CHAPTER - 7

SUMMARY

Research in anxiety, and especially targeted or test anxiety, has received considerable attention in the psycho-educational field and related disciplines, resulting in its transition from a novel research area in the 1950's to a field of major educational interest (See Ploeg, Schwarzer & Spielberger, 1983, 1984, 1984; Schwarzer, Spielberger & Ploeg, 1982; Sharma & Rao, 1984). Researchers in the Hullian tradition (e.g.; Gaudry & Spielberger, 1971; Spence & Spence, 1966; Taylor, 1953, 1958) attempted to show that anxiety operates like any other source of drive to improve performance on easy tasks and impede it on difficult ones. Accumulating evidence from the late 1950's onward shows a marked improvement in the quality of test anxiety research, resulting from advances in both theory and methodology. A veritable flood of studies in the West attest to the fact that the high test-anxious subjects perform poorer as compared to their low test-anxious counterparts (Carver, Peterson, Follansbee & Scheier, 1983; Covington, 1983; Deffenbacher, 1977, 1978, 1985; Deffenbacher & Hazaleus, 1981, 1985; Fox & Houston, 1983; Geen, 1976; Paulman & Kennely, 1984; Plake, Ansorge, Parker & Lowry, 1982; Ploeg, 1984; Sarason, 1963, 1978, 1980, 1984; Sud, S. 1983). This lower performance of the high test-anxious subjects is not an artifact of ability (Deffenbacher, 1978) or intelligence (Malamuth, 1983), but theorists conceptualize that the differential effect of test anxiety on performance varies with
evaluative stress (Deffenbacher, 1978; Sarason, 1961, 1972, 1973; Sarason & Stoops, 1978). For example, the literature on test anxiety (e.g., Deffenbacher, 1978, 1984; Deffenbacher & Hazaleus, 1985; Sarason, 1980, 1984) shows that highly anxious individuals perform less well on the same task under high evaluative stress (e.g., conditions which stress the difficult, comparative or time-limited nature on the task) than under low evaluative stress conditions. Evaluative stress initiates a complex array of behaviours which are disruptive for the high test-anxious subjects as summarized by Wine (1971, 1980, 1982) in her Attentional Model of Test Anxiety, which holds the critical difference to be that persons who are highly test anxious become self-focused in evaluative testing situations. Because their attention is focused on themselves, they have less attention to devote to the task, and because they devote less attention to the task, performance deteriorates.

Adding support to Wine's (1971, 1980, 1982) attentional model, are included the findings that test anxious persons due to evaluative stress engage in self-deprecatory rumination (e.g., Deffenbacher, 1978; Meichenbaum, 1972; Sarason, 1984) and neglect or misinterpret readily available task-relevant cues (e.g., West, Lee & Anderson, 1969). In recent years, the theoretical construct of test anxiety has been construed as being made up of the cognitive and emotional components. Studying the relationship of these components to test achievement, physiological arousal and
behaviour in general, has become a standard procedure. In effect, the empirical distinction between the cognitive (Worry) and emotional (Emotionality) components has not only been widely accepted in test anxiety research (Deffenbacher, 1980; Hagtvet, 1976; Liebert & Morris, 1967; Ploeg, 1983, 1984b; Schwarger, 1984b, Spielberger, 1980), but also is a notable milestone in the comprehension of the cognitive attentional theory of test anxiety propounded by Sarason (1972, 1975, 1978, 1980, 1984) and Wine (1971, 1980, 1982). Recent research also rather consistently implicates the worry component as the more important of the two in producing the deficits associated with test anxiety, i.e., impaired performance (e.g., (Depreeuw, 1984; Hodapp & Hanneberger, 1983; Houston, 1977; Morris, Finkelstein & Fisher, 1976; Ploeg, 1982; Richardson, O'Neil, Whitmore & Judd, 1977; Schwarzer, Jerusalem & Lange, 1982; Spielberger, 1980; also see Deffenbacher, 1980; Morris, Davis & Hutchings, 1981; for reviews). Such research has also shown that high levels of emotionality have little, if any effect on performance, perhaps because such arousal (within normal limits) demands little attention. On the other hand, high levels of worry are generally debilitating presumably because these irrelevant cognitions do take up processing capacity, leading the attention to wander from the task (Sarason & Stoops, 1978), and resulting in more negative self-statements (Bruch, 1978) and negative thoughts (Galassi, Frierson & Sharer, 1981) and eventually poorer problem-solving strategies (Bruch,
1978, 1981). Considerable research in the West has focussed on the assessment techniques for the separation of these components (e.g., Spielberger, 1980) and some investigators have developed scales to assess the cognitive interference component alone (e.g., Morris, Harris & Rovins, 1981; Sarason, 1980b). Furthermore, test anxiety therapy often concentrates on directing attention away from such cognitive interference (cf. Wine, 1971, 1980, 1982).

