CHAPTER – III

DESIGN/METHODOLOGY OF THE STUDY

3.0 Introduction:

Research methods are of utmost importance in a research process. They describe the various steps of the plan of attack to be adopted in solving a research problem, such as the manner in which the problems are formulated, the definition of terms, the choice of the subjects for investigation, the validation of data – gathering tools, the collection, analyses and interpretation of data and the process of inferences and generalizations.

Methods of research, according to Good, Barr and Scates; May be classified from many points of view; the field to which applied: education, history, philosophy, psychology, biology etc.; purpose: description, prediction, determination of causes, determination of status etc.; place where it is conducted: in the field or in the laboratory; application: pure research or applied research; data gathering devices employed: tests, rating scales questionnaires etc.; nature of data collected: objective, subjective, quantitative, qualitative etc.; symbols employed in recording, describing or treating results: mathematical symbols or language symbols; forms of thinking: deductive, inductive etc.; control of factors; controlled and uncontrolled experimentation; methods employed in establishing casual relationships: agreement, differences, residues and concomitant variation.

According to Hill way: “...to describe in detail the specific method being used, incidentally, constitutes a very good way of determining whether the method chosen has been worked out properly and is likely to prove effective. If the scholar cannot describe his method, the chances are that it is too vague and general to yield him satisfactory results”.

The selection of a method and the specific design within that method appropriate in investigating a research problem will depend upon the kind of data that the problems entail. However, the method selected should be in harmony with scientific principles and adequate enough to lead to dependable generalization. A pre – planned and well – described method will provide the researcher a scientific and feasible plan for attacking and solving the problem under investigation.
3.1 Method and procedure of study:

**Descriptive method:**

Descriptive methods can tell us about what exists at present by determining the nature and degree of existing conditions. Because of the methods apparent ease and directness, descriptive method has undoubtedly been the most popular and most widely used research method in education.

**Nature of descriptive method:**

Descriptive research studies are designed to obtained pertinent and precise information concerning the current status of phenomena and, whenever possible, to draw valid general conclusions from the facts discovered. They are restricted not only to fact finding but may often result in the formulation of important principles of knowledge and solution of significant problems concerning local, state, national and international issues. Descriptive studies are more than just a collection of data; they involve measurement, classification, analysis, comparison and interpretation.

The activities of descriptive studies researchers are not different from those of other researchers. As in any study they –

- Identify and define their problem.
- State their objectives and hypotheses.
- List the assumptions upon which their hypotheses and procedures are based.
- Choose appropriate subjects and source materials.
- Select or construct tools for collecting data.
- Specify categories of data that are relevant for the purpose of study and capable of bringing out significant similarities, differences or relationships.
- Describe, analyze and interpret their data in clear and precise terms and
- Draw significant and meaningful conclusions.

Descriptive studies investigate phenomena in their natural setting. Their purpose is both immediate and long range. They constitute a primitive type of research and do not aspire to develop an organized body of scientific laws. Such studies however provide information useful to the solution of local problems and at time provide data to form the basis of research of a more fundamental nature. Research and do not aspire to develop an organized body of scientific laws. Such studies however provide information useful to the
solution of local problems and at time provide data to form the basis of research of a more fundamental nature.

**Types of descriptive research:**
Descriptive studies have been classified variously by various writers. Some have classified them on the basis of purpose they achieve; some on the basis of the geographical areas they cover and some on the basis of the technique they employ. For the sake of convenience descriptive studies may be classified in the following three categories:

- Survey studies.
- Interrelationship studies.
- Developmental studies.

**Survey studies:**
Survey studies are conducted to collect detailed descriptions of existing phenomena with the intent to employing data to justify current conditions and practices or to make more intelligent plans for improving them. Their objective is not only analyze, interpret and report the status of an institution, group or area in order to guide practice in the immediate future, but also to determine the adequacy of status by comparing it with established standards.

Some surveys are confined to gather all three types of information:

- Data concerning existing status.
- Comparison of existing status with the established status and standards.
- Means of improving the existing status.

While others are limited to one or two of these types.

Survey studies may take different forms depending upon the scope, nature and purpose of the problem under investigation. They may be broad or narrow in scope. Survey data may be collected from every unit of the population or from the representative sample. The information gathered may be concerning a large number of related factors or may be confined to a few selected items.

For the present study the descriptive survey method was employed. A descriptive survey research design was employed in the present study in which the researcher collected the data from the respondents by means of some psychological tests and tools to investigate the relationship between **SELF CONCEPT, ADJUSTMENT AND INTELLIGENCE IN RELATION TO ACADEMIC ACHIEVEMENT OF “JUVENILE DELINQUENTS OF KARNATAKA STATE”**
3.2 Selection of Sample:

District WISE juvenile delinquents list

BOYS SCHOOLS

DIVISION LEVEL FLOW CHART

BOYS SCHOOLS

BENGALURU DIVISION

1. BENGALURU  89
2. SHIVAMOGGA  18
3. HASSAN  11
4. KOLAR  09
5. DAVANGERE  18
TOTAL  145

MYSORE DIVISION

1. MYSORE  - 17
2. MANDYA  - 22
3. KODAGU  - 08
4. CHITRADHURGA  - 08
TOTAL  - 45
### BELGUAM DIVISION

1. BAGALKOT    - 17
2. BELGUAM      - 22
3. KARWAR       - 08
4. HAVERI       - 06
5. VIJAYAPURA   - 11

**TOTAL** - 64

### KALBURGI DIVISION

1. KALBURGI     - 09
2. KOPPALA      - 11
3. RAICHUR      - 06
4. BIDAR        - 08
5. BALLARY      - 13

**TOTAL** - 47
GIRLS SCHOOLS

BENGALUR DIVISION

1. BENGALUR - 42
2. TUMKUR - 18
3. DAVANGERE - 09
4. CHAMARAJ NAGAR - 11

TOTAL - 80

MYSORE DIVISION

1. UDAPI - 03
2. HASSAN - 05
3. MYSORE - 08

TOTAL - 16
### BELGUAM DIVISION

<table>
<thead>
<tr>
<th>City</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>HUBBALLI</td>
<td>18</td>
</tr>
<tr>
<td>VIJAYPUR</td>
<td>11</td>
</tr>
<tr>
<td>KARWAR</td>
<td>04</td>
</tr>
<tr>
<td>GADAG</td>
<td>09</td>
</tr>
<tr>
<td>BELGAVI</td>
<td>13</td>
</tr>
</tbody>
</table>

**TOTAL:** 55

### KALBURGI DIVISION

<table>
<thead>
<tr>
<th>City</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>KALBURGI</td>
<td>08</td>
</tr>
<tr>
<td>BIDAR</td>
<td>06</td>
</tr>
<tr>
<td>RAICHUR</td>
<td>09</td>
</tr>
</tbody>
</table>

**TOTAL:** 23
Concept of Sampling:

Sampling is the process by which a relatively small number of individuals or measures of individuals, objects or events is selected and analyzed in order to find out something about the entire population from which it was selected.

A population is any group of individuals who has one or more characteristics in common that are of interest of the researcher. The population may be all the individuals of a particular type or a more restricted part of that group. All public school teachers, all male secondary school teachers, all elementary school teachers or all Chicago kindergarten teachers may be populations.

A sample is a small proportion of a population selected for observation and analysis. By observing the characteristics of the sample, one can make certain inferences about the characteristics of the population from which it is drawn. Contrary to some popular opinion, samples are not selected haphazardly; they are chosen in a systematically random way so that chance or the operation of probability can be utilized.

The representative proportion of the population is called a sample. To obtain a representative sample, the researcher selects each unit in a specified way under controlled conditions. Usually four steps are involved in the process:

- Defining the population.
- Listing the population.
- Selecting a representative sample
- Obtaining an adequate sample.

Stratified random sampling:

At times a simple random sample, particularly a small one, may by chance have an undue proportion of one type of units in it and therefore, it is necessary to make certain that the units include in the sample are selected in proportion to their occurrence in the population. When the units in a sample are proportional to their presence in the population, the sample is said to be stratified. When employing the method of stratified random sampling, a researcher divides his population into different strata by some characteristics which is known from previous research or theories to be related to the phenomena under investigation. And from each of the smaller homogeneous groups falling in each strata, he draws randomly a predetermined
number of units. Thus, in addition to randomness, stratification introduces a secondary element of control as a means of increasing precision and representativeness.

The usual stratification factors are sex, residence, type of schools, discipline of study, age, socio-economic status, educational background, occupation, religion, caste, general intelligence and so on. The efficiency of the stratified random sample depends upon the allocation of sample size to is in proportion to the size of the strata.

Stratified sampling provide more accurate results than simple random sampling only if stratification results in greater homogeneity within the strata, with respect to the trait under study than it would be found in the whole population taken as unit.

For the present study the stratified simple random sampling method was adopted. For the present study all the district juvenile delinquents who are presently studying in schools the population was for the study.

By using the tools researcher select the sample of 20 boy’s juvenile delinquents schools and 15 girl’s juvenile delinquents girls keeping in the mind that is 475 juvenile delinquents sample represents gender i.e., Boy and Girls ,, Urban and Rural, Senior and Junior, Parents occupation, Educated parents Uneducated parents, and Type of family and ,North Karnataka  and South Karnataka.
3.3 Tools used:

The researcher must gather data with which to test the hypotheses or answer the questions. Many different methods and procedures have been developed to aid in acquisition of data. These tools employ distinctive ways of describing and quantifying the data. Each is particularly appropriate for certain sources of data, yielding information of the kind and in the form that can be most effectively used.

A researcher will require many data gathering tools or techniques which may vary in their complexity, design, administration and interpretation. Each tool is appropriate for the collection of certain type of evidence or information. The researcher has to select from the available tools, which will provide data, he requires for the testing of the hypotheses. In some situations, he may find that the existing research tools do not suit his purpose and so he may have to modify them or construct his own. For this the researcher should familiarize himself with the nature, merits and limitations of the existing tools; and should also develop skill in the construction and use of each of these research tools.

The major data gathering tools of research may be classified broadly into the
Self - Concept Scale

I. Self concept scale : By The Researcher

Infant learns physical self different from environment. If basic needs are met, child has positive feelings of self. Child internalizes others’ attitudes toward self. Child or adult internalizes standards of society.

