CHAPTER III

METHOD

School and Sample

The present research aims at identifying invulnerable children from a general population. The study was conducted in different schools of Bhadrak, Orissa, India. In the beginning 700 samples were selected from Bhadrak Highschool, Government Girls' High School, Popoh Singh School, and Banka U.G.M.E. School of Bhadrak. First, the peer nomination Inventory was administered to select the four groups of children such as advantaged-competent, advantaged-incompetent, invulnerable-disadvantaged-competent, and vulnerable-disadvantaged-incompetent. This Inventory was administered to all the students of class v, vii, and ix of those four schools. From Bhadrak High school the students of class vii, and ix were taken. In the girls' high school the students of class v, vii, and ix were taken. From Banka U. G. M. E. school the students of class v and vii and only the students of class v were taken from Popoh Singh U.P. school.

The purpose of the present research topic was briefly explained to the students to satisfy their curiosity, then the meaning of each of the question in the inventory were explained in detail to them. In the inventory they were asked to name two students from their respective sections basing upon their acquaintance and knowledge. In the inventory four cells were there, cell 1 meant for advantaged competent, those who were from enriched socio economic and educational background, doing well both in studies and behaviour. Cell 2 meant for advantaged incompetent, were from enriched socio economic and educational background but not doing well either in studies and behaviour. The cell 3 was meant for invulnerable children which was the main focus of this research project were from impoverished socio
economic and educational background but excelling both in the studies and behaviour. Fourth cell was meant for the disadvantaged incompetent were from impoverished socio economic and educational background but not doing well either in studies or in behaviour. From the 700 samples only 120 subjects were selected by the socio metric method. Thirty subjects were there in each cell. In cell 1, 16 boys and 14 girls, 15 each from both the sexes were in cell 2, in cell 3, 16 girls and 14 boys and in cell 4, 15 each from both the sexes were there. These subjects were administered Raven’s Progressive Matrices, three forms of Stroop tests (verbal form, motor form, and symbol substitution form), Incidental memory, and Coping questionnaire.

**Administration procedure:**

(a) Raven's Progressive Matrices was administered first. Which consisted of 5 sets, each has 12 problems and the difficulty level increases progressively. In the RPM recording form the name, class, and school were written and also the space for starting and finishing time of the test was also there. Five columns were there and in each column 12 matrices were there, at last space for set total score were there. This test was administered in a small group of 4 students. All the 4 students were explained the first example and were asked to solve the problem serially from set ‘A’ to ‘E’. They were asked to take their own time in finishing the test and requested to sit wide apart from each other to avoid any kind of discussion or copying.

Recording forms were given to the students and were asked to fill in the form regarding the name, school class, and section. After this they were given the test booklet and the following instruction were given. "At the top ‘A 1’ pattern with a bit missing, each of these bits is the right space to fit the space
but they do not complete the pattern. No. '4' is the correct answer here so you have to write '4' against no. '1' in column 'A'. You have to decide each time which of the bits below is the right one to complete the pattern, when you get the right pattern you write the number of it down on your scoring form against the number of the pattern. They are simple at the beginning and get harder as you go on. If you pay attention to the way the easy ones so you will find the later ones difficult. Try each problem from beginning to the end, do not miss any out. Go on like that by your self until you get to the end of the book.

The starting and finishing time as was recorded in this way RPM was administered on all those 120 students. Each student was taking not less than 40 minutes so it took 2 months to complete the data collection of RPM.

The stroop test: may be used to give information about variety of things developed by Stroop. It gives a comparison of the word reading, colour naming, colour-word-naming, incidental memory, colour naming interference, ratio, speed ratio, distraction ratio, and conceptual versus, perceptual ratio.

Verbal Form:

It contains four cards, card no. 1 contains the name of colours in black ink, the colours are red, blue, yellow, and green written alternatively in each line. Card 2 contained colour circles of the same colours in card no. 1. Card no. 3 contained the names of colour written in a different colour. In card no. 4 colour circles were there but in the middle some pictures were pasted. In addition to the basic processes like reading and naming speed, this test gives us scores for general speed, colour recognition ability, conceptual dominance, interference, and distraction proneness as well as incidental memory.
Motor Form:

Here the subjects were required to match the blocks prepared in the same way as the verbal form of the Stroop test. 48 wooden blocks were prepared, in one side the name of colours like red, green, yellow, and blue were written in black ink, in another side the colour circle of those four colours were there, in the other side the names of colours were written in conflicting colours, for e.g. the word blue written in red, yellow, and green but never in blue. Hence the subjects were required to put the block matching the words, colours, colour-word. Here no test of incidental memory was there just the subjects were asked to put the block that contain the circle of the colour on the page of the file where pictures were pasted on the colour circle.

