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Comparing the Effectiveness of Brain-Based Learning and Cognitive Rehabilitation on Emotional Control in Children Aged 10-12 Years with Attention-Deficit/Hyperactivity Disorder

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ABSTRACT

Objective: This study aimed to compare the effectiveness of brain-based learning and cognitive rehabilitation on emotional control in 10- to 12-year-old children with attention deficit hyperactivity disorder (ADHD).

Methods: This applied study used an experimental design with pre-test, post-test, and control groups. The sample was selected through random sampling and then assigned to two experimental groups and one control group, with 15 participants in each group. Data were collected using the Executive Functions Scale of Gerrard et al. (2000) and the ADHD scale of Gado and Sprafkin (2001). The experimental groups received one month of training based on brain-based learning and cognitive rehabilitation protocols, while the control group received no intervention. Data were analyzed using SPSS version 26 and one-way analysis of covariance.

Results: The results of covariance analysis showed a significant difference among the groups in emotional control scores at the post-test stage ($p < 0.05$). Pairwise comparison of mean scores indicated that both interventions were effective, but brain-based learning had a greater effect than cognitive rehabilitation on improving emotional control.

Conclusions: The findings suggest that brain-based learning is more effective than cognitive rehabilitation in improving emotional control in children with ADHD. Therefore, brain-based learning can be considered a useful educational intervention for enhancing emotional regulation in this population.

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Introduction

Attention to children's psychological growth and development begins most effectively in primary education, which is undoubtedly the first and most appropriate formal context for fostering cognitive, emotional, and social development. This educational stage prepares children for higher levels of schooling, and when delivered with strong quantitative and qualitative standards, it can reduce later academic failure and school dropout rates (Hokyung & Parsons, 2018). Among the psychological and behavioral conditions that may interfere with children's educational progress during this critical period, attention-deficit/hyperactivity disorder (ADHD) is recognized as one of the most prevalent psychiatric disorders of childhood. According to the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders published by the American Psychiatric Association, ADHD is characterized by symptoms such as limited attention span, poor concentration, impulsive behavior, and hyperactivity. In Iran, the prevalence of this disorder has been estimated at 10% to 20% (Mirhosseini et al., 2020).

A substantial body of research has shown that children with ADHD experience serious deficits in executive functions. These deficits may persist into later developmental stages and create considerable difficulties in school performance as well as in everyday personal functioning. Therefore, early identification and timely intervention are essential for addressing the challenges faced by these children (Sonuga-Barke et al., 2006). Executive functions refer to a set of distinct yet interrelated abilities that enable individuals to engage effectively in goal-directed behavior and problem-solving through conscious processing, while also adapting to complex life situations (Khanjani, Nazari, & Abravani, 2019). Diamond's (2013) developmental model of executive functions identifies three core components: inhibitory control, working memory, and cognitive flexibility. Attention, as a major executive function, is one of the most fundamental operations of the human brain, and its components provide the basis for other cognitive processes. Consequently, the integrity of the attentional system is necessary for the effective functioning of higher-level cognitive systems (Posner & Petersen, 2006). Nevertheless, emotional control remains one of the major difficulties experienced by children with ADHD, and improving this domain has been strongly emphasized in psychological intervention literature.

Both pharmacological and educational approaches have been used to treat ADHD and its associated impairments. Although medication may be effective, it can also impose substantial financial costs on families and may be accompanied by undesirable physical and psychological side effects. In contrast, educational and behavioral interventions are generally less invasive and, when successful, can yield considerable developmental and academic benefits. Accordingly, the present study seeks to examine and compare two educational interventions that may help alleviate difficulties associated with ADHD in children. According to scholars in educational psychology, brain-based learning and cognitive rehabilitation are among the innovative approaches that may enhance executive functions.