In recent years, the worry and emotionality components have also been linked to explain the trait-state dichotomy of anxiety. Controversies have ranged between worry and emotionality being considered as two dimensions of state test anxiety (Liebert & Morris, 1967) or linked more to trait test anxiety (e.g., Deffenbacher, 1980; Hodapp, 1982; Jerusalem, 1985; Jutshi, 1983; Spielberger, 1980; Schwarzer, 1984b).

The initial distinction focussed primarily on the state level of anxiety, that is, on subjective experiences in specific test situations. Later, it was also applied to the study of trait-test anxiety.

However, the focus of Western researchers has been on studying the effects of worry and emotionality at three levels of state test anxiety, i.e., before an exam, during an exam and after an exam. In other words, test anxiety is conceptualized as a state, as a trait, and as a process (see Becker, 1980, 1982; Becker & Schneider, 1976; Martin, 1971; Mechanic, 1962).
With increasing emphasis upon the study of the state measure of test anxiety, most treatment studies are also oriented towards modifying state anxiety (see Morris et al., 1981). A second recent emphasis is how worry and emotionality are related to difficult and easy test situations (Morris & Liebert, 1970; Morris & Perez, 1972). Worry has been shown to be a significant predictor of test performance; however, results for emotionality have been inconsistent (Arkin, Detchon & Maruyama, 1982; Deffenbacher, 1980; Spence & Spence, 1966; Spielberger, 1975). Ploeg (1982) found that both emotionality and worry were moderate predictors of performance decrements with differences observed for sex, intelligence levels and course difficulty. Salamé (1984) has also observed different patterns of test anxiety for males and females, offering explanations that females convert anxiety into achievement-oriented behaviours, whereas male students appear to be more immune to the debilitating effects of anxiety. However, differences between males and females in their test anxiety levels and especially in their worry and emotionality measures, has led sex to be termed as a moderator variable in test anxiety research (Jerusalem, 1985; Wine, 1980, 1982) and should be taken into consideration when dealing with emotionality and worry differences in predicting academic performance. In effect, Wine (1980) has appropriately assessed that for future directions in test anxiety theory and research, there is a need for more explicit examination of sex differences in test anxiety (p. 379).
Subsequent research, much of its within the cognitive behavioural framework (Meichenbaum, 1977) has demonstrated that test anxious individuals could improve their performance by rehearsing or observing coping responses that stayed relevant to the task (e.g., Holroyd, 1976; Ribordy, Tracy & Bernotas, 1981; Sarason, 1975; Wine, 1971). Most of these investigators used laboratory tasks to assess performance, rather than tests in naturalistic settings. However, Kirkland and Hollandsworth (1980) showed that a skills-training treatment raised students grade-point averages and reduced attentional interference more than anxiety-reduction treatments. Despite occasional contrary evidence (e.g., Cooley & Spiegler, 1980), it appears that cognitive training can indeed make a difference in people's cognitive functioning. Since worry is more frequently experienced by test anxious persons and more so under evaluative stress conditions, programs containing cognitive restructuring of worrisome thoughts are proving to be more beneficial in alleviating test anxiety and improving performance. Wine's (1971, 1980, 1982) 'attentional training' procedure and Meichenbaum's (1972) 'cognitive modification' procedure have proved to be especially effective in the West in training in task-orientated self-instructions, and modifying a negative self-focus to a positive self-focus. Such research has provided finer insights into the cognitive domain of test anxiety. In effect, as suggested by Deffenbacher and Hazaleus (1985), not to alter the cognitive
interference in more benign directions may simply leave too much of the cognitive variance unaccounted for, and the highly anxious may continue to distract themselves from the task at hand as they undo their task-oriented skills and self-instruction with worry.