Written Symbol Substitution Form: 247369

Here the subjects were required to substitute the original Stroop test stimuli with the symbols using `+' for red, `0' for blue, `x' for green, and `*' for yellow. A recording form was used for it, eight vertical lines and six horizontal lines were there, all total 48 matrices were there for card no. 1 and likewise 4 x 48 matrices were there for the four types of card. It measures the symbol substitution ability, information processing that is encoding and decoding process and the perceptual and conceptual ability of the subject. Those who are more intelligent and superior in cognitive ability they can complete it faster and without error. It also measures the same abilities that the verbal form of the Stroop test measures. This form of the Stroop test is more difficult in comparison to the other two.
Coping Style Questionnaire:

This questionnaire was developed by Dash and used in the Ph. D. research of Hariharan and Choudhury. Which presents 30 day to day problems of the children, from this questionnaire children's evaluation of the seriousness of the problems and encountering the problems in the past, apprehension for the future, their effects on the life, the degree of control over the problems and finally their approaches aimed at solving these problems would be obtained.

From this questionnaires we can know socio economic and homee background of the subjects, whether the parents are educated or not, how far they care for their children. It measures how effectively the students adjust with the teachers, classroom situation, and with their peers. This questionnaires also highlights the health problem, the surrounding of the subjects, it also includes the question when the child is neglected, punished without his/her fault and when tasked by the family work. It measures the competence, confidence, problemsolving ability, and frustration ability of a student. This aims to discover the way of living of the family, parents, siblings, neighbourhood relationship, role of the family towards community development, cooperation of the family towards education, sense of responsibility, peace and understanding between the parents, hopes for the children and child's own perception hope towards the future life. It also aims to discover the teacher student relationship, achievement motivation of the child. How he adjusts, when he is belittled by his peers and when he is misguided by them. So it measures how the subject perceives his world, what he has learned from his past and how effectively he is trying to overcome the shortcomings in life.
Verbal Form of the Stroop Test: This test was administered individually, the student were given a recording form to fill in regarding their name, class, section, and school. Then they were given the instruction in the following way: "you see I am going to administer a new test which is very interesting on you. Here in this card the names of four colours like red, yellow, blue, and green are written in black ink. You have to read names of colours as fast as you can, try to read correctly, do not stop in the middle even if you commit mistake, and read from left to right. I will record the time how many time you are taking in completing the reading". The following instructions were given for card no. 2 "you see here the same four colour patches were arranged interchangably like previous page you have read. You have to read the names of the colour as fast as you can, read row wise till you finish, do not stop in the middle even if you commit mistake, here also your time will be recorded". For card no. 3 the following instructions were given "this card consists of colour word naming, here the names of the colours are written with a different ink in a conflicting manner. Suppose the word red is written either in yellow, blue, or green but never in red. You have to name the colour in which the coloured word is written, do not read the word, there is every possibility that instead of naming the colour you may read the exact word so you have to be very careful while naming the colour. You will take more time than the first and the second card, do not get hurry otherwise you will fumble, take your own time to name correctly, here also I will record your time. In this card the subjects faced a lots of difficulty, most of them fumbled, some subjects required three to four instructions and most of them took longer time and committed more number of mistakes.

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In the card no. 4 no instructions regarding the pasted pictures were given to the subjects only they were asked to the colour patches. After the administration of card no. 4 is over immediately the test was closed and the subject was asked to recall the pictures that he had seen on the previous page. This tests the incidental memory of the subject, here no specific instructions were given regarding the pictures. So the subjects were not mentally prepared to remember those pictures so they became dumb founded and showed their inability to remember anything, when they were insisted gradually they started writing the name of the pictures one by one. This test was administered individually because other subjects may be benefitted of the practice and previous acquaintance.

**Motor Form of the Stroop Test:**

In this form of the stroop test 48 wooden blocks were there, in one side of the block the names of the colours like red, green, yellow, and blue were written in black colour like the first card, the colour patches of those four colours were made in another side, in the third side the colour words were written like card no. 3, here in this form of the test no test of incidental memory was there.