In recent years, growing attention has been directed toward understanding brain functioning as the foundation of human learning. Advances in developmental neurophysiology have generated extensive research on the structure and function of the human brain, with a particular focus on mental health, brain disorders, and the effects of medication. At the same time, international scholarly interest has increasingly shifted toward the educational implications of neuroscience findings (Soleimani Davoudli, 2019). The philosophy of whole-brain teaching suggests that approaches based solely on right-brain or left-brain stimulation are not sufficient to promote effective learning. Rather, meaningful learning requires the integration of methods that engage both hemispheres through instructional content and teaching pathways selected by the educator, thereby supporting whole-brain learning and thinking (Amini et al., 2012). Brain-based learning theory emphasizes the use of research on how the brain works and how teachers can apply this knowledge to help students learn more rapidly and efficiently, including in language and academic learning contexts (Ebadi, 2018). Since learning styles are often associated with right- or left-hemispheric dominance, understanding students' patterns of brain dominance may play an important role in the learning process (Marew, 2011).

Alongside the brain-based learning approach, the present study also focuses on cognitive rehabilitation and its effectiveness in the target population. Cognitive rehabilitation is a system of therapeutic activities grounded in brain-behavior relationships and designed to improve functioning through several mechanisms: reestablishing or strengthening previously learned behavioral patterns, developing new cognitive activity patterns through compensatory cognitive mechanisms, establishing new patterns through external compensatory strategies, and helping individuals adapt to cognitive limitations in order to improve overall functioning (Cicerone et al., 2011). Cognitive rehabilitation is often part of comprehensive multimodal treatment programs and, when properly implemented, is based on theoretical and strategic foundations derived from neuroscience, neurophysiology, neurobiology, neuropsychology, neurolinguistics, language development, cognitive development, and cognitive neurology (Finchot et al., 2006).

Previous researchers have examined the effectiveness of both brain-based learning and cognitive rehabilitation on executive-function-related outcomes in children with ADHD. Relevant work includes studies by Jensen (1998, 2006, 2008, 2009), Sousa (2003, 2005, 2006, 2007, 2008, 2011), Scaulin (2002), Wolfe (2001, 2009), Lyons (2003), Nunnally (2003), Goswami (2004), and several Iranian researchers such as Hadianfar (2000), Zarei (2000), Hashemi Nosratabad (2006), Naserizadeh (2006), Azarmi (2008), Ghasabi (2008), Saheban (2010), Alizadeh (2009), Joukar (2009), Pashasoltani (2002), Tizdast (2006), and Jantian (2008). These studies have generally reported satisfactory effects of psychological interventions in reducing ADHD symptoms, although some findings have not confirmed such effectiveness. However, those contradictory findings are beyond the scope of the present discussion.

Given the accumulated knowledge regarding the variables under investigation, the main research question of the present study is whether there is a significant difference between the effectiveness of brain-based learning and cognitive rehabilitation in improving emotional control among 10- to 12-year-old children with ADHD.

Material and Methods

The present study is an applied, empirical investigation employing a randomized pretest-posttest control group design. The statistical population consisted of all male primary school children aged 10–12 years with symptoms of Attention-Deficit/Hyperactivity Disorder (ADHD) in Sirjan, Iran, during the 2022–2023 academic year. A sample of 45 children was selected using simple random sampling from a master list compiled by the researcher. This list was generated after obtaining official authorization from the Education Department of Sirjan and reviewing the academic and behavioral records of students in local boys' primary schools (identifying preliminary indications documented by teachers, principals, and school counselors).

Diagnosis was formally confirmed by administering the ADHD Rating Scale. The selected participants were then randomly assigned into three groups of 15: Experimental Group 1 (Brain-Based Learning), Experimental Group 2 (Cognitive Rehabilitation), and a Control Group.

Inclusion and Exclusion Criteria

To be included in the study, participants had to meet the following criteria:

1. Written informed consent from parents or legal guardians.
2. Scoring at or above the 50th percentile on the ADHD Rating Scale.
3. Absence of comorbid psychological or psychiatric disorders.
4. Absence of chronic physical or neurological diseases.
5. No prior participation in brain-based learning or cognitive rehabilitation training programs.
6. Not receiving pharmacotherapy for ADHD (specifically methylphenidate/Ritalin or other sedative-stimulant medications).