The Self Concept scale has been designed for use with English/Kannada knowing juvenile students of Karnataka. The scale seeks to segregate well adjusted secondary schools students (age group 12 to 16 years) from poorly adjusted students in the eight areas of Self concept Desirable Behavior, Intellectual and/ School status, Dynamic Attitude, Popularity, Depression, Benevolent, Spiteful.

Self Concept scale

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Areas</th>
<th>Sl.No of Items</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Desirable Behavior</td>
<td>2,3,4,17,20,21,26,27</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>Intellectual and/ School status</td>
<td>1,7,13,14,15,22,23,25,31</td>
<td>9</td>
</tr>
<tr>
<td>3</td>
<td>Dynamic Attitude</td>
<td>5,6,12,19,21,29,32</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>Popularity</td>
<td>9,11,18,22,24,30</td>
<td>6</td>
</tr>
<tr>
<td>5</td>
<td>Depression</td>
<td>16</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>Benevolent</td>
<td>10,28</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>Spiteful</td>
<td>8</td>
<td>1</td>
</tr>
</tbody>
</table>

|                         |                              | 32 |

SCORING PROCEDURE FOR SELF CONCEPT SCALE.

Scoring procedure is very simple the positive response. Always liking-3, more time-2, some time-1, never-3, negative response Always liking-0, more time-1, some time-2, never -3,. for the construction of this tool researcher reviewed and referred several tools such as Dr.S.P.Ahuwalias’s Children’s self concepts scale and Dr.Harishankar Shing Children’s self concepts scale, etc.
Validity of the tool co-efficient was 0.9372 by the split half method on sample of 50 boys and 50 girls Juvenile delinquents.

Using the split half method on sample on 20 boys and 20 girls level the co-efficient of co-relation was 0.7831 between odd and even items.

The inventory has a high validity co-efficient of 0.9372 as this tool was found reliable and present study.

II. Adjustment scale: by the Researcher

Adjustment is a continued process in which a person varies his behavior relationship between himself and his environment. Adjustment refers to the degree of harmony between the person and his environment. Characteristics of a well adjusted person Awareness of his own strengths and limitations. Respecting him self and others. An adequate level of aspiration, Satisfaction of his basic needs. Absence of critical or fault finding attitude. Flexibility in behavior. The capacity to deal with the adverse circumstances. A realistic perception of the world. A feeling of ease with his surroundings. A balanced philosophy of life.

Role of the teacher in pupils’ adjustment Provide a classroom climate that permits the students to feel free to express themselves. Develop pupils self respect and self esteem by giving complements for the work well done through a smile or praise. The degree of one’s adjustment is directly proportional to satisfaction of one’s basic needs. Therefore the school atmosphere such that the child should not suffer from physical, mental emotional and social starvation.

Help the students in acquiring balanced emotional development and to exercise control over their emotions. Help the students to develop proper level of aspiration, help them to set a attainable goals. Find out the maladjusted children in the class and help them to adjust with the classmates and school environment.

Find out the maladjusted children in the class and help them to adjust with the classmates and school environment. Help the pupils to develop proper patience and power of tolerance to face failures and frustration. Accept that every person is unique and respect their personality.

The Adjustment scale has been designed for use with English/Kannada knowing juvenile students of Karnataka. The scale seeks to segregate well adjusted secondary schools.
students (age group 12 to 16 years) from poorly adjusted students in the four areas of adjustment: Family, School, Climate, and Friends, Society, Education, and Individual.

**Adjustment scale.**

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Areas</th>
<th>Sl.No of Items</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Family</td>
<td>1,4,6,16,21,23,26,29,39,36,41,44</td>
<td>12</td>
</tr>
<tr>
<td>2</td>
<td>School Climate and Friends</td>
<td>3,7,12,13,18,28,37,38,42,46,47,48</td>
<td>12</td>
</tr>
<tr>
<td>3</td>
<td>Society</td>
<td>2,5,10,42,24,25,27,32,40,43</td>
<td>9</td>
</tr>
<tr>
<td>4</td>
<td>Education</td>
<td>39,8</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>Individual</td>
<td>9,11,14,15,17,19,20,24,30,33,34,35,45,49,50</td>
<td>15</td>
</tr>
</tbody>
</table>

**SCORING PROCEDURE FOR ADJUSTMENT SCALE:**

Scoring procedure is very simple for positive response Yes-1, No-0 and for negative response Yes-0, No-1 the response.

For the construction of this tool researcher reviewed and referred several tools such as A.K.P Sinha Adjustment inventory for school students and R.P.Sing Adjustment inventory for school students etc.

Validity of the tool co-efficient was 0.7856 by the split half method on sample of 50 boys and 50 girls.

Using the split half method on sample on 20 boys and 20 girls level the co-efficient of co-relation was 0.8799 between odd and even items.

The inventory has a high validity co-efficient of 0.9380 as this tool was found reliable and present study.

**Facilitations of juvenile delinquents: By The Researcher**

The facilitations of juvenile delinquents have been designed for use with Kannada knowing juvenile students of Karnataka. The scale seeks to segregate well adjusted secondary schools students (age group 12 to 16 years) from poorly adjusted students in the Six areas of Communication with Friends, Economic and Social status of family, Hostel climate, Sapper/ Meals Arrangement, Parent’s Support, Teacher’s Support.
Facilitationsof Juvenile Delinquent’s.

