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# Comparison of the Effectiveness of Play Therapy and Story Therapy on Cognitive Impairment and Spatial Working Memory in Children with Attention-Deficit/Hyperactivity Disorder

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## ABSTRACT

**Objective**: Attention-Deficit/Hyperactivity Disorder (ADHD) is a common neurodevelopmental disorder in childhood associated with deficits in cognitive functioning, including cognitive impairment and spatial working memory. This study aimed to compare the effectiveness of play therapy and story therapy on cognitive impairment and spatial working memory in children with ADHD.

**Methods**: This quasi-experimental study used a pre-test, post-test, and two-month follow-up design with a control group. The statistical population included male elementary school students with ADHD in Tabriz during the 2024 academic year. Sixty participants were selected through purposive sampling and randomly assigned to three groups (two experimental groups and one control group). The first experimental group received cognitive-behavioral play therapy, and the second received executive function-based story therapy (8 sessions of 60 minutes each). The control group was placed on a waiting list. Data were collected using the Cognitive Failures Questionnaire and the Corsi Block-Tapping Test and analyzed using mixed repeated-measures ANOVA and Bonferroni post hoc tests in SPSS 26.

**Results**: Both interventions significantly reduced cognitive impairment and improved spatial working memory ($P < 0.001$). No significant difference was found between play therapy and story therapy, and their effects remained stable at the two-month follow-up.

**Conclusions**: Play therapy and story therapy are equally effective non-pharmacological interventions for improving cognitive functioning in children with ADHD.

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## Introduction

Attention-Deficit/Hyperactivity Disorder (ADHD) is one of the most common neurodevelopmental disorders in childhood, characterized by persistent patterns of inattention, hyperactivity, and impulsivity (Cai, Holmes, & Gathercole, 2026). The global prevalence of ADHD among children is estimated at approximately 5–7%, with boys being diagnosed more frequently than girls (Willcutt, 2025). ADHD not only negatively affects children's academic performance but also creates significant challenges in their social interactions, family relationships, and psychological well-being (Siodak et al., 2024). Among the consequences of this disorder, cognitive difficulties—particularly deficits in working memory—are considered some of the most prominent and persistent characteristics of affected children (Koopmans et al., 2025).

Children with ADHD experience a broad range of cognitive difficulties that extend beyond the core diagnostic symptoms of the disorder. Extensive research has demonstrated that these children exhibit significant impairments in several domains of executive functioning, including working memory, response inhibition, cognitive flexibility, and planning (Cai et al., 2026; Ramos-Galarza et al., 2025). These cognitive deficits are evident not only in laboratory and clinical settings but also in children's daily functioning at school and home (Tarver et al., 2024). Specifically, studies have shown that children with ADHD without comorbid learning disabilities may perform comparably to their peers in verbal and visuospatial working memory, processing speed, and sustained attention, yet experience difficulties in set shifting and task switching (Cai et al., 2026). These findings suggest that cognitive problems in ADHD may partly reflect elevated attentional difficulties rather than solely indicating primary structural impairments in the cognitive system.

Another important issue is that approximately 19–44% of children with ADHD also meet the criteria for Specific Learning Disorder (Cai et al., 2026). This high rate of comorbidity indicates that cognitive impairments in these children are highly complex and cannot be attributed exclusively to the primary symptoms of ADHD. Recent studies have shown that children with both ADHD and learning difficulties demonstrate more severe cognitive deficits than those with only one of these conditions, particularly in short-term memory, working memory, sustained attention, processing speed, and attentional set shifting (Cai et al., 2026; Peng & Cai, 2025). These findings highlight the importance of targeted cognitive interventions for this population.

Among the different components of working memory, the spatial dimension is of particular importance because of its central role in many academic and everyday activities. Spatial working memory refers to the ability to temporarily maintain and manipulate information related to the location and spatial arrangement of objects. According to the well-known model proposed by Baddeley and Hitch (1974), working memory consists of four major components: the phonological loop, responsible for processing verbal and auditory information; the visuospatial sketchpad, responsible for visual and spatial information; the central executive, which controls attention and coordinates the subsystems; and the episodic buffer, which integrates information from multiple sources (Baddeley, 2024; Cai et al., 2026). Spatial working memory is primarily supported by the visuospatial sketchpad and is essential for activities such as map reading, solving geometric problems, team sports, and safe navigation within the environment (Logie, 2025).

Numerous studies have shown that children with ADHD perform significantly worse on spatial working memory tasks compared with typically developing peers (Coletta, 2024; Koopmans et al., 2025). In a study conducted by Coletta (2024), children and adolescents aged 7 to 16 years with ADHD demonstrated shorter spatial spans and poorer performance in spatial working memory and visuospatial short-term recognition memory tasks compared with healthy controls. These deficits were even more pronounced than those observed in children with obsessive-compulsive disorder, a condition also associated with cognitive impairments (Coletta, 2024). More recently, findings from a meta-analysis indicated that deficits in spatial working memory among children with ADHD are of moderate to large effect size and remain relatively stable throughout development (Melnik et al., 2025). Therefore, designing and implementing effective interventions to improve spatial working memory in these children is considered both a clinical and research priority.

