Chapter Three

METHODOLOGY

3.0.0 METHODOLOGY

Today's anxious and tense adolescents can benefit much from assertive training. But not much work has been done to study the impact of assertive training on them.

Present Study

One way of studying this impact will be to give assertive training to certain adolescents showing overanxious and withdrawn disorders.

Most of the studies conducted so far have been limited to adults, physically disabled or young children, etc. very little attention has been paid to the nonassertive overanxious and withdrawn adolescents. Hence, the investigator thought of working on this problem as she hoped that it would help the counsellors, parents and teachers to identify, understand and help the nonassertive adolescents having overanxious or withdrawn disorders to develop assertive skills to combat coercive 'significant others'. She therefore, decided to address this need.

3.1.0 Objectives of the Study

1. To study the relationship between overanxious disorder and nonassertive behaviour as well as between withdrawn disorder and nonassertive behaviour.

2. To study the impact of role-playing as an assertive therapeutic technique on nonassertive overanxious and withdrawn adolescents.
3. To study the impact of covert modeling as an assertive therapeutic technique on nonassertive overanxious & withdrawn adolescents.
4. To study the impact of the two techniques combined on nonassertive overanxious & withdrawn adolescents.
5. To assess the differential impact of the intervention techniques with respect to each behaviour disorder.
6. To compare the experimental & control groups to understand the effectiveness of the intervention techniques on the experimental groups.
7. To study the difference between the girls and boys on the impact of the intervention techniques applied for both the disorders.

3.2.0 Hypotheses

1. There will be a correlation between the overanxious disorder & nonassertive behaviour. So the null hypothesis to be tested would be: There will be no correlation between the overanxious disorder and nonassertive behaviour.

2. There will be a correlation between the withdrawn disorder and nonassertive behaviour. So the null hypothesis to be tested would be:

There will be no correlation between the withdrawn disorder and nonassertive behaviour.

3. There will be an impact of role-playing on nonassertive overanxious adolescents. So the null hypothesis to be tested would be: There will be no impact of role playing on nonassertive overanxious adolescents.

4. There will be an impact of role-playing on nonassertive withdrawn adolescents. So the null hypothesis to be tested would be: There will be no impact of role-playing on nonassertive withdrawn adolescents.

5. There will be an impact of covert modeling on nonassertive overanxious adolescents. So the null hypothesis to be tested would be: There will be no impact of covert modeling on nonassertive overanxious adolescents.

6. There will be an impact of covert modeling on nonassertive withdrawn adolescents.So the null hypothesis to be tested would be: There will be no impact of covert modeling on nonassertive withdrawn adolescents.

7. There will be an impact of the two techniques combined on nonassertive overanxious adolescents. So the null hypothesis to be tested would be: There will be no impact of the two techniques combined on nonassertive overanxious adolescents.

8. There will be an impact of the two techniques combined on nonassertive withdrawn adolescents. So the null hypothesis to be tested would be: There will be no impact of the two techniques combined on nonassertive withdrawn adolescents.

9. There will be a reduction in nonassertive overanxious disorder of adolescents belonging to the control group. So the null hypothesis to be tested would be: There will be no reduction in the nonassertive overanxious disorder of adolescents belonging to the control group.

10. There will be a reduction in the nonassertive withdrawn disorder of the adolescents belonging to the control group. So the null hypothesis to be tested would be: There will be no reduction in nonassertive withdrawn disorder of adolescents belonging to the control group.

11. There will be a differential impact of the intervention techniques on nonassertive overanxious disorder. So the null hypothesis to be tested would be: There will be no differential impact of the intervention techniques on nonassertive overanxious disorder.

12. There will be a differential impact of the intervention techniques on nonassertive withdrawn disorder. So the null hypothesis to be tested would be: There will be no differential impact of the intervention techniques on nonassertive withdrawn disorder.

13. There will be a difference between each experimental group (ie,groups 1,2 & 3) and the control group (ie, group 4) for nonassertive overanxious disorder. So the null hypothesis to be tested would be: There will be no difference between each experimental group (ie, groups 1, 2 & 3) and the control group (ie, group 4) for nonassertive overanxious disorder.

