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The Effect of Bead-Stringing Activities Using Beads of Various Sizes on Concentration in Students with ADHD at SLB C Autis Negeri Kedungkandang

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Abstract

Attention-Deficit/Hyperactivity Disorder (ADHD) is a neurodevelopmental disorder characterized by difficulties in focusing and sustaining attention, which may affect students' concentration during learning. This study aimed to determine the effect of bead-stringing activities using beads of various sizes on the concentration of a student with ADHD, particularly in terms of attention duration. The study employed a quantitative approach using the *Single-Subject Research* (SSR) method with an A-B-A design. The participant was one second-grade student with ADHD at the elementary level (SDLB) at SLB C Autis Kedungkandang. Data were collected through observation using the *duration recording* technique and analyzed visually within and between conditions. The results showed an increase in attention duration following the provision of bead-stringing activities using beads of various sizes. Data stability percentages were 100% in the initial baseline condition, 87.5% in the intervention condition, and 100% in the post-intervention condition. The 25% overlap between the initial baseline and intervention conditions indicated a change in attention duration following the intervention. The study concludes that bead-stringing activities using beads of various sizes had a positive effect on improving the concentration of the student with ADHD, particularly in terms of attention duration.

Keywords: ADHD 1; bead-stringing activity 2; concentration 3; attention duration 4; Single Subject Research 5.

1. Introduction

Education is a right that should be obtained by every child without exception, including children with special needs. Children with Special Needs are individuals who have characteristics or developmental conditions that differ from those of children in general, whether in physical, intellectual, mental, or socio-emotional aspects. Children with Special Needs can be classified into several categories, including physical disabilities, emotional and behavioral disorders, intellectual disabilities, hearing impairments, learning difficulties, giftedness, and behavioral disorders (Hardaningtyas et al., 2024).

Attention-Deficit/Hyperactivity Disorder (ADHD) is one of the conditions that may be experienced by children with special needs and is characterized by difficulties in maintaining attention, controlling activity levels, and regulating impulsive behavior. Children with ADHD tend to have difficulty sustaining focus on a task, demonstrate high levels of activity, and act spontaneously beyond what is typically expected of children their age. These conditions can affect children's ability to participate optimally in the learning process. Children with ADHD tend

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to have difficulty concentrating on the activities they are engaged in and are easily distracted by other stimuli. These limitations are often clearly observed in academic settings, where the demands of sitting calmly and focusing on a single task can be a significant challenge (Bourke et al., 2025).

Difficulty sustaining attention indicates that concentration is one of the factors that determine students' success in participating in the learning process. Concentration can be defined as an individual's ability to maintain attention on a particular activity or object for a certain period of time, so that the attention is not easily disrupted by other stimuli from the surrounding environment (Nuraini & Rahmawati, 2021). In the context of special education, concentration is closely related to students' mental readiness, interest, and self-control when participating in learning activities (Sari & Widodo, 2022).

Efforts to improve concentration among students with ADHD require learning activities that are engaging, structured, and appropriate to their individual characteristics. One activity that can be used to provide attention training is bead-stringing. Bead-stringing activities require eye-hand coordination, accuracy, the ability to follow instructions, and sustained attention to the objects being used. The use of beads of various sizes allows the activity to be presented gradually, enabling the task demands to be adjusted to the student's abilities (Jannah & Ainin, 2024; Lufitasari, 2021).

In this study, the bead-stringing activity was conducted using beads of various sizes. This activity was selected because students are required to direct their attention toward the beads, pick up and insert the beads according to the given activity, and maintain their engagement throughout the bead-stringing process. Previous studies that serve as the foundation for this research have indicated an association between bead-stringing activities and concentration and attention abilities. However, research specifically examining the effect of bead-stringing activities using beads of various sizes on the attention duration of students with ADHD using a Single-Subject Research (SSR) design remains limited and therefore requires further investigation.

Therefore, this study aims to determine the effect of bead-stringing activities using beads of various sizes on the concentration of students with ADHD, particularly in terms of attention duration. Based on the aforementioned description, the purpose of this study is to determine changes in the attention duration of students with ADHD before, during, and after participating in bead-stringing activities using beads of various sizes.

2. Method

The study employed a quantitative approach using the *Single-Subject Research* (SSR) method with an A-B-A design consisting of Baseline-1 (A1), intervention (B), and Baseline-2 (A2). The study involved one second-grade student with ADHD at SLB C Autis Kedungkandang and was conducted over 18 sessions, comprising five A1 sessions, eight B sessions, and five A2 sessions. Each session lasted 35 minutes. During the A1 phase, the student's attention was observed during learning activities; during the B phase, the student participated in bead-stringing activities using beads of various sizes; and during the A2 phase, the intervention was discontinued and attention was observed again during learning activities (Sunanto et al., 2005).