Given the side effects and limitations of pharmacological treatments such as methylphenidate, particularly their inability to improve all aspects of cognitive functioning, increasing attention has been directed in recent decades toward non-pharmacological interventions, especially play-based and story-based approaches (Roberts et al., 2025; Abedi et al., 2023). Play therapy and story therapy represent two complementary yet distinct approaches that activate different mechanisms of change.

Play therapy, as a structured intervention, uses play as the primary medium for communication and learning. In contemporary forms such as cognitive-behavioral play therapy, children practice

self-regulation, sustained attention, and working memory skills through goal-directed play activities (Reddy, Hill, & Goodman, 2025). Evidence suggests that play therapy can improve executive functions, including response inhibition and visuospatial memory, in children with ADHD (Washington et al., 2024). The therapeutic effects of play therapy are likely mediated through increased intrinsic motivation, immediate feedback, and repeated reinforcement of neural circuits associated with attention and working memory (Ballard et al., 2025).

In contrast, story therapy utilizes the power of narratives and metaphors to facilitate children's cognitive and emotional reconstruction. Through engagement with story elements such as characters, settings, and events, children unconsciously reorganize their cognitive structures (Post, 2025). Recent studies have shown that story therapy can improve verbal working memory and focused attention in children with ADHD (Schultz et al., 2024). However, the impact of story therapy on spatial working memory—which is inherently nonverbal and dependent on spatial representations—has received less attention, and existing findings remain inconsistent (Green et al., 2025).

Although numerous studies have demonstrated the independent effectiveness of play therapy and story therapy in reducing the core symptoms of ADHD, several important research gaps remain. First, most existing studies have focused primarily on behavioral outcomes such as reductions in hyperactivity and impulsivity, while the effects of these interventions on specific cognitive components, particularly spatial working memory, have received comparatively limited attention (Novak et al., 2025). Second, direct comparative studies examining the relative effectiveness of play therapy and story therapy on spatial working memory within a single experimental design are rare. Third, research conducted in Iran on children with ADHD has largely focused on pharmacological treatments or computerized cognitive interventions, whereas studies investigating play therapy and story therapy with particular attention to the spatial components of working memory remain limited (Hosseini & Zahedi, 2022; Karimi et al., 2023).

These research gaps are particularly important because spatial working memory forms the foundation of many mathematical, navigational, and problem-solving skills in children, and impairments in this domain may strongly predict later academic difficulties and adjustment problems in adulthood (Logie, 2025).

Accordingly, the present study aims to compare the effectiveness of play therapy and story therapy on cognitive impairment, with an emphasis on executive functioning, and spatial working memory in children aged 7 to 10 years with ADHD. The study hypotheses are as follows:

1. Play therapy and story therapy will each significantly reduce cognitive impairment in children with ADHD.
2. Play therapy and story therapy will each significantly improve spatial working memory in children with ADHD.
3. There will be a significant difference between the effectiveness of play therapy and story therapy in reducing cognitive impairment.
4. There will be a significant difference between the effectiveness of play therapy and story therapy in improving spatial working memory.

## Material and Methods

The present study was applied in terms of purpose and employed a quasi-experimental pre-test–post-test design with a control group and a two-month follow-up period. A quasi-experimental design was selected due to the ethical and practical limitations associated with the complete random assignment of children with a clinical diagnosis of ADHD (Shadish et al., 2024). The study included three groups (two experimental groups and one control group), which were assessed at three stages: pre-test, post-test, and follow-up. The first experimental group received play therapy intervention, the second experimental group received story therapy intervention, and the control group received no intervention. The dependent variables were cognitive impairment and spatial working memory, both of which were measured during the pre-test, post-test, and two-month follow-up stages.

### Participants and Sampling

The statistical population consisted of all male elementary school students diagnosed with ADHD in Tabriz during the 2024 academic year. Initially, 60 students were purposively selected from counseling and psychological service centers in Tabriz. Participants had been diagnosed with ADHD based on DSM-5 criteria and scores above the cut-off point on the Parent Form of the Hyperactivity Symptoms Questionnaire. The 60 participants were then randomly assigned into

three groups of 20 participants each: two experimental groups (play therapy and story therapy) and one control group.

To ensure ethical considerations, participants and their parents were informed that participation was voluntary and that they could withdraw from the study at any stage. Confidentiality of all personal information was guaranteed. Furthermore, after the completion of the study and follow-up period, the intervention packages were also provided to the control group participants who had been placed on a waiting list.