14. There will be a difference between each experimental group (ie.groups 1,2 & 3) and the control group (ie, group 4) for nonassertive withdrawn disorder. So the null hypothesis to be tested would be: There will be no difference between each experimental group (ie, groups 1, 2 & 3) and the control group (ie, group 4) for nonassertive withdrawn disorder.

15. There will be a difference between nonassertive overanxious girls & nonassertive overanxious boys on the impact of intervention techniques applied. So the null hypothesis to be tested would be: There will be no difference between nonassertive overanxious girls & nonassertive overanxious boys on the impact of intervention techniques applied.

16. There will be difference between nonassertive withdrawn girls and nonassertive withdrawn boys on the impact of intervention techniques applied. So the null hypothesis to be tested would be: There will be no

difference between nonassertive withdrawn girls and nonassertive withdrwan boys on the impact of intervention techniques applied.

3.3.0 Sample

The following three schools were contacted to collect the initial data:

In School-I, i.e., Kalka Public School, six sections of VIII and IX standards were available.

In School-II, i.e., St. George's School, only three sections of VIII and IX standards were available.

In School-III, i.e., Cambridge School, just two sections of VIII and IX standards were available.

Table 1: Shows the distribution of initial sample as taken from the three schools.

	School -I		School - II		School - III		Total
	Girls	Boys	Girls	Boys	Girls	Boys	
Std. VIII	55	52	39	41	16	20	223
Std.IX	51	49	20	20	17	20	177
	106	101	59	61	61	40	
Total	207		120		73		400

Thus, the initial sample of 400 adolescents rated themselves on the inventories provided for judging the two disorders and the nonassertive behaviour.

All these adolescents were also rated by their parents and class teachers on another though similar inventories for the two disorders.

The adolescents were also rated by their parents on nonassertiveness inventory. The teachers however, did not show any inclination to go through it for lack of time and interest as well.

Out of 400, fifty subjects were dropped because their parents and/or teachers either did not return or returned incompletely filled inventories. Therefore, the final sample was chosen out of 350 subjects only.

3.3.1 Selection of the final sample

The final sample was chosen keeping the following criteria in mind:

1) Purposive Incidental Sampling was done as the students were included in the final sample only if they were diagnosed as being overanxious or withdrawn adolescents amongst the one's diagonosed as nonassertive.

2) Students scoring 75% and above on the nonassertiveness inventory and 60% and above on the disorders inventories only were included.

3) Only those students who fell in the age range of 13 to 15 years and were studying in VIIIth and IXth standards were included.

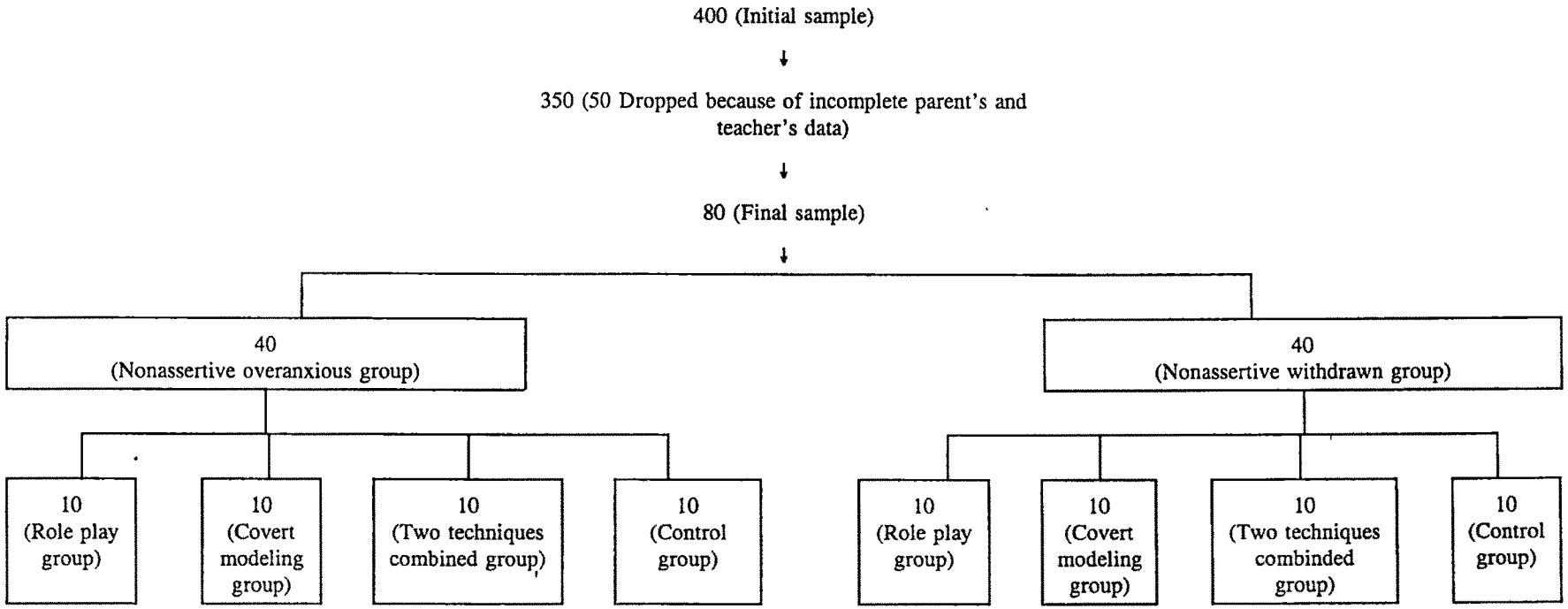
4) The whole sample came from english medium coeducational schools.

