The present study was designed to test and establish cross-cultural validity of the Attentional interpretation of the test anxiety theory in Indian Setting. This was affirmed by studying the differences between the high anxious-ego stress high anxious-control, low anxious-ego stress and low anxious-control groups of boys and girls on the following parameters:

A **Process Measures**, namely Worry-State (W-State) and Emotionality-state (E-State);

B **Performance measures**, namely, Arithmetic Reasoning (AR) and Anagram Solution tasks of moderate difficulty; and

C **Post Task Self-Ratings**, namely, Task Generated Interference (TGI) and Percentage of time spent on Task (PTT).

Additionally, Attentional Skills Training as a short term cognitive coping strategy, was also introduced to bring about:

i) a significant reduction in the Worry-state rather than Emotionality-state;

ii) a significant improvement in performance in both the problem solving tasks-Arithmetic Reasoning and Anagram Solution;
iii) a significant reduction in self reported Task Generated Interference (TGI) and a significant increase in the Percentage of time spent on task (PTT), in the case of the high anxious-ego stress group of boys and girls as compared to their high anxious control, low anxious-ego stress or low anxious control counterparts.

The results have been discussed following the sequence of the process measures, performance measures and post task self-ratings, with major emphasis on an empirical test of the Cognitive Attentional theory of Test Anxiety in Indian Setting.

6.1 **Empirical test of attentional theory of test anxiety in terms of process measures**

The major findings of this study in terms of process measures under experimental condition of No-Attentional Skills Training are as follows:

1. There are significant differences ($P's < .0001$) between the high test anxious and low test anxious boys and girls on their worry-state scores. And this is more pronounced under high levels of arousal. In other words, the high anxious-ego stress group of boys and girls report the greatest worry-state as compared to their high anxious -
control, the low anxious-ego stress or low anxious-control counterparts. These findings for worry-state, therefore, support the Attentional Theory of Test anxiety (See Tables: 5.2, 5.3, 5.5 & 5.6).

(ii) An additional finding is that, regardless of stress conditions, the high anxious group of boys report more emotionality-state than their low anxious counterparts (vide Tables 5.8 & 5.9). But the girls under ego stress belonging to the high anxiety group report greater emotionality-state than their high anxious-control, low-anxious-ego stress or low-anxious control counterparts (See Tables, 5.11, 5.12).

The results of this study for worry-state are, consistent with previous research (Deffenbacher, 1977, 1978, 1980, 1984; Doctor & Altman, 1969; Morris & Liebert, 1970), which have shown worry to be a more relevant component of test anxiety than emotionality. Moreover, Morris, Davis and Hutchings (1981) in their literature review, have stressed that the high test anxious subjects are more prone to excessive worry rather than emotionality. For the highly test-anxious subjects who already view tests as tension-creating and discomforting experiences, these effects are exacerbated under evaluative stress or ego involving situations. With regard to this behavioural process,
Irwin Sarason (1960,1975) has suggested that stress elicits a tendency to worry about possible failure and to direct more attention to self-related thoughts. And appropriately outlined by the Direction-of-Attention-Hypothesis (Wine,1971, 1980), it is stated that highly test anxious individuals turn their task-relevant cognitions into interfering task-irrelevant thoughts (e.g., worry) in situations that are appraised as threatening.

The results with regard to worry-state for both high school boys and girls in this study viz., the high anxious-ego stress group reporting the greatest worry-state as compared to its high anxious-control, low anxious-ego stress or low anxious-control counterparts, consolidate findings in the West, Europe as well as in India. Investigators (Arkin, Detchon & Maruyama, 1981; Arkin & Schumann, 1984; Deffenbacher, 1978, 1980, 1984; Deffenbacher & Hazaleus, 1981, 1985; Depreeuw, 1984; Hagtvet, 1983b; Hodapp & Heneberger, 1983; Holmes, 1982; Ploeg, 1984; Sarason, 1980, 1984; Sarason & Stoops, 1978; Schwarzer, 1984b; Smith, Snyder & Handleman, 1982; Sud, S. 1983; Sud, A. 1984; Wine, 1971, 1973, 1974, 1980, 1982) have determined that the high test anxious in achievement-orienting situations suffer from more cognitive distraction in the form of heightened task-irrelevant worries as compared to their low test anxious counterparts.

In evaluative situations highly test anxious people, as in the present study, worry about how they are doing, browbeat
themselves for poor preparation, think about the time passing, worry about the consequences of doing poorly, or how other people are doing, think about how tense and upset they feel, etc. Whatever from the thoughts take, they invariably are irrelevant to the task in hand, and interfere directly with getting the task done. These characteristics befit the Attentional theory of test anxiety propounded by Wine (1971, 1973, 1974, 1980, 1982). Results supporting this model that highly test anxious people become intensely, painfully self-aware under evaluative stress (Deffenbacher, 1978; Deffenbacher & Hazaleus, 1985; Deo & Sharma, 1971; Galassi, Frierson & Sharer, 1981; Kuhl, 1981; Ross, 1981; Sarason, 1971; Sud, S. 1983) have pinpointed the focus of investigators in elucidating the defining and consequently further lending support to the cognitive attentional model of test anxiety. Based on this model, it has also been asserted that it is worry, rather than emotionality, which is not only more strongly experienced by the high test anxious persons, but is also the more important precursor in leading to impaired academic performance. Consistent with previous findings, both boys and girls of the high anxious-ego stress group in the present study reported significantly higher mean worry-state scores (Ms = 33.63 & 35.36 P's < .0001 respectively) than emotionality state scores (M = 19.60 and 19.06 P's < .0001, respectively. Inspite of the fact that the high anxious boys did report higher emotionality - state than their
low anxious counterparts, the greatest distraction was in the form of cognitive 'worry' and was reported by the high anxious boys and girls under ego stress conditions. In effect, under control conditions, the differences between the high and low test anxiety groups were minimized. In this study, therefore, the ideal comparison group for the high test anxious, that is the low test anxious (Carver & Scheier, 1984; Sarason, 1972, 1975, 1978, 1984; Wine, 1971, 1980, 1982) was also studied in the form of a control group under differential stress conditions. Included as controls were also the high anxious subjects given 'control' instructions. Supported by findings from earlier reports (Deffenbacher, 1978, Sud.8. 1983), this study has also shown the high anxious boys and girls under control conditions to report almost similar worry-state scores as their low test anxious counterparts given evaluative stress.

From this study, one inference drawn is that high test anxiety and 'worry' are highly inter-related and especially more so under threats to self-esteem, i.e., ego stress. In recent years, the distinction between worry and emotionality has been widely accepted in test anxiety research (Deffenbacher, 1980; Liebert & Morris, 1967; Ploeg, 1983; 1984b, Schwarzer, 1984b; Spielberger, 1980). It is frequently reported that the cognitive component of state-test anxiety is apparently more responsible for its debilitating effects on academic achievement, as contrasted
to autonomic arousal which appears to have little or no effect on performance in evaluative situations. Therefore, in test anxiety research, separate worry and emotionality scales have been constructed (Morris, Harris & Rovins, 1981). The need for differentiating between male and female subjects, as done in the present study, in their perceived worry and emotionality measures has also been recently acclaimed (Floeg, 1984).

The findings of this study in terms of process measures for boys and girls under experimental condition of Attentional Skills Training (Wine, 1971, 1980, 1982) used as a short term cognitive coping strategy, are as follows:

i) Attentional Skills Training is effective in the significant reduction in worry-state (P's < .0001), of the high anxious-ego stress group of boys and girls as compared to their high anxious-control, low anxious-ego stress or low anxious-control counterparts (vide Tables 5.2, 5.3, 5.5, & 5.6).

ii) There is no significant reduction in worry-state with Attentional Skills Training for either the high anxious-control, the low anxious-ego stress or low anxious-control groups in the case of either boys or girls.
iii) There is also no significant reduction in emotionality-state scores with Attentional Skills Training of both boys and girls of the high anxious group. However, there is a significant reduction in emotionality-state of the low test anxious boys, regardless of their level of arousal and the girls under ego stress regardless of test anxiety (vide Tables 5.8, 5.9, 5.11, 5.12, 5.13 & 5.14).

In a review of the literature in psychology concerning the treatment of test anxiety, Tyron (1980) concludes that treatments directed towards test-worry are more effective in reducing self-reported test anxiety than treatments directed towards test-emotionality. Most investigators have reported the usefulness of cognitive coping strategies (Lemire, 1983; Morris & Engle, 1981).