However, research in test anxiety especially in the treatment of test anxiety has been scant even in the West (Hahnloser, 1974; Holroyd, 1976; Meichenbaum, 1972, 1977; Sarason, 1984; Wine, 1971, 1980, 1982) and almost negligible in India. Much cross-cultural research is required to fill in the gaps in further advancing the knowledge as well as treatment of the cognitive-attentional domain of test anxiety.

The present study, the first of its kind in India, attempts an integrative and comprehensive approach to the validation of the cognitive-attentional theory of test anxiety in Indian setting. This has been done by introducing attentional skills training (Meichenbaum, 1972; Sud, A. 1984; Wine, 1971) as a short-term cognitive coping strategy as an independent variable. An empirical verification of the attentional theory not only seeks to wipe out the loopholes in advancing and developing a more structured and well-defined concept of test anxiety, but, by employing Attentional Skills Training (AST), this study furthers the investigator's earlier study in 1983 on high test-anxious, high school boys performing under evaluative stress conditions.
This study also attempts to suffice the over-whelming necessity of alleviating test anxiety in an evaluative setting of a culturally different sample of boys and girls in India.

Since, it is asserted in the literature of test anxiety (see Deffenbacher, 1978, 1980, 1985; Wine, 1971, 1980, 1982) that Worry and Task Generated Interference are the biggest source of interference, and, with the lessening of these, not only does test anxiety reduce but performance has also been found to improve. The present study, therefore, attempts to validate these assertions by lessening the worry-state, modify the negative self-focus to a positive self-focus and improve performance on moderately difficult tasks of the high anxious-ego stress boys and girls with Attentional Skills Training. Evaluative stress introduced in this study has been adopted from Sarason’s (1961, 1972, 1973) ego involving instructions, which, coupled with moderately difficult problem solving tasks of 'Arithmetic Reasoning' and 'Anagram solution' from the most effective method in determining the validity of attentional skills training in lessening state test anxiety (process measure) and improving performance (product measure). Both the high as well as the low anxious boys and girls have been exposed to equivalent degrees of ego stress or control conditions. Therefore, in this study controls have been studied, not only as a no-treatment control group (e.g., no attentional skills training group) but also in
the form of the low test anxious subjects, exposed to differential stress conditions. The high test anxious have been compared to their low anxious counterparts, since previous research has determined that the best comparison group of the high test anxious is the low test anxious or, more appropriately stated, the ideal state during a test is one of low test anxiety (Sarason, 1972, 1975, 1978; Wine, 1971, 1980, 1982). This study, which is an empirical test of attentional theory, not only involves studying the interfering effects of state-worry, state-emotionality and task-generated interference in the performance of the high school boys and girls, but also involves the investigation whether the change in the process measures with attentional skills training, leads to a change in the self-report measures as well as performance measures (with task difficulty controlled but the nature of tasks varied) as product or outcome measures.

In other words, this study addresses itself to the following research questions:

1) Whether the high anxious-ego stress group of boys and girls report greater worry-state than emotionality-state, and thus report poorer performance scores and more negative post task self ratings, as compared to their high anxious-control, low anxious-ego stress or low anxious-control counterparts?

ii) Is attentional skills training effective in the significant reduction in worry-state, rather than emotionality state?
it also effective in the significant improvement in performance and does it lead to more positive post task self-ratings of the high anxious-ego stress group as compared to their high anxious-control, low anxious-ego stress or low anxious-control counterparts?

iii) Is the gain, due to attentional skills training, the greatest for the high anxious-ego stress group as compared to its high anxious-control, low anxious-ego stress or low anxious-control counterparts?

iv) Does attentional skills training also bring about any changes in the form of reducing worry-state, improving performance lowering task generated interference and increasing the percentage of time spent on task of the low anxious boys and girls regardless of stress conditions?

