

CHAPTER IV

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VARIABLES STUDIED

In the study of cognitive development, the importance of continual interaction between the individual and the environment cannot be over-emphasized. Factors such as age, sex, mental ability, differential cultural and educational backgrounds perhaps contribute variations in the acquisition of concepts. Though, the results reported by Piaget have been confirmed by other investigators, his interpretations of these findings, attributing the age changes in conservation, class concepts, and relational logic to the unfolding of mental operations have been questioned by several researchers. Other investigators ask: to what extent are the results obtained by Piaget with middle class western European children generalisable to children of other races, cultures and geographical areas. If similar results are obtained, there is no problem, but if differences are found, it is not easy to account for the cause of the differences. In the present investigation the following variables are studied in their relation to the acquisition of number concepts.

Schooling/No Schooling

Precious little information based on systematic studies

is available regarding the effect of schooling on the nature of concepts acquired. Greenfield (1966) (already alluded to) worked in Senegal, French - Africa, with Wolof children, who are Moslem. The subjects were grouped according to residence and school attended urban-school, bush-school, and bush-unschooled. The subjects were tested in their native language on liquid conservation task. The results showed that no more than 80 percent of the unschooled bush children attained conservation by the age of 11 to 13 years. By the same age level urban (Dakar) and bush school children showed 100 percent conservation. Goodnow (1969) after reviewing several cross-cultural studies made the following conclusions: (a) some tasks are more vulnerable than others to departures from urban, western schooling. The most hardy of the tasks appears to be the conservation of number, (b) the tasks that are less vulnerable to cultural differences may be those for which the child has action models, (c) "The critical skill may be versatility in the use of different sources of information and different models" (Goodnow, 1969; P.454). But the investigations undertaken elsewhere may not be quite meaningful in this context of differential socio-economic, educational and cultural backgrounds that prevail in Indian situation. The present investigation attempted to study the differences, if any, between the school going and the non-school going children in the development of number concepts.

In this study pupils from Municipal and Private schools were employed as subjects.

Age

In the acquisition of concepts, age has a pre-eminent role. Several investigators are interested in testing Piaget's interpretation of his findings, namely, that the age differences in performance are attributable to age differences in cognitive structures or mental operations. According to Piaget numerical operations develop through the ages 4 to 7 years. Therefore, children in the age group 4-7 years were chosen for this investigation. The children were divided into 4 age levels from 4 through 7 by one year intervals.

Sex

The reason for the observed sex differences (in some studies) in the acquisition of concepts may be owing to the existence of differences in the specific nature of the task and also the differential social standards for the two sexes. As it is not known that sex differences invariably affect cognitive development in general and number development in particular, this study sought to examine the differences between boys and girls in the attainment of number concepts.

Socio-Economic Status and Educational Background of the Family

In the acquisition of concepts it is observed that children from culturally deprived or disadvantaged homes usually perform much more poorly than middle class children. Sigel, Anderson, and Shapiro (1966); and Sigel and McGhee (1967) found that

lower class Negro children were inferior to middle class Negro children in the ability to label pictorial materials. When content is important on a Piagetian task, socio-economic and cultural differences will probably be greater than when content is not important. Bernstein (1961a) attributed this to the variations in linguistic training between lower class Negro children and middle class White children. In the present investigation an attempt was made to study the role of educational and socio-economic factors in the acquisition of number concepts.

Mental Ability

Studies concerning relationship between mental ability and concept formation yielded equivocal results. Beard (1960) using a concept test, based in part upon Piaget type tests, obtained a correlation of .38 between performance and Stanford-Binet M.A. Kikini (1961) quantified several of Piaget's conservation tests (number, continuous and discontinuous quantity) and obtained a correlation of .43 with full-scale I.Q. on the W.I.S.C. Using a Piagetian task of logical classification Dedwell (1961) obtained a correlation of .34 with I.Q. Hood (1962) found that children with M.A. of less than 5 years almost never showed conservation but children with M.A. of eight or nine years were almost always conservers. Goldschmid (1967) also reported similar results. The findings reveal that Piagetian tests and I.Q. tests overlap to a certain extent but do not tap the same range of mental abilities. Hahn (1976) obtained a high correlation between mental age and

Piaget's stage of concrete operations among 58 middle class 6-to-8 year olds. The correlation between mental age and progression toward Piaget's stage of formal operations among 56 middle class 10-12 year olds was found to be non-significant. Studies regarding mental ability and concept development were made using largely verbal type of tests. In this study the relation of mental ability to concept development was sought to be examined using a non-verbal type of instrument. This could help clear equivocality of the relation between mental ability and concept development to some extent.

An attempt was made in the present study to assess the relationship between mental ability and development of number concepts. As young children have obvious limitations with language and speed, care was taken to avoid these difficulties by selecting a non-verbal paper test to assess mental ability. In the present investigation draw-a-man test was chosen to assess the level of mental ability of children.