Some research has been carried out in the West employing Attentional Skills Training (Hahnloser, 1974; Holroyd, 1976; Mahoney, 1974; Meichenbaum, 1972; Rimm & Masters, 1974; Wine, 1971a, 1974). This research evidence shows this therapeutic procedure to be highly satisfactory for the alleviation of worry-state. It has been highlighted that it is the worry component of test anxiety which is stable and enduring, and which triggers the emotional arousal and thus leads to impaired academic performance (Deffenbacher, 1980, 1984; Deffenbacher & Hazaleus, 1981, 1985; Doctor & Altman, 1969; Liebert & Morris, 1967; Morris & Liebert, 1970; Sarason, 1980, 1984; Wine, 1971, 1973, 1980, 1982).
Some researchers have also employed Attentional Skills Training in combination with other treatment strategies such as Relaxation Training (Finger & Galassi, 1977; Little & Jackson, 1974; Owen, 1981). Systematic Desensitization (Lavigne, 1974; Meichenbaum, 1972; Scrivner, 1974), Cognitive Modification (Hahnloser, 1974; Holroyd, 1976; Wine, 1971a) or simply Placebo-training and non-training control group (Ribordy, Tracy & Bernotas, 1981). They have arrived at the conclusion that treatment approaches that help test anxious persons attend to the requirements of the test (such as Wine's 1971, 1974, Attentional Skills Training procedure) are of considerable therapeutic value. However, relatively few researchers have attempted to treat the test anxiety levels of students with the help of attentional skills training in the West. Recently, a study by Sud, A. (1984), besides lending cross-cultural support to Wine's attentional theory of test anxiety, has also opened a new dimension in the treatment of test worry of the highly anxious high school girls in India. In the present study, the findings obtained in terms of a striking change in worry-state scores, in the form of a significant reduction in pre-to-post measures with attentional skills training of both boys and girls under high anxiety-ego stress conditions, are in accordance with those promulgated by Wine's (1971, 1974), Attentional model and with those reported in the literature (Deffenbacher & Hazaleus,
One interesting observation, however, is that attentional skills training was only effective in significantly reducing the worry-states of both boys and girls of the high anxious-ego-stress group as compared to its high anxiety counterparts under control conditions. Thus, as reported earlier, that the high test anxious subjects are the most effected by ego stress (Deffenbacher, 1978; Deffenbacher & Hazaleus, 1981, 1985; Sarason, 1972, 1973, 1975, 1984, 1985; Wine, 1971, 1980), Attentional Skills Training therefore was most effective in alleviating the cognitive interference in the form of 'worry' of this group alone in this study. This finding adds support to the Attentional Model because the high anxious-ego stress group of boys and girls not only reported the greatest worry-state, but also the maximum reduction in worry-state with attentional skills training. This treatment strategy is aimed at modifying the cognitive element (worry) of test anxiety alone, rather than the emotionality component. Moreover, attentional skills training as expected, was not effective in bringing about any significant reduction in worry-state of the low anxious boys and girls, regardless of their level of arousal.

These findings add to the wealth of evidence provided in psychological literature (Carver & Scheier, 1984; Sarason, 1975,
1978, 1980, 1984, 1985). In fact, it has been reliably demonstrated by Galassi et al. (1981), Head & Lindsey (1983), Hobfall, Anson and Bernstein (1983), Hollandsworth, Glazeski, Kirkland and Van Norman (1979), and Holroyd, Westbrook, Wolf and Badhorn (1978) that the low test anxious subjects are not suffering from any maladaptive cognitive tendencies. They are not negatively self-preoccupied unlike the high test anxious as suggested by Wine (1980, 1982) in her bi-directional model of test anxiety. Not only do they excel in their quality of ideas (Covington, 1984), but when aroused physiologically, they tend to interpret this arousal as energy, alteness and being "turned on". Thus, under evaluative stress conditions, they direct this energy to situational demands. As such they do not require any attentional training. In other words, attentional training would be of no consequence to them, since the low anxious do not suffer from cognitive distraction, in the form of task-irrelevant worry.

Furthermore, in this study, attentional skills training, also did not reduce the emotionality-state of the high test anxious boys or girls. Only the low anxious boys regardless of their level of arousal, and the girls given ego stress regardless of their level of test anxiety benefitted from this treatment strategy, in terms of a lessening of their emotionality-state scores.

Since the self-focussing aspect of worry, is the key concept of the cognitive attentional theory of test anxiety, Sarason, 1972,
1975a, 1975b, 1984; Wine; 1971, 1980) rather than physiological reactivity itself, the findings of this study are quite consistent with the viewpoints of Sarason (1973) and Wine (1971). They have reported that by just reminding subjects to be task-oriented can have a salutary effect on their performance and intrusive thoughts. The attention-directing instructions by way of attentional skills training provide the high test anxious subjects with an applicable coping strategy. For the effective reduction in emotionality levels, some training in muscular relaxation or deep breathing exercises will prove more beneficial. Attentional skills training and other cognitively oriented treatment approaches, such as cognitive behaviour modification procedures (Goldfried, Linehan & Smith, 1978; Meichenbaum, 1972, 1977; Meichenbaum & Butler, 1980; Sarason, 1973) are not aimed at alleviating the emotionality component of test anxiety. However, in the present study, the subsequent reduction in emotionality-state with Attentional Skills Training of the low anxious boys and girls under ego stress can be explained in the manner that this strategy was able to elicit some form of relaxation for these subjects. In other words, treatments targetted at the reduction of worry in some circumstances can reduce emotionality as well. This finding further raises the often-asked question whether worry and emotionality are indeed two separate components of state test anxiety, (Morris & Liebert, 1973; Morris, Brown & Halbert, 1977) or do they cluster together as elements of trait anxiety (Deffenbacher, 1980; Lazarus & Averill,
1972). Since, if they do cluster as elements of trait test anxiety, then cognitive oriented treatments, or affective oriented, or both combined will be successful in reducing both worry as well as emotionality (Deffenbacher & Hahnloser, 1978). This observation has been affirmed by Finger and Galassi (1977) who employed attentional skills training alone, relaxation training alone and a combination of both. They have reported a reduction in both worry as well as emotionality. Moreover, ample evidence is available to assert that worry and emotionality are two separate components of test anxiety (Deffenbacher, 1980, 1984; Depreeuw, 1984; Liebert & Morris, 1967; Ploeg, 1983, 1984b; Schwarz, 1984b; Spielberger, 1980), but are aroused and elicited by different cues. Therefore, treatments aimed at modifying both elements of test anxiety are essential. However, since it is worry, which is more strongly and frequently experienced by the high test anxious individuals, interventions aimed at the cognitive restructuring of worrisome thoughts and training in task-oriented self-instructions, such as 'attentional skills training' hold the greatest promise (e.g. Hahnloser, 1974; Holroyd, 1976; Meichenbaum, 1972; Wine, 1971, 1980). In effect, treatments which combine both cognitive restructuring-relaxation or affective skills, are most effective in the reduction of both worry and emotionality in test performance.

Some investigators (Finger & Galassi, 1977; Kaplan, McCordick & Twitchell, 1979) have argued that if both worry and emotionality
are significantly reduced by either cognitive modification (Meichenbaum, 1972, 1977) or relaxation alone, then this weakens the validity of the worry-emotionality distinction in cognitive attentional research. Moreover, gender had turned out to be a moderator variable in research on worry and emotionality (Ploeg, 1982; Ploeg, Schwarzer & Spielberger, 1983, 1984, 1985; Wine, 1980, 1982). As such this important factor should not be ignored.

In general, the analysis pertaining to the process measures support the attentional theory of test anxiety.

Attentional Theory deals mainly with the differential effects of high and low test anxiety, the effects of which are heightened under ego stress. The results obtained for this study in the case of both high schools boys and girls under high anxiety ego stress conditions consolidate the attentional interpretation promulgated by Wine (1971). This group tended to report the greatest worry-state rather than emotionality-state, than its high anxious-control low anxious-ego stress or low anxious-control counterparts. Also attentional skills training was primarily effective in removing the differential effects of test anxiety of the boys and girls given ego stress in their worry-state scores.

6.2 Empirical Test of Attentional Theory of Test Anxiety in Terms of Performance Measures of Moderate Difficulty

a) Arithmetic Reasoning Task: The major findings of the present
study in terms of Arithmetic Reasoning Task (AR Task) under experimental condition of No -Attentional skills training are as follows:

i) The high anxious-ego stress group of boys and girls perform more poorly on the Arithmetic reasoning task (AR task), as compared with their high anxious-control, low anxious-ego stress or low anxious-control counterparts (vide Tables 5.16, 5.17,5.19 & 5.20).

ii) Under control conditions, the high anxious boys, rather than girls, perform as well as their low anxious counterparts under differential stress conditions.