**Hypotheses**

On the basis of the related literature, the following hypotheses are framed:

A. **Process Measures**

   The high anxious-ego stress groups of boys and girls -

I. will show significantly greater Worry-State than their high
anxious-control, low anxious-ego stress or low anxious-control counterparts.

II. will show significantly greater reduction in Worry-State with Attentional Skills Training than their high anxious-control, low anxious-ego stress or low anxious-control counterparts.

III. will not show significantly greater Emotionality-state than their high anxious-control, low anxious-ego stress or low anxious-control counterparts.

IV. will not show significantly greater reduction in Emotionality-state than their high anxious-control, low anxious-ego stress or low anxious-control counterparts.

B. Performance Measures

The high anxious-ego stress groups of boys and girls will

V. perform more poorly on the Arithmetic Reasoning task than their high anxious-control, low anxious-ego stress or low anxious-control counterparts.

VI. show significantly greater improvement in performance with Attentional Skills Training on the Arithmetic Reasoning task than their high anxious-control, low anxious-ego stress or low
VII. perform more poorly on the Anagram solution task than their high anxious-control, low anxious-ego stress or low anxious-control counterparts.

VIII. show significantly greater improvement in performance with Attentional Skills Training on the Anagram solution task than their high anxious-control, low anxious-ego stress or low anxious-control counterparts.

C. **Post-Task Self-Ratings**

The high anxious-ego stress groups of boys and girls will report

IX. greater Task-Generated Interference than their high anxious-control, low anxious-ego stress or low anxious-control counterparts.

X. significantly greater reduction in Task-Generated Interference with Attentional Skills Training than their high anxious-control, low anxious-ego stress or low anxious-control counterparts.

XI. spending less Percentage of Time on the Task than their high
anxious-control, low anxious-ego stress or low anxious-control counterparts.

XII. significantly greater increase in the Percentage of Time on the Task with Attentional Skills Training than their high anxious-control, low anxious-ego stress or low anxious-control counterparts.

Method

Experimental Design

A 2 x 2 x 2 (TA x AST x ES) factorial design has been used. The effects of test anxiety (high and low), attentional skills training (AST and No-AST), and ego stress (ES and control) have been studied on the following dependent variables:

(i) Process Measures of worry state and emotionality-state

(ii) Performance Measures of Arithmetic Reasoning (AR Test) and Anagram solution task of moderate difficulty, and

(iii) Post task self-ratings of task-generated interference and percentage of time spent on the task.

Separate analyses have been made for both boys and girls on all the measures. Various experimental controls have also been
taken care of. The educational level, socio-economic status, instructions, age and sex of the subject, sex of the experimenter, and duration of intervention have been controlled. Besides this, certain methodological controls (Allen, et al., 1980) have also been taken into consideration such as complete randomization in the assignment of subjects to the experimental conditions, an inclusion of a non-treatment control group, the low test-anxious studied as a control group, employment of multiple methods of measurement and the use of powerful multiple statistical procedures.

Subjects

From a randomly selected sample of 820 pupils (416 boys and 404 girls) studying in the ninth class in public schools in Delhi, their ages ranging between 13 and 15 years, 240 pupils (120 boys and 120 girls) were selected as the final sample. Of these 120 boys and 120 girls, 60 were assigned as the high and 60 as the low test anxious respectively. The criteria of selection was mean ± 1 SD of the total mean and SD of the TAI scores. All those boys or girls whose scores were above M ± 1 SD, were classified as the high test anxious, and similarly those with their scores at or below M ± 1 SD classified as the low test anxious. In order to meet the requirements of a 2 x 2 x 2 (TA x AST x ES) factorial design, the subjects were randomly
assigned to either of the two treatment conditions (AST and No AST) and to either of the two stress conditions (ego stress and control) with 15 subjects in each subgroup. This resulted in 8 groups of 15 subjects each for boys and 8 groups of 15 subjects each for girls.

There was complete randomization in the assignment of subjects to each sub-group. Furthermore, the subjects all belonged to the higher socio-economic group, were non-volunteers and from a non-clinical population.