<table>
<thead>
<tr>
<th>SL.NO</th>
<th>Areas</th>
<th>SL.NO.ITEMS</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Communication with Friends .</td>
<td>1,2,3,4,5,6,7,8,9,10.</td>
<td>10</td>
</tr>
<tr>
<td>2.</td>
<td>Economic and Social status of family.</td>
<td>11,12,13,14,15,16,17,18,19,20,21,22.</td>
<td>12</td>
</tr>
<tr>
<td>3.</td>
<td>Hostel climate</td>
<td>23,24,25,26,27,28,29,30,31,32,33,34,35,36.</td>
<td>14</td>
</tr>
<tr>
<td>4.</td>
<td>Sapper/ Meals Arrangement</td>
<td>37,38,39,40,41,42,43,44,45.</td>
<td>09</td>
</tr>
<tr>
<td>5.</td>
<td>Parent’s Support</td>
<td>46,47,48,49,50,51,52,53,54,55.</td>
<td>10</td>
</tr>
<tr>
<td>6.</td>
<td>Teacher’s Support</td>
<td>56,57,58,59,60,61,62,63,64,65,67,68,69,70.</td>
<td>15</td>
</tr>
</tbody>
</table>

SCORING PROCEDURE FOR Facilitationsof Juvenile Delinquent’s.

Scale.

Scoring procedure is very simple for positive response Yes-1, No-0 and for negative response Yes-0, No-1 the response.

Validity of the tool co-efficient was 0.9152 by the split half method on sample of 50 boys and 50 girls.

Reliability of the tool co-efficient was 0.8376 by the split half method on sample of 50 boys and 50 girls.

The inventory has a high validity co-efficient of 0.9152 as this tool was found reliable and present study.

Raven’s Coloured progressive matrices

Obtain a representative sample of approximately a hundred children of each year of age from 5 to 11 1/2 , lists of children living in the Burgh of Dumfries, whose names began with the letters E to L inclusive, were prepared. From a total school population of 2700 children between these children were tested individually. 19 children had either moved out of the district or were suffering from a physical illness of long duration.
Table CPM VI
Comparisons between the CPM, Terman-Merrill and Criston Vocabulary Scale Correlations for Children 9 years of age

<table>
<thead>
<tr>
<th></th>
<th>CPM</th>
<th>T-M</th>
<th>CVS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coloured progressive Matrices</td>
<td>0.80</td>
<td>0.66</td>
<td>0.65</td>
</tr>
<tr>
<td>Terman-Merrill Scale</td>
<td>0.90</td>
<td>0.83</td>
<td></td>
</tr>
<tr>
<td>Crichton Vocab. Scale</td>
<td></td>
<td></td>
<td>0.95</td>
</tr>
</tbody>
</table>

Reliability

In an extensive review of the psychometric properties of the RPM, Burke (1958) was unable to cite reliability data for CPM other than the initial work reported in this manual (see table CPM VIII). Since that time, however, studies of CPM reliability have generally confirmed that it is extremely satisfactory, whether assessed by split-half or retest methods. The reliability studies can be reviewed in relation to independent variables such as age and ethnic grouping, while sample size often has a bearing on the findings reported.

Carlson has related CPM to Piagetian conservation concepts, noting a development in the reasoning processes required for CPM solutions from perceptual to conceptual (after Winkelmann 1972). Carlson and Wiedl (1977) found high loadings for both perceptual items and conceptual items on the factor defined as simultaneous processing, following Das (1973).

Further development of this work in the U.S.A. and Germany has led to the conclusion that three dimensions can be identified in CPM, viz. abstract reasoning by analogy, pattern completion through identity and closure, and simple completion.

3.4 Data Collection Techniques and Procedure:

Concept of Data Collection:

Data collection is essentially an important part of the research process so that the inferences, hypothesis or generalizations tentatively held may be identified as valid, verified as correct or rejected as untenable. In order to collect the requisite data for any research problem, the researcher has to simplify the population concerned, since it is not possible to encompass the entire population, to devise appropriate tools measuring the attributes concerned and to administer those tools.

A researcher will require many data gathering tools or techniques which may vary in their complexity, design, administration and interpretation. Each tool is appropriate for the
collection of certain type of evidence or information. The researcher has to select from the available tools, which will provide data, he requires for the testing of the hypothesis.

**SELF CONCEPT SCALE -By Researcher.**

This inventory was developed and standardized by researcher himself.

The Self Concept scale has been designed for use with English/Kannada knowing juvenile students of India. The scale seeks to segregate well adjusted secondary schools students (age group 12 to 16 years) from poorly adjusted students in the eight areas of Self concept Desirable Behavior, Intellectual and/ School status, Dynamic Attitude, Popularity, Depression, Benevolent, Spiteful.

- Desirable Behavior- 8 items
- Intellectual and/ School status-9 items
- Dynamic Attitude-7 items
- Popularity-6 items
- Depression-2 items
- Benevolent-2 items
- Spiteful-1 items

The inventory consists of 32 items among them 30 are positive in nature and 2 are negative in nature.

