

CHAPTER VIII

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SUMMARY AND CONCLUSIONS

Review of the literature on the subject revealed that work on number concept centred round study of acquisition of counting skills; arithmetic achievement; effect of school curriculum on arithmetic achievement and the like. The acquisition of number concepts and children's ability to use the numerical operations have not led to significant research. Piaget's studies regarding conservation, moral judgement and similar others have stimulated researchers and several studies have been reported. Yet, studies regarding number concept have not been as incisive and numerous. This is surprising because Piaget's work with regard to number concepts is considered to be superior to most of his earlier studies. The theoretical background is believed to be much more precise than his earlier theories of cognitive development.

Although the subject (number development) is of fundamental interest, little work has so far been reported in India, in this area (Number concepts). While it is plausible that the studies carried out in the West, may be valid with regard to children from that milieu, one could reasonably wonder whether the same would hold good for children in India with its unique cultural and social conditions. This view appears to be

Reasonable in the light of the suggestion that the course of development of concepts in children is not universal (Mead 1932). Mead stresses the importance of cultural factors in the mental development of children.

The present investigation was concerned with the study of the development of number in young children. This was studied in relation to age, schooling or absence of schooling, mental ability, socio-economic and educational background of the family. Relevant hypotheses were set up for examining the relation of these variables to the concept under investigation.

The population of the study was children in the age group of 4 - 7 years in Tirupati Municipality. Half of the sample of subjects were drawn from among the school going children and the other half from among the non-school going children. There were 288 subjects in each group.

A 2 X 3 X 3 X 4 design with schooling/no schooling (2), materials (3), operations (3) and age levels (4) was used. There were 576 subjects in all. Over sampling to the extent necessary was resorted to, to obviate the loss of subjects during the course of the investigation. Discarding of data was done wherever necessary by a procedure of picking out the unwanted data at random. Three operations namely discrimination, seriation and enumeration were studied employing three materials, - blocks (three dimensional), slats (two dimensional)

and sticks (unidimensional). The subjects were tested individually employing strictly the same procedure in three sessions with an interval of one week between any two sessions. The experiment involved testing with two series of materials. The first set of materials was painted orange and the second red. The second series of materials were slightly bigger than the materials in the first series.

The subjects were shown standard demonstrations and they were required to make the necessary operations. The experimenter made, as exhaustive notes of operations made by the subjects, as possible.

The analysis of data (ANOVA) was made for boys and girls as well as for series I and II separately. The data were analysed employing analysis of variance after testing for homogeneity, and 't' tests were used wherever indicated. Chi-square test in contingency tables were also used wherever necessary. As the design of the study involved repeated measures of subjects on two variables viz., operations and materials, the data were analysed employing appropriate statistical procedure as suggested by Winer, B.J. (1971) as suitable for a $p \times q \times r$ factorial design with the last two being repeated measures. In addition, scalogram analysis was made to scale the items in terms of difficulty and phi-coefficients were computed for the items. As a supplement to quantitative analysis of data, qualitative analysis was made to obtain greater insight into the processes involved.

The subjects were administered in addition to the above a numerosity test, a number conservation test and a draw-a-man test, the last for assessing mental ability of the subjects. The hypotheses set up were examined in the light of the results obtained.

The following conclusions appear warranted.

1. Discrimination, Seriation and Numeration operations among young children appear in that order.
2. Children are able to discriminate successfully by the time they reach 4 years of age. Seriation is mastered between 5 to 6 years of age and numeration is attained seldom before 7 years of age.
3. There are significant differences between the school going and the non-school going subjects. The non-school going subjects performed poorly on numeration.
4. The non-school going girls performed poorly in comparison to boys at 4 and 5 year age levels with regard to discrimination and seriation operations.
5. The non-school going subjects' performance was uniformly poor with regard to numeration.
6. There were no significant differences between the school going and the non-school going subjects with regard to discrimination.
7. Differences owing to schooling became apparent with regard to seriation operation and the differences were most pronounced with regard to numeration.

8. The experience of schooling appears to play a significant role in the acquisition of number concept especially at the lower age levels.
9. Differences in mental ability seem to play a significant role in the acquisition of number concept. Children with higher levels of mental ability appear to perform better on seriation and numeration. However, these differences were not significant with regard to discrimination.
10. The differences in socio-economic and educational background were found to significantly affect the seriation and numeration operations. These differences were not found to be significant in so far as discrimination was concerned. Children, both boys and girls, appear to acquire the necessary skills in discriminating objects by the time they are 4+ years of age. Therefore, schooling experience was not found to significantly affect the discrimination operation.
11. The dimensionality of materials affects the discrimination, the seriation and the numeration operations positively. Children were able to perform the operations better when more perceptual cues were available to them to discriminate or to seriate or to numerate.