CHAPTER - II

REVIEW OF RELATED LITERATURE

2.1 Introduction

The review of related literature helps a researcher to ensure that the work he/she has undertaken is not a repetition of the work already done. It helps the researcher to build on the current knowledge and explore new horizons. The researches that are similar to the studies undertaken help the researcher to define his/her work more specifically. The basic concerns in any review of research are to find out if there are researches conducted in the related areas and to see what implications they have on the current study.

The review of related literature done with respect to the present study is presented in this chapter in three parts. The first part deals with relevant researches and literature available, both in India and abroad. The second part presents the synthesis of the review done and an overview of all these studies in terms of their implications for the present study is presented in the third part.

PART - I

2.2 Foreign Studies on Structure of Intellect Model – A Review

The studies conducted in this area are reviewed in this section. The number of pertinent studies conducted abroad in this area is small in number and their reviews are presented in this chapter.
Mary Williams (1969) studied the Structure of Intellect Factors as determined by Stanford-Binet in kindergarten boys.

This study investigated factors of Guilford's Structure of Intellect in Kindergarten boys using Meeker's Structure of Intellect Analysis of Binet responses. It was also concerned with the relationship of these Structure of Intellect Binet patterns and behavioural characteristics.

Findings

i. Thirty Five of the 50 boys in the study showed deficits in "Memory" Operations on the Structure of Intellect profiles.

ii. 38 Boys showed strengths in the Figural dimension of "Cognition".

iii. 12 of the boys showed strengths in Semantic dimension throughout all five operations.

iv. Six boys showed strength in Evaluation.

v. Boys with IQ's over 120 showed a greater number of strengths in "Memory" and the Semantic dimensions throughout the Structure of Intellect profile than those with IQ's below 120.

vi. The six boys considered educationally handicapped by their Structure of Intellect profiles showed higher total weighted scores on both 'parents' and 'teachers' ratings on the Burk's Scale indicating that their behaviour problems were noticed to a more severe degree.
vii. 12-20% who were rated as having a problem to a 'considerable' degree regarding a poor self-concept also had low Divergent production scores.

Feldman, B. (1970) studied the relationship between Structure of Intellect (selected) factors and academic achievement at the primary level.

The concern of this study was the discovery of specific intellectual correlates of first-grade reading success. The study was designed to test the predictability of first-grade reading achievement from selected intellectual abilities that were defined in Guilford's Structure of Intellect model. The study sought to confirm the existence of CFU-V, MFU-V, MFU-A, EFU-V and CMU at the 6 year level, to establish the existence of CFU-A and EFU-A at the 6 year level, and to identify those Structure of Intellect abilities that significantly correlate with first grade reading achievement out of CFU-V, CFU-A, MFU-V, MFU-A, EFU-V and CMU. The Content of information selected for this study was Figural.

Findings

i. The factors MFU-V, MFU-A, EFU-V and CMU were confirmed at the 6-year level, while CFU-V was extended for first time from 5 year level to the 6 year level.

ii. CFU-A emerged as a new factor at the six-year level. It did significantly increase multiple regression by 3 per cent.

iii. EFU-A was identified as a unique factor for the first time at any age. EFU-A played a minor role in word
reading and was virtually absent in paragraph meaning.

iv. CFU-V was the only factor not significantly related to reading achievement in first-grade.

v. EFU-V was another strong predictor of reading success, accounting for 12% of the total variance.

vi. CMU, the ability to comprehend the meaning of words was also a significant predictor of reading skill, both for word reading and paragraph meaning.

vii. CMU accounted for 7% of success in total reading.

Brown Darrell (1971) conducted a study which sought to find whether some mental abilities, measured by items on the Standard-Binet Scale, are more closely related to the sex and social class status of preschool children than are others and the relative magnitude of the relationships that could be predicted from Guilford's Structure of Intellect (SOI) theory of intelligence. Subjects for the study were drawn from a pool of 616 children between the ages of 3 years and 2 months and 4 years and 7 months, who were routinely tested over a 2½ year period for possible early entrance into kindergarten in the sampling community.

*Findings*

i. Cognitive abilities showed more frequent and larger statistical relationships to social class than did other thinking processes measured by the Binet.

ii. Those items categorized as Semantic in Content were more often significantly related to social class and tended to yield correlations of greater magnitude than
items measuring Figural Content. All significant correlations favoured the High Status group.

iii. There was no systematic increase in magnitude of relationships along the Structure of Intellect Products dimension for 3 and 4 years old.

iv. The only phi co-efficients significantly relating sex and scores on Semantic items did favour girls.

Meeker, M. N. (1971) studied memory factors and school success of average and special groups of ninth-grade boys. Study focused on short-term memory in its relation both to the Structure of Intellect and to differential school success.

The purpose of the study was to investigate the assumption that immediate Memory is molar and to ascertain whether certain tasks which are assumed to test Memory not only demand but are predicated upon different kinds of Memory abilities. It sought to differentiate span-type Memory abilities in ninth-grade boys of average intellectual ability and to determine whether specific Memory abilities can be related to specific curricular tasks. It also sought to determine whether specificity in Memory is due in part to mode of input.

Findings

i. Factor analysis of the resulting inter-correlation matrix yielded 6 interpretable factors, of which three saturated the 8 span tests. These were thus identified as three of the anticipated 4 factors. A very clear Auditory-forward factor (VI) completely fulfilled expectation. The Auditory-backward (II) also saturated one Visual-forward test; the Visual-backward factor (V) saturated one of the Visual-
forward test. Thus, while three Memory factors emerged unmistakably independent of the other tests, they cross-loaded each other some what. The Memory tests did not load to any extent on the other factors nor did other variables load importantly on the memory factors.

ii. High and low scores of Auditory-backward (II) were distinguished in arithmetic and in language sentences. Visual backward (V) related to spelling, but also distinguished language sentences as well. High and low scorers on Auditory-forward (VI) did not distinguish subject matter achievement but did relate to spelling, which was affected by Auditory-backward as well. Spelling was thus predicted by all three Memory factors. Reading was not significantly related to any, because reading is complexly determined.

iii. The most dramatic difference occurred for Behaviour problem vs. Educational Handicap where all three Memory factors clearly distinguished the groups. The maths groups were distinguished primarily by Auditory-backward as predicted, but also somewhat by the other two Memory scores. The two English groups were distinguished significantly only by Visual-backward (V).

Billie Hays and Esther Pereira (1972) studied the effect of visual memory training on reading ability of kindergarten and first grade children. The purpose of this study was to determine whether a specific cell, (MFU-V) of Structure of Intellect can be significantly affected by training KG and first grade children, and whether improvement in MFU-V has a significant effect on reading achievement of first grade children.
Findings

i. No relation was found between Visual Memory and chronological age, Visual Memory and home environment, Visual Memory and mental age or Visual Memory and sex, favouring girls.

ii. A low correlation of Visual Memory with the auditory score of the ITPA pointed out the differentiation of receptor modalities.

iii. Median scores on the MFU-V subtest of both control and experimental groups improved significantly.

iv. There was no significant difference between pre-test and post-test scores for either group.

v. The median scores of both control and experimental groups on the MSU-V subtest improved significantly.

vi. Both control group and experimental group exhibited improvement in MFU-V and MMU-V due to maturational factors.

Dailey, Joanne V. (1975) studied the effect of selected Structure of Intellect memory ability materials on second grade reading achievement. The purpose of this study was to determine if there was a significant difference in visual and auditory memory abilities and reading achievement between disadvantaged second grade pupils whose curriculum consisted of systematic experiences in selected Structure-of-Intellect memory ability materials (experimental group) and disadvantaged second grade pupils who have not had access to these systematic experiences using the S.O.I. memory ability materials (control group).
It was found that the desired level of significance was reached from three criterion variables: reading vocabulary, reading comprehension and auditory memory. Sex differences and the interaction between treatment and sex were not found to be significant.

