



## The Effect Of Barins Gym Exercises On Cognitive Development In Grup B Kindergarten

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**Abstract:** The cognitive development of children is closely related to neural functioning. In this context, the effort to enhance a child's cognitive development necessitates the provision of brain stimulation. Among the activities designed to stimulate brain function, Brain Gym exercises have been reported as a promising method. Therefore, this study aimed to investigate the impact of Brain Gym exercises on cognitive development in Group B children. In this context, a quantitative approach was used with an experimental and Nonequivalent Control Group Design. The study population consisted of 23 Group B students at Kindergarten Lenterahati Islamic Boarding School. Sample selection was conducted using the Purposive Sampling technique and data collection included a statement-based test instrument that met the required quality standards. Meanwhile, data analysis was performed using an Independent Sample T-Test. The results showed that there was a significant difference ( $t = -10.371$ ,  $p = 0.000 < 0.005$ ) between Conventional Learning ( $M=44.50$ ,  $SD=1.314$ ), which exhibited lower cognitive abilities, and Brain Gym activities ( $M=50.45$ ,  $SD=1.440$ ). Therefore, Brain Gym exercises had an impact on the cognitive development of Group B children.

**Keywords:** Brain Gym Exercise, Cognitive Development, Early Childhood.

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## Introduction

The period between the ages of 4 and 6 is a sensitive phase of development for children, characterized by increased receptivity to unlock their full potential. During this sensitive phase, children are subjected to physical and psychological maturation, preparing for effective responses to environmental stimulation. Therefore, this period is crucial for laying the initial foundation for developing physical, cognitive, language, socio-emotional, self-concept, discipline, independence, artistic, moral, and religious values.

Among the aspects of early childhood, cognitive development, which is the ability to understand issues related to knowledge, holds a prominent position (Egger et al., 2019). The cognitive development of early childhood is the ability to understand their surroundings and increase knowledge. This aspect is closely related to brain control and requires stimulation efforts for enhanced growth and development. Furthermore, children who receive regular and directed stimulation tend to develop faster. To stimulate a child's brain, engaging activities are needed as part of the learning process, such as brain gym exercises, often referred to as Brain Gym (Sa'idah et al., 2023).

Brain gym exercise is a series of simple movements to connect and harmonize the mind and body. In addition, this exercise is part of the kinesiology education process. Kinesiology is a science that studies body movement and the relationship between muscles and posture, concerning brain function (Nussbaum, 2010)

Brain gym exercises are a vital activity for the cognitive abilities of children. These activities are carried out to enhance concentration and balance the left and right brain hemispheres (Agustina & Ardhiani, 2023). The ability to concentrate is essential for children to solve problems and keep their minds from becoming distracted by disturbances or situations encountered.

Based on the observations conducted at Lenterahati Islamic Boarding School Kindergarten, there are children whose cognitive development is not optimal. This is apparent from their lack of concentration and inability to recognize numerical and alphabetic symbols during lessons. The level of cognitive development for children aged 5-6 years includes symbolic thinking abilities. These children can understand numbers and name numerical symbols. They are also capable of

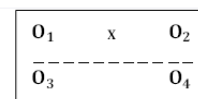
logical thinking, classifying objects based on color, shape, and size, and solving problems encountered in their daily lives (Bunketorp Käll et al., 2015).

Through Brain Gym, children are trained to be calmer and more focused, making them better at absorbing information and communicating. The entire body can also be engaged to feel relaxed and ready to learn. The exercises prepare children to be more receptive to new learning materials, enhance short-term memory, improve concentration, boost communication skills, and aid in emotional self-regulation (Adzani et al., 2024). These movements facilitate learning and are particularly beneficial for learning abilities.

## Method

According to (Dian et al., 2022), experimental method is an approach used to investigate changes in a condition strictly controlled. Different treatments are applied to this condition as an experimental study. The method is used to examine the influence of specific treatments on others under controlled conditions. In this study, the focus is on examining the effect of Brain exercise on the cognitive development of Group B at Lenterahati Islamic Boarding School Kindergarten in 2023.

The method uses a Quasi-experimental design, including the experimental and control group with a Nonequivalent Control Group Design.