The independent variable was bead-stringing activities using beads of various sizes, while the dependent variable was concentration, measured through attention duration. Data were collected using observation sheets and the *duration recording* technique. Data were analyzed visually within and between conditions to examine trend direction, stability, level changes, and percentage overlap. Changes in attention duration were examined across A1, B, and A2 to determine the effect of the intervention (Sunanto et al., 2005; Gast & Ledford, 2018).

3. Results and Discussion

3.1 Result

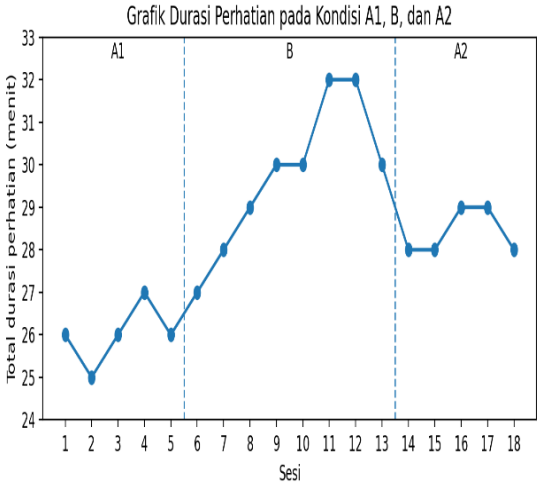
The research results were obtained through direct observation during each research session, consisting of the *Baseline-1* (A1), Intervention (B), and *Baseline-2* (A2) phases. In this study, attention duration was defined as the length of time the student maintained attention to the assigned activity continuously from the beginning of the activity until the student demonstrated a loss of attention to the task. The study was conducted over 18 sessions, consisting of 5 baseline-1 sessions, 8 intervention sessions, and 5 baseline-2 sessions.

The total attention duration data for each condition were subsequently calculated to provide an overview of changes in attention duration before, during, and after the provision of bead-stringing activities using beads of various sizes. The student's total attention duration data across the 18 sessions are presented in Table 1.

Table 1. Total Attention Duration Data for Each Session

Condition	Sessions	Attention Duration (minutes)	Mean
A1	1–5	26; 25; 26; 27; 26	26,00
B	6–13	27; 28; 29; 30; 30; 32; 32; 30	29,75
A2	14–18	28; 28; 29; 29; 28	28,40

Based on Table 1, during condition A1, attention duration ranged from 25–27 minutes, with a mean of 26.00 minutes. After the intervention was provided, attention duration in condition B increased from 27 minutes in the first intervention session to 32 minutes in sessions 11 and 12, followed by 30 minutes in session 13. The mean for condition B reached 29.75 minutes. In A2, attention duration ranged from 28–29 minutes, with a mean of 28.40 minutes. Descriptively, these changes indicate an increase in attention duration during the intervention. After the intervention was discontinued, there was a decrease compared with several of the final sessions in condition B; however, all A2 values remained at or above the highest value recorded in A1



To examine the data changes in greater depth, the attention duration data were subsequently analyzed visually through within-condition and between-condition analyses. These analyses included trend direction, stability, data path, level change, and percentage overlap.

Within-Condition Analysis

Within-condition analysis was conducted to determine the trend of the data in each research condition. The within-condition analysis included condition length, estimated trend direction, stability trend, data path, stability level and range, and level change. The results of the within-condition analysis are presented in Table 2.

Table 2. Within-Condition Analysis Data

Analysis Component	A1	B	A2
Condition Length	5	8	5
Estimated Trend Direction	(+)	(+)	(=)
Stability Trend	Stable (100%)	Stable (87,5%)	Stable (100%)
Data Path	(+)	(+)	(=)

Stability Level and Range	Stable (23,975–28,9025)	Stable (27,35–32,15)	Stable (26,225–30,575)
Level Change	26–26 (+0)	27–30 (+3)	28–28 (+0)

Based on Table 2, the within-condition analysis shows that phase A1 consisted of five sessions, with an attention duration range of 25–27 minutes. The A1 data showed a relatively stable trend, with a stability percentage of 100%. The intervention condition B consisted of eight sessions, with a range of 27–32 minutes and a stability percentage of 87.5%. Condition A2 consisted of five sessions, with a range of 28–29 minutes and a stability percentage of 100%. The level change in phase B showed an increase from 27 minutes at the beginning of the intervention to 30 minutes at the end of the intervention, while the highest value reached 32 minutes. This indicates that attention duration did not increase in only a single session but tended to increase throughout the provision of bead-stringing activities using beads of various sizes.

Between-Condition Analysis

Between-condition analysis was conducted by comparing the baseline-1 (A1) condition with the intervention (B) condition, as well as the intervention (B) condition with baseline-2 (A2). This analysis aimed to determine changes in trend direction, stability, level, and percentage overlap following the provision of bead-stringing activities using beads of various sizes. The results of the between-condition analysis are presented in Table 3.

