CHAPTER III
CHAPTER III
REVIEW OF THE RELATED LITERATURE

CONTENTS

3.1. INTRODUCTION.  
3.2. WESTERN STUDIES  
3.3. INDIAN STUDIES  
3.4. SUMMARY OF THE STUDIES REVIEWED  

PAGE NO.  
56  
56  
73  
113
CHAPTER III
REVIEW OF THE RELATED LITERATURE

3.1 INTRODUCTION:

The present chapter embodies a brief review of the researches done in the area related to this investigation. An intensive review of existing literature on the subject is an important step in any research endeavour. Apart from providing a sound theoretical framework of research it serves the functions of (a) providing knowledge of the previous research on the problem (b) finding relevant theories that apply to the investigation being undertaken, (c) providing insight into the various methods and procedures being used to reach the objectives of research (d) helping the investigator to design his study in a manner that recurrence of the shortcomings and pitfalls observed in any earlier study may be checked. Moreover, their findings may be utilised to facilitate the support wherever necessary, for interpretation of the result of the present study.

The studies related to cognitive development has stimulated such an enormous research activity throughout the globe that it is almost impossible to review all the theoretical and empirical reports on the topic. The review, therefore, confined to those studies which have considerable bearing on this investigation.

3.2 WESTERN STUDIES:

In reviewing the relevant work, reference must be made to some early western studies in which cognitive development has given priority. Some of the western studies reviewed are given below:
Price-Williams (1962), conducted a study on "Abstract and Concrete Modes of Classification in Primitive Society" on the Tiv tribe of Nigeria. The purpose of this research was to see to what extent and in what ways the Tiv children could categories the everyday living materials viz. animals and plants with which they are familiar, the sample for this study consisted of children of 6 1/2 to 11 years studying in standards I to IV. In all 80 children were studied. Results of this study revealed that hardly any differences existed between literate and illiterate groups. Dependence on concrete modes of classification decreased with age. There seemed to be a deficiency in the ability to form abstract classes below standard III as the children were in the concrete operational age group.

Bittner and Shinedy (1968), conducted, “A Methodological Investigation of Piaget’s Concept of Conservation of Substance.” The purpose was to examine Piaget’s clinical concentric method and methodological issues in research in the area dealing with the concept of conservation of substance. According to Piaget, the ability to conserve is dependent upon an internally developed cognitive system and should not be affected by external variables such as the characteristics of the experimenter or those between tests. It was hypothesised that there will be effects on conservation measurement due to variation in tasks, instructional variations, experimenter variations, and subject’s gender. Four conservation tasks involving conservation of liquid, quantity and weight were administered on 161 grade and III grade children in two separate experiments. Task effect was found on the I grade children but not on the II grade ones. Variation in instructions also produced a similar result. Female experimenters elicited better performance among I graders, males did so among III graders.
Gagne's learning set analysis was used as a basic for teaching young children length and weight conservation. 2 instructors alternated in conducting individual training for a minimum of 9-20 minutes... sessions. Analysis of results using both parametric and non-parametric techniques yielded highly significant training effects. In addition experimental groups improved significantly more than control groups in substance conservation. Evidence was presented which indicated that this was due to the similarity of weight and substance tasks. Although only 3 of the appropriate 17 subjects in the trained group resisted extinctions, all 15 of a "natural conservers" control group also extinguished.

Barbara B. Rothenberg, studied certain methodological issues in current conservation of number assessment procedures. Concern was most particularly directed to the effects on conservation status of the focus and the number of question asked; the presentation of various transformations and the use of justifications of prior judgements. The subjects were 210 lower and middle pre-school and kindergaten aged children. The results showed important differences in the number of conservers identified, depending on the conservation question or questions asked and on the number of transformations presented. It was seen that lower class children are more likely to be inaccurately assessed in terms of conservation status than middle class children. The result also suggested that further study should be devoted to the realistic use of S's justifications. Overall, only 6 percent of the Ss were actually found to be conservers.

Elizabeth A Delacy, studied about the problems which are associated with a paper and pencil test of conservation of length. Following Smedslund, the Muller-Layer illusion arrowheads were used to distort two lines and it
was proposed to test, the age at which conservation of length can be reliably be measured on paper and pencil tests, the validity of using paper and pencil forms of Piaget’s tasks and the effect of different angled arrowheads on the amount of illusion show by young children. One hundred and forty primary school children of age group 6-12 years (20 from each age group) and from high socio-economic status group. Each child was tested individually. Under these conditions it was found that children could not reliably conserve length until 12 years old. Some inversion of performance at 10 years old, with the shift from iconic to symbolic reasoning was found.

\[ \text{Relationship between general intellectual ability, conceptual development and attainment in arithmetical computation and arithmetical problem solving and spelling were investigated by Freyberg. The subjects of the investigation were 151 children (64 boys, 87 girls) of age 6-9 year. Conceptual development measured by a 72 item objective test were more highly correlated with Primary Mental Abilities Test, mental age (r=.523) then with the chronological age (r=.116). Regression analysis showed that the inclusion of concept - development scores with mental age accounted for a significantly larger proportion of attainment score variance in most cases. It is suggested that children's school performance is associated with aspects of conceptual development not adequately assessed by conventional intelligence tests.} \]

\[ \text{The relation of Piagetian reversibility to intelligence and to creativity was investigated on 9 years old Edmon-ton boys by O'Byran K.G. and Mac. Arthur R.S. Data were collected on Piagetian, Torrance, intelligence, age and occupational variables. Factor analysis reduced the Piagetian and Torrance batteries to derived measures of reversibility, and} \]
creativity respectively. This was again combined with the other variables for statistical and further factor analysis. It was found that reversibility of classes (inversion) and reversibility of relations reciprocity. Inversion appears to be related to creativity, while reciprocity is related to intelligence.

The present research is concerned with the question of universal applicability of Piaget's theory. Its main goal is to determine the influence of the type of culture and the degree of schooling on the development of certain aspects of thinking, as part of a more general investigation aimed at establishing the developmental implications of the stage concept. Piaget type tasks were used for the purpose. Chronological age and amount of schooling were the two main criteria for dividing the subjects into groups. The results obtained does not support the fact of the sequence of stages. The analysis of declages as a function of cultural setting, on the other hand, has led to quite unforeseen results. Schooling or its absence does not affect all structures to the same degree.

Upper Sylvia, studied about the concept development of Thai urban and rural children. Two groups of samples one from the urban capital of Bangkok and the other from the rural district of Bangkok were used as subjects. Each sample was equally divided by sex and included children ranging from 6 to 11 years. A total of seven Piagetian tasks were given convering the mental operations of the concrete operational stage. The results show that in all seven tasks the three stages described by Piaget are found in both samples, the occurrence of the various types of reasoning is similar for both urban and rural groups. Difference were noted between the two samples in both the speed of development of concepts - with the urban sample acquiring all seven of them ahead of the rural group and in the pattern of acquisition.
Kelly Max carried out a study in three stages. The first stage (1968, 1969) surveyed achievement of children in two kinds of tasks viz. getting the "correct" answer and alter with how the answer was derived. The second stage (1971-1973) was concerned with attempting to disentangle some of the important sources of variance and third is attempting intervention techniques. The sample for stage one was stratified for sex, years of school experience "age" and language culture groups. The total sample was 216 school children plus 216 village children with no school experience. Piagetian type tasks were used.

Many investigator in the field of cognitive development attempted to study the global capacity called intelligence in the content of Piagetian context. Synoptic view of a few of the more important studies are -

(1) Feignebaum (1963) studies the task complexity and I.Q. as variables in Piaget's problem of conservation. The sample comprises 90 subjects of 4 - 7 years. The data indicated that children's grasp of conservation tends to vary with their I.Q. and with the nature of the concrete experimental operations.

(2) Za'rour (1971) examined the effect of sex, religion scholastic level, S.E.S. and mother's literacy on conservation of number. The study was conducted on 224 Lebanese children. He concluded that scholastic level was not significantly related to conservation.

(3) Bat - Hall et al (1972), studied the relationship between Piaget's conservation of quality tasks and three measures of intelligence. It was found that there was positive correlation between the three measures of intelligence and conservation of quantity.
(4) De-Veries (1974), tried to find out the relation between Piagetian conservation task and I.Q. One hundred and forty three children were divided into three groups, high, middle and low I.Q. groups on the basis of their performance on intelligence test. These subjects were administered a number of tasks including conservation tasks of number, mass, length and liquid. He concluded that Piagetian tasks do appear to measure a difference intelligence and a different achievement than do psycho-metric tests.

(5) Ayers et al (1974) studied the relationship among ability to conserve perceptual motor skills reading readiness and I.Q. Piagetian conservation tasks of number, liquid amount, solid amount, weight, length and area were individually administered. Significant correlation were found between the measures of Piagetian task and I.Q.

Gold Schmid et. al. (1973) conducted “A cross-cultural Investigation of conservation,” with the purposes of assessing the sequence and rate of conservation acquisition in several different cultures and to assess the cross-cultural reliability of the concept assessment kit on conservation. A minimum of 250 children of 4 - 8 years from each of 6 countries. Australia, Holland, England, New Zealand, Poland and Uganda were taken as samples for the study. The study revealed that the age trends in both males and females were fairly consistent from culture to culture, whereas the rate of acquisition differed somewhat across the cultures. These variations were attributed to specific environmental differences.

Peter B. Pufall, Shaw, Robert E, and Syrdal Lasdy, studied about the ability of children to judge composition 1,2 and 3, prior to the ability to judge composition. 4, that the strategy to construct a set in one to one
correspondence with a model to match its number develop simultaneously with the ability to judge correctly composition 3, also to judge that the reliability of judgements in curvilinearly related to age. 54 white children were tested, 18 within each of three age ranges of equal number of boys and girls. The subjects were tested individually on five different number of judgements tasks designed according to Piaget’s rule. From the analysis of the data it was found that the first two predictions are relevant to his stage theory of the development of number conservation. It was found that children count before they conserve i.e. the child can establish the correspondence between the verbal levels or numbers and the items in a set before he understands the numeric relation between the sets. The reliability or consistency of judgement would be curvilinearly related to age was not supported.

