

The Effect of Brain Gym on the Memory of Kindergarten Children Aged 5-6 Years in Maitreyawira School

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Abstract— Memory plays an important role in every psychological and cognitive functions which influence their ability to memorize the lessons. The Educational Kinesiology program called Brain Gym is reported as simple movements that can help to coordinate the body and brain thus can improve concentration and memory in children. The objective of this study is to investigate the effect of Brain Gym on the memory of kindergarten children aged 5-6 years in Maitreyawira school. This study was an experimental research with One group pretest-posttest design taken place in Maitreyawira School. The subjects of this study is the students of class Xing Fu 5, which included the 20 students of kindergarten B aged 5-6 years (8 boys and 11 girls). Data collection method used in this study is carried out by Pictorial test that matches the characteristics of early childhood. The test was divided into Pre-Test, which was a test carried out before the subjects were given the Brain Gym treatment and Post Test, which was a test carried out after the subjects were being given the Brain Gym treatment. Data analysis used to compare the results of memory score before and after the Brain Gym treatment which shown the positive memory score improvement result by average. The average memory score of subjects before being given Brain Gym treatment was 57.5, while the average memory score of subjects after being given Brain Gym treatment was 77.5. The results of the SPSS analysis Paired Sample T Test on the pretest-posttest value of the experimental among subjects yielded the -t count <-t table (-3.501 <-2.093) with the significant value produced was 0.02 <0.05 which is stated in conclusion that there is an effect of Brain Gym on the memory of kindergarten children aged 5-6 years in Maitreyawira school.

Keywords—brain gym; memory; children

I. INTRODUCTION

The golden age of human early childhood is fundamental for optimal growth and development that very important for the next stage of life. Various stimulation efforts and coaching were carried out at that time to maximize growth and development through early childhood education.

Cognitive development is closely related to memory through the process of encoding, interpreting, storing and retrieving information. Information enter memory through the encoding process that occurs automatically (subconsciously) or consciously (with effort) that requires our attention or mental focus on certain information.^[1] Carter & Seifert

(2018). But children, like adults, can only focus on a limited amount of information at one time.^[2] Upton (2012). Based on researcher observations at Maitreyawira Kindergarten student who were late picked up by their parents by some questions, encountered a phenomenon of memory where students difficult to recall information and learning just conveyed by their teacher. Teachers experienced the problem in children's focus. The fact of today issues of the bad effects of smartphones on human memory .Thus, children with high rating of gadgets influences are having problem in focus and bad memory in learning. Strengthening memory means developing beneficial learning habits^[1].

The objective of this study is to investigate the effect of Brain Gym on the memory of kindergarten children aged 5-6 years in Maitreyawira school. The benefits of this study can be used as a reference for the development of research knowledge about the influence of Brain Gym on early childhood memory.

In this study, researchers formulated the following hypothesis (1) Ho: Brain Gym has no effect on the memory of kindergarten children aged 5-6 years at Maitreyawira school, (2) Ha: Brain Gym has effect on the memory of kindergarten children aged 5-6 years at Maitreyawira school.

II. THEORY FRAMEWORK

A. Memory

Memory is consequences that persist in the mind about our experiences in the world.^[1] There are three stages in the basic memory process: (1)encoding information; (2)storing information; (3)retrieving information. Based on Shiffrin in^[3] Laksana (2015), memories are stored in three information storage systems i.e (1)sensory memory; (2)working memory or short term memory; (3)long term memory. Memory is mental ability to retain and recall pass experience. Retrieval will depend on the strength of the memory. Information that has been well rehearsed, practiced, or is particularly meaningful e.g., impressive persons, inspired events will be stronger, whereas information of less interest or less rehearsed will be difficult to retrieve (Anderson, 1995).^[4] Tan & Hoon Seng (2005). The more an impression is kept current in short-term working memory by sensory review and rehearsal, the more readily it can be recalled.^[5] Dennison (2010).