This test was also administered individually, the subjects were asked to match the wooden blocks with the different cards of the verbal form of the stroop test. The subjects were instructed in the following way. "You see the wooden blocks are there and in a particular side the name of four different colours were written in black ink, you have to put the block in the respective places of the card no. 1 where the same colour names were written in words, here the blocks are arranged randomly, you have to see what colour name is written on the card and you have to
bring the block on which the same word is written and I will record your time."

For card no. 2 the instructions were "you are seeing different patches of colour in one side of the block, you have to see what colour patch is there on the card and matching with it you have to bring the block which has the similar colour and you are required to put that block on the card. Arrange it serially from the left hand corner and proceed towards the right side in a row wise manner, do not put the blocks haphazardly, match with the blocks as fast as you can as I am recording your time."

For card no. 3 the subjects were instructed in the following way "you have been already acquainted in reading this card which is written in confusing colour, here more attention, care, and concentration is needed while you are going to match the blocks with the colour-word that is written on the card, there is every possibility of putting the blocks of any colour you are reading on the card. You will take more time in comparison to the first and second test, here you may face a lot of confusion and interference, you may not be able to get the right block immediately but have patience and confidence in you, do not get hasty otherwise you may commit more errors. Take your own time and I am recording how many minutes you are taking in completing this test. Here I marked the subjects were more confused and nervous in spite of the attention, care and concentration.

Then the last experiment of the motor form of the stroop test the subjects were asked to put the colour patches side of the block with the colour patches on which picture were pasted, naturally the pictures will act as distractors to distract the attention of the subject.
**Written symbol Substitution form for the Stroop test**

In this form the subject has to substitute `+` for red, `0` for blue, `x` for green, and `*` for yellow, basing upon the card here. 6 rows and 8 matrices were there on the recording form. You see in this form 24 rows and 8 matrices are there and after 6 rows a red line is there to demarcate the four parts in the Stroop test. On the top of the paper the different signs are written for the different colours, you have to read names of the colours and then have to convert it with the respective symbol, in this way go on giving symbols for the card no. 1. Card no. 2 have only colours, you have to put right symbol on the form. For card no. 3 you have to read color word not in terms of what it is written but in what colour the words are written, read it correctly in your mind and then convert them into symbols, go on systematically, do not get hasty, take your time but do as fast as you can, try your best to do it correctly, I am recording your time. In this way the four forms of the Stroop test were completed.

**Coping Questionnaire:**

This questionnaire was administered on a group of four students, first they were asked to write their names, school, and class and then they were instructed in the following way. "This is a very interesting questionnaire here you will find some of the problems of the students you are facing in your day-to-day life. Go through each of the problems attentively, for each problem you have to fill up seven columns. In column 1, 2, 3, 5, and 6 you have to fill it by selecting the appropriate and have to write it in number, but for column 4, and 7 you have to think over the solution and have to write in your own language. I am giving you an example and trying to clarify your doubts. In this
problem different names have been used but you think it as your name, you are facing that problem. So in the first question you believe that you have done well in the examination but when your result is published you came to know that you have failed, here in column 1 it is written how important or severe this problem is for you '1' very very serious, '2' mildly important, '3' not important at all. If you are perceiving this problem to be very serious put '1' in column 1 against that question, if this problem is mildly important for you then put '2' in that column, and if this problem is not at all either serious or important you put '3' against that particular question. Then come to column no. 2 it is written have you ever faced this kind of problem in your life if yes put '1' and if no put '2' in that column. In column no. 3 it is written are you apprehending of facing this kind of problem in future, if it is yes put '1' or if no put '2' in that column. In column no. 4 you have to fill that from your own language. If that problem will occur in your life then how you will feel, You have to write it whether you will be very sad unhappy or wont' feel anything at all. In column no. 5 it is written if it happens then will it bring any change or disurbance in your life. Here in this column the students faced difficulty in understanding so I tried to clarify their doubts by giving some examples. If it is yes put '1' and if no put '2' in that column. Then in column 6 it is written how much controll you have upon this problem whether very little, or to some extent, or it is fully under your control, here also I had to give some examples in making them understand this problem. Then comes the last column 7, here the subjects had to write how they are going to solve the problem. Think over it and then write, here I had to give some hints on alternatives which would help
them to think over various solutions like whether you work hard, go for a tuition, ask your parents to clarify your doubts or can ask politely to your teachers why and where they have got less marks even if you have done very well in the examination. To avoid copying and discussion among the group of students I made them sit in different corner of the room and I had to supervise what they were writing on the form. In each and every step I was asking them about their doubts. They were instructed to be free and frank and also be truthful while answering the questions and they were assured that their answers would be kept confidential and also they were asked to answer the questions serially. In this way all the students were administered this questionnaire. It took me complete 3 months as this was very time consuming but from this we can know the different aspect of a student's life which will help me while interpreting the result of each of the student. So in this way administration of RPM, 3 forms of the Stroop test, and the Coping style questionnaire were administered. I had got both the cooperation from the students and staffs of those 4 schools for which I am thankful to them.

