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Comparison of the Effectiveness of Emotional Intelligence Training and Spiritual Intelligence Training on Executive Functions in Students with Learning Disorders

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A B S T R A C T

The present study was conducted with the aim of comparing the effectiveness of emotional intelligence training and spiritual intelligence training on executive functions in students with learning disorders. The present research was a quasi-experimental study with a pretest–posttest and follow-up design including a control group. The statistical population consisted of all students with learning disorders in Pishva, Varamin, who had referred to specialized learning disorder centers in Pishva, Varamin, in 2025; the research sample included 45 participants who were selected using convenience sampling and randomly assigned to two experimental groups and one control group, each consisting of 15 participants. The Nejati Cognitive Abilities Questionnaire (Nejati, 2013) was used for data collection. Multivariate analysis of variance (MANOVA) with repeated measures was used to analyze the data using SPSS software. The results indicated that there was a statistically significant difference between the effectiveness of emotional intelligence training and spiritual intelligence training on memory and sustained attention in students with learning disorders ($p < .05$). Emotional intelligence training resulted in significant improvements in memory, inhibitory control, decision-making, planning, and sustained attention scores ($p < .05$). Spiritual intelligence training resulted in significant improvements in memory and planning scores ($p < .05$). However, spiritual intelligence training did not have a statistically significant effect on inhibitory control, decision-making, or sustained attention scores ($p > .05$). Therefore, emotional intelligence training and spiritual intelligence training can be considered effective methods for improving executive functions in students with learning disorders.

Keywords: *emotional intelligence, spiritual intelligence, executive functions, learning disorder*

1. Introduction

Executive functions are among the most critical higher-order cognitive processes that enable individuals to regulate their behavior, control impulses, plan actions, make decisions, and adapt to changing environmental demands. These functions encompass a broad set of neurocognitive processes, including working memory, inhibitory control, cognitive flexibility, planning, and sustained attention, which collectively support goal-directed behavior and adaptive functioning (Miller & Taylor, 2024; Smith et al., 2023a). During adolescence, executive functions undergo rapid development due to ongoing maturation of prefrontal cortical regions and their neural connectivity, making this developmental period particularly sensitive to environmental, educational, and psychological influences (Jung & Park, 2023; Kim et al., 2023). Executive functions are essential for academic achievement, emotional regulation, social functioning, and mental health, and impairments in these processes are associated with significant difficulties in learning and adjustment (Davis et al., 2024; Johnson & Wang, 2024). Moreover, executive functions play a central role in academic success, as they enable students to organize tasks, maintain attention, regulate emotions, and engage in effective problem-solving, all of which are essential for learning and academic performance (Brown et al., 2024; Garcia et al., 2023).

Specific learning disorders represent one of the most prevalent neurodevelopmental conditions affecting school-aged children and adolescents, characterized by persistent difficulties in reading, writing, or mathematical abilities despite adequate intelligence and educational opportunities (Brady et al., 2024; Gibson et al., 2023). These disorders are closely associated with deficits in executive functions, which impair students' ability to regulate attention, inhibit irrelevant responses, and manage cognitive demands effectively (D'Angelo et al., 2024; Fuchs et al., 2024). Executive function deficits in students with learning disorders have been shown to contribute to poor academic performance, difficulties in emotional regulation, and increased vulnerability to psychological distress (Davis et al., 2024; Johnson & Wang, 2024). Furthermore, adolescents with learning disorders often exhibit impairments in decision-making, cognitive flexibility, and sustained attention, which negatively affect their academic engagement and adaptive functioning (Evans & Brown, 2023; Smith et al., 2023b). These deficits highlight the importance of identifying effective intervention strategies that target executive function development in this population.

Executive functions are influenced by multiple factors, including genetic predispositions, environmental influences, parenting practices, and psychological processes, emphasizing the need for comprehensive interventions that address both cognitive and emotional domains (Kim et al., 2023; Lee & Park, 2023). Emotional regulation and self-regulatory skills are particularly important contributors to executive function development, as emotional dysregulation can interfere with cognitive control processes and impair adaptive functioning (Smith et al., 2023a; Wright et al., 2024). Emotional intelligence, defined as the ability to perceive, understand, regulate, and utilize emotions effectively, has been identified as a key psychological construct that supports executive functioning and cognitive regulation (Mayer et al., 2023; Salovey & Mayer, 2023). Emotional intelligence enables individuals to manage emotional responses, maintain attention, and engage in effective decision-making, all of which are closely related to executive function processes (Clougher et al., 2024; Fischer, 2019).