Several factors that cause a person to have problems of memory e.g. (1) Trauma at birth or toddlers (under five years), (2) Excessive stress pressure, (3) Lack of drinking water, (4) Less nutritious food, (5) Too much gadget/screen exposure, (6) Lack of movement, sitting too long, (7) Pollution, both water, air, sound and electromagnetic radiation. ^[6] Wijanarko & Setiawati (1998)

B. Brain Gym

No learning takes place without memorization of data i.e. the ability to retain and recall. Because the brain is informed by the movement and the senses, learning always involves patterns of physical activity. Infants build an internal map through movement, by which they orient themselves, connect with the world, and self teach. ... Relaxed movement and play develop a centralized awareness based on alignment, balance and attention. ^[5]

Brain Gym is a series of simple movements that are fun and maximize the overall brain applied to students in Educational Kinesiology with the aim of improving their students' learning abilities. Educational Kinesiology is an institution that applies movement to the study of the brain, left-right body, and integration between the two in order to maximize learning potential and reduce stress levels. ^[5]

Since establishment of the Educational Kinesiology Foundation in 1987, research projects using Brain Gym have sprung up worldwide with remarkable result. ^[7] Hannaford (2005). The most surprising results were the remarkable improvements in self-esteem and in ability to focus on task ^[7]

C. Brain Gym Movements

Reference ^[5] The 26 Brain Gym activities for brevity often refer to as simply "The 26" that support the development of key sensorimotor abilities-readiness skills-that make learning easier and happier. The Brain Gym activities are uniquely designed to fulfill specific physical requirements that learners encounter in the classroom. The 26 facilitate the physical skills correlating to the important assets of organizations, focus, and communication. ^[8] Dennison (2005). The lateral movement pattern has a communication function for the left and the right brain hemisphere aims to train the coordination of left-right body parts, the focusing movement pattern has a function for the back of the brain, brain stem and front part of the brain, while the organization movement pattern has the function to balance the front and back positions (limbic system) and the cerebrum for coordination of the upper and lower body.

Furthermore, The 26 foster the eye teaming, the flexibility, and hand eye coordination that allow learners to thrive in the classroom, along with the ability to live creatively and happily amid the stressors of modern life. Edu-K Brain Gym is simple movements that can help coordinate the body and brain and can improve concentration and memory in children.

6 types of Brain Gym movements were chosen to do in this research as Brain Gym treatment related to memory, i.e. The sequence of PACE that consists of (1) Drinking water, (2) Brain Button, (3) Cross Crawl, (4) (Hook Up); (5) Thinking Cap; and (6) Elephant.

- **Drinking Water**

Activates the brain by drinking water



Fig.1. Drinking Water

- **Brain Button**

Brain Buttons are done by placing one hand over the navel while the other hand stimulates points between the ribs. The hand over the navel brings attention to the gravitational center of the body. ^[7]



Fig.2. Brain Buttons

- **Cross Crawl**

The Cross Crawl is simply a cross-lateral walking in place. By touching the right elbow to the left knee and then the left elbow to the right knee, large areas of both brain hemispheres are being activated simultaneously.



Fig.3 Cross Crawl

- **Hook Up**

Hook-ups are done by first crossing one ankle over the other — whichever feels most comfortable. The hands are then crossed, clasped and inverted. To do this, stretch your arms out in front of you, with the back of the hands together and the thumbs pointing down. Now lift one hand over the other, palms facing

and interlock the fingers. Then roll the locked hands straight down and in toward the body so they eventually rest on the chest with the elbows down



Fig.4. Hooks Up

- **Thinking Cap**

The Thinking Caps exercise wakes up the whole hearing mechanism and assists memory. It is done by unrolling the outer cartilage of the ears from top to bottom several times.



Fig.5. Thinking Cap

- **Elephant**

This is one of the most integrative of the Brain Gym activities. It is done by placing the left ear on the left shoulder, tight enough to hold a piece of paper between the two, then extending the left arm like a trunk. With knees relaxed and bending with the flow, the arm draws a Lazy 8 pattern in the mid-field, again starting up the middle and out and around with eyes following the movement of the finger tips. For increased effectiveness, it should be done slowly three to five times on the left and an equal number of times with the right ear against the right shoulder.



Fig 6. Elephant

III. METHODOLOGY

This study is to determine whether there is an effect of Brain Gym on short-term memory on kindergarten children aged 5-6 years, by comparing the results of picture memory tests in a sample group before being given a Brain Gym treatment and after a Brain Gym treatment.

A. Research Design

The research design is preexperimental with one group pretest posttest

B. Research Place

This research was conducted at Maitreyawira school , which address is at 8, Cemara Boulevard Utara, Cemara Asri Complex, Deli Serdang, North Sumatra, Indonesia.