Wei Tam T.D.B. Celia, and J. Stewart R studied about the concept of classification among the disadvantaged and middle class young children. In Piaget’s theory of equilibration, the continued interaction between the individual and the environment is stressed. Opportunities for such inter-action are often missing in a deprived environment and may contribute to differences in the level of development. 80 white children forming 4 groups of 20 each were tested with 4 classification task of Piaget. A 3 way analysis of variance percentage of success, and classification of responses into stages of development were used in the treatment of data. It was found that the culturally deprived group progressed at a slower pace than the middle class groups. However, results from the study did not support the hypothesis of range of differences between the 2 social classes. Differences in the reasoning process were also found between the 2 social groups. Differences between sexes were not
significant in the present study.

Frank B. Murray, studied about the fact that if the conservation stimuli were of different degrees of abstractness, one might expect that the acquisition of conservation behaviour would be facilitated or be more likely to occur when the stimuli were more concrete than abstract. This was investigated in an experiment on the conservation of weight and conservation of number. Highly insignificant differences in the proportions of conservers and non-conservers on three conservation of weight problems were found between four groups of second graders (N=80) in which stimuli used were concrete objects, like drawings of the objects, photographs of the objects or verbal descriptions. However significant differences in those proportions were found between older and younger subjects in both studies and between higher and lower socio-economic groups of subjects in the conservation of weight study. It was concluded that even the most obvious recommendation from Piaget's theory of cognitive development for instruction are empirically uncertain.

Kirk (1977) conducted a study on "Maternal And Sub-Cultural Correlates Of Cognitive Growth rate, The Ghana Accre Pattern," The intent of this research was to account for differences among children in rate of cognitive development. 413 children of 5-11 years from three sub-cultures of Ghana Accra children. The tasks studies were Spatial visualisation, conservation of quantity and length. The findings of this study were that the suburban children showed a relatively high performance and rapid improvement, the rural and urban children showed a deficiency on the Spatial visualisation task, the rural children excelled on the conservation of quantity, and that sub-culture is not as closely associated with conservation skills as are certain features of maternal behaviour. The
findings of this study were consistent with the assertion that (a) conservation is essentially invariant from culture to culture and (b) good teaching facilitates its development.

Griffiths, et. al. (1977) conducted a study titled "A Methodological Problem in Conservation Studies: The use of Relational Terms". The purpose of this study was to investigate young children's understanding of the relational terms involved in conservation problems and the availability of spontaneous or elicited responses. 54 nursery school children of age range 49 to 62 months were tested using three dimensional familiar objects on the content areas of number, length and weight. Usually the conservation tasks require the knowledge of relational terms like "more", "same" and "less". If subjects knowledge of these terms are not ensured, failure on the classical conservation tasks may indicate either that the subject does not understand the terms, or that he cannot conserve, or both. The results showed that children had most difficulty using the terms 'same' correctly. The spontaneous use of these terms were correct but on number and weight conservation, the correct use of the terms was most often on elicited response.

Esther (1997) reports a study on "The Effects of Incapability between Perception and Logic in Piaget's stage of Concrete Operation". This study examines thinking dominated by perception and thinking guides by logic. The hypothesis tested were: (a) children with an empirical orientation commit more errors than children with a deductive orientation, (b) children with an empirical orientation make proportionately more of their errors when perception directly contradicts logic than do children with a deductive orientation. A total of 36 problems were administered to 20 children of 5 to 7 years from suburban middle to upper-middle income group.
As expected, the empirical group made errors than the deductive group, and proportionately more of their errors were on problems where perception directly contradicted logic. This study suggested that the change from perceptually dominated to operational thinking in one specific concrete operational area also appears to be gradual.

Delacy (1977), conducted a study titled “Some Problems Associated with a paper and pencil Test of Conservation of Length”. The purpose of this study was to convert Piaget’s conservation of length task to a paper and pencil form. Following Smedslund, the Mullerlyer illusion arrow head were used to distort two lines. It was proposed to test the age at which conservation of length can reliably be measured on paper and pencil test and the validity of using paper and pencil forms of Piaget’s tasks. 140 primary school children of 6-12 years constituted the sample. It was found that children could not reliably conserve length until 12 years. The emergence of conservation of length was between 6-8 years. However, the 10 years old group presented some problem by giving erratic responses because, the probability of success had been increasing with age till ten years.

Poole (1979), studied “The Effect of Urbanisation upon Scientific Concept attainment among Nousa children of Northern Nigeria." The purpose was to measure the influence of varying types of settlement upon the attainment of scientific concepts among African school children. Unlike other studies where comparison was made between African and European children, this study attempted measuring changes occurring within an African society. 150 children of 10-11 years dwelling in different conditions of urbanisation were tested using Piaget type schedules. The results indicate that the conceptual dominance in the Nausa are changing
but the conservatism of the rural communities on the other hand ensures slower acculturation. It seemed that the cohesiveness which enables rural group to preserve their outward customs also promotes the survival of their conceptual systems. Conversely, urbanisation did exert same degree of force on people of receptiveness.

Demetriou and Efklides (1979), tested “Formal Operational Thinking in Young Adults as a Function of Education and sex on three Formal Operational Tasks of Equilibrium in Balance, Combination of Liquids and Conservation of Motion.” The subjects were educated and uneducated males and females with a total number of 30 persons. The educated group consisted of secondary school graduates, students of graduate school of physics, and Ph. D. students. Subjects were tested individually on all three tasks in one session. The results revealed a consistent patterning of performances on all three tasks, which is in disagreement with the Piagetian Model Education and Sex were identified as important factors in respect of formal thought attainment.

Philip and Kelly (1979) have reported a study in which the performance of school age children in different cultures were compared on product and process abilities in cognitive development. The sample for this study consisted of children between 6 and 15 years of Australian born parents living in New South Wales (N=656), children of Non-English speaking migrants living in New South Wales (N=448), and children from three different areas in Papua and New Guinea (N=432). The cognitive abilities compared were conservation of length, quantity, formal operational reasoning, problem solving and classification. All behaviours were found in all samples studied. The investigators suggested that possibly the capacity to display behaviours are inherent in human germ plasma or
commonalities of cultural patterns which may affect or determine the development of intellectual skills. However, the formal operational abilities were not displayed by the Papua-New Guinea children. This was thought to be due to a time lag effect or due to the problem of communication.

Goldshmied Marcel L, and Bentler P.M. studied about the dimensions and measurement of conservation. A large pool of behaviour and explanation conservation item was administered to 143 kindergarten first and second grade children. 2 parallel forms of conservation scale were constructed from these items. Each form consisted of 6 conservation tasks. An additional scale assessing a slightly different dimension of conservation was constructed from 2 other conservation tasks. The scales were cross validated on a new sample of 107 children and maintained high levels of internal consistency and homogeneity. Significant correlations with school grades and other non conservation variables were also found. This review summarizes literature dealing with child rearing practices that influence cognitive development. The three major aspects of the literature considered are studies that attempt to relate measures of the child’s cognitive ability to particular parental rearing practices, characteristic of various social class levels as related to cognitive performances of children from those social classes and experimental attempts to enhance cognitive skills in the very young child by specialised training techniques. Despite increasing interest in this area, systematic research concerned with specific rearing practices as they affect particular cognitive skills is only beginning to become available.

✓ Lack of formal schooling and the acquisition of conservation was studied by Mermelstein C Egon and Shulman S. Lee. The performance of Negro (6 and 9 year), old children from Prince Edward country Virginia, a
community which has been without public schools for 4 years. A series of Piagetian conservation tasks were compared with those of Negro children from a community which had regular schooling and 3 techniques of questioning. Findings revealed generally no significant differences attributable to effect of non-schooling, except within one questioning condition. Difference between verbal and non-verbal tasks were found to be highly significant. Implication for the Piagetian theory of cognitive development and for the methodology of conservation experiments are discussed.

Dorothy Field, studied about the possibility of inducing conservation in pre-school children. Children of 3 and 4 years old were given verbal rule training in a $2 \times 2 \times 2$ factorial design intended to probe the importance of identity, reversibility and compensation explanations in training length and number concepts replicating and extending an earlier study of retarded children. As before identity was found to be the most significant factor in conservation acquisition, reversibility was important as well, and compensation prove to be of little value. Nursery school children performed similarly to older children, both retarded and non-retarded except that younger groups were not able on average to conserve as many quantities. 4 year old children were able to generalise to untrained quantities for better than 3 years old. In a follow up post test 2 or 5 months after the first 79% of the children who had generalised on the first post test maintained or increased their conservation but 70% of 3 years old who had conserved on post test 1 reverted to non-conservation.

This study analysed the strategies that children ages 5 through 8 years used on two modified versions of Inhelder and Piaget’s class inclusion task. In two experiments, children were tested on Witkinson's
"percept" inclusion task in which distinctive features marked both superordinate and sub-classes. It was hypothesized that children who fail standard Piagetian inclusion task succeed on the "percept" task by counting and comparing mutually exclusive features rather than using features as markers for classes and sub classes. The hypothesis was supported by children's performances on "percept" tasks in which solutions based on features counting conflicted with solutions based on consideration of class inclusion relations. In two other experiments children answered part-whole and part-part comparison question in which one of the two terms was described as a collection. These experiments contrasted Markman and Seibert's "organisation" hypothesis that the greater psychological integrity of collections facilitates reasoning on part-whole comparison problems with the hypothesis that the facilitative effect results from the "large number" connotation of collective nouns. Results on collection problems in which parts were described as collection supported the "large number" hypothesis. Results were discussed in terms of their implications for Piaget's theory.

Arnold et. al. (1981) conducted a study, "The Acquisition of Conservation. Effects of schooling and Parental Profession on Ghanian children", to investigate the effects of age, schooling and parental profession, on conservation. Subjects were 120 females of 6-11 years. It was presumed that females are more likely than males to engage in the traditional professions. It was found that schooling had no effect or a limited effect on conservation. The older children scored higher on the two conservation tasks used in the study namely liquid and substance. The girls from families where the parents were engaged in traditional professions scored higher than those of non traditional profession
background. Interestingly, there were evidences that unschooled children scored higher than those who went to school.