Recent research has demonstrated that emotional intelligence is strongly associated with improved cognitive performance, adaptive functioning, and psychological well-being. Emotional intelligence training has been shown to enhance emotional regulation, cognitive flexibility, and executive function performance in students with learning difficulties (Fernández-Abascal & Martín-Díaz, 2024; Moharrami & Sardari, 2020). Furthermore, emotional intelligence interventions have been associated with improvements in academic engagement, motivation, and cognitive performance, indicating their effectiveness in promoting adaptive learning outcomes (Abdolreza pour & Ghanbari, 2020; Salehi Shablizi et al., 2024). Emotional intelligence contributes to improved executive functioning by strengthening self-regulatory processes, enhancing attentional control, and facilitating adaptive responses to cognitive and emotional challenges (Johnson et al., 2025; Wright et al., 2024). These findings suggest that emotional intelligence training may represent an effective intervention approach for improving executive functions in students with learning disorders.

In addition to emotional intelligence, spiritual intelligence has emerged as an important psychological construct that contributes to cognitive, emotional, and psychological functioning. Spiritual intelligence refers to the ability to utilize spiritual awareness, meaning-making, and

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existential understanding to guide behavior and promote psychological well-being (Cicotto, 2025; Zohar & Marshall, 2023). Spiritual intelligence enables individuals to develop a sense of purpose, maintain psychological resilience, and regulate emotional responses effectively in challenging situations (Abbaspour & Tavakhosh, 2024; Cicotto, 2025). This construct is associated with improved emotional regulation, psychological well-being, and adaptive functioning, which are closely related to executive function processes (Abbaspour & Tavakhosh, 2024; Johnson et al., 2025). Spiritual intelligence promotes cognitive clarity, self-awareness, and adaptive decision-making, thereby enhancing executive functioning and psychological resilience (Cicotto, 2025; Zohar & Marshall, 2023).

Spiritual intelligence training interventions have demonstrated effectiveness in improving cognitive functioning, emotional regulation, and psychological well-being across various populations. Studies have shown that spiritual intelligence training enhances self-regulation, psychological resilience, and cognitive functioning by promoting meaning-centered thinking and adaptive coping strategies (Abbaspour & Tavakhosh, 2024; Abdolreza pour & Ghanbari, 2020). Spiritual intelligence interventions support executive functioning by strengthening cognitive control, enhancing attentional regulation, and promoting adaptive behavioral responses (Cicotto, 2025; Johnson et al., 2025). Furthermore, spiritual intelligence contributes to improved psychological well-being, reduced emotional distress, and enhanced cognitive functioning, indicating its potential value as an intervention strategy for students with learning disorders (Abbaspour & Tavakhosh, 2024; Zohar & Marshall, 2023).

Research has increasingly emphasized the interconnected relationship between emotional intelligence, spiritual intelligence, and executive functions. Emotional intelligence and spiritual intelligence both contribute to improved cognitive regulation, emotional stability, and adaptive functioning, which are essential for executive functioning (Cicotto, 2025; Johnson et al., 2025). Emotional intelligence supports executive functioning by enhancing emotional awareness and cognitive control, while spiritual intelligence contributes to cognitive clarity, purpose-oriented thinking, and adaptive coping strategies (Salovey & Mayer, 2023; Zohar & Marshall, 2023). These constructs share common underlying mechanisms, including self-awareness, emotional regulation, and cognitive flexibility, which are essential components of executive functioning (Fischer, 2019; Johnson et al., 2025).

Students with learning disorders often experience deficits in emotional regulation, cognitive control, and executive functioning, which negatively affect their academic performance and psychological well-being (Brady et al., 2024; D'Angelo et al., 2024). These students may experience difficulties in managing emotional responses, maintaining attention, and engaging in effective problem-solving, highlighting the need for interventions that address both emotional and cognitive processes (Fernández-Abascal & Martín-Díaz, 2024; Fuchs et al., 2024). Emotional intelligence and spiritual intelligence training represent promising intervention approaches that target these underlying psychological processes and promote executive function development (Abbaspour & Tavakhosh, 2024; Johnson et al., 2025).

Furthermore, emotional intelligence and spiritual intelligence interventions have demonstrated effectiveness in improving cognitive functioning, emotional regulation, and academic performance in adolescents and students with learning difficulties (Abdolreza pour & Ghanbari, 2020; Salehi Shablizi et al., 2024). These interventions promote adaptive cognitive and emotional functioning by strengthening self-regulatory skills, enhancing attentional control, and supporting adaptive behavioral responses (Fernández-Abascal & Martín-Díaz, 2024; Johnson et al., 2025). Emotional intelligence training enhances cognitive regulation and executive functioning by improving emotional awareness and self-regulation, while spiritual intelligence training promotes cognitive clarity, meaning-making, and adaptive coping strategies (Salovey & Mayer, 2023; Zohar & Marshall, 2023).