Scoring Procedure:

**Peer Nomination Inventory:**

In case of Peer Nomination Inventory serial numbers were given to the students of a particular section, then the tally marks were counted off against the names or serial number selected in each category. Here 4 categories are to be found out like 'A', 'B', 'C', and 'D'. Group 'A' students those who have come from the high socio economic and educational background and doing well in the study, in group 'B' students coming from rich home socio economic backgrounds but doing badly in the study, group 'C' belongs to the invulnerable those who inspite of
impoverished poor background in all respects still excelling in different spheres of life, in group 'D' those who have come from the poor background but doing very bad in the study.

So, after writing the serial number of the students of a particular section in a frequency table their choice for group 'A' students were marked off against that particular serial number in the form of a tally mark. After putting the tally marks of each of the subject for a particular group at last it is counted. Two students of a particular class is selected basing upon the highest number of choice that a particular student has got. In this way the subjects of a group B, C, and D of that section were found out. In this way subjects of various groups from all the sections were found out and all total hundred twenty subjects were selected by the sociometric method and their names were written classwise.

**Raven's Progressive Matrices:**

After collecting the data for RPM they were arranged classwise, by seeing the key of RPM tick (✓) marks were given for the right answer and cross (x) marks were given to the wrong answers, set total of right answers were written below each set. Then by adding the right number of scores of each was added and grand total was found out. In each set 12 problems were there having 5 sets so all total 60 problems were there. Out of 60 problems of RPM 8 belongs to the simple pattern completion group (I.P), 8 items pattern completion involving identity group (II.P), 8 item involves pattern completion through clouser (III.P), 12 items involves pattern completion through abstract reasoning (IV.P), out of these 36 problems of set A, B, C, 23 involves perceptual organisations and rest 13 items involves...
conceptual organisations which symbolises C, only the set total of set D and E was found out.

So, for the convinience of my scoring I have to write the symbol I_P in the first eight items of set A, nineth and tenth problem were IV_P and XI and XII problems of set A were IV_C , in set B first three problems were II_P then fourth to eighth problems were in the III_P group and from nineth to twelveth were III_C, II_C, IV_C, IV_C respectively. In set C first three problems were in the II_P group, fourth and fifth problems were in the III_P group, sixth problem is II_C, from seventh to twelveth problems were in the IV_C group.

So, after writing the symbols in the 36 problems of set A, B, and C then 12 scores have to found out from this RPM test, they were arranged serially.

1. The simple pattern completion score.
2. Pattern completion through identity.
3. Pattern completion through clousure.
4. Pattern completion through abstract reasoning.
5. Perceptual organisation.
7. Proportion of set A.
8. Proportion of set B.
9. Proportion of set C.
10. Proportion of set D.
11. Proportion of set E.
12. Proportion of all the sets.

**Stroop Test (Verbal Form):**

In the verbal form of the stroop test time in seconds of each of the subject was collected in the data collection period. Time for word reading, colour-naming, colour-word-naming, colour-
naming with distraction, and also incidental memory, what the subject had written by recalling the pictures, so by counting the total number of recall of incidental memory we can get a number.

In case of colour-word reading it was recorded in seconds so by converting them we can get 5 raw scores- 1. Word reading (W)
2. Colour naming (C).
3. Colour word naming (CW).
5. Incidental memory recall (IM).