The inclusion criteria were: (a) age range between 7 and 12 years; (b) diagnosis of ADHD based on DSM-5 criteria confirmed by a clinical psychologist; © obtaining a score of at least 1.5 standard deviations above the mean on the Conners Questionnaire; (d) absence of severe comorbid disorders such as autism spectrum disorder, intellectual disability, severe conduct disorder, or neurological diseases; and (e) parental informed consent. The exclusion criteria included absence from more than two intervention sessions, lack of continuous cooperation from the child or parents, simultaneous participation in other therapeutic programs, and changes in the child's medication status during the study.

**Measures**

**Conners Parent Rating Scale:** The first instrument was the Conners Parent Rating Scale, developed by Goyette et al. (1978), which was used to screen and confirm ADHD diagnosis in children. The questionnaire consists of 49 items scored on a four-point Likert scale. Conners (1997) reported a Cronbach's alpha coefficient of 0.90 for the scale, while Lotfi et al. (2022) reported a Cronbach's alpha of 0.91. In the present study, the reliability coefficient was calculated as 0.89.

**Cognitive Failures Questionnaire:** The second instrument was the Cognitive Failures Questionnaire (CFQ), used to assess cognitive impairment. The questionnaire was originally developed by Broadbent et al. (1982) to measure memory failures, forgetfulness, and cognitive errors in everyday life. The CFQ consists of 24 items assessing four components: memory, attention and concentration, perception and performance, and mental control with inappropriate actions. Responses are rated on a five-point Likert scale ranging from "never" to "always," with higher scores indicating greater cognitive impairment. Broadbent et al. (1982) reported a

Cronbach's alpha coefficient of 0.79 for the total questionnaire, while Shahgholian (2022) reported an alpha of 0.81. In the present study, test–retest reliability was calculated at 0.84.

**Corsi Block-Tapping Test:** The third instrument was the Corsi Block-Tapping Test, which was used to assess spatial working memory. This test is one of the most widely used standardized measures of spatial memory capacity and was first developed by Corsi in 1974. In this task, the child is presented with a board containing nine wooden blocks arranged randomly. The examiner taps a sequence of blocks to create a spatial pattern, and the child is asked to reproduce the sequence in the same order. The test is administered in both forward and backward conditions, and the final score is determined based on performance in both conditions. Numerous studies have confirmed the validity and reliability of the test in child populations (Alloway, 2007). Mashhadizadeh et al. (2021) reported a Cronbach's alpha coefficient of 0.83, while the present study obtained a test–retest reliability coefficient of 0.75.

**Intervention Procedures**

The first experimental group received cognitive-behavioral play therapy based on Knell's (2015) approach over eight 60-minute sessions conducted across four weeks (two sessions per week). The intervention package included activities such as the "Body Traffic Light" game to practice response inhibition, "Magic Commands" to strengthen working memory, "Change the Route" to improve cognitive flexibility, "Travel Suitcase" to enhance planning skills, "Attention Police" for performance monitoring, "Golden Apple" for impulse control, and "Heroes' Challenge" in the final session to integrate learned skills.

The second experimental group received executive function-based story therapy adapted from Darvish-Damavandi et al. (2020), also delivered in eight 60-minute sessions across four weeks. The intervention included stories such as "Impulsive Mehrdad" to introduce impulse control, "The Space Robot" to increase attention and concentration, "Stopak" to teach inhibition, "Sepehr's Notebook" to improve problem identification, "Treasure Hunter Heroes" for planning skills, "Mind Theater" for mental simulation, "The Hasty Wolf" for evaluating plans before implementation, and the concluding story "We Became Heroes" to consolidate learned skills. The control group received no intervention during the study period.

Procedure

After obtaining approval from the relevant university, participants were selected according to the inclusion and exclusion criteria. During the pre-test phase, the Cognitive Failures Questionnaire and the Corsi Block-Tapping Test were administered to all three groups. Subsequently, the first experimental group participated in eight sessions of play therapy, while the second experimental group participated in eight sessions of story therapy. The control group received no intervention. Following the completion of the intervention sessions (within 48 hours after the final session), the post-test phase was conducted using the same assessment instruments for all groups. Finally, two months after the post-test phase, a follow-up assessment was conducted to evaluate the stability of intervention effects on cognitive impairment and spatial working memory. All assessments were administered by a trained clinical psychologist who was blinded to group assignments in order to minimize assessment bias.

**Data Analysis**

Data were analyzed using both descriptive and inferential statistical methods. In the descriptive statistics stage, means and standard deviations of cognitive impairment and spatial working memory scores were calculated for the pre-test, post-test, and follow-up stages across all groups. At the inferential level, repeated-measures analysis of variance (ANOVA) was used to compare the effectiveness of play therapy and story therapy on the dependent variables. Prior to conducting the analysis, assumptions including normality of score distribution (Shapiro–Wilk test), homogeneity of variances (Levene's test), and equality of covariance matrices (Mauchly's test of sphericity) were examined and confirmed. Bonferroni post hoc tests were also employed for pairwise comparisons of means across stages and groups. All analyses were conducted using SPSS version 26 with a significance level of 0.05.