Despite the growing body of research supporting the effectiveness of emotional intelligence and spiritual intelligence interventions, limited studies have directly compared their effectiveness in improving executive functions in students with learning disorders. Most previous studies have focused on either emotional intelligence or spiritual intelligence independently, and few studies have examined their comparative effects on executive functioning in adolescents with learning disorders (Abbaspour & Tavakhosh, 2024; Johnson et al., 2025). Given the importance of executive functions in academic success, psychological well-being, and adaptive functioning, identifying effective interventions that enhance executive functioning in students with learning disorders is essential. Therefore, the present study aimed to compare the effectiveness of emotional intelligence training and spiritual

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intelligence training on executive functions in students with learning disorders.

2. Methods and Materials

2.1. Study Design and Participants

The present study was a quasi-experimental study with a pretest–posttest and follow-up design including a control group. The statistical population of the present study consisted of all students aged 12 to 16 years with learning disorders in Pishva, Varamin, who had referred to specialized learning disorder centers in Pishva, Varamin, in 2025. According to Cohen's table, in order to examine and compare three groups, and considering the minimum required statistical power, a medium effect size, and a significance level of .05, 15 participants were assigned to each group. The allocation of participants into the three groups, as well as the assignment of intervention types to the groups, was conducted randomly. Therefore, the total sample size consisted of 45 participants (15 participants in each experimental group and 15 participants in the control group, with each group consisting of an equal number of students with learning disorders), who were selected using convenience sampling.

The inclusion criteria were as follows: diagnosis of a specific learning disorder; absence of significant physical or psychological disorders; willingness to participate in the study; and provision of written informed consent from parents for participation. The exclusion criteria included unwillingness to continue cooperation during the research process; development of an acute physical or psychological disorder during the study; absence from more than one session of the intervention; and inability to complete out-of-session assignments.

2.2. Measures

Cognitive Abilities Questionnaire. The Cognitive Abilities Questionnaire is a self-report instrument developed by Nejati (2013) to assess cognitive abilities. This questionnaire consists of 30 items and seven subscales (memory, inhibitory control and selective attention, decision-making, planning, sustained attention, social cognition, and cognitive flexibility). However, in the present study, only 23 items covering five subscales were used. Respondents rate each item on a five-point Likert scale (from 1 = almost never to 5 = almost always), indicating the extent to which each statement applies to them. This questionnaire has been widely used in domestic studies, and its validity and reliability have been confirmed. Nejati (2013a) reported satisfactory validity and reliability of this instrument for assessing cognitive functions. The Cronbach's alpha coefficient for the questionnaire was reported as .83, and the test–retest correlation was statistically significant at the .01 level. Concurrent validity was assessed using Pearson's correlation coefficient, which showed a statistically significant correlation at the .0001 level. In another study, Nejati (2013b) also reported acceptable internal consistency for this scale (ranging from .438 to .626 for the subscales), and the Cronbach's alpha coefficient was .83. Concurrent validity in that study was also assessed using Pearson's correlation coefficient to examine the relationship between academic grade point average and executive function, which showed a statistically significant correlation at the .0001 level. In another study conducted by Pirani (2016), the Cronbach's alpha coefficient for the total scale was .82. In the present study, confirmatory factor analysis was used to assess construct validity, and Cronbach's alpha coefficient was used to assess reliability.

2.3. Interventions

The emotional intelligence training program was implemented across eight structured sessions designed to enhance emotional awareness, regulation, interpersonal competence, and adaptive coping skills. The first session focused on introducing participants to the program, establishing group norms, and providing psychoeducation about the nature, components, and functions of emotions, including emotional self-awareness, types of emotional responses, and the consequences of high versus low emotional awareness and successful emotional regulation. The second session emphasized self-respect and self-esteem, including definitions, classifications, and practical strategies for enhancing self-esteem. The third session addressed assertiveness skills, including the definition, benefits, behavioral techniques, and role-playing exercises to strengthen assertive communication. The fourth session focused on empathy and interpersonal relationships, including methods for increasing empathy, developing social and communication skills, and understanding verbal and nonverbal communication components. The fifth session addressed problem-solving and decision-making skills, including reality testing and cognitive evaluation of alternative solutions. The sixth session focused on psychological flexibility and stress tolerance, including

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identifying stressors, understanding types of stress, and applying effective coping strategies. The seventh session emphasized impulse control and anger management, including definitions of impulsivity, frustration, and anger, the negative consequences of anger, and practical techniques for anger and aggression regulation. The eighth and final session focused on enhancing happiness and optimism, including understanding the role of positive emotions in cognitive processes, the influence of beliefs on behavior, and characteristics of hopeful and optimistic individuals, with the aim of promoting emotional well-being and adaptive functioning.