Several investigators have arrived at the conclusion that high test anxiety levels and performance decrements are correlated (Culler & Holahan ,1980; Dweck & Wortman, 1982; Hagtvet, 1984). Test anxiety interferes with performance on both classroom and aptitude tests (e.g. Deffenbacher, 1977; Sarason, 1972). As early as 1960, Sarason explained that the performance decrements of the high test anxious subjects are further heightened under ego stress or evaluative conditions. This has been amply supported by various researchers (Deffenbacher, 1978; Deffenbacher & Hazaleus, 1981; Gissraru, 1976; Hashemian, 1977; Mills, 1982; Sharma & Rao, 1984; Sud,S.1983). Sarason's view has been
explicitly furthered and explained by Wine (1971) in terms of an attentional approach to test anxiety. Since the high test anxious subjects are prone to excessive worry in test situations (as observed in this study as well), this accounts for performance decrements (Deffenbacher, 1978, 1985; Morris et al, 1981; Sarason, 1980, 1984; Rocklin, 1985). And those test situations, wherein excessive reasoning and thinking are involved, lead the high test anxious to be caught in a vicious cycle of irrelevant thinking and subsequently poor performance.

In the present study, Arithmetic Reasoning test, designed as a multiple choice test format, generated greater cognitive distraction, in the case of the high anxious boys and girls under ego stress as reflected in their low mean performance scores (Ms = 6.66 & 7.13 respectively). The low test anxious boys and girls, however, scored higher on the arithmetic reasoning test. This can be explained that, since this test involved constructive thinking for efficient problem solution, it happened to be the most suitable way of adjudging the thinking capacity of the high test-anxious persons. Since the highly anxious individuals suffer from disorganized and dis-orientated thought processes during test performance, in other words a negative self focus (Wine, 1971), this effect was heightened under a multiple choice format used. Multiple Choice test in which the correct answer is usually present among other incorrect or ambiguous solutions, create tension for
highly anxious persons. Although Arkin and Schumann (1984) assess that Multiple Choice tests, provide students, in a way, more than one single attempt to answer each item. In this study, however, the high anxious boys under control conditions performed as well as the low anxious subjects on the Arithmetic Reasoning task. It was only under ego stress that the performance of the high test anxious suffered considerably. Individuals who have a high level of test anxiety tend to perceive evaluative situations as persona threats. During exams, they are tense, apprehensive, nervous and emotionally aroused. Although it is mainly the 'worry' component which leads to performance decrements on cognitive-intellectual tasks (see Liebert & Morris, 1967; Spielberger, 1980) as for instance the 'AR Test' in the present study, the emotionality component of test anxiety, however, has also been shown in a few studies to contribute to performance decrements (Ploeg, 1982).

Moreover, distinguishing between the cognitive and somatic trait and state anxiety in children, Fox and Houston (1983) have observed that cognitive trait anxiety, but not somatic trait or state anxiety, is related to task performance. In fact, Fox and Houston (1983) have used, maths.test as a form of high stress instructions. They did so by telling the subjects in the high stress group that they would be performing a maths.test, on which their performance would be evaluated and compared with that of
other students. They noted poorer performance for the high anxious high stress students.

Results conforming to the findings of the present study, in terms of the high anxious-ego stress group of boys and girls performing the poorest, have been reported by several investigators in the West, using Mathematics test (e.g., Fox & Houston, Hendel, 1980; Plake, Ansorge, Parker & Lowry, 1982 among others).

However, former evidence (Bander & Betz, 1981; Cecere, 1982; Cunnion, 1984; Halliwell, 1975; Mueller, Carlomusto & Marler, 1978; Peters, 1982) that females perform more poorly than males on Mathematics tests, has been provided further support in this study. There were mean differences in performance scores on the 'AR' Test between males and females of the high anxious-ego stress group (Ms = 6.66 & 7.13 respectively). This, therefore, acknowledges the fact that research must treat the data obtained from the two sexes separately (Ploeg, 1982; Salame, 1984; Wine, 1980, 1982). The lower performance on ability, intelligence and aptitude tests of the high comparative to the low test anxious has been reported by a variety of investigators (Alpert & Haber, 1960; Deffenbacher & Hazaleus, 1985; Ploeg, 1984; Nijhawan, 1972; Rocklin, 1985; Verma & Nijhawan, 1976). The poorer performance of the high test anxious is a combined effect of a stream of causes. Investigators, focussing on the relationship between anxiety, intelligence and academic performance have expressed that causal
links between these variables exist (e.g., Deffenbacher, 1978; Desidenato & Koskinen, 1969; Gaudry, 1978; Hill & Sarason, 1966; Hodapp, 1982; Osterhouse, 1975; Rao, 1974; Sarason, Davidson, Lighthall, Waite & Ruebush, 1960; Schwarzer, 1975). While some researchers have found that intelligence and anxiety have an interactive effect upon academic performance (Bajtelsmit, 1978; Kanekar, 1977; Nickel, Schiliter & Fenner, 1973; Sharma & Rao, 1983a, 1983b), Ploeg (1984) has reported that highly intelligent subjects are not affected by the deleterious effects of test anxiety. He found that the most affected are those who are of moderate intelligence as well as highly anxious. This was also suggested by Verma and Nijhawan (1976).

This implies that intelligence, as an independent variable, needs to be included in the experimental design to study the pattern of test anxiety x intelligence interaction while dealing with task performance as a dependent variable. However, in 1978, Deffenbacher had found that the high test-anxious are not poor in ability or intelligence as such. They are not demonstrably less capable. But, researchers such as Culler and Holahan (1980), Lin and McKeachie (1970), Whittmaier (1972) suggest that the high test anxious subjects have poorer ability and poor study skills. This fact is also supported by Benjamin et al (1981) and Vagt & Kuhn (1976). This is so mainly because the high test anxious subjects spend less time on the task, have less knowledge of the relevant
material of the task in hand and are generally more preoccupied with negative self-evaluations and preoccupations rather than their low test anxious counterparts. This type of behaviour is heightened under ego involving (Sarason, 1960) and difficult test situations (Deffenbacher, 1978). Eysenck (1979) has argued that difficult tasks are generally more demanding of working memory capacity than simple tasks. Therefore, performance on difficult tasks suffers relatively more than on simple tasks, under high levels of anxiety and evaluative stress due to the 'worry' elicited. This is so because the 'worrying' and off-task processing of contextual information use up part of a subject's limited working memory capacity. Considerable empirical evidence supports the notion that it is especially the worry component which accounts for performance decrements in high test anxious persons (Deffenbacher, 1980, 1984; Hodapp, 1982; Morris et al., 1981; Sarason, 1980, 1984; Sharma & Rao, 1983; Rocklin, 1985). Thus, besides the anxiety level of the subject, all other factors such as, his/her intellectual capacity and abilities the type of task, its nature, content and difficulty level, and whether the task is presented in a relaxed or a highly stressful environment, interact to affect performance.

The findings of this study for the 'Arithmetic Reasoning' Test in the case of both boys and girls are in accordance with the predictions of the Cognitive Attentional Theory of Test Anxiety. This can be explained 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. However, under control conditions, the high anxious boys performed similar to the low test anxiety group that was aroused with ego stress. Such findings have been reported earlier employing Anagram Solution tasks in the West by Deffenbacher (1978) and in India by Sud, S. (1983). Since Attentional Theory accounts for the comparable performance of the high anxiety-low stress and low anxiety-high stress groups, this was confirmed by these two investigators. Findings of a similar nature, in this study, provide additional support to the Attentional Theory. Also in conformity with the predictions of attentional theory, low anxious-control group of both boys and girls showed the best performance, in terms of reporting significantly higher scores than the high anxious-ego stress or even the high anxious-control groups.

Also Sud, S. (1983) was able to obtain more clear-cut results in support of attentional theory, with regard to performance scores, as compared to Deffenbacher (1978). She found that the high anxious-high stress high school boys showed the poorest performance as compared to the high anxious-low stress or low anxious-high stress groups. Whereas in the case of Deffenbacher (1978) although the high anxious-high stress did show the poorest
performance, there was no significant difference between the low anxious-low stress and high anxious-high stress groups in their mean performance scores. This can be explained with the help of the fact that Deffenbacher (1978) had employed Sarason's (1961, 1973), 13 highly difficult Anagrams, as a performance task, which coupled with high stress or ego involving instructions became a greatly tension provoking situation. Whereas Sud, S. (1983) employed moderately difficulty anagrams as a performance task also given under high stress conditions.

Therefore, it can be interpreted that highly difficult test material, coupled with ego stress, generates excess tension, almost above the threshold of the high test anxious subjects. This leads to ceiling effects in performance scores for this group who, in other words, are incapable of answering more than two or three items correctly. In such a situation, the low anxious also perform poorer than what they are capable of, as reported by Deffenbacher (1978) since he observed no significant difference between the high anxious-high stress or low anxious-low stress groups. This, therefore, also results in inadequate comparisons between the high and low test anxious, for which purpose the low test anxious are included in test anxiety studies. Poor results in terms of performance measures using highly difficult tasks have also been reported in a recent investigation by Sud, A. (1984) in India. Thus, if performance itself shows no improvement at all, because of
this limitation, such as the test being too difficult then this
seems to be more a fault of the task than of the validity of the
attentional theory of test anxiety. It may be recalled that
'Arithmetic Reasoning' test has been standardized and labelled
moderately difficult in the present study.