Thus, 40 adolescents from overanxious disorder group and 40 adolescents from withdrawn disorder group were selected. These 80 adolescents were further subdivided into eight groups of 10 each according to the experimntal design. Each of these 10 adolescents were subjected to different treatment techniques.

The following flow chart explains clearly the sample distribution.

3.3.2 Shows the distribution of the initial sample of 400 into the final sample according to the number of disorders and number of therapeutic techniques used.

Flow Chart



3.4.0 Diagnostic Tools Used

Three diagnostic tools, one for measuring overanxious disorder, second for measuring withdrawn disorder and third for measuring nonassertiveness, were used.

1. Two inventories for identifying the overanxious and withdrawn adolescents developed by the investigator were based on the respective diagnostic criteria as given in the DSM-III-R (already discussed in the introduction chapter-I).

2. The third inventory for identifying the nonassertive adolescents also developed by the investigator was based on some books and journals.

3.4.1 Standardization of the Three Inventories

Since, the three inventories were prepared by the investigator, they were subjected to Judgmental Technique for standardization. In this technique, the inventories were given to different judges for giving their opinions about the appropriateness and applicability of the statements given in the inventory meant for a specific purpose.

Ten Faculty members of the Department of Psychology, University of Delhi, were taken as judges for rating the different statements in the three inventories. Items on which seven or more judges agreed were retained and the rest were dropped.

Table 2: **Shows the number of items retained by each judge from the initial number of items for each inventory.**

Judges	Overanxious inventory		Withdrawn inventory		Nonassertiveness inventory	
	Initial No. of items	No. of items retained	Initial No. of items	No. of items retained	Initial No. of items	No. of items retained
1	37	35	31	20	50	46
2	37	30	31	24	50	48
3	37	34	31	30	50	42
4	37	36	31	23	50	41
5	37	31	31	26	50	41
6	37	32	31	24	50	43
7	37	33	31	28	50	44
8	37	30	31	22	50	40
9	37	33	31	24	50	45
10	37	36	31	27	50	49

3.4.2. Description of the Final Tools

1. Inventory for overanxious disorder.

The inventory thus prepared consisted of 32 statements to which the adolescents had to respond in terms of 3 options given like Always/Sometimes/Never.

2. Inventory for withdrawn disorder

The inventory prepared for this disorder consisted of 27 statements to which the adolescents had to respond in terms of 3 options given like Always/Sometimes/Never.

Parents and class teachers were also provided with the similar two inventories for rating the adolescents on the two behaviour disorders. This was done to obtain second opinion about the adolescent's behaviour.