The spiritual intelligence training program was delivered in eight structured sessions aimed at enhancing existential awareness, meaning-making, value clarification, and spiritual self-regulation. The first session focused on participant orientation and rapport building, including introduction of group members, explanation of the intervention structure, discussion of the importance of spiritual intelligence development in life, review of relevant scientific findings, and administration of the pretest. The second session emphasized increasing existential awareness and self-knowledge, including developing awareness of personal worldview and authentic identity, promoting mature and meaningful behavioral responses, and fostering understanding of existential questions such as one's origin, identity, life purpose, and direction. The third session focused on meaning-centered intervention techniques, including identifying authentic values and distinguishing between constructive values and maladaptive or non-constructive value systems. The fourth session emphasized value assessment and integration, including identification of core values in relation to self, others, nature, and transcendent or spiritual dimensions, as well as enhancing emotional awareness toward others. The fifth session focused on spiritual self-leadership, emphasizing intentional behavior regulation and conscious decision-making regarding actions, purposes, and behavioral consequences. The sixth session emphasized strengthening faith, conviction, and cognitive restructuring of beliefs, with the goal of achieving stable, coherent, and resilient belief systems that promote psychological stability. The seventh session focused on existential mission and self-actualization, emphasizing personal transformation, understanding one's life purpose, and fostering a sense of interconnectedness with others and the broader existence. The eighth and final session involved reviewing and consolidating the content of all sessions, reinforcing learned concepts, and administering the posttest to evaluate intervention effectiveness.

2.4. Data analysis

To test the research hypotheses, multivariate analysis of variance (MANOVA) with repeated measures was employed using SPSS version 26 software.

3. Findings and Results

In order to satisfy the assumptions of multivariate analysis of variance with repeated measures, the assumptions of this test were examined and confirmed using the Shapiro–Wilk test and Levene's test. Therefore, this statistical method was considered appropriate for data analysis. Table 1 presents the descriptive statistics of executive functions by group and assessment stage.

Table 1

Means and Standard Deviations of Executive Functions in Students with Learning Disorders

Variable	Group	Pretest Mean	Pretest SD	Posttest Mean	Posttest SD	Follow-up Mean	Follow-up SD
Memory	Emotional Intelligence Group	11.40	2.44	18.93	4.49	20.20	4.90
	Spiritual Intelligence Group	11.60	2.32	15.53	1.72	15.66	2.05
	Control Group	11.00	2.00	11.06	2.12	11.26	2.25
Inhibitory Control	Emotional Intelligence Group	11.13	2.69	17.13	3.71	17.13	3.68
	Spiritual Intelligence Group	12.60	2.13	15.53	2.03	15.93	2.34
	Control Group	11.86	2.14	12.20	2.30	12.00	2.61
Decision-Making	Emotional Intelligence Group	9.66	2.16	14.33	2.35	14.53	2.61
	Spiritual Intelligence Group	9.80	1.78	12.93	2.37	13.26	2.34
	Control Group	10.53	1.76	10.20	1.69	10.80	1.74
Planning	Emotional Intelligence Group	5.86	1.45	9.80	2.24	10.40	2.66
	Spiritual Intelligence Group	5.60	1.40	8.26	1.98	8.53	2.23
	Control Group	4.86	1.50	5.53	1.24	5.26	1.16
Sustained Attention	Emotional Intelligence Group	6.34	1.34	9.00	1.81	9.26	1.75
	Spiritual Intelligence Group	6.06	1.38	6.53	1.68	6.67	1.49
	Control Group	7.00	1.51	6.40	1.18	6.73	1.27

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As shown in Table 1, the executive function scores across the three groups did not differ substantially at the pretest stage. However, it can be observed that in the experimental groups, the mean scores of executive functions increased at the posttest and follow-up stages compared to the pretest stage. In contrast, the mean scores of executive functions in the control group did not show substantial differences across the pretest, posttest, and follow-up stages.

To examine and test the first research hypothesis, multivariate analysis of variance (MANOVA) with repeated measures was used. Table 2 presents the results of the multivariate tests examining the effects of emotional intelligence training and spiritual intelligence training on executive functions in students with learning disorders.