In view of these results, it was concluded that reading vocabulary, reading comprehension and auditory memory skills for these pupils improved significantly through the use of daily S.O.I. memory ability experiences.

2.3 Indian Studies on Structure of Intellect Model – A Review

The studies conducted in this area in India are reviewed in this section. The number of pertinent studies conducted in India is also small in number and their reviews are presented below.

**Zafar, S.U. (1976)** conducted an experimental study of retention of phonemic and semantic information in short and long term memory in relation to certain personality variables. The study was undertaken to determine the differential effect of the type of task similarity (i.e., phonemic and semantic similarity), anxiety and imagery type (i.e., visible and audible) on short and long term memory.

*Findings*

1. Phonemic similarity had detrimental effect on the short-term recall but had no such effect on the long-term recall.

2. Semantic similarity depressed the long-term recall but had no effect on the short-term recall.
3. Both anxiety and imagery type had no differential effects on the short and the long-term recall.

4. An interaction was found between imagery type and similarity in the case of long-term recall. No such interaction was found in the case of short-term recall.

**Girish Bala (1978)** conducted a study regarding a factor analysis of reasoning ability of 13, 14, 15 years old children studying in Delhi higher secondary schools.

The major hypotheses were:

1. It is possible to identify the independent factors - CMC, CMR, CMI, NMC, NMR and NMI, and Guilford's SI model constituting reasoning ability, among children of 13, 14 and 15 years of age, and

2. The factors constituting reasoning ability emerge more clearly with experience, i.e., they can be more clearly identified at 14 rather than at the lower age levels.

**Findings**

i. The first hypothesis was partially substantiated as much as factor cognition of semantic implications (CMI) emerged clearly in age groups 14 and 15.

ii. The second hypothesis that the factors constituting reasoning ability emerged more clearly with experience, was partially substantiated.

iii. The following factors were identified: Inference or General Cognition or Convergent production, Perception of Abstract similarities or Convergent production of Semantic Classes and Relations, Induction or deduction of conceptual relations or
Cognition of Semantic Classes and Relations, Association or Relational Thinking or Diffused Convergent Production and Cognition of Semantic Implications, Conceptual Foresight or Cognition of Semantic Implications, Deduction or General Convergent Production, and Apprehension of Relations or Mixed Classifications and Relations.


The major purpose of the study was to clarify the nature of relationship among creativity, intelligence and school achievement, and especially to test for interactive effects of intelligence and creativity upon achievement in different school subjects. It also examined the Getzels-Jackson Effect besides testing Anderson's ability gradient theory in terms of the existence or otherwise of the maximum and minimum intelligence thresholds.

Findings

i. There were no sex differences in intelligence figural creativity and achievement in Telugu, general science and social studies. Significant sex differences in verbal creativity and achievement in English and maths were found in favour of girls. The performance of either sex was better on the verbal than on the figural TTCT.

ii. The average correlation between intelligence and verbal TTCT ($r=0.21$) was not only significant but was also higher than that between intelligence and figural TTCT ($r=0.10$). These correlations were higher for
girls than for boys. Further the correlations between verbal TTCT and school achievement were as high as those between intelligence and school achievement.

iii. The hypotheses of interaction between intelligence and creativity as they affected school achievement were not supported in 34 out of the 35 sets of 7x3 factorial analysis of variance. There was a significant dis-ordinal interaction between intelligence and figural elaboration, although no definite trend in their effect on the English language was noticed.

iv. The main effects of both intelligence and creativity were significant in 33 out of the 35 analysis of variance involving intelligence, verbal and figural creativity measures and school achievement and the form of relationship was such that intelligence and creativity tended to be additive and more or less linear in their effect on school achievement.

Chauhan, C.P.S. (1980) conducted a study with respect to evaluation in algebra with reference to abilities of structure of intellect model.

The purpose of the present study was two fold: first, verification of the findings of the previous studies in the Indian context; second, investigation of sex differences in the pattern of predictor abilities in case of tenth grade algebra.

The main objectives of the study were:

1. To determine the pattern of selected SI abilities as predictors of achievement in tenth grade algebra.
2. To examine the relevance of previous findings with regard to Indian situation.

3. To investigate sex differences in the role of SI abilities in the prediction of achievement in algebra.

Tests to measure the relevant abilities were selected from the list given by Guilford and Hoepfner (1971). These tests were developed by the investigator himself for the abilities like:

2. Convergent production of symbolic relations – (NSR) – Correlate completion word.
5. Cognition of semantic units – (CMU) – Synonyms

The above mentioned 8 tests were used as independent predictor variables for the present study. The marks obtained by students in the annual exams were the criterion scores. These tests were administered to 203 students of Class X in selected schools of Delhi city. Inter correlation and regression analyses were used to analyse the data.
Findings

1. Out of eight SI abilities selected for the present study, only three were found to be relevant for predicting achievement of students in algebra. They were CMU, CST and NSS.

2. The pattern of predictor variables exhibited sex difference. In case of boys, only the SI ability, namely NSS was found to be the best predictor of achievement in algebra, the remaining abilities were totally absent. In case of girls, two abilities, namely CSI and CMU were found relevant, the former being a measure of ability to draw inference and latter of verbal factor.

It can be concluded that in case of boys, numerical ability plays a prominent role in doing algebra and in case of girls verbal factor occupies significant position.

Katageri, B.S. (1981) conducted study on construction and analysis of Guilford's type tests for some selected Semantic abilities in school going children. The objectives of study were: (1) To develop tests for some Semantic abilities of the Structure of Intellect model for children studying in IX standard; (2) To analyse graphically the inter-relationship among tests hypothesized for the factors; and (3) To identify the tests that may possibly be good factor representatives.

The study was carried out in two phases, in the first phase test items for Guilford's Structure of Intellect factors, such as, (1) Cognition of Semantic Units (CMU), (ii) Cognition of Semantic Classes (CMC) (iii)
Cognition of Semantic Systems (CMS), (iv) Memory of Semantic Implications (MMI), (vii) Divergent Production of Semantic Transformations (DMT), and (viii) Evaluation of Semantic Classes (EMC) were developed. In the second stage, graphical unit relationship among the tests hypothesized for the factors was done preparing correlation profiles. One hundred and fifty boys of class IX constituted the sample for the study.

The investigator concluded that:

i. Tests constructed for the eight factors when individually considered with those factors with which each significant correlation were different could be used in future.

ii. The factors are CMU, CMC, CMS, MMI, DMT and EMC.

Singh, D.R. (1983) conducted a study of memory, symbolic representation and some other mental abilities in relation to achievement in Chemistry at graduation level.

Findings

1. The four mental abilities selected under this study showed positive influence over achievement in Chemistry at the graduation level.

2. The regression coefficient calculated from the scores of boys and girls revealed that reasoning and symbolic representation abilities contributed much to the criterion.

3. Regression equation can be used in predicting performance in Chemistry of boys and girls at the graduation level.
4. The regression coefficient and multiple R calculated from the scores in the predictors provide *raison de être* for their inclusion in the in the undetermined variables.

**Ari, P.G. (1984)** conducted a study on the development and detailed items analysis of Guilford's type test of some Semantic abilities. The objectives of the study were: (i) To develop tests for some selected Semantic abilities of Structure of Intellect model; (ii) To undertake item analysis in two stages: 1st stage (i) Determining difficulty index, and (ii) Test-factor total correlation coefficients as indicators of item discrimination. 2nd stage: (i) Determining difficulty index, and (ii) Determining factor-total correlation coefficients as indicators of discrimination validity; and (iii) To identify the tests that are good representative of proposed factors.