**Adjustment scale.**

The Adjustment scale has been designed for use with English/Kannada knowing juvenile students of India. The scale seeks to segregate well adjusted secondary schools students (age group 12 to 16 years) from poorly adjusted students in the four areas of Family, School Climate and Friends, Society, Education, and Individual.

- Family-12 Items
- School Climate and Friends- 12 items
- Society-9 items
- Education-2 items
- Individual-15 items
The inventory consists of 50 items among them 11 are positive in nature and 39 are negative in nature.

**Facilitations of juvenile delinquents**

The *facilitations* of juvenile delinquents has been designed for use with Kannada knowing juvenile students of Karnataka. The scale seeks to segregate well adjusted secondary schools students (age group 12 to 16 years) from poorly adjusted students in the Six areas of Communication with Friends, Economic and Social status of family, Hostel climate, Sapper/Meals Arrangement, Parent’s Support, Teacher’s Support.

- Communication with Friends -10 items
- Economic and Social status of family-12 items
- Hostel climate- 14 items
- Sapper/Meals Arrangement-09 items
- Parent’s Support-10 items
- Teacher’s Support-15 items

The inventory consists of 70 items among them 30 are positive in nature and 40 are negative in nature.

**Ravens Colored progressive matrices**

To obtain a representative sample of approximately a hundred children of each year of age from 5 to 11 1/2, lists of children living in the Burgh of Dumfries, whose names began with the letters E to L inclusive, were prepared. From a total school population of 2700 children between these children were tested individually. 19 children had either moved out of the district or were suffering from a physical illness of long duration. Children suffering from mental disabilities were traced and tested. The sample tested represented approximately 25% of the total school population within this age range. Each child was given individually the Book form CPM, and the Crichton Vocabulary Scale. Six weeks after the first test, one in every three children, aged 9 years, was given the same two tests again, together with the Terman-Merrill Scale (Form L). 35 children completed the second test, and the Terman-Merrill (Form L). 30 of these children completed the Terman-Merrill (Form m) six weeks later.
Table CPM VI compares, for children aged 9 years, the probable re-test reliability of the CPM, Terman-Merrill (T-M) and Crichton Vocabulary Scales (CVS) and the extent to which these three tests are inter-correlated. Looking back on the experimental investigations reported here it would appear that it would be more profitable to compare children’s test performances at the ages of 6½, 8½, and 10½ years.

**Table CPM VI**

Comparisons between the CPM, Terman-Merrill and Crichton Vocabulary Scale Correlations for Children 9 years of age

<table>
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</tr>
<tr>
<td>Crichton Vocab. Scale</td>
<td></td>
<td></td>
<td>0.95</td>
</tr>
</tbody>
</table>

In general, it can be seen that the CPM is most sensitive to functional fluctuations in the output of intellectual activity. The more the test has been improved, the more this has become evident. The CVS, on the other hand, has been found to be even less sensitive than the T-M. The correlation between the CPM and the CVS is, however, of an order which justifies using them together to assess a child’s present capacity for observation and clear thinking and the general information he has acquired up to the present. The high correlation between the T-M and the CVS suggests that success in the Terman scale depends largely upon acquired verbal ability. It can also be seen that a child’s CPM and CVS performances provide, in a clearly defined form all the information obtained from a single test of “general intelligence.”

**Studies of Reliability and Validity.**

**Reliability**

In an extensive review of the psychometric properties of the RPM, Burke (1958) was unable to cite reliability data for CPM other then the initial work reported in this manual (see table CPM VIII). Since that time, however studies of CPM reliability have generally confirmed that it is extremely satisfactory, whether assessed by split-half or retest methods.
The reliability studies can be reviewed in relation to independent variables such as age and ethnic grouping, while sample size often has a bearing on the findings reported.

**Split-half:**

A substantial study by Jensen (1974) investigated the responses of 1,662 young children (Kindergarten to sixth grade) and included three ethnic groups (Anglo, black and Hispanic). A split-half reliability estimate of 0.90 was reported, with no differences by ethnicity to sex. While no account of age differences was reported that study, a subsequent report (Carlson and Jensen, 1981) has analyzed the data from 783 of the subjects to find an overall split-half estimate of .85, with subjects aged 6, 7 and 8, producing values of 65, 86 and 85 respectively. The low value for young children in this study is consistent with a small study of 5 years olds by Harris (1959), but is in contrast to the report from Freyberg (1966) of .90 for 6-7 year old. Khatena Chew and Gowan (1964) and Khatena (1965), also used the split-half method to determine reliability with a sample of 463 Singaporean children across grades 1 to 6. Values ranged from .82 at the lower age range to .94 or better two ages (grades 3 and 4).

Reddington and Jackson (1981) have completed a normative Queensland study with 737 children around seven mid-year points (5 1/2 - 11 ½ years), of whom 693 were white, with 44 aborigines. At the youngest age (5 1/2) a Cronbach alpha of .80 was reported with values rising to .93 at age 11 ½. The authors noted a particularly high reliability for non-English speaking origin children (Cronbach’s alpha=.94).

**Test- Retest:**

There remain few studies of the test-retest reliability of the CPM.

