



Short-Term Memory Ability Through Traditional Games

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Abstract. Memory in early childhood is a part of development because it is closely related to children's cognitive abilities. This study aims to determine the impact of traditional games on children's short-term memory. Short-term memory in this study was used because all activities were repeated in early childhood. The traditional game in this study is ongsrotan. The population and sample in this study were kindergarten-age children in the Gresik area, with a total of 41 children in public and private kindergartens. The results of this study indicate a value of $t = 2.427$ and a probability of 0.025 ($p < 0.05$). So, the findings of this study are that the use of traditional games is effective in stimulating children's short-term memory.

Keywords: Short Term · Memory · Ability Trough · Traditional Games

1 Introduction

Term memory or memory is very important for humans because it is the power of the human soul to receive, store, process, and reproduce impressions, understanding, or responses [1]. Memory or memory of information over time is a major process in children's cognitive development [2]. In memory, there is what is called short-term memory. In short-term memory, children can retain the information they have for 30 s as long as there is no repetition of that information [3]. Short-term memory is the capacity to store, but not manipulate, small amounts of information in the mind that is active and available for a short period [4]. For example, short-term memory can be used to remember numbers or letters that were just read [5].

The brain is the center of human application that can give instructions to all elements, influenced by stimuli obtained from outside, several knowledge stored in memory, and responses to existing stimuli [6]. This reflects a person's behavior through maturity in managing nerves with various approaches. Human memory can be processed consciously and automatically. Conscious processing usually results in new actions while automatic processing usually produces reflexes or sudden actions within a short time. Where childhood is one of the periods in the span of human life that must be passed by all humans in this world. At an early age, there are many processes of inculcating the

values of life for the first time. Currently is also a relatively long period for children to learn about everything.

Children have a lot of potential in each of these forms of development. To optimize the potential of each child's development, the child must be facilitated in the right container, namely the right education. Proper education for children somewhat triggers healthy and effective brain development. The study of neuroscience is closely related to education because education can affect the development of neuroscience and vice versa. The goal that can be expected in the application of Neuroscience theory in education is that children can manage information stored in short-term and long-term memory. At an early age, one of which is at the age of 0–6 years, child development takes place very quickly, is the most sensitive, and is very decisive for the realization of the optimization of the next stage of development [7]. Therefore, various positive stimulations in sharpening children's memory must be carried out from an early age optimally and funnily.

Understanding children is the beginning of success in education. The world of children is a world of play, when children play, they will absorb everything that happens in the surrounding environment, "play is also an essential demand and need for early childhood, through playing children will be able to satisfy the demands and developmental needs of the dimensions of the motor, cognitive, creativity, language, emotion, social, values, and attitude to life". Games are one of the dominant forms of social activity in early childhood. This is because children spend more time outdoors playing with their friends than engaging in other activities [8].

In play activities, all stages of child development can function and develop properly, and the results of good development will appear and be seen when the child enters adolescence. Playing, or playing as an activity related to the whole of the child, not only partially, but through the game, the child will be encouraged to practice his skills that direct the child's cognitive development, child's language development, psychomotor development, and physical development. The experience of playing will encourage children to be more creative. Starting from emotional development, then leading to social creativity [9]. There are several principles of play based on children's behavior, namely: the game is something fun, outside of everyday events. Games are a means of experimenting in various ways, open without limits. The game is active and dynamic, not static, so it is not limited by space and time. Games also apply to every child throughout the ages, have the context of social and spontaneous relationships, and play is also a means of communication with peers and the environment [9].

One type of game is a traditional game. Traditional games are children's games from simple materials according to cultural aspects in people's lives [10]. In addition, traditional games, also known as folk games, are recreational activities that not only aim to entertain themselves but also as a tool to maintain relationships and social comfort. The types of traditional games are Gatrik, Stilts, Bekel Ball, Jump Rope, Congklak, Hide and Seek, Engklek, etc. With traditional play, children can do many activities happily and can stimulate all children's abilities. Traditional games can help children develop various aspects of development in a holistic and integrated manner as well as the development of various positive characteristics such as improving children's social behavior, in traditional games children can build cooperation with friends, and solve problems, as part of cognitive development, build communication and emerge new vocabulary and

can train children's memory, namely children's short-term memory. Thus, researchers want to do more in-depth research related to traditional games with children's short-term memory.

