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A Comparison of the Effectiveness of Emotional Cognitive Regulation Strategies and Self-Regulated Learning Strategies on Academic Self-Concept and Cognitive Flexibility in Elementary School Students with Specific Learning Disabilities in Reading

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A B S T R A C T

Purpose: This study aimed to compare the effectiveness of emotional cognitive regulation strategies and self-regulated learning strategies on improving academic self-concept and cognitive flexibility in elementary school students diagnosed with specific learning disabilities in reading.

Methods and Materials: A quasi-experimental pre-test, post-test, and follow-up design was used, involving 60 students with specific reading disabilities from elementary schools in Sari, Iran. Participants were randomly assigned to one of three groups: emotional cognitive regulation training, self-regulated learning training, or a control group. Each experimental group consisted of 20 students who underwent 8 sessions of their respective intervention. Data were collected using two standardized questionnaires: the Academic Self-Concept Questionnaire (Chen, 2004) and the Cognitive Flexibility Inventory (Dennis & Vander Wal, 2010). Statistical analysis was performed using multivariate analysis of covariance (MANCOVA) and Bonferroni post-hoc tests.

Findings: Both emotional cognitive regulation and self-regulated learning strategies significantly improved academic self-concept and cognitive flexibility compared to the control group ($p < .001$). No significant differences were found between the two experimental groups in terms of academic self-concept ($p = .102$) or cognitive flexibility ($p = .241$). The Bonferroni post-hoc test confirmed that both interventions were equally effective in enhancing the targeted outcomes.

Conclusion: The findings indicate that emotional cognitive regulation and self-regulated learning strategies are equally effective in improving academic self-concept and cognitive flexibility in students with specific learning disabilities in reading. Both interventions offer valuable tools for educators to support these students' academic and emotional development.

Keywords: *Specific learning disabilities, academic self-concept, cognitive flexibility, emotional regulation, self-regulated learning, elementary students.*

1. Introduction

Specific learning disabilities (SLDs) such as reading difficulties are pervasive challenges that affect a substantial number of students, influencing not only their academic performance but also their emotional and cognitive development. In recent years, a growing body of research has emphasized the importance of cognitive and emotional self-regulation as key strategies for improving outcomes for students with learning disabilities. Academic self-concept and cognitive flexibility, both of which play critical roles in educational achievement, are significantly impacted by the presence of learning disabilities (Ashori & Najafi, 2020).

Self-regulation refers to the processes by which individuals control their thoughts, emotions, and behaviors in order to achieve goals (Korucu et al., 2022). For students with learning disabilities, the ability to regulate cognitive and emotional processes is often impaired, leading to difficulties in academic performance and social interactions (Ghazvineh et al., 2022). Asgari et al. (2011) argue that self-regulation training can significantly enhance academic self-concept and performance, particularly in subjects like mathematics, where self-regulation and perseverance are essential (Asgari et al., 2011).

The concept of academic self-concept is closely tied to self-regulation. Academic self-concept, or a student's perception of their own abilities in academic settings, has been shown to influence motivation, engagement, and ultimately academic success (Lohbeck & Moschner, 2021). Research suggests that students with higher academic self-concept tend to use more effective cognitive learning strategies and demonstrate better academic outcomes (Ofem et al., 2024; Ragusa et al., 2023). In contrast, students with learning disabilities often struggle with low self-concept, further exacerbating their academic challenges.

Cognitive flexibility, defined as the ability to shift between thinking about different concepts or adapting to new information, is another important component of academic success (Pourjaberi et al., 2023; Vaziri et al., 2021). Students with higher cognitive flexibility are more capable of adapting to challenges and overcoming learning obstacles. However, students with specific learning disabilities, particularly those involving reading, often exhibit lower levels of cognitive flexibility (Baradaran & Ranjbar Noushari, 2022). This rigidity in thinking patterns can lead to poor academic outcomes and hinder their ability to engage in effective problem-solving strategies.

One of the key interventions for improving cognitive flexibility and academic outcomes in students with learning disabilities is emotional regulation training (Baradaran & Ranjbar Noushari, 2022). Emotional regulation involves the ability to manage and respond to emotional experiences in a way that promotes adaptive functioning. Students with learning disabilities frequently experience frustration, anxiety, and low self-esteem due to their academic struggles (Onuigbo et al., 2019; Roghani et al., 2022). Therefore, training in emotional regulation can help these students develop resilience and psychological flexibility, which in turn improves their cognitive and academic performance (Faraj Zadeh et al., 2020).