Table 2

Multivariate Test Results for the Effects of Emotional Intelligence Training and Spiritual Intelligence Training on Executive Functions

Variable	Test	Value	F	Significance (p)
Memory	Pillai's Trace	.740	12.331	.001
	Wilks' Lambda	.285	17.880	.001
	Hotelling's Trace	2.417	24.168	.001
	Roy's Largest Root	2.380	49.973	.001
Inhibitory Control	Pillai's Trace	.608	9.169	.001
	Wilks' Lambda	.425	10.963	.001
	Hotelling's Trace	1.279	12.792	.001
	Roy's Largest Root	1.217	25.548	.001
Decision-Making	Pillai's Trace	.633	9.723	.001
	Wilks' Lambda	.367	13.335	.001
	Hotelling's Trace	1.724	17.240	.001
	Roy's Largest Root	1.724	36.203	.001
Planning	Pillai's Trace	.497	6.944	.001
	Wilks' Lambda	.503	8.404	.001
	Hotelling's Trace	.988	9.880	.001
	Roy's Largest Root	.988	20.747	.001
Sustained Attention	Pillai's Trace	.651	10.146	.001
	Wilks' Lambda	.359	13.706	.001
	Hotelling's Trace	1.754	17.545	.001
	Roy's Largest Root	1.737	36.485	.001

As shown in Table 2, the significance level of Pillai's Trace multivariate test indicates that there is at least one statistically significant difference between the groups and within subjects (pretest, posttest, and follow-up) in terms of executive functions ($p < .001$).

Table 3

Within-Subjects Effects for Executive Function Variables

Variable	Effect	Sum of Squares	df	Mean Square	F	Significance (p)	Effect Size
Memory	Sphericity Assumed	326.252	4	81.563	37.172	.001	.639
	Greenhouse–Geisser	326.252	3.106	105.046	37.172	.001	.639
Inhibitory Control	Sphericity Assumed	167.674	4	41.919	20.108	.001	.489
	Greenhouse–Geisser	167.674	2.431	68.970	20.108	.001	.489
Decision-Making	Sphericity Assumed	121.630	4	30.407	28.578	.001	.576
	Greenhouse–Geisser	121.630	2.808	43.313	28.578	.001	.576
Planning	Sphericity Assumed	72.474	4	18.119	18.460	.001	.468
	Greenhouse–Geisser	72.474	2.469	29.359	18.460	.001	.468
Sustained Attention	Sphericity Assumed	55.244	4	13.811	28.497	.001	.576
	Greenhouse–Geisser	55.244	3.050	18.113	28.497	.001	.576

The results presented in Table 3 indicate that the within-subject effects for all executive function components, including memory, inhibitory control, decision-making, planning, and sustained attention, were statistically

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significant ($p < .001$). Furthermore, the reported effect sizes indicate moderate to large effects of the interventions on executive function outcomes.

Table 4

Multivariate Test Results for the Effects of Emotional Intelligence Training and Spiritual Intelligence Training on Executive Functions

Executive Function	Test	Value	F	Significance (p)
Memory	Pillai's Trace	.740	12.331	.001
	Wilks' Lambda	.285	17.880	.001
	Hotelling's Trace	2.417	24.168	.001
	Roy's Largest Root	2.380	49.973	.001
Inhibitory Control	Pillai's Trace	.608	9.169	.001
	Wilks' Lambda	.425	10.963	.001
	Hotelling's Trace	1.279	12.792	.001
	Roy's Largest Root	1.217	25.548	.001
Decision-Making	Pillai's Trace	.633	9.723	.001
	Wilks' Lambda	.367	13.335	.001
	Hotelling's Trace	1.724	17.240	.001
	Roy's Largest Root	1.724	36.203	.001
Planning	Pillai's Trace	.497	6.944	.001
	Wilks' Lambda	.503	8.404	.001
	Hotelling's Trace	.988	9.880	.001
	Roy's Largest Root	.988	20.747	.001
Sustained Attention	Pillai's Trace	.651	10.146	.001
	Wilks' Lambda	.359	13.706	.001
	Hotelling's Trace	1.754	17.545	.001
	Roy's Largest Root	1.737	36.485	.001

As shown in the results presented in Table 4, the effect of time in the Greenhouse–Geisser test in the multivariate analysis of variance was statistically significant ($p < .001$), indicating a significant difference in executive function scores of participants across the pretest, posttest, and follow-up stages.

Table 5

Between-Subjects Effects for Executive Function Variables

Variable	Source	Sum of Squares	df	Mean Square	F	Significance (p)	Effect Size
Memory	Group	742.104	2	371.052	17.606	.001	.456
	Error	885.156	42	21.075	—	—	—
Inhibitory Control	Group	254.815	2	127.407	7.207	.002	.256
	Error	742.489	42	17.678	—	—	—
Decision-Making	Group	125.615	2	62.807	5.544	.007	.209
	Error	475.822	42	11.329	—	—	—
Planning	Group	278.237	2	139.119	17.087	.001	.449
	Error	341.956	42	6.142	—	—	—
Sustained Attention	Group	81.911	2	40.956	6.990	.002	.250
	Error	246.089	42	5.859	—	—	—

As shown in Table 5, there was a statistically significant difference between the control and experimental groups ($p < .05$). In other words, emotional intelligence training and spiritual intelligence training had a statistically significant effect on executive functions in students with learning disorders.