Under experimental condition of Attentional Skills Training,
both boys and girls on the 'Arithmetic Reasoning' Test performed
as follows:

i) The high anxious-ego stress group of boys and girls show the
greatest significant improvement (P's < .0001) in performance
as denoted by higher mean scores (vide Tables: 5.16, 5.17,
5.19 & 5.20), as compared to the other three groups.

ii) In fact with Attentional Skills Training, the high anxious-
ego stress group of boys and girls perform as well as their
low anxious-ego stress counterparts given No-Attention Skills
Training.

iii) Attentional skills training is, however, not effective in
the significant improvement in performance scores on the 'AR
Test' of either boys or girls under high anxious-control,
the low anxious-ego stress or low anxious control conditions,
as denoted by Non-significant mean differences (vide Tables:
5.16, 5.17, 5.19 & 5.20) between these groups.
iv) A marginal, yet significant, ($P < .01$) improvement in mean performance scores does result for the high anxious-control group girls. However, this is much less than the improvement that has occurred for their high anxious-ego stress counterparts.

Furthermore, a significant Test Anxiety $\times$ Attentional Skills Training $\times$ Ego Stress effect for both boys and girls on their performance on the Arithmetic Reasoning Test implies that this treatment strategy (Attentional Skills Training) is effective in improving performance under conditions of ego-stress and high test anxiety.

This significant three-way ($TA \times AST \times ES$) effect also establishes the validity of this short-term cognitive procedure (40-mins.) in alleviating the detrimental consequences of elevated worry under ego involving conditions and, thus, resulting in improved performance.

Earlier, through a series of three studies Wine (1974) has demonstrated that significant performance improvements occurred for the high test anxious with attentional skills training on tests such as the Wonderlic Personnel and Digit Symbol.

In some studies, however, significant improvement in performance scores with cognitively aimed treatment strategies has not only been less (Cowington, 1984; Finger, 1975; Spielberger,
1976; Tyron, 1980), but totally absent (see Finger & Galassi, 1977; Scrivner, 1974). Other investigators (Holroyd, 1976; Lavigne, 1974; Meichenbaum, 1972; Wine, 1971a, 1974) provide strong empirical evidence reporting significant improvements in performance on Anagram solution tasks and the Wonderlic Personnel, with attentional skills training either used alone or in combination with some other treatment strategy. With cognitive modification also considerable gains in performance are denoted by Lavigne (1974), Holroyd (1976), Meichenbaum (1972) and Wine (1974). Recently, Sarason (1984) has asserted that high test-anxious subjects given attention-directing instructions, improve in test performance. This is one form of cognitive modelling which, since it is geared towards task-orientation, lessons 'worry' and improves performance (Deffenbacher, 1980; Deffenbacher & Hazaleus, 1985; Meichenbaum, 1972, 1977; Meichenbaum & Butler, 1980; Sarason, 1983, 1978).

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 improvements in performance scores. Thus, attentional skills training
introduced as a short term (40 mins.) cognitive coping strategy in this study not only resulted in implementing change for the better in subjects' cognitive functioning, but also resulted in improved performance scores on the Arithmetic Reasoning Test. These findings, therefore, replicate earlier research in the West (Holroyd, 1976; Lavigne, 1974; Meichenbaum, 1972; and Wine, 1971a, 1974). The improvement occurred especially for the high anxious-ego stress subjects; and since it is this group alone which defines the assumptions stated by the cognitive attentional theory of test anxiety, the findings of this study provide additional support to the attentional model (Wine, 1971).

b) Anagram Solution Task

The findings of this study in terms of performance measures on the Anagram solution task under experimental conditions of No-Attentional Skills Training are as follows:

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 (See Tables 5.22, 5.23).

ii) Whereas in the case of girls, regardless of their level of arousal, the high test anxious subjects perform significantly poorer than their low test anxious counterparts (see Tables: 5.27 & 5.28).
Various studies, employing anagram solution as performance tasks, report findings of a similar nature to those obtained in this study (Deffenbacher, 1978; Sarason, 1960, 1978; Sud, S., 1983). In an earlier study by the present researcher (Sud, S., 1983), between-group comparisons showed that the high anxiety-low stress, the low anxiety-high stress and the low anxiety-low stress groups solved significantly more anagrams ($P's < .01$) than the high anxiety-high stress group. These findings are in accordance with that reported in the West earlier by Deffenbacher (1978) with one main difference, however, that Sud's (1983) study was able to provide stronger support to the attentional theory in terms of the high anxious-high stress subjects reporting the lowest mean performance score ($M = 5.15$) and the low anxious-low stress subjects reporting the highest ($M = 9.65$). However, for Deffenbacher (1978), this was not so, wherein the mean Anagram-performance scores were, $Ms = 4.53$ & $3.29$ for the low-anxious-low stress and high anxious-high stress groups respectively, and the difference between these two groups was non-significant. Deffenbacher (1978) however, had used very difficult anagrams. Evidence in favour of difficult anagrams leading to poor performance of the high test anxious compared to the low, are reported by Harleston & Smith (1965), Jack (1964) and Nottleman & Hill (1977). However, in their case the high test anxious performed poorly regardless of stress conditions.
Anagrams have been chosen, in this study because they have been used frequently in research on cognitive intellectual skills. Also they minimize differences in knowledge or experience, and males and females perform equivalently on these tasks (Bourne, Ekstrand & Dominowski, 1971; Mendelsohn, Griswold & Anderson, 1966). Former studies employing anagram solving tasks, both in the West and East (Deffenbacher, 1978; Gissrau, 1976; Goldklang, 1982; Rapaport, 1979; Sud, S., 1983; Thyer et al, 1981; Toner, 1983) have shown that the performance of the high test anxious, under ego stress conditions, is poorer than that of their low test anxious counterparts. In the present study, the high anxious-ego stress boys (M = 9.53) and the high anxious girls (M = 10.96), regardless of the level of arousal, perform the poorest as compared to the other groups.

The results of the present study are also consistent with those reported earlier, by Arkin et al (1982), and Sarason (1961, 1978, 1980 and 1984). They have stated that the high test anxious persons divide their attention between the self and the task, which leads to poorer performance as compared to their low test-anxious counterparts. The present findings, therefore, conform to the general view of Wine (1971b, 1980) and Sarason (1972) that under ego-involving conditions, coupled with difficult material, the performance of the high test anxious subjects is poorer than that of the low test anxious. Difficult tasks such as problem solving (Covington, 1983) one such being Anagram solution

Therefore, most pertinent to the present discussion is the need for self-preoccupied persons to gain better control over their self-oriented thinking and, thus, become adept at coping with the task in hand. Training in attentional skills which implements critical and objective thinking has been, therefore, introduced in this study. Situations that require decision-making (such as Anagram solution or multiple choice Arithmetic Reasoning) can most benefit from a treatment which trains the subject in positive thinking.

Under experimental condition of Attentional Skills Training, the performance of boys and girls on the Anagram solution task is as follows:

1) Only those boys who are given ego stress show improvement in mean performance scores with attentional skills training. But this is regardless of their level of test anxiety. In other words, this treatment strategy has not been successful in improving the performance scores on the anagram solution.
task of either the high or low test anxious boys (vide Tables 5.24 & 5.25).

ii) In the case of girls, those of the high test anxious group as compared to their low test anxious counterparts, show significant improvement in mean anagram performance scores with attentional skills training. However, this is regardless of ego-stress conditions (See Tables 5.27 & 5.28).

These findings with anagram solution task, therefore, offer limited support to the attentional theory of test anxiety.

In other words, the attentional hypothesis holds good only in the case of girls rather than boys. This is also explained that, since Anagrams arouse greater competing error responses because of the fact that they are non-sensical at sight, even moderately difficult anagrams, as in the present study, were viewed as tension creating and high stressful events.

A study of the literature on test anxiety reveals that there is empirical evidence (Covington, 1984; Spielberger et al, 1976, Tyron 1980) showing low performance gains with treatment targeted to reduce anxiety levels. Statistics denote that only in 16 out of 54 (29.6%) of the studies (Finger, 1975) a significant improvement in performance resulted because of treatment. Even with cognitive oriented treatments very few show an improvement in performance, inspite of the fact that such treatments brought
about a significant change in the self-report measures from negative to positive (See, Finger & Galassi, 1977; Scrivner, 1974).