Self-regulated learning is a multifaceted process that involves setting goals, monitoring progress, and adjusting behaviors to achieve academic success (Almurumudhe et al., 2024). It has been shown to be particularly effective for students with learning disabilities, as it encourages them to take control of their learning processes and develop strategies for overcoming their difficulties (Veisiy et al., 2021). In a study by Enayati Shabkolai et al. (2023), self-regulated learning strategies were found to significantly improve academic self-regulation and cognitive flexibility in students with learning disabilities, highlighting the potential of these strategies to enhance both cognitive and emotional outcomes (Enayati Shabkolai et al., 2023).

Moreover, self-regulation is closely linked to motivational processes. Research has shown that students who are more adept at regulating their learning behaviors also tend to be more motivated and engaged in their academic work (Abbasi et al., 2015). This is particularly important for students with learning disabilities, who often face additional barriers to motivation due to repeated academic failures and low self-efficacy (Fateme Saati et al., 2021).

While both emotional cognitive regulation and self-regulated learning strategies have been shown to improve outcomes for students with learning disabilities, it remains unclear which approach is more effective for specific outcomes like academic self-concept and cognitive flexibility. Emotional regulation strategies focus on helping students manage their emotional responses to academic challenges, thus reducing the negative impact of emotions like frustration and anxiety on learning (Behnaz 2016). On the other hand, self-regulated learning strategies emphasize the importance of goal setting, monitoring progress, and adapting learning strategies to meet academic goals (Asdolahzadeh et al., 2021).

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Studies have shown that emotional regulation interventions can lead to significant improvements in cognitive flexibility, as students who are better able to manage their emotions are more likely to adapt to changing academic demands (Ashori & Najafi, 2020). This suggests that emotional regulation training may be particularly effective for students who struggle with the cognitive flexibility necessary to overcome reading difficulties. However, self-regulated learning strategies have been found to have a strong impact on academic self-concept, as these strategies encourage students to take ownership of their learning and develop a sense of competence and achievement (Huang et al., 2023).

Learning disabilities, particularly in reading, have far-reaching effects on students' academic performance and emotional well-being. Students with reading disabilities often face academic challenges that lead to frustration, low self-esteem, and social isolation (Abbasi et al., 2015). These emotional challenges can further exacerbate their learning difficulties, creating a vicious cycle of academic failure and emotional distress (Rafezi et al., 2021).

Research has shown that students with learning disabilities are more likely to experience academic procrastination, emotional dysregulation, and lower levels of academic engagement (Eisenbeck et al., 2019). In a study by Hassanpour et al. (2022), emotional self-regulation was found to be a significant predictor of academic procrastination and shyness in students, indicating the crucial role that emotional regulation plays in academic success (Hassanpour et al., 2022). Furthermore, academic procrastination has been linked to psychological inflexibility, suggesting that interventions aimed at improving emotional regulation and cognitive flexibility may also reduce procrastination and enhance academic performance (Eisenbeck et al., 2019).

Given the complex interplay between cognitive and emotional factors in students with learning disabilities, it is essential to develop targeted interventions that address both emotional regulation and self-regulated learning. Studies have shown that interventions focused on emotional regulation can significantly improve cognitive flexibility, academic self-concept, and overall academic performance (Almurumudhe et al., 2024; Haseli Songhori & Salamti, 2024). Similarly, self-regulated learning strategies have been found to enhance academic engagement, reduce procrastination, and improve academic outcomes in students with learning disabilities (Abbasi et al., 2015).

This study aims to compare the effectiveness of emotional cognitive regulation strategies and self-regulated learning strategies on academic self-concept and cognitive flexibility in elementary students diagnosed with specific reading disabilities.

2. Methods and Materials

2.1. Study Design and Participants

This study adopts a semi-experimental pre-test, post-test, and follow-up design with a control group. The statistical population consists of elementary school students (ages 10-12) in the second phase of education who have been diagnosed with specific learning disabilities in reading. The study is conducted in Sari during the 2023-2024 academic year. The sample size, determined using G*Power software, includes 60 students who are selected through convenience sampling. The students are randomly assigned to one of three groups: the emotional cognitive regulation strategies training group, the self-regulated learning strategies training group, and the control group, with 20 students in each group. These groups are matched based on age and gender to ensure homogeneity.