Memory is the ability to store, retain, and recall information from past experiences in the human brain. Memory is a collection of what is remembered to provide an individual's ability to learn and adapt and provide control from the use of past experiences to current behavior and thinking processing in the future. Suharnan states that memory is the memory that refers to the process of storing or maintaining information over time.

Slightly better than what is defined by Santrock which gives the notion of memory as the retention (memory) of information over time, involving encoding, storage, and retrieval. Short-term memory has more capacity with a tempo of about 30 s unless the information is repeated or processed further so that it can last longer. This is where the attention process starts to go well. Sensory memory that is done by children needs to get attention and filter by sorting out the best information for children.

Short-term memory is a memory of facts, words, numbers, letters, or other small information that lasts from a few seconds to a minute or more at a time. An example of using short-term memory is when a person wants to remember a phone number in a short time from the phone book. However, short-term memory is usually limited to seven small pieces of information, so if some new information is loaded into short-term storage, the old information will be replaced. So, after someone remembers a phone number a second time, the first number is usually forgotten. In short-term memory, the information needed is immediately available so that a person does not need to look for the information in his memory like in long-term memory [11].

The formation of short-term memory can be preceded by the formation of sensory memory. Sensory memory is specific for certain senses and is formed in a very short time, namely iconic memory for visual information with a duration of 150–500 ms and echoic memory for auditory information with a duration of 1–2 s [12]. The information from the sensory memory that has been received will then be transferred to the next memory storage. All information from sensory memory, both iconic and echoic, is not entirely short-term memory. The information will be sorted and processed to become short-term memory.

The formation of short-term memory requires awareness, unlike sensory memory which can be done outside of consciousness. Characteristics of short-term memory: 1) Information in short-term memory is conscious memory, 2) Small short-term memory capacity which is about 7 ± 2 items, phone numbers, passwords, 3) Information quickly accessed, 4) The duration of short-term memory is very short, without certain stimuli, the information will be lost after 18 s, 5) Loss of information can be prevented if it is repeated, 6) Information is usually encoded in the form of sound. Information can be cut or changed to more familiar things to increase capacity.

Without memory, individuals can't reflect on themselves, self-understanding is very dependent on interconnected awareness that only occurs in the presence of memory. Memory continues to work as indicated by the activities performed and spoken.

Memory or memory of information over time is a major process in children's cognitive development. In memory, there is what is called short-term memory. In short-term memory, individuals can retain the information they have for 30 s if there is no repetition

of that information. Because through repetition of information presented, we can retain information through short-term memory for a longer time. Re-peating stored information is important, older children repeat numbers more often than younger children [13]. Speed especially the speed at which portions of memory can be identified and efficiency in processing information are also important.

Playing is a very fun activity. By playing, children can satisfy the demands and needs of children's development in the dimensions of cognitive motor skills, creativity, language, emotion, social, and attitude to life [10]. Play is a window of child development. Through play, aspects of child development can be grown optimally [14]. In general, the types of children's games can be categorized into three groups, namely as follows: Active games, namely games that usually involve more than one child [12]. Active games are usually in the form of sports that are useful for cultivating kinesthetic abilities in children. Passive games are games that are mechanical and are usually done without real friends. One of the passive games is electronic games such as PlayStation. Fantasy games or imagination games are created by children in their world.

Children need adequate physical activity to stimulate their growth and development. Physical activity that is carried out will also be beneficial for the health and fitness of the child's body. One of the physical activities that children often do is play a game. By playing many benefits can be obtained from children, for example, children become happy, can make friendships, enrich their movements of children, and can learn new skills. Traditional games are a means of playing for children.