**Instruments**

(i) **Hindi version of the Test Anxiety Inventory (TAI)** (Sharma, Sud & Spielberger, 1983).

(ii) **The Present Affect Reactions, Questionnaire** (Endler, 1980).

(iii) **Post task Questionnaire (PTQ)** (Deffenbacher, 1978), in order to determine the post-experimental self-ratings of task generated interference and percentage of time spent on task.

(iv) **Experimental stress manipulation**: The subjects were given ego stress or control instructions. Ego stress instructions were adopted from Sarason's (1961, 1972, 1973) ego involving instructions. The control instructions on the other hand
were similar in nature and content to the standard instructions given to all subjects.

(v) **Hindi version of the Hundal General Mental Ability Test (GMAT)** (Singh, 1967), in order to test the intelligence level of subjects on whom the performance tests were standardized.

(vi) **Attentional Skills Training (AST)** modelled after the cognitive coping mechanism of Meichenbaum (1972) and Wine (1971) was employed to teach the subjects to make coping positive self-statements and how to maintain a positive task focus. The No-attentional skills training groups (No AST) were mainly engaged in talk, of about general things and city life, totally unrelated to the test situation.

(vii) **Performance tasks of moderate difficulty**

(a) **Arithmetic Reasoning task (AR Test)**: This has been constructed for this study and is a 12-item multiple choice test with a stipulated time limit of 6 minutes, i.e., 30 secs. for each question. The 12 items are randomly distributed on three pages, and care has been taken not to include more than two difficult or two easy items on one single page. Any item answered correctly is given the score of '1' and
any item answered incorrectly is given the score of '0' (zero).

(b) **Anagram Solution Task**: This test has also been constructed for this study and has a total number of 16 items to be solved within 8 minutes. These 16 anagram have been distributed randomly on four subsequent pages, and care has been taken not to include more than two difficult or two easy items on one single page. Any word solved, correctly is given the score of '1' and similarly any word word solved incorrectly is given the score '0' (zero).

During the standardization of these tests, no such item was included which was solved by either only the high intelligent or by everybody; thus the tests are not suffering from any ceiling or floor effects (Denny, 1966).

**Procedure**

Before beginning the experiment, it was assured that the subjects were comfortable, that the information collected would be kept strictly confidential and would be used for research purposes only. The experiment has been performed individually on each subject. First of all, the subjects (120 boys and 120 girls) were administered the present affect reaction questionnaire (PARQ)
with standard instructions. This was followed by the attentional skills training procedure for 40 minutes, with half of the subjects also exposed to a no-treatment control procedure (No attentional skills training) for an equal amount of time as per requirements of the experimental design. After this, the subjects were administered the ego stress or control instructions with N = 15 subjects per group, to meet the requirements of a $2 \times 2 \times 2$ (TA x AST x ES) factorial design. Thereafter, the subjects again filled up the Present Affect Reaction Questionnaire (PARQ). This was followed by their performance being adjudged on two tasks of moderate difficulty i.e., the Arithmetic Reasoning Test (AR Test) and the Anagram Solution task, administered in a counter balanced order, i.e., half the subjects were given first the 'AR' test followed by Anagram solution task and for the other half the order was reversed. This was done to avoid the subjects from developing a mental set or to balance out the carry-over effects, if any. Thereafter, the subjects completed the post-task Questionnaire, thus indicating the extent of their self-ratings on task generated interference and percentage of time spent on the task.

The subjects in the no-treatment control group were also exposed to the same sequence of experimental procedures except that during the no-treatment (No Attentional Skills Training) session, the experimenter and the subject (E & S) talked about general day to day things, about city life and other events unrelated to the test or experimental situation for 40 minutes.
Both the treatment (AST) and no-treatment (No AST) were conducted in the environs of the class-room and both were administered by the experimenter herself.

Analysis of the Data

The main statistics employed were

(i) **Analysis of Covariance (ANOCOVA)** for the scores. Four 2 x 2 x 2 ANOCOVAS were performed and as recommended by Cronback & Furby (1970) the pre-treatment worry-state and emotionality state scores were covaried against post-treatment W-state and E-state scores.