Then we divide the addition of C + W with the subtraction score of C - W. Conceptual vrs. perceptual dominance can be found out by adding the time of C and CW and divide it by 2 word reading score. Interference score can be found out by subtracting the colour naming timing from colour word naming timing. Distraction score can be found out by subtracting the colour naming timing from the colour naming with distractors. Distraction vs. interference ratio can be found out by dividing the colour word reading timing with the timing of colour reading with distractors. Then the incidental memory score can be found out by just counting the number of recall of the pictures by the subjects. So, in this way we are getting all total 11 scores from the verbal form of the stroop test. From the first raw scores different derived scores have been found out -
1. Average speed.
2. Colour recognition ratio.
3. Conceptual verses perceptual dominance.
4. Interference score.
5. Distraction score.
6. Distraction vs. interference score.
The formulas are -

1. Average speed = \( \frac{W + C + CW + CD}{4} \)
2. Colour recognition ratio = \( \frac{C + W}{C + W} \)
3. Conceptual/perceptual dominance ratio = \( \frac{C + CW}{2W} \)
4. Interference score = \( \frac{CW - C}{2} \)
5. Distraction score = \( \frac{CD - C}{2} \)
6. Distraction vs. interference ratio = \( \frac{CD}{CW} \)
7. Incidental memory recall score that is number of pictures correctly recalled.

The average speed can be found out by adding the time of W, C, CW, and CD and then dividing it by 4. Colour recognition ratio can be found out by first subtracting the word reading time from color naming and then adding the timing of C with D. 5 raw scores and 6 derived scores are there. And in the same way the derived score of Motor Form of the Stroop test and the symbol substitution form of the Stroop test was found out. In this two form no incidental picture recall score was there. Another extra 4 scores we are getting by deducting the timing of verbal form of the Stroop test from the timing of the motor form that is \( WM - W, CM - C, CWM - CW, CDM - CD \), this is the difference between the verbal from the motor. And also another 4 scores were found out by subtracting the timing of the verbal form of the Stroop test from the timing of the symbol substitution form of the Stroop test. The difference between the verbal form and symbol substitution form of the Stroop test was found out by \( WS - W, CS - C, CWS - CW, CSD - CD \).

After the scoring of the RPM, stroop test, the coping questionnaire forms were sorted out separately according to the class, school and their groups. In group A 30 subjects were there and they were given a serial number from 1 to 30, and in group B 30 subjects were there, 31, 60 serial number were given to them and 61 to 90 to group C and 91 to 120 serial number was given to
group D. Four identification symbols were used to know about the serial number, group, grade, and the sex of the subjects. Four sheets of scoring table were taken for A, B, C, D group. In column 1 serial numbers are there from 001 to 120, in column 2 group no. like A = 1, B = 2, C = 3, D = 4, in column 3 grades of class 5, 7, and 9 was there, 4th column is for sex, boys = 1, girls = 2. So, we are getting 4 identification scores for serial number, group, grades, and sex. We are getting 55 scores, 4 identification score, 12 RPM score, 39 stroop test score. Four separate sheets of paper were used for group A, B, C, and D, in each group 30 subjects were there, and each of them has 55 scores so a 30 x 55 matrices will be done. The scores were arranged in the following order.

1. serial number
2. Group
3. Grade
4. Sex
5. Simple pattern completion
6. Pattern completion through identity
7. Pattern completion through closure
8. pattern completion through abstract reasoning
9. Perceptual organisation
10. Conceptual organisation
11. Proportion of set A
12. Proportion of set B
13. Proportion of set C
14. Proportion of set D
15. Proportion of set E
16. Proportion of all the sets
17. Word reading (W) timing in seconds
18. Colour naming (C)
19 Colour naming (CW)
20. Colour naming (CWD)
21. Average Speed
22. Color recognition ratio
23. Conceptual Vs perceptual dominance ratio
24. Interference score
25. Distraction score
26. Distraction Vs interference ratio
27. Incidental memory recall score
28. Word matching (WM)
29. Color naming (CM)
30. Colorword Matching (CWM)
31. Color Matching with pitcher distractors (CMD)
32. Average Speed
33. Color recognition ratio
34. Conceptual Vs perceptual dominance ratio
35. Interference ratio
36. Distraction Score
37. Distraction Vs interference ratio
38. WM - W
39. CM - C
40. CWM - CW
41. CMD - CD
42. Word substitution (WS)
43. Colour substitution (CS)
44. Colour Word substitution (CWS)
45. Colour substitution with pictures distractors (CSD)
46. Average speed
47. Colour recognition ratio
48. Conceptual vs. perceptual dominance ratio
49. Interference score
50. Distraction score
51. Distraction vs. interference ratio

Difference between stroop symbol substitution and verbal form

52. WS - W
53. CS - C
54. CWS - CW
55. CSD - CD