The investigator constructed test items for Guilford's Structure of Intellect factors, such as: (i) Cognition of Semantic Classes (CMC), (ii) Cognition of Semantic Relations (CMR), (iii) Cognition of Semantic Systems (CMS), (iv) Convergent Production of Semantic Classes (NMC), (v) Convergent Production of Semantic Relations (NMR), (vi) Convergent of Semantic Units (DMU), (ix) Divergent of Production Semantic Classes (DMC), (x) Divergent Production of Semantic Relations (DMR), (xi) Evaluation of Semantic Classes (EMC), (xii) Evaluation of Semantic Systems (EMS), and (xiv) Evaluation of Semantic Transformations (EMT). Thirty boys in class IX constituted the sample of the study. Biserial co-efficient of correlation was used for the analysis of data.
The investigator concluded that,

i. the tests whose difficulty index value for above factors was between 0.40-0.60 and discrimination index was above 0.25, and

ii. the tests constructed for selected Semantic abilities, i.e., CMR, CMC, CMS, MMU, MMC, MMT, DMU, DMR, NMC, NMT, EMC, EMS of Guilford’s Structure of Intellect model taking IX standard children into consideration could be used in future.

Tiwari, N. (1986) conducted a study on investigation into inter-relationship between measures of selected Guilford’s Structure of Intellect Factors and Set concept achievement of secondary level students of Delhi.

i. Most of the reasoning ability tests had significant, low and positive correlations among themselves.

ii. Inter-correlations among six Set concept achievement tests ranged from 0.142 to 0.469.

iii. Factor analysis of the inter-correlation matrix of 19 reasoning ability tests resulted in the identification of factors Inductive Reasoning or Cognition of Semantic Implications, Deductive Reasoning or Convergent Production of Semantic Implications.

iv. Factor analysis of the inter-correlations of six Set concept achievement tests resulted in the extraction of two factors Ach I-concept of Set, and Ach II-concept of Function.
v. Correlations between reasoning ability tests and the composite of Set concept achievement, except for seeing problem tests, were all significant.

vi. Factor analysis of the inter-correlation matrix of 19 reasoning ability tests together with composite Set concept achievement shared significant loadings on deductive reasoning of Convergent Production or Cognition of Semantic Implication factors.

vii. Multiple regression analysis revealed that five tests, namely, Effects, Figure concept test, Association IX test, Syllogism III test, and Sequential association test, contributed significant variance to the variance of composite Set concept achievement. Three tests, namely, Word matrix test, Association IV test and Syllogism III test, contributed significant variance to the variance of the concept of Set and Word classification test, Effect test and Figure concept test contributed significantly to the variance of the achievement of the concept of Function.

Mirajkar, R.G. (1987) studied some selected Figural, Symbolic and Semantic abilities by means of Structure of Intellect factors tests. The objectives were: (i) To develop tests for some selected Figural, Symbolic and Semantic abilities of Structure of Intellect model; (ii) To establish reliability and validity of the tests; (iii) To establish only tentatively factor-wise and sum-wise norms for the test; (iv) To make a comparative study pattern of abilities using profiles of factor-wise performance of selected students.
Findings

i. The validity of the test battery was found to be 0.71.

ii. The reliability of the whole test was found to be 0.80.

iii. The mean and standard deviation scores were 700 and 67.6 respectively. The Skewness was 10.95 and Kurtosis was 0.258 which means that the given distribution was very much normal.

iv. Profiles showed that although the five individual total scores were more or less same, the profiles of each individual differed from the other. The ability of an individual varies from factor to factor.

v. The study found that the performance of students was generally good in abilities like ; CMC, DMU, DMC, DFT and DSR. The performance of students was relatively inferior in abilities like ; CST, NST, DSI, DFS and NFT.

Khire, Usha (1989) conducted a study for the construction of a battery of tests based on Guilford’s SOI model.

Objective : To construct 90 tests for measuring 90 factors from figural, symbolic and semantic areas in Guilford’s SOI model and to standardize them for three high school levels, viz., Standards VII, IX and X.

Findings

1. The indices of internal consistency and homogeneity were mostly satisfactory. 2. Test-retest correlations ranged widely, were lower for tests of memory and higher for those of symbolic and semantic content and cognition. 3. Test-retest correlations for composite scores form a single content-operation category were higher than those for individual
product tests. 4. The sex difference was not always consistent and significant. Though urban-rural difference was observed very often, it was not always in favour of the urban group. 5. Metropolitan-urban difference was greater than urban-rural difference. The group means generally increased with grades but there were some reversals. The more striking observation was that our students were not acquainted with many processes of thinking involved in SOI tests. 6. The independence of factors was evidenced in the product-wise analyses. It was more so across the content. The content-wise and operation-wise analyses yielded some higher order factors common to products in the same content-operation category. Thus, the results suggested greater possibility of distinction between contents and operations than between products.

Suri Ishwar Saran (1989) investigated into the structure of reasoning ability of 14 year old students belonging to rural and urban areas.

Cultural diversity is one of the common characteristics shared by societies the world over. Hence, the structure of intellect abilities are expected to vary considerably across groups. The investigator tested this assumption in a study of the reasoning ability of rural and urban students. Factor analysis of data yielded cognition of semantic classes, cognition of semantic relations and convergent production of semantic implications as 3 major factors accounting for the reasoning ability of rural children. For the urban group, on the other hand, convergent production of semantic classes emerged as the only factor to account for students' reasoning ability.
Harapanahalli, J. G. (1994) conducted a comparative study of Guilford's Cognitive abilities among the advantaged and disadvantaged students. The objectives of the study were: (i) To compare Guilford’s Cognitive factors among the advantaged and disadvantaged students; and (ii) to compare Guilford’s Cognitive factors among students when they are classified according to sex.

Findings

i. The advantaged and disadvantaged students differed significantly in their abilities factors like CMR, CMS, CFT and CBI.

ii. Both the advantaged and disadvantaged students were alike in their factors/abilities like CMC, CSI, CFR, CFS, and CBR.

Venugopal, G. (1994) conducted a correlational study of the intellect profile and the achievement of middle school pupils.

Objectives: (1) To study the intellect profile of middle school pupils, (2) to measure the achievement of the pupils, (3) to ascertain the relationship between intellectual profile and achievement, (4) to find out the relationship between intellectual abilities and gender, (5) to find out the relationship between intellectual abilities and socio-economic status of parents, and (6) to study the relationship between achievement and gender.

Findings

1. Boys and girls differed in their intellectual abilities. 2. Pupils differed in their intellectual abilities whose fathers differed in their
educational status. 3. The intellectual abilities influenced the total achievement of the pupils in Biology. 4. Cognition, memory, convergent production, divergent production and evaluation abilities under 'operation' influenced the total achievement in Biology. 5. The intellectual abilities influenced the achievement of pupils in knowledge, understanding, application and psychomotor skill objectives. 6. Educational status of the fathers was related to the achievement of the pupils. 7. There was no relationship between the achievement and the gender of the pupils. 8. Achievement was related to intelligence, parental educational status, occupation and income. 9. Pupils from low socio-economic strata needed compensatory education programmes.

Pednekar, R. G. (1995) conducted a comparative study of Guilford's Convergent abilities among the advantaged and disadvantaged students. The objectives of the study were: (i) To compare Guilford's Convergent factors of advantaged and disadvantaged students; and (ii) To compare Guilford's Convergent factors of students when they are classified according to sex.