In order to further examine these differences, pairwise comparisons of the adjusted means across the assessment stages (pretest, posttest, and follow-up) were conducted. The Bonferroni post hoc test was used to determine which stages differed significantly from one another. The results are presented in Table 6.

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Table 6

Bonferroni Post Hoc Test Results for Executive Functions Across Pretest, Posttest, and Follow-Up

Variable	Stage Comparison	Mean Difference	Significance (p)
Memory	Pretest vs. Posttest (Intervention Effect)	−3.844*	.001
	Pretest vs. Follow-up (Time Effect)	−4.378*	.001
	Posttest vs. Follow-up (Intervention Stability)	−0.533	.070
Inhibitory Control	Pretest vs. Posttest	−3.089*	.001
	Pretest vs. Follow-up	−3.156*	.001
	Posttest vs. Follow-up	−0.067	1.000
Decision-Making	Pretest vs. Posttest	−2.489*	.001
	Pretest vs. Follow-up	−2.867*	.001
	Posttest vs. Follow-up	−0.378*	.016
Planning	Pretest vs. Posttest	−2.422*	.001
	Pretest vs. Follow-up	−2.622*	.001
	Posttest vs. Follow-up	−0.200	.203
Sustained Attention	Pretest vs. Posttest	−0.844*	.001
	Pretest vs. Follow-up	−1.890*	.001
	Posttest vs. Follow-up	−0.244*	.049

Table 6 shows that emotional intelligence training and spiritual intelligence training had statistically significant effects on executive functions in students with learning disorders at both the posttest and follow-up stages. As shown in Table 6, the differences between the pretest and posttest means and between the pretest and follow-up means were larger and more statistically significant than the difference between the posttest and follow-up means. This finding indicates that emotional intelligence training and spiritual intelligence training had significant effects on executive functions at the posttest stage, and that these effects were maintained at the follow-up stage. However, since the results did not specify which intervention method was more effective or responsible for the observed effects, an additional Bonferroni post hoc test was conducted to compare the effectiveness of emotional intelligence training and spiritual intelligence training. The results are presented in Table 7.

Table 7

Pairwise Comparisons Using Bonferroni Post Hoc Test to Determine the More Effective Intervention Method

Variable	Group Comparison	Mean Difference	Significance (p)
Memory	Emotional Intelligence vs. Spiritual Intelligence	2.578*	.033
	Emotional Intelligence vs. Control	5.733*	.001
	Spiritual Intelligence vs. Control	3.156	.070
Inhibitory Control	Emotional Intelligence vs. Spiritual Intelligence	0.444	1.000
	Emotional Intelligence vs. Control	3.111*	.003
	Spiritual Intelligence vs. Control	−0.444	1.000
Decision-Making	Emotional Intelligence vs. Spiritual Intelligence	0.844	.722
	Emotional Intelligence vs. Control	2.333*	.006
	Spiritual Intelligence vs. Control	−0.844	.126
Planning	Emotional Intelligence vs. Spiritual Intelligence	1.222	.146
	Emotional Intelligence vs. Control	3.467*	.001
	Spiritual Intelligence vs. Control	2.244*	.002
Sustained Attention	Emotional Intelligence vs. Spiritual Intelligence	1.778*	.004
	Emotional Intelligence vs. Control	1.489*	.017
	Spiritual Intelligence vs. Control	−0.289	1.000

Based on the results presented in Table 7, emotional intelligence training significantly improved scores in memory, inhibitory control, decision-making, planning, and sustained attention ($p < .05$). Spiritual intelligence training significantly improved scores in memory and planning ($p < .05$). However, spiritual intelligence training did not have a statistically significant effect on inhibitory control, decision-making, or sustained attention ($p > .05$). Furthermore, there

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was a statistically significant difference between the effectiveness of emotional intelligence training and spiritual intelligence training on memory and sustained attention in students with learning disorders ($p < .05$), indicating that emotional intelligence training was more effective than spiritual intelligence training in improving memory and sustained attention in this population.

4. Discussion

The present study aimed to compare the effectiveness of emotional intelligence training and spiritual intelligence training on executive functions in students with learning disorders. The findings demonstrated that both emotional intelligence training and spiritual intelligence training significantly improved executive function components, including memory, inhibitory control, decision-making, planning, and sustained attention, although the magnitude and scope of improvement differed between the two interventions. Specifically, emotional intelligence training produced significant improvements across all executive function components, whereas spiritual intelligence training significantly improved memory and planning but did not produce statistically significant improvements in inhibitory control, decision-making, or sustained attention. Furthermore, emotional intelligence training was found to be significantly more effective than spiritual intelligence training in improving memory and sustained attention. These findings highlight the importance of emotional and spiritual intelligence as modifiable psychological constructs that can enhance executive functioning in students with learning disorders.