In a normative Indian study, Rao and Reddy (1968), with 1017 pupils in grades 1-5, retested a sample of 100 after 2-3 weeks, and found the product –moment correlation of .86 .this closely resembles elley and MacArthur’s (1962) study of 27 canadian children in which a retest value of .87 was found. Similarly, Freyberg (1966) reported retest reliabilities of .87, .83 and .81 for samples of 5, 7 and 8 year old pupils respectively. Over longer periods, the value declines. Khatena and Gowan (1967) reported a value of .71 after 1year.
Validity:

The construction of CPM is such that it is well-suited for use with young children, with the retarded and with elderly populations. Moreover, its non-verbal nature has made it attractive to clinicians looking at questions of cerebral damage and dementia, and to psychologists wishing to compare ability across cultures where language based tests are inappropriate. It is necessary therefore to consider whether CPM can be a valid instrument for such purposes.

From its inception, it has been acknowledged that CPM has a high ‘g’ loading, with the visuo-spatial ‘k’ factor involved some degree. The test is not one of “general intelligence”, but it does measure a person’s intellectual output in a rather pure factorial sense. This position was confirmed in Burke’s (1958) review, indicating at that time the need for further cross-validation. A good deal of this has since been accomplished.

Two groups of authors, working with Carlson and with Das, have contributed substantially to our understanding of the factorial structure of CPM.

Carlson has related CPM to Piagetian conservation concepts, noting a development in the reasoning processes required for CPM solutions from perceptual to conceptual (after Winkelmann 1972). Carlson and Wiedl (1977) found high loadings for both perceptual items and conceptual items on the factor defined as simultaneous processing, following Das (1973).

Further development of this work in the U.S.A. and Germany has led to the conclusion that three dimensions can be identify in CPM, viz. abstract reasoning by analogy, pattern completion through identity and closure, and simple completion ie. Wiedl and Carlson (1976), using principal components analysis, found these factors accounted for 36 per cent of total variance, with a sample of 180 first to third grade children.

With a larger sample of 783 children of similar age from California, Carlson and Jensen (1980) confirmed the german findings. Using principal components analysis, the same three factors accounted for 27.8 per cent of the total variance, and using tetrachoric correlations accounted for 41 per cent of total variance.
Reporting CPM Results Scoring Procedure.

The most satisfactory method of interpreting the significance of a person's total score is to consider it in terms of the percentage frequency with which a similar score is found to occur amongst people of his own age. This has the advantage over other methods that no a priori assumption is made that in childhood the development of intellectual capacity is necessarily uniform or distributed symmetrically. For practical purposes, it is convenient to consider certain percentages of the population and to group people's scores accordingly. In this way, it is possible to classify a person according to the score he obtained as:

GRADE I or “intellectually superior”, if his score lies at or above the 95th percentile for people of his age-group.

GRADE II “definitely above the average in intellectual capacity”, if his score lies at or above the 75th percentile;

II+ If his score lies at or above the 90th percentile.

GRADE III “intellectually average”, if his score lies between the 25th and 75th percentiles;

III+ If his score is greater than the median or 50th percentile;

III- If his score is less than the median.

GRADE IV “Definitely below average in intellectual capacity”, if his score lies at or below the 25th percentile;

IV- If his score lies at or below the 10th percentile.

GRADE V “intellectually impaired”, if his score lies at or below the 5th percentile for his age-group.

The total score obtained, the consistency of an estimate, and the grade reached are conveniently summarized as in the following examples:

Total Score ......................24
Discrepancies ......................-1,0,+1
Grade ............................II+
Erroneous choices .................normal

(or descriptively in terms of tables CPM IV and CPM V)
3.5 Variables involved in the study:

Dependent variable

Academic achievement

Knowledge attained or skills developed in the school subjects usually designated by test scores or by marks assigned by teacher,

The achievement of pupil in the so called “Academic” subjects. Such as Kannada, English, Hindi, Mathematics, Science and Social Study as contrasted with skills developed is such areas as industrial arts and physical education.

Self concept,

The self-concept is psychological construct not biological given. Therefore it is subject to change and development Because the self Concept is psychological in origin and nature. Many contemporary psychologists regard it as the most important influence on a person’s behavior”

An individual’s full view and appraisal of him self-his physique abilities, social roles and worth”.

Adjustment,

“This approach regards the student primarily as a member of society one who either fits or does not fit in well with his group and with the larger society. Therefore school guidance concentrates not on pupil self-development but rather on assisting the individual to adjust and conform to the demands and exigencies of both his own group and the larger society”.

“The quality of an individual’s behavior ( its efficiency and satisfying ness) in relation to his environment, especially in this interpersonal relations

Intelligence

Raven’s coloured progressive matrices defined The aggregate of global capacity of the individual to act purposefully, to think rationally and to deal effectively with the environment’ Operationally, intelligence seems to indicate the individual’s capacity to profit
to from experience, this reinforces the standard concept that intelligence is a measure of person’s ability to make associations.

**Intervening variables**

➢ **Rural juvenile delinquents (RJD)**

➢ The juvenile delinquents who is born and brought up and studied at prior to joining the juvenile delinquents school rural place are termed as Rural Juvenile Delinquents

➢ **Urban juvenile delinquents (UJD)**

The juvenile delinquents who is born and brought up and studied at prior to joining the juvenile delinquents school urban place are termed as Urban juvenile delinquents

➢ **Senior juvenile delinquents (SJD)**

The juvenile delinquents who are studying in 9th and 10th standard classes and their age from 14 years to 16 years old considered as senior juvenile delinquents.