Findings

i. The advantaged and disadvantaged students differed in their Convergent Production abilities like NFC, NFT, NSI, NSR and NMC.

ii. The advantaged and disadvantaged students differed in their Convergent Production abilities like NMU, NSC, NSS, NST, NMR, NMS, NMT and NMI.
iii. The advantaged and disadvantaged boys differed significantly in all the thirteen Convergent Production factors.

iv. The advantaged and disadvantaged girls differed significantly in their Convergent Production abilities like NFC, NFT, NSI, NMU, NSC, NSS, NST, NMC, NMR, NMT and NMI.

v. The advantaged and disadvantaged girls were alike in their Convergent Production ability NSR.


The objectives of the study were:

1. To compare Guilford’s memory factors among the advantaged and disadvantaged students; and

2. To compare Guilford’s memory factors among the students when they are classified according to sex.

The memory factors selected for the study were: MFU, MFS-V, MSU, MSC, MSR, MSI, MMU, MMS, MMT and MMI.

Findings

1. Both the advantaged and disadvantaged students differed significantly in all the memory factors.

2. Both the advantaged and disadvantaged boys differed significantly in their memory abilities like MFU, MFS-V, MSC, MMU, MMS and MMI.

3. The advantaged and disadvantaged boys were alike in their memory abilities like MSU, MSR, MSI and MMI.
4. Both the advantaged and disadvantaged girls differed significantly in their memory abilities like MFU, MSR, MMU, MMS and MMI.

5. Both the advantaged and disadvantaged girls were alike in their memory abilities like MFS-V, MSU, MSC, MSI and MMT.

Ramachandrachar, K. (1997) conducted a factor analytical study of some selected structure of intellect factor based tests in Kannada for the children of school leaving age.

The purpose of the study was to analyse 25 Structure of intellect factor based tests in Kannada language, including 2 tests of creative thinking. Factor analysis yielded five prime factors which accounted for a major portion of variance in the intellectual performance of high school students. The analysis did not yield a separate factor which may be referred to as the 'originality' factor.


**Findings**

i. The advantaged and disadvantaged students differed in their Divergent Production abilities like DFU, DSU, SMU, DSR, DMR, DFS, DMS, DMI, DFI and DMI.

ii. The advantaged and disadvantaged boys differed in their Divergent Production abilities like DFU, DSU, DMU, DSR, DMR, DFS, DMS and DMI.
iii. Both the advantaged and disadvantaged boys were alike in their Divergent Production abilities like DMI and DFI.

iv. The advantaged and disadvantaged girls differed in the Divergent Production abilities like DSU, DMU, DFI and DMI.

v. Both the advantaged and disadvantaged girls were alike in their Divergent Production abilities like DFU, DSR, DMR, DFS and DMS.

Martha Pujar (2001) conducted a study on relative effectiveness of selected Guilford’s evaluation factors in predicting changes in academic achievement.

The objectives of the study were: (i) To investigate the relationship between performance of boys in different evaluation abilities and their total academic achievement, (ii) To investigate the relationship between performance of girls in different evaluation abilities and their total academic achievement, (iii) To investigate the relationship between performance of secondary school students in different evaluation abilities and their total academic achievement, (iv) To determine the relative efficiency of different evaluation abilities of boys in predicting changes in total academic achievement, (v) To determine the relative efficiency of different evaluation abilities of girls in predicting changes in total academic achievement, (vi) To determine the relative efficiency of different evaluation abilities of secondary school students in predicting changes in total academic achievement, (vii) To compare the profiles of
evaluation abilities among 'high achiever', 'average achiever' and 'low achiever'.

The study was carried out involving 10 Guilford's Evaluation factors/abilities, such as, (i) Evaluation of Symbolic Units (ESU), (ii) Evaluation of Symbolic Classes (ESC), (iii) Evaluation of Symbolic Relations (ESR), (iv) Evaluation of Symbolic Transformations (EST), (v) Evaluation of Symbolic Implications (ESI), (vi) Evaluation of Semantic Units (EMU), (vii) Evaluation of Semantic Classes (EMC), (viii) Evaluation of Semantic Relations (EMR), (ix) Evaluation of Semantic Transformations (EMT), and (x) Evaluation of Semantic Implications (EMI).

Findings

i) There was a significant relationship between ESU, ESC, ESR, EST, ESI, EMU, EMC, EMT and EMI and total academic achievement in boys.

ii) There was no significant relationship between EMR and total academic achievement in boys.

iii) There was a significant relationship between ESU, ESC, ESR, EST, ESI, EMU, EMC, EMR, EMT and EMI and total academic achievement in girls.

iv) There was a significant relationship between ESU, ESC, ESR, EST, ESI, EMU, EMR, EMT and EMI and total academic achievement in secondary school students.

v) EMI had the highest contribution to the total academic achievement, and EMR had the suppressing effect on the total academic achievement of boys.

vi) EMC had the highest contribution to the total academic achievement, and EMU as well as EMR had the
suppressing effects on the total academic achievement of girls.

vii) EMC had the highest contribution to the total academic achievement, and EMU as well as EMR had the suppressing effects on the total academic achievement of secondary school students.

vii) High achievers performed high in the Evaluation abilities like ESU, ESC, EST, ESI, EMU, EMC, EMR, EMT and EMI.

ix) Average achievers performed above average in Evaluation abilities like ESU, ESC, EMT, EMU and EMI and performed below average in ESR and ESI abilities.

x) Low achievers performed just above average in ESI, and performed below average in ESC, ESR, EST, EMU, EMC, EMR and EMT abilities.

Sujatha, S. (2001) conducted a correlative study of the selected Guilford's memory factors in relation to the achievement of IX standard students studying in State schools and Central schools of Bangalore city.

The objectives of the study were: (i) to assess the level of Guilford's memory factors among the students studying in State schools and Central schools of Bangalore city, (ii) to compare the Guilford's memory factors among the students studying in State schools and Central schools of Bangalore city, (iii) to compare Guilford's memory factors among male and female students, (iv) to compare Guilford's memory factors among students studying in aided schools and government schools of Bangalore city, (v) to find out the relationship between the memory factors and academic achievement of students.
Findings

(i) There was a significant difference in the mean memory scores of State and Central schools students with respect to MFU, MFS-V, MMU, MMS, MMT, and MMI. (ii) There was a significant difference in the mean memory scores of male and female students with respect to MFU, MSC, MMS, and MMT. (iii) There was a significant difference in the mean scores of government and aided school students with respect to MFU, MFS-V, MSU, MSC, MSR, MDI, MMU, MMS, MMT and MMI. (iv) There was no significant difference in the mean scores of State and Central school students with respect to MSU, MSC, MSR, and MSI. (v) There was no significant difference in the mean scores of male and female students with respect to MFS-V, MSU, MSR, MSI, MMU and MMI. (vi) There was a significant relationship between the memory scores and academic achievement of students in total.

Shetti, P. N. (2003) conducted a study to determine the efficiency of Guilford’s evaluation abilities in predicting changes in academic achievement in Mathematics.

The study was carried out involving 10 Guilford’s Evaluation factors/abilities, such as, (i) Evaluation of Symbolic Units (ESU), (ii) Evaluation of Symbolic Classes (ESC), (iii) Evaluation of Symbolic Relations (ESR), (iv) Evaluation of Symbolic Transformations (EST), (v) Evaluation of Symbolic Implications (ESI), (vi) Evaluation of Semantic Units (EMU), (vii) Evaluation of Semantic Classes (EMC), (viii) Evaluation of Semantic Relations (EMR), (ix) Evaluation of Semantic Transformations (EMT), and (x) Evaluation of Semantic Implications (EMI).
The objectives of the study were: (i) To study the relationship of Evaluation abilities with academic achievement in Mathematics among SC, ST and General Category students. (ii) To determine the relative efficiency of Evaluation abilities in predicting changes in academic achievement in Mathematics. (iii) To determine the direct and indirect effects of the Evaluation abilities on academic achievement in Mathematics among SC, ST and General Category students. (iv) To determine the cluster of Evaluation abilities in terms of their contribution to variations in academic achievement in Mathematics among SC, ST and General Category students.