The number of statements in overanxious inventory were 31 and number of statement in withdrawn inventory were 23. The number of statements were less in the inventories provided to parents and teachers than the ones provided to adolescents. It was so because one statement in overanxious inventory for adolescents had to be formed in two ways, i.e.

A-1 "I feel that I have not been able to come upto the expectations of my parents"

A-2 "I feel that I have not been able to come upto the expectations of my teachers".

This was done to match the statements of adolescents' inventory with those of the parents' and teachers' inventories separately.

Similarly, for matching the statements on withdrawn inventory, the number of statements formed in adolescent's inventory were more than those in parents' and teachers' inventories. These statements were:

B-1 "I prefer to remain alone in the house when others go out".

B-2 "I prefer to remain alone in the classroom when others go out".

C-1 "I get irritated when forced to talk to unfamiliar people".

C-2 "I get irritated when forced to talk to unfamiliar teachers".

D-1 "I feel at a loss for words in social gatherings".

D-2 "I feel at a loss for words in group discussions".

In the inventories provided to parents and teachers the beginning of the statements were changed from 'I' to 'He/She' for making it more applicable to them. The scoring of the inventories was similar to scoring of inventories of adolescents.

3. Inventory for nonassertiveness

The inventory prepared for nonassertiveness consisted of 40 statements. The adolescents had to respond to each statement in terms of 2 options given, i.e. True/False.

Parents were also provided with the similar inventory for rating the adolescents. The number of statements in adolescent's inventory and parent's inventory were the same, i.e. 40 statements in each. Only the beginning of the statements in parent's inventory were changed from 'I' to 'He/She' to make these more applicable. The scoring of the inventories was similar to the scoring of the inventories of adolescents.

The two inventories namely, Inventory for overanxious disorder and Inventory for withdrawn disorder were combined to form one inventory for making their administration easy. The different statements were randomly arranged. Inventory for measuring nonassertive behaviour was retained as an indepenent tool.

3.4.3 Scoring of the Inventories

1. The inventory meant for measuring the two disorders was very simple to score. There were three options provided for every statement out of which the subject had to choose one. The options were rated as 1, 2 and 3. Score of 1 meant no disorder and score of 3 meant symptom of the disorder present. Since the inventory comprised of both the disorders, the scores were added separately for each disorder. Scoring for parents' and teachers' inventories was also done in the similar fashion.

2. The scoring of the second inventory meant for measuring the nonassertiveness was also very simple. Here the subject had to respond to every statement by opting for either of the two options given. The options were scored as 1 & 2. Score of 1 meant assertiveness and score of 2 meant nonassertiveness. The inventories filled by the parents were also scored in the similar manner.

The investigator prepared a list of students according to their scores starting from highest and going down to the lowest on both the disorders as well as on nonassertiveness. Those students who scored high on either of the disorders and nonassertiveness, were chosen according to the design of the study.

3.5.0 Design

The present investigation is an intervention study. Therefore, the study aimed at evaluating the changes on the given sample of subjects as a result of the intervention techniques applied. To achieve this a 4 x 2 factorial design was prepared.

The main design was as under:

Table 3: Shows the distribution of the final sample according to the two disorders and the therapeutic techniques used in the present study.

		Assertive Techniques				Total
		Role playing	Covert Modeling	Two Techniques combined	Control	
Disorders	Nonassertive overanxious disorder	10	10	10	10	40
	Nonassertive withdrawn disorder	10	10	10	10	40
Total		**20**	**20**	**20**	**20**	**80**

The detailed designs were as under:

Table 4: Shows the detailed design for nonassertive overanxious disorder.

		Nonassertive overanxious adolescent		
		Girls	Boys	Total
Assertive techniques	Role playing	5	5	10
	Covert modeling	5	5	10
	Two techniques combined	5	5	10
	Control	5	5	10
	Total	**20**	**20**	**40**

Table 5: Shows the detailed design for the nonassertive withdrawn disorder.

		Nonassertive withdrawn adolescent		
		Girls	Boys	Total
Assertive techniques	Role playing	5	5	10
	Covert modeling	5	5	10
	Two techniques combined	5	5	10
	Control	5	5	10
	Total	**20**	**20**	**40**

The sample size and its distribution at the beginning and the end of the study was similar as shown in the above tables.