The exclusion criteria included student fatigue, regular absence from training sessions, or a parental request to withdraw from the study at any point.

Interventions

Brain-Based Learning Intervention

Experimental Group 1 received 12 sessions of brain-based learning (each session lasting 60 minutes, conducted over one month, three times a week) based on the protocol established by Caine and Caine (2005). The outline of these sessions is detailed in Table 1.

Table 1. Structure and Contents of the Brain-Based Learning Intervention Sessions (Caine & Caine, 2005)

Session	Session Objective and Description
Session 1	Orientation: Introduction of the researcher/therapist and participants; briefing on goals, rules, and expectations for the upcoming sessions.
Session 2	Review of previous guidelines; clarifying participation processes and administering the pretest.
Session 3	Brainstorming: Engaging in discussions on specific educational themes and promoting information flow.
Session 4	Visualization and Imagination: Utilizing mental imagery and visualization techniques to expand on a specific topic.
Session 5	Contextualized Learning: Experiencing and describing a specific, real-life environment relevant to the students' lives.
Session 6	Mind Mapping: Teaching the "memory tree" technique and applying it to structured writing tasks.
Session 7	Simulation: Training in scenario simulation and writing narratives based on simulated experiences.
Session 8	Creative Association: Using free-association and forced-association tables to develop creative essay writing.
Session 9	Word Synthesis: Integrating designated vocabulary words to foster creativity in writing.
Session 10	Multi-sensory Synthesis: Combining numbers and images to stimulate creative writing and cognitive processing.
Session 11	Evaluation and Comparison: Comparing writings from the final sessions with initial pre-intervention writing samples.
Session 12	Reflection and Closing: Analyzing the strengths and weaknesses of the written works; closing remarks.

Cognitive Rehabilitation Intervention

Experimental Group 2 received 12 sessions of cognitive rehabilitation (60 minutes per session, conducted three times a week over one month) using the Attention Process Training (APT) protocol by Sohlberg and Mateer (2001). The content of these sessions is outlined in Table 2.

Table 2. Structure and Contents of the Cognitive Rehabilitation Intervention Sessions (Sohlberg & Mateer, 2001)

Session	Session Objective and Description
Session 1	Pretest administration and establishing therapeutic alliance; introducing cognitive exercises; obtaining written consent; conducting clinical interviews and DASS-21 baseline screening; providing parent-cooperative cognitive-rehabilitation worksheets.
Session 2	Session bridge and feedback; attention exercises (auditory vigilance using numbers, words, and sentences); mapping life stressors from the past 3 months, 1 year, and 3 years (in collaboration with parents).
Session 3	Distributing cognitive rehabilitation worksheets; attention tasks (sustained attention drills, target letter/word searches in texts).
Session 4	Focused attention tasks (visual, numerical, shapes, and letters); working memory training (selective attention and information processing tasks).
Session 5	Alternating attention drills; episodic memory training; reading comprehension and cognitive expansion exercises.
Session 6	Sequencing tasks (descending and ascending orders) for sustained attention; reading paragraphs for comprehension while searching for target letters and meanings.
Session 7	Auditory and visual memory tasks using numbers, letters, words, and shapes; logical memory training.
Session 8	Verbal and visual memory drills; paired-associate learning and verbal organization strategies.
Session 9	Executive function training (designing/writing action plans for simple tasks, retrieving mental cues); metamemory and visualization training.
Session 10	Executive functions: categorization, differentiation, problem-solving, and self-instruction training (explaining categorization details, phases, and components of tasks).
Session 11	Motor memory and execution of multi-step physical instructions (one-step to complex sequences).
Session 12	Preparation for termination; reviewing cognitive training components (attention, memory, and executive functions) and planning for maintenance.

