

Effect of Mindfulness Practices on Concentration and Attention Span Among Children with Autism Spectrum Disorder

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Abstract

Children with autism spectrum disorder (ASD) often experience difficulties in concentration and sustained attention, which can affect classroom participation, task persistence, behavioural regulation, and academic engagement. Although mindfulness-based approaches have been increasingly discussed as supportive interventions for attentional regulation and self-management, focused empirical evidence on their effects on concentration and attention span among children with ASD remains limited. The present study examined the effect of mindfulness practices on concentration and attention span among children with ASD using a single-group pretest-posttest experimental design. The sample comprised 30 children with ASD aged 8 to 14 years, selected through non-probability sampling from school-based settings. Participants received a structured four-week mindfulness programme based on pranayama and meditation practices delivered in 45-minute sessions. Concentration and attention span were assessed using a researcher-constructed and validated test, and the data were analysed using descriptive statistics and paired-samples *t* tests. The findings indicated statistically significant postintervention improvement in both outcomes. Concentration scores increased from a pretest mean of 24.42 to a posttest mean of 27.32, while attention-span scores increased from a pretest mean of 15.90 to a posttest mean of 22.65. These findings suggest that structured mindfulness practices may serve as a promising supportive intervention for improving attentional focus among children with ASD. However, the findings should be interpreted cautiously in light of the single-group design, modest sample size, and the need to verify one reported attention-span test statistic against the original statistical output.

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1. Introduction

Autism spectrum disorder (ASD) is a neurodevelopmental condition characterized by persistent differences in social communication and interaction, along with restricted and repetitive patterns of behaviour, interests, or activities (American Psychiatric Association, 2022). In addition to these diagnostic features, many children with ASD experience significant difficulties in concentration, sustained attention, and task engagement. Such challenges can affect classroom participation, instructional responsiveness, behavioural regulation, and academic functioning. Concentration and attention span are therefore central cognitive processes in the educational development of children with ASD.

Mindfulness-based practices have increasingly been examined as supportive approaches for improving attention regulation, emotional balance, and present-moment awareness. Mindfulness is generally understood as purposeful and nonjudgmental awareness of present experience and has been associated with psychological well-being and improved attentional control (Brown & Ryan, 2003; Jha et al., 2007). In educational and therapeutic contexts, practices such as breathing regulation, focused attention, and meditation are appealing because they are noninvasive, low-cost, and

adaptable to different learner needs. For children with ASD, such practices may be especially relevant because they offer structure, repetition, and calm bodily engagement.

The present study addresses a practical and research-based need. Although earlier studies suggest that mindfulness and yoga-based practices may support self-regulation and attention, there remains limited focused evidence on concentration and attention span as distinct outcomes among children with ASD, especially in school-oriented contexts. The present investigation therefore concentrates specifically on these two cognitive outcomes. Such a focus is educationally important because concentration and sustained attention directly affect a child's ability to remain engaged in learning and to respond meaningfully to structured instruction.

The study was guided by two objectives: to examine whether mindfulness practices improve concentration among children with ASD and to determine whether mindfulness practices improve attention span among children with ASD. Accordingly, the following null hypotheses were tested:

H₀₁: Mindfulness practices do not significantly improve concentration among children with autism spectrum disorder (ASD).

H₀₂: Mindfulness practices do not significantly improve attention span among children with autism spectrum disorder (ASD).

2. Literature Review

The literature on mindfulness provides a strong conceptual foundation for examining its relevance to attention and concentration. [Brown and Ryan \(2003\)](#) argued that mindfulness is associated with enhanced awareness and psychological well-being. [Jha et al. \(2007\)](#) demonstrated that mindfulness training can modify attentional subsystems, while [Tang et al. \(2007\)](#) reported that short-term meditation training may improve attention and self-regulation. Similarly, [Zeidan et al. \(2010\)](#) found that brief mindfulness meditation may improve cognitive performance. [Chiesa et al. \(2011\)](#), in a systematic review of neuropsychological findings, concluded that mindfulness training may positively affect cognitive abilities, especially those related to attention and executive functioning. [Mak et al. \(2018\)](#) likewise reported encouraging evidence for the efficacy of mindfulness-based interventions in improving attention and executive function in children and adolescents.