"The Effect of Schooling On Conservation Skills" was also studied by Rogan (1983). This study conducted in Ciskei, South Africa had a total of 602 children. The results suggested that the acquisition of conservation skills may depend more on factors such as physical and mental interaction with the environment and the type of reasoning to which a child is exposed than on schooled and unschooled categories. The study suggested that schools in developing countries could be more effective in contributing to cognitive development if they encourage physical and mental manipulation of the environmental stimuli.

Cox (1983), studied "Cumulative Deficit in culturally Disadvantaged children" taking samples of 7-15 years from culturally and materially disadvantaged homes in England and Wales. This longitudinal study revealed that disadvantaged children show a cumulative deficit in certain aspects of their scholastic development between the ages of 7 to 15 years, and that even moderately disadvantaged children may show a progressive decrement over a wide range of educational attainment measures, both oral and written.

Green, et. al (1986) conducted a study on "Hypotheses Testing on a Proportional Reasoning Task by children at different Piagetian Stage levels," with an intention of examining the relationship between Piagetian stage level and children's use of hypotheses. The aims of this study were: (a) to deduce the relationship between the children stage level and the kinds of hypotheses they used in proportion task, (b) to determine whether the children's ability to change hypotheses following negative feedback
increased with increasing age, and (c) to learn whether the complexity of children's hypotheses increased with age level. 84 children of the age range 7-13 years from rural Indians constituted the sample for this study. As expected, a strong relationship between stage level and the complexity of hypotheses, the use of proportional hypotheses and overall use of logical hypotheses was found. Contrary to the expectation, children were not responsive to feedback. Stereotype and inconsistent hypotheses predominated among level -1 children, but was rarely observed in state - 3 children. The findings of this study supported the basic conclusions drawn by Piaget and Inhelder with respect to proportional reasoning.

Gold (1983) investigated into the "Reasons for Decalge between identity Conservation and Equivalence Conservation." Piaget's equivalence conservation tasks differ from identity conservation tasks in two ways. The former requires a transitive inference for solution and they present the child with a greater's perceptual seduction' to overcome it. Elkind reasoned that identity conservation should be easier than the equivalence conservation since equivalence conservation requires identity conservation plus a transitive inference. 78 subjects of the age group 52 months to 79 months were tested on three conservation tasks, The results suggested that the component of 'perceptual seduction' accounts for atleast greater portion of the identity equivalence decalage.
Piagetian studies are comparatively fewer in number among the large quantum of research conducted in India. Bevli, et al (1989) have done a major work of compiling studies done on Indian children. The present review is based on the work of Bevli, et al as well as the materials collected from I.C.S.S.R. and N.C.E.R.T. libraries. The following are some of the review done by the investigator for the purpose of her study.

Rao (1977), conducted a series of studies titled "Concept Development in Children" involving a wide age-range and a number of operational abilities of children of 4-8 years in conservation of mass, weight, and volumes. The sample consisted of 432 children drawn from the nursery and primary schools in Tirupati. He found that conservation of mass develops around 4 years, conservation of weight around 6 years, and the conservation of volume does not appear even at 8 years of age. Cognitively development on these dimensions were observed to be affected by the socio-economic status and mental ability.

In another study, he investigated into the concept of casual relationship and of life. These concepts were studied in relation to area, locality, sex, mental ability, socio-economic and educational backgrounds, taking a huge sample of 2,250 children of 5 to 9 years. Data obtained from a standard interview questionnaires were analysed using both qualitative and quantitative techniques. The results revealed that the urban children were superior to the rural children on concept of casual relations. But, at 8 to 9 rural boys were superior to urban boys on concept of life. There were no sex or SES differences on the concepts measured, concluding that the level of concept required by children largely depends...
on the exposure and stimulation provided to them, it was observed that the age-range suggested by Piaget can not be strictly adhered to.

Sandhu (1980), conducted 'A Factorial study of Adolescent Thought Using Piaget Type Tasks' with a view to investigate into the structure of thinking at formal operational stage. A sample of 986 students from 12 high school of rural Punjab in the age group and studying in grades VI to X were tested. It was found that the performance on tasks increased with age, boys performed equally or better than the girls, and significant correlations existed between intelligence and achievement on one hand and adolescent thought on the other.

Jain (1981) studied the 'Attainment of Conservation of Mass Weight and Volume in School Children.' The sample of VI to XII grade children numbering 400 in all and belonging to middle class section of the Ajmer City were tested on the conservation of mass, weight and volume using standard Piagetian tasks. It was found that almost all students of standard VI onwards did conserve mass and weight and the percentage of conservers were 94% at grade IX. Also, a difference in performance on the conservation of volume using two different tasks was observed in the sample.

Menon (1986) conducted a study titled "The Study Of A System Of Science Education In The Perspective Of The Processes Of Science Inquiry." The major objectives of this study were (i) to arrive at the norms of development of the process skills of scientific inquiry among students of secondary and higher secondary classes of the English medium schools following State curriculumn (ii) to study the impact of this curriculum on process skills, and (iii) to examine the textbook, instruction and evaluation in the light of process skills.
A multi-cross-sectional survey of a sample of 1448 students of VIII to XII standard from the English medium schools of Baroda was undertaken for norm establishment. A "Test of Process of Science Inquiry" (TOPSI) was developed and validated by the researcher. Pertinent findings of this study were: (1) proficiency in process skills improved with grade, (ii) a transition in process skills was observed between X to XI standard (around 16 years), (iii) VIII standard students were able to identify variables, X standard students (around 15 years) were able to interpret observational data, and XII standard students (around 17 years) were unable to exhibit the skill of controlling variables.

Basu and Ramachandran (1979), conducted a study on "Development Of Science and Mathematics Concepts In Urban And Rural Children At The Primary Grades in India". This study investigated the difference in time of acquisition, ways of acquisition and sequence of development of certain selected concepts in urban and rural children of 11 years. The sample consisted of 156 urban (Delhi) and 159 rural (Maharashtra) children. The urban group consisted of middle class and upper middle-class groups while the rural group belonged to farmers and farm-labourers group. They were tested on number, length, area, volume, weight, force, and energy. It was found that the urban children performed better on all the task. The urban group found the concept of number the easiest. Both groups found the concept of energy difficult to master.

Bevli (1983) reports " A Study of Effect of Home, School and Individual Variables on the Cognitive Development of India Children ". This study was undertaken to investigate into the relationship between Piagetian conservation tasks and (i) 25 independent variables consisting of school, home and individual variables, (ii) school achievement in arithmetic and
language, and the magnitude of weighted combination of the independent variables. The conservation tasks on number, length, quality, area and volume were adapted to Hindi and were administered to a total of 664 children of 5½ to 7½ years. The main conclusion of the study were that: (i) SES, facilities for play, school facilities and intelligence were highly related to the conservation ability, (ii) achievement and conservation were related and (iii) language achievement and intelligence were predictive of the success on conservation tasks.

A related study to the above was undertaken by Kale and Danko (1974) which was titled as "Developmental Norms Project 5½ to 11½ years". This study aimed at measuring operation ability and the scholastic achievement. A total of 664 children were tested from the Bombay industrial and non-industrial areas. The age range covered were 5 to 9 and 9 to 11 years. The conservation abilities measured were number, quantity, weight, area, length and volume. It was observed in this study that there was a grade and age grade sequence with increase in proportion of conservers for each of the tasks. No sex difference was observed. The declage was observed in grade 1 students among the concepts of mass, weight, and volume. Low mean score was observed among the children in the non-industrial area school and both industrial and non-industrial area municipal schools.

Sinha and Jha (1989) report a study titled, "Invariance of mass and number among Tribal and Non-Tribal children." Age, sex, culture and habitation were taken for comparison of the attainment of 240 children of 4-10 years on conservation of mass and number. Results revealed no sex or cultural difference on the performance while age and rural/urban origin had significant influences. Thus, the developmental trend envisaged within the Piagetian framework was found to be true.
Jindal (1983), conducted a study titled "Child's Concepts of Movement: An Empirical Study". Taking a sample of 480 children of 15 years, the investigator compared the development of the concept of movement at different age levels, sexes, socio-economic classes, and intelligent levels. The concept of movement was studied through Piagetian tasks; alternative directions of travel, order of success inherent in cyclic movement, the path traversed, the composition of displacements and the relative movements. It was found that development of concept of movement increased with age, some children exhibited different order of difficulty of the questions than that exhibited by the majority of children.

Bevli, et. al. (1983) reports a study titled, "Cognitive Development Of Indian Children Of Ages 2 To 13 year. A Longitudinal Cross-Sectional Study." This study aimed at investigating into the structure of logical thinking in Indian children on Piagetian model. Notion of casual numbers and relations, conservation of quantities, distance and surface notion of space and time, movement and speed. The methodology employed in this study was a combination of longitudinal and cross-sectional approaches. Testing was started simultaneously with four different groups at four different age levels i.e. 2, 5, 8 and 11 years old were tested every 6 months and others every one year. The sample-size for this study was 176 children from three schools in Delhi. Overall school, sex and socio-economic differences were also studied applying chi-square test. The results revealed that higher socio-economic groups performed better. It was concluded that in the case of low income groups, home experiences are of very poor quality, which the schools do not seem to make up altogether.
Vaidya (1964), conducted a research titled "A Study of Logical Thinking in Science During Adolescence." This study attempted to trace the growth of thinking process evolved by a variety of problems, determine the relationship between scores on thinking process suitably grouped and some outside variables like intelligence, measures of adjustment, length of schooling and immediate test reactions to the problems on presentation. The sample consisted of 200 pupils drawn age-wise in equal numbers from grades VI to X and matched on intelligence. A total of seventeen problems re-classified into seventeen schemes of thought were used.

The concept of Causal Relation and Concept of Life has been studied by Rao, Narayan and S. Reddy. The concept were studied in relation to Age, Locality, Sex, Mental Ability, S.E.S. and Education background of the family and schooling. The total no. of sample was 2,241 belonging to age group 5+ to 9+. A standard interview questionnaire method was used. Quantitative and Qualitative analysis of the data were made. Urban children were found to be superior to the rural children with regard to the concept of life. No sex and S E S differences were found although educational background was found to be significantly related to the nature of concept of causal relation. The age range suggested by Piaget can not be strictly adhered to.