Instruments

Behavior Rating Inventory of Executive Function (BRIEF) - Parent Form: Executive functions (specifically cognitive and emotional control) were measured using the Behavior Rating Inventory of Executive Function (BRIEF) parent form, developed by Gioia et al. (2000). The instrument consists of 86 items scored on a 3-point Likert scale (0 = *Never*, 1 = *Sometimes*, 2 = *Always*). Total scores range from 0 to 172, where 0 indicates low executive dysfunction, 86 reflects moderate dysfunction, and 172 represents high executive dysfunction. The inventory evaluates a child’s behavior at home and school, and is validated for children aged 5 to 18 years.

Shahabi validated the Persian version of BRIEF, reporting test-retest reliability coefficients for the subscales: Inhibit (0.90), Shift (0.81), Emotional Control (0.91), Initiate (0.80), Working Memory

(0.71), Plan/Organize (0.81), Organization of Materials (0.79), Monitor (0.78), Behavioral Regulation Index (0.90), Metacognition Index (0.87), and Global Executive Composite (0.89). The internal consistency (Cronbach's alpha) of the subscales ranged from 0.87 to 0.94 (Nodehi et al., 2016). In the present study, the overall scale achieved a Cronbach's alpha of 0.76. The alpha values for the subscales were: Inhibit (0.73), Shift (0.73), Emotional Control (0.74), Initiate (0.73), Working Memory (0.75), Plan/Organize (0.74), Organization (0.74), and Monitor (0.74). Specifically, items 1, 7, 20, 25, 26, 45, 50, 62, 64, and 70 were utilized to assess the dependent variable of Emotional Control.

ADHD Rating Scale (SNAP-IV): The ADHD Rating Scale (SNAP-IV), developed by Gadow and Sprafkin (2001), was used to confirm diagnostic status for inclusion. This 50-item scale evaluates ADHD symptoms in children and adolescents aged 3 to 18 years. It comprises subscales for Inattention (items 1–9), Hyperactivity/Impulsivity (items 10–18), and combined ADHD symptoms (items 1–18). It also includes 8 items for Oppositional Defiant Disorder (ODD), 10 items for conduct problems/peer conflict, and 14 items monitoring drug-related side effects (mood, behavioral, and physical symptoms). Items are rated on a 4-point Likert scale (1 = *Never*, 2 = *Sometimes*, 3 = *Often*, 4 = *Always*).

The developers reported strong psychometric properties, with an inter-rater agreement exceeding 0.85 and Cronbach's alpha for the inattention and hyperactivity subscales reaching 0.95. In Iranian samples, internal consistency has been reported at 0.91. In the present study, the Cronbach's alpha for this scale was 0.74.

Ethical Considerations

Prior to the study, informed written consent was obtained from the parents of all participating children. The details of the intervention, research objectives, potential benefits, absence of risks, and the duration of the study were explained to the parents, teachers, and school administrators. Participants' families were assured that all individual data would remain strictly confidential.

Data Analysis

Descriptive statistics, including means and standard deviations, were calculated for all variables. For inferential statistics, Multivariate Analysis of Covariance (MANCOVA) and Bonferroni post-hoc tests were performed to compare the differences in treatment effects. Data analysis was conducted using SPSS version 26.

Results

Table 1 presents the mean and standard deviation of the emotional control variable for participants in the control, brain-based learning, and cognitive rehabilitation groups at the pretest and posttest stages.

Table 1. Mean and Standard Deviation of Emotional Control Scores in the Control and Experimental Groups

Group	Pretest Mean	Pretest SD	Posttest Mean	Posttest SD
Control group	6.80	3.05	7.53	2.82
Brain-based learning group	8.00	2.44	12.07	2.28
Cognitive rehabilitation group	6.33	2.55	12.80	2.78

As shown in Table 1, the mean score of the dependent variable increased in both experimental groups from pretest to posttest. In contrast, no substantial change was observed in the mean scores of the control group across the two measurement stages.

The above description is based solely on the observed scores of the participants in the sample. Generalizing these findings to the target population requires inferential statistical analysis, which is reported below.