Findings

(i) There was a positive and significant relationship between Guilford’s Evaluation Abilities, viz., ESU, ESC, ESR, EST, ESI, EMI, EMC, EMR, EMT, EMI and academic achievement in Mathematics among SC, ST and General Category students. However, the relationship between ESI and academic achievement in Mathematics was not significant for ST category students.

(ii) In case of SC category students, EMT with 34.49% variance was seems to be the best predictor, whereas ESC and ESI had suppressing effects on academic achievement in Mathematics.

(iii) In case of General Category students, EMI with a variance of 27.65% was seems to be the best predictor, whereas EMT,
EMU and ESC had suppressing effects on academic achievement in Mathematics.

2.4 Researches / Literature on Reading Comprehension

Smith (1971) defines "reading is a common process in which the reader plays an active role ... all aspects of reading from the identification of individual letters or words to the comprehension of entire passages, involve the reduction of uncertainty."

Durojaiye (1978, as in Chellamani, 2001) found out that malnutrition is associated with intellectual backwardness. Great deal of repetition and rehearsal is needed for learning. He did researches on intellectual framework and reading. Their findings are listed below;

1. Cognitive confusion was the common state of young beginners in their thinking about units of print (or writing too).

2. Attending to whole words and their pronunciation and over a period of time learning to make intuitive generalizations about phoneme-grapheme relationships, the child will acquire a sound basis of phonic knowledge.

3. Partially sighted children's reading efficiency was increased using special teaching aids rather than depending on Braille.

4. Malnutrition was associated with intellectual backwardness, a great deal of repetition and rehearsal is needed.

Rivers, Wilga M. (1968) found that in order to attain speed and comprehension the reader must know what signals to look for and what
signals to assume because of expectancy habits which he had developed in the new language. The author stated that teachers must learn not to become too concerned that the students will have the exact meaning of what they are reading. They should be encouraged to make intelligent guesses.

Kavale (1981, as in Chellamani, 2001) found out that children make greater gains when they receive prescriptive, structured, individualized interventions. These language programmes stimulate children’s receptive reasoning and expressive language in several ways. They build vocabulary, model the construction of syntactically accurate sentences, encourage problem solving and generation of information through dialogues, analyse sentence structure, and train such skills as description, classification, logical reasoning facility with opposites, synonyms, analogies, absurdities and ability to describe functional relationship.

Carpenter and Just (1977 as in Chellamani, 2001) used 10 subjects and explored 3 devices that indicate how the current sentence relates to the preceding old information; pronominal reference, the entailed agents and instruments of verbs and cleft constructions.

They found that,

1. there should be more regressive fixations to the noun.
2. when recalling the pronoun, sentence, subjects often substituted the interpreted referent.
3. it demonstrates that the assignment of pronominal referent is influenced by the linguistic context.

4. the study has implications for the interpretation of regressive eye fixations.

5. demonstrates that at least some regressive fixations are due to interpretative processor, rather than some "immature reading habits".

Thompson (1978) correlated scores from Meeker SOI Learning Abilities Test with results from the IOWA Tests of Basic Skills for a sample of 145 V and VI grade pupils. 9 of the 24 SOI abilities hypothesised to be related to reading performance did so moderately and 17 SOI scores correlated with arithmetic achievement. Some SOI abilities presumed to be arithmetic related were found to correlated more highly with reading performance than those presumed to be reading success predictors.

Stanovich et al., (1984) administered tests of general intelligence, decoding speed, phonological awareness and listening comprehension to 56 first grade children. All four types of measures were moderately related to end of year Reading Comprehension. The relationships between decoding, intelligence, and Reading Comprehension found in the first grade sample were replicated in the fifth grade sample but were somewhat different in the third grade sample. The interrelationships between various sub skills of reading and intelligence increased with age, probably due to mental facilitation.
Berg (1977) lists concept formation as an important aspect of successful reading behaviour. Concept formation is a cognitive organising system which brings the pertinent features of past experience to bear upon a present object or stimulus. General level of intelligence is one among the different factors that influence concept formation.

Thirumalai (1990) also considers concepts are closely related to thinking and language development. Thinking and concept are inter-related and one can consider thinking as a covert process which largely involves the manipulation of concepts. Concept may be taken as internal representation of classes or categories of experience an organism undergoes.

Eapen (1996) concludes that learning (cognition) is inextricably linked with the development of language; language is a mediator tool, a symbolic form to discuss and communicate with the 'world'. Cognitive development is closely linked with the development of symbolic language forms. Though the ontological roots of thought and language are different, they become soon intertwined with each other, so that each is essential in later years.
2.5 Synthesis of the Foreign Studies on Structure of Intellect Model

<table>
<thead>
<tr>
<th>Author and Year</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mary Williams (1969)</td>
<td>1. 35 of the 50 boys in the study showed deficits in Memory Operations on the Structure of Intellect profiles.</td>
</tr>
<tr>
<td></td>
<td>2. 38 Boys showed strengths in the Figural dimension of Cognition.</td>
</tr>
<tr>
<td></td>
<td>3. 12 of the boys showed strengths in Semantic dimension throughout all five operations.</td>
</tr>
<tr>
<td></td>
<td>4. Six boys showed strength in Evaluation.</td>
</tr>
<tr>
<td></td>
<td>5. Boys with IQ's over 120 showed a greater number of strengths in Memory and the Semantic dimensions throughout the Structure of Intellect profile than those with IQ's below 120.</td>
</tr>
<tr>
<td></td>
<td>6. The six boys who were considered as educationally handicapped by their Structure of Intellect profiles showed higher total weighted scores on both parents and teachers ratings on the Burk's Scale indicating that their behaviour problems were noticed to a more severe degree.</td>
</tr>
<tr>
<td></td>
<td>7. 12-20% who were rated as having a problem to a considerable degree regarding a poor self-concept also had low Divergent production scores.</td>
</tr>
<tr>
<td>Feldman B. (1970)</td>
<td>1. The factors MFU-V, MFU-A, EFU-V and CMU were confirmed at the 6-year level, while CFU-V was extended for first time from 5 year level to the 6 year level.</td>
</tr>
</tbody>
</table>
2. CFU-A emerged as a new factor at the six-year level. It did significantly increase multiple regression by 3 per cent.

3. EFU-A was identified as a unique factor for the first time at any age. EFU-A played a minor role in word reading and was virtually absent in paragraph meaning.

4. CFU-V was the only factor not significantly related to reading achievement in first-grade.

5. EFU-V was another strong predictor of reading success accounting for 12% of the total variance.

6. CMU, the ability to comprehend the meaning of words was also a significant predictor of reading skill, both for word reading and paragraph meaning.

7. CMU accounted for 7% of success in total reading.

Brown Darrell (1971)

1. Cognitive abilities showed more frequent and larger statistical relationships to social class than did other thinking processes measured by Binet.

2. Those items categorized as Semantic in Content were more often significantly related to social class and tended to yield correlations of greater magnitude than items measuring Figural Content. All significant correlations favoured the High Status group.

3. There was no systematic increase in magnitude of relationships along the Structure of Intellect Products dimension for 3 and 4 years old.

4. The only phi co-efficients significantly relating
sex and scores on Semantic items did favour girls.

| Meeker, M. N. (1971) | 1. Factor analysis of the resulting inter-correlation matrix yielded 6 interpretable factors, of which three saturated the 8 span tests. These were thus identified as three of the anticipated 4 factors. A very clear Auditory-forward factor (VI) completely fulfilled expectation. The Auditory-backward (II) also saturated one Visual-forward test; the ? Visual-backward factor (V) saturated one of the Visual-forward test. Thus, while three Memory factors emerged unmistakably independent of the other tests, they cross-loaded each other somewhat. The Memory tests did not load to any extent on the other factors nor did other variables load importantly on the memory factors.