(ii) **Analysis of Variance (ANOVA)**. Eight 2 x 2 x 2 ANOVAS were performed on the performance and post-task self-rating measures.

(iii) Newman-Keuls’ multiple-range test (Bruning & Kintz, 1977) was applied to study the significant between group comparisons among adjusted and non-adjusted means. Separate analysis were made for boys and girls.

Results and Discussion

The major findings in terms of the process measures performance measures and post-task self-ratings are as follows:
A. **Process measures**

(i) Both boys and girls of the high anxious-ego stress group, under the experimental condition of No-attentional skills training, report the greatest elevation in worry-state rather than emotionality-state, as compared to their high anxious-control, low anxious-ego stress or low anxious-control counterparts.

(ii) With attentional skills training, both boys and girls of the high anxious-ego stress group report the greatest significant reduction in worry-state rather than emotionality-state, as compared to their high anxious-control, low anxious-ego stress or low anxious-control counterparts.

(iii) An additional findings, however, is that with attentional skills training, the low test anxious boys regardless of their level of arousal showed a significant reduction in emotionality-state as well.

In this study, the high test anxious group of boys and girls given ego stress, not only reported the greatest worry-state, thus replicating the findings in the literature of test anxiety (Deffenbacher, 1978, 1984; Deffenbacher & Hazaleus, 1981, 1985; Sud, S. 1983), but also benefitted the most with Attentional Skills
Training, almost becoming at par with the low test anxious-ego stress group.

In other words, these findings with worry-state support the efficacy of attentional skills training, or more precisely the cognitive-attentional theory of test anxiety. This study also adds to the literature in suggesting greater interference from worrisome ruminations rather than from emotional arousal. Both boys and girls of the high anxious-ego stress group reported greater worry-state rather than emotionality-state, as reflected in higher mean worry-state scores as compared to the lower mean emotionality-state scores. Thus, this study consolidates the findings of researchers in the West (Deffenbacher, 1978, 1980, 1984; Deffenbacher & Hazaleus, 1985; Sarason, 1978, 1980, 1984) Europe (Depreeuw, 1984; Ploeg, 1982, 1983, 1984) as well as in India (Sud, S., 1983), in suggesting the importance of cognitive interference 'worry' over automatic reactivity 'Emotionality'. Moreover, attentional skills training, as a cognitive coping strategy, was effective in reducing worry-state and not emotionality-state, thus replicating findings in the West (Hahnloser, 1974; Holroyd, 1976; Mahoney, 1974; Meichenbaum, 1972; Rimm & Masters, 1974; Wine, 1971a 1974). This finding, however, suggests that for future research for the reduction of emotionality also training in relaxation should be coupled with cognitive restructuring strategies.
In this study, attentional skills training was not effective in the alleviation of worry-state of the low test-anxious boys or girls. Except for the boys of the low anxious group who showed a small yet significant reduction in emotionality-state and which can be explained by the fact that cognitively-oriented treatment approaches in some cases reduce emotionality as well. However, this study has confirmed the viewpoint of researchers (Galassi, Frierson & Sharer, 1981; Hobfall, Anson & Bernstein, 1983; Hollandsworth, Kirkland, Jones & Van Norman, 1979; Holroyd, Westbrook, Wolf & Badhomp, 1978; Head & Lindsey, 1983) that the low test anxious are more stable and enduring during test situations; they do not suffer from any maladaptive cognitive tendencies and therefore, are not in any dire need of treatment as such.

Furthermore, this study employing the low test-anxious also in the form of a control group, compared to the high test-anxious, has furthered the propositions suggested by Wine (1980) in her bi-directional model of test anxiety, that the high test-anxious subjects are not the exact opposites of their low anxious counterparts, but only differ in their quality of ideas.

M. **Performance Measures**

I. **Arithmetic Reasoning Test**

(1) The high anxious-ego stress group of boys and girls perform more poorly on the Arithmetic reasoning task (AR Test) as
compared to their high-anxious-control, low anxious-ego stress or low anxious-control counterparts.

(ii) With attentional skills training, the high anxious-ego stress group show the greatest significant improvement in performance in the AR Test, as compared to their high anxious-control, low anxious-ego stress or low anxious-control counterparts.

