CHAPTER - 3
REVIEW OF THE RELATED LITERATURE

In an interesting finding D'Alelio in 1983 posited that approximately 16% of the general population in the United States comprises of test anxious people. In psychology, the last two decades have shown an increase in the frequency and quality of research on the nature and treatment of 'targeted' or test anxiety. An increasing number of investigators from many countries have devoted much effort to the investigation of test anxiety as a conspicuous emotional phenomenon in human experience. The research is characterized by a broader theoretical perspective integrating different advanced concepts from other fields in psychology, and by more international contributions including cross-cultural studies.

The relevant research is briefly reviewed as under:

3.1 Reactions to Testing

3.1.1 Characteristics of Test Anxious Persons

In what way can one describe the test anxious student as contrasted with the 'average' student? Diverse investigators have researched extensively in order to clarify the profile of the test anxious student. Results obtained from a number of recent studies by Sarason (1975, 1978, 1980, 1984) highlight the fact that the two most important characteristics which
distinguish the high test-anxious individual are:

(i) the manner in which he attends to the events of his environment; and
(ii) how he interprets and utilizes the information provided by these events.

These characteristics are viewed as habits or acquired attributes whose strength is influenced by specific types of person-environment encounters. Among the characteristics of anxiety responses are:

(i) The situation is seen as difficult, challenging, and threatening;
(ii) the individual sees himself or herself as inadequate or ineffective in handling the task in hand;
(iii) the individual focuses on undesirable consequences of personal inadequacy;
(iv) self-deprecatory preoccupations are strong and interfere or compete with task-relevant cognitive activity; and
(v) the individual expects and anticipates failure and loss of regard by others.

These characteristics are apparent more among the high test-anxious individuals than among the low test-anxious.
Probably the greatest focus of student anxiety is the course examination. When subjects encounter an item they cannot answer, frustration and anxiety are aroused and this affects the ability to answer later items. Drawing one inference from the Gestalt Theory, one can safely assess that when anxious students are unable to answer questions, a Zeigarnik effect occurs, or more appropriately stated, the unresolved tension of lack of completion interferes with attention to later items, with the result that anxiety arises and further impairs performance.

According to Hill (1972), low anxious children are task-orientated, more interested in the adequacy of their performance, and less concerned about external evaluation than high anxious individuals who are more self-orientated, and responsive to evaluation by others. Studies have indicated that high anxious children become highly cautious in problem solving tasks, e.g., they have longer decision timings and more redundancy than low anxious children (see also Marlett & Watson, 1968; Messer, 1970). These findings have been interpreted in terms of the strong motives of high anxious individuals to avoid failure and criticism. Another set of earlier researchers (Dusek & Hill, 1970; Marlett & Watson, 1968; and Silverman & Waite, 1969) assess that high anxious children are more repetitive and restrictive in their response strategies in evaluative situations.
than in non-evaluative situations.

In a series of studies Lin and McKeachie (1970) who investigated the relationship between test anxiety, ability, study habits and achievement found that subjects high in test anxiety were lower in scholastic aptitude and reported poorer study habits than low anxious subjects. In another two studies, they have offered support to the fact that high test-anxious subjects learn more by rote and have problems in organising the subject matter than the low test-anxious. Research findings by other investigators (Deffenbacher, 1977, 1978, 1980, 1984; Morris Davis & Hutchings, 1981; Sarason, 1984; Wine, 1971, 1980, 1982; among others) suggest that the high test-anxious students are strikingly different from the low test-anxious. The high test-anxious perform poorly, report greater worry, emotionality and task-generated interference and spend less time on task than the low anxious subjects, and this difference is more apparent under evaluative stress conditions (Deffenbacher, 1977, 1978, 1980, 1984). In their literature review, Morris et al., (1981) conclude that high anxious subjects show excessive worry as compared with low anxious subjects. Later, Sarason (1984) in a set of three studies, measuring the reaction to tests of high and low test-anxious subjects performing under evaluative stress, observed that the high test-anxious are poorer in performance than the low test-anxious. Wine (1971, 1980, 1982) studying the performance decrements of the high compared to the low test-anxious subjects
under evaluative stress, has concluded that highly test anxious students direct their attention away from the task and towards self related worry cognitions, which lead to debilitating effects on performance. Recently, Depreeuw (1984) has reported that the test anxious students are more unstable, vulnerable and more introverted than the students in the control group. They also are much more worried being indecisive and suffer from a pronounced lack of self-confidence compared to the subjects in the control group.

Investigators such as Holroyd, Westbrook, Wolf and Badhørn (1978); Hollandsworth, Glazeski, Kirkland, Jones and Van Norman (1979); and Mahoney (1979), conclude that persons high and low in test anxiety display equivalent degrees of physiological arousal while anticipating and taking tests. Apparently it is not arousal per se that makes the difference between these two kinds of persons, what does make the difference is the cognitive perspective which holds the critical difference between persons who are test anxious and who become self-focused in evaluative test situations. Since their attention is focused on themselves, they have less attention to devote to the task, and because they devote less attention to the task, their performance deteriorates. This point of view is consistent with the wealth of evidence summarized by Wine (1971, 1980, 1982), including the finding that the test anxious engage in self deprecatory rumination (e.g., Deffenbacher 1978; Meichenbaum, 1972) and neglect or misinterpret readily
available task-relevant cues. When working under evaluative stress and compared to less test anxious individuals, the highly anxious report greater cognitive distraction especially the tendency to wander in attention from the task (Sarason & Stoops, 1978) have more negative thoughts (Galassi, Frierson & Sharer, 1981), and higher rates of negative self-statements (Bruch, 1978, 1981). These cognitive tendencies are related to the lowering of performance and in the use of poorer problem solving strategies.