Within autism-related literature, the evidence is still developing but promising. [Cachia et al. \(2016\)](#), in a systematic review, suggested that mindfulness-based interventions may hold relevance for individuals with ASD, although the field remains methodologically underdeveloped. [Kumar et al. \(2018\)](#) reported that mindfulness meditation may improve attention and executive functioning in children with ASD. Yoga-based research also indicates possible benefits. [Radhakrishna et al. \(2010\)](#) discussed the relevance of yoga therapy in ASD, while [Sharma et al. \(2019\)](#) found beneficial effects of yoga and physical exercise on attention span and related functions among children with ASD. In a related context, [Singh et al. \(2014\)](#) reported preliminary benefits of mindfulness-based positive behavior support for mothers of adolescents with ASD, suggesting that mindfulness may have broader relevance in autism-support contexts. [Spek et al. \(2013\)](#) also found positive outcomes of mindfulness-based therapy in adults with ASD. Collectively, these studies indicate that mindfulness may be associated with improved self-regulation, attention, and adaptive functioning in autism-related populations.

A broader ecological perspective is also important in understanding attention-related functioning in children with ASD. Recent autism-focused works by Singh ([2025a](#), [2025b](#), [2025c](#), [2025d](#), [2025e](#), [2025f](#), [2025g](#), [2025h](#), [2025i](#), [2025j](#)) emphasize communication support, daily routines, family resilience, school partnership, positive parenting, nutrition, social confidence, transition planning, and parental understanding as interconnected supports shaping developmental outcomes. Singh ([2025a](#)) highlights the importance of communication support and expressive connection, while Singh ([2025b](#)) emphasizes predictable routines in creating calmer and more organized home environments. Singh ([2025e](#)) foregrounds caregiver stress and burnout, and Singh ([2025g](#)) underlines positive parenting approaches that reduce escalation and emotional overload. Singh ([2025h](#)) and Singh ([2025i](#)) further stress the role of school collaboration and social skill support in the child's everyday development. Although these works are not experimental studies of mindfulness, they are relevant to the present study because they locate child functioning within a larger support ecosystem in which attention, regulation, and participation are influenced by routine, communication, caregiver well-being, school structures, and relational support.

The literature therefore supports the view that mindfulness may be a useful supportive intervention for attentional functioning in children with ASD. However, a specific gap remains: relatively fewer studies have examined concentration and attention span as direct and clearly distinguished outcomes in school-aged children with ASD using focused intervention designs. The present study attempts to address this gap by examining whether a structured four-week mindfulness programme based on pranayama and meditation is associated with measurable improvement in concentration and attention span among children with ASD.

3. Method

3.1 Research Design

The study employed a single-group pretest-posttest experimental design. In this design, the same participants were assessed before and after the intervention to determine whether statistically significant change occurred in the target

variables. This design was selected to evaluate the effect of mindfulness practices on concentration and attention span among children with ASD.

3.2 Participants and Sampling

The sample consisted of 30 children with autism spectrum disorder aged 8 to 14 years. Participants were selected through non-probability purposive sampling from school-based settings. Only those children with a formally confirmed diagnosis of ASD, verified by a qualified healthcare professional according to DSM-5 criteria, were included.

3.3 Tools

Two researcher-developed and validated tools were used. The first was a mindfulness intervention module based on pranayama and meditation. The second was a researcher-constructed test designed to measure concentration and attention span among children with ASD.

3.4 Intervention Procedure

The intervention consisted of a structured four-week mindfulness programme delivered in 45-minute sessions. The module included Anuloma-Viloma, Bhramari, Bhastrika, Omkar/Udgeet, focused meditation, and mantra meditation. The practices were selected to support calmness, attentional engagement, mental clarity, and sustained focus.

3.5 Statistical Analysis

The data were analysed using descriptive statistics and paired-samples *t* tests. Descriptive statistics were used to summarize pretest and posttest performance, and paired-samples *t* tests were used to determine whether the observed changes were statistically significant.