Inclusion criteria for participation in the study include being in the second phase of elementary school (ages 10-12), having a diagnosed specific learning disability in reading according to DSM-5 criteria, willingness to participate, and no concurrent participation in other treatments. Exclusion criteria include having a psychological disorder other than specific learning disabilities (e.g., depression), being from a single-parent household or having a parent with substance abuse issues, or missing more than two sessions during the intervention.

Data collection begins by visiting elementary schools in Sari. Students diagnosed with specific learning disabilities in reading, based on DSM-5 criteria, are selected for participation. After explaining the study to participants and considering ethical issues, those willing to cooperate are randomly assigned to one of the three groups. The two experimental groups undergo group-based training in cognitive regulation or self-regulated learning strategies, while the control group remains on a waiting list. All participants complete the pre-test questionnaires before the intervention and the post-test questionnaires after the training. After three months, a follow-up test is administered to assess the sustainability of the intervention.

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2.2. Measures

2.2.1. Academic Self-Concept

The first data collection tool used in the study is the Academic Self-Concept Questionnaire, developed by Yi-Yen Chen in 2004. This self-report questionnaire assesses academic self-concept at three levels: general, academic, and non-academic. It consists of 15 items rated on a four-point Likert scale, ranging from 'strongly agree' (4 points) to 'strongly disagree' (1 point). All items are scored directly. The internal consistency reliability for the three subscales is 0.75, 0.82, and 0.82, respectively. The validity of the questionnaire was assessed by correlating it with the academic self-esteem subscale and the Coopersmith Self-Esteem Inventory, resulting in a correlation of 0.53 (Asdolahzadeh et al., 2021; Asgari et al., 2011; Enayati Shabkolai et al., 2023; Malahi & Tabodi, 2020).

2.2.2. Cognitive Flexibility

The second data collection tool is the Cognitive Flexibility Inventory (CFI), developed by Dennis and Vander Wal in 2010. This self-report instrument consists of 20 items designed to measure cognitive flexibility, particularly the individual's ability to challenge and replace ineffective thoughts with more effective ones. Responses are recorded on a seven-point Likert scale, where 'strongly agree' is rated as 7 and 'strongly disagree' as 1. The minimum score is 20, and the maximum is 140, with higher scores indicating greater cognitive flexibility. The questionnaire demonstrated appropriate construct, convergent, and concurrent validity. In Iran, its convergent validity was found to be 0.67 when correlated with the Resilience Questionnaire, and its concurrent validity was 0.50 with the Beck Depression Inventory. Cronbach's alpha for this scale in previous studies has been reported to range from 0.71 to 0.86 (Ashori & Najafi, 2020; Baradaran & Ranjbar Noushari, 2022; Vaziri et al., 2021).

2.3. Interventions

2.3.1. Self-Regulated Learning Training

This intervention is based on Pintrich's (1999) self-regulation model and aims to enhance students' self-regulatory skills in learning (Asgari et al., 2011). The training consists of eight sessions, each focusing on a different aspect of self-regulated learning. The first session is centered on building rapport with the participants, establishing a friendly atmosphere, and creating a positive attitude toward the training program. In the second session, motivation and interest are discussed, with a focus on ways to foster and increase motivation for learning. The third session introduces goal setting for studying, as well as strategies for improving concentration and attention. The fourth session covers time management and planning, teaching participants how to better organize their study time and have more control over their learning tasks. In the fifth session, repetition and review are introduced as the first cognitive strategies, with a discussion on their importance for reinforcing learning. The sixth session explores elaboration strategies, helping students understand how to expand and deepen their learning by connecting new information to what they already know. The seventh session focuses on organizational strategies, teaching the SQ3R method (Survey, Question, Read, Recite, Review) to enhance learning effectiveness. Finally, the eighth session reviews the self-regulation strategies learned throughout the course, with a focus on consolidating these skills and revisiting key concepts.

2.3.2. Emotional Regulation Training

This intervention is structured around Gross's (2002) emotion regulation model and is designed to teach students how to better manage their emotions (Ashori & Najafi, 2020; Baradaran & Ranjbar Noushari, 2022; Behnaz 2016; Enayati Shabkolai et al., 2023; Ghazvineh et al., 2022; Roghani & Afrokhte, 2023). The program consists of eight sessions, starting with the first session, which introduces the participants and helps them identify positive emotions, such as joy, in themselves and others. The second session focuses on recognizing negative emotions like anger, sadness, fear, and anxiety, as well as identifying these emotions in others. In the third session, the application of both positive and negative emotions in interpersonal relationships is discussed, emphasizing the role of different emotions in various situations and how they influence interactions. The fourth session continues this discussion, focusing on how emotional intensity varies in different contexts and the environmental factors that contribute to emotional expression. The fifth session introduces techniques for regulating emotions, such as delaying reactions, redirecting attention, and employing cognitive reappraisal. The sixth session focuses specifically on managing anger through interactive games designed to teach coping strategies. The seventh session continues the focus on anger management,

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introducing self-talk techniques and relaxation methods such as deep breathing and counting. In the final session, the participants learn how to help others regulate their emotions by stepping toward them, using humor and jokes, and a summary of the key lessons from the previous sessions is provided to consolidate their learning.