Kumari Indira and B.S. Dagaur, studied about the relationship between the Intelligence and Piagetian concepts of conservation, Seriation and classification. 240 subjects from various schools of Rohtak District in the age group 7 -12 years were taken into consideration. Raven's Colour Progressive Matrices, Piagetian type tasks were selected for the study. The data were analysed by computing frequency, percent frequency, chi-squares etc. The result found are, children with higher level of abstract
performed better on conservation tasks than those with lower level ability. The relationship between the development of conservation of mass, weight, volume, seriation, classification in relation to intelligence are found to be significant. Result of the present investigation are well in tune with the findings of Feigenbaum (1963), Bat-Haul (1972) and Rao (1976) who found that children with higher level of ability performed better on conservation tasks than the lower levels.

Nalini Debi G studied about the development of number concept in young children in relations to age schooling, mental ability and SES and the educational background of the family. For this purpose 288 school going and 288 non-school going children of 4 to 7 years were selected. A 2 x 2 x 3 x 4 design with schooling non schooling, materials operations and SES level was used. The operations taken into consideration are Discrimination, Seriation and Numeration. The findings are Discrimination Seriation and Numeration appeared in order. By the time they reached the age of 4 they discriminate successfully, seriate at the age of 4 they discriminate successfully, seriate at the age of 5/6 years and numerate at the age of 6 years. There are significant difference between the school going and non school going children. Non schooled performed uniformly poorly in Numeration tasks but no difference seen regard to discrimination. Difference of S.E.S. mental ability seem to play a significant role in acquisition of Number concept. They perform better when more perceptual clues are given.

The present study was aimed at finding out the cognitive styles of primary school children and the social factors that influence their cognitive attainment by M. Pushpa. Biological, familial and social variations were taken into consideration. A sample of 265 primary school children
from Grade-I, III and V were selected. To test the Cognitive Styles, the "Children's Embedded Figure Test" was used and the prolonged deprivation scale was adapted with slight modification for assessing the level of social deprivation.

It was found that residential accommodation, physical environment, food, clothing, home environment, economic-sufficiency parental characteristics and inter-action with the parents were the significant factors that influence the child in his cognitive attainments. Children who were deprived in residential accommodation and recreational experience were found to be highly field dependent. Among the predictor variables the type of school, grade, father's educational level and income were found to be more significant in effecting cognitive attainment.

Sandhu T.S. (1980) investigated the structure of thinking in Formal Operational Stage. 986 students (505 boys and 481 girls) drawn randomly from the students of twelve high schools of rural areas of Punjab from age group of 11+, 12+, 13+, 14+, 15+ studying in class VI-X. Tools used for the purpose of the study were Piagetian Task, Catell's Culture Fair Intelligence Test, Jalota's Mental Ability Test, Dubey's Reasoning Ability Test, Adjustment Inventory and Catell and Bellot's High School Personality Questionnaire. The statistical procedure used were Pearson Product Moment Method. One way ANOVA and factor analysis. The findings were adolescences performance in Piagetian task increased with age. Boys perform better than girls in some tasks. Intelligence, both verbal and non-verbal scores are correlated significantly with the measures of adolescent thought which exhibited a unifactoral structure. Personality traits like outgoing tendencies abstract thinking, emotional stability and many others are found related with the development of adolescence thought
whereas reserves, concrete thinking, emotional instability excitability, assertiveness and many others related to the non-development of adolescent thought.

Chatterjee R. G. investigated the rate of development of the concept of time in accordance with the different phase from the early childhood to the late childhood and to locate a transition if any. The study was conducted on the basis of an interview schedule. There was five sub-heads concerning self concerning parents, notion of time by clock concerning peers historical time etc. The study was completed in phases viz. pre-pilot study and the final study. 240 children were drawn from eight different schools (B-120, G-120). The findings are the development of the notion of temporal estimation in children is very slow and gradual process having its transitional power at the age of 7-8 years. The true concept however develop at 10 years in both sex. This notion of estimation evidently dependent upon cues of personal involvement.

RATH. R, studied about the cognitive growth and classroom learning of the primary school children in Orissa. 330 children of Brahmin Schedule Caste and Schedule Tribe children studying in 5 different Primary School in Orissa were taken as sample. Raven’s Progressive Matrices and Ratter’s Aspiration Test to measure a particular kind of level of aspiration was adopted for the purpose of the study. Marks secured by the children in various school examinations in all the subjects of study was noted to asses their academic achievement. The findings are Brahmin children were younger by 9-10 months and were most intelligent closely followed by S.T. children. The Brahmin were consistently better in verbal abilities and concept formation.
Jachuck K and Mohanty A.K. studied about the low socioeconomic status and progressive retardation in cognitive skills. 100 boys: 50 were between 8-10 years and 50 were 14-16 years were selected. From each group equal no. of students were chooses from high SES and low SES families. Three different schools were taken. Raven's Standard Progressive Matrices and Stroop Test were taken as tools. The ANOVA and 't' test were adopted for statistical analysis. The findings are the high SES subject had better performance than the low SES subjects. At higher age the low SES group was found to had faster word reading speed than the high SES group. Significant interaction between Age and SES obtained. Disadvantaged lower class children did not compensate for their handicap when they came out of the limited home environment and grew in a wide urban structure and school environment. The disadvantaged group showed a cumulative deficit in language as they grew older.

The measurement of cognitive development of children by using Piagetian tasks and also its relationship with language and arithmetic of children was studied by Kale S.V. and Danka V.D. (1974). A total sample of 664 subjects were tested from the Bombay industrial and non-industrial (areas). Where (B-333 and G-331). The age range was 5-6-7 and 9-10 years. The variables studied were age, sex, grade, SES, parent child Interaction, Language achievement, arithmetic achievement, social maturity with reference to conservation ability. The findings are - Language and Arithmetic Achievement is positively correlated with cognitive development but social maturity is negatively correlated with the same. Sex has no influence but age has positive influence in cognitive development. There is a low positive relationship between cognitive development and I.Q. and cognitive development and parent child Interaction. (r = + .2862 and (r=+.2744).
Ghakhar Sudesh and Kaur Jagdip (1982), studied the relationship of School Achievement with Figural Creativity and Concrete Operational Logic. 150 students of three age groups 9+, 10+ and 11+ grades IV-VI representing Concrete Operational Stage were selected. The Torrance test of Creativity Thinking and the set of Piagetian tasks were selected. The scope on school achievement of two school term held in the same year had been converted into t-score with Mean as 50 S.D. as for the purpose of addition and for considering total school achievement. The statistical procedure used were Product Moment Co-efficient of Correlation between figural creativity and school achievement was computed to find out the relationship among these variables. Concrete operational Logic at the IV grade is found to be positively significantly correlated with school achievement at .05 level of significance.

Batra Poonam and Neerja Popli (1983) studied about the relationship between the perspective of Taking Ability and Moral Development. This study aimed at exploring the relation between these two variables in the young children, with special reference to institutionalisation. A sample of 60 children (30 = Orphanaged reared children, 30= family reared children) were selected and matched on age, sex and S.E.S. The children were of 8 and 11 years. Two perspective taking tasks - Perceptual perceptive taking tasks and Cognitive - Perspective taking task were used along with a Moral judgement test. Data were analysed by using ANOVA and Chi-square test. Perspective Taking ability is positively and significantly correlated with Moral Judgement ability. Orphans performed better than non orphans on cognitive Perspective taking tasks and Moral judgement test. Sex differences were not found significant. An age wise analysis indicated a sequential development.
trend for both groups of children in perspective. Taking Ability and Moral Development.

The main aim of this study conducted by Bevil U. Kapoor R. and Bharati K (1983) was to look for the existence of Piagetian Stages of Cognitive development in Indian Children of ages 2 to 13 years. This was done by studying the Motion of Casualty, classes, numbers and relations; conservation of quantities, distance and surface; time movement and speed; and notion of space. The design of the study was combination of longitudinal and cross-sectional approaches. The statistical procedure used were Chi-square test. The results show no definite school differences are seen. Status show that higher S.E. group performs better than the lower S.E. group. The nature of experience offered by the school and the particular curriculum content emphasized and the teaching method used, determined the level of thinking rather than the S.E. class to which the child belonged.

Vaidya N, (1964) attempted to trace the growth of thinking processes evoked by a variety of problems, determine relationships between scores. On thinking processes suitably grouped and some outside variables like intelligence. Measures of adjustment, length of schooling and immediate test reactions to the problem on presentation. The sample comprised of 200 pupils (B+G=100) each matched on intelligence and age wise drawn in equal numbers from grades VI to X. Seventeen problems re-classified into 17 schemes of thought were used. The main results indicated that complex problem-solving processes arise from simple thinking processes. Average performance on each problem shows an increasing trend with age. Problem solving favours boys rather than girls. Top group and the bottom group differed from each other on all the five measures of adjustment, understanding of the problem and the seventeen schemes of thought.
Development of Science and Mathematics concept at the primary grade children was studied by Basu C.K. and Ramchandra K (1979). This study tries to investigate the difference in time of acquisition. Ways of acquisition and sequence of development of certain selected basic science and mathematics concept. The sample consisted of 156 urban children and 159 rural children of Delhi of age group 7-11 years. The urban group belong to middle class and upper class families and the rural group belong mostly to parents who were farmers and field labourers. The seven basic concepts selected for the study were Number, Length, Area, Volume, Weight, Force and Energy. The child scoring 66.6% and above was considered a conserver, between 33.3% and 66.6% a transitional and the child who scored less than 33.3% was a non-conserver. The results are higher the grade and age performance is better. Urban child perform better than the rural children due to better educational and learning experiences. Rural children perform better in weight task. Rural and Urban children showed performance (less than 50%) on an Energy task indicating that this concept may be taught only in higher grade.

Amin Najma (1981) conducted a study to find whether Spatial Ego-Centrism is related to the conservation of Length and the Conservation of Area and also to see the relationship between intelligence with that of conservation of Length, Area And Spatial Ego-Centrism. 280 children were selected as subjects and each child was tested on Raven's coloured Matrices, Task of Spatial Ego-Centrism and Tasks of conservation of Length and Area. Flavell's (1968) Perceptual Role Taking skills task was used for the assessment of spatial Ego-centrism. The finding are, there was high and positive correlation between Perceptual Role Taking both with conservation of length and area. Perceptual Role Taking are considered
as inversely related with Spatial Ego-Centrism. Perceptual role taking is positively and highly related with conservation of Area. Intelligence is moderately and positively correlated to conservation of Length and conservation of Area (0.44 and 0.46 respectively).