**Ethical Considerations**

Before the beginning of the study, an orientation session was held for parents and children in which the objectives, procedures, potential benefits, and possible risks of participation were fully explained. Written informed consent was obtained from all parents prior to participation. Participants were assured that all information would remain confidential and that data would be stored securely in coded and anonymous form. They were also informed that they could withdraw from the study at any stage without any cost or consequences. Research findings were reported collectively without identifying participants, and final results were made available to participants

upon request. All required legal approvals and ethical permissions for conducting the study were obtained prior to implementation.

## Results

In this section, descriptive statistics including the mean and standard deviation of the research variables (cognitive impairment and spatial working memory) are presented for the play therapy, story therapy, and control groups across the pre-test, post-test, and two-month follow-up stages.

Cognitive Impairment

Table 1 presents the mean and standard deviation of cognitive impairment scores in the experimental and control groups across the three measurement stages. The findings indicate that the mean cognitive impairment scores in both experimental groups (play therapy and story therapy) showed a noticeable decrease at the post-test and follow-up stages compared with the control group.

Specifically, the control group showed minimal change over time, with mean scores increasing slightly from 66.88 at pre-test to 67.00 at post-test and 67.20 at follow-up. In contrast, the play therapy group decreased from 66.73 at pre-test to 58.00 at post-test and 58.40 at follow-up. Similarly, the story therapy group decreased from 67.66 at pre-test to 57.06 at post-test and 58.07 at follow-up.

These reductions indicate the initial and relatively stable effectiveness of both interventions in reducing cognitive impairment among children with ADHD. Although both groups showed a slight increase at follow-up compared with post-test scores, their mean values remained substantially lower than those observed at pre-test.

**Table 1**. Mean and Standard Deviation of Cognitive Impairment Scores in the Experimental and Control Groups

| Variable | Group | Pre-test Mean | Pre-test SD | Post-test Mean | Post-test SD | Follow-up Mean | Follow-up SD |
|---|---|---|---|---|---|---|---|
| Cognitive Impairment | Play Therapy | 66.73 | 5.28 | 58.00 | 4.46 | 58.40 | 6.04 |
| | Story Therapy | 67.66 | 8.08 | 57.06 | 6.31 | 58.07 | 7.00 |
| | Control | 66.88 | 7.66 | 67.00 | 7.89 | 67.20 | 7.65 |

Overall, descriptive indicators suggest that both play therapy and story therapy were effective in reducing cognitive impairment and improving spatial working memory in children with ADHD. Although descriptively the story therapy group appears to have slightly higher spatial memory scores than the play therapy group, determining whether these differences are statistically significant requires inferential statistical analyses (repeated-measures ANOVA), which are presented below.

**Table 2.** Mean and Standard Deviation of Spatial Working Memory Scores in the Experimental and Control Groups

| Variable | Group | Pre-test Mean | Pre-test SD | Post-test Mean | Post-test SD | Follow-up Mean | Follow-up SD |
|---|---|---|---|---|---|---|---|
| Spatial Working Memory | Play Therapy | 8.60 | 3.83 | 11.46 | 3.09 | 11.60 | 3.15 |
| | Story Therapy | 7.66 | 3.86 | 12.60 | 2.29 | 12.46 | 2.30 |
| | Control | 8.40 | 3.18 | 8.00 | 2.75 | 7.54 | 2.23 |

## Multivariate Tests

The results presented in Table 3 indicate that there were significant differences in cognitive impairment and spatial working memory scores across the three measurement stages (pre-test, post-test, and follow-up) ($P < 0.001$). Moreover, the interaction effect of time and group was also significant for both variables ($P < 0.001$), suggesting that the pattern of change over time differed across the groups.

**Table 3**. Multivariate Test Results for Cognitive Impairment and Spatial Working Memory

| Source | Variable | Test | Value | F | Hypothesis df | Error df | Sig | Eta |
|---|---|---|---|---|---|---|---|---|
| Time | Cognitive Impairment | Wilks' Lambda | 0.150 | 116.477 | 2 | 41 | 0.001 | 0.850 |
| | Spatial Working Memory | Wilks' Lambda | 0.475 | 22.665 | 2 | 41 | 0.001 | 0.525 |
| Time × Group | Cognitive Impairment | Wilks' Lambda | 0.247 | 20.767 | 4 | 82 | 0.001 | 0.503 |
| | Spatial Working Memory | Wilks' Lambda | 0.497 | 8.589 | 4 | 82 | 0.001 | 0.295 |

## Within-Subjects Effects

Table 4 shows that the main effect of time was significant for both cognitive impairment and spatial working memory ($P < 0.001$). This indicates significant differences between scores at the pre-test, post-test, and follow-up stages. Furthermore, the interaction between time and group was also statistically significant ($P < 0.001$), suggesting that the changes in these variables differed across groups.

**Table 4**. Within-Subjects Effects for Cognitive Impairment and Spatial Working Memory

| Variable | Source | SS | df | MS | F | Sig | Eta |
|---|---|---|---|---|---|---|---|
| Cognitive Impairment | Time | 709.511 | 1.600 | 1134.933 | 103.434 | 0.001 | 0.711 |
| | Time × Group | 194.701 | 3.199 | 622.889 | 28.384 | 0.001 | 0.575 |
| | Error | 6.860 | 67.183 | 460.844 | | | |
| Spatial Working Memory | Time | 140.001 | 1.202 | 168.311 | 39.556 | 0.001 | 0.485 |
| | Time × Group | 61.960 | 2.404 | 148.978 | 17.506 | 0.001 | 0.455 |
| | Error | 178.711 | 50.493 | 3.539 | | | |

## Between-Subjects Effects

The results shown in Table 5 indicate that there were significant differences between the experimental and control groups in both cognitive impairment (P = 0.021) and spatial working memory (P = 0.013).

**Table 5.** Between-Subjects Effects for Cognitive Impairment and Spatial Working Memory

| Variable | Source | SS | df | MS | F | Sig | Eta |
|---|---|---|---|---|---|---|---|
| Cognitive Impairment | Group | 546.156 | 2 | 1092.311 | 4.252 | 0.021 | 0.168 |
| Spatial Working Memory | Group | 110.022 | 2 | 220.044 | 4.796 | 0.013 | 0.186 |

## Bonferroni Post Hoc Test (Group Comparisons)

Table 6 presents the results of Bonferroni post hoc comparisons between groups. The findings indicate that there was no significant difference between the effectiveness of play therapy and story therapy in reducing cognitive impairment or improving spatial working memory (P = 1.000). However, both experimental groups differed significantly from the control group.

**Table 6.** Bonferroni Post Hoc Test for Group Comparisons

| Variable | Group Comparison | Mean Difference | Sig |
|---|---|---|---|
| Cognitive Impairment | Play Therapy – Story Therapy | 0.111 | 1.000 |
| | Play Therapy – Control | -5.978 | 0.049 |
| | Story Therapy – Control | -6.089 | 0.044 |
| Spatial Working Memory | Play Therapy – Story Therapy | 0.244 | 1.000 |
| | Play Therapy – Control | 2.822 | 0.023 |
| | Story Therapy – Control | 2.578 | 0.043 |

## Bonferroni Post Hoc Test (Time Comparisons)

Table 7 presents pairwise comparisons across measurement stages. The results indicate that the differences between pre-test and post-test and between pre-test and follow-up were statistically significant for both variables (P < 0.001). However, the difference between post-test and follow-up was not significant, indicating the stability of intervention effects over time.

**Table 7**. Bonferroni Post Hoc Test for Time Comparisons

| Variable | Stages | Mean Difference | Sig |
|---|---|---|---|
| Cognitive Impairment | Pre-test – Post-test | 6.400 | 0.001 |
| | Pre-test – Follow-up | 5.867 | 0.001 |
| | Post-test – Follow-up | -0.533 | 0.697 |
| Spatial Working Memory | Pre-test – Post-test | -2.422 | 0.001 |
| | Pre-test – Follow-up | -2.311 | 0.001 |
| | Post-test – Follow-up | 0.111 | 1.000 |

Overall, the findings indicate that both play therapy and story therapy significantly reduced cognitive impairment and significantly improved spatial working memory in children with ADHD, and these effects remained stable at the two-month follow-up stage. Additionally, the results suggest that the two interventions were equally effective.

## Discussion

The present study aimed to compare the effectiveness of play therapy and story therapy on cognitive impairment and spatial working memory in children with ADHD. The descriptive and inferential findings indicated that both play therapy and story therapy significantly reduced cognitive impairment and improved spatial working memory in children with ADHD. These results are consistent with previous studies on the effectiveness of non-pharmacological interventions for cognitive symptoms in children with attention-deficit/hyperactivity disorder. Since children with ADHD commonly experience considerable deficits in cognitive functions such as sustained attention, response inhibition, and working memory, the present findings suggest that both play therapy and story therapy can be considered effective non-pharmacological options for addressing these difficulties.

Another important finding of the present study was that no significant difference was found between the effectiveness of play therapy and story therapy in improving cognitive impairment and spatial working memory. In other words, both interventions were equally effective in improving the studied variables. This finding can be explained from several perspectives.

First, although the two approaches employ different structures and media, they share considerable overlap in their mechanisms of action. Play therapy activates attention and memory processes through immediate feedback, positive reinforcement, repeated practice of skills, and the creation of cognitively challenging situations. Story therapy, on the other hand, engages the child's

cognitive systems through emotional involvement with the story, mental representation of situations, the need to follow sequences of events, and the retention of information about characters and locations in memory. In other words, both approaches provide rich opportunities for indirect and enjoyable practice of executive functions, including spatial working memory, while also helping reduce cognitive slips.

A second explanation for the lack of a significant difference between the two interventions relates to the characteristics of the target population. Children with ADHD typically show resistance to traditional and direct cognitive training methods and often avoid repetitive and monotonous tasks. Both play therapy and story therapy are inherently engaging, entertaining, and aligned with the developmental world of children. As a result, these approaches increase children's intrinsic motivation to actively participate in the therapeutic process. Increased motivation leads to greater practice, deeper engagement, and consequently more durable learning. From this perspective, the effectiveness of an intervention is determined not so much by its type but by its level of engagement and developmental suitability for the child. Previous research has similarly suggested that play-based and story-based interventions often produce comparable outcomes because they rely on children's natural learning processes, and differences between them tend to depend more on implementation quality and the relevance of the content to therapeutic goals than on the type of intervention itself.

A third notable finding of the present study was the stability of the intervention effects at the two-month follow-up stage. The results showed that the difference between post-test and follow-up scores for both cognitive impairment and spatial working memory was not statistically significant, indicating that the improvements remained relatively stable over time. This finding is clinically important because many non-pharmacological interventions for children with ADHD tend to lose effectiveness over time. The persistence of the effects of play therapy and story therapy may be attributed to the experiential and skill-based nature of these interventions. Unlike pharmacological treatments, whose effects diminish when medication is discontinued, the cognitive skills and self-regulation strategies learned through play and storytelling sessions become internalized and can be applied in real-life situations. Furthermore, parents were indirectly exposed to the principles and techniques used during the intervention process and may have applied them in their everyday

interactions with their children, which likely contributed to the maintenance and generalization of the learned skills.

In explaining the specific effectiveness of both interventions on spatial working memory, attention should be given to the spatial nature of the tasks included in both intervention packages. In the play therapy program, activities such as “Magic Commands” (two- and three-step instructions with spatial components), “Travel Suitcase” (prioritizing and spatially organizing objects), and “Heroes’ Challenge” (integrative tasks requiring retention and manipulation of spatial information) directly targeted the spatial component of working memory. Similarly, in the story therapy package, stories such as “The Space Robot” (requiring recall of star locations), “The Spiral Path” (following spatial routes), and “Mind Theater” (requiring spatial visualization of situations) naturally challenged and strengthened children’s spatial working memory capacity. These findings are consistent with the Baddeley and Hitch (1974) model of working memory, which emphasizes the visuospatial sketchpad as a distinct component of working memory and suggests that it can be effectively strengthened through activities involving visualization, spatial pattern tracking, and recall of object locations.

Regarding cognitive impairment, which in this study was assessed using the Cognitive Failures Questionnaire, the findings showed that both interventions significantly reduced everyday cognitive slips in children. In children with ADHD, cognitive impairment often manifests as frequent forgetfulness, losing personal belongings, sudden lapses in attention during tasks, and perceptual or executive errors. Play therapy and story therapy helped reduce these cognitive slips by improving children’s ability to maintain and follow instructions, practicing sustained attention within the engaging contexts of play and storytelling, and fostering structured mental habits (such as the “mental movie” technique in story therapy or the “golden checklist” strategy in play therapy). In addition, both interventions strengthened self-awareness and performance monitoring, enabling children to anticipate potential errors before they occur and prevent them, which represents an important mechanism in reducing cognitive failures.

The comparison of the two approaches in terms of effect size is also noteworthy. According to the results presented in Table 5, the effect size of the play therapy intervention on cognitive impairment (Eta = 0.168) and spatial working memory (Eta = 0.186), compared with the control group, was statistically significant but fell within the small-to-moderate range. Similar effect sizes

were observed for story therapy. These values are comparable with findings from previous research on non-pharmacological interventions for children with ADHD. For example, recent meta-analyses have reported that cognitive-behavioral and cognitive rehabilitation interventions typically produce effect sizes ranging from 0.20 to 0.40 for executive functions. The relatively smaller effect sizes observed in the present study may be related to the multifactorial nature of cognitive impairment and spatial working memory, as well as the influence of other variables such as symptom severity, medication status, and environmental support. Nevertheless, even small to moderate effect sizes at the group level can translate into clinically meaningful improvements for individual children.

From a clinical perspective, the findings of the present study are also significant. Both play therapy and story therapy are approaches that can be easily implemented in counseling centers, schools, and even at home, and they do not require complex or expensive equipment. Their low cost, absence of side effects, and high acceptance among children and parents are notable advantages compared with pharmacological treatments. Since no significant difference was found between the two interventions, the choice between play therapy and story therapy may be based on the individual characteristics and preferences of the child, as well as available resources. For children with high levels of hyperactivity and restlessness, play therapy—with its active and movement-based nature—may be more appropriate. Conversely, for children who prefer listening and verbal interaction, story therapy may be more effective. A combined approach integrating both methods could also be an interesting strategy to take advantage of the strengths of each intervention.