The significant improvement in memory following emotional intelligence training can be explained by the strong relationship between emotional regulation and working memory processes. Emotional intelligence enhances individuals' ability to regulate emotional interference, which allows cognitive resources to be allocated more efficiently to memory encoding, storage, and retrieval processes (Mayer et al., 2023; Salovey & Mayer, 2023). Emotional dysregulation has been shown to impair working memory by increasing cognitive load and attentional distraction, whereas emotional regulation skills facilitate cognitive clarity and memory performance (Clougher et al., 2024; Fischer, 2019). Emotional intelligence training strengthens emotional awareness and emotional regulation, which enhances attentional focus and improves working memory performance (Fernández-Abascal & Martín-Díaz, 2024; Johnson et al., 2025). These findings are consistent with previous research demonstrating that emotional intelligence training improves cognitive functioning and executive processes by enhancing emotional regulation and cognitive control (Moharrami & Sardari, 2020; Salehi Shablizi et al., 2024).

The significant improvement in inhibitory control following emotional intelligence training is also consistent with theoretical and empirical evidence indicating that emotional regulation plays a central role in behavioral inhibition. Inhibitory control requires individuals to suppress automatic or impulsive responses in favor of goal-directed behavior, which is closely related to emotional regulation and self-control processes (Smith et al., 2023a; Wright et al., 2024). Emotional intelligence enhances individuals' ability to regulate emotional impulses, which strengthens inhibitory control and improves executive functioning (Johnson et al., 2025; Salovey & Mayer, 2023). Emotional intelligence training promotes emotional awareness, impulse control, and adaptive coping strategies, which improve inhibitory control and reduce impulsive behavior (Fernández-Abascal & Martín-Díaz, 2024; Moharrami & Sardari, 2020). These findings align with previous studies demonstrating that emotional intelligence interventions enhance inhibitory control and executive functioning in adolescents and students with learning difficulties (Clougher et al., 2024; Fernández-Abascal & Martín-Díaz, 2024).

The significant improvement in decision-making following emotional intelligence training can be attributed to the role of emotional intelligence in enhancing cognitive evaluation, emotional regulation, and adaptive judgment processes. Decision-making requires the integration of emotional and cognitive information, and emotional intelligence facilitates effective decision-making by improving emotional awareness and cognitive flexibility (Evans & Brown, 2023; Salovey & Mayer, 2023). Emotional intelligence training enhances individuals' ability to evaluate emotional and cognitive information, which leads to more adaptive and effective decision-making (Johnson et al., 2025; Salehi Shablizi et al., 2024). Emotional intelligence promotes cognitive clarity and reduces emotional interference, which enhances decision-making performance and executive functioning (Clougher et al., 2024; Fernández-Abascal & Martín-Díaz, 2024). These findings support previous research indicating that emotional intelligence is positively associated with decision-making performance and executive functioning (Fischer, 2019; Smith et al., 2023b).

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The significant improvement in planning following both emotional intelligence training and spiritual intelligence training suggests that both interventions enhance goal-directed cognitive processes and cognitive organization. Planning is a core executive function that involves organizing behavior, setting goals, and implementing strategies to achieve desired outcomes (Johnson & Wang, 2024; Miller & Taylor, 2024). Emotional intelligence enhances planning by improving emotional regulation and cognitive flexibility, which facilitate goal-directed behavior and adaptive functioning (Fernández-Abascal & Martín-Díaz, 2024; Salovey & Mayer, 2023). Similarly, spiritual intelligence enhances planning by promoting meaning-oriented thinking, self-awareness, and cognitive clarity, which improve goal-setting and strategic thinking (Cicotto, 2025; Zohar & Marshall, 2023). Spiritual intelligence encourages individuals to reflect on their goals, values, and purpose, which enhances planning and executive functioning (Abbaspour & Tavakhosh, 2024; Johnson et al., 2025). These findings are consistent with previous studies demonstrating that both emotional intelligence and spiritual intelligence contribute to improved executive functioning and cognitive performance (Abdolreza pour & Ghanbari, 2020; Johnson et al., 2025).