2. High and low scores of Auditory-backward (II) were distinguished in arithmetic and in language sentences. Visual backward (V) related to spelling, but also distinguished language sentences as well. High and low scorers on Auditory-forward (VI) did not distinguish subject matter achievement but did relate to spelling, which was affected by Auditory-backward as well. Spelling was thus predicted by all three Memory factors. Reading was not significantly related to any, because reading is complexly determined.

3. The most dramatic difference occurred for Behaviour problem vs. Educational Handicap where all three Memory factors clearly |
distinguished the groups. The maths groups were distinguished primarily by Auditory-backward, as predicted but also somewhat by the other two Memory scores. The two English groups were distinguished significantly only by Visual-backward (V).

| Billie Hays and Esther Pereira (1972) | 1. No relation was found between Visual Memory and chronological age, Visual Memory and home environment, Visual Memory and mental age or Visual Memory and sex, favouring girls.  
2. A low correlation of Visual Memory with the auditory score of the ITPA pointed out the differentiation of receptor modalities.  
3. Median scores on the MFU-V subtest of both control and experimental groups improved significantly.  
4. There was not a significant difference between pre-test and post-test scores for either group.  
5. The median scores of both control and experimental groups on the MSU-V subtest improved significantly.  
6. Both control group and experimental group exhibited improvement in MFU-V and MMU-V due to maturational factors. |

| Dailey, Joanne V. (1975) | 1. It was found that the desired level of significance was reached from three criterion variables: reading vocabulary, reading comprehension and auditory memory.  
2. Sex differences and the interaction between treatment and sex were not found to be significant. |
3. In view of these results, it was concluded that reading vocabulary, reading comprehension and auditory memory skills for these pupils were improved significantly through the use of daily S.O.I. memory ability experiences.

### 2.6 Synthesis of the Indian Studies on Structure of Intellect Model

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Findings</th>
</tr>
</thead>
</table>
| Girish Bala | 1978 | 1. The first hypothesis was partially substantiated as much as factor cognition of semantic implications (CMI) emerged clearly in age groups 14 and 15.  
2. The second hypothesis that the factors constituting reasoning ability emerged more clearly with experience, was partially substantiated.  
3. The following factors were identified: inference or General Cognition or Convergent production, Perception of Abstract similarities or Convergent production of Semantic Classes and Relations, Induction or deduction of conceptual relations or Cognition of Semantic Classes and Relations, Association or Relational Thinking or Diffused Convergent Production and Cognition of Semantic Implications, Conceptual Foresight or Cognition of Semantic Implications, Deduction or General Convergent Production, and Apprehension of Relations or Mixed Classifications and Relations. |
| Zafar S.U. | 1976 | 1. Phonemic similarity had detrimental effect on the short-term recall but had no such effect on the long-term recall. |
2. Semantic similarity depressed the long-term recall but had no effect on the short-term recall.

3. Both anxiety and imagery type had no differential effects on the short and the long-term recall.

4. An interaction was found between imagery type and similarity in the case of long-term recall. No such interaction was found in the case of short-term recall.

<table>
<thead>
<tr>
<th>Acharyulu S.T.V.G. (1978)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. There were no sex differences in intelligence figural creativity and achievement in Telugu, general science and social studies. Significant sex differences in verbal creativity and achievement in English and maths were found in favour of girls. The performance of either sex was better on the verbal than on the figural TTCT.</td>
</tr>
<tr>
<td>2. The average correlation between intelligence and verbal TTCT ($r=0.21$) was not only significant but was also higher than that between intelligence and figural TTCT ($r=0.10$). These correlations were higher for girls than for boys. Further, the correlations between verbal TTCT and school achievement were as high as those between intelligence and school achievement.</td>
</tr>
<tr>
<td>3. The hypotheses of interaction between intelligence and creativity as they affected school achievement were not supported in 34 out of the 35 sets of 7x3 factorial analysis of variance. There was a significant disordinal</td>
</tr>
</tbody>
</table>
| Chauhan C.P.S. (1980) | 1. Out of eight SI abilities selected for the present study, only three were found to be relevant for predicting achievement of students in algebra. They were CMU, CST and NSS.  
2. The pattern of predictor variables exhibited sex difference. In case of boys, only the SI ability, namely NSS was found to be the best predictor of achievement in algebra, the remaining abilities were totally absent. In case of girls, two abilities, namely CSI and CMU, were found relevant, the former being a measure of ability to draw inference and latter of verbal factor.  
3. It can be concluded that in case of boys, numerical ability plays a prominent role in doing algebra and in case of girls, verbal factor occupies significant position.  
interaction between intelligence and figural elaboration, although no definite trend in their effect on the English language was noticed.  
4. The main effects of both intelligence and creativity were significant in 33 out of the 35 analysis of variance involving intelligence, verbal and figural creativity measures and school achievement and the form of relationship was such that intelligence and creativity tended to be additive and more or less linear in their effect on school achievement. |
| Katageri (1981) | 1. Tests constructed for the eight factors when individually considered with those factors with which each significant correlation were different could be used in future.  
2. The factors are CMU, CMC, CMS, MMI, DMT and EMC. |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Singh, D.R. (1983) | 1. The four mental abilities selected under this study showed positive influence over achievement in Chemistry at the graduation level.  
2. The regression coefficient calculated from the scores of boys and girls revealed that reasoning and symbolic representation abilities contributed much to the criterion.  
3. Regression equation can be used in predicting performance in Chemistry of boys and girls at the graduation level.  
4. The regression coefficient and multiple R calculated from the scores in the predictors provide *raison de être* for their inclusion in the undetermined variables. |
| Ari (1984) | 1. the tests whose difficulty index value for above factors was between 0.40-0.60 and discrimination index was above 0.25; and  
2. the tests constructed for selected Semantic abilities, i.e., CMR, CMC, CMS, MMU, MMC, MMT, DMU, DMR, NMC, NMT, EMC, EMS of Guilford’s Structure of Intellect model taking IX standard children into consideration. |
| 1. Most of the reasoning ability tests had significant, low and positive correlations among themselves. |
| 2. Inter-correlations among six set concept achievement tests ranged from 0.142 to 0.469. |
| 3. Factor analysis of the inter-correlation matrix of 19 reasoning ability tests resulted in the identification of factors Inductive Reasoning or Cognition of Semantic Implications, Deductive Reasoning or Convergent production of Semantic Implications. |
| 4. Factor analysis of the inter-correlations of six Set concept achievement tests resulted in the extraction of two factors Ach I-concept of Set, and Ach II-concept of Function. |
| 5. Correlations between reasoning ability tests and the composite of Set concept achievement, except for seeing problem tests, were all significant. |
| 6. Factor analysis of the inter-correlation matrix of 19 reasoning ability tests together with composite Set concept achievement shared significant loadings on deductive reasoning of Convergent production or Cognition of Semantic Implication factors. |
| 7. Multiple regression analysis revealed that five tests, namely, Effects, Figure concept test, Association IX test, Syllogism III test, and Sequential association test, contributed significantly to the variance of composite Set concept achievement. Three tests, namely Word matrix test, Association IV test and Syllogism III test, contributed significantly to |
the variance of the concept of Set and Word classification test, Effect test and Figure concept test contributed significantly to the variance of the achievement of the concept of Function.