**Junior juvenile delinquents (JJD)**

The juvenile delinquents who are studying in 7th and 8th standard classes and there age are varies from 12 years to 14 years old. Considered as junior juvenile delinquents.

➢ **Boy juvenile delinquents (BJD)**

The boy who is under age of 16 called as boy juvenile delinquents

➢ **Girl juvenile delinquents (GJD)**

The girl who is under age of 18 called as girl juvenile delinquents

➢ **Juvenile delinquents of educated parents (JDEP)**

The juvenile delinquents who is born and brought up from educated family that is parents, who have possessed any education, should be educated or even literate family such kind of juvenile delinquents are called as juvenile delinquents of educated Parents.
- **Juvenile delinquents uneducated parents (JDUEP)**

The juvenile delinquents who is born & brought up from uneducated family that is parents, who have not possessed any education, should be uneducated or completely illiterates such kind of juvenile delinquents are called as juvenile delinquents of Uneducated parents

- **Parent’s occupation (Agriculture, Business, Government employee)**

  **Agriculture**- The parents of juvenile delinquents who are working as farmers and farm (Agriculture) labors are considered under Agriculture category.

  **Business**- The parents of juvenile delinquents who are having their own entrepreneurship are considered under business category.

  **Government employee**- The parents of juvenile delinquents who are employed in government sector are considered under Government employee category.

- **Regions of Karnataka (South Karnataka and North Karnataka)**

  **North Karnataka**- the juvenile delinquents schools which falls in the Belagavi and kalaburgai division are categorized as North Karnataka

  **South Karnataka**- the juvenile delinquents schools which falls in the Bengaluru and mangaluru division are categorized as south Karnataka.

- **Type of family (joint family Nuclear family)**

  **Joint family**- The family where three and more generations are living together is called joint family the parents of juvenile delinquents who are living in such family are categorized under joint family.

  **Nuclear family**- The family where two generations are living together is called Nuclear family the parents of juvenile delinquents who are living in such family are categorized under Nuclear family.
3.6 Statistical techniques used:

For the present study the researcher used descriptive statistics, namely mean and SD. Differential analysis including unpaired t-test, one way ANOVA followed by Tukeys multiple posthoc procedures, correlation analysis - Karl-Pearson’s correlation coefficient, multiple regression analysis - multiple linear regression models and path analysis by using SPSS 21.0 statistical software and the results obtained, thereby have been interpreted.

After the data had been collected, it was processed and tabulated using Microsoft Excel - 2007 Software. The data collected on academic achievement, self concept and its dimensions (i.e. desirable behavior, intellect and school status, dynamic attitude, popularity, depression benevolent and spiteful), adjustment and its dimensions (i.e. family, school climate and friends, society, education) and intelligence of juvenile delinquents. Then the data were analyzed with reference to the objectives and hypotheses by using descriptive statistics, differential analysis including unpaired t-test, one way ANOVA followed by Tukeys multiple posthoc procedures, correlation analysis, multiple regression analysis and path analysis by using SPSS 21.0 statistical software and the results obtained there by have been interpreted.

The purpose of the convenience, the different sections of chapter IV of the study has been organized under the following sections:

1. Descriptive statistics
2. Differential statistics
3. Correlation analysis of academic achievement scores of juvenile delinquents with other variables of students
4. Multiple linear regressions analysis of academic achievement scores of juvenile delinquents with other independent variables of students
5. Path analysis i.e. direct and indirect effects of independent variables of students on academic achievement scores of juvenile delinquents

Descriptive statistics

In this section, the mean and standard values of academic achievement, self concept and its dimensions (i.e. desirable behavior, intellect and school status, dynamic attitude, popularity, depression benevolent and spiteful), adjustment and its dimensions (i.e. family, school climate and friends, society, education) and intelligence of juvenile delinquents by
gender (boys and girls and female), location (rural and urban), occupations of parents (Agriculture, business and government employee), nature of family (nuclear and joint), regions (south and north), seniority (senior and junior) and educations of parents (educated and uneducated) and presented in the following section.

**Differential statistics**

In this section, we compared the different characteristics like gender (boys and girls and female), location (rural and urban), occupations of parents (Agriculture, business and government employee), nature of family (nuclear and joint), regions (south and north), seniority (senior and junior) and educations of parents (educated and uneducated) with respect to academic achievement, self concept and its dimensions (i.e. desirable behavior, intellect and school status, dynamic attitude, popularity, depression benevolent and spiteful), adjustment and its dimensions (i.e. family, school climate and friends, society, education) and intelligence of juvenile delinquents by unpaired t-test, one way ANOVA followed by Tukeys multiple posthoc procedures.

**Correlation analysis**

In the present study, the academic achievement scores of juvenile delinquents is taken as dependent variable and self concept, adjustment and intelligence scores of juvenile delinquents is considered as independent variables.