2.4. Data Analysis

In this study, data analysis was conducted using both descriptive and inferential statistical methods. For descriptive analysis, demographic characteristics of the participants and the research variables were described using frequency distributions, central tendency indices (mean), and measures of dispersion (standard deviation). For inferential analysis, in order to generalize the findings from the sample to the broader population and to test the research hypotheses, repeated measures analysis of variance (ANOVA) was employed, provided that the data followed a normal distribution. Post-hoc tests were also applied where necessary. All statistical analyses were performed using SPSS software, version 21.

3. Findings and Results

The demographic characteristics of the participants in this study include an equal distribution of boys and girls across all three groups. In the control group, there were 10 boys and 10 girls, making up 50% for each gender, and the same distribution was observed in both the cognitive regulation strategies group and the self-regulated learning strategies group, with 10 boys and 10 girls in each, resulting in a total of 30 boys and 30 girls, equally distributed between genders (50% male, 50% female). In terms of age, the participants ranged between 10 and 12 years old. In the control group, 30% of the students were 10 years old, 30% were 11 years old, and 40% were 12 years old. In the cognitive regulation strategies group, 25% were 10 years old, 40% were 11 years old, and 35% were 12 years old. Similarly, in the self-regulated learning strategies group, 20% of the participants were 10 years old, 50% were 11 years old, and 30% were 12 years old. This resulted in an overall distribution where 25% of the participants were 10 years old, 40% were 11 years old, and 35% were 12 years old across the entire sample of 60 students.

Table 1

Descriptive Statistics for Academic Self-Concept and Cognitive Flexibility

Variable	Group	N	Pre-test Mean (SD)	Post-test Mean (SD)	Follow-up Mean (SD)
Academic Self-Concept	Control	20	32.95 (5.79)	32.60 (5.41)	32.60 (4.65)
	Cognitive Regulation	20	32.00 (6.10)	53.00 (5.56)	52.40 (4.47)
	Self-Regulated Learning	20	33.90 (5.57)	53.20 (6.58)	51.65 (5.71)
Cognitive Flexibility	Control	20	70.20 (7.84)	78.40 (9.08)	76.75 (10.33)
	Cognitive Regulation	20	79.40 (9.18)	98.10 (10.19)	99.45 (10.10)
	Self-Regulated Learning	20	82.35 (8.55)	94.70 (6.53)	95.65 (6.60)

For academic self-concept, the control group showed no significant change, with pre-test scores averaging 32.95 (SD = 5.79), post-test scores at 32.60 (SD = 5.41), and follow-up scores at 32.60 (SD = 4.65). In contrast, the cognitive regulation group improved significantly, increasing from 32.00 (SD = 6.10) in the pre-test to 53.00 (SD = 5.56) in the post-test, maintaining a high score of 52.40 (SD = 4.47) in the follow-up. Similarly, the self-regulated learning group improved from a pre-test mean of 33.90 (SD = 5.57) to 53.20 (SD = 6.58), with a follow-up score of 51.65 (SD = 5.71).

For cognitive flexibility, the control group exhibited slight improvement from 70.20 (SD = 7.84) in the pre-test to 78.40 (SD = 9.08) in the post-test, with a follow-up score of 76.75 (SD = 10.33). The cognitive regulation group showed a greater improvement, increasing from 79.40 (SD = 9.18) in the pre-test to 98.10 (SD = 10.19) in the post-test, with a follow-up score of 99.45 (SD = 10.10). The self-regulated learning group also improved significantly from 82.35 (SD = 8.55) in the pre-test to 94.70 (SD = 6.53), with a follow-up score of 95.65 (SD = 6.60).

The assumptions of normality, linearity, and homogeneity of variances were tested and confirmed. Levene's test confirmed the homogeneity of variances across groups. The Box's M test indicated no significant violations for equality of covariance matrices. However, Mauchly's test of sphericity was violated ($p < .05$), so the Greenhouse-Geisser correction was applied to adjust the degrees of freedom in the repeated measures analyses.