High anxious subjects under high stress also report greater task generated interference than high anxious subjects under low stress conditions or low anxious subjects under any condition, (Deffenbacher, 1978). Task-generated interference may also be an inverse of effective problem solving strategies. Richardson (1973) as well as Melchenbaum and Butler (1980) identified the presence in the thinking processes of highly test anxious subjects, the following task and personality generated interferences:

(i) ruminating too long and fruitlessly over alternative answers or responses; and

(ii) being preoccupied with bodily reactions associated with anxiety.

In a recent study by Carver, Peterson, Follansbee and Scheier (1983) subjects high and low in test anxiety performed
anagrams under a moderately evaluative setting. The arrangement of the room was controlled, since half the subjects were placed in front of a device that manipulated their attentional focus just before they were to begin their assigned task. They conclude that the high test-anxious persons perform poorly, report a greater incidence of the intrusion of task irrelevant thoughts during the test and report having spent a lower percentage of time focussing on the concrete elements of the task. In marked contrast, the subjects low in test anxiety perform better and report a lower degree of task irrelevant thoughts, and a higher percentage of time focussing on the task elements.

Since the major difficulty experienced by high test-anxious subjects is the deleterious intrusion during exams of task-irrelevant cognitive reactions to stress, the main focus of psychologists has been to reduce the potency of these intrusive self-preoccupations, and this has yielded encouraging results. Highly test anxious subjects benefit from exposure to models who display adaptive task relevant behaviour (Sarason, 1973), and also from training exercises designed to strengthen their attention to task relevant activity, and extinguish personalized preoccupying thoughts (Meichenbaum, 1972; Sarason, 1973; Wine, 1971). Wine’s (1971) Attentional Skills Training procedure has proven especially beneficial in increasing task-focus and alleviating negative self-appraisal.
3.1.2 Feelings about ability, self and pleasantness of task of Test-Anxious Persons

High test-anxious subjects, as compared to their low test-anxious counterparts, rate their feelings about their ability more negatively, have negative feelings about themselves and view the task as an unpleasant ordeal, or in short indulge in excessive 'self-related cognitions' or 'negative ideation'.

The term 'self-related cognitions' refers to an individual's information processing about himself. In stressful situations, a cognitive appraisal takes place which assesses the environmental demands as well as the personal resources. According to Schwarzer, Ploeg & Spielberger (1982), "cognitions about the self appear to be critical precursors in the process of developing test anxiety". Deffenbacher (1978) found that the high anxious-high stress group of subjects reported more negative feelings about their ability and self and viewed the task as being more unpleasant compared to the high anxious-low stress, the low anxious-high stress or the low anxious-low stress groups.

In another study Rapaport (1979) investigating the performance of the high and low test-anxious subjects, found that high test-anxious subjects explain their poor performance as resulting from "low general ability" and "finding most tasks difficult". In general, high anxious subjects use more negative causal explanations for their performance than low test-anxious subjects.
Gentil and Lader (1979) found that anxious subjects rate themselves with lower self-esteem and confidence. They react with apprehension to unfamiliar locations and perceive danger in other people, their apprehensions are particularly raised by vague abstractions. Olson and Schlottmann (1980) have also confirmed that high test-anxious subjects evaluate their performance more negatively than low test-anxious subjects. Culler and Holahan (1980) report that the high test-anxious subjects have poorer studying abilities than their low test-anxious counterparts. Galassi et al. (1981) found that the low test-anxious subjects have fewer negative thoughts about themselves, have more positive thoughts and report less bodily sensations than the high test-anxious subjects. In fact the negative thoughts increase significantly in a linear fashion with test anxiety level, i.e., as the subjects test anxiety levels increase their evaluations of tests become correspondingly and significantly more negative. In addition, low test-anxious subjects view tests as significantly less potent and less active than both moderate and high test-anxious subjects who do not differ from each other on either variable.

From an extensive observational study of 66 4th graders, Wine (1973) described the specific behaviours of high, moderate and low test-anxious children under differing conditions of evaluative stress. She noted that the high anxious children under evaluative stress focus inordinate amount of attention on
themselves in the form of indulging in excessive negative ideation. On the basis of this and other studies, Wine (1982) has presented a cognitive attentional interpretation of test anxiety, and has proposed that the component common to self-reported anxiety on measures of general anxiety and test anxiety can be labelled "evaluation anxiety".

