

**RESEARCH PAPER****Development of Conservation Concepts in Partially Sighted and Sighted Children Sighted****Harihar Sarangi<sup>1</sup> and Sujata Meher<sup>2</sup>**<sup>1</sup> P.G. Department of Education, G.M. University, Sambalpur, Odisha, India<sup>2</sup> Department of Education, Anchalik Kishan College, Bheden, Bargarh, Odisha, IndiaEmail: [hsarangi@rediffmail.com](mailto:hsarangi@rediffmail.com), [meher.sujata2@gmail.com](mailto:meher.sujata2@gmail.com)Received: 16<sup>th</sup> July 2017, Revised: 30<sup>th</sup> August 2017, Accepted: 6<sup>rd</sup> September 2017**ABSTRACT**

*Development of conservation concepts in partially sighted and sighted children sighted as a research problem the researchers going to research this problematic conceptual frame work in the mind of the people to achieve the objective- to study the development of conservation concepts in partially sighted children as compared to sighted children at various age groups with the hypothesis of the study was there exists significant difference between partially sighted children and sighted children on development of conservation concepts at various age groups taking the sample of 100 partially sighted children and 100 sighted children, 20 each from five age groups such as 6-8 years, 8-10 years, 10-12 years, 12-14 years and 14-16 years were selected randomly using the Table of Random Numbers. Thus, the total number of visually impaired children selected for the present study was 200, out of which 100 were totally blind and 100 were partially sighted children. The partially sighted children met the criterion of visual acuity between 20/70 and 20/200 in the better eye with correction to reach the research destination.*

**Key words:** Sighted Children, Sighted Children Sighted, Partially Sighted

**INTRODUCTION**

Development of Piagetian conservation concepts is age related. In case of normally sighted children, conservation of liquid and length are developed at 6-8 years, conservation of mass is developed at 8-10 years, conservation of weight is developed at 12 years, and conservation of volume is developed at 12 years onwards.

Studies have found out three years lag (Hatwell, 1966), four to eight years lag (Stephens & Simpkins, 1973), one to four years lag (Wan-Lin, 1986) in development of conservation concepts with blind children; whereas other studies have found out no significant difference among blind, partially sighted and sighted children in development of conservation concepts (Cromer, 1973; Higgins, 1973; Stephens & Simpkin, 1974; Brakke, *et al.*, 1974; Kephart, *et al.*, 1974; Lister, Leach & Walsh, 1989). The present study has been designed to investigate development of conservation concepts such as liquid, length, matter, weight and volume in partially sighted children as compared to sighted children to resolve the conflicting findings emerged out of the previous studies.

**OBJECTIVE**

The objective was to study the development of conservation concepts in partially sighted children as compared to sighted children at various age groups.

**HYPOTHESIS**

The hypothesis of the study was there exists significant difference between partially sighted children and sighted children on development of conservation concepts at various age groups.

**SAMPLE**

A sample of 100 partially sighted children and 100 sighted children, 20 each from five age groups such as 6-8 years, 8-10 years, 10-12 years, 12-14 years and 14-16 years were selected randomly using the Table of Random Numbers. Thus, the total number of visually impaired children selected for the present study was 200, out of which 100 were totally blind and 100 were partially sighted

children. The partially sighted children met the criterion of visual acuity between 20/70 and 20/200 in the better eye with correction.

## TOOLS

The verbal performance test developed by the investigator consisted of five subtests one each for the concept of liquid, length, matter, weight and volume selected from the original sources of Piaget (1929 & 1952), Piaget and Inhelder (1941) and Elkind (1961). Materials used for performance of activities were beakers (100ml), plasticine, bowl and sticks. The construct validity calculated against conventional Piagetian type of verbal test for each sub test ranged from .80 to .82 and the test-retest reliability estimated for each sub test ranged from .96 to 1.00.

## RESULTS

**Table 1:** Summary of 'Z' ratios of conservation responses on development of different concepts in partially sighted children and sighted children (N=200)

Types of Children	Age group (Year)	Conservation of Liquid		Conservation of Length		Conservation of Matter		Conservation of Weight		Conservation of Volume	
		%	'Z' ratio	%	'Z' ratio	%	'Z' ratio	%	'Z' ratio	%	'Z' ratio
Partially Sighted Vs Sighted	6-8	15	4	15	4	10	2.77	-	-	-	-
		75		75		60		-			
Partially Sighted Vs Sighted	8-10	25	3.6	25	3.6	20	3.6	10	3.2	-	-
		80		80		75		55			
Partially Sighted Vs Sighted	10-12	35	3.33	35	3.33	35	3.2	25	2.3	-	-
		80		85		80		60			
Partially Sighted Vs Sighted	12-14	55	2.5	45	3.2	55	2.5	30	3.3	15	3.6
		90		90		90		80		70	
Partially Sighted Vs Sighted	14-16	80	1.5	85	1.0	85	1.0	90	.60	90	.60
		95		95		95		95		95	