Before testing the research hypotheses, the underlying assumptions of covariance analysis were examined. The normality of the research data was assessed using the Kolmogorov-Smirnov test. The results indicated that the Type I error rate (p-value) for the study variables exceeded the .05 threshold; therefore, there was no basis for rejecting the null hypothesis. In this test, the null hypothesis assumes no difference between the normal distribution curve and the empirical data distribution. Accordingly, the data for the study variables were considered normally distributed.

To assess the homogeneity of variances, Levene's test was conducted. For the emotional control variable, the obtained F value was 0.725, which was not statistically significant at the conventional level ($p > .05$). Based on this finding, the variances of the groups on the dependent variable did not differ significantly, and the assumption of homogeneity of variances was confirmed.

Box's M test was used to examine the homogeneity of covariance matrices. The F statistic for Box's M was also not significant at the conventional level ($p > .05$). Therefore, the null hypothesis was retained, and the assumption of homogeneity of covariance matrices was supported.

To examine the effect of the independent-variable interventions, a one-way analysis of covariance (ANCOVA) was performed on the posttest scores while controlling for pretest scores on the dependent variable. Table 2 reports the results of the one-way ANCOVA for comparing emotional control scores among the experimental and control groups.

Table 2. Results of the Analysis of Covariance for Emotional Control

Source of Variation	SS	DF	MS	F	P	Test Power
Group	244.133	2	122.067	17.494	0.0001	0.454
Error	293.067	42	6.978			
Total	537.200	44				

The results in Table 2 show that the F value, after controlling for error effects and taking the pretest into account, was statistically significant at the desired level ($p < .05$). This finding indicates that at least two of the sample groups differed significantly on the emotional control variable. To identify the exact location of these differences and determine whether the hypothesis should be accepted or rejected, a post hoc test was required. Accordingly, a Bonferroni post hoc test was performed, and the results are presented in Table 3.

Table 3. Results of the Bonferroni Post Hoc Test for Emotional Control

Comparison Groups	Mean Difference	Standard Error	p	Lower Bound	Upper Bound
Brain-based learning vs. cognitive rehabilitation	5.20	0.69496	0.0001	3.4670	6.9330
Brain-based learning vs. control	8.53	0.69496	0.0001	6.8003	10.2663
Cognitive rehabilitation vs. control	3.33	0.69496	0.0001	1.6003	5.0663

According to Table 3, the mean differences in emotional control between the brain-based learning and control groups, the cognitive rehabilitation and control groups, and the brain-based learning and cognitive rehabilitation groups were all statistically significant. This significance is further supported by the fact that the lower and upper confidence bounds are in the same direction and do not include zero. Based on these findings, it can be inferred that brain-based learning increased the mean emotional control score significantly more than cognitive rehabilitation.

Therefore, the third sub-hypothesis was confirmed: there is a significant difference between the effectiveness of brain-based learning and cognitive rehabilitation in improving the emotional control of children with Attention-Deficit/Hyperactivity Disorder (ADHD) in Sirjan.

Discussion

The statistical findings related to the third sub-hypothesis confirmed that: (1) both educational interventions examined in this study had a significant effect on emotional control, (2) there was a significant difference between the effectiveness of brain-based learning and cognitive rehabilitation in improving the emotional control of children with Attention-Deficit/Hyperactivity Disorder (ADHD) in Sirjan, and (3) the effectiveness of the brain-based learning group in this domain was significantly greater than that of the cognitive rehabilitation group. These findings are consistent with previous studies, including those of Mahdavi et al. (2023), Wacher et al. (2022), Peymannia et al. (2022), Yavari Barhaghtalab et al. (2022), Javidipour and Dehghan (2022), Rashidi Asl and Ashouri (2020), Ashouri (2019), and Borjali et al. (2017).

This finding may be explained as follows. Emotion and its regulation are fundamental aspects of human life, to the extent that they help individuals protect themselves against natural, interpersonal, and psychological threats. In children with ADHD, however, this capacity often does not function adequately and frequently encounters serious obstacles. Children with hyperactivity and attention deficits often have difficulty controlling and regulating their emotions and may display both positive and negative emotional reactions continuously without considering the consequences of those reactions for others or for their surrounding environment. Both cognitive rehabilitation and brain-based learning can contribute, first, to increasing awareness in children with ADHD and, second, to teaching them how to regulate their feelings and emotions. The question raised in the present study, however, is why brain-based learning demonstrated greater effectiveness in this area and appeared to function more efficiently.

