CHAPTER - II

METHOD
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In this chapter we will look a description of the sample size and the respondents included in this study. It also discussed the procedure of the data collection and the measures used in the present study.

SAMPLE

In the present study there are three between subject variables and one within subject variable. Between subject variables are age (A), Sex (B), and intelligence (C) To test all the hypotheses three hundred subjects were taken from different schools as reported in the table 1. These subjects were divided into three equal number of subjects on the basis of their age. Half of them were of high intelligence (1) and half of it were male and half of it were female. 150 were of low intelligence subjects and half of it were male and half of it were female.

The first development stage is 3 to 4 year subjects. On third of the total subjects (300/3 - 100) were tested of this age. In 100 subjects, 50 subject were male and 50 subjects were female. In 50 male and female subjects were 25 high intelligent and 25 subjects were low intelligent.
The second development stage is 5 to 7 year subjects. These were school going children. 50 boys and 50 girls of this stage and in both, 25 high intelligent, 25 low intelligent boys and girls were tested under the responses to knots.

The last developmental stage and third stage is 8 to 10 year children. 50 male and 50 female subject and on the basis of intelligence 25 high intelligent 25 low intelligent boys and girls were tested under this stage.

Types of knots (D) is a within subject variable. Therefore all of three hundred subjects responses were observed on three groups (D₁ D₂ & D₃) of 10 different types of knots.

**TABLE : 1 Description of subjects in sample:**

<table>
<thead>
<tr>
<th>Intelligenced (C)</th>
<th>Age (A)</th>
<th>Male (B₁)</th>
<th>Female (B₂)</th>
<th>Male (B₁)</th>
<th>Female (B₂)</th>
<th>Male (B₁)</th>
<th>Female (B₂)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>3 to 4 years (A₁)</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>25</td>
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<td></td>
<td>5 to 7 years (A₂)</td>
<td>25</td>
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<tr>
<td></td>
<td>8 to 10 years (A₃)</td>
<td>25</td>
<td>25</td>
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<td>25</td>
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<tr>
<td>High Intelligenced (C₁)</td>
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<td></td>
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<tr>
<td>Low Intelligenced (C₂)</td>
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<td></td>
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<tr>
<td>Total</td>
<td></td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
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<tr>
<td>Total</td>
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</tbody>
</table>

Total 300.00
PROCEDURE

To know the high and low intelligent students, firstly we asked the class teacher to assess the high intelligent and low intelligent students of his or her class. After that we judge their intelligence by Stanford - Binet test (1905). We tested one by one each subject. The student was alone, uninfluenced by other persons. Instructions are given according to the manual of the test. After administrating the test we scored them with scoring key and found out high intelligent and low intelligent subject. According to their intelligence we selected equal number of high and low intelligent students from each class. Each subjects was seated at a chair. After that instructions were given as under:

"It is a simple piece of string you know please see carefully. And now, I will present the ten types of knots to you, Your task is to made similar knots and answered me which will be ask by me".

Firstly shown an ordinary simple knot tied tightly and asked to make similar knots. If they were unable to make the knot, then asked to from one around a thick stick or the leg of the table. If this also fails another string shown in two colours (half-blue, half-red) and the process explained as a story "the red part of the string goes underneath, turn on top, then
inside" etc." Asked to subject make a similar knot in the same way of model knot.'

One another knot shown which was more loosely but similar in pattern and then asked "Is it like the first one"? And also asked to copy this knot. The next knot is expanded knot. It means the two wings or half loops become clearly visible in the pattern used conventionally to represent the 'clover' in geometry text books. Subjects were asked to make similar knot and tried to know what is similarity among (tight knot, loose, knot and expanded knot) these knots.

If subject were able to understand the perceptual continuity between shapes then shown a 'left hand clover' and 'right hand clover' and asked what is difference between knots. You can judge this by eye or by running your finger over the string from one end to the other. If the subject were able to appreciate difference between the left hand clover and right hand clover. Children were asked to compare a true and false 'overhand' (the false 'overhand' is a pseudo knot, homeomorphic with the circle when the ends of the string are joined).

The next knot was a false and true figure of eight firstly shown and asked which is true figure of eight. The false figure eight is a simple 'overhand' knot whose ends are joined together and arranged is such a
way that the knot separates two loops and the true figure of eight is homeomorphic with the circle. When the ends of the string are joined.

At last subjects were shown two pairs of circles made of string the first paid is superimposed and the second pair is intertwined what would happen if the two opposite sides of the two loops were pulled in different directions.

In each knots three trials given to the subject. If subjects were given correct responses at one knots then asked about one by one to 10th knots, subjects' responses and oral answers also were noted.

MEASURES:

We have used intelligence test, which was constructed by stainford - Binet (1905) for measures high and low intelligent subjects. Although the Binet test was made up of items that tested several different mental capacities (including memory, comprehension, attention, moral judgement and aesthetic appreciation). Binet was primarily concerned with the
child's general intelligence, rather than the child's specific mental abilities.

Binet developed the concept of mental age (M.A.) to reflect the general level of the child's intellectual functioning. This term was devised to refer to the number of items and individual child answered correctly in relation to the number of items that the average child of a given age answered correctly. After administering this standardized test scored numbers, whose subject scored above 110 they were classified in high intelligent group and one who scored below 90 was labeled low intelligent.

"After I.Q. testing subjects' responses were measured through the ten types of knots. In ten types of knot subjects were able to tie knots and answered of knot subjects were able to tie knots and answered correctly 1 to 3 knots, it means he had topological understanding. If they were succeed to 4 to 6 knots it means they had good understanding of perceptual or intuitive continuity and in 7 to 10 knots subjects were giving correct responses it means subject had operational or conceptual continuity. Each subjects given three chance in every knots only the better responses was of subjects for every knots."
DESIGN

The design of the study is mixed design i.e.; three between subject and one within subject which is described by Myers (1979). Mixed design is used in this study because it is required by the nature of independent variables and mediating variables. Two types of independent and two types of mediating variables are examined. Those in which different treatments involve different subjects (between subject variable) and those in which all subjects are tested under each treatment (within subject variable). The most prevalent design in the psychological literature is a combination of these two approaches.

In this study three between and one within subject variables were used. A quota sample from a large population of subjects were randomly distributed among the (3x2x2) combinations of levels of the variables A, B and C with the limitation that there were - 300 subjects in each combination. Each subject was tested at three levels (D1, D2, D3) of 10 types of knots.
ANALYSIS OF THE DATA

1. Means, standard deviations, standard error of means and confidence intervals for each type of knot for each age group, sex and intelligence were computed.

2. A mixed ANOVA of mixed design was computed to interpret the results.

3. Co-efficient of co-relation was computed among each variables.