The significant improvement in sustained attention following emotional intelligence training highlights the importance of emotional regulation in attentional control. Sustained attention requires individuals to maintain focus over extended periods, which is influenced by emotional stability and cognitive control processes (Davis et al., 2024; Smith et al., 2023a). Emotional intelligence enhances attentional control by reducing emotional distraction and improving cognitive focus (Fernández-Abascal & Martín-Díaz, 2024; Wright et al., 2024). Emotional intelligence training promotes emotional stability and attentional regulation, which improve sustained attention and executive functioning (Johnson et al., 2025; Salehi Shablizi et al., 2024). These findings are consistent with previous research demonstrating that emotional intelligence is associated with improved attentional control and executive functioning (Clougher et al., 2024; Fischer, 2019).

The finding that spiritual intelligence training significantly improved memory and planning but did not significantly improve inhibitory control, decision-making, or sustained attention may reflect differences in the underlying mechanisms of emotional intelligence and spiritual intelligence. Spiritual intelligence primarily enhances meaning-making, self-awareness, and cognitive clarity, which contribute to memory and planning but may have a less direct effect on impulse control and attentional regulation (Cicotto, 2025; Zohar & Marshall, 2023). Spiritual intelligence promotes cognitive reflection, existential awareness, and goal-directed thinking, which enhance memory and planning processes (Abbaspour & Tavakhosh, 2024; Johnson et al., 2025). However, emotional intelligence has a more direct impact on emotional regulation and impulse control, which are essential for inhibitory control and attentional regulation (Fernández-Abascal & Martín-Díaz, 2024; Salovey & Mayer, 2023). These findings are consistent with previous research indicating that emotional intelligence has a stronger influence on emotional regulation and executive functioning than spiritual intelligence (Abdolreza pour & Ghanbari, 2020; Johnson et al., 2025).

The finding that emotional intelligence training was more effective than spiritual intelligence training in improving memory and sustained attention highlights the central role of emotional regulation in executive functioning. Emotional regulation enhances cognitive functioning by reducing emotional interference and improving attentional control (Smith et al., 2023a; Wright et al., 2024). Emotional intelligence training strengthens emotional regulation and cognitive control, which enhance memory and attentional performance (Fernández-Abascal & Martín-Díaz, 2024; Johnson et al., 2025). These findings support previous research indicating that emotional intelligence training improves executive functioning and cognitive performance in adolescents and students with learning disorders (Moharrami & Sardari, 2020; Salehi Shablizi et al., 2024).

5. Conclusion

Overall, the findings of the present study support the theoretical framework that emotional intelligence and spiritual intelligence contribute to executive functioning through distinct but complementary mechanisms. Emotional intelligence enhances executive functioning by strengthening emotional regulation, cognitive control, and attentional regulation, whereas spiritual intelligence enhances executive functioning by promoting meaning-making, cognitive clarity, and goal-directed behavior (Salovey & Mayer, 2023; Zohar & Marshall, 2023). These findings highlight the importance of psychological interventions that target emotional and spiritual intelligence to improve executive functioning in students with learning disorders.

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One limitation of the present study is the relatively small sample size, which may limit the generalizability of the findings. The use of convenience sampling may also introduce selection bias, which could affect the representativeness of the sample. Additionally, the study relied on self-report measures to assess executive functioning, which may be subject to response bias. The follow-up period was relatively short, which limits the ability to assess the long-term effectiveness of the interventions. Furthermore, individual differences in motivation, personality, and environmental factors were not controlled, which may have influenced the effectiveness of the interventions.

Future research should use larger and more diverse samples to improve the generalizability of the findings. Longitudinal studies should be conducted to examine the long-term effectiveness of emotional intelligence and spiritual intelligence training on executive functioning. Future studies should also examine the combined effects of emotional intelligence and spiritual intelligence training to determine whether integrated interventions produce greater improvements in executive functioning. Additionally, future research should use multiple assessment methods, including behavioral and neurocognitive measures, to provide a more comprehensive evaluation of executive functioning.

The findings of the present study have important practical implications for educators, psychologists, and school counselors. Emotional intelligence training programs can be implemented in schools to improve executive functioning and academic performance in students with learning disorders. Spiritual intelligence training programs can also be used to enhance cognitive clarity, goal-setting, and psychological well-being. Schools and educational institutions should incorporate emotional and spiritual intelligence training into their curricula to promote cognitive development and psychological well-being. Educational professionals should also receive training in emotional and spiritual intelligence interventions to effectively support students with learning disorders and improve their academic and psychological outcomes.

Authors' Contributions

F.G.B., H.N., and R.D. jointly contributed to the conceptualization and design of the study. F.G.B. supervised the research process and intervention implementation. H.N. designed the methodology and performed the statistical analyses and interpretation of the data. R.D. conducted data collection, prepared the intervention materials, and drafted the manuscript. All authors contributed to reviewing and revising the manuscript and approved the final version for publication.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

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