Table 3. Between-Condition Analysis Data

Analysis Component	A1/B	B/A2
Number of Variables	1	1
Change in Direction and Effect	(+) → (+)	(+) → (=)
Change in Stability	Stablel → Stable	Stable → Stable
Level Change	26–27 (+1)	30–28 (−2)
Percentage Overlap	25%	100%

Based on Table 3, the comparison between baseline-1 (A1) and intervention (B) showed a level change of +1, from 26 to 27 minutes, with a percentage overlap of 25%. The intervention condition showed an increasing trend compared with the baseline-1 condition. Meanwhile, the comparison between intervention (B) and baseline-2 (A2) showed a change in trend direction from increasing to stable, with a level change of −2, from 30 to 28 minutes, and a percentage overlap of 100%.

Overall, the results of the within-condition and between-condition analyses indicate changes in the student's attention duration during the provision of bead-stringing activities

using beads of various sizes. These changes were particularly evident during the intervention condition, which showed an increasing trend and a level change of +3. These findings indicate that the provision of bead-stringing activities using beads of various sizes was associated with an increase in the attention duration of the student with ADHD during the research process.

3.2 Discussion

The increase in attention duration during the intervention phase indicates that bead-stringing activities using beads of various sizes may provide an activity setting that supports students' engagement in tasks. Bead-stringing activities require students to maintain attention to the objects and sequence of actions being performed, thereby directing their attention continuously toward the task (Jannah & Ainin, 2024; Lufitasari, 2021).

The use of beads of various sizes also allows the activity to be presented gradually. Variations in bead size provide different levels of task demands and encourage students to pay attention to the objects being used. In the context of students with ADHD, concrete and structured activities may help maintain engagement in the activity being performed (Barkley, 2019; Jannah & Ainin, 2024).

The findings of this study are consistent with previous research indicating that bead-stringing activities can involve attention, eye-hand coordination, accuracy, and task completion. The similarity lies in the use of bead-stringing as an activity that requires active student engagement. However, the present study specifically measured changes in attention duration and employed an A-B-A SSR design involving one student with ADHD (Jannah & Ainin, 2024; Lufitasari, 2021).

The increase in the mean attention duration from 26 minutes in A1 to 29.75 minutes in B indicates an increase of 3.75 minutes. After the intervention was discontinued, the mean in A2 was 28.4 minutes, which remained 2.4 minutes higher than the mean in A1. This pattern indicates that the change in attention observed during the intervention remained evident in the post-intervention condition. The A1/B overlap percentage of 25% is an important indicator in interpreting the intervention effect. A lower percentage of overlap generally indicates a greater difference between the intervention and baseline data. In this study, the 25% overlap indicates that most of the B data did not overlap with the range of the A1 data.

Meanwhile, the 100% overlap between B and A2 should be understood as indicating that all A2 data fell within the range of the B data. This value does not indicate that all A2 performance was identical to all B performance; rather, it indicates that the data after the intervention remained within the range achieved during the intervention. Therefore, the primary interpretation should remain based on the overall patterns of data level, trend direction, and stability.

The findings of this study have practical implications for the learning of students with ADHD. Bead-stringing activities can be used as an alternative structured activity to train the ability to sustain attention. Teachers can adjust the size and difficulty level of the beads according to students' abilities and provide simple and consistent instructions.

Nevertheless, this study has limitations because it involved only one student and was conducted using an SSR design. The findings describe changes in the individual participant studied and cannot yet be generalized to all students with ADHD. Future research could involve more participants, extend the intervention period, or compare different types of activities to obtain broader evidence.

Overall, the findings demonstrate a pattern of change consistent with the objectives of the

intervention. Attention duration increased during the bead-stringing activities and remained at a higher level than the initial baseline during the A2 phase. These findings support the use of bead-stringing activities using beads of various sizes as one alternative intervention for supporting attention duration among students with ADHD.

4. Conclusion

Based on the research findings and visual analysis, bead-stringing activities using beads of various sizes had a positive effect on improving concentration among students with ADHD, particularly in terms of attention duration. The mean attention duration increased from 26 minutes in A1 to 29.75 minutes in B and subsequently reached 28.4 minutes in A2. Stability percentages of 100% in A1, 87.5% in B, and 100% in A2 indicate relatively stable data across each condition. The 25% overlap between A1 and B indicates a change following the intervention, while the A2 data remained within the range of performance achieved during the intervention.

Therefore, bead-stringing activities using beads of various sizes can serve as an alternative structured activity to help improve attention duration among students with ADHD. The use of this activity should be adapted to the student's abilities and implemented consistently.

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