Traditional games that are structured in such a way directly affect the psychomotor, cognitive, and emotional development of children. Playing is an activity that uses tools or does not use tools spontaneously, is flexible, fun, not forced, and develops children's imagination power, without considering the result. Thus, playing can be interpreted as an activity carried out either using tools or not using tools that are fun and help the growth and development of children. That the world of children is the world of play, where playing for them can be said to be a core activity or main activity. Play has an important role in the development of children in almost all areas of development, including physical-motor development, language, intellectual, moral, social, and emotional [15]. Traditional games are the nation's cultural heritage and heritage from their ancestors whose existence must be preserved. As a child of the nation, it is an obligation to maintain the existence of these traditional games. Traditional games are not just games, there are values and cultural elements inherent in them. In all corners of Indonesia, each region has traditional games that characterize the area.

Traditional games have positive values that can be instilled in children. These values are all very good and useful in a child's life. The traditional game in this study is the ongsrotan game.

2 Method

2.1 Types of Research

In this study, the type used was quasi-experimental research (quasi-experimental), namely experimental research carried out in only one group called the experimental group without a comparison group or control group [16]. The research design used

Table 1. One group pre-test-post-test design

Pre-Test	Treatment	Post Test
O1	X	O2

O1: Pre-test is done before treatment

X: Treatment (Treatment) is given to children

O2: The final test (Post Test) is carried out after being given treatment

in this study was “One Group Pretest-Posttest Design”, namely a research design that included a pretest before being given treatment and a posttest after being given treatment. Thus it can be known more accurately because it can be compared with being held before being given treatment [17].

This research activity aims to test the hypothesis about the effect of the given treatment. Through this experimental research, researchers want to know that traditional ongsrotan games can stimulate children’s short-term memory abilities. The one-group pre-test-post-test design scheme is shown as in Table 1.

2.2 Variable Operational Definition

An operational definition is a definition based on the observable properties of a defined thing [18]. While the variable is everything in any form determined by the researcher to be studied so that information is obtained about it, then conclusions are drawn [17]. Variables can also be classified into independent variables and dependent variables. The independent variable is the variable that influences, while the dependent variable is the variable that is affected. The variables in this study are:

Independent variable (X) = Ongrotan Traditional Game

Dependent variable (Y) = Short term memory

To avoid misinterpretation in this study, the following operational definitions of traditional games and short-term memory will be presented, operational definitions in this study, namely:

- a. Traditional games are children’s games from simple materials according to cultural aspects in people’s lives. In addition, traditional games, also known as folk games, are recreational activities that not only aim to entertain themselves but also as a tool to maintain relationships and social comfort.
- b. Short-term memory is a recollection of facts, words, numbers, letters, or other small information that lasts from a few seconds to a minute or more at a time.

2.3 Population and Sample

a. Population

The population is the entire research subject which is a group of individuals who have the same characteristics. The population in this study were children aged 5–6 years in the TK Gresik district.

b. Sample

The sample is part of the population. The sampling technique in this study used a purposive sampling technique, namely the technique of determining the sample in certain considerations. The consideration in question is that the group used as the research sample can represent the population. The samples in this study were State kindergartens and Private Kindergarten with a total of 41 institutions.

2.4 Data Collection Technique

Data collection is a systematic and standard procedure to obtain the required data. The data collection method used in this research is a questionnaire (questionnaire) and documentation.

a. Questionnaire

The questionnaire is a data collection technique that is done by giving a set of questions or written statements to respondents to answer [19]. The questionnaire in this study is closed because the answers have been provided and this questionnaire is used to collect data about traditional games and short-term memory.

In this study, the data collection method used was a questionnaire whose measurement was using a Likert scale with answer choices and scores had four answers, namely: strongly agree, agree, disagree, and strongly disagree.

b. Observation

One method of data collection, in this study, is the observation method used to view and obtain data directly.

2.5 Research Instrument

Research instruments are tools or facilities used by researchers in collecting data so that their work is easier and the results are better in the sense of being more accurate, complete, and systematic so that they are easier to process [16]. In the research, the instruments used are questionnaires and documentation. The following are the results of the researchers compiling the instrument grid (Table 2).