Variables

As in all experimental studies the present study too consisted of independent and dependent variables.

3.6.0 Independent Variables (IV)

It is the one which the researcher observes, manipulates or controls in order to determine its effects on 'behaviour'. The independent variable of the present study was:

3.6.1 Nonassertiveness

An individual is said to be nonassertive if he 'gives in' easily in any situation even when he himself does not agree to it. Nonassertive person lacks the ability to stand and speak for himself. He is unable to say 'No' to unreasonable demands and is easily put down by others in his environment.

Thus, nonassertiveness is the violation of one's own rights by failing to express one's thoughts and needs openly and thereby allowing others to disregard them. For a nonassertive individual whatever the 'other person' thinks is okay but whatever he thinks doesn't matter. He is not able to communicate his real feelings just to avoid unpleasantness. For the goal of nonassertiveness is "to appease others and avoid conflict at any cost" (Lange & Jakubowski, 1976). By behaving in such a fashion the nonasserter lets himself be taken advantage of and in turn doing serious harm to himself and his esteem.

To manipulate and control the independnt variable the following techniques were used;

1) Role playing

2) Covert modeling

3) Combination of the above two techniques

3.6.2 Role playing

It is the technique in which the therapist and the client act out the relevant interpersonal interactions. This technique was first used by Wolpe (1958) as an assertive therapeutic technique. The therapist assigns roles to himself and the client. In certain situations the therapist takes up the role of "significant others" from the client's life and the client acts as he is. Here the therapist tries to bring about the changes in vocal and postural expressions of the client from less assertive to more assertive modes. In other situations the role reversal takes place as the therapist takes up the role of the client and the client takes up the role of the "significant other". This helps the client to predict the behaviour and the reactions of others better and hence adjust his behaviour accordingly thus, leading the way out of conflict.

3.6.3 Covert modeling

As the name suggests, it is a treatment plan involving imagination of a model. The client imagines a model showing assertive behaviour in a particular

situation from the client's life. It is assumed that by imagining a model's assertive behaviour the client will be able to change his behaviour. Change in behaviour would come through the client's identification with the imagined model and symbolic coding of the model's performance. This technique was given by Cautela (1971). He suggested that modeling stmuli can be presented in imagination by means of instructions instead of viewig a live or filmed model. During the training, it is important to ensure that the client learns to express positive feelings like love and affection as well as negative feelings like anger and disgust in imagination with favourable consequences.

3.6.4 Combination of the above two techniques

The principles and procedures of the techniques involved were the same as in above two cases. Here the only difference was that instead of using any one technique both the techniques were given together. This was done to see whether the above mentioned techniques were successful as individual therapies or were more successful in combination.

3.7.0 Dependent variables

It is the one which varies systematically with or is dependent upon another variable, the independent variable. Dependent variable is what is observed and measured in an experiment. The dependent variables of the present study were:

1) Overanxious disorder

2) Withdrawn disorder

3.7.1 Overanxious Disorder

It is characterized by unrealistic fears, oversensitivity, self consciousness, night-mares and chronic anxiety. The child is often dependent on his parents and lacks self-confidence.

This disorder can be diagnosed on the basis of the diagnostic criterion as given in the DSM-III-R, which is :

Excessive or unrealistic anxiety or worry for a period of six months or longer, as indicated by the frequent occurance of atleast four of the following:-

i) excessive or unrealistic worry about future events.

ii) excessive or unrealistic concern about the appropriateness of past behaviour.

iii) excessive or unrealistic concern about competence in one or more areas, i.e., athletics, academics, social.

iv) somatic complaints, such as headaches or stomachaches, for which no physical basis can be established.

v) marked self-consciousness.

vi) excessive need for reassurance about a variety of concerns.

vii) marked feelings of tension or inability to relax.

The physical symptoms of this disorder are apparent lump in the throat, gastrointestinal distress, etc. Difficulty in falling asleep is common. They constantly appear nervous or tense.