Mirajkar (1987)

1. The validity of the test battery was found to be 0.71.
2. The reliability of the whole test was found to be 0.80.
3. The mean and standard deviation scores were 700 and 67.6 respectively. The Skewness was 10.95 and Kurtosis was 0.258 which means that the given distribution was very much normal.
4. Profiles showed that although the five individual total scores were more or less same, the profiles of each individual differed from the other. The ability of an individual varies from factor to factor.
5. The performance of students was generally good in abilities like CMC, DMU, DMC, DFT and DSR. The performance of students was relatively inferior in abilities like CST, NST, DSI, DFS and NFT.

Khire, Usha (1989)

1. The indices of internal consistency and homogeneity were mostly satisfactory.
2. Test-retest correlations ranged widely, were lower for tests of memory and higher for those of symbolic and semantic content and cognition.
3. Test-retest correlations for composite score from a single content-operation category were higher than those for individual product tests.
4. The sex difference was not always consistent and significant. Though urban-rural difference was observed very often, it was not always in favour of the urban group.

5. Metropolitan-urban difference was greater than urban-rural difference. The group means generally increased with grades but there were some reversals. The more striking observation was that our students were not acquainted with many processes of thinking involved in SOI tests.

6. The independence of factors was evidenced in the product-wise analyses. It was more so across the content. The content-wise and operation-wise analyses yielded some higher order factors common to products in the same content-operation category. Thus, the results suggested greater possibility of distinction between contents and operations than between products.

---

| Suri Ishwar Saran (1989) | 1. Factor analysis of data yielded cognition of semantic classes, cognition of semantic relations and convergent production of semantic implications as 3 major factors accounting for the reasoning ability of rural children.  
2. For the urban group, on the other hand, convergent production of semantic classes emerged as the only factor to account for students reasoning ability. |
<table>
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<tbody>
<tr>
<td>Harapanahalli (1994)</td>
<td>1. The advantaged and disadvantaged students differed significantly in their abilities/factors like</td>
</tr>
</tbody>
</table>
| Venugopal, G. (1994) | CMR, CMS, CFT and CBI.  
2. Both the advantaged and disadvantaged students were alike in their factors/abilities like CMC, CSI, CFR, CFS, and CBR. |
|---|---|
| 1. Boys and girls differed in their intellect abilities.  
2. Pupils differed in their intellect abilities whose fathers differed in their educational status.  
3. The intellect abilities influenced the total achievement of the pupils in biology.  
4. Cognition, memory, convergent production, divergent production and evaluation intellect abilities under 'operation' influenced the total achievement in biology.  
5. The intellect abilities influenced the achievement of pupils in knowledge, understanding, application and psychomotor skill objectives.  
6. Educational status of the father was related to the achievement of the pupils.  
7. There was no relationship between achievement and the gender of the pupils.  
8. Achievement was related to intelligence, parental educational status, occupation and income.  
2. Pupils differed in their Convergent Production abilities whose fathers differed in their educational status.  
3. The Convergent Production abilities influenced the total achievement of the pupils in biology.  
4. Cognition, memory, convergent production, divergent production and evaluation intellect abilities under 'operation' influenced the total achievement in biology.  
5. The intellect abilities influenced the achievement of pupils in knowledge, understanding, application and psychomotor skill objectives.  
6. Educational status of the father was related to the achievement of the pupils.  
7. There was no relationship between achievement and the gender of the pupils.  
8. Achievement was related to intelligence, parental educational status, occupation and income.  
abilities like NFC, NFT, NSI, NSR and NMC.

2. The advantaged and disadvantaged students differed in their Convergent Production abilities like, NMU, NSC, NSS, NST, NMR, NMS, NMT and NMI.

3. The advantaged and disadvantaged boys differed significantly in all the thirteen Convergent Production factors.

4. The advantaged and disadvantaged girls differed significantly in their Convergent Production abilities like, NFC, NFT, NSI, NMU, NSC, NSS, NST, NMC, NMR, NMT and NMI.

5. The advantaged and disadvantaged girls were alike in their Convergent Production ability NSR.


1. Both advantaged and disadvantaged students differed significantly in all the memory factors.

2. Both advantaged and disadvantaged boys differed significantly in their memory abilities like MFU, MFS-V, MSC, MMU, MMS and MMI.

3. The advantaged and disadvantaged boys were alike in their memory abilities like MSU, MSR, MSI and MMI.

4. Both advantaged and disadvantaged girls differed significantly in their memory abilities like MFU, MSR, MMU, MMS and MMI.

5. Both advantaged and disadvantaged girls were alike in their memory abilities like MFS-V, MSU, MSC, MSI and MMT.
<table>
<thead>
<tr>
<th>Source</th>
<th>Findings</th>
</tr>
</thead>
</table>
| Ramachandrachar, K. (1997) | 1. Factor analysis yielded five prime factors which accounted for a major portion of variance in the intellectual performance of high school students.  
2. The analysis did not yield a separate factor which may be referred to as the 'originality' factor.                                                                                                                                                                                                                       |
| Morkar (1999)     | 1. The advantaged and disadvantaged students differed in their Divergent Production abilities like DFU, DSU, SMU, DSR, DMR, DFS, DMS, DMI, DFI and DMI.  
2. The advantaged and disadvantaged boys differed in their Divergent Production abilities like DFU, DSU, DMU, DSR, DMR, DFS, DMS and DMI.  
3. Both advantaged and disadvantaged boys were alike in their Divergent Production abilities like DMI and DFI.  
4. The advantaged and disadvantaged girls differed in the Divergent Production abilities like DSU, DMU, DFI and DMI.  
5. Both advantaged and disadvantaged girls were alike in their Divergent Production abilities like DFU, DSR, DMR, DFS and DMS.                                                                                                                                                                                      |
| Martha Pujar (2001) | 1. There was a significant relationship between ESU, ESC, ESR, EST, ESI, EMU, EMC, EMT and EMI and total academic achievement in boys.  
2. There was no significant relationship between EMR and total academic achievement in boys.  
3. There was a significant relationship between...  |
ESU, ESC, ESR, EST, ESI, EMU, EMC, EMR, EMT and EMI and total academic achievement in girls.

4. There was a significant relationship between ESU, ESC, ESR, EST, ESI, EMU, EMR, EMT and EMI and total academic achievement in secondary school students.

5. EMI had the highest contribution to the total academic achievement, and EMR had the suppressing effect on the total academic achievement of boys.

6. EMC had the highest contribution to the total academic achievement, and EMU and EMR had the suppressing effect on the total academic achievement of girls.

7. EMC had the highest contribution to the total academic achievement, and EMU and EMR had the suppressing effect on the total academic achievement of secondary school students.

8. High achievers performed high in all the Evaluation abilities like ESU, ESC, EST, ESI, EMU, EMC, EMR, EMT and EMI.

9. Average achievers performed above average in Evaluation abilities like ESU, ESC, EMT, EMU and EMI and performed below average in ESR and ESI.

10. Low achievers performed just above average in ESI and performed below average in ESC, ESR, EST, EMU, EMC, EMR and EMT.

Sujatha, S. (2001)

1. There was a significant difference in the mean memory scores of state and central schools.
65

| Shetti, P. N. (2003) | students with respect to MFU, MFS-V, MMU, MMS, MMT, and MMI.  
2. There was a significant difference in the mean memory scores of male and female students with respect to MFU, MSC, MMS, and MMT.  
3. There was a significant difference in the mean scores of government and aided school students with respect to MFU, MFS-V, MSU, MSC, MSR, MDI, MMU, MMS, MMT and MMI.  
4. There was no significant difference in the mean scores of state and central school students with respect to MSU, MSC, MSR, and MSI.  
5. There was no significant difference in the mean scores of male and female students with respect to MFS-V, MSU, MSR, MSI, MMU and MMI.  
6. There was a significant relationship between the memory scores and academic achievement of students in total  

1. There was a positive and significant relationship between Guilford's Evaluation abilities, viz., ESU, ESC, ESR, EST, ESI, EMI, EMC, EMR, EMT, EMI and academic achievement in Mathematics among SC, ST and general category students. However, the relationship between ESI and academic achievement in Mathematics was not significant for ST category students.  
2. In case of SC category students, EMT with 34.49% variance seems to be the best predictor whereas ESC and ESI had suppressing effects on academic achievement in Mathematics.  
3. In case of general category students, EMI with a
variance of 27.65% seems to be the best predictor, whereas EMT, EMU and ESC had suppressing effects on academic achievement in Mathematics.