Table 2. Short-term memory instrument grid

Variable	Sub Variable	Indicator
Short Term Memory	Generating/recalling information	Children can name the stages of traditional games
		Children can explain the rules of the game in traditional games
		Children can classify between games played with tools and without using tools
		Children can practice traditional game sequences

Table 3. Questionnaire Reliability Test Results

Indicator	r count	r table	Description
A1	0.541	0.308	Valid
A2	0.391	0.308	Valid
A3	0.632	0.308	Valid
A4	0.380	0.308	Valid

2.6 Validity and Reliability

a. Validity

Validity is a measure that shows the level of validity or validity of an instrument. To measure the validity content was used validity. The results of the validity content show that 87.5% of the items on the instrument are feasible and appropriate to be used in the measurement. The validity test that has been carried out in this study is shown in Table 3.

The results of the analysis obtained the correlation between item scores with a total score containing 4 question items that have been applied to 40 respondents. This value is then compared with the r table value sought at a significance of 0.05, then the r table is 0.308. From the results of the calculation of the validity of the Table 3, it can be seen that $r \text{ count} > r \text{ table}$, it can be concluded that all question items are valid and none of them fall.

Table 4. Questionnaire Reliability Test Results

Cronbach’s Alpha	N of Items
0.114	5

b. Reliability

Reliability is an instrument that is reliable enough to be used as a data collection tool because the instrument is already good. To determine the reliability of each item, this study uses a reliability test with the Alpha Cronbach formula as follows:

$$r_{11} = \left(\frac{k}{k - 1} \right) \left(1 - \frac{\sum \sigma b^2}{\sigma^2 t} \right)$$

Calculation of Cronbach’s Alpha Correlation.
Information:

r^{11} = reliability

K = number of valid items

$\sum \sigma b^2$ = the number of variance scores for each item

$\sigma^2 t$ = total variance

This reliability calculation was performed using a computer program SPSS 26.0 for windows. Reliability is expressed by the reliability coefficient whose numbers are in the range from 0 to 1.00. The higher the reliability coefficient approaching the number 1.00 means the higher the reliability. The results of reliability testing on this research variable are as in Table 4.

The results of the reliability test on the traditional game variable can be seen that Cronbach’s alpha on this variable is higher than the table value, namely $0.114 > 0.60$. These results prove that all statements in the questionnaire are declared reliable.

2.7 Data Analysis Technique

The data obtained from this study was followed by analyzing the data and then concluding using parametric statistics. Analysis Prerequisite Test.

a. Normality test

The normality test is nothing but testing the normal distribution of the data to be analyzed. Tests are carried out depending on the variables to be processed. Testing the normality of data distribution using the Kolmogorov-Smirnov Test with the help of SPSS 26. The Kolmogorov-Smirnov formula described is as follows [17]:

$$kd = 1,36 \sqrt{\frac{n1 + n2}{n1 \times n2}}$$

Table 5. Normality Test Results

Tests of Normality				
	Classification	Statistics	df	Sig.
Results	Pretest	0.139	41	0.044
	Posttest	0.253	41	0.065

Table 6. Homogeneity Test Results

Test of Homogeneity of Variance			
		Levene Statistics	Sig.
Results	Based on Mean	18,284	0.050
	Based on Median	14,030	0.050
	Based on the Median and with adjusted df	14,030	0.048
	Based on trimmed mean	18,341	0.040

Description:

Kd = value of Kolmogorov-Smirnov sought

n1 = number of samples observed/obtained

n2 = expected number of samples

The results of Normality testing on this research variable are as in Table 5.

Based on the Table 5, the significance value of the pretest and posttest results in the table (Asymp. Sig. (2-tailed)) is 0.044, and 0.65 is greater than (0.05). It was decided that both data were normal distribution.

b. Homogeneity Test

In addition to testing the distribution of values to be analyzed, it is necessary to test for homogeneity to ensure that the groups that make up the sample come from a homogeneous population. The homogeneity test used Levene's test from pretest and posttest data in both groups using the SPSS 26 program. The results of the calculation of the homogeneity test of this study are as in Table 6.

Based on the results of the homogeneity test above, it is known that the value of sig. is 0.050 significant, meaning that the result is arguably greater than 0.05, it can be concluded that the data is the same or homogeneous.

3 Result and Discussion

The data collected from the results of the study consisted of pre-test data and post-test data on the application of traditional ongsrotan games in children aged 5–6 years. In this case, each data will be described in detail regarding the maximum value, minimum value, mean, median, mode, and standard deviation obtained.

Table 7. Frequency Distribution of Pretest Score

No	Score	Frequency	Percentage
1	8	1	2.4%
2	9	6	14.6%
3	10	6	14.6%
4	11	8	19.5%
5	12	7	17.1%
6	13	9	22%
7	14	3	7.3%
8	15	1	2.4%
Total	41	100	

Table 8. Distribution of Posttest Score Frequency

No	Score	Frequency	Percentage
1	12	1	2.4%
2	13	6	9.8%
3	14	6	31.7%
4	15	8	43.9%
5	16	7	12.2%
Total	41	100	

a. Pretest

The pretest value data in the study obtained the highest value of 15 and the lowest value of 8 with an average value (mean) of 11.41. The mode is 13 and the median is 11 and the standard deviation is 1.717. To make the description of the data clearer, the following will be described in the frequency distribution table at the time of the pre-test (Table 7).

Based on Table 4, it is known that from 41 students who got a score of 8 as many as 1 child, while those who got a score of 9 were 6 children, who got a score of 10 were 6 children, who got a score of 11 were 8 children, who got a score of 12 were 7 children, who got a score of 13 as many as 9 children, who got a score of 14 as many as 3 children and who got a score of 15 as many as 1 child.

b. Posttest

Posttest value data in the study obtained the highest score of 16 and the lowest value of 12 with an average value (mean) of 14.54. The mode is 15 and the median is 15 and the standard deviation is 0.925. To make the description of the data clearer, the following will be described in the frequency distribution table at the time of the posttest (Table 8).

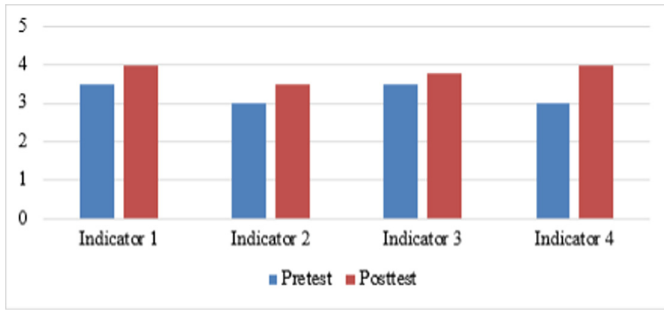


Fig. 1. Pretest and Posttest Results of Short-Term Memory Ability in Children

Based on Table 5, it is known that from 41 students who got a score of 12 as many as 1 child, who got a score of 13 as many as 6 children, who got a score of 14 as many as 6 children, who got a score of 15 8 children and who got a score of 16 as many as 7 children.

Based on the results of research that has been obtained during field trials, it shows that there is a significant effect of ongsrotan traditional games on the short-term memory ability of children aged 5–6 years. Therefore, the research hypothesis which states that there is an effect of traditional ongsrotan games on the short-term memory ability of children aged 5–6 years is acceptable. This decision can be seen from the results of data analysis which shows that the value of $t = 2.427$ and the probability is 0.025 ($p < 0.05$). The above description can be explained with the following data (Fig. 1).

The data above shows that in indicator 1, namely, the child can mention the stages of traditional games, the pretest shows an average of 3.5 then the posttest shows an average of 4. Indicator 2, namely the child can explain the rules of the game in traditional games, the pretest score shows a score of 3, and the posttest met a score of 4. Indicator 3 is that children can classify between games played with tools and without using tools, showing an average pretest score of 3.5 and a posttest showing an average of 3.8. Indicator 4, namely that children can practice traditional game sequences shows an average pretest score of 3 and then an average posttest score of 4. The data can be concluded that each average score of the ongsrotan game indicator has a positive and significant increase.

The application of traditional ongsrotan games affects the ability of short-term memory in children aged 5–6 years. This study involves indicators of the implementation of the traditional ongsrotan game which was carried out at 41 institutions in State Kindergarten and Private Kindergartens with the following analysis (Fig. 2).

The data above can be seen that in the activity mentioning the stages of the traditional ongsrotan game carried out, it shows that as many as 77% of private kindergarten institutions have stimulated children, while 23% are carried out in state kindergartens. This is because the number of private TK is greater than that of State TK (Fig. 3).

In terms of gender, as many as 68% of girls can explain the rules of the game in the ongsrotan game. Then 32% of boys were able to explain the rules of the game in the ongsrotan game. The main point here is that girls can explain in more detail each stage in the ongsrotan game through language that is easier to understand (Fig. 4).

Mentioning the Stages of the Traditional Ongsrotan Game

■ TK Negeri ■ TK Swasta

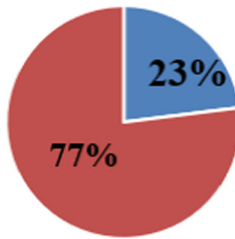
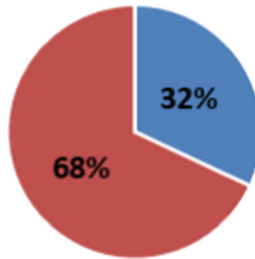


Fig. 2. Mentioning the Stages of the Traditional Ongsrotan Game

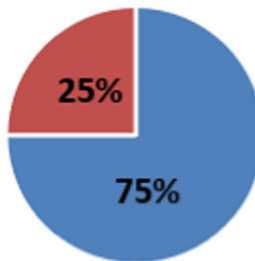
Explaining the Rules of the Ongsrotan Game



■ Laki-laki ■ Perempuan

Fig. 3. Explaining the Rules of the Ongsrotan Game

Classification of Ongsrotan Games



■ Dengan Alat ■ Tanpa Alat

Fig. 4. Classification of Ongsrotan Games

Practicing the Sequence of the Ongsrotan Game

**Fig. 5.** Practicing the Sequence of the Ongsrotan Game

Based on the implementation that has been done, it is known that as much as 75% of traditional ongsrotan games are carried out using tools. As much as 25% have been played ongsrotan without using tools. These data indicate that the ongsrotan game is more effectively carried out using simple tools that meet the elements of local wisdom (Fig. 5).

The data above shows that 86% of children can practice the traditional ongsrotan game sequence with very good criteria, while 14% still need guidance. This form of guidance is more towards scaffolding in which children are given direct assistance by the teacher when playing the ongsrotan game.

Ongsrotan games can affect children's ability in short-term memory, especially in mentioning the stages of the game in detail starting from the initial, core, and final stages with the results that 23% have been carried out in public kindergartens and 77% in private kindergartens. Memory is very important for humans because it is the power of the human soul to receive, store, process, and reproduce impressions, understand, or respond [1].

The child can explain the rules of the ongsrotan game is important in this study because it can see the child's ability to capture information in a short period (short-term memory) to be used as a reference in playing the ongsrotan game with the correct steps/stages. This supports the statement that short-term memory can store, but not manipulate, small amounts of information in the mind in an active state and is available for a short time [5].

The implementation of the ongsrotan game has also shown that 75% is dominant in its implementation using tools, while 25% is done without using tools. These results can be related to the study of Hasanah [20]; Maryati & Nurlaela [21]; Prasetya & Komaini [22] that traditional games that use tools can affect the ability of short-term memory in children aged 5–6 years as well as stimulate the gross motor and social-emotional aspects of children.

The ability of children to practice this ongsrotan game also shows a good thing because children can do this activity actively and there is also cooperation between children so that this makes stimulation on aspects of children's social and emotional

development. This statement is supported by studies that active play involves more than one child and also stimulates the social aspects of children [12].

4 Conclusion

This study concludes that there is an effect of traditional ongsrotan games on the short-term memory ability of children aged 5–6 years. This is supported by the value of $t = 2.427$ and a probability of 0.025 ($p < 0.05$). This result is also supported by the average score on indicator 1 reaching a pretest of 3.5 then the posttest showing an average of 4. Indicator 2, namely the pretest score shows a score of 3 and the posttest meets a score of 4. Indicator 3 shows an average pretest score of 3.5 and the posttest showed an average of 3.8. Indicator 4 shows the average pretest score of 3 and then the average posttest score of 4.

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