As it can be seen in Table 1, 15% partially sighted and 75% sighted children developed concept of liquid at the age group 6-8 years. The difference found out between the performance of partially sighted children and sighted children on development of liquid concept at the age group 6-8 years was significant ( $Z=4$ ;  $df=38$ ;  $P<.01$ ) in favour of sighted children. Further, at the age group 6-8 years there found out significant difference between partially sighted and sighted children on development of such concepts as length ( $Z=4$ ;  $df=38$ ;  $P<.01$ ) and matter ( $Z=2.77$ ;  $df=38$ ;  $P<.01$ ) in favour of sighted children. However, nobody from partially sighted children and sighted children was found out developing the concept of weight and volume at the age group 6-8 years. It can be concluded that the partially sighted children lagged significantly behind sighted children on development of conservation concepts such as liquid, length and matter at the age group 6-8 years. Table 1 shows that 25% partially sighted children and 80% sighted children developed concept of liquid at the age group 8-10 years. The difference found out between the performance of partially sighted children and sighted children at the age group 8-10 years on development of liquid concept was significant ( $Z=3.6$ ;  $df=38$ ;  $P<.01$ ) in favour of sighted children. There found out significant difference between partially sighted and sighted children on development of such concepts as length ( $Z=3.6$ ;  $df=38$ ;  $P<.01$ ), matter ( $Z=3.6$ ;  $df=38$ ;  $P<.01$ ) and weight ( $Z=3.2$ ;  $df=38$ ;  $P<.01$ ) in favour of sighted children at the age group 8-10 years. However, nobody was found out from partially sighted children and sighted children in developing the concept of volume at the age group 8-10 years. It can be concluded that the partially sighted children lagged significantly behind sighted children on development of conservation concepts such as liquid, length, matter and weight at the age group 8-10 years.

Table 1 shows that 35% partially sighted children and 85% sighted children developed concept of liquid at the age group 10-12 years. The difference found out between the performance of partially sighted children and sighted children on development of liquid concept was significant ( $Z=3.33$ ;  $df=38$ ;  $P<.01$ ) in favour of sighted children. Further, there found out significant difference between partially sighted children and sighted children on development of such concepts as length ( $Z=3.33$ ;  $df=38$ ;  $P<.01$ ), matter ( $Z=3.2$ ;  $df=38$ ;  $P<.01$ ) and weight ( $Z=2.3$ ;  $df=38$ ;  $P<.05$ ) in favour of sighted children at the age group 10-12 years. However, nobody was found out from partially sighted children and sighted children in developing the concept of volume at the age group 10-12 years. It can be concluded that the partially sighted children lagged significantly behind sighted children on development of conservation concepts such as liquid, length, matter and weight at the age group 10-12 years.

As it can be seen in Table 1, 55% partially sighted children and 90% sighted children developed concept of liquid at the age group 12-14 years. The difference found out between the performance of partially sighted children and sighted children on development of liquid concept was significant ( $Z=2.5$ ;  $df=38$ ;  $P<.05$ ) in favour of sighted children. Further, there found out significant difference between partially sighted children and sighted children on development of such concepts as length ( $Z=3.2$ ;  $df=38$ ;  $P<.01$ ), matter ( $Z=2.5$ ;  $df=38$ ;  $P<.05$ ), weight ( $Z=3.3$ ;  $df=38$ ;  $P<.01$ ) and volume ( $Z=3.6$ ;  $df=38$ ;  $P<.01$ ) in favour of sighted children. It can be concluded that it can be concluded that the partially sighted children lagged significantly behind sighted children on development of conservation concepts such as liquid, length, matter, weight and volume at the age group 12-14 years.

Table 1 shows that 80% partially sighted children and 95% sighted children developed concept of liquid at the age group 14-16 years. The difference found out between the performance of partially sighted children and sighted children on development of liquid concept was not significant ( $Z=1.5$ ;  $df=38$ ;  $P>.05$ ). Further, there found out no significant difference between partially sighted children and sighted children on development of such concepts as length ( $Z=.10$ ;  $df=38$ ;  $P>.05$ ), matter ( $Z=.10$ ;  $df=38$ ;  $P>.05$ ), weight ( $Z=.60$ ;  $df=38$ ;  $P>.05$ ) and volume ( $Z=.60$ ;  $df=38$ ;  $P>.05$ ) at the age group 14-16 years. It can be concluded that partially sighted children and sighted children developed liquid, length, matter, weight and volume on similar line at the age group 14-16 years.

## DISCUSSION

Concept, an artificial abstract unit of thinking behaviour (Furth, 1966) is developed and formed during childhood through the acquisition of generic ideas from concrete empirical experience inductively and spontaneously by relating critical attributes of a concept with the concepts already existing in the cognitive structure by grouping the critical attributes through the cognitive process of assimilation and accommodation. Though, the genesis of the development of a concept what Piaget calls operational scheme has its origin in infantile schemes of sensorimotor stage of cognitive development, the concept begins to be formed and developed during concrete operational stage in normal children. The present study attempts to assess the development of science concepts such as liquid, length, matter, weight and volume in partially sighted children as compared to sighted children in order to draw conclusion with regard to dependence or independence of concept development on sensory deficit i.e., blindness. The study makes comparison of the performance of partially sighted children with sighted children on development of science concepts.

The finding that the partially sighted children lagged significantly behind sighted children on development of conservation concepts at younger age groups ranging from 6-14 years is supported by the studies of Hatwell (1960), Tobin (1972), Gottesman (1973), Stephens and Simpkins (1973), Wan-Lin (1986) and Mandaravalli (1991) and no significant difference between partially sighted and sighted children at older age group ranging from 14-16 years is supported by Gottesman (1973). It can be interpreted that visual impairment acts as a detrimental factor for the development of conservation concepts during childhood and early adolescence period whereas visual impairment does not affect development of conservation concepts at older age. It is made clear that loss of vision does not exert any long run retarding effect on a child for development of concepts. The deficiency found with a child in developing concepts due to loss of vision during

childhood is substantially made up during adolescence. This can be attributed to the reason that visually impaired children might take little more time to discover innovative cognitive strategies for adapting themselves with the environment required for collection, assimilation and accommodation of environmental inputs in the process of concept development.

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