### 2.7 Synthesis of the Studies on Reading Comprehension

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<td>1. Cognitive confusion is the common state of young beginners in their thinking about units of print (or writing too).</td>
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<td>2. Attending to whole words and their pronunciation and over a period of time learning to make intuitive generalizations about phoneme-grapheme relationships, the child will acquire a sound basis of phonic knowledge.</td>
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<tr>
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<td>3. Partially sighted children’s reading efficiency is increased using special teaching aids rather than depending on Braille.</td>
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<tr>
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<td>4. Malnutrition is associated with intellectual backwardness, great deal of repetition and rehearsal is needed.</td>
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<td>Wilga M. Rivers (1968)</td>
<td>The study suggests that -</td>
</tr>
<tr>
<td></td>
<td>1. to attain speed and comprehension the reader must know what signals to look for and what signals to assume because of expectancy habits which he had developed in the new language.</td>
</tr>
<tr>
<td></td>
<td>2. students should be encouraged to make intelligent guesses of meanings of new words while reading.</td>
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</tbody>
</table>
2. They build vocabulary, model the construction of syntactically accurate sentences, encourage problem solving and generation of information through dialogues, analyse sentence structure, and train such skills as description, classification, logical reasoning facility with opposites, synonyms, analogies, absurdities and ability to describe functional relationship. |
| Carpenter and Just (1977) | 1. There should be more regressive fixations to the noun.  
2. When recalling the pronoun, sentence, subjects often substituted the interpreted referent.  
3. The assignment of pronominal referent is influenced by the linguistic context.  
4. Findings has implications for the interpretation of regressive eye fixations.  
5. At least some regressive fixations are due to interpretative processor, rather than some “immature reading habits”. |
| Thompson (1978) | 1. 9 of the 24 SOI abilities hypothesised to be related to reading performance did so moderately  
2. Some SOI abilities presumed to be arithmetic related were found to correlated more highly with reading performance than those presumed to be reading success predictors. |
| Stanovich and others (1984) | 1. General intelligence, decoding speed, phonological awareness and listening |
| Berg (1977)                      | 1. Concept formation as an important aspect of successful reading behaviour.  
                                      2. General level of intelligence is one among the different factors that influence concept formation. |
|----------------------------------|---------------------------------------------------------------------------|
| Thirumalai (1990)                | 1. Concepts are closely related to thinking and language development.  
                                      2. Thinking as a covert process which largely involves the manipulation of concepts.  
                                      3. Concept may be taken as internal representation of classes or categories of experience an organism undergoes. |
| Eapen (1996)                     | 1. Learning (cognition) is inextricably linked with the development of language.  
                                      2. Cognitive development is closely linked with the development of symbolic language forms. |

From what has been reviewed above, the following conclusions can be drawn.

1. Many of the studies done on different factors of intelligence have tried to explore the correlation between intelligence factors and academic achievement. Studies conducted by Acharyulu(1978), Singh(1983), Tiwari(1986), Sujatha(2001), Shetti(2003), Pujar(2001), have made attempts to understand how
intelligence factors influence achievement in various subjects.

2. Several researchers have tried to construct tests for different Structure of Intellect factors and validate the same. Mirajkar (1987), Khire (1989), Ari (1984), Katageri (1981), Ramachandrachar (1997) have taken up studies to validate tests on some selected Structure of Intellect factors.

3. Many researchers have tried to examine the existence of Structure of Intellect factors and general intelligence among the advantaged and disadvantaged children. Morkar (1979), Pednekar (1995), Harapanahalli (1994), Jayashri (1995) have explored the existence of intelligence factors among the disadvantaged children. The studies by Tucker (1974) and Dailey, Joanne (1975) made one basic assumption that an understanding of factors of intelligence among children would enable us to provide good remedial programmes.

4. There are very few studies relating Structure Of Intellect factors to reading comprehension. Feldman (1970), Dailey, Joanne (1975), Hays and Pereira (1972) have attempted to relate factors of intelligence to reading comprehension, especially at kindergarten level.

5. Zafar (1976) studied the relationship between retention abilities and intelligence factors and some personality variables.

6. Researches on Reading and language development have reiterated the close relationship between cognitive development and language learning.
PART – III

REVIEW : AN OVERVIEW

The studies that have been conducted on SOI can be broadly classified under three headings.

1. Studies conducted to establish the existence of SOI factors and validate tests for the same.

2. Studies conducted to establish the correlation between academic subjects and SOI factors.

3. Studies that have been conducted to understand the correlation between SOI factors and Reading Comprehension.

The present study is interested in the third issue listed above. The investigator, while going through books and web sites for literature on the topic has come across many commercial sites which offer training in Reading Comprehension through the training of Structure of Intellect factors. Unless the positive correlation between Structure of Intellect factors and Reading Comprehension are obvious, such commercial ventures would not have taken place. However, there are very less research studies on this area, practically no studies correlating Semantic Factors of Structure of Intellect with Reading Comprehension at class VIII level.

The study conducted by Feldman(1970) sought to confirm the correlation between some SOI abilities and Reading Comprehension. Along with the SOI abilities relating to Figural Content, CMU was also found to be a significant predictor of reading skill. CMU accounts for 7%
of success in total reading. The study had limited itself to first grade reading achievement. The study gives rise to many questions and directions for further research.

1. What are the other Structure of Intellect abilities that might correlate with Reading Comprehension?

2. Will this result hold good at higher levels of Reading Comprehension?

3. At higher levels the Figural Content is likely to give way to Semantic Content which is more abstract in nature. The simplest Structure of Intellect ability with the Semantic Content, CMU, has already been established to have a significant relationship with Reading Comprehension. Now it would be worthwhile to find out if other factors with the Semantic Content also correlate with Reading Comprehension.

The question of higher level needs more clarification. First grade happens to be the beginning of a reading programme. It is at class VIII level that the students enter the secondary level of their schooling (at present, in India, Class VIII is considered to be the end of primary level). Students are expected to show higher abilities of Reading Comprehension at this level as compared to the first grade students. Do the Semantic Factors significantly correlate with Reading Comprehension at this level?

The study of Dailey Joanne V(1975) concluded that vocabulary, Reading Comprehension and auditory memory skills improved significantly through the use of daily Structure of Intellect - Memory abilities' experiences. The attempts of Meeker to provide reading programmes
based on Structure of Intellect training also have a similar preoccupation. The Structure of Intellect provides a very comprehensive view of intelligence, which can be expressed in some tangible terms. Such quantifiable expressions of intelligence are very useful in classroom work. Such an analysis can provide the teacher with a better, more objective understanding of the intellectual composition of the class. Any thinking about classroom basically tries to address one question: how can the learners be helped to learn better?

2.8 Conclusions

There have been more studies to relate Structure of Intellect factors with achievement than on any other area. The efforts to construct and validate tests for Structure of Intellect factors are also a means to such an end. These studies also seem to have assumed that a detailed understanding of intelligence factors would be helpful in understanding children and facilitating better learning. Probably Structure of Intellect factors have influence on reading achievement too. Many writers have mentioned the close relationship between cognitive development and language learning. The present study takes such an assumption one step ahead by examining the correlation between Structure of Intellect factors relating to Semantic Content with Reading Comprehension.