The results of the multivariate analysis of covariance (MANCOVA) are shown in Table 2. This analysis compared the differences across groups (control, cognitive regulation,

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self-regulated learning) for academic self-concept and cognitive flexibility, while controlling for pre-test scores.

Table 2

MANCOVA Results

Source	Variable	SS	df	MS	F	p	Partial Eta Squared
Group (Control vs. Cognitive Regulation)	Academic Self-Concept	1400.5	1	1400.5	124.53	<.001	0.812
	Cognitive Flexibility	900.2	1	900.2	68.24	<.001	0.727
Group (Control vs. Self-Regulated Learning)	Academic Self-Concept	1450.7	1	1450.7	127.23	<.001	0.816
	Cognitive Flexibility	780.4	1	780.4	56.13	<.001	0.691
Group (Cognitive Regulation vs. Self-Regulated Learning)	Academic Self-Concept	40.1	1	40.1	2.78	0.102	0.089
	Cognitive Flexibility	20.5	1	20.5	1.45	0.241	0.048

The MANCOVA results show significant differences between the control group and both experimental groups for academic self-concept and cognitive flexibility. The cognitive regulation group significantly outperformed the control group in academic self-concept ($F = 124.53$, $p < .001$, partial eta squared = 0.812) and cognitive flexibility ($F = 68.24$, $p < .001$, partial eta squared = 0.727). Similarly, the self-regulated learning group showed significant improvements over the control group in academic self-concept ($F = 127.23$, $p < .001$, partial eta squared = 0.816) and cognitive flexibility ($F = 56.13$, $p < .001$, partial eta squared = 0.691). No significant differences were found between the two experimental groups in either academic self-concept ($F = 2.78$, $p = 0.102$) or cognitive flexibility ($F = 1.45$, $p = 0.241$).

Table 3

Bonferroni Post-Hoc Test

Comparison	Academic Self-Concept (p-value)	Academic Self-Concept (Mean Diff)	Cognitive Flexibility (p-value)	Cognitive Flexibility (Mean Diff)
Cognitive Regulation vs. Control	<.001	20.4	<.001	19.7
Self-Regulated Learning vs. Control	<.001	19.8	<.001	12.3
Cognitive Regulation vs. Self-Regulated	0.102	0.2	0.241	2.2

The Bonferroni post-hoc comparisons indicate that both the cognitive regulation and self-regulated learning groups significantly outperformed the control group in academic self-concept and cognitive flexibility ($p < .001$). No significant differences were found between the two experimental groups for academic self-concept ($p = 0.102$) or cognitive flexibility ($p = 0.241$). The mean differences suggest a slight edge in improvement for cognitive flexibility in the cognitive regulation group, though not statistically significant.

4. Discussion and Conclusion

The purpose of this study was to compare the effectiveness of emotional cognitive regulation strategies and self-regulated learning strategies on academic self-concept and cognitive flexibility in elementary school students with specific learning disabilities in reading. The findings of this study indicate that both interventions were successful in significantly improving academic self-concept and cognitive flexibility, with no significant differences between the two intervention groups. These results suggest that both emotional cognitive regulation and self-regulated learning strategies are valuable tools for enhancing the cognitive and emotional capacities of students with reading disabilities.

In terms of academic self-concept, students who received training in both emotional cognitive regulation and self-regulated learning strategies demonstrated substantial

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improvements compared to the control group. This finding aligns with previous research, which highlights the positive relationship between self-regulated learning and academic self-concept (Abbasi et al., 2015; Lohbeck & Moschner, 2021). The improvements in academic self-concept observed in this study can be attributed to the emphasis on goal setting, self-monitoring, and feedback, which are central to self-regulated learning strategies. These strategies help students develop a sense of competence and control over their learning, thus boosting their academic self-concept (Asgari et al., 2011). Similarly, emotional regulation strategies, by helping students manage negative emotions such as frustration and anxiety, reduce the emotional barriers to learning and contribute to a more positive self-concept (Huang et al., 2023).

The significant improvement in cognitive flexibility among students in both intervention groups is consistent with previous findings that highlight the importance of cognitive and emotional regulation in enhancing cognitive flexibility (Ashori & Najafi, 2020; Baradaran & Ranjbar Noushari, 2022). Cognitive flexibility, or the ability to adapt to new information and switch between tasks, is crucial for students with learning disabilities, particularly in reading, where they may face frequent academic challenges. Emotional regulation strategies help students to manage their emotional responses to these challenges, enabling them to remain focused and flexible in their cognitive processing (Faraj Zadeh et al., 2020). Self-regulated learning strategies, on the other hand, provide students with the cognitive tools to plan, monitor, and adjust their learning strategies, which also promotes cognitive flexibility (Korucu et al., 2022).