Associated features are: social and simple phobia may also be present. Refusal to attend school because of anxiety in that setting, seem hypermature because of their "precocious" concerns, perfectionist tendencies with obsessional self-doubt. Excessive conformist or overzealous in seeking approval. Sometimes excessive motor restlessness or nervous habits like nail biting or hair-pulling. Reluctant to engage in age-appropriate activites which demand performance like sports.

3.7.2 Withdrawn Disorder

In withdrawn disorder the child tends to be seclusive, timid and unable to form close interpersonal relationships. Lack of interpersonal relationships cause them to get involved in day-dreaming and fantasy.

The diagnosis of this disorder can be done using the diagnostic criteria as given in DSM-III-R, which are:

a) shows excessive shrinking from contact with unfamiliar people, for a period of six months or longer, sufficiently severe to interfere with social functioning in peer relationships.

b) desires for social involvement with familiar people (family members and peers the person knows well) and generally warm and satisfying relations with family members and other familiar figures.

c) age of onset is atleast two and a half years.

d) the disturbance is not sufficiently pervasive and persistent to warrant the diagnosis of avoidant personality disorder.

The physical symptoms of withdrawn disorder are: socially withdrawn, embarrassed and timid in company of strangers. In severe social anxiety, adolescent may become inarticulate or mute even if communication skills are unimpaired.

Associated features are: they are generally unassertive and lack self-confidence. Among adolescents inhibition of psychosexual activity is common. Disorder is usually accompanied by another anxiety disorder like overanxious disorder.

3.8.0 Control Variables

It is the one which is neither manipulated nor observed by the experimenter. It is a potential independent variable that is held constant in an experiment. This is achieved by equating the two groups (experimental and control groups) on these variables.

In the present study the following variables were controlled:

1. Age - only 13 to 15 years old adolescents were taken.
2. Educational qualification - only 8th and 9th standard adolescents were taken.

3. The whole sample came from english medium co-educational schools.

4. Sex - number of girls and boys were same i.e. 40 each.

3.9.0 Procedural details

The present study was an experimental study in which it studied the comparison between the experimental groups and the control groups with respect to the effects, if any, of the interventioin techniques applied. The study was conducted in four statges:

1) Pre-intervention stage

2) Intervention stage

3) Post-intervention stage

4) Followup-intervention stage

Pre-intervention stage: Consisted of contacting different schools for collecting the initial or pre-data by means of a letter from the Head of Department requesting permission to work in the school. After obtaining the permission in three schools the inventories were provided for filling up, to the students of class 8th and 9th during school hours only. The inventories were also provided to the parents and the teachers which they, as explained earlier in the chapter, filled up at their own convenience.

Once this was done, the inventories were scored on each of the two disorders and on the nonassertive behaviour as well. On the basis of the scores obtained

the final sample was selected according to the criteria of the selection of the sample (discussed earlier in the chapter) and finally the students were divided into groups as per the experimental design according to which the final sample of 80 adolescents included 40 nonassertive overanxious adolescents and 40 nonassertive withdrawn adolescents. Each group of 40 was again subdivided into 4 groups of 10 each with one group receiving role-playing, another covert modeling, still another a combination of the two techniques and the last was the control group which did not receive any therapy. Before actually starting the treatment the subjects were asked to get the permission letters signed from their parents.

Intervention Stage: Consisted of administering the treatment techniques investigator was allowed to conduct therapy sessions in such periods like library, music/art, games/P.T., house activities and general studies. During these periods all other students would go to the respective departments and the investigator was left with the classroom to conduct the therapy sessions.

The therapies were administered in groups of two students having similar disorder. Initially the therapeutic treatment was given for three months twice a week to every group. In all there were 25 sessions given for half an hour duration each.

The first two sessions were spent in forming a good rapport and getting familiar. Simultaneously the subjects were explained the usefulness and the meaning of being assertive and the purpose of the treatments and the procedures involved. Also, all their doubts and apprehensions about the treatments were cleared before starting.

In the third session the subjects were explained how to make a list of the situations where they felt defeated and then give a priority rating on the basis of the severity of the situation experienced.

From the fourth session the treatment was started. Since the treatment was being given in groups, initially, those situations were taken up which were common to both.