Rao, Narayan (1977,a) studies about the conservation of Mass, Weight and Volume in the age groups of 4 to 8 years, divided into half-year intervals, attending primary and nursery schools located within the limits of Tirupati Municipality in Andra Pradesh in South India. A $2 \times 2 \times 6 \times 9$ factorial design with sex (2) Socio-economic levels (2) conditions of Testing (6) and Age levels (9) as experimental variables was used. A total of 432 subjects were tested. It has been observed that conservation of Mass develops as early as 4 years, conservation of Weight around 6 years and volume does not appear at age studies. S.E status as well as mental ability were found to be significant factors affecting cognitive development.

The effect of Training on formal operational thought was studied by G.S. Bhawa(1981). The study was planned to see the effect of training on ability to test the hypothesis. Matching group design was adopted. The experiment and control groups were matched with respect to the dimension of stating hypothesis and testing hypothesis. The two groups were also equated with respect to measure of intelligence. Pre-test, Post-test were used and t-test technique was used to find the significance of difference. 80 students of 14+ to 15+ were taken for the purpose and divided into Experimental and Control groups. Tools used were Jalota's General Mental Ability Test and Tests of stating and Testing Hypotheses. The training period consisted of 10 sessions. The differences between the scores of Experimental and Control group on the dimension of stating hypothesis on post-test was found to be significant significant at .01 and ($t = 3.806$) on...
the testing hypothesis at .01 (t = 7.750). Thus in general it has been found that training has a significant effect on the development of ability taken into consideration.

De, B. studied about the cognitive style and cognitive ability of Tribal and Non Tribal School pupils. The investigator emphasised the influence of cultural differences in the cognitive style of tribal and non-tribal high school students, its influence on general intelligence and the creative thinking of the tribal and non-tribal students. The samples were drawn from high school students of Ranchi. The data were collected with the help of Witkin's Embedded Figure Test, Raven's Progressive Matrices and Mehdi's Non Verbal Creative Thinking Test. Scores were treated statistically using two non-parametric techniques. The major findings were tribals were more oriented towards field dependence than the non-tribals Male and female tribal and non tribal students differed in field dependence where as, this difference was not noticed in the case of field independence. Regarding creative thinking the results showed that tribal and non-tribal students did not differ among themselves. Cognitive style was found to be associated with academic achievement.

Jain S.C. (1981) studied the performance on Piagetian Tasks and cognitive development in adolescence. The students of age 16 - 18 years, grade XI Science was taken as a sample and the total number of sample were 180 (B = 90, G = 90). The Piagetian Task, like Metal Cylinder Task, Bending Rod Task, Equilibrium in the Balance Beam Task and Pendulum Task. The findings of this study are as follows- Most of the students perform at concrete and post concrete level in each task and very few reach at formal level. Out of 180 students only 65 are at formal level, 83 are at post concrete level and 32 are still at concrete level.
No sex differences has been observed. An individual who has applied the concrete or post concrete or formal level reasoning on one Piagetian task had the similar performance on the other tasks.

Dash and Das, studied about the Cognitive Development of Tribal and Non-Tribal Schooled and Un-schooled children. The study involved individual testing of 160 rural children (N.Tribal = 80, Tribal = 80). Half of the total number were attending schools and half were not attending schools. Piagetian tasks based on classification, separation, measurement and conservation was adopted for the purpose. The findings are, in the six Piagetian Tasks the children of non-tribal and tribal culture differed significantly. The difference were mainly due to the lower level performance of younger tribal children than their counter parts. Culture seems to produce a difference in cognitive development of younger children which seems to vanish with increasing age. Impact of schooling on cognitive development is more prominent in the older children as compared to that of younger children. It has observed that certain important experiences promoted by formal schooling are important for cognitive development except conservation. The growth of conservation ability children was found to be influenced by neither culture nor schooling.

Verma and Tiku studied about the effect of socio-economic status and general intelligence on the learning styles of the school going children. The study was conducted following a 2 X 2 factorial design. The students of class X, a representative sample of 300 students (both male and female) was selected from Simla city. The main interaction effects of SES on the learning styles were examined. Thus learning styles was regarded as dependent variables and SES economic status and intelligence were treated as independent variables. The tools used were
SES scale. The Group Test of General Mental Ability, Student Learning Style Questionnaire were used. Socio-economic status and intelligence neither in separate nor in joint form are related with the independent learning style of high school students. The S.E.S and intelligence do not have any significant effect on dependent learning style singly or jointly. Participants learning style of high school students is not affected by the variation in their S.E.S or intelligence.

Mahesh Chand investigated the development of concepts (conservation of concepts) making use of comparative and critical ideas of Bruner and Piaget in order to meet the present challenge of concept development. The main purpose of the study was to find out the best technique of presentation of concepts on the basis of certain effective variables so that understanding of the concepts may be developed effectively and successfully among students. The sample consisted of 300 children of the age group 7 to 9 years (150 rural, 150 urban) Rural and Urban children were matched in terms of their age and years of schooling so that only the effect of cultural factor i.e. rural and urban children could be isolated and studied. Five Piaget type tasks developed by Bruner et. al were used with slight modification along with children's personality questionnaire by Cattell. The findings are the symbolic mode or representation in which language plays an important role is the best mode for the development of conservation concepts. This is contrary to Piaget's view but supports that of Bruner. For urban children the order of the three techniques in terms of their effectiveness is the same as for rural children. Contrary to Piaget's view cultural differences are in accordance with Bruner's views on concept development. The effectiveness of certain categories of variables of individual differences like intelligence, ego-
strength and personality on three techniques i.e. screening, manipulation and labelling was found to be significant in some cases. Hence, with certain fluctuations, it supports Bruner as well as Piaget's views on the development of concepts.

Sandhu (1980) made an attempt through this study to determine the relationship between the cognitive development (formal-operational thought) and the affective development (personality factors) of High School students. The sample for the study was drawn from two clusters of rural High Schools situated in some district of Punjab of age group 15-16 and about 900 in numbers. The schools selected were Govt. schools having common syllabus, same staffing pattern, similar socio-cultural background and equal physical facilities. The Piaget type Tasks and High School Personality Questionnaire were selected for the study. Product Moment Co-efficient Of Correlation were computed between the measures of formal thought and fourteen factors of personality. Significant co-efficient of correlation were obtained between the measures of formal operational thought and the four factors of personality - expedient - conscientious, shy-adventurous, secure-insecure, and group dependent, self sufficient.

Anandalakshmy S. studied the role of variables in the development of cognition in infancy. The investigator pointed out that an intervention programme is most likely to succeed if it includes the involvement and interest of the mother and is conducted in an environment familiar and stress free for the infant. This study highlights the crucial role played by the mother in optimizing infant development. Clearly one should aim at educating mothers on the value of stimulating play activities and at providing them with skills that would enable them to offer a stimulating environment for their infants.
The impact of familial deprivation on the acquisition of skills for pictorial depth perception was studied by Sinha, Durgananda and Shukla Puspa, on two groups of 125 children each from Indian nurseries and orphanages ranging in age from 3 to 6½ years. Ss were required to judge distance by interpreting each of the six common pictorial cues depicted one at a time in a set of pictures. Analyses of mean scores revealed a clear developmental trend in both the groups. Intelligence was significantly correlated with the scores. With intelligence controlled, significant retarding effects of deprivation on the scores at the higher age levels but none at 3 to 4 years were found. Comparison of scores on each of the six cues revealed the same tendency. Lack of heterogeneity and absence of stimulation in orphanages had a general retarding influence on the development of the skill for pictorial depth perception.

Chatterjee Biswa B. studied about the Mosaic Test Performance Of School Children. The scope of using the Mosaic Test for studying cognitive development and related processes in young children was explored systematically in the Development Norms of 5½ to 11 years old children's study carried out by Chatterjee, Singh and Singh (1974). In this study the area sampling technique was used in which 15 primary schools were selected from the city area of the district. In each of the samples school students were chosen from Grade I, II and V on a strictly random basis. The study uses the urban - rural dimension. Chatterjee noted that for the variable "number of Sub-designs", the mean of the rural group is higher than the corresponding urban group. For other variables urban means are higher.
"Cognitive Development in school and Non-school children: Evidence from Cross-cultural Studies" was studied by Dash U.N. and Das J.P. This study conducted in rural Orissa where the both groups of schools and non-schooled children come from the lower socio-economic stratum of society and from the same village. The total number of sample were 250 from pre-school children to 10-12 years children. The mean ages of the five sub-groups were 5.25, 7.5, 10.75 and 10.8 years. Three types of tasks were used of which first was dealt with Piaget's concrete operational thinking, the second dealt with the development of simultaneous and successive processing and the third one dealt with memory and problem solving skills. The main objectives of the study were, to observe if schooling bring about cognitive changes over and above what can be expected from maturation alone. If so, would school children perform at a higher level on all kinds of intellectual tasks or would their performance superiority was restricted to only a few specific kinds of cognitive skills. The findings of this study are there was no significant differences found between the schooled and non-schooled group, concrete operational skills improved with age not with schooling. The Multivariate Analysis of Variance applied on four Piagetian tasks taken together revealed a significant age effect thus suggesting that the acquisition of concrete operational thinking was a function of age rather than schooling. The researcher found that the elementary level of educational experiences imparted in remote rural schools of India does not promote concrete operational knowledge over and above those resulting from maturation and experiences available in children milieu. The educators should try to incorporate in the school curriculum "specific elements" requiring activities with concrete materials and objects. Teaching methods should be geared to promote reasoning and conceptual thinking in children and de-emphasis rote learning and a technique of mastering the contents of the curriculum.
Impact of pre-school educational on Language development was studied by Pankajam G. This study gives developmental sequences and a comparison between rural and urban children. The study indicates that in certain aspects of language development those children who attend pre-schools perform better than the others. Attending pre-schools with good programme, specially in rural areas definitely plays a prominent role in language development of children. This asserts the value and necessity of strengthening pre-school education and making it compulsory in the educational system to have a strong foundation for the future higher education.

