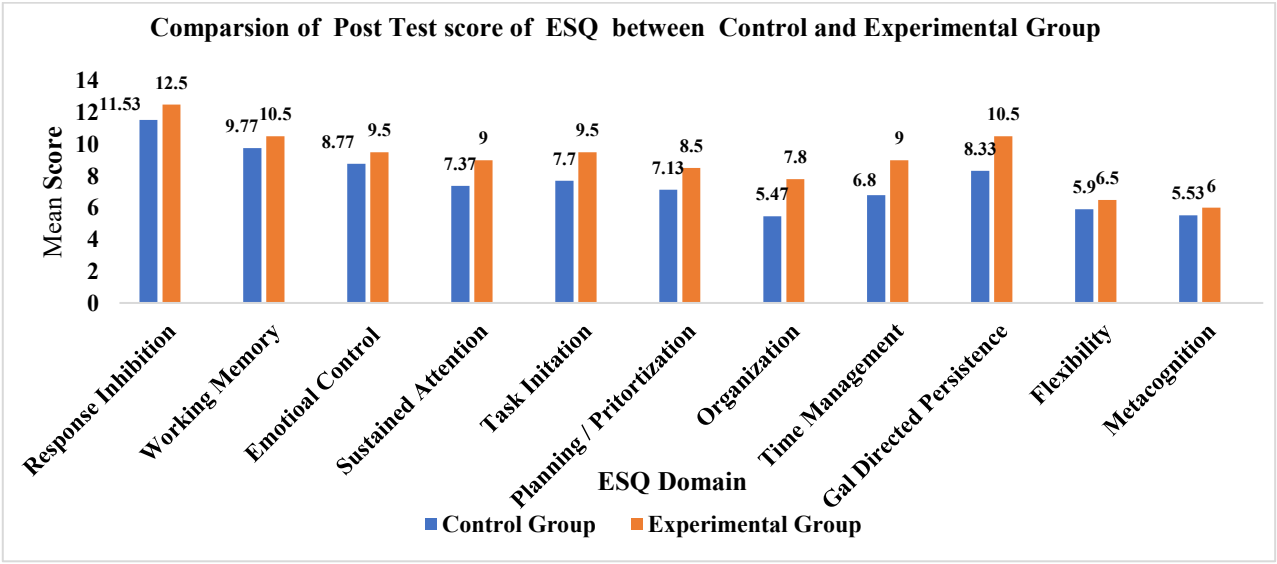


Figure 5.1 Comparsion of Post Test score of ESQ between Control and Experimental Group

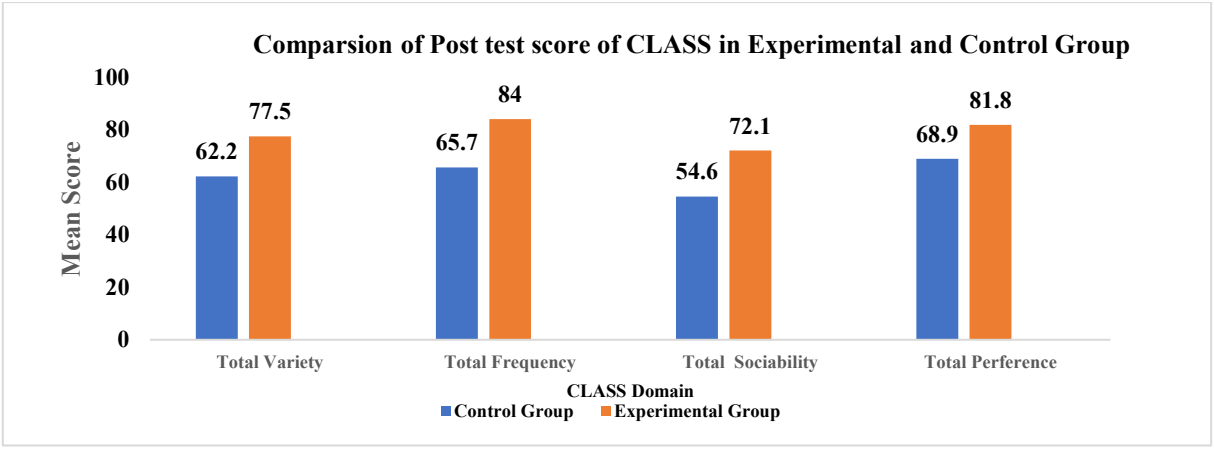


Figure 5.2 Comparsion of Post Test score of CLASS between Control and Experimental Group

Discussion

In the current investigation, both experimental and control participants were equivalent with respect to mean values for age, sex, executive function and leisure participation variables at the outset of the experiment, demonstrating no significant differences prior to the introduction of the intervention. No statistically significant changes across executive function or leisure participation domains were demonstrated within the control group; however, there were slight numerical scores increased for children with SLD in control group while comparing pre and post test scores, but there are no evident statistical differences seen, which suggests that the passage of time alone does not result in large changes in their executive functions.

The experimental group exhibited statistically significant improvements across all executive function (attending, memory, planning, organizational skills, emotional controls, flexibility and metacognition) and

leisure time participation domains, when looking at variance (including variety, frequency, social interaction, and preference), following the delivery of the intervention program (all $p < 0.001$). The pre and post test comparison of both groups whereas, the experimental group showed statistically superior results compared to the control group on all outcome measures supporting the positive impact of the intervention. The changes were significant due to the structured, goal-oriented, leisure-based EF training program that assisted with self-regulation, planning, and problem-solving. The findings are consistent with existing theoretical and empirical literature that supports the premise that participation-focused, skill-based interventions will improve both cognitive and functional outcomes in children with developmental disabilities. In conclusion, these results support the effectiveness of group therapies that focus upon leisure-based executive function skill training for improving executive function and leisure participation for children with Specific Learning Disorder.

Limitation and Future Recommendation

The study was conducted on a relatively small sample of children with Specific Learning Disorder (SLD), which may limit the generalizability of the findings.Participants were recruited from a limited geographical area and educational settings; therefore, the results may not be representative of all children with SLD,The duration of the leisure-based executive functional skills training program was limited, and a longer intervention period may have yielded greater improvements,The study focused primarily on executive functions and did not assess the impact of the intervention on academic performance, social participation, or quality of life,Follow-up assessments were not conducted; therefore, the long-term retention and maintenance of the intervention effects could not be determined, Future studies should include subsequent research with an expanded sample population is encouraged, similar studies may be carried out in different educational settings and geographical regions to validate the effectiveness of the intervention,To determine whether the improvements in executive functions are sustained a subsequent evaluation is recommended, Future research may investigate the effects of leisure-based executive functional skills training on academic achievement, classroom performance, and social participation, Comparative studies may be conducted to evaluate the effectiveness of leisure-based group therapy against other intervention approaches for children with SLD, **Stackholders** should be involved in intervention programs to facilitate the generalization of executive function skills to home and school environments, Leisure-based executive functional skills training may be incorporated into school and clinical rehabilitation programs as a complementary intervention for children with Specific Learning Disorder.

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