In order to find out the relationship between dependent variable with independent variables, the correlation coefficients were obtained. The correlation coefficient is calculated by using the Karl-Pearson’s correlation coefficient method and it is mathematically expressed in the following way:

\[
r = \frac{\sum XY - n\overline{xy}}{\sqrt{(\sum X^2 - n\overline{x}^2)(\sum Y^2 - n\overline{y}^2)}}
\]
If \( r \) value if zero, it indicates that there is no correlation between the two variables. If \( r \)-value is positive, it indicates that, one variable values increases with increase in another variable value and if \( r \)-value is negative, it indicates that, one variable values increases with decrease in another variable value.

**Multiple Regression analysis**

The most commonly used procedure in the prediction of a continuous criterion variable is the multiple linear regression models. Weights are known, as regression coefficients are determined for each predictor variable. The resulting sum of squares on the composite of these variables will show the highest possible relationship (multiple correlation) with the criterion variable.

The most commonly applied computational procedures for multiple linear regressions, which have now been made feasible by electronic computers. In this method, multiple correlation coefficients reveal the degree of relation between linear combination of independent (or predictor) variable and respective dependent (or criterion) variable.

In this method, multiple correlations and multiple linear regressions reveal the degree to which each selected independent variable like Self concept, adjustment and intelligence of juvenile delinquents. To identify this type of relationship between of independent variables on the one hand and the dependent variable i.e. academic achievement of juvenile delinquents on the other hand, the multiple correlations and multiple regression analysis were carried out.

**Path Analysis**

In simple, multiple regression analysis, empathy was on the study of the extent to which the dependent variable(s) get affected by the contribution of the independent variable(s) on original scales measurements being standardized for comparison of the scores with the studies being carried out by others with the same variables(s). The regression coefficients obtained carrying out simple, multiple regression analysis were found to get affected by the unit of measurement. In other words, the values of the regression coefficients of the variables get affected with the change of unit of measurement of the variable(s). In order to understand the true relation between the dependent and independent variables it becomes necessary to have regression coefficients independent of the unit of measurement of the variables. This is achieved by both the dependent and the independent variables being standardized as: \( Z = (X - \mu) / \sigma \) with \( \mu \) and \( \sigma \) being the mean and the standard deviation of the variable \( X \). It is evident that the standardized variable \( Z \) has mean zero (0) and standard
deviation (1) (Garrett, 1981. PP.313). with the standardized variables, the regression coefficients will be having the same values as that of the corresponding correlation coefficients. The regression coefficients are directional in the sense that they indicate the direction of the direction in the form of independent variable as the cause of the corresponding dependent variable. Thus, the regression coefficients in the regression models of the standardized variables have come to be named path (directional) coefficients, with the path (direction) being from an independent variable towards the corresponding dependent variable. Hence the regression analysis carried out with the help of standardized variables has come to be known as path analysis. It is worth nothing that, one value of the path coefficients as regression coefficients of the standardized variables, are the same in their values as those of the corresponding correlation coefficients. In the magnitude, the path coefficients are directional, but correlation coefficients are not directional, though both are independent of the units of measurement of the corresponding variables.

Added advantage of path analysis over multiple linear regression analysis is that of finding the direct and indirect effects of the independent variables on the corresponding dependent variable. In general, a variable can have its effect being revealed by the magnitude and the direction of the path coefficient of the independent variable. It can also have an effect on the dependent variable by the virtue of its relation with another independent variable. Thus, the effect of an independent variable on a dependent variable as received by the path coefficient of the independent variable is known as direct effect of the independent variable. On the other hand, the effect of an independent variable through another variable is termed as indirect effect of the independent variable on the dependent variable.

**Figure:** Direct and Indirect paths

In the above figure, P1 is the direct effect of X1 on Y, r_{1.2} is the indirect effect of X1 on Y through X2 and P2 is direct effect of X2 on Y
A variable not exerting direct effect on the dependent variable may exert indirect effect on the dependent variable through an independent variable. Such a phenomena holds good in many situations.

**Figure:** Indirect paths through intermediately variables

In the above figure $X_1$, $X_2$, and $X_3$ are the independent variables each having direct effect as well as indirect effect on the dependent variables $Y$. The variables $u_1$, $u_2$, $u_3$, $v_1$, and $v_2$ are also the independent variables with only indirect effect on $Y$ through some or all of the independent variables $X_1$, $X_2$, and $X_3$ as indicated in the figure 2. In such situations the variables $X_1$, $X_2$, and $X_3$ are called the intermediately variables between $Y$ and $u_1$, $u_2$, $u_3$, $v_1$, and $v_2$.

From the above narration it is evident that a variable can have only direct effect, only indirect effect and both direct and indirect effects on a dependent variable or variables.

**CHAPTER - IV**

**DATA ANALYSIS AND INTERPRETATION OF RESULTS.**

4.1 Introduction

However valid, reliable and adequate the data may be, it does not serve any useful purpose unless it is carefully processed, systematically classified and tabulated, scientifically analyzed, intelligently interpreted and rationally concluded.

After the data had been collected, it was processed and tabulated using Microsoft Excel - 2007 Software. The data collected on academic achievement, self concept and its dimensions (i.e. desirable behavior, intellect and school status, dynamic attitude, popularity, depression benevolent and spiteful), adjustment and its dimensions (i.e. family, school climate and friends, society, education) and intelligence of juvenile delinquents. Then the data were