In a review of the literature on test anxiety by Tyron (1980) it further becomes clear that most investigators, employing cognitive treatment approaches, were mainly concerned in the alleviation of test anxiety, i.e., in the form of a positive change in the self-report measures (Decker, 1977; Finger, Galassi, 1977; Gaudry & Randoff, 1974; Hahnloser, 1974; Holroyd, 1976; Hollandsworth et al., 1979; Hussain & Lawrence, 1978; Kaplan et al., 1979; Kostka & Galassi, 1974; McCordick, Kaplan, Finn & Smith, 1979; Meichenbaum, 1972; Reister, Stockton & Maultsby, 1977; Wisocki, 1973). Also, only two studies, those of Holroyd (1976) and Wine (1971a) were successful in implementing significant performance improvements with Attentional Training.

Holroyd (1976) employed cognitive modification, attentional training alone, systematic desensitization, a placebo condition, and an untreated control condition, and he found all conditions beneficial in reducing self-report measures of test anxiety, as compared to the untreated control condition. Furthermore, he also obtained significant improvement in performance scores, with cognitive modification and with attentional training, with the subjects under the latter treatment showing greater improvement in performance.
Findings of a similar nature were obtained earlier by Wine (1971a). She employed cognitive modification (a combination of both relaxation and attentional training), attentional training alone, and placebo condition and found attentional training alone, superior in not only lessening test anxiety, but also in bringing about greater performance improvement.

In the present study, the findings for boys under experimental condition of attentional skills training on anagram performance do not support the predictions of Holroyd (1976) and Wine (1971a). Findings of a similar nature were reported earlier by Sudina (1984) on a different sample of girls in India. She failed to find any improvement in anagram performance with either attentional skills training or systematic rational restructuring for these high school girls. These type of evidence, therefore, suggest that the nature of the task is also an important factor and should not be overlooked in test anxiety treatment studies.

However, in the present study, the findings for girls (see Tables 5.27, 5.28), in terms of significant improvements in performance of the high test anxiety subjects on anagram solution task with attentional skills training, are in accordance with the hypothesis stated by Finger and Galassi (1977). According to them, significant improvement in performance is only likely to occur for those groups who receive some type of cognitive treatment.
In general the analyses pertaining to the performance measures in the present study, lend support to the attentional theory of test anxiety.

a) **Arithmetic Reasoning Task**

(i) Both boys and girls of the high anxious-ego stress group perform the poorest on the arithmetic reasoning task of moderate difficulty, as compared to their high anxious-control, low anxious-ego stress and low anxious-control counterparts. It is only under ego stress that the performance of the high anxious subject deteriorates. This contention is clarified in this study, wherein a non-significant difference is observed between the high anxious-control and low anxious-ego stress groups. This observation, therefore, lends further support to the attentional hypothesis which accounts for comparable performance between the high anxious control and low anxious-ego stress groups (Deffenbacher, 1978).

(ii) Consolidating support to the attentional theory, boys and girls of the high anxious-ego stress group benefitted the most in the form of showing significant performance improvement on the arithmetic reasoning test with attentional skills training. Thus this cognitive oriented treatment approach is also successful in improving the performance scores, as has been reported earlier in the literature on test anxiety (e.g., Holroyd, 1976; Wine, 1971a).
(iii) The low test anxious subjects, regardless of their level of arousal, not only perform the best, but also do not show any significant improvement in performance with attentional skills training. These findings are in accordance with the predictions of attentional theory and with that reported in the literature, that the low test anxious are in built controls and do not require any treatment as such (Carver & Scheier, 1984; Wine, 1980, 1982). Only in one study so far (Sarason, 1975) have the low test anxious also shown improvement in performance, with modelling used as a treatment strategy for test anxiety.

b) **Anagram Solution Task**

(i) Boys of the high anxious-ego stress and girls of the high anxious group solve minimal anagrams. Moreover, there is no significant difference between the high anxious-control and the group that is aroused in the case of low test anxiety for boys. Similar findings in support of the attentional model, using anagram solution tasks, have been reported earlier (Deffenbacher, 1978, Sud. S. 1983).

(ii) Attentional skills training has only improved the performance of the high test anxious girls, as compared to their low test anxious counterparts. The boys, on the other hand, do not benefit
from this cognitive oriented treatment approach. The only gain in the solution of anagrams is for the boys under ego stress. This finding, however, does not hold good for attentional theory, because it is regardless of test anxiety levels. This, therefore, implies that gender is also an important variable in test anxiety treatment studies. Moreover, most of the treatment strategies used in the West have been long term, with follow-up procedures. It appears that different tasks also need different durations of intervention. That anxiety and performance are not connected in a one to one relationship has been suggested by several investigators. Researchers in the West as well as in India have employed different types of tasks such as Paired Associate, Serial learning Problem solving, Anagram solution and Maths. tests, and have shown that factors such as task difficulty, intelligence level of the subject, evaluative stress and gender differences all contribute to produce academic performance. Recently, the focus of investigators has been on relating ineffectual study skills (Culler & Holahan, 1980) and poor test preparation (Klinger, 1984) to deletrious test performance.

6.3 Empirical Test of Attentional Theory of Test Anxiety in terms of Post-task Self-ratings

A. Task Generated Interference
The major findings on task-generated interference (TGI) under experimental condition of No-Attentional Skills Training are as follows:

i) The boys of the high anxious-ego stress group report the greatest task generated interference as compared with their high anxious-control, low anxious-ego stress or low anxious-control counterparts (see Tables 5.32 & 5.33).

ii) Moreover, there is no significant difference in mean task generated interference scores between the high anxious-control and the low anxious-ego stress boys.

iii) An additional finding is, that ego stress, although detrimental for both the test anxiety (high and low) groups of boys, however, led the high test anxious to report greater task generated interference than the low test anxious. These findings are in accordance with the attentional model of test anxiety (Deffenbacher, 1973).

iv) Girls, however, only under arousal (ego-stress) report significantly greater task-generated interference than under control conditions. But this is regardless of their test anxiety levels (see Tables 5.35 & 5.36). This finding, therefore, is not in accordance with the attentional model, even though all the
main effects of test anxiety, attentional skills training, and ego stress are statistically significant, they exert their differential impact alone and the combined effects of test anxiety and ego stress are absent.

The concept of task generated interference (Deffenbacher, 1978) has been derived from the drive theories of anxiety. It attests to the fact that, under ego-involving conditions, the high test-anxious uses poorer problem-solving strategies (Bruch, 1978, 1981). Appropriately, stated by Bruch (1978, 1981) task generated interference is an inverse of effective problem solving strategies. This is so, because the high test-anxious subject is more preoccupied with task irrelevancies in the form of ruminating too long and fruitlessly over alternative answers or responses, and being preoccupied with bodily reactions associated with anxiety (Meichenbaum & Butler, 1980).

In fact, the high test anxious mainly because he/she is pessimistic is, therefore, mentally withdrawn from the task, which ultimately leads to poor performance (Klinger, 1984). The task itself is viewed as challenging, highly difficult, and as an unpleasant ordeal. As further delineated by Sarason (1975, 1978) the high test anxious person differs from the low test-anxious in terms of the manner in which he attends to the events of his environment and how he interprets and utilizes the information
provided by these events. Recently, Sarason (1984) measuring the reaction to tests of the high and low test anxious persons performing under evaluative stress, has asserted that the high test anxious person suffers from greater cognitive-interference in the form of task irrelevant worry.

This form of behaviour further heightens the anxiety levels of these subjects, and thus generates greater negative thoughts and averse feelings about oneself. Similar observations were also made earlier by Klinger (1977, 1982).

Several viewpoints (Hollandsworth et al, 1979; Holroyd et al 1978; Mahoney, 1979) constantly expressed are that the high and low test anxious persons are equally aroused in evaluative situations. Interpreting this in terms of Wine's (1971) attentional theory, it becomes apparent that it is not arousal per se that leads to this basic difference between the two anxiety groups. It is more because the key focus of the high test anxious is upon themselves, upon self-deprecatory rumination (Deffenbacher, 1978; Meichenbaum, 1972) and negative thoughts (Galassi et al, 1981), which tends to interfere with effective task performance.

Further, interpreting these assumptions on the basis of the findings of the present study, it is inferred that this pessimistic attitude of the high test anxious subject is elevated under evaluative stress or ego stress conditions, since the high test
anxious boys and girls, in this study, reported the greatest worry-state, and their performance was also the poorest as compared with that of the high anxious-control, low anxious-ego stress or low anxious control counterparts. This group, therefore also reported significantly greater task generated interference than the other three groups. Furthermore the present study also denotes that the high anxious group of boys or girls given control instructions, are not only better in reporting lower cognitive disruption in the form of state-worry but also perform better than their high anxious counterparts under ego stress conditions. They reported less task generated interference. In short they are comparable to the low anxious-ego stress group. These observations support the attentional theory, and also denote the debilitating consequences of evaluative stress for the high test anxious high school boys and girls.

Irrelevant thoughts during test situations of the high test anxious persons are in marked contrast to that of the low test anxious. Low test-anxious people report significantly lower levels of task irrelevant thoughts but a higher percentage of time focussing on the task elements. Such observations are reported by several investigators in the literature on test anxiety, who have studied the differences in state anxiety levels and test performance of the high test anxious relative to the low test anxious (e.g. Arkin & Schumann, 1984; Carver et al, 1983;

Consistent with the literature of test anxiety, the high test anxious person devotes less attention to the task because of heightened preoccupation with task irrelevant worry (Depreeuw, 1984; Ploeg, Schwarzer & Spielberger, 1983, 1984, 1985; Schwarzer, 1983, 1984; Schwarzer, Ploeg & Spielberger, 1982) rather than emotionality (Deffenbacher, 1980). In fact Deffenbacher (1980) has also noted task-generated interference to be linked more strongly to the worry component of test anxiety than emotionality. This observation is consistent with the findings by Morris et al. (1981), who have also reported worry to be more important than emotionality in accounting for anxiety-test performance relationships. In fact, worry and task generated interference are no different from one another, this has been recently observed by Deffenbacher and Hazaleus (1985), adding support to similar earlier findings (Deffenbacher, 1978, 1980, Sud, S. 1983).

In the present study also, the high anxious-ego stress group of boys and girls report greater worry and the same group of boys also report greater task generated interference, both higher than emotionality and consequently poorer performance, as compared with
the high anxious-control and the low anxious groups. This finding, therefore, also replicates many of the findings for test anxiety reported in the literature (Deffenbacher, 1978, 1980; Morris et al 1981; Sarason & Stoops, 1978; Sud, S. 1983; Wine, 1980). Since, the high test anxious subjects tend to worry a great deal in test situations about their personal adequacies or past failures, much research, therefore has been targeted towards the cognitive attentional interpretation of test anxiety (Wine, 1971, 1980, 1982). Treatment programs have been especially designed for the cognitive-restructuring of worrisome thoughts in the alleviation of debilitating test anxiety.

With Attentional Skills Training used as an intervention, the major findings are as follows:

(i) Attentional skills training is effective in the maximum significant reduction in task generated interference of the high anxious-ego stress boys rather than their high anxious-control, low anxious-ego stress or low anxious-control counterparts (vide Tables 5.32 & 5.33).

(ii) Attentional skills training is not beneficial in reducing the task-generated interferences of the high anxious boys under control conditions.

(iii) Additionally, although both the high as well as the low test anxious boys were 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.

(iv) In the case of girls, although under high anxiety, they report significantly greater task generated interference (Ms = 14.86, & 9.20 respectively), Attentional skills training is not effective in the reduction in mean task generated interference scores of either group. This is clarified by the absence of the significant TA x AST effect, or the TA x AST x ES effect.

(v) However, Attentional Skills Training is effective in significantly reducing the task-generated interference scores of the girls under ego stress as compared to those under control conditions. But this finding does not hold good for attentional theory, because it is regardless of their test anxiety levels (See Tables 5.35 & 5.36).

In other words, attentional skills training in this study is effective in the significant reduction in task generated interference of the high anxious ego stress boys alone rather than girls. In short, these findings of the present study, for boys, as illustrated in a significant test anxiety x attentional skills training x ego stress effect, add further support to the attentional theory of test anxiety. That the high anxious-ego
stress subjects in this study, report greater task generated interference, this replicates earlier observations by Deffenbacher (1978), Deffenbacher & Hazaleus (1985) and Sud (1983), who have studied these three sources of interference (worry, emotionality and task-generated interference) in laboratory studies. Recently, therefore, Deffenbacher (1985) undertook to study these sources of interference in classroom exams, although his findings support his earlier observations (Deffenbacher, 1978, 1980; Deffenbacher & Hazaleus, 1985; Sud, S. 1983) in suggesting greater importance of both worry and task generated interference rather than emotionality in predicting poor performance. Subsequent analysis for extreme anxiety groups revealed that only 'worry' was the most important factor and regressed upon performance and was reported to be at a significantly higher level than either emotionality or task-generated interference. In other words, he reported that emotionality and task generated interference levels were not significantly different for the highly anxious. However, Deffenbacher studying the components of test anxiety in naturally occurring exams has not defined whether the high anxious worked under any form of evaluative stress.

In the present study, the high test anxious are compared to the low test anxious working under differential stress conditions (ego stress and control). And worry is observed to
be the most important factor in lowering performance of both the high test anxious ego stress boys as well as girls, as reported by higher mean scores even after attentional skills training (Ms = 29.82 & 30.53 respectively), as compared to task generated interference mean scores (Ms = 10.26 & 9.66 respectively). This is consistent with earlier reports (Deffenbacher, 1978, 1980; Deffenbacher & Hazaleus, 1985; Sud, S., 1983).

Attentional Skills Training, as reported in the literature concerning the treatment of test anxiety, is high effective in reducing self-report measures, such as worry of the test anxious subjects (Finger & Galassi, 1977; Hahnloser, 1974; Holroyd, 1976; Mahoney, 1974; McCordick et al., 1979; Meichenbaum, 1972; Slapion & Carver, 1981; Sud, A., 1984; Wine, 1971a, 1974; Wisocki, 1973). This study adds support to these observations since attentional skills training is effective in significantly reducing the worry states of the high test anxious ego stress boys and girls and also the task-generated interference scores of the high anxious ego stress boys, as compared to the low test anxious subjects, regardless of their level of arousal, or even the high anxious subjects under control conditions. This implies that attentional skills training is not beneficial for the low test anxious subjects in lowering their task generated interference scores. This, therefore, supports the predictions stated earlier (Wine, 1971, 1980, 1982) that the low test anxious are themselves in-built
control subject, and are not in need of any treatment as such. However, Sud, A. (1984) in a recent study found that attentional skills training is effective in reducing the task generated interference scores of both the high as well as the low test anxious girls.

The present study, however, offers stronger support to the attentional theory, since the high anxious-ego stress group of boys and the high anxious girls report significantly greater task-generated interference than the other comparison groups, who have also been studied as control groups. With attentional skills training, the maximum reduction is for the high anxious ego stress boys. There are, however, no significant differences with or without attentional skills training between the high anxious-control, low anxious-ego stress or low anxious control groups. Also the low anxious-control groups report the least task-generated interference with or without attentional skills training. This replicates earlier findings in favour of the attentional model (Deffenbacher, 1978, 1980; Sud, S., 1983).

b) Percentage of Time Spent on Task

The major findings on Percentage of Time Spent on Task, under experimental condition of no-attentional skills training are as follows:

(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 (see Tables 5.38, 5.39, 5.43 & 5.44).

ii) The low anxious boys and girls under control conditions 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) Ego stress is more detrimental for the low anxious boys and girls rather than the high anxious. This is clarified by way of highly significant mean difference ranges of $R = 14.00 \ (P .001)$ and $R = 17.00 \ (P .0001)$, between the low anxious-ego stress and low anxious-control group boys and girls respectively.

These findings replicate those reported earlier in the literature on test anxiety that the high test anxious subjects under ego stress report spending less time on the task than their low test anxious counterparts (Deffenbacher, 1978,1980; Deffenbacher & Hazaleus, 1985; Sud,S.,1983). The indirect evidence is ably summarized by Wine (1980). A particularly good illustration is the finding of Nottelman and Hill (1977) that children high in test anxiety glanced away more frequently from the task they were engaged on than did children lower in test anxiety. It is also shown that such avoidance becomes more covert and
internalized over time. In Galassi et al (1981) study, the single most frequently reported category of thoughts among persons high in test anxiety concerned escaping from the test situation. This suggests the probable involvement of a disengagement impulse in the performance impairment associated with high test anxiety. Such individuals spend less time on the task because of heightened preoccupation with task irrelevant worry. This is especially heightened under evaluative stress conditions. In test situations, the high anxious subject under evaluative stress encounters unexpected difficulties, generated by the task itself. This further elevates their anxiety levels and leads to fewer problem-solving thoughts. More time, during the test, is spent upon thoughts on their adequacy relative to the test. Such observations, in other words, assess that high test-anxious subjects are caught in a vicious cycle. They are caught in a web of refocussing their thoughts on matters of their personal adequacy, which is elicited in turn by their examination predicament interacting with their pre-existing concerns about personal adequacy (Hoelscher, Klinger & Barta, 1981; Klinger, 1977, 1978; Klinger, Barta & Maxeiner, 1980).

Relating this type of behaviour to the attentional theory, performance deterioration, therefore occurs because of diversion of attention from the task. This is interpreted by Sarason (1972, 1984) and Wine (1971), as 'Selective Attention' in the case of
the high test anxious subjects performing under evaluative stress. As outlined earlier, according to these theorists, highly anxious individuals under stress respond with personalized self-oriented responses which direct attention away from the task. Performance, therefore, suffers as a lower proportion of the time is spent upon the task itself. Findings supporting this theoretical position have been reported in the West (Deffenbacher, 1978, 1980; Deffenbacher & Hazaleus, 1985). In India, Sud, S (1983), studying sources of interference in highly test anxious individuals performing under evaluative stress, found a significant difference in the estimated percentage of time spent on task between the high and low test anxious boys irrespective of the stress conditions. Moreover, in a recent study, Sud, A (1984) has reported a significant difference between the high and low test anxious high school girls in their mean percentage of time spent on the task. The present study however, provides stronger support to the attentional theory. The findings are more clear-cut of both boys and girls with regard to the high anxious-ego stress group reporting having spent the least time on the task, as compared to the high anxious-control, low anxious-ego stress or low anxious-control groups.

One additional finding, however, is that ego stress is more detrimental for the low anxious boys as well as girls, rather than for the high anxious. In fact under ego stress the low anxious boys and girls are only marginally different from their
high anxious-control or even the high anxious-ego stress counterparts.

Relating this finding to the performance on the two moderately difficult tasks for both boys and girls, the low anxious-ego stress group was not significantly different from the high-anxious control group, in the performance measures on the Arithmetic Reasoning Test. This group (i.e., the low anxious-ego stress) also tended to report the same amount of worry-state and task generated interference as the high anxious-control group. Therefore, their performance scores were also not significantly different.

The low anxious boys and girls under control conditions report spending the maximum percentage of their time on task. They also report the least worry-state scores, less task generated interference, and consequently the best performance scores. This confirms earlier predictions that the ideal state during test performance is one of low test anxiety (Sarason, 1978, 1980; Wine, 1971, 1980, 1982).

With attentional skills training used as a short term (40 mins) cognitive treatment strategy, the findings on Percentage of Time Spent on Task for boys and girls are as follows:

(i) The hypothesized beneficial effect of Attentional Skills Training in significantly increasing the mean percentage of
time spent on task is absent for both boys and girls, irrespective of their level of test anxiety.

(ii) Attentional Skills Training is only effective in significantly increasing the percentage of time spent on task of the boys and girls under ego stress, as compared to those given control instructions. But this does not support the attentional theory, because it is regardless of their test anxiety levels. This is also clarified by the absence of the test anxiety x attentional skills training x ego stress effect (See Tables 5.40, 5.41, 5.45 & 5.46).

In the present study, neither the highly test anxious nor the low test anxious subjects (boys and girls) report any significant increase in their estimated perceived time on the task. That the low test anxious subjects do not increase their time on task with attentional skills training is explained by the fact that they are more positively oriented towards the task (Wine, 1980, 1982). In other words they are more task centered rather than self-centered. They excel in the quality of their thoughts and ideas (Covington, 1984). In short, since they are in no dire need of any cognitive treatment, no improvement as such in either performance or change in their cognitive processes is expected of them. The findings for the low test-anxious subjects
of this study, are consistent with the literature available on test anxiety (Carver et al., 1983; Sarason, 1978, 1984; Wine, 1980, 1982), and also with the attentional theory (Sarason, 1972; Wine, 1971).

However, contrary to the expectations of the attentional theory, the high test anxious boys and girls in this study did not benefit in reporting greater estimated time on task with attentional skills training. The possible explanation of this inconsistent finding can be that either this short term intervention in the form of Attentional Skills Training is not efficacious when the percentage of time spent on task is estimated solely on the post-task self-ratings or the subjects who were exposed to Attentional Skills Training could not correctly recall and estimate on a rating scale the time spent on tasks. In any case, this part of the research needs to be replicated till valid generalizations can be made. In fact, besides a couple of attempts no study has investigated the impact of Attentional Skills Training on the percentage of time spent on task as assessed through post-task self-ratings.

In the present study, however, for the high anxious-ego stress group, there is a significant improvement in performance on the Arithmetic Reasoning Test more than on the Anagram solution task for both boys as well as girls with Attentional Skills Training. This was primarily due to the significantly reported
change for the better in the self report measures or worry-state rather than emotionality-state. Also a significant reduction in task generated interference was noted in the case of boys, rather than girls. However, no significant increase in the estimated percentage of time on task was noted for either boys and girls. This finding, therefore, suggests that with the lessening of the worry-state and task generated interference, performance improved even though this is apparently not reflected in these subjects reporting having spent more time on the task. It appears that the high test anxious boys and girls, with a significant reduction in their worry-levels with attentional skills training, apparently stopped viewing the task with dread as reflected in a significant improvement in their performance measures and a lessening in task generated interference measures. These subjects however, could not correctly recall and report spending more time on the task, after attentional skills training. It is suggested that further research is required for studying the post-experimental self-ratings of the subjects given cognitive treatment. The evidence that is available in reducing self-reported anxiety is rather small (Hahnloser, 1974; Holroyd, 1976; Finger & Galassi, 1977; Meichenbaum, 1972; McCordick et al, 1979; Wisocki, 1973; Wine, 1971a). Moreover, none of the experiments have included post-experimental self-ratings as outcome measures after treatment. Except in one recent study in India, Sud.A (1984), employed the
post-experimental self report measures as outcome measures in predicting performance. And she found that attentional skills training, was superior to systematic rational restructuring in significantly reducing task-generated interference, anxiety interference and anxiety ratings of both the test anxious girls (high and low) at both high as well as low levels of cognitive capacity. The high anxious-high cognitive capacity girls also reported spending more time on the task, as compared to the low test-anxious girls. This evidence suggests that the variable of cognitive capacity may also be a relevant one for further research for its consideration along with test anxiety and ego stress. The post-task questionnaire used in the present study has only one item asking subjects to circle a percentage from 0% to 100% estimating the portion of time they had actually spent working on the task opposed to thinking about or doing other things. It may be fruitful to add more items to this dimension to get a proper recall and estimate of time spent on learning and problem solving tasks. The validity of such post-task self ratings can also be tested through follow-up studies with long-term interventions.

6.4 Concluding Remarks

An investigation of the sources of interference, in terms of worry-state and emotionality-state of the high test-anxious persons
performing under ego stress as compared to their high anxious-control, low anxious-ego stress or low anxious-control counterparts, was carried out. In this study, attentional skills training was also introduced, as a short term (40 mins.) cognitive coping strategy. Its effects were studied in implementing a significant reduction in the process measures of worry-state rather than emotionality-state of the high anxious-ego stress subjects. Also observed was whether any significant performance improvements occurred for these subjects. The findings were interpreted in terms of the cognitive attentional theory of test anxiety and were as follows:

Both boys as well as girls of the high anxious-ego stress group given No-Attentional Skills Training experienced the greatest elevation in worry-state than their high anxious-control, low anxious-ego stress or low anxious-control counterparts. According to some researchers, persons with high test-anxiety and given ego stress, also tend to report higher self-perceptions of physiological arousal (emotionality), rather than arousal itself (Deffenbacher, 1980; Deffenbacher & Hazaleus, 1985; Holroyd & Appel, 1980). In the present study also, the high test anxious boys and the high anxious-ego stress girls experienced significantly greater emotionality state than their low anxious counterparts. However, both boys and girls reported higher elevations in worry-state than emotionality-state in this study. This finding further
conforms to the predictions of the attentional theorists. Further, the high anxious-ego stress groups of boys and girls showed the poorest performance on the 'Arithmetic Reasoning Test' of moderate difficulty. These groups were significantly poorer, as compared to their high anxious-control, low anxious-ego stress or low anxious-control counterparts. Also in accordance with the attentional theory, the low anxious subjects under control conditions were found to be the best performers.

An additional finding that emerged is that ego stress is highly detrimental for the high anxious subjects as reflected in their lowest mean performance scores. Also, it does not serve a facilitating (Alpert & Haber, 1960) or activating (Hebb, 1972) function for the low anxious subjects, to perform better under arousal than their low anxious-control counterparts.

With regard to Anagram solution task, high anxious-ego stress boys showed the poorest performance than those of the high-anxious control, low anxious-ego stress or low anxious-control groups. The high test anxious girls also performed significantly poorer than their low anxious counterparts on the Anagram solution task, but this was regardless of their level of arousal (ego stress or control instructions).

On the post-test, self-ratings the high anxious-ego stress boys reported having suffered greatly from task generated interference, which thus led them to spend least time on the task.
The high anxious girls also reported greater task generated interference than their low anxious counterparts, but this was regardless of their level of arousal. Also the high anxious-ego girls reported having spent significantly less time on the task as compared to their low anxious-ego stress or low anxious-control counterparts.

As is apparent, these findings are in accordance with the predictions of the cognitive attentional theory of test anxiety thereby consolidating cross-cultural validity of this theory developed in Western settings on the sample of high school boys and girls of India.

With attentional skills training used as a short-term intervention, the high anxious-ego stress groups of both boys and girls experienced the greatest significant reduction in worry state. In effect, after this cognitive modification, these subjects reported no greater worry-state than their low anxious-ego stress counterparts. No significant reduction in worry-state occurred for the high anxious-control, low anxious-ego stress or low anxious-control subjects. Thus the high test anxious ego stress subjects who, according to the attentional theorists, are the most debilitated in their thought processes, due to high cognitive interference also showed the maximum benefit due to attentional skills training.
Moreover, boys and girls of the high anxious groups, did not show any reduction in emotionality state with attentional skills training. A small yet significant lessening in emotionality-state occurred only for the low anxious boys, irrespective of their level of arousal.

Thus, attentional skills training, which is mainly targeted in the reduction in worry-state, rather than emotionality-state has proved to be efficacious in bringing about a significant reduction in the cognitive concern about the consequences of failure for the high anxious boys and girls as reflected in the reduction of worry-state scores and subsequent improvement in performance.

In fact, the performance of the high anxious-ego stress boys and girls showed the maximum improvement on the 'Multiple Choice Arithmetic Reasoning Test' which mainly requires the recognition of test items and the increased task focus as a result of Attentional Skills Training given, proved to be of maximum advantage in their case. However, on the Anagram solution task, only girls of the high anxious group, regardless of their level of arousal solved more anagrams, when given Attentional Skills Training. This was reflected in a significant TA x AST effect. Moreover, the improvement in performance for the high anxious-ego stress group of boys on the two problem solving tasks, can be explained by the fact that these subjects also reported the
maximum, significant reduction in task generated interference. Thus, with attentional skills training, the high anxious boys especially under ego stress, ceased to view the task with dread. Although both boys and girls did not report spending more time on the task, with attentional skills training, their performance showed significant improvement.

Thus, the validity of attentional skills training, as a treatment procedure most befitting the cognitive attentional theory of test anxiety has been established in this study. Since it has proved most effective and helpful in lowering the worry-state levels and task generated interference for the high anxious-ego stress boys and girls. These changes in process measures consequently led to the significant improvement in performance tasks as compared to the low test-anxious subjects after Attentional Skills Training. The low test anxious boys and girls regardless of their level of arousal, however, did not benefit from this treatment, these subjects practically remained unchanged, stable and enduring during the whole test procedure. The low test anxious, as specified by Wine (1980, 1982) in her bi-directional approach, are more positive in their outlook, towards exams. This was reflected in their best mean performance scores, in this study. Since they are active problem solvers, they seem to be in no need of attentional skills training as such. In fact, the low anxious-control group was the best in every respect, in not
only showing the lowest worry levels, but also the best performance and more positive post-task self-reports. This finding is also in accordance with the predictions of the attentional model of test anxiety. The low test-anxious subjects therefore, were included in this study, not only in the form of the most appropriate comparison group for the high test-anxious, but also in the form of a control group, similar to the treatment control group.

The findings of this study highlight the need for developing treatments directed towards the cognitive restructuring of worrisome thoughts, of the high test anxious groups. In other words, treatment programs directed towards the alleviation of debilitating test anxiety, should be targeted towards 'worry' rather than emotional arousal, since 'worry' is more important and the primary source of disturbance or cognitive distraction or interference than emotionality.

A promising recent development is work on cognitive restructuring, in which efforts are made to help the high test anxious individual acquire new cognitive skills as replacement for maladaptive ones. Also clinical efforts to achieve anxiety reduction and behaviour change through exploration of the personalized meanings attached to situations have increased during recent years (Ellis, 1962, Meichenbaum, 1972; Holroyd, 1976). It is agreed that test anxiety is a part of a complex array of self-
preoccupations. In sum, the findings are by and large, consistent with the idea that the problem of anxiety is, to a significant extent, a problem of intrusive thoughts that interfere with task-focused thinking. It is also illustrated that self-preoccupying intrusive thoughts can be reduced by means of a task focussing experimental condition.

6.5 Suggestions for Future Research

(i) More research is needed to provide further insight into the quality and quantity of self-preoccupying thoughts of the highly test anxious persons. Evidence is available (e.g., Allen & Desaulniers, 1974; Sarason, 1975) which supports the notion, that when the stimulus for these self-preoccupying thoughts (i.e., undue worry over one's performance, too much task irrelevant information processing, mal-adaptive personalized feedback) is removed, the highly test anxious persons usually show significant improvement in performance. Research is required to delineate the content of thought processes between the high and low test-anxious persons in different cultures, and different sub-groups (e.g., the disadvantaged) within the same culture.

(ii) The inclusion of the moderately anxious subjects besides the high and low test anxious groups will provide greater insight into
the test anxiety domain and its consequences.

(iii) Wine (1971a) has stated that 'persons high in one form of evaluation anxiety are not necessarily prone to anxiety in all other kinds of evaluative situations' (p.208) and that test anxiety as a specific case of evaluation anxiety cuts across the trait-state anxiety distinction' (p.208). Cross-cultural research is required to test these assumptions, which will thus clarify the validity of the trait-state distinction of anxiety in evaluative situations.

(iv) Also in order to evaluate the intensity of test anxiety reactions, it is advisable to consider anxiety responses within a temporal perspective that is, more evidence is required to distinguish between the responses that occur before taking a test, those that occur simultaneously with taking a test, as well as responses that occur after the test situation has terminated.

(v) There is evidence in the literature that worry and emotionality are two separate components of test anxiety. More research is required to study the independent as well as combined influence of these in academic test performance, particularly in classroom settings.

(vi) Research findings suggest the importance of worrisome
rumination over emotional arousal, in disrupting performance (Bruch, 1981; Deffenbacher, 1980, 1985; Galassi et al., 1981). However, any source of interference, such as worry, task-generated interference or emotionality, may vary from task to task within analogue studies or from analogue to real-life-testing circumstances. Therefore, research is necessary in order to assess the validity of these findings through multi-channel assessment across tasks and testing circumstances (Deffenbacher & Hazaleus, 1985).

(vii) The treatment studies should be designed for cognitive restructuring of the worrisome cognitions, rather than simply training in self-applied relaxation or short-term task-oriented self-instructions as done in the present study. The highly anxious need to be assisted in truly changing their perfectionistic self-standards, self-criticism, the need to compare with others, implied personal failure in poor performance and the like. Cross-cultural research in this domain is required for the cognitive restructuring of the worrisome cognitions.

(viii) Since worry and emotionality have been shown to be highly inter-related, i.e., at high levels of worry, emotionality has also been found to disrupt performance (Deffenbacher, 1977), treatment programmes should include cognitive restructuring, for the alleviation of the worry component, as well as relaxation
training for the reduction of emotionality in such groups. Research is also required to examine the communalities and differences among measures of anxiety, worry, emotionality and cognitive interference by analyzing the relative contributions of each to performance in easy and difficult test situations for male and female students.

(ix) Since gender has proved to be a critical moderator variable in explaining the test anxiety performance relationship, more research is needed for the "explicit examination of sex differences in test anxiety" (Wine, 1980) (p.379). Similarly, the differences in cognitive capacity also need to be included in the experimental design.

(x) Further research needs to be done by considering process and outcome measures together with special emphasis upon the post-task self-ratings, so as to adequately explain the observed findings.

(xi) There is also need for reconceptualizing the cognitive component in test anxiety. It should be different for social anxiety and for test anxiety and should contain at least the following facets: worry about one's coping adequacy, anticipation of failure and its consequences, concern about one's self-worth,
escape cognitions and irrelevant thinking. In stressful situations or academic situations, the cognitive emotional process of anxiety, experienced by the high test anxious needs to be explicitly delineated.

(xii) The low test-anxious subjects should invariably be included as a control group, similar to the no treatment control in studies evaluating the relative efficacy of different cognitive treatments of test anxiety.

(xiii) Follow-up studies to evaluate the long-term effects of treatments reflected in performance changes as well as self-report measures are necessary. Although there is limited evidence that test-anxiety treatment programmes, directly and immediately, influence performance on examinations, it takes time for the test-anxious student to integrate newly learned skills into his behavioural repertoire. Therefore in evaluating test-anxiety treatment programmes, it is important to assess cumulative effects as well as the immediate impact on performance. (Atkinson, 1974; Lens, 1979).

(xiv) In contrast to the cognitive-attentional interpretation of test anxiety, the work of Culler and Holahan (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 insufficient 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 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 emphasizing 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 et al, 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.