

# **A Comparative Study of the Development of Logical Thinking between Deprived and Non-Deprived Categories of Students in the Pre-Adolescent Stage**

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## **ABSTRACT**

This paper was designed to find out the development of logical thinking between the deprived and non-deprived categories of students in the pre-adolescent stage. For this study, the investigator selected 24 samples of elementary school students by using a purposive sampling technique. The descriptive method was used for this study and data were collected by self-developed cognitive tasks. The investigator used a simple percentage and "t" Test for analysis of the data. The result indicated that there was no significant difference between the non-deprived and deprived groups of students concerning their logical thinking.

**Keywords:** Logical thinking, Deprived and Non-Deprived children, pre-adolescent

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Date of Submission: 02-01-2023

Date of Acceptance: 14-01-2023

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## **I. INTRODUCTION**

Piagetian theory of cognitive development(logical thinking ) is based on the active state of equilibrium and disequilibrium which moves the child from perceptual to formal operational (Sullivan,1967) Piagetian theory of cognitive development(logical thinking ) is based on the active state of equilibrium and disequilibrium which moves the child from perceptual to formal operational (Sullivan,1967). logical thinking is a process where using our logical abilities, we can draw conclusions based on our pre-existing, incomplete knowledge. ( Végh,2021) logical thinking is the active reflection of objective reality as a rational cognitive process through concepts, judgments, reasoning, and other forms of thinking. .( Végh,2021) Thought comprises the mental functions of conceiving(formation and apprehension of ideas about an object), of judging (discrimination of the identity or diversity of two concepts) and of reasoning (completion from two or more related, previously known judgments)( Francisca, and et al,2022). Piaget describes the sequence of development of logical thinking in terms of conservation of mass weight and volume (BatHae and Hosseini,1971), conservation of identity of Mass was easier than the conservation of equal equivalence of quantity which was easier to conserve within most profound in young children (Elkind and Schoenfield,1972), the conservation of area developed was much better in the original subject than in European subject and in some cases, this concept did not develop. The researcher did not notice the invariant order of development of logical thinking among the original subject for conservation of quantity, weight, and volume (Delemos,1969), the development of conservations of urban and rural children aged between 6 to 11 years was individually notified and the development of logical thinking in terms of conservation of quantity started at an earlier in urban school children (Muhar and Jain,1969). The performance and conservation of logical thinking in terms of volume and area did not differ from those who ability to identify the subject in terms of length, conservations of logical thinking in terms of numbers mass weight, and volume (Rao,1976), Conservation of logical thinking in terms of volume was a poor performance by students on conservation of mass weight and volume of both male and female children's (Jain,1982)

## **RATIONALE OF THE STUDY**

The development of logical thinking is very important for cognitive function. Logical thinking is a process of conserving knowledge concerning Mass Weight, and volume. From an educational point of view, logical thinking plays an important role in identifying the structure and function of knowledge among pre-adolescent children. During that stage, the student develops their different dimension concerning perceiving and conserving the shape and function of the object. Logical thinking ability can be a help to the student in solving the practical problem faced in real-life situations. One can take a better decision if one logically analyzes the condition from and different perspective. So the member of society generally accepts that those who belong to the well economic family have logical thought and took the right decision for themselves and those who belong to a lower background don't have that type of ability to solve their problem, so the higher category people took the advantage of that and create discrimination between the deprived and non-deprived group of people concerning their logical thinking ability. Deprived children are the under develop and backward category in society they are exploited by the non-deprived category in the social, economic, political, and educational sector, The non-deprived group think that deprive group has no idea about taking a decision and lack proper knowledge. They also think that they are superior then the deprived category in respective of their mind and reasoning ability. Deprived students are unable to solve critical problems more efficiently. Logical thinking is also used to solve daily life problems and valued arguments and arguments are based on valid facts. thus the researcher conducted a study to identify the development of logical thinking of students concerning the conservation of mass weight and volume as compared to the non-deprived.

## **OBJECTIVE OF THE STUDY**

- To Study the percentage of development of logical thinking of the pre-adolescent student belonging to the non-deprived c category concerning the mass weight and volume
- To study the significant difference between deprived and non-deprived students in the development of logical thinking concerning the conservation of mass weight and volume

## **HYPOTHESIS OF THE STUDY**

- The development of logical thinking up prediction students belonging to deprived and non-deprived categories concerning the conservation of mass weight and volumes volume are equal
- There is no significant difference between the deprived and non-deprived categories of pre-education students on the development of logical thinking concerning mass weight and volume.

## **OPERATIONAL DEFINITION OF KEY VARIABLES**

**LOGICAL THINKING:** Logical thinking is a part of cognitive development which involves moving one related statement to another through inductive and deductive reasoning. In this present study, researchers study the development of logical thinking concerning mass, weight, and volume.

**PRE-ADOLESCENT:** pre-adolescent is a stage of human development that consists of the age group between 10 to 13 years.

**DEPRIVED CHILDREN:** Children belonging to the weaker section of society, mainly the Schedule Caste and Schedule Tribe.

**NON-DEPRIVED CHILDREN:** children belonging to the socio-economically stronger section, mainly the OBC and General children.

## **DELIMITATION OF THE STUDY**

- The present study was delimited to the ODIA medium elementary school children of Dahita Gram Panchayat of Padampur Block only.
- The present study was delimited to pre-adolescent children belonging to deprived and non-deprived categories only.

## **DESIGN OF THE STUDY**

The descriptive method was adopted by the investigator to describe the development of logical thinking in terms of Mass, Weight, and volume.

## **POPULATION :**

The population of the current study included all the students of Dahita elementary school of Padampur Block, those who had in the age group of 10 to 13 years of age.

## **SAMPLE AND SAMPLING**

The researcher selected 24 samples using stratified purposive sampling, which included 12 (6 samples from Schedule caste, 6 Samples from Schedule Tribe ) samples from the Deprived category and 12 Samples ( 6 from General and 6 from OBC) from the Non-deprived category taken in to account.

**TOOLS USED**

The researcher developed a Cognitive Task Scale with help of a supervisor by following the cognitive task of Piagetian theory, this task was designed to measure the conservation of Mass, weight, and volume of the student, which are the essential characteristic of Logical Thinking at the pre-adolescent period (Concrete operational stage) (Piaget, 1971.).

**PROCEDURE OF DATA COLLECTION**

After preparing the cognitive task for the elementary or pre-adolescent children, the investigator visited the particular school and selected the sample with the prior permission of the Headmaster. The investigator used some materials and objects from which cross questions have been asked to the learners in the form of mass, volume, and weight to study their logical thinking. Then the investigator collected the responses of conservation of mass, volume, and weight.

**STATISTICAL TECHNIQUES**

To analyze the obtained data the researcher used both descriptive and inferential statistics. the researcher applied simple percentages, the mean and standard deviation of descriptive statistics, and the "t" test of inferential statistics. The researcher also used graphs and chat for analyzing the data.

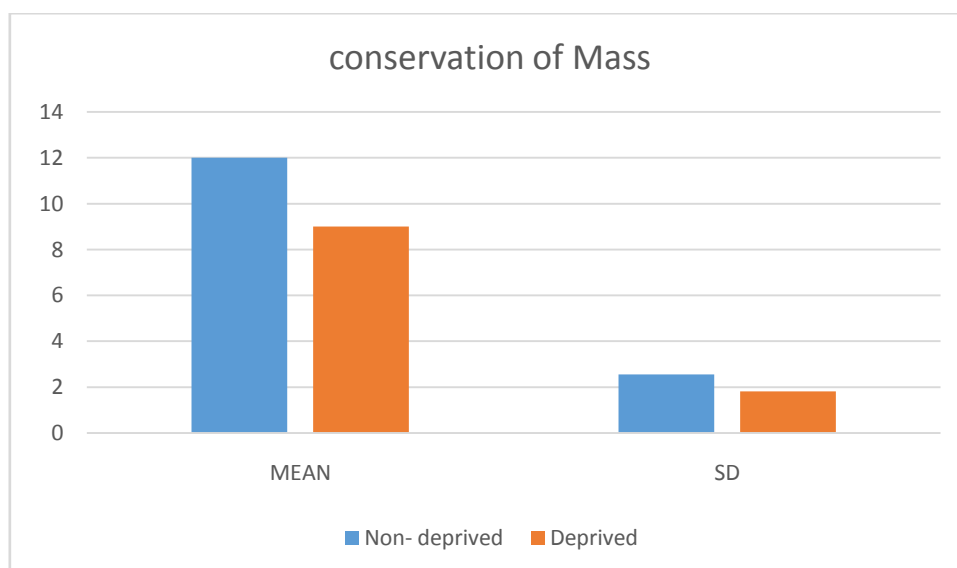
**ANALYSIS AND INTERPRETATION**

Data analysis is a process of inspecting, cleansing, transforming, and modelling data to discover useful information, suggest conclusions, and support decision-making. Analysis refers to breaking a whole into its separate components for obtaining reliable results, so it is a process for obtaining raw data and converting it into information useful for decision-making.

**Table no. 1**

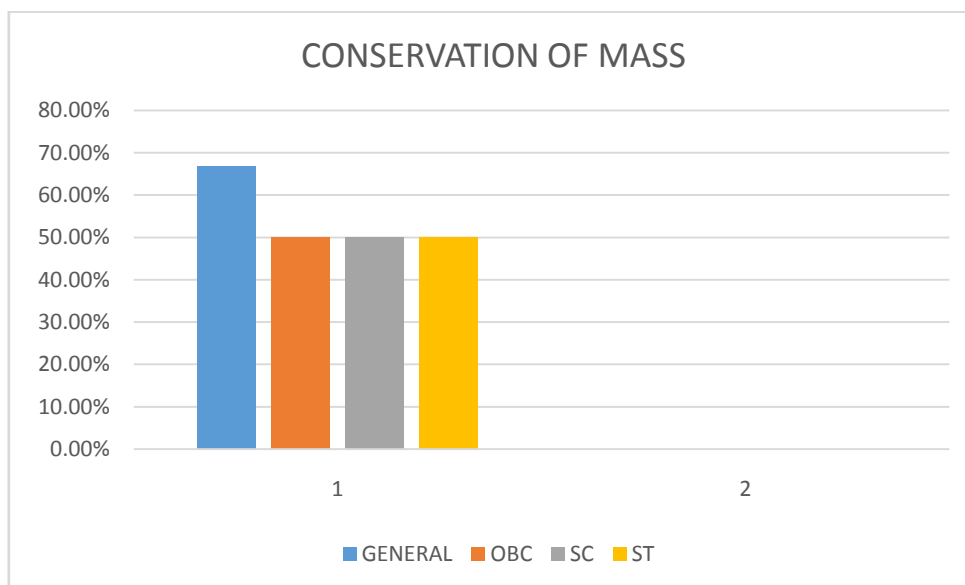
Difference between deprived and non-deprived groups of students on the development of logical thinking in term of terms of conservation of mass.

SL NO	category	Total no. of students	Mean	SD	SED	"t" value	Significant level	The test is not significant
1	Non-deprived	12	9.67	1.109	0.55	0.454	0.01	
2	Deprived	12	9.42	1.55				



The above table and graph showed about mass conservation of deprived and non-deprived students, the above data makes it clear that the mean of the non-deprived and deprived group is 9.67 and 9.42 and their SD are 1.109 and 1.55 respectively. And the SED of both groups is 0.55 and the "t" value is 0.454 when we compare the calculated value with the table value with the help of df 22 at the significant level of 0.05(2.074) and 0.01(2.819). So as the obtained 't' value is smaller than the table value at both these levels of significance, therefore the test is not significant and the null hypothesis is So it was concluded that there is no significant difference between the non-deprived and disadvantaged group of student in term of conservation of mass.

Percentage of deprived and non-deprived groups of students on the development of logical thinking in term of terms of conservation of mass.



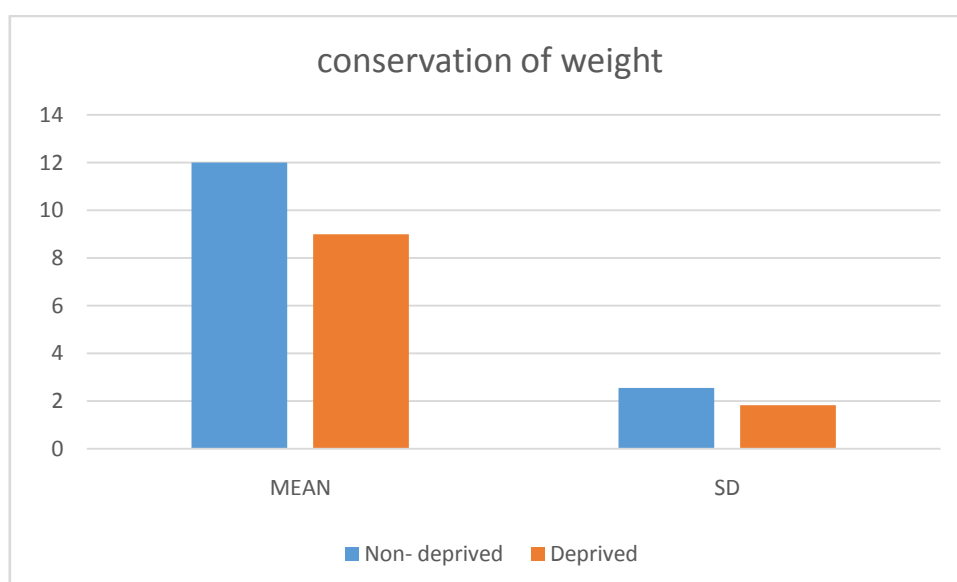
Graph no.2

the above graph showed that there is no significant difference found among the General, OBC, and SC categories of students in terms of conservation of mass. The above group secured 83.33% of the score in the conservation of mass test but only in the case of ST students, they secured 66.67% of the score in the conservation of mass which is slightly less than the other group of students. It means both deprived and non-deprived groups are equal in terms of mass conservation despite ST students.

Table no.2

Difference between deprived and non-deprived groups of students on the development of logical thinking in terms of conservation of weight.

Sl.no	Categories	Total no of students	Mean	SD	SED	"t" values	Level of significance
1	Non- deprived	12	8.5	2.06	0.741	0.404	0.01
2	Deprived	12	8.2	1.53			



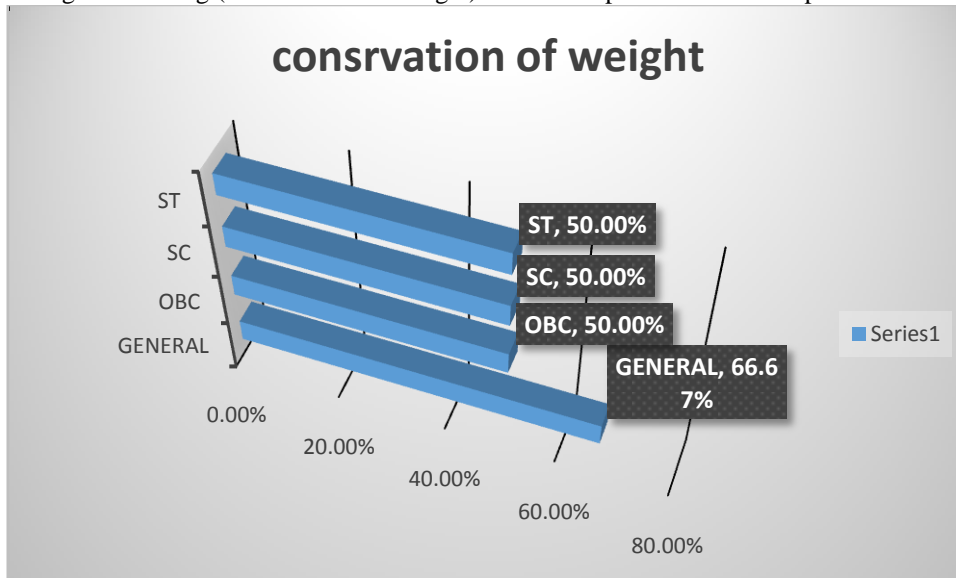
Graph -3

The above tables no.2 and graph no.3 reveals the conservation of weight of deprived and no deprived students, the data makes it clear that the mean value of both groups is 2.06 and 1.53 and their SD vale are 2.06 and 1.53 respectively. And in their SED is 0.741 and value is 0.404 respectively. The "value is compared with

the table value with the help of doing 022) 66502016) and 6.610.819) level of significance. If the calculated value exceeds the table value, we conclude that the test is significant and the null hypothesis is rejected but in the same case when the calculated value is not exceeding the table value the test is not significant and the null hypothesis is accepted. It means that there is no significant difference between non-deprived and deprived groups of students in the conservation of weight.

Graph no.4

Percentage of logical thinking (conservation of weight) between deprived and non-deprived adolescent students



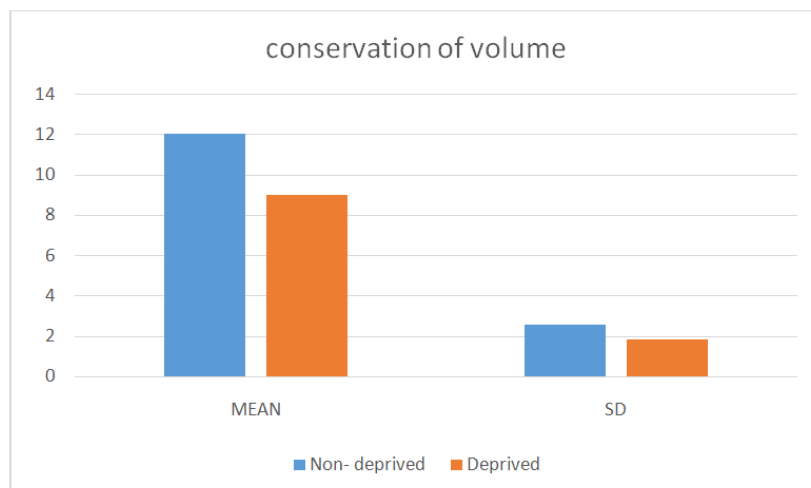
Graph no. 2 indicated that about 66.67%of the scores by Non- deprived (General and OBC) and 66.67% of the score by deprived (SC and ST ) students have been secured. It means there is no difference between deprive and non-deprived adolescent students in terms of weight conservation.

Table no. 3

Comparison of deprived and non-deprived group students on the development of logical thinking in terms of conservation of volume.

Sl.no	Category	No.of students	Mean	SD	SED	“t” value	Level of significant
1	Non-deprived	12	12	2.55	0.904	3.32	0.01
2	Deprived	12	9	1.82			

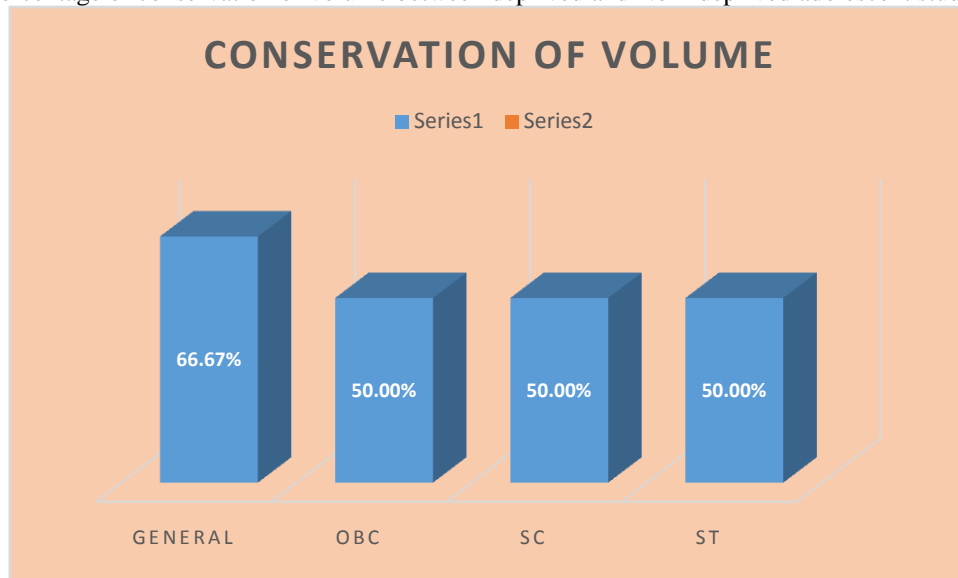
The test is significant:



Graph -5

The above table 3 and graph no. 5, describes the volume conservation of deprived and non-deprived students, the data makes it clear that the mean value of both the categories are 12 and 9 and SD are 2,55 and 1,82 of the students, and their SED is 0.904 and "t" value is 3.32. to know whether the "t" test is significant or not we have to compare the "t" value with the table value with the help of df (22) at 0.05(2.074) and 0.01(2.819) significant levels, and if the calculated value is exceeding the "t" test is significant and null hypothesis is rejected. In this present "test the calculated value is exceeding the "t" value at both levels so the test is significant and the null hypothesis is rejected. So that we conclude that there is exist a significant difference between the non-deprived and deprived groups of students in the conservation of volume.

Graph no.3  
Percentage of conservation of volume between deprived and Non- deprived adolescent student



Graph no .6 describes the conservation of the volume of deprived and non-deprived adolescent students. It revealed that near about 50% scored by SC, 50% scored by ST, and 50% scored by OBC students in the conservation of volume test. But slightly more scored by the general students (66.67%). it means the volume conservation OBC, SC, and ST were the same.

### MAJOR FINDINGS

the main findings of the present study are as follows,

As per the data, about 16.67% of SC and 33.33% of ST students have not developed the abilities of mass conservation in terms of intelligence. The other hand about 83.33% of SC and 66.67% of ST Students have attained mass conservation. About 33.33% of SC and 33.33% of ST students have not developed their abilities to conserve weight. About 66.67% of SC students and 66.67% of ST students have attained weight conservation in terms of intelligence. About 50% of SC students and 50% of ST students have not developed their ability to conserve the volume. In some cases, about 50% of SC and 50% of ST students have attained the conservation of volume. About 16.67% of General students and 16.67% of OBC students have not developed their abilities to conserve the mass. In some cases, about 83.33% of General students and 83.33% of OBC students have attained the conservation of mass. About 33.33% of General and 33.33% of OBCs have not developed their ability to conserve weight. In the same case, about 66.67% of General and 66.67% of OBC students have attained the conservation. About 33.33% of General and 50% of OBC students have not developed their ability of volume conservation. At the same time, 66.67% of General and 50% of OBC students have attained theme conservation. There is no significant difference between the non-deprived and deprived groups so the student in the conservation of mass. There is no significant difference between the non-deprived and deprived groups of students in the conservation of weight. There is exist a significant difference between the non-deprived and deprived groups of students in the conservation of volume.

## II. DISCUSSION OF THE RESULT

After the major finding of the present study, this study revealed that students conserve the mass, weight, and volume respectively by their age and intelligence they have but in the case of category-wise distribution of deprived and non-deprived categories of students. The present study found that there is no significant difference between deprived and non-deprived categories of students in terms of their conservation of mass, and weight (BatHae and Hosseini,1971) but in the case of conservation of volume present study found a significant difference between the deprived and non-deprived group per adolescent students. The present study also denied the view of children with higher level availability performed better than those with low-level availability the performance and conservation of tags a volume and area of the high-level group did not differ from those whose ability subject to the length conservations developed conservation of numbers mass weight and volume (Rao,1976) the present study support the view of development among of original subject for conservation of quantity, weight, and volume (Delemos,1969).

## III. CONCLUSION

The mental process is not abrupt but gradually develops during the children's growth from the sensory-motor to adolescence. The most important significant stage for such mental development and mental operation to take place is the concrete operational stage of Piagetian theory during this stage child shifts from transformation deductive logic to reversibility and equilibrium and thus makes the beginning of real logic as used by the adult in day-to-day life. the concrete operational stage is conceding normally called the preadolescent stage.

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GOPIKANTA SUNA, et. al, "A Comparative Study of the Development of Logical Thinking between Deprived and Non-Deprived Categories of Students in the Pre-Adolescent Stage." *IOSR Journal of Humanities and Social Science (IOSR-JHSS)*, 28(1), 2023, pp. 35-41.