(iii) In fact, with attentional skills training, the high anxious-ego stress groups of boys and girls perform as well as their low anxious-ego stress counterparts.

II. Anagram Solution Task

(i) The high anxious-ego stress group of boys perform significantly poorer than their high anxious-control, low anxious-ego stress or low anxious-control counterparts.

(ii) Whereas the girls of the high anxious group, regardless of their level of arousal, perform significantly poorer than their low test anxious counterparts.

(iii) Attentional skills training has increased the performance scores on the Anagram solution task of the high anxious girls, regardless of their ego stress levels.
(iv) Attentional skills training, however, is not effective in improving the performance scores on the Anagram solution task of boys.

That the high test anxious, subjects, given ego stress, showed the poorest performance on both the tasks of moderate difficulty, consolidates the previous findings reported in the literature predicting negative relationships between Test anxiety, and performance (Carver & Scheier, 1984; Deffenbacher, 1978, 1984; Sarason, 1972, 1978, 1984; Sud, S., 1983; Winer, 1971, 1980, 1982). The findings of this study on both tasks, in case of the high anxious-ego stress boys and girls, are in accordance with the predictions of the cognitive attentional theory of test anxiety. This is explained on the ground that since the high anxious boys and girls under ego stress or high levels of arousal showed the greatest worry-state, their performance was also the poorest as compared to their high anxious-control, low anxious-ego stress or low anxious-control counterparts. Moreover, under control conditions, the high anxious subjects performed similar in the group that was aroused in the case of low test anxiety. Such findings have been reported earlier employing Anagram solution tasks in the West by Deffenbacher (1978) and in India by Sud, S. (1983). This finding, therefore, provides additional support to the attentional theory since this theory accounts for the comparable performance of the high anxiety-low stress and low anxiety-high stress group.
Furthermore, with attentional skills training, the high anxious-ego stress group performed as well as the low anxious-ego stress group. This finding affirms the validity of the cognitive-oriented treatment procedure such as attentional skills training in also improving the performance measures of the test anxious persons. Similar findings employing attentional training have been reported by only very few investigators (e.g., Hahnloser, 1974; Holroyd, 1976; Sud, A., 1984; Wine, 1971). Therefore, this study further advances knowledge into this unexplored domain, which is the relationship of the cognitive restructuring of worrisome thoughts leading to improved performance. Highly difficult tasks coupled with evaluative stress generate excess tension and they become almost above the threshold of the high test-anxious subject, thus invariably lead to ceiling effects in performance scores for this group. One recent study by Sud, A. (1984) on Indian high school girls has demonstrated such an effect. Therefore, in the present study moderately difficult tasks were chosen and coupled with evaluative stress (ego stress) they became the most appropriate test of attentional theory.

The significant improvements in performance measures in this study with attentional skills training can be explained in this manner. Since the amount of negative self-preoccupation of test-anxious subjects interferes with their performance measures (Geen, 1976, 1980), people who are prone to worry in evaluative situations benefit in a two-fold manner. Firstly, in their
attention being called to the importance of maintaining a task focus, they tend to report less cognitive interference, in the form of state-worry, and secondly they show significant improvement in performance. This occurred especially for the high anxious-ego stress subjects, thus providing strong support in favour of the attentional model (Wine, 1971). This is because it is the high anxious-ego stress group alone that defines the assumptions stated by the cognitive attentional theory of test anxiety.

C. **Post Task Self-Ratings**

I. **Task Generated Interference**

(i) The high anxious-ego stress boys report the greatest task generated interference as compared to their high anxious-control, low anxious-ego stress, or low anxious-control counterparts.

(ii) The high test anxious girls report greater task generated interference than their low test anxious counterparts, regardless of stress conditions.

(iii) In the case of task generated interference also, there is no significant difference in mean TGI scores between the high anxious control and the low anxious-ego stress boys.
(iv) An additional finding is that ego stress, although detrimental for both the high and low test anxious group of boys, is however, more detrimental for the high test anxious subjects. These findings are in accordance with the attentional model of test anxiety (Deffenbacher, 1978).