4. Results

4.1 Concentration

The results showed improvement in concentration following the intervention. The mean pretest concentration score was 24.42, and the mean posttest concentration score increased to 27.32. The pretest standard deviation was 5.15, and the posttest standard deviation was 5.05. The median score increased from 24.00 to 28.00, and the quartile distribution shifted upward, indicating improvement across the distribution.

The paired-samples *t* test revealed that the pretest-posttest difference in concentration was statistically significant, $t = 9.799$, $p < .001$, with a reported 95% confidence interval of [2.2947, 3.5053] and an effect size of $d = 1.79$. Thus, the null hypothesis related to concentration was rejected.

4.2 Attention Span

Attention span also improved following the intervention. The mean pretest attention-span score was 15.90, and the mean posttest attention-span score increased to 22.65. The pretest standard deviation was 3.52, and the posttest standard deviation was 6.46. The median increased from 15.25 to 21.25, and the quartile pattern also shifted upward.

The study reports a statistically significant paired comparison for attention span, $t = 5.7065$, $p < .001$, with a 95% confidence interval of [-3.8031, -1.7963] and an effect size of $d = 1.04$. Thus, the null hypothesis related to attention span was also rejected.

4.3 Overall Pattern of Findings

Across both dependent variables, the pretest-posttest pattern was consistently positive. Concentration improved significantly with a large effect size, and attention span also improved significantly with a substantial effect size. The combined descriptive and inferential results suggest that the mindfulness programme was associated with meaningful gains in attentional functioning in this sample.

5. Discussion

The purpose of the study was to examine whether mindfulness practices improve concentration and attention span among children with autism spectrum disorder. The findings indicated statistically significant improvement in both outcomes after the intervention. These findings suggest that the structured mindfulness programme was associated with enhanced attentional functioning in this sample.

The concentration findings were especially strong. The increase in mean concentration scores, together with a large *t* value and a strong effect size, suggests that the intervention may have meaningfully improved focused engagement and cognitive persistence. This is important because concentration is directly related to classroom participation, learning engagement, behavioural regulation, and task completion in children with ASD.

The attention-span findings showed a similar pattern. The increase in mean scores and the statistically significant paired comparison indicate that the intervention may also have supported greater sustained attention over time. When considered together, the concentration and attention-span results suggest that mindfulness practices may influence both the intensity and continuity of cognitive engagement.

These findings are broadly consistent with earlier work linking mindfulness with attentional regulation and improved cognitive functioning (Brown & Ryan, 2003; Chiesa et al., 2011; Jha et al., 2007; Tang et al., 2007; Zeidan et al., 2010).

They are also in line with systematic review evidence suggesting benefits of mindfulness-based interventions for attention and executive functioning in children and adolescents (Mak et al., 2018). Within autism-related contexts, the present findings converge with previous studies reporting potential benefits of mindfulness and yoga-based interventions for attention, self-regulation, and related outcomes (Cachia et al., 2016; Kumar et al., 2018; Radhakrishna et al., 2010; Sharma et al., 2019).

The findings also align with the broader ecological perspective reflected in the autism-support literature by Singh (2025a–2025j). These works suggest that attentional functioning in autism is embedded within a larger support system involving communication, routines, school collaboration, parenting practices, family stress, and social development. From this perspective, mindfulness may be especially useful when understood as one supportive practice within a wider ecology of care and educational support.

At the same time, the findings should be interpreted cautiously. Because the study used a single-group pretest-posttest design, alternative explanations such as maturation, testing effects, or contextual influences cannot be ruled out fully. Therefore, the most appropriate conclusion is that the intervention was associated with significant improvement in concentration and attention span in this sample rather than that it conclusively caused such improvement in all contexts.

6. Conclusion

The present study examined the effect of mindfulness practices on concentration and attention span among children with autism spectrum disorder using a single-group pretest-posttest design. The findings indicated statistically significant improvement in both concentration and attention span after the intervention. These results suggest that structured mindfulness practices may offer a promising supportive approach for improving attentional focus among children with ASD.

The study is important because it addresses two functionally relevant cognitive outcomes closely linked to school participation, behavioural engagement, and learning readiness. At the same time, the conclusions should remain proportionate to the research design. The study does not establish a universal causal claim but provides evidence that, in this sample, a structured mindfulness intervention was followed by meaningful gains in concentration and attention span. The study therefore offers a useful basis for future research involving larger samples, control groups, standardized measures, and longitudinal follow-up.

7. Limitations

The study has several limitations. First, the use of a single-group pretest-posttest design without a control group restricts causal interpretation. Second, the use of non-probability sampling and a sample size of 30 limits the generalizability of the findings. Third, the study was confined to children aged 8 to 14 years with formally confirmed ASD in a specific institutional context. Fourth, the intervention was examined as a combined package, and the separate contribution of each component was not isolated.

Table 1
Study Profile and Design Characteristics

Variable	Description
Study title	Effect of Mindfulness Practices on Concentration and Attention Span Among Children With Autism Spectrum Disorder
Design	Single-group pretest-posttest experimental design
Participants	Children with autism spectrum disorder
Sample size	30
Age range	8-14 years
Sampling	Non-probability purposive sampling
Setting	Inclusive or special school context in Delhi
Independent variable	Mindfulness practices intervention
Dependent variables	Concentration and attention span

Variable	Description
Intervention duration	Four weeks
Session format	45 minutes per student
Intervention basis	Researcher-constructed and validated pranayama and meditation module
Outcome tool	Researcher-constructed and validated test for concentration and attention span
Statistical techniques	Descriptive statistics and paired-samples t test

Note. This table summarizes the overall design, participants, intervention structure, and analytical framework of the study.

Table 2
Summary of the Mindfulness Intervention Module

Component	Main Objective	Core Instruction	Duration	Frequency	Implementation Note
Anuloma-Viloma	Balance and focus	Inhale through one nostril and exhale through the other; repeat.	5 min	Daily	Keep back straight.
Bhramari	Calmness and relaxation	Close eyes, plug ears, inhale, and make a humming sound while exhaling.	5 min	Daily	Do not strain the voice.
Bhastrika	Energy and alertness	Quick, forceful inhalation and exhalation.	5 min	Daily	Start slowly.
Omkar/Udgeet	Mental clarity and focus	Inhale deeply and chant “Om” during exhalation.	5 min	Daily	Keep eyes closed.
Focused meditation	Improve concentration	Focus on breath or on a specific point in space.	5-10 min	Daily	Choose a quiet space.
Mantra meditation	Inner peace	Chant a simple mantra such as “Om” or “Peace,” silently or aloud.	5-10 min	Daily	Use an easy-to-remember mantra.

Note. The intervention was delivered over four weeks in structured sessions lasting approximately 45 minutes.

Table 3
Descriptive Statistics for Concentration and Attention Span at Pretest and Posttest

Outcome	Test Phase	n	M	SD	Minimum	25th Percentile	Median	75th Percentile	Maximum
Concentration	Pretest	30	24.42	5.15	13.00	21.00	24.00	27.75	35.50
Concentration	Posttest	30	27.32	5.05	16.00	24.00	28.00	31.00	35.50
Attention span	Pretest	30	15.90	3.52	10.00	13.13	15.25	19.13	23.00
Attention span	Posttest	30	22.65	6.46	15.97	17.72	21.25	24.77	43.88

Note. M = mean; SD = standard deviation. Higher posttest values indicate improvement in both concentration and attention span relative to pretest performance.

Table 4
Paired-Samples t-Test Results for Pretest-Posttest Change

Outcome	Pretest M (SD)	Posttest M (SD)	t	p	Effect Size (d)	Decision
Concentration	24.42 (5.15)	27.32 (5.05)	9.799	< .001	1.79	Significant improvement
Attention span	15.90 (3.52)	22.65 (6.46)	5.7065*	< .001	1.04	Significant improvement

Note. The asterisked attention-span statistic is retained from the source manuscript and should be interpreted with the caution stated in the article.

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