Murlidharan and Bevli investigated about the growth and development of Indian children in aspects of motor adaptive, social-personal and language. The study was designed on the lines of Gessell's developmental schedules which provide both qualitative and quantitative evaluation. The study was conducted on both cross-sectional and longitudinal bases. The sample of the study covered children age group 2½ - 5 years from the urban rural and industrial area of Calcutta, Bombay, Delhi, Madras, Allahabad, Ahmedabad and Hyderabad. Total No. of samples were 1080, taking approx. 360 from per centre. The tests from Gesell's schedules were adapted for the Indian situation. The results indicated that the urban children are faster on their development compared to the rural and industrial children. The industrial children were found to be better than their rural counterparts. Children of Calcutta and Hyderabad showed a faster rate of development in various aspect when compared with Gesell's norms. Indian children showed retardation where handling of picture books or picture card was involved.
Dani D.N. (1984) studied the scientific attitude and cognitive styles of higher secondary students (1984). The major objectives were to measure the scientific attitudes of higher secondary students, to find out the cognitive styles of the same students as well as to compare the scientific attitude and cognitive styles of boys and girls, village town and city population, to compare the cognitive styles of early adolescents, middle adolescents and late adolescents of arts, science and commerce faculties. Total no. of sample taken into consideration were 1265 (B-804 G-416), and the stratified cluster sampling and purposive sampling techniques was adopted. Self constructed Scientific Attitude Scale, Group Embedded Figures Test by Ruskin, Otliman, Witkin was used. Method were the combination of the normative, correlational and comparative study. The major finding are, 80% of the students possess positive scientific attitudes. Boys and Girls did not differ in scientific attitudes. Science students possess higher scientific attitudes than the arts and commerce stream. City students also possessed higher field independence ability than the town and village students. Early adolescents were also found to be more field independent than the middle and late adolescents.

Mukerjee, D. studied about the differential effect of S.E. Ss and deprivation upon cognitive process in children. 180 samples were taken into consideration of whom 50 belonged to H.S.E.S, 68 M S E S and 62 L S E S. of primary schools. Tools used were Jalota S.E.S. Questionnaire (1975), Piagetian six Plasticine Balls (1955), the Lovell et. al. 16 cards (1960). Samples were divided into three groups. Results revealed the children of different S E S differed in conservation tasks. No sex differences are observed. No differences between male and female also observed in the judgement aspect of conservation. Conservation responses increased.
with the increase of age. Male and female didn’t differ significantly in the number of equivalence response. Socially and economically deprived children had poorer vocabulary than other children.

Despande, M.B. (1984) studied the Cognitive Affective Development and Scholastic Achievement of Tribal Secondary School students. Tools used were General Intelligence Test, Numerical Ability Test, Verbal Ability Test, Reasoning Test, Bernreuter Personality Inventory, and Scholastic Achievement Test. Major findings were Mean scores of Non-tribal boys and girls were significantly higher than those of tribals on cognitive aspects. Tribal girls were found more social, stable and emotionally well developed than non-tribal girls. Tribal girls had a more favorable attitude than non-tribal girls towards schooling. Tribal students scored lower than non-tribal students on Bernruter Personality Inventory which indicated that tribal students were more emotionally stable and more social than non-tribal students.

Ghuman (1975, 1978a) studied The Conceptual Development Of Panjabi Children. The main purposes of these research was to apply the Piagetian perspective to explore the conceptual development of Panjabi children belonging to different sub-cultural strata and to demonstrate the effects of a western type of environment on the thinking abilities of immigrant Punjabi children. Ninety six boys and girls of equal number were randomly selected from four rural and two urban schools of age 10 years. Piagetian Task (Length, Area, Weight, Amount), the Colour-Progressive Matrices and W.I.S.C. Block Design. The sample belong to the four sub cultures i.e. professional, Brahmins and Kshetriyas, Jat Harijans. The findings are as follows - Harijans are significantly poorer in its performance but the other groups do not differ significantly.
difference is very marked on the conservation of weight test. The high success rate is mainly due to their background and experience. Children of farmers and artisans learn skills of measuring, weighing and storing things as part of their daily activities. Therefore they have action models to solve conservation of weight problem. The sample did not perform well on the conservation of area test. Schooling did play an important part in the cognitive development.

Shukla J.P. and Sharma V.P. studied about the effect of sex on conservation of substances. The study aims at diagnosing the correct perspective of sex differences in acquisition of mass, weight and volume. The sample was collected randomly from the middle schools of class VI to VIII of M.P. The total no. of samples were 230 out of which B=117 and G=113. Piagetian type tasks were utilised to measure the conservation in mass, weight and volume of solid and liquid. The findings are boys and girls differ significantly between their means on the test of conservation in mass of liquid \( t = 2.339 \) of 228 \( p < 0.02 \) and in weight of solid \( t = 2.096 \) of 228, \( p < 0.05 \). The difference also found to be significant on conservation in mass of solid. All other differences between the means on conservation in volume of solid and in weight and volume of liquid have been found non-significant. The boys score on all measures of conservation of substances have been found consistently higher than girls which indicates the superiority of boys over girls in the conservation of mass, weight and volume of solid and liquid.

Das, P. studied about the structure of cognitive abilities among normal and tribal children as a function of development level. The objectives were to make a comparative analysis of processing habits using the sub-cultural group as independent variables, to find whether there was any
interactive relationship between the organismic variables like age, social groups and the process variables. 150 boys of class I to V were selected. The tools employed were Figure Copying Test, Hidden Patterns Test, Raven's Coloured Progressive Matrices and many other. The data were analysed using 2 x 3 factorial analysis of variances. The major findings were children above ten years and coming high S.E.S. background were superior to children under seven years and coming from low socio-economic status. The performance of low SES background normal children was very close to that of tribal children at both age level. Span of attention and memory of low SES are found to be short in case of low S.E.S. and tribal children compared to those of high S.E.S. The younger and tribal children took more time and committed more errors than older and normal children.

Ram, A.L. studied the relationship between congnitive complexity among the college students as a function of their personality factors. 480 students of Agra University of a age group 17 - 26 years were selected as a sample. After doing a pilot study questionnaire and inventories are selected. On the basis of the Md. scores two groups were selected namely - high congnitive complexity group and the low cognitive complexity group. Chi-square test. Coefficient of Correlation, t -test, ANOVA etc. were adopted for analysing the scores. The findings are cognitive complexity is significantly related to and affected by variables like sex, discipline and college. Cognitive style and personality factor sex and discipline have significant positive correlation with cognitive complexity. The female has more cognitive complexity than male. The students from the discipline of Science and Home science has more cognitive complex structure than those of Arts Agriculture and Commerce.
HCC group and LCC group differ in cognitive complexity also having different personality factor.

Cognitive Style Of Adolescent students as related to their intelligence was studied by Verma and Sheikh. The study was carried out to explore the relationship of field dependence - independence cognitive style of adolescent students with their intelligence. An attempt was made to ascertain whether there were significant differences in the cognitive style of adolescent students belong to high average and low intelligence groups. 185 adolescent students studying in P.U.C in four Higher Secondary Schools of Jammu Province was taken as sample. Descriptive Survey Method was taken into consideration, cognitive style was considered dependent variable and intelligence was treated as independent variable. Ex-Post-facto research design was adopted. The tools used are the Standard Progressive Matrices (S.P.M) and The Group Embedded Figur Test. The findings of the study are - high, average and low intelligence students do exhibit significant difference with respect to their cognitive styles. Adolescent student of high intelligence group are more field independent than the adolescent student of average and low intelligence group. Adolescent students of average intelligence group are significantly more field independent than their counterparts of low intelligence group. The findings of the study are in line with the reported results of various studies (Black 1977, Ford 1979, Salturly 1979, Cooperman 1980, Rat 1983, Mc Kenna 1984).

Asha, C.B. studied on the “Effects Of Rearing On Cognitive Control.” The investigator examines the relationship of home or orphanage rearing on cognitive control dimensions, derived from the interference aspects of the Stroop Colour-Ward Test. Malayam version of
the Stroop Test was administered to 65 home reared (boy - 33, girls - 32 and 68 orphanages reared (boys - 35, girls - 33). Two Way Analysis of Variance was used to analyse the data. The findings are as follows (1) In both the cases orphanages reared boys are found low in interference proneness (flexible control) compared to the other groups. Home reared boys and girls do not differ in interference proneness. Similarly orphanage reared girls and home reared girls also show homogeneity with respect to interference proneness. (2) Significant difference observed between orphanage and home reared girls indicate that the later group is faster in word reading than the former. In the case of girl it has observed that speed of reading is positively influenced by home rearing, But among boys rearing does not seem related to the speed of word reading. (3) Home reared girls take less time to name colours than all the other groups of reared boys however appear slower than the orphanage reared boys. (4) Orphanage rearing seems to have positively related with the speed of naming coloured works.

Mishra, G. and Tiwari B.K. studies the effect of environment and cognitive development. The study was formulated to understand cognitive development of children from an ecological perspective. It dealt with cognitive differentiation (E.F.T.), inter-active functioning (DAT and RPM) and visual motor functioning (B.G.T.) The design of the study was 2x2x3 factorial with two levels of residential background group (rural, urban), two types schools (superior and inferior) and three levels of grades (III, IV and V). The tools used were RPM, DAT Bender Gestalt Test and Story Pictorial Embedded Figure Test. The finding suggest that environmental influence are multi-faceted and depend upon the specific nature of cognitive skill as well as the development stage of children. On the whole, the result baser.
on board ecological factor of residential background and the type of school suggest that different ecologies provide varying inputs and demands for different skills.

Muralidharan, R. studied the effect of environmental process variables on children's achievement in primary schools. The study investigated the effect of parent related, school related, child related variables socioeconomic status and facilities provided at home on achievement. 664 children belonging to classes I, II and V in the age range of 5½ to 11 years were taken as sample. First order correlation matrix worked out between independent variables and dependent variables. Almost all home variables have a significant relationship with the child's achievement in school. But the school variables did not prove to have any effect on the child's achievement. S.E.S. prove to be consistently having significant impact. Ethical discrimination as well as positive concepts work an effect on the school achievement on the case of the younger age group.