(v) Attentional skills training is effective in the maximum significant reduction in task generated interference of the high anxious-ego stress boys, rather than the high anxious-control, low anxious-ego stress or low anxious-control counterparts.

(vi) Attentional skills training is not beneficial in reducing the task generated interference of the high anxious boys under control conditions, nor of the high or low anxious girls.

(vii) Additionally, although both the high as well as the low test anxious boys are significantly aroused with ego stress attentional skills training is not effective in reducing task generated interference of the low anxious subjects, regardless of their level of arousal.

II. **Percentage of Time Spent on Task**

(i) Both boys and girls of the high anxious-ego stress group report spending the least time on the task as compared to
their high anxious-control, low anxious-ego stress or low anxious-control counterparts.

(ii) The low anxious-control group boys and girls report spending the maximum time on the task, as compared to their low anxious-ego stress, high anxious-control or high anxious-ego stress counterparts.

(iii) The hypothesized beneficial effect of attentional skills training, in significantly increasing the mean percentage of time spent on the task, is however, not observed for both boys and girls, irrespective of their level of test anxiety.

That the high test anxious subject suffers from a greater intrusion of task irrelevant thoughts is further consolidated since worry and task generated interference were reported at a much higher level as compared to emotionality in this study; as reflected by higher mean TGI scores compared to lower mean emotionality scores.

Earlier research (Deffenbacher, 1978, 1980; Deffenbacher & Hazaleus, 1985; Sud, S., 1983) has suggested greater importance of both worry and task generated interference in predicting poor performance.

In the present study, the findings are more clear-cut, since the high test anxious persons worked under evaluative stress, they
reported greater task generated interference in the form of self-deprecatory rumination (Deffenbacher, 1978; Meichenbaum, 1972) and negative thoughts (Galassi et al., 1981), which eventually interfered with effective task performance. Irrelevant thoughts during test situations, as reported in the literature of test anxiety, lead the high test anxious persons' attention to waver from the task, and because they focus a lesser percentage of the time on task, their performance suffers (Deffenbacher, 1978, 1984; Depreeuw, 1984; Ploeg et al., 1983, 1984, 1985; Schwarzer, 1983, 1984, Schwarzer et al., 1982), similar observations were noted in the present study. The high anxious ego stress group of boys and girls reported spending the least time on the task which, therefore, explains their poor performance scores. The low test anxious subjects reported spending the maximum time on the task, thus supportive of the attentional model (Deffenbacher, 1978). Although, attentional skills training was successful in significantly improving the performance scores of the high test-anxious-ego stress boys as well as girls, it, however, led to no significant increase in these subjects self-reported percentage of time spent on task.

In contrast to the cognitive-attentional interpretation of test anxiety, the work of Culler and Halahan (1980) provides a view of test anxiety that stands in considerable contrast to the preceding interpretations. These investigators proposed that some students are anxious because they are less well-prepared owing to
inefficient study skills. Thus, rather than being a cause of poor performance, anxiety is treated as an emotional correlate of the individual's recognition that he/she is ill-prepared, for the upcoming test and hence likely to fail. Strictly speaking then, anxiety may play no significant causal role in the achievement process apart from being correlated with variations in study habits. However, in more general form, this deficiency model can be interpreted as emphasising an indirect causal linkage between anxiety and performance via impaired study skills. Such a complex sequence will be manifested only when a series of test-taking opportunities is the unit of observation. In effect, anxiety (worry/emotionality) which results from a sense of inadequate preparation following a first test failure eventually comes to interfere with preparation for subsequent tests, thereby causing a self-defeating loop. Moreover, the centrality of good study habits to academic performance is suggested by the frequently-reported finding that treatment for test anxiety is ineffectual unless deficient study habits are remediated (Allen, 1971; Klinger, 1984; McCordick, Kaplan, Finn & Smith, 1979). However, the exact roles of anxiety arousal and the quality of test preparation as independent and joint contributors to successive test performance must await multivariable analyses that focus on the test achievement cycle over time.

The present study establishes cross-cultural validity of the Attentional theory of Test Anxiety. Some suggestions for future research in India have also been put forth.