The study was conducted at Lenterahati Islamic Boarding School Kindergarten and the population consisted of 23 students. The sample was obtained using purposive sampling, a technique that considers specific criteria determined by the study (Chang et al., 2013). Furthermore, the data collection included measurement tests for the pretest and posttest. Data analysis used descriptive statistics, given the quantitative nature of the study and normality was assessed using the Kolmogorov-Smirnov test. The Independent Sample T-test was used to test hypotheses, with a significance level of 5%, and the analysis was performed using SPSS 22 for Windows.

## Result and Discussion

**Result**

In this section, the topics to be discussed include the analysis requirement tests and hypothesis testing. The analysis requirement tests comprise tests of normality and homogeneity. In this context, the normality test is used to determine whether both samples are

derived from a normal data distribution. This testing is a prerequisite for the hypothesis, where only the final values (posttest) from the control and the experimental groups are tested using the Kolmogorov-Smirnov method. The results of the normality test can be seen in the following Table 1.

**Table 1. Statistical Descriptive Data**

Descriptive Statistics						Learning				
Cognitive Development	N	Mini	Maximu	Mean	Std. Deviation	Brain Exercise Valid (listwise)				
Posttest Conventional	12	42	46	44,50	1,314					
							11	48	52	50,45 1,440

Based on the post-test results, there is a difference in scores between Conventional Learning and Brain Exercise. The control class has an average score of 44.50, with the highest and lowest scores in the class being 46 and 42. The experimental class has an average score of 50.45, with the highest and lowest scores in the

group being 52 and 48. From the posttest results, there is an improvement in the scores in the experimental group after Brain Gym exercises. This indicates a more significant improvement compared to the group of conventional learning methods.

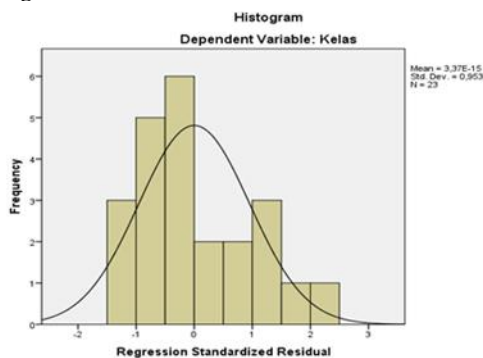
**Table 2. Normality Test Results**

Variable	Class	Statistical Tests	Cognitive Ability	Control	Experiment	Description
				0,203	0,187	Normally distributed
				0,214	0,170	Normally distributed

Source: Processed from primary data with SPSS 22

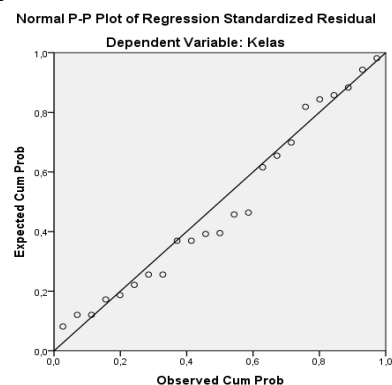
Based on the test, the data in both classes is normally distributed and meets the requirements for parametric analysis. Meanwhile, the normality test uses graphic and statistical analysis. Graphic analysis is in the form of histogram and P-P Plot graphs shown in Figures 1 and 2.

The graph above explains the curve showing the shape of the P-P Plot graph around the regression line. The P-P Plot graph depicts data distributed diagonally and in the same direction. Therefore, the regression model has a normal distribution and satisfies the normality assumption.



**Figure 1 Normality Test With Histogram**

The P-P Plot graph can be understood by examining the distribution of elements along the diagonal of the diagram. The diagram does not meet the normality assumption when the elements are widely dispersed diagonally and do not follow the direction (Elbanna et al., 2023).



**Figure 2 Normality Test with P - P Plot**

Furthermore, a homogeneity test was carried out to determine whether the two samples were from homogeneous data as described in Table 3 below.

**Table 3. Homogeneity Test Results**

Source: Processed from primary data with SPSS 22

Variable	Levene Statistic	Sig.	Description
Cognitive Ability	1,132	0,300	Homogen

Based on the homogeneity test, the Levene and the parametric statistical tests can be continued. The Levene statistic value is 1.132 with Sig. 0.300 > 0.05. Therefore, the data is said to be homogeneous.