C. Description of times

- Preliminary observations before the study August 2018- November 2018
- Collection of literacy and materials November 2018- April 2019
- Research proposal seminar April 13 2019
- Pretest and sample determination April 15-18 2019
- Research time April 24-30 2019
- Time for writing reports End of April - May 2019

D. Population and sample

Maitreyawira Kindergarten B class which consists of 6 classes of early childhood aged 5-6 years totaling 131 students are as the population in this study. The sample for this study was kindergarten B class students aged 5-6 years with the lowest score of the average value of pretest score results among classes in the population.

TABLE 1. POPULATION

Population	Boy	Girl	Total
Kindergarten B Class	62	69	131

From the pretest data collection, Xing Fu 5 class is one of Kindergarten B class with the lowest average score of the pretest that is 57.5 so the Xing Fu 5 class is set as the sample for this study as the experimental group that will be given Brain Gym treatment and posttest after 5 days Brain Gym treatment in study to find out whether Brain Gym has any effects on their memory.

TABLE 2. TECHNIQUE SAMPLING IN PRETEST DATA COLLECTION

NO.	XF1	XF2	XF3	XF4	XF5	XF6
	16/4'19	16/4'19	16/4'19	18/4'19	15/4'19	15/4'19
1	70	80	50	50	60	80
2	60	40	50	30	20	70
3	90	40	70	90	50	90
4	0	80	80	60	80	100
5	40	20	40	30	20	90
6	100	80	80	100	30	80
7	90	80	90	30	40	100
8	80	90	100	70	60	90
9	70	30	50	100	80	100
10	90	90	50	90	0	70
11	90	90	80	90	10	90
12	0	90	80	100	90	100
13	80	80	20	100	100	90
14	90	70	70	30	70	80
15	70	100	70	30	70	90
16	50	80	0	60	80	80
17	70	80	100	50	80	80
18	50	90	90	90	50	80
19	80	90	100	60	90	80
20	80	0	80	100	70	-
21	80	100	90	100	-	-
22	70	90	70	30	-	-
23	90	90	80	90	-	-
MEAN	69,1	73,0	69,1	81,7	67,5	86,3

E. Data Analyzing

This study uses pictorial tests as instrument conducted before and after treatment. Pre-Test which is a test carried out before the sample is given a Brain Gym treatment and Post Test is a test carried out after being given a Brain Gym treatment. Analysis data used to compare the test score of memory before and after being given a Brain Gym.



Fig. 7. Instrument Test

- Validity and Reability of Instrument Test

The validity and reliability test was done to make sure this research instrument is valid and reliable with SPSS 22 analyzing data program. Validity test has been tested by comparing the correlation value with r table are searched at 0.05 significance with 2-sided test and the amount of data (n) = 30, so r table is 0.361 according to the attachment in Table r (Pearson Correlation)^[9] Priyatno (2016). Then with the Cronbach's Alpha reliability test method, data are stated to have reliability if the alpha value > value in table r (for n = 30; 2-tailed test; r table = 0.361). Meanwhile based on Sekaran^[9], to determine whether the instrument is reliable or not, a 0.6 limit can be used which means the reliability of less than 0.6 is not good. Then from the results of the analysis above, the items that can be declared valid and reliable are test items number No.1,2,3,4,5,6,7,8,9, 10. The test result is the instrument that the researcher will use in the research is valid and reliable.

- Normality Test

Normality test is a test used to test the distribution of data in the normal category or not. The normality test in this study uses the SPSS 22 program through Descriptive Explore Analyze. Data is stated as normal distribution if significance > 0.05. Normality test is done from the results of the initial test (pre-test) and the final test (post-test) sample.

- Homogeneity Test

Homogeneity test is a test conducted to find out whether several variants of the population data are homogeneous or not. The data variants used in the analysis must be homogeneous.^[9] Therefore, homogeneity test needs to be done before conducting the T Test (for hypothesis test) using the SPSS program through the One Way ANOVA test. If the significance value is more than 0.05, it can be said that the variants of two or more groups of data are homogeneous.

- Hypothesis Test

Researcher tested the differences in the two groups of data (pretest-posttest) using the SPSS 22 Paired Sample T Test program on the pre-test-post-test sample of experimental samples with a significance of 0.05. This test is used to find out the difference in the mean score of the group before treatment (pre-test) with the average value of the group after treatment (post-test). The hypothesis used is (1) H0: Brain Gym has no effect on the memory of kindergarten children aged 5-6 years at Maitreyawira school, (2) Ha: Brain Gym has effect on the memory of kindergarten children aged 5-6 years at Maitreyawira school. Based on probability: H0 is accepted if significant > 0.05. H0 is rejected if significant < 0.05

IV. RESEARCH RESULT

Based on the results of data calculations it can be seen that the average value of pretest before sample group being given a

Brain Gym treatment is 57.5. While the average value of posttest after sample group being given a Brain Gym treatment is 77.5 thus means the memory of a sample group consisting of children aged 5-6 years before and after Brain Gym is experiencing an increase in the difference of the average value 20 score or 34.7% higher than before the Brain Gym treatment.