Answering this question requires attention to the nature of emotional inhibition. Although the first hypothesis of the present study addressed cognitive inhibition in detail, the current discussion concerns emotional control and inhibition. In brain-based learning, the child with ADHD learns that various psychological characteristics—including cognitive, affective, and emotional responses—can be regulated and controlled in such a way that they do not emerge at inappropriate times and are expressed more adaptively in appropriate situations. Although the researcher observed related elements in the cognitive rehabilitation approach as well, the brain-based method, by virtue of its neuropsychological foundation, addresses these processes in a more comprehensive and scientifically grounded manner. Therefore, it is reasonable that a brain-based approach, which is grounded in findings regarding brain structure and functioning, may perform more effectively in enhancing the emotional regulation of children with ADHD.

Emotional control, in fact, has long been one of the central concerns of psychologists and psychotherapists, who have sought to design and implement the most effective interventions for this purpose. In this regard, Yepp et al. (2018) reported that children with ADHD experience difficulties in emotional management, a condition that creates the basis for deficits in emotion regulation. Similarly, Biederman et al. (2012) noted that children and adolescents with ADHD demonstrate substantial impairments in functions related to emotional self-regulation, such that they encounter significant difficulties in understanding and controlling their emotions and feelings. Christian, Martel, and Levinson (2020), based on the inhibitory dysfunction theory, argued that children with ADHD are unable to respond effectively to delayed environmental demands and may display emotional reactions in social settings that are not appropriate to the context, because they fail to attend adequately to essential social cues and to recognize the inappropriateness of their own behavior.

Most researchers conceptualize emotion regulation as a multidimensional construct comprising several components. These include the internal dimension, which involves understanding and identifying one’s own emotions and modulating or coping with them appropriately; the social dimension, which involves perceiving and identifying the emotional states of peers and family members; and the behavioral dimension, which involves responding appropriately in interpersonal situations. Based on these considerations, it becomes evident that the intervention most likely to achieve greater effectiveness is one that, according to well-defined principles, strengthens emotional inhibition and self-regulation. Even a brief review of the session content of the two intervention methods shows that this feature is more clearly represented in the brain-based learning approach. By drawing on neuroscience-informed principles, this method appears better able to facilitate inhibitory control and, consequently, more effective emotional regulation.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by ethics committee of Islamic Azad University.

Author contributions

All authors contributed to the study conception and design, material preparation, data collection and analysis. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

References

Abbadi, T. (2018). The effectiveness of essay instruction using a brain-based learning approach on students' academic self-efficacy beliefs and writing skills. Iranian Association of Sociology of Education, 8(8), 80-93.

Amini, M., Yazdkhasti, A., & Zadeh Arani, M. (2012). Brain-based learning in schools and educational centers. Kashan University Press.

Anderson, V., Anderson, P. J., Jacobs, R., & Smith, M. S. (2008). Development and assessment of executive function: From preschool to adolescence.

Ayouzi, S., Yazdanbakhsh, K., & Moradi, A. (2018). The effectiveness of computerized cognitive rehabilitation on improving the executive function of response inhibition in children with attention-deficit/hyperactivity disorder. Neuropsychology, 4(14), 9-22. https://doi.org/10.30473/clpsy.2018.41327.1350

Barati, Z., Sepah Mansour, M., & Radfar, S. (2021). Comparison of the effectiveness of virtual reality-based cognitive rehabilitation and classic cognitive rehabilitation on improving executive functions in children with attention-deficit/hyperactivity disorder. Arak Medical University Journal, 24(5), 688-703.