Ability Of Discrimination, Seriation and Numeration Operations in Young children was studied by S. Narayan Rao. Population for the study was selected from the children of age group 4+ through 7+ from the town of South India. Materials used for this study were three dimensional wooden blocks, two dimensional wooden slats and uni-dimensional wooden sticks. Factorial design with the sex (2) x schooling/non-schooling operations (D.S. and N=3 x materials (block/slats/stick=3) was adopted. F-ratios were significant for age, operations materials and schooling. Subjects performance significantly improved with age which corroborates Piaget's findings. F ratios for Discrimination, Seriation and Numeration operations suggested that there were significant differences in the performance of the subject on the different operations. Subject performed differently...
the three kind of materials (blocks/slats/sticks) which is found significant F ratio for schooling/non schooling showed that the children who were schooled undoubtedly performed better than those who were not schooled.

Sinha, Durgananda and Jha studied the Invariance of Mass And Number Among Tribal And Non-Tribal Children. The study was designed to analyse some of the factors other than purely maturational which operate in the acquisition of conservation ability of mass and number. Factors of age, sex, cultural differences and rural urban background were specially considered. Variable taken into consideration are age (4 to 13 years) sex (boys/girls), culture (tribal and non-tribal) habitation (rural/urban). Accordingly a 3 x 2 x 2 x 2 factorial design was used. Tasks used were clay balls (250 gms) for mass conservation and for number conservation 4" x 1" wooden cubes were utilised. The results obtained are there was no sex or cultural differences noticed on the performances on conservation task for mass and number. Children of different age levels differed from each other on their performance on conservation tasks. These findings give unequivocal support for developmental trend so far as conservation of mass and number are concerned. A noteworthy result of the present study is that the performance of children constituting the samples whether tribals or non-tribals belonging to rural or urban areas on commonly used conservation tasks was well below that of Western children and even Indian children.

Sudesh Gakhar and Rajinder Kaur studied the Development Of Ability To Do Piagetian Conservation, Seriation And Classification Tasks At The Concrete Operational Stage. Thirty subjects each of 7-11 years
are taken as a sample. The study was designed as Cross-sectional which one section consisting of 30 subjects in each age level resulting sub-groups with a total number of 150. A group of 30 subjects comprised of 15 male and 15 female subjects from each level i.e. 7 to 11 years (representing the Piagetian concrete stage were selected. The selection of 30 subjects for each group from each age level was based on randomization technique of sampling. Piagetian type of tasks was used for the purpose of the study. The results are ability of Classification and Seriation was found to become operational at 8 and 9 years of age respectively. In respect of conservation of weight and area it was found that they do not become operational even upto 11 years of age.

Kumari, Lalita. (1976) studied that effect of occupational environment on the concept of conservation. It was hypothesized that experiences in the potter’s environment promote earlier conservation of the concept of mass and that the ability to conserve mass is not generalized to conservation of liquid and number. 6 to 8 years old boys (N=30) from pottery making families in Delhi and a group of boys from the same SIC (N=30) from families in other vocations were taken. All the children were of class I, II, III in Municipal Corporation schools. The date of birth and the occupation of his parents was taken from the admission register of the school. Tasks selected were conservation of Number, Liquid and Mass. The result indicated that the potter’s sons attained conservation of Mass earlier, and success in conservation of mass was not generalised to liquid and number. It is suggested that the role of cognitive conflict and reversibility may be important factors in the concept of conservation. Manipulation may be a necessary pre-requisite to the attainment of the conservation of children.
Srivastava and Thomas studied, "The Effect Of Socio-Economic Status, Religion, Caste, Parental Attitude, Parental Nurturance And The Type Of Family On Creativity Of Pre-School Children". The sample consisted of 100 Pre-School children of (B-50, G-50) between the age group of 2½ years and 5 years. The creativity tests devised by Wallach and Kogan adapted by Ward and Sushila Srivastava were used to measure creativity of the children. Kuppuswamy's Socio-Economic Scale was used to assess the Socio-Economic Status of the children. The study disclosed the fact that Socio-Economic Status had a bearing on the creativity of Pre-school children while, religion and caste did not show any effect on child's creativity. Similarly parental attitudes, parental nurturance and family types showed no significant difference on individuals creativity.

Mohan, Jitendra, studied about the cognitive and psychomotor behaviour of gifted, normal mentally retarded children. The study was conducted on 440 subjects who were selected from a wider sample with the help of Raven's Standard Progressive Matrices, Raven's Coloured Progressive Matrices and Seguin From Board Test, in addition the teachers ratings and academic achievement scores were also taken in the case of gifted and normal children. Mentally retarded children were contacted at their respective institution. Parental attitude was also studied with the help of 40 institutionalised mentally retarded subjects belonging to 4 levels of retardation. The tools used for this study were reaction time, maze learning, problem solving device of Bhatia (1955) Katharia (1940), Memory (Digit Span Test - Jacob 1887), attention, the Reversible Figure Test Rubin, (1958), Vigilance Test (Mohan and Malhotra -1973), Parental Attitude - for children, Seguin Form Board Test- Goal (1984), Vmaeland Social Maturity Scale (Main), for parents - S.P.M. (Raven's 1960), Locus
of Control Scale (Ratter-1966). Parental Attitude Scale (Puri and Sen, 1987), 16 P F Test (Cattel 1967). SESS (Singh, 1974). The result of the study clearly showed that the gifted are better learners than normal and mentally retarded are poorer than normal children. Efforts need to be made to better the environment and surroundings of the mentally retarded and not segregate them from the society.

Mohapatra Saudamani studied about the cognitive and non-cognitive factors of intellectually gifted and normal children in the primary schools of Orissa. The main objective of the study were to identify intellectually gifted and normal children, to find out the cognitive and non-cognitive factors of intellectually gifted as well as that of normal children, and also to find out whether there was any differences in cognitive style (field-dependence-independence) academic achievement, self concept, socio-economic status and locus of control of the intellectually gifted and normal children. The investigator adopted the comparative survey method and the sample was drawn from class V students studying in the primary schools. (1800=N) The tools used are Raven's Coloured Progressive Matrices. The Group Embedded Figure Test of Witkin, Oriya verson of self-concept test of Piers and Harris, K. M. Rompals Locus Of Control Test. The findings of the study are (1) The incidence of gifted children was highest in urban area followed by rural area and lowest in tribal area. The cognitive style of gifted children was significantly higher than those of normal children in all the three area of Orissa (Urban, Rural and Tribal). The average academic achievement score of gifted children on the whole was higher than the normal children in all the three locations. H.I.I. feel more positively about themselves than normal children among all the three locations. There was a significant difference between intellectually gifted
and normal children on locus of control scores. There was no significant
difference between urban gifted and rural gifted children though they differ
significantly from each other so far as S.E.S. was concerned.

Kaul Vinita in her study tried to explore and identify some
cognitive and socio-emotional strengths of the Socio-economically
disadvantaged children. Theoretical basis of the study was mainly the social
learning theory of development. An experimental design was followed
whereby the experimental group i.e. the disadvantaged were studied in
comparison to two control groups i.e. middle and high S.E.S. groups.
Father's education and occupation were considered the criteria for
selection of the three SES samples. A stratified purposive sample was
selected from 14 schools consisting of 300 students of class V. The six
dependent variables investigated were field - independence, visual
modality, preference creativity, co-operation, dependency and delay of
gratification. Intelligence was treated as an intervening variable. The data
was analysed by the technique of univeriable 2 X 3 ANOVA and ANCOVA
and Non-parametric Chi-square test. The findings are - The disadvantaged
were significantly more field dependent as compared to the middle and
high SES groups. They also demonstrated a stronger preference for visual
modality as compared to the control groups. The disadvantaged were found
to be significantly more co-operative than the high SES group. Sex
difference were observed only in co-operation and elaboration. For co-
operation inter-action effects (Sex X SES) were also significant.

Rath Radhanath and Dash Srikanta, investigated about the
Development of Cognitive Processes in Children of Disadvantaged
backgrounds. To the researchers, a disadvantaged child is one who suffers
from a continuing inadequacy of material, affectional educational or socia-
provisions or who is subject to detrimental environment stresses of any kind, which are likely to interfere with the growth and development of his body intellect and sometimes his or her total personality. The findings of the study are - (1) The tribal children of earlier grades seem to be better than the rural urban children in respect of RCPM score, but when factor wise analysis is made the urban children seem to be superior to the other two groups of children in respect of conceptual factors, even though they are younger in age. (2) There is a steady increase from perceptual to conceptual abilities as the children proceed from lower to higher grades. (3) Tribal group has done better except for Visual Reception Test than the other groups. The scores of these test by and large correlate significantly with the RCPM scores indicating positive relationship with intelligence. (4) In respect to concrete concepts tribal and rural children score more than the urban children but the latter excels the other two groups in words Tribal and rural groups are better than the urban groups in respect of comprehension but this trend is reversed in case of organisation ability.

Violet Kalyan Mashi studied (1978), The Himalayan Mountain Children: Their performance on selected Piagetian Tasks. This exploratory study was undertaken in sundarnagar, Himachal Pradesh, India, to investigate the performance of 3 - 6 years old children on selected Piagetian tasks, related to sex, age and income level. A sample of 76 Ss. selected from two local schools consisted of 27 boys and 39 girls. Toy type materials, were individually administered in Hindi and Punjabi as preferred by the child in the session of 40 - 50 minute. The findings are as follows. About 52% of 5 years children could identify their own left and right body parts in spite of some confusion. Only 3% of 5 years could converse mass as compared with 16% of the Vain - Bang - Inhelder
standardisation sample and 19% of Elkind (1961) sample. From the low percentages of success on these operational tasks it is reasonable to conclude that these children are pre-operational by age were also pre-operational by performance.