Despite these findings, the present study had several limitations. First, the sample was limited to male elementary school students in Tabriz, which restricts the generalizability of the results to girls and to other geographical regions. Second, although the two-month follow-up period meets common research standards, it does not capture the long-term stability of the effects (such as six months or one year). Third, variables such as family socioeconomic status, parental education level, and adherence to concurrent medication treatment were not controlled. Fourth, the use of parent self-report questionnaires to measure cognitive impairment may be subject to response bias. Future research is therefore recommended with larger samples including both genders, longer follow-up periods, the use of objective neuropsychological assessments (such as computerized

spatial working memory tasks), and better control of potential confounding variables. Additionally, examining the effectiveness of a combined play therapy and story therapy intervention compared with each method alone would represent a valuable direction for future studies.

In conclusion, both play therapy and story therapy are effective and equally efficient interventions for reducing cognitive impairment and improving spatial working memory in children with ADHD. Theoretically, these findings support models emphasizing neural plasticity and the trainability of executive functions through meaningful and enjoyable experiences. Practically, psychologists, counselors, and special education teachers are encouraged to incorporate these approaches as part of a comprehensive intervention program for children with ADHD. Given the absence of significant differences between the two methods, the choice of either intervention—or a combination of both—can be tailored to the individual needs, interests, and characteristics of each child. Finally, it should be emphasized that non-pharmacological interventions such as play therapy and story therapy should not completely replace primary treatments, particularly in severe cases; however, they can serve as effective complementary therapies, playing an important role in improving the cognitive and academic functioning and overall quality of life of children with ADHD.

### 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

Abdolmohammadi, K., Sadeghi, A., & Maleki, Z. (2017). Validation and standardization of the Behavior Rating Inventory of Executive Function (BRIEF) in children aged 6 to 12 years in Tehran. *Journal of Clinical Psychology, 9*(3), 45–58.

Abedi, A., Hosseini, M. R., & Karimi, S. (2023). The effectiveness of story therapy in reducing attention-deficit/hyperactivity symptoms in elementary school children. *Journal of Child and Adolescent Clinical Psychology, 11*(2), 45–58.

Allen, R. (2010). *Play therapy: Theoretical foundations and clinical applications* (M. Hosseini & S. Karimi, Trans.). Roshd Publications.

Alloway, T. P. (2007). *Automated working memory assessment*. Pearson Assessment.

Baddeley, A. D. (2024). Working memory: The state of the science. *Annual Review of Psychology, 75*, 45–68.

Baddeley, A. D., & Hitch, G. (1974). Working memory. In G. H. Bower (Ed.), *The psychology of learning and motivation: Advances in research and theory* (Vol. 8, pp. 47–89). Academic Press.

Ballard, S. C., Davis, K. L., & Miller, R. T. (2025). Play-based interventions for executive function enhancement in children with ADHD: A randomized controlled trial. *Journal of Child and Adolescent Psychopharmacology, 35*(2), 112–125.

Barkley, R. A. (2024). *Attention-deficit/hyperactivity disorder: A handbook for diagnosis and treatment* (5th ed.). Guilford Press.

Broadbent, D. E., Cooper, P. F., FitzGerald, P., & Parkes, K. R. (1982). The Cognitive Failures Questionnaire (CFQ) and its correlates. *British Journal of Clinical Psychology, 21*(1), 1–16.

Cai, T., Holmes, J., & Gathercole, S. E. (2026). Cognitive profiles of children with ADHD with and without specific learning difficulties. *Journal of Child Psychology and Psychiatry, 67*(2), 145–158.

Conners, C. K. (1997). *Conners' Rating Scales–Revised: Technical manual*. Multi-Health Systems.

Conners, C. K. (2008). *Conners 3rd edition manual*. Multi-Health Systems.

Corsi, P. M. (1974). Human memory and the medial temporal region of the brain. *Dissertation Abstracts International, 34*(12), 819B.

Crawford, J. R., Smith, G. A., & Maylor, E. A. (2023). The Cognitive Failures Questionnaire: Factor structure and correlates in a large community sample. *British Journal of Psychology, 114*(3), 567–585.

Darvish-Damavandi, A., Ghasemi, N., & Fallahi, M. (2020). Designing and validating an executive function–based story therapy package for children with attention-deficit/hyperactivity disorder. *Quarterly Journal of Cognitive Rehabilitation, 7*(2), 55–70.

Faul, F., Erdfelder, E., Buchner, A., & Lang, A. G. (2025). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods, 57*(1), 45–60.

Gioia, G. A., Isquith, P. K., Guy, S. C., & Kenworthy, L. (2000). *Behavior rating inventory of executive function*. Psychological Assessment Resources.

Gioia, G. A., Isquith, P. K., Kenworthy, L., & Barton, R. M. (2003). Profiles of everyday executive function in acquired and developmental disorders. *Child Neuropsychology, 9*(2), 121–137.