The lack of significant differences between the two experimental groups in terms of academic self-concept and cognitive flexibility suggests that both interventions are equally effective. This finding is important because it highlights the complementary nature of emotional cognitive regulation and self-regulated learning strategies. While emotional regulation focuses on managing emotions to enhance cognitive processes, self-regulated learning emphasizes the cognitive aspects of learning itself. Both approaches ultimately converge in improving the overall learning experience for students with disabilities, leading to enhanced self-concept and cognitive flexibility (Ghazvineh et al., 2022). This is supported by research from Almurumudhe et al. (2024), who found that both emotional regulation and self-regulation are critical factors in academic success and psychological well-being (Almurumudhe et al., 2024).

Moreover, these findings align with Eisenbeck et al. (2019), who emphasized the role of psychological flexibility in mitigating academic procrastination and stress (Eisenbeck et al., 2019). The emotional regulation strategies used in this study likely contributed to increased psychological flexibility, allowing students to better manage academic pressures. Similarly, the improvements in cognitive flexibility align with the work of Enayati Shabkolai et al. (2023), who demonstrated that training in self-regulation could enhance cognitive flexibility in students with learning disabilities (Enayati Shabkolai et al., 2023). The results of this study further confirm the importance of both emotional and cognitive self-regulation for improving cognitive flexibility in students with specific learning disabilities.

The improvements observed in this study also resonate with the findings of Vaziri et al. (2021), who demonstrated that cognitive flexibility and self-regulation are interconnected processes that support academic success. The interventions used in this study likely helped students develop greater cognitive flexibility by enabling them to switch between different learning strategies and adapt to the demands of their academic tasks (Vaziri et al., 2021). This increased flexibility, in turn, may have contributed to their improved academic self-concept, as students were better able to manage academic challenges and experience success in their learning.

While the results of this study are promising, several limitations must be acknowledged. First, the sample size was relatively small, consisting of only 60 students from a specific geographic area. This limits the generalizability of the findings to other populations, particularly those in different cultural or educational contexts. Additionally, the study focused exclusively on students with specific learning disabilities in reading, which means that the findings may not be applicable to students with other types of learning disabilities. Another limitation is the reliance on self-report measures for assessing academic self-concept and cognitive flexibility. While these measures are commonly used in educational research, they are subject to bias, as students may not accurately report their cognitive and emotional experiences. Finally, the study was limited to a relatively short follow-up period of three months. It is unclear whether the improvements in academic self-concept and cognitive flexibility would be sustained over a longer period without continued intervention.

Future research should seek to address the limitations of this study by using larger and more diverse samples, including students from different cultural and educational

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backgrounds. This would provide a more comprehensive understanding of how emotional cognitive regulation and self-regulated learning strategies affect students with learning disabilities in various contexts. Additionally, future studies should explore the long-term effects of these interventions by extending the follow-up period to determine whether the improvements in academic self-concept and cognitive flexibility are sustained over time. Researchers could also investigate the effectiveness of these interventions for students with other types of learning disabilities, such as those related to mathematics or writing, to determine whether the findings are applicable across different learning challenges. Moreover, future research should consider using a combination of self-report measures and objective assessments, such as performance-based tasks, to provide a more accurate and holistic assessment of students' cognitive and emotional abilities.

Educators and practitioners working with students with learning disabilities should consider incorporating both emotional cognitive regulation and self-regulated learning strategies into their instructional practices. These interventions have been shown to significantly improve academic self-concept and cognitive flexibility, both of which are critical for academic success. Teachers should focus on helping students develop emotional regulation skills, such as managing frustration and anxiety, to reduce the emotional barriers to learning. Additionally, they should teach students self-regulated learning strategies, such as goal setting, self-monitoring, and strategy adjustment, to help them take control of their learning processes. Schools should also consider providing professional development opportunities for teachers to learn how to effectively implement these strategies in the classroom. Finally, parents can play a supportive role by encouraging their children to apply emotional regulation and self-regulation techniques at home, further reinforcing the skills learned at school.

Authors' Contributions

All authors significantly contributed to this study.

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

In this study, to observe ethical considerations, participants were informed about the goals and importance of the research before the start of the interview and participated in the research with informed consent.

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