Boivin, M. J., Busman, R. A., Parikh, S. M., Bangirana, P., Page, C. F., Opoka, R. O., & Giordani, B. (2010). A pilot study of the neuropsychological benefits of computerized cognitive rehabilitation in Ugandan children with HIV. Neuropsychology, 24(5), 667.

Caine, R. N., & Caine, G. (2005). Teaching and the human brain. Alexandria.

Cane, C., Carcone, D., Gardhouse, K., Lee, A. C., & Ruocco, A. C. (2023). An exploratory study of functional brain activation underlying response inhibition in major depressive disorder and borderline personality disorder. PLOS ONE, 18(1), e0280215.

Castellanos, F. X., Sonuga-Barke, E. J., Milham, M. P., & Tannock, R. (2006). Characterizing cognition in ADHD: Beyond executive dysfunction. Trends in Cognitive Sciences, 10(3), 117-123.

Cicerone, K. D., Dahlberg, C., Kalmar, K., Langenbahn, D. M., Malec, J. F., Bergquist, T. F., Felicetti, T., Giacino, J. T., Harley, J. P., Harrington, D., Braden, C., et al. (2011). Cognitive rehabilitation: The evidence, funding, and advocacy for care in brain injury. Brain Injury Association of America.

Dana, A., & Shams, A. (2019). The effectiveness of brain cognitive rehabilitation interventions on executive functions in children with attention-deficit/hyperactivity disorder. Neuropsychology, 5(18), 131-140. https://doi.org/10.30473/clpsy.2020.46249.1440

Demehri, F., Darvishi, E., & Saeidmanesh, M. (2020). The effectiveness of movement-based cognitive rehabilitation on orientation, learning memory, cognitive status, and attention in children with nonverbal learning disorder. Physical Treatments, 9(2), 249-256. https://sid.ir/paper/408840/fa

Diamond, A. (2013). Executive functions. Annual Review of Psychology, 64, 135-168.

Edmunds, S. R., MacNaughton, G. A., Rueda, M. R., Combita, L. M., & Faja, S. (2022). Beyond group differences: Exploring the preliminary signals of target engagement of an executive function training for autistic children. Autism Research, 15(7), 1261-1273.

Eslami Nosratabadi, M., Namazizadeh, M., & Aslankhani, M. A. (2020). The effect of attention games and cognitive rehabilitation on attention and cognitive functions in hyperactive children. Physical Treatments, 9(1), 201-208. https://sid.ir/paper/239585/fa

Fattahi Andabil, A., Saberi, H., & Kazemi Kavaki, A. (2020). The effectiveness of neurofeedback and transcranial direct current stimulation on the executive function of response inhibition in boys aged 6 to 11 years with attention-deficit/hyperactivity disorder. Quarterly Journal of Health Promotion Management, 9(3), 49-60.

Feintuch, U., Raz, L., Hwang, J., Josman, N., Katz, N., Kizony, R., & Weiss, P. L. (2006). Integrating haptic-tactile feedback into a video-capture-based virtual environment for rehabilitation. CyberPsychology & Behavior, 9(2), 129-132.

Feyzipour, H., Sepehrian Azar, F., Isazadegan, A., & Ashayeri, H. (2019). The effectiveness of cognitive rehabilitation on cognitive flexibility, response inhibition, and selective attention in patients with multiple sclerosis. Journal of Medical Sciences Studies, 30(1), 49-62.

Huckans, M., Hutson, L., Twamley, E., Jak, A., Kaye, J., & Storzbach, D. (2013). Efficacy of cognitive rehabilitation therapies for mild cognitive impairment (MCI) in older adults: Working toward a theoretical model and evidence-based interventions. Neuropsychology Review, 23, 63-80.

Knutson, K. M., Dal Monte, O., Schintu, S., Wassermann, E. M., Raymont, V., Grafman, J., & Krueger, F. (2015). Areas of brain damage underlying increased reports of behavioral disinhibition. The Journal of Neuropsychiatry and Clinical Neurosciences, 27(3), 193-198.