**Table 4. Independent Sample T-test Results**

Independent Samples Test				t-test for Equality of Means								
Levene's Test for Equality of Variances				Sig. (2-tailed)					Mean Difference		95% Confidence Interval of the Difference	
	F	Sig.	df		Mean Difference	Std. Deviation	Std. Error	Lower	Upper			
st	,256	,618	-					-7,149	-4,761			
bl			10,371	,000	-5,955	1,314	,574					
st			20,329	,000	-5,955	1,440	,577	-7,156	-4,753			

Source: Processed from primary data with SPSS 22

Based on the Independent Sample T-Test using the SPSS version 22 application, there is a significant difference in cognitive development between providing brain gym activities and conventional learning. ( $t = -10.371$ ;  $p, <0.000$ ). Conventional learning ( $M=44.50$ ;  $SD=1.314$ ) has lower cognitive abilities than providing brain gym activities ( $M=50.45$ ;  $SD=1.440$ ). Therefore, there is an influence of brain gym on cognitive abilities in group B children

## Discussion

The results of hypothesis testing using the Independent Sample T-Test obtained a sig value (2-tailed) of 0.000. This value is then compared with a level of 5% with hypothesis testing criteria, namely when the Sig value  $<0.05$ , which means  $H_0$  is rejected and  $H_a$  is accepted. This is proven by the results of the analysis using the Independent Sample T-Test which obtained a Sig value.  $0.000 < 0.05$  meaning  $H_0$  is rejected and  $H_a$  is accepted. Therefore, there is a positive influence of brain gym on cognitive development in group B children. The next step is to perform a gain score test to calculate the extent of improvement in learning outcomes from the initial (pretest) to the final (posttest) scores of the control and the experimental classes. The n-gain values for the control and experimental class are 0.41 and 0.89, categorized as "medium" and "high." The results of this study indicate that the experimental class is more active in the learning activities. These average values can be interpreted as a difference or an average gap in the scores between the experimental and the control group. Therefore, the implementation of a brain gym has a significant impact on improving the cognitive development of children (Raver, 2002).

In brain gym exercise, the brain gym exercise habituation carried out was consistent with the prepared plan. The stages of brain gym exercise activities are drinking water, doing the owl movement, activating the arms (Arm Activation), ear massage (The Thinking Cap), diagonal movements (Cross crawl), putting on a horse-horse (The grounder), brain buttons (Brain buttons), belly breathing (Belly breathing), and relaxation hooks (Hooks Up) 2-8 times. According to a previous study conducted by (Kirby, 2016), brain exercises can improve concentration and clear the mind. This is also consistent with the views of (Saputri & Risnawati, 2024) that brain exercises can help students improve their concentration system, increase motivation, and deal with stress. Furthermore, the exercises activate and balance the right and left brain, containing the frontal lobes. These lobes regulate the

cognitive, emotional, and motivational functions of the brain (Sanders & Mazzucchelli, 2018)

The benefits of brain gym exercise activities are visible in children, and this is proven through the process of teaching and learning activities. Furthermore, children become more patient and can control their desires after getting used to conducting brain gym exercises. This is consistent with (Chang et al., 2013) who states the benefits of brain training such as increasing concentration, reducing stress, improving memory, the ability to think faster, and the ability to understand lessons well.

A relevant study to improve cognitive development includes (Adimayanti et al., 2022), where the use of brain gym exercises can enhance children's abilities. Furthermore, (Diana et al., 2017) shows that the Brain Gym method has an impact on children's hearing abilities. The results of another study conducted by (Pratama et al., 2022) report that the exercises have an impact on improving children's short-term memory abilities.

## Conclusion

In conclusion, brain gym exercise was reported to improve the development of group B students at Lenterahati Islamic Boarding School Kindergarten in 2023. This was shown by the difference in cognitive ability scores in the control class which implemented a conventional learning model and the experimental class treated with brain gym activities.

Based on the results of the Independent Sample T-test hypothesis test,  $\text{sig} = 0.000 < 0.05$ , hence  $H_0$  was rejected and  $H_a$  was accepted. In this context, brain gymnastics affected the improvement of cognitive development in group B. This showed that there was an increase in the cognitive abilities of 11 experimental class students after being given brain gym treatment.

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