3.9.1 Administration of Therapies

3.9.2 Role-Playing

In role-playing treatment after the problem situation was decided, the investigator took up the role of the 'significant other' and the subjects were asked to act as they would. This process was repeated with both the subjects in the group. Initially the assertive responses were supplied by the investigator. But after few sessions the subjects started trying on their own. Initial therapeutic sessions consisted of helping the students to bring about a change in their behaviour pattern through following methods:

1. Helping them to develop an eye-contact and later on maintaining it.
2. Helping to change the body-posture from the stooping to the straight back position and later maintaining it.
3. Helping to raise the pitch of the voice from feeble to audible level and later maintaining it.
4. Helping to change the tone from meek to an assertive one and later to maintain it.

In each session before and during the role-play the above mentioned methods were consistently repeated to strengthen the learning of the new behaviours. After the subjects had learnt to respond in assertive manner the roles were reversed and the investigator took up the role of the subject and subjects took up the role of the 'significant other'.

Extension of Role-Playing

Once the subjects had learnt the procedure they were given the opportunity to role play among themselves, i.e., one subject would take up the role of the 'significant other' and the other would act as he/she would and after sometime the roles were reversed. This gave them the additional opportunity to better understand each other's point of views and find solutions of their problems among themselves. During the session the investigator supervised the whole process.

To reach this extention stage the subjects took about 8-10 sessions.

After this they were required to try out the new behaviour pattern in real-life situations. It took them about 17-18 sessions before they gained confidence to try out these new behaviour patterns. Most of the subjects succeeded in exhibiting their assertive behaviour. Some took few more sessions. Every time they were asked to report back after trying it out in the real-life situation.

3.9.3 Covert Modeling

In covert modeling the subjects were initially asked to make a list of events where they had generally been rendered incapable of handling a situation. Later on they were asked to think and decide on a model preferably of their own age and sex who they thought was assertive and capable of achieving results. Simultaneously subjects were trained to imagine neutral scenes in detail for first five sessions. After they had learnt imagining, the problem situations from real-life, common to both the subjects, were considered. Then they were made to imagine their model tackling the problems situation. Initially the assertive responses of the model were provided by the investigator till the subjects learned to give assertive responses themselves. The outcome whether positive or negative was left for them, to imagine. After every session the subjects were asked to report in detail what they had imagined and with what result.Investigator at every reporting retrained the subject on the behaviour of the model. This went on till they started imagining positive

outcomes of assertive responses with utmost ease. Then they were asked to act out in 'real-life' situation whatever they had learned and were asked to report back after every trial. The subjects took about 18-19 sessions before they felt ready to try out the new behaviour pattern which they had learned by imitating the model.

3.9.4 Two Techniques Combined Group

This group was given the training in similar fashion as the two earlier ones. Only difference was that here for every problem situation the subjects were trained in both role-playing and covert modeling during the same fixed time period.

3.9.5 Control Group

This group as the name suggests was the controlled group as no treatment was provided to it. They were only tested and retested on the same inventories.

After the training period of three months was over every subject was asked to give an introspective report stating how they felt after treatment.

Post-intervention stage: As soon as the three months of intervention stage was completed, the post-intervention stage was put into motion. This stage consisted of readministering the inventories to the students, parents and teachers.

The scores obtained at this stage were compared to the scores of the pre-intervention stage and the result were thus obtained.

Followup-intervention stage: The final stage was followup-intervention stage. This was conducted after a gap of four months from the post-intervention stage. For the followup the therapeutic treatments were given for one month, twice a week to every group. In all eight sessions of half an hour duration each were given. The procedure followed for administration of therapies was the same as in the intervention stage. At the end of one month period the students, parents and teachers were again administered the inventories.

The final analysis of results, therefore, comprised of the scores of all the administrations of the inventories. The results thus, obtained are given in chapter IV.

3.10.0 Statistical Analysis

The data collected was quantitative in nature hence, was subjected to statistical analysis. The statistics used were:

1. Analysis of Variance (ANOVA)
2. Analysis of Covariance (ANCOVA)
3. Student's t-distribution
4. Pearson's Product Moment of Correlation

To understand the impact of assertive training, the data was analyzed at three levels, i.e. Pre-Post, Post-Followup and Pre-Follow up, using the above statistical methods.