Table 3. Histogram of Frequency Pretest Data Result

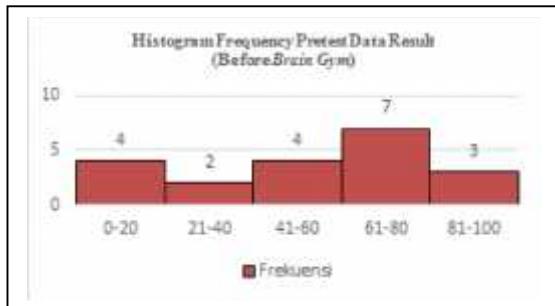


Table 4. Histogram of Frequency Posttest Data Result

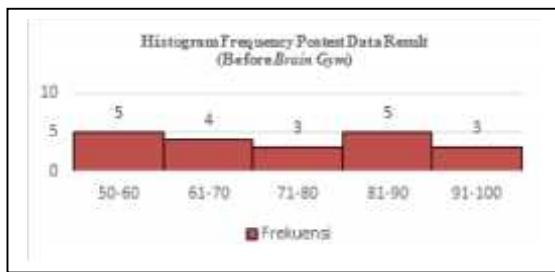


Table 5. Diagram of Pretest Posttest Data Comparison

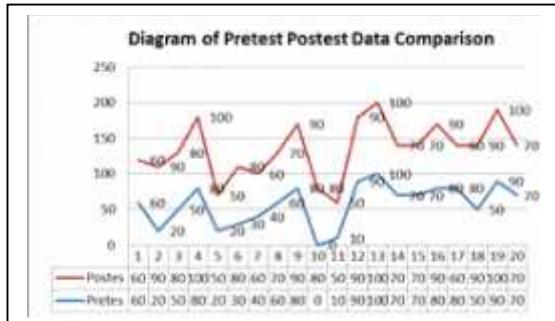


Table 6. Test of Normality Result

Tests of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
pretest	,167	20	,146	,936	20	,201
posttest	,180	20	,088	,925	20	,124

a. Lilliefors Significance Correction

Table 7. Test of Pretest Data Homogeneity Result

Test of Homogeneity of Variances

skor

Levene Statistic	df1	df2	Sig.
.022	1	18	.884

Table 8. Test of Posttest Data Homogeneity Result

Test of Homogeneity of Variances

Skor

Levene Statistic	df1	df2	Sig.
.572	1	18	.459

Table 9. T-Test Result

Paired Samples Test

	Paired Differences				t	df
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		
				Lower		

The results of the SPSS 22 Paired Sample T Test analysis on the pretest-posttest value of the experimental sample group resulted in t count $<-t$ table (-3,501 <-2,093) and the resulting significant value was 0.02 <0.05 then H_0 was rejected and H_a was accepted , which means Brain Gym has effect on the memory of kindergarten children aged 5-6 years at Maitreyawira school

Based on the notes of the researchers' observations, during the implementation of the Brain Gym treatment in the experimental sample group also found several positive influences that followed, including effective coping with child stress, and more confident children. This was proven by researchers when from the first day the researcher entered and conducted the opening activity in accordance with the planned learning strategy, most of the children faces seemed unhappy and less enthusiasm. However, over time, after treating Brain Gym, researchers found a change in facial expression on children who looked happier. This is an additional finding that reinforces other benefits of Brain Gym.

V. CONCLUSION & SUGGESTIONS

A. Conclusion

This research proofed that Brain Gym has effect on the memory of kindergarten children aged 5-6 years at Maitreyawira school. The results of the SPSS 22 Paired

Sample T Test analysis on the pretest-posttest value of the experimental sample group resulted in t count <-t table (-3,501 <-2,093) and the resulting significant value was 0.02 <0.05 then H₀ was rejected and H_a was accepted

B. Suggestions

- 1) Principals and teachers should consider Brain Gym program in learning scenario in order to maximize students learning potential
- 2) Early childhood parents should try to do Brain Gym with their kids for both body mind stimulating and bonding with pleasure.
- 3) Other researchers in this field are suggested to do a study about the influence of the brain gym time to the results quality.

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