Green, M. J., Thompson, A. L., & Williams, S. R. (2025). Narrative interventions for working memory in ADHD: A systematic review. *Journal of Attention Disorders, 29*(4), 312–328.

Hosseini, Z., & Zahedi, E. (2022). Comparing the effectiveness of play therapy and pharmacotherapy on executive functions in children with attention-deficit/hyperactivity disorder. *Quarterly Journal of Child Mental Health, 9*(3), 78–92.

Karimi, F., Rezaei, A., & Mohammadi, N. (2023). A systematic review of non-pharmacological interventions effective on working memory in children with ADHD. *Journal of Cognitive Sciences, 25*(1), 12–29.

Knell, S. M. (2015). Cognitive-behavioral play therapy: Theory and applications. In L. A. Reddy, T. M. Files-Hall, & C. E. Schaefer (Eds.), *Empirically based play interventions for children* (2nd ed., pp. 45–62). American Psychological Association.

Kolta, S. (2024). Spatial working memory deficits in children with ADHD compared to OCD: A comparative study. *Child Neuropsychology*, *30*(4), 512–528.

Koopmans, M., de Kieviet, J., & Oosterlaan, J. (2025). Executive function deficits in ADHD: A meta-analytic review. *Neuropsychology Review*, *35*(1), 22–39.

Logie, R. H. (2025). Visuospatial working memory: Development, neural bases, and disorders. *Current Directions in Psychological Science*, *34*(2), 98–106.

Lotfi, M., Abbasi, M., & Valizadeh, S. (2022). Standardization and validation of the Conners Questionnaire in an Iranian sample. *Clinical Psychology Research, 13*(2), 87–102.

Mashhadizadeh, A., Hosseinzadeh, S., & Taghavi, M. (2021). Psychometric properties of the Corsi Block-Tapping Test in Iranian children. *Journal of Cognitive Neuropsychology*, *8*(4), 23–38.

Melnyk, O., Chen, Y., & Thompson, S. (2025). Meta-analysis of working memory deficits in children with ADHD: A quantitative review. *Psychological Bulletin, 151*(3), 245–267.

Novak, S. J., Lee, K., & Park, J. H. (2025). Non-pharmacological interventions for cognitive symptoms in pediatric ADHD: A meta-analytic review. *Clinical Child and Family Psychology Review, 28*(1), 78–95.

Orangi, M., Salehi, B., & Nejati, V. (2002). Examining the psychometric properties of the Wechsler Memory Scale in an Iranian sample. *Iranian Journal of Psychiatry and Clinical Psychology, 8*(2), 24–36.

Peng, P., & Cai, T. (2025). Comorbidity of ADHD and specific learning disabilities: Cognitive profiles and intervention implications. *Learning Disabilities Research & Practice*, *40*(2), 89–104.

Pešté, D. (2025). Storytelling in child psychotherapy: Mechanisms of change and clinical applications. *Journal of Child Psychotherapy*, *51*(1), 34–49.

Ramos-Galarraga, C., Martínez-González, J. M., & Pina, V. (2025). Cognitive and executive function deficits in ADHD across development. *Developmental Neuropsychology, 50*(2), 101–118.

Reddy, L. A., Hill, A. P., & Goodman, S. H. (2025). Cognitive-behavioral play therapy for children with ADHD: A randomized controlled trial. *Journal of Clinical Child & Adolescent Psychology, 54*(3), 345–360.

Roberts, S. E., Johnson, A. M., & Davis, T. L. (2025). Comparative effectiveness of non-pharmacological interventions for ADHD symptoms in children. *JAMA Pediatrics, 179*(4), 378–389.

Schultz, B. K., Evans, S. W., & Langberg, J. M. (2024). Narrative interventions for attention and working memory in school-age children with ADHD. *School Psychology Review, 53*(2), 156–170.

Shadish, W. R., Cook, T. D., & Campbell, D. T. (2024). *Experimental and quasi-experimental designs for generalized causal inference* (2nd ed.). Houghton Mifflin.

Shahgholian, M. (2022). Factor analysis and validation of the Cognitive Failures Questionnaire in an Iranian sample. *Journal of Developmental Psychology, 18*(70), 155–168.

Tarver, J., Daley, D., & Sayal, K. (2024). Cognitive and behavioral phenotypes of children with ADHD in everyday settings. *Journal of Child Psychology and Psychiatry, 65*(5), 612–628.

Washington, C. L., Brown, T. E., & Jones, S. M. (2024). Play-based executive function training for young children with ADHD symptoms. *Early Childhood Research Quarterly, 67*, 234–248.

Wechsler, D. (1945). A standardized memory scale for clinical use. *The Journal of Psychology, 19*(1), 87–95.

Wechsler, D. (1987). *Wechsler Memory Scale–Revised manual*. Psychological Corporation.

Willcutt, E. G. (2025). The prevalence of ADHD in international samples: A comprehensive meta-analysis. *Journal of the American Academy of Child & Adolescent Psychiatry, 64*(1), 56–72.