Description of the Statistical Tools

3.10.1 Analysis of Variance (ANOVA)

Analysis of variance is a systematic approach to provide more efficient & exact tests of experimental hypotheses. The application of ANOVA determines the significance of the difference between means.

ANOVA was originally developed by late Sir Ronald A. Fisher. It is a powerful aid to the investigation. It enables the investigator to design studies more efficiently, to generalize more broadly and to take account of the complexities of interacting factors. It is actually a class of techniques designed to aid in hypothesis testing. The basic principle of ANOVA is to test for differences among the means of the populations by examining the amount of variations within each of these samples, relative to the amount of variation between the sample. That is, two estimates of population variance are to be made, namely, one based on between-sample-variance and the other based on within-sample-variance. Then these two estimates of population variance are compared with the F-test.

$$F = \frac{\text{Estimate of population variance based on between-sample-variance}}{\text{Estimate of population variance based on within-sample-variance}}$$

The value of 'F' thus obtained is compared with F-limit for the given degrees of freedom. If the obtained value of F is equal to or exceeds the F-limit value, it would mean that there are significant differences between the sample means.

In the present study the ANOVA'S were calculated to test the difference among the means of raw scores at the three levels for all the four treatment groups.

3.10.2 Analysis of Covariance (ANCOVA)

Analysis of covariance represents an extension of analysis of variance to allow for the correlation between initial and final scores. Covariance analysis is especially useful when for various reasons it is impossible or quite difficult to equate control and experimental groups at the start: a situation which often obtains in actual experiments. The ANCOVA enables to effect adjustments in final or terminal scores which will allow for differences in some initial variables.

The main distinction between ANOVA and ANCOVA is the fact that in ANOVA there is only one basic variable to analyze while in ANCOVA there are atleast two such variables and in some cases, many more than two. Thus, ANOVA may be regarded as univariate analysis while ANCOVA may be regarded as multivariate analysis.

In the present study ANCOVA was used to adjust this effect in the final scores and to correlate the initial and final scores. Hence, the results obtained gave a full picture of the effects of the various treatments on all the subjects.

3.10.3 Student's Distribution of 't'

Student's t-distribution was given by William S. Gosset, writing under the name of "Student". Student's distribution of t is not a single distribution but rather a family of distributions. The exact shape of a particular member of that family depends on sample size, or, more accurately, on the number of degrees of freedom (df), a quantity closely related to sample size. The term degrees of freedom (df) refers to the freedom of observations to vary. In general, the number of degrees of freedom corresponds to the number of observations that are completely free to vary.

Student's t is defined as

$$t = \frac{\bar{X}_1 - \bar{X}_2}{s} \sqrt{\frac{n_1 n_2}{n_1 + n_2}}$$

In the present study the student's 't' was used to test the hypothesis about the difference between two means at all the three levels for each group separately. If the value thus obtained was equal or greater than the standard value of 't' from the table, for the given degrees of freedom (df), it indicated a significant difference between means.

3.10.4 Pearson's Product-Moment of Correlation

When the relationship between two sets of measure is 'linear' the correlation between scores may be expressed by the product-moment coefficient of correlation, designated by 'r'. Coefficient of correlation are indices ranging over a scale which extends from -1.00 through 0.0 to + 1.00.

A positive correlation indicates that large amounts of one variable tends to accompany large amounts of the other.

A negative correlation indicates that small amounts of one variable tends to accompany large amounts of the other.

A zero correlation indicates no consistent relationship.

In most of the cases, calculated r's fall at intermediate points like 0.72, 0.26, etc. Such r's are to be interpreted as 'high' or 'low' depending in general upon how close they are to $\pm$ 1.00.

In the present study correlation was computed for the raw scores by using.

$$r = \frac{\sum xy - N \cdot M_x \cdot M_y}{\sqrt{\left[\sum x^2 - N \cdot M_x^2\right]\left[\sum y^2 - N \cdot M_y^2\right]}}$$

It was computed to find the relationship between the nonassertiveness and the two disorders.