Study 2, Violet Kalyan Mashi undertook the second study during the summer of 1981 to explore the relationship between cognitive performance and cognitive style. 76 children (B - 39, G - 37) of age group 6 - 11 years were selected and they were divided into three age groups viz. age group 1 (6 - 7 years old), age group 2 (8 - 9 years) and age group 3 (10 - 11 years). The tools used for this study were 8 Piagetian tasks and 2 psychomotoric tasks. Figure embedded Figure tasks. All tasks were individually administered in the same order to children in school. The findings are there was a clear and significant differentiation in cognitive performance between the three age groups. No significant differences by income level on Hurdles and no Transitivity. Significant sex differences in cognitive performance were non-existent except on Liquid in favour of the boys. Significant co-relation between cognitive style and cognitive performance across the three age levels were noted.

Sharma, S (1988) developed and administered Piaget-like standard tasks for measuring the development of science concept of Weight (W), Volume (V) and Density (D) among 11 - 16 years of age students. The findings revealed that the concept of V was conserved around the age of 15+. The concept of D showed only about 50% conservation by the age 16+. A developmental increases of various rates was noted on all concepts, however, on the D concept the Indian Sample was found to lag.
behind the Genevan Sample by 5 years. The development of logical thinking among students in a sequential manner was clearly in evidence.

Kumari Indira (1990) examined the development of abilities of conservation of mass, weight and volume and of seriation and classification in relation to intelligence and SES. Prediction were made about age-specific developments in various abilities and their relationship with SES and intelligence. While there appeared to be a general increase in the percentage of mass, weight and volume, conservers with an increase in children's age, the development was not clearly age specific. Similar results were found on seriation and classification tasks also. High intelligent children showed an earlier conservation of mass, weight and volume including the abilities of seriation and classification than low intelligent children. However none of these abilities appeared to be significantly related with this SES factor.

Malhotra, A (1990) adopted the tasks of Bruner and Piaget, and administered these to 1,000 students from the age 11+ to 15+ years. The classification, and the patterns of change in the criteria of categorisation were analysed. The findings revealed that the functional mode was the most specific mode of classification in the selected age group (11+ to 15+ years). The younger children used extensive superordinate and complexive modes more often than the older children. Classification skill showed a continuous increase from 11+ to 13+ years of age but the criterion of internalising the class inclusion skill was achieved only at the age of 15+ years. The complexity of task was found to adversely affect the degree of conservation and the skill of hierarchical classification.
Jain, M. (1984) gave 16 Piaget-type tasks in a group setting to adolescent boys and girls of varying age and topology of school. Non-verbal intelligence, differential aptitudes and the personality of subjects were also assessed. The study yielded a number of significant results. There was a decrease in concrete thought with decreasing age-levels, however, the incidence of this thought was greater among girls and government-school students than among boys and private school students. Classification and combinatorial skills showed a fairly clear development in accordance with age. Whereas probability, proportionality and conservation of volume did not provide such clear evidence of development. On classification tasks, the private school students generally performed better than those of government schools. Girls performed better in reasoning and combinatorial skills, while boys performed better on problem grasping and proportionally skills. Generally type variables of adolescent thoughts were significantly correlated with intelligence, linguistic ability and personality traits. Factor analysis yielded "total adolescent thought" and grasping the essence of the problem" as factors which accounted for major variance in performance on various cognitive tasks.

Behera M (1989) studied the effect of home environment and caste on the development of conservation ability of primary school children. Brahmin and Harijan children from enriched and poor home background were given a conservation ability test. The analysis revealed superiority of performance of Brahmin children over Harijan and of children from enriched home environment over those from poor home environment.

Gupta, S (1991) identified deprived and non-deprived adolescents of high and low SES, and analysed differences in their personality traits, level of adjustment, intelligence and academic
achievement. She found male students and students of non-deprived home environment to exhibit extrovert tendencies. The non-deprived students were more intelligent, more creative and high achieving as compared to deprived students. On the other hand, deprived students appeared to be over-protective, depressive, submissive and worried, and yet they showed a high academic self-concept.

Goal, A.K. (1992) studied the effect of early stimulation received at Anganwadi centre on the cognitive development of children between 4-5 years of age. He compared village children attending Anganwadi centres with those staying home. Since the familial, educational and economic profile of these groups was almost homogeneous, no discernible differences in the cognitive development of the groups were found. The study highlighted the importance of family support in cognitive development.

Mishra H.C. (1989) investigated the impact of bilingual experience on the cognitive skills metalinguistic competence, coding processes and educational achievement of tribal children of different grade levels. A wide variety of tests and tasks measuring intelligence, conservation abilities, memory reasoning and meta linguistic abilities were given to subject. The results revealed a general proficiency in memory and the use of strategies over unilinguals. Bilingualism also promoted children's metalinguistic competence including their analysed knowledge and control over language, and academic achievement. The findings revealed a greater differentiation in the cognitive structures of bilinguals than in those of unilinguals. These results bring out the experience of bilingualism as a facilitator of cognitive development.
Rajeshwari, B (1988) studied the levels of concept attainment in middle school-children and examined their relationship with intelligence and scholastic achievement. Variations in understanding taxonomy relations, problem solving, and principles of learning were particularly in the focus of this study. The pupils of higher grade were found to score higher than those of lower grade at the concrete and identity levels of concept attainment, including taxonomic relations and application of principles with evidence for minor differences for different types of concepts (e.g., tree, cutting tool, equilateral triangle). Boys generally scored higher than girls on the classificatory and formal levels of concept attainment, and on problem solving and application of principles. A complex pattern of correlation between intelligence and various levels of concept attainment and between concept attainment and scholastic achievement was noted, and a similarity in the factor structure of concept attainment of pupils of all grade was demonstrated.

Gaysre, A (1988), examined the performance of some conservation task as a result of children's exposure to Smedsund's Cognitive Conflict Training (SCCT), Bruner's Language Activation Training (BLAT) and Beilin's Verbal Rule instruction Training (BVRIT). While SCCT technique did not promote conservation level, the BLAT and BVRIT appeared to be quite effective techniques in improving the conservation status of non-conservers.

Shah, S.H. (1992). Boys and girls of class IX were given a series of lessons which aimed at promoting the development of the concerned skills. The effect of the decision making programme was found to be highly placed among girls as compared to boys in the samples characterised by low intelligence. The programme aimed at the development of creative
thinking skills appeared to be equally effective for all the groups. Even the intelligence scores showed a significant increase, particularly on the items of the opposite words, class identification mathematical reasoning and social reasoning as a result of exposure to educational programme.

Chottray B (1989), analysed self developmental planning, future perceptions and dreams of Nolia (a fishermen's community in Orissa) children. The Piagetian clinical interview technique was used in the collection of data. It was found that schooling shaped not only the anticipation of the future and the development of the self, it also influenced the contents of dreams of children. Schooling children of high caste groups appeared to be more ambitious and confident about achieving future goals than schooled or unschooled Nolia children, but schooled Nolia children able to recall the exact dreams more clearly than other groups.

Mohan G (1988) studied about the cognitive preferences among high school students in relation to certain attitudinal academic and personal variables. Generally, the attitudinal and personality variables (extroversion, neuroticism and achievement motivation) showed no significant relationship with any of the cognitive preference dimensions. Similarly, no significant relationship between academic achievement and cognitive preference dimensions of “reception-discovery”, “passivity-activity” and “superficialities depth” was discovered, however a negative relationship was indicated dimensions of “concreteness-abstractness”, “Induction-deductions” and “analysis-synthesis”.

Panda, S (1991) studied age and gender differences in the filed dependent and filed independent cognitive style of pre-school children and examined its relationship with intelligence, receptive vocabulary and
nine different aspects of autonomous achievement striving. The findings revealed no significant difference in the level of field independence of boys and girls, whereas a developmental increase towards field-independence was quite evident. Intellectual ability and the variables of autonomous achievement striving were generally found to be significantly correlated with field independence only for the 5 year old boy's sample. For the 4 and 6 year age samples, none of the variables appeared to be correlated with field-independence.

Shukla, M (1991) studied the influence of child-rearing practices on the development of cognitive style and locus of control among individuals of different localities, SES and family structure. The findings revealed virtually no relationship between cognitive style and locus of control. While the relationships among were positive and significant, only the family structure (nuclear) and SES (low) were found to be positively associated with field independence.

3.4. SUMMARY OF THE STUDIES REVIEWED:

The studies related to cognitive development throughout the globe is extensive one but it is to be noted that, the vast majority of empirical cross cultural Piagetian studies have been concerned with a single stage that of concrete operation giving more importance on conservation tasks. Though recently some studies concentrated on sensori-motor and formal stage but these cannot be regarded as sufficient enough. It is only in 1970's onwards the Indian researchers become interested on Piaget's theory. A number of studies were done on this sub continent, some of which has reviewed in this chapter along with the Western studies.
On the basis of the reviewed literatures both Western and Indian, it has been found that the studies done can be categorised as follows:


   (a) These cross cultural studies of replication nature of Piaget’s task confirmed Piaget’s findings with regard to the development of the conservation progressively with age and also Piaget’s contention of sequence of stages and ages at which a particular concept of conservation starts developing.

   (b) Only a few studies have observed minor departures in the ages of attainment of conservation concepts in different area and in different cultures as well (Sacket 1971, Al Fakhri 1976, Al Shaikh 1976, Panda 1969, Gaudia 1972, Dasen 1972).

   (c) Some studies have marked the slight but non-significant differences in sex in favour of boys rather than girls (Singh 1976, Bevli 1978) while most of the studies find no sex differences in conservation abilities.
2. Studies on relationship of concepts with other independent variables:


3. Studies having training components:


Studies have also attempted the analysis of the effect of education on cognitive processes through a comparison of schooled and unschooled children using certain non conventional measures. Chhotray, B (1989), Mohan G (1988)
4. Studies on Cognitive style: Correlates and outcomes:

In the studies of perception, Witkin H.A. et al. (1962) had reported a consistent tendency on the part of individuals to psychologically operate on a number of tests measuring perception of upright and restructuring of perceptual field. It was found that individuals either showed a consistent reliance on field forces (hence called field dependent, F.D.) or exhibited a tendency to function independently or field forces (hence called field-independent, F.I.). Since the tendency was found to be generalised to other tasks that required cognitive operations. (Witkin H.A. and Good enough. D.R. 1981) the construct was referred to as “Cognitive Style”. Panda S (1991), Skukla M (1991), Sharma P. (1990) also did the same type of study on cognitive styles.