Maleki Avarsin, S., Dadashzadeh, S., Fathi Azar, E., & Khadivi, A. (2021). The effect of a context-based strategy grounded in brain-based learning principles on learning levels in elementary third-grade science. Journal of Educational Strategies in Medical Sciences, 14(4), 220-228.

Merve Oflaz. (2011). The effect of right and left brain dominance in language learning. Procedia - Social and Behavioral Sciences, 15, 1507-1513.

Mirhosseini, M., Saberi Kakhaki, A., Arabi, M., & Jalali, N. (2020). The effect of balance exercises on sustained attention in 7- to 10-year-old boys with attention-deficit/hyperactivity disorder in Kerman. Sport Psychology, 1400(2), 103-115.

Movahedi, Y., & Beirami, M. (2017). The effectiveness of neuropsychological rehabilitation on improving cognitive function (attention) in children with attention-deficit/hyperactivity disorder. Social Cognition, 6(2), 9-20.

Narimani, M., Soleimani, E., & Tabrizchi, N. (2015). Investigating the effect of cognitive rehabilitation on improving attention maintenance and mathematics academic achievement in students with ADHD. School Psychology, 4(2), 118-134. https://sid.ir/paper/216745/fa

Nazarzadeh Giglou, S., Fathabadi, J., Nejati, V., Nazarboland, N., & Sadeghi Firouzabadi, V. (2021). The effect of computer-based cognitive rehabilitation on executive functions (selective attention, working memory, and behavioral inhibition) in students with specific learning disorder. Exploration in Educational Sciences and Counseling, 7(15), 69-89. https://sid.ir/paper/962296/fa

Rahnama, F., Bayazi, M. H., Rajaei, A., & Khooeinejad, G. R. (2020). Comparing the effects of neuropsychological treatment, rhythmic movements, and cognitive empowerment on executive functions of students with specific learning disorder with reading difficulty. Journal of Psychiatric Nursing, 8(1), 82-93.

Roberts, S., Henry, J. D., & Molenberghs, P. (2019). Immoral behaviour following brain damage: A review. Journal of Neuropsychology, 13(3), 564-588.

Romero-Ayuso, D., Toledano-Gonzalez, A., Rodriguez-Martinez, M. D. C., Arroyo-Castillo, P., Trivino-Juarez, J. M., Gonzalez, P., et al. (2021). Effectiveness of virtual reality-based interventions for children and adolescents with ADHD: A systematic review and meta-analysis. Children, 8(2), 70.

Ryu, H., & Parsons, D. (2018). Modern mobile learning: Techniques and technologies (E. Zarei Zavaraki, S. Mousa Ramazani, & V. Velayati, Trans.). Donya-ye Eghtesad Publications.

Saleh Al Rasheed, L., & Hanafy, A. A. M. (2023). Effects of brain-based instruction on executive function and habits of mind among young children at-risk for learning disabilities. Applied Neuropsychology: Child, 1-8.

Soleimani Davoudli, G., Khormaie, F., Jokar, B., & Hossein Chari, M. (2019). Investigating the effectiveness of a reading instruction method based on brain-based learning theory. Teaching Research, 7(4), 132-149. https://doi.org/10.34785/J012.2019.112

Tajik-Parvinchi, D., Wright, L., & Schachar, R. (2014). Cognitive rehabilitation for attention deficit/hyperactivity disorder (ADHD): Promises and problems. Journal of the Canadian Academy of Child and Adolescent Psychiatry, 23(3), 207.

Yavari, E., Asgari, P., Naderi, F., & Heydari, A. (2021). Investigating the effect of cognitive rehabilitation on executive functions (response inhibition and planning) in children with attention-deficit/hyperactivity disorder. Physical Treatments, 10(1), 146-157. https://sid.ir/paper/413684/fa

Zia Bakhsh, S. M., Sharifi, M., Fathabadi, J., & Nejati, V. (2020). Comparing the effectiveness of cognitive rehabilitation and neurofeedback in students with attention-deficit disorder. Psychological Achievements, 27(1), 167-192. https://sid.ir/paper/186568/fa