A study by White (1982), keeping in line with Wine's cognitive attentional interpretation of test anxiety, assesses that subjects scoring high in cognitive anxiety are also found to score highly on items on private self-consciousness. Further, Glazeski (1982) reports that test anxious subjects report fewer task-relevant statements and a higher frequency of interfering thoughts during problem solving than the non-test anxious subjects. The degree of interference due to excessive irrational ruminations and heightened negative ideation during the task as a whole appears to be greater among test anxious subjects. Frederick, Gibbons and Wicklund (1982) provide strong evidence that the high test-anxious subjects engage in a prolonged negative self preoccupation, which not only has debilitating effects upon their performance in tests, but also on social behaviour as a whole. Zatz (1983) investigated the cognitions of low, moderate and high test-anxious children under naturalistic test taking conditions. His findings show that when high test-anxious subjects make coping self statements and 'on-task' thoughts, it is
an attempt to cope with anxiety and mind-wandering. Moreover, high test-anxious subjects make more negative self-statements compared to their low test-anxious counterparts. Fox and Houston (1983) observed that high cognitive state and/or trait anxiety is associated with more preoccupation and performance denigration as well as taking less of an analytic attitude towards the situation. Further, Toner (1983) in two studies found that high relative to low test-anxious subjects, report a higher percentage of negative ideation concerning the test and themselves, during the test situation.

Recently, Arkin and Schumann (1984) have reported that compared to low test-anxious students, the high test-anxious students view themselves as less able, see the test as more difficult, experience greater cognitive interference and view their performance as inferior to that of other students, all despite the fact that they perform no less well than their low test-anxious counterparts. Similarly, Paulman and Kennelly (1984) investigating test anxiety and ineffective test taking techniques of the high and low test-anxious posit that it is due to the negative internal focus of the high anxious subjects, that their performance is poorer.

Experimental studies of test anxiety have provided evidence that cognitive interference (in the form of task irrelevant thinking) is an important factor in lowering the performance of
highly test anxious persons. Consistent with the literature, Sarason and Stoops (1978) have also reported that high test-anxious subjects are deleteriously affected by the achievement orienting instructions, and they spend less time on the task. In effect, the high test-anxious subjects report a greater amount of cognitive interference compared to their low test-anxious counterparts. Sarason (1978) has also testified that under test like conditions, the high test-anxious subjects, more so than the low and middle anxious, report being preoccupied with how poorly they are doing, how other people are doing, and what the examiner will think about them. Under neutral conditions groups that differ in test anxiety levels show little or no differences in performance or cognitive interference. Thus, highly test anxious subjects in situations that pose test like challenges perform at relatively low levels and experience relatively high levels of task-irrelevant thoughts. In non-test like situations, groups with different test anxiety levels show either small or no differences in performance and cognitive interference. In fact, this type of evidence has led Wine (1971, 1982) to an attentional interpretation of test anxiety. Recently, Sarason (1984), keeping in mind the cognitive attentional interpretation of test anxiety, has concluded that the problem of anxiety is to a significant extent a problem of intrusiv thoughts that interfere with task focused thinking, and this self preoccupying intrusive thinking can be reduced by means of a
task-focusing experimental condition (see, Meichenbaum, 1972, 1977; Meichenbaum & Butler, 1980).

3.2 **Attentional Theory of Test Anxiety**

3.2.1 **Empirical Evidence**

Wine's (1971, 1974, 1980) approach for the explanation of the nature and the effects of test anxiety is purely a cognitive attentional one. Partially, stimulated by the work of Liebert and Morris (1967); Doctor and Altman (1969); Morris and Liebert (1970); Wine (1971) has highlighted the importance of the worry or cognitive component in test anxiety; she further assesses that it is the 'worry' component which is stable and enduring, which triggers the emotional arousal and thus interferes directly with cognitive performance.

Based on this cognitive-attentional treatment of test anxiety, Wine (1971a,b) has devised an "Attentional Training procedure that aims at directly modifying interfering cognitive variables". With the help of three different studies, Wine (1971, 1973, 1974) has concluded that Attentional Skills Training is most effective in alleviating test anxiety by way of directly changing the negative self focus to a more beneficial positive self focus by training the test anxious individual to attend more to the task than to irrelevant thoughts.
Meichenbaum (1972) has devised a "cognitive modification" programme for the reduction of test anxiety that is somewhat similar to Wine's (1971) Attentional Training, but he undertakes to modify more systematically some of the cognitive variables which are thought to mediate effective test taking behaviours. Meichenbaum by way of his studies (1972, 1977) concludes that his "cognitive modification" programme has proved significantly more successful in reducing test anxiety, as assessed by several self report and performance measures, than a conventional systematic desensitization treatment procedure of the same length.

Investigations by Mahoney (1974); Rimm and Masters (1974); and Holroyd (1976) on the cognitive treatment of test anxiety support Wine's Attentional Training procedure. These investigators have worked on improving the attention and thought processes of high test-anxious subjects employing cognitive treatment procedures and have found their training convenient and effective. Furthermore, Slapion and Carver (1984) indicate that experimentally heightened self-attention facilitates the performance of highly test anxious persons and that this performance facilitation can be mediated cognitively rather than through emotional arousability.

A promising development is work on "cognitive restructuring" in which efforts are made to help the individual acquire new cognitive skills as replacements for maladaptive ones. Work in this area by Sarason (1973) has proved highly beneficial for high
test-anxious students who through systematic training and the observation of models strengthen attention to task relevant activity and extinguish personalized preoccupying thoughts. Also, Sarason (1975), Meichenbaum (1977), Ribordy, Tracy and Bernotas (1981) demonstrate that test anxious individuals can improve their performance by rehearsing or observing coping responses that remain relevant to the task.

Sarason (1984) has highlighted the importance of the attention directing instructions as a successful behavioural intervention in having a salutary effect upon not only the performance measures of the high test-anxious, but also on modelling their intrusive thoughts. People who are prone to worry in evaluative situations benefit simply from their attention being directed to the importance of maintaining a task focus. Cognitive modelling geared to task orientation and other training procedures also seems to be effective (Meichenbaum, 1972, 1977; Meichenbaum & Butler, 1980; Sarason, 1973).

On the basis of research evidence, Sarason (1972) concludes that treatment approaches that help test anxious persons attend to the requirements of the task are of considerable therapeutic value rather than those that make them think about themselves. All such evidence provides indirect support to the attentional theory of test anxiety. Consequently, formulations of test anxiety have emphasized cognitive and attentional factors rather than heightened emotional arousal.
Many investigators have employed Attentional Skills Training in combination with other interventions and conclude that Attentional Skills Training in combination with relaxation training is generally more effective in the reduction of anxiety. In one such investigation test anxiety was treated through Attentional and Relaxation Training by Little and Jackson (1974). Their main finding was that when Attentional Training was used with Relaxation conditions it showed significant reductions in both test and general anxiety, compared to Attentional Training used alone. Furthermore, Ribordy et al. (1981) assigned high and low test-anxious subjects to one of three conditions: Attentional Training, Placebo training, and No-Training control conditions. They have highlighted the relative efficacy of Attentional Training over the other treatments, and more so for younger than for older subjects.

However, Finger and Galassi's (1977) study lacking in bringing about a significant change on facilitating anxiety and performance employing the cognitively oriented treatment approaches (Attentional and Attentional Relaxation) is in contrast to the predictions of Wine's (1971) attentional theory. Furthermore, Owen (1981) who employed three treatment strategies: Attentional Skills Training, Relaxation Training and Relaxation training + Attentional Skills Training found that all three treatments were effective in reducing state test anxiety. The investigator,
however, failed to obtain statistically significant differences among the three treatment groups. In a review of the literature concerning treatment of test anxiety, Tyron (1980) concludes that treatments directed towards test-worry are more effective in reducing self-reported test anxiety and increasing grades than treatments directed towards test-emotionality. Self-reported test anxiety has been found to decrease as a result of most treatments, including Pseudo-therapy. Similarly, Morris and Engle (1981) and Lemire (1983), among others, have reported the usefulness of cognitive coping strategies in meeting the stressfulness of a testing situation and have reported that cognitive coping behaviours to a great extent increase pre-to-post attention to task behaviours. In addition to the comparative outcome studies, component analytic studies of cognitive modification have been conducted by Wine (1971a), Hahnloser (1974), Holroyd (1976), Deffenbacher (1980), that support the efficacy of Attentional Skills Training alone or in combination with other treatment strategies. Training in self-applied relaxation or task-oriented self-instruction is simply not enough in alleviating debilitating test anxiety and improving performance. The highly anxious are likely to need assistance in truly changing their preoccupations with perfectionistic self-standards, self-criticism, the need to compare with others, implied personal failures in poor performance and the like. Not to alter these in more benign directions may leave too much of the cognitive variance
un-accounted for, and the highly anxious may continue to
distract themselves from the task in hand as they undo their
task-oriented skills and self-instruction with worry
(Deffenbacher & Hazaleus, 1985). On the basis of the studies
reviewed so far, one inference can be drawn: that increasing
the task focus of test anxious individuals, who are highly
disturbed and preoccupied with a negative self-focus not only
helps in improving performance but moderating to a considerable
extent the unpleasant consequences of excessive worry or
irrelevant debilitating thought processes. All such studies
provide support to Wine's Attentional Theory of Test Anxiety,
Attentional Skills Training procedure, modified after Wine's
(1971) attentional skills training and Meichenbaum (1972)
cognitive modification treatment procedure, has been introduced
in this study to meet standards stated by Deffenbacher and
Hazaleus (1985), to a considerable extent.

3.3 Test Anxiety and Performance

Previous research in several parts of the world has
demonstrated that anxiety, and especially test anxiety, is
inversely and significantly related to performance. High test-
anxious subjects achieve or perform less than their low test-
anxious counterparts. The great amount of research done on this
topic of test anxiety and its relationship to performance gives
evidence both of its complex nature and of its interest to Psychology and Education. Test anxiety, a conditioned response to evaluative stress, has a debilitating effect on test performance (Sharma & Rao, 1983a, 1983b; Simmons, 1983). The very nature of school is evaluative and the negative test-anxiety-test-performance relationship increases during elementary school years. Many students regard examination as highly threatening (e.g. Bigard & Guyot, 1980; Mechanic, 1978). Thus test anxiety is an important consequence of failure in student life, as McKeachie (1984) concludes that test anxiety results not simply from testing, but from the threat of a test or grade topped with uncertainty about what to do to achieve a "good grade".

Studies of the relationship of test anxiety and performance have consistently demonstrated that high test-anxious individuals perform more poorly than low test-anxious individuals in a variety of contexts, for example, in classroom tests (Alpert & Haber, 1960; Munz & Smouse, 1968; Paul & Ericksen, 1964) intelligence and aptitude tests (Alpert & Haber, 1960) reading tests (Cotler, 1969; Kestenbaum & Weiner, 1970), and anagram solution tasks (Deffenbacher, 1978; Sud, S. 1983). Similarly, other studies undertaken in order to explain and treat academic performance deficiencies in test anxious individuals in colleges (Culler & Holahan, 1980) have generally supported the notion that high test anxiety levels and performance decrements are correlated.
Glazeski (1982) found that low test-anxious subjects perform better than high test-anxious subjects, and according to McLellan (1982) high test-anxious subjects have poorer problem solving strategies resulting in poor performance. Earlier, Ploeg (1979) in two experiments on Dutch Medical students found a significant negative relationship between the levels of anxiety and the level of academic success. Also Deffenbacher, Deitz and Hazaleus (1981) found that high test anxiety leads to poorer performance as compared to low test anxiety.

Another report by Weinstein, Cubberly and Richardson (1982) documents that test anxiety disturbs the performance of the high test-anxious subjects. Further, Plass (1983) asserts that high anxious subjects perform significantly lower than their low anxious counterparts, and also report more interfering thoughts during testing. These findings are supported by Bierhoff-Alferman (1976), Fox and Houston (1983), Heinrich (1979), Klínger (1984), Michaud (1979), Mueller, Carlomusto and Marler (1978) and Rapaport (1979). Deffenbacher and Deitz (1978) and Deffenbacher (1984) further support the contention that high test-anxious subjects perform poorly as compared with their low test-anxious counterparts.

In another study, Moreno (1978) asserted that test anxiety disturbs performance of a difficult task and facilitates performance of an easy task. Arkin and Hagtvedt (1983) observe
that task difficulty plays an important role in high and low test-anxious individuals' preferences. High test-anxious individuals in their study preferred easy and avoided difficult items, as is so commonly found. This is so because difficult tasks tend to generate prodigious amounts of cognitive interference among test anxious persons (e.g., Arkin, Detchon & Maruyama, 1981; Sarason & Stoops, 1978). The findings on problem solving tasks by Covington (1983) follow expectations, namely that the performance of the high anxious subjects is poorer relative to that of the low anxious subjects, on more difficult performance indices.

Thus, as the difficulty level of the task increases, high test-anxious children do worse. Basically, anxiety expresses its disruptive influence in the form of troublesome, self-defeating thoughts (e.g., Meichenbaum & Goodman, 1971; Sarason, 1978; Wine, 1971). This results in low task involvement and limited task focus, in effect, the anxious student is trapped in what Wine (1973) has called a "reverberating circuit of worry". Hamilton (1975) has proposed an information-processing model of neurotic anxiety, and has predicted by this model that high anxious subjects perform consistently worse than low anxious subjects on tasks with systematic increases in informational complexity when exposed to threat of pain or to ego stressors.
Tasks which are extremely difficult, or difficult lead to deleterious performance, but tasks in the middle range of difficulty, not too easy and not too hard, lead to optimal performance levels, maximize approach tendencies (Atkinson & Raynor, 1977), and discourage counter-ppdductive avoidance behaviour such as irrational goal setting and procrastination (Beery, 1975). In a recent study, Rocklin (1985) tested the high medium and low test-anxious subjects performance on 35 difficult and 35 easy verbal ability tests selected from the Scholastic Aptitude Tests (SAT). He found that students low in anxiety did better on the hard test (relatively speaking) than on the easy test, while the opposite was true of students with moderate anxiety. Moreover, the most highly anxious subjects did poorly on both tests.

Researchers have also investigated the test anxiety performance relationship using tasks which not only differ in their nature, being simple or complex, but also range in content from simple trial and error to complex problem solving and reasoning tests.

3.3.1 Studies on Anagram Solution

A number of studies on anagram problem solving tasks have shown that the performance of the high anxious subjects, especially under high stress, is inferior to that of the low anxious subjects.
Gissrau (1976) reports higher performance of the high anxious subjects on an anagram solving task under reassuring instructions, compared to the low anxious subjects. In the evaluative situation, low anxious subjects are superior to the high anxious subjects. Results confirm the hypothesis that there is an impeding and promoting component of test anxiety that independently influences performance.

Another finding by Rapaport (1979) showed the performance of the high test-anxious subjects to be poorer than that of the low test-anxious on an anagram solution task. Earlier, Deffenbacher (1978) had observed that the performance on difficult anagrams of the high test anxious-high stress subjects was significantly poorer than that of the high anxious-low stress, or the low anxious-high stress subjects. In another study, Mueller (1978) found that on an anagram solving task, the performance scores of the high test-anxious males and females in ego stress situations are lower. Thyer et al. (1981) also indicate that high test-anxious individuals performing under evaluative stress conditions on an anagram solution task have poorer performance indices as compared with their low test-anxious counterparts.

One interesting finding by Toner (1983) was that although the test anxiety groups did not differ in test performance, the high relative to low test-anxious subjects reported that they
performed less successfully on the anagram solving task. Goldklang (1982) employing anagrams, observed that the high test-anxious subjects prefer moderately difficult anagram solving tasks. In Sarason's (1961) study, high, middle and low test-anxious subjects worked on solving difficult anagrams under reassuring and achievement orienting instructions. The high test-anxious under evaluative threat conditions performed at relatively lower levels, as compared with the middle and low anxious subjects, whereas for the reassuring condition, the results were reversed. The results of this study as well as Sarason's later studies (1978, 1980, 1981, & 1984) are quite in line with the general views 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. Similarly Deffenbacher (1978) contends that the lower performance of the highly test-anxious is not a simple artifact of ability, since the high anxious perform as well as, or better than, the low anxious when stress is low. It is evaluative stress which appears to elicit behaviours which interfere with the performance of the highly anxious. In line with these convictions using anagrams of moderate difficulty, Sud, S. (1983) has shown that the performance of the high anxious-high stress high school boys is inferior to that of the high anxious - low stress, the low anxious - high stress or low anxious-low stress counterparts. She explains that this is
so, because these jumbled up words, being low in meaningfulness, produce more task generated interference and competing error tendencies in the high anxious under high stress than the high anxious under low stress or the low anxious subjects.

3.3.2 Other Learning Tasks

Studies dealing with the negative test anxiety-performance relationship have also been reported by various investigators using different learning tasks. Weinstein et al., (1982) used a paired associate word list with either a superficial or a deep processing strategy, their results indicate that on the superficial level processing task, the performance of the low test-anxious was not significantly different from that of the high test-anxious subjects, while on the deep level processing task, the performance of the low test-anxious was significantly better than the performance of the high test-anxious subjects.

In an earlier study, Mueller et al., (1978) in a free recall experiment using a list of words that could be organized by associate or rhymes, found that compared to the low anxious subjects, the high anxious subjects recalled fewer rhyming words and had fewer rhyming clusters, but there was no difference for recall of associates or associative clustering. They also found that high anxiety seemed to be more debilitating for women than
for men. Furthermore, Verma (1977) reports that the performance of the high anxiety subjects is lower than that of the low-anxiety subjects on the reproduction of complex geometric figures, whereas on the reproduction of simple figures, there are no noticeable differences between the two anxiety groups. Recently Paulman and Kennelly (1984) have found that exam skilled high anxious subjects performed comparably with skilled low anxious subjects on the primary Raven task, yet significantly worse on the concurrent Digit Span task.

Test anxious students often report that they read material, but are unable to recall it even a few minutes later. Research has supported this fact that individuals who report considerable anxiety show greater problems in learning (e.g., Sarason, 1972) and a decreased amount of information stored and/or deficiencies in the depth of information processing (e.g., Mueller, 1980). For example high anxious individuals consistently store and recall fewer digits in a digit span task than less anxious individuals (e.g., Mueller, 1977).

The foremost studies conducted in India on test anxiety and performance are by Nijhawan (1972), who found that high test-anxious school subjects learned paired associate tasks at slower rates than their low anxious counterparts. Later, Verma (1973) who used an easy paired Associate task, concluded that task
difficulty is an important variable. Further, Verma and Nijhawan (1976), on a difficult Paired Associate task, found that test anxiety was debilitating only under certain conditions. At upper levels of intelligence, neither anxiety nor reinforcement was found to have a significant effect on performance of a difficult task, whereas at lower levels of intelligence anxiety interfered with learning under all reinforcement conditions, praise, praise + reproof and reproof alone. The most effected group was the middle intelligence-high anxiety group. The effects of test anxiety on serial verbal learning was studied by Ganzer (1968), Sarason (1975) and Sharma and Sud (1982). In these studies, the high anxious subjects performed poorly as compared with their low anxious counterparts, however, in these studies serial position effect was not taken into consideration.


Performance on Mathematics tasks has been analyzed by several investigators (Fox & Houston, 1983; Hendel, 1980; Plake, Ansorge,
Parker & Lowry, 1982 among others. They have reported that the high test-anxious perform lower than the low test-anxious subjects. This is so because the high test-anxious take less of an analytic attitude towards the test situation, which leads to severe performance denigration and thus to subsequent poor arithmetic performance.

Research has indicated that the two sexes should be considered separately in their test anxiety levels and manifestations. Ploeg (1982) and Salamé (1983) among others, feel that research must treat the data obtained from the two sexes separately. Although Deffenbacher (1984) found no sex differences in components of test anxiety and their relationship to performance, Bander and Betz (1981), had found that females generally report higher anxiety levels than males on mathematical tests. They also found that the differences in anxiety levels on the maths test were the strongest contributory factor in the separation of the sexes.

Furthermore, Mueller et al. (1978) found that high test anxiety seems to be more debilitating for women than for men. Earlier, Halliwell (1975) reported that females obtained lower number of correct scores than males under high stress but higher number of correct scores than males under low stress. Peters (1982) investigating math anxiety and mathematics under achievement found that females suffered more than males. In a study by Cecere (1982) on attribution expectancy and test anxiety,
women were found to have lower confidence and aspiration and suffered from greater cognitive disruption than men in evaluative situations.

Recently, Cunnion (1984) has reported significant differences between boys and girls in their capacity to solve problems. Girls reported using more approaches when solving a problem, than boys, indicating that they may use a more exhaustive strategy as they solve problems, thereby not only taking longer but also perceiving most problems as more complex than do boys. Boys on the other hand, using a more streamlined approach may not attend to problems that would indicate that their answer is not the best one.

Thus, much more research needs to be done in order to highlight the differences in the test anxiety levels and performance, between the two sexes. Furthermore, Wine (1980) has already assessed with respect to future directions in test anxiety theory and research, that a more "explicit" examination of sex differences in test anxiety is needed.

To sum up, anxiety and performance are not connected in a one-to-one relationship. The complaint of the test anxious subject, "I really can't do it anyway", is often really true in a literal sense. It is not solely due to the fact that the tasks are difficult or the subject lacks intelligence and ability or that the task itself is unfamiliar and ambiguous asking for
different response strategies from test anxious students who are already tense and disoriented in thought and task focus; but as Topman and Janson (1984) contend, that it is more due to the issues of the test anxious students doing the wrong things, preparing themselves badly, having poor exam taking skills, and evaluating their performance inadequately. Therefore, in order to alleviate their tension and stop their negative thoughts, they should not only be taught correct cognitions, but the therapist should recognize why the test anxious subjects feels inferior and what sort of statements he should do away with. The therapist should help the student recognize the exact nature of the negative statements, the irrationality of these negative self-statements compared to the positive self-statements that a test anxious person can make to oneself during evaluative situations.

Attentional Skills Training devised by Wine (1971) and Meichenbaum (1972) given to such test anxious people is beneficial for alleviating worry, and task-generated interference rather than emotionality, since these two components have been recognised to lead to poorer performance especially during evaluative situations.

3.4 Test Anxiety, Stress and Performance

Stress is defined as "a state of unacceptable divergences between perceived demands and capabilities to adapt" (Sanders, 1983).
Stress is aroused in many situations. One such stress which is aroused in evaluative situations or situations in which some judgement will be made by significant persons upon one's adequacy or abilities is called ego-stress or high stress. As early as 1938a, Brown stated that "students who become excited before examinations tend, on the whole, to do a little poorer in the examination than those students who are calm before the examination" (1938b, p. 30-31). Brown's conclusions are confirmed by much research in the area of anxiety and learning which stresses that the performance of the high and low anxious subjects depends a great deal on the experimental condition under which they work.

Research findings (Gaudry & Bradshaw, 1970; Sarason, 1960, 1961, 1970; Sarason & Harmatz, 1965) have indicated that the effects of anxiety on a difficult task are minimized under reassuring non-ego-involving and control conditions and are heightened under threatening and ego-involving or high-stress conditions. These findings have been supported by Sarason (1972), who says that highly anxious individuals perform less well in the same task under high evaluative stress conditions (e.g., conditions which stress the difficult, comparative, or time limited nature of the task) than under low stress conditions. Later Deffenbacher, in 1978, found that the high anxious-high stress group subjects solved fewer anagrams as compared with the high anxious-low stress or low anxious-high stress groups. Poorer performance under high
stress has also been reported by Hashemian (1977).

Test anxious people under high stress tend to adapt stereotypical inflexible approaches to problem solving. They become cognitively "rigid" in their approach to dealing with the stressor and are unable to flexibly think through and resolve the problem. Some individuals seem to get locked into narrow cognitive sets, i.e., under stress they appear to persevere in irrelevancies of the situations and/or upon ineffective solutions of the problem. For example, test anxious subjects under evaluative stress tend to have difficulty in resolving problems, or resort to ineffective problem solving strategies (Deffenbacher 1978; Deffenbacher & Hazaleus, 1985).

Early in 1975, Sarason investigated high and low test-anxious subjects' performance levels who had received either achievement orienting or neutral instructions, and found an overall superiority of low to high test-anxious groups. Moreover, there was also a high test anxiety X instructions interaction. Sarason (1975, 1978) has interpreted these findings in terms of attentional blocks that characterize highly anxious individuals. Following Sarason's study, Gisraelo's (1976) study states that there is an impeding and promoting component of test anxiety that independently influences performance. In a reassuring situation, the high anxious subjects are superior to low-anxious subjects on performance measures, whereas in an "evaluative" or
disturbing situation the low anxious subjects are superior to
the high anxious subjects. Mills (1982) highlighting the poorer
performance of the high anxiety group under high stress concludes
that this group is unable to control its worrisome thoughts which
results in impaired performance.

To sum up, one can safely conclude on the basis of the
investigations by various researchers and scholars in the field
of test anxiety, that in the absence of stress or when stress is
minimized, the high anxious perform as well as the low anxious on
various problem solving tasks of varied difficulty (see also

3.5 Test Anxiety, Stress, Intelligence and Performance

The relationships between test anxiety and performance and
also between intelligence and academic performance are complex.
Since longitudinal studies of the test anxiety and performance
domain are not readily available, previous research has suggested
that students can learn to compensate for the detrimental effects
of test anxiety by changing their habits of studying. However,
this kind of compensation by overlearning and by using more time
for their studies is limited by the intelligence factor.

Considerable interest has been focused on the relationship
between anxiety and academic performance. Although correlations
point to a rather moderate relationship, there appears little
doubt that causal links between these variables exist. This is
especially valid for complex academic performance where impairing
influences of anxiety on performance have been shown in several
studies (e.g., Deffenbacher, 1978; Desiderato & Koskinen, 1969;
Rao, 1974; Sarason, Davidson, Lighthall, Waite & Rusbush, 1960 and
Schwarzer, 1975). On the other hand, Tyron, Leih and Tyron (1973)
and Wittmaier (1976) found that only the moderately anxious
subjects scored slightly higher as compared with high and low
anxious subjects. In line with earlier findings Merryman (1974)
has reported that anxiety is differentially related to different
school courses. Some recent reviews posit that intelligence and
anxiety have an interactive effect upon academic performance
Sharma & Rao, 1983a,b).

Studies by Lin and Mckeachie (1970), Wittmaier (1972) and
Culler and Holahan (1980) who investigated the role of intellectual
ability and study habits in academic performance for high and low
test-anxious subjects, assert that the high test-anxious students
have poorer ability and poor study skills. Poor performance is
due to the fact that the high test-anxious subjects spend less
time on the task, has less knowledge of the relevant material or
the task in hand, and is more preoccupied with self-evaluations
and preoccupations of an interfering nature as compared with the low test-anxious person.

These findings have been supported by Deffenbacher (1978) who studied the performance differences between high and low test-anxious persons, working on a difficult anagram solution task under evaluative and low stress conditions. His major findings were that the high anxious-high stress group reported more anxiety, more interference due to worry and emotionality and had poorer performance as compared with the high anxious-low stress, the low anxious-high stress or low anxious-low stress groups. These findings have further been replicated in a recent study by Deffenbacher and Hazaleus (1985), wherein they investigated sources of interference in highly test anxious subjects performing on a short intellective test and found similar results.

Verma and Nijhawan (1976), exploring the interactive effects of anxiety, reinforcement and intelligence on the learning of a difficult task have reported that at upper levels of intelligence, neither anxiety nor reinforcement is significant in interfering with performance whereas at lower levels of intelligence, anxiety interferes with learning under all the reinforcement conditions. Furthermore, the most affected group tends to be the middle intelligence high anxiety group. Sharma, Dang & Spielberger (1985) have found that high anxiety facilitates the performance of most
able children. Also Sharma and Rao (1983a, 1983b) and Ploeg (1984) have clarified the exact nature of the test anxiety \times \text{intelligence} \text{ effect, by stating that it is the reverse of what is observed in general anxiety and achievement relationship studies. Ploeg (1984) investigated the effects of test anxiety including both worry and emotionality components on academic performance, and found that in the first place test anxiety and intelligence were significantly related to achievement and that the high test-anxious boys achieved lower than their low test-anxious counterparts. These findings are consistent with the conclusions of previous research. Furthermore, he also found that the debilitating effects of high test anxiety, upon performance were based in the upper ranges of intelligence only, that is, within the sub-group of high intelligent children it makes a great difference being anxious or not, whereas the difference is less important in less intelligent groups. Boys and girls with lower levels of intelligence achieved less and were less influenced by the impairing effects of test anxiety.

The high anxious students differ from the low anxious because they prepare themselves badly for the test. This preparation differs both in quality as well as quantity. The quality of preparation seems to be of greater importance than the quantity of preparation (Allen, Lerner & Hinrichsen, 1972; Benjamin, Mckeachie, Lin & Holinger, 1981). Further Hodapp, (1983) on the basis of his research findings, assesses that preparation is an
important variable for an analysis of test anxiety. Quite recently Klinger (1984) has observed that preparation correlated only with performance. However, this appears inconsistent with a cognitive interference interpretation of test anxiety and suggests that in naturalistic settings, anxiety is more clearly an effect than a cause of poor performance. This is, of course, a "reaction to performance" interpretation of test anxiety. Klinger (1984) investigated whether preparation acts as a moderator variable in test performance and deduced that test anxiety should facilitate the examination performance of those who expected to do well and should impede the performance of students who expected to do poorly, but he obtained only partial and weak support for his hypotheses.

Thus, on the basis of various studies reported above, the general conclusion arrived at is that the performance of the high test-anxious subject:

(i) varies as a function of evaluative stress i.e., the more the stress, the greater the decrement in performance;

(ii) varies with the difficulty level of the task, i.e., the more difficult the task, the greater the possibility of the occurrence of task-irrelevant responses, such as worry, emotionality and task generated interference, which diverts attention away from the task-relevant responses and, therefore, performance suffers;
(iii) varies with the intelligence levels of the subject, because if the subject is highly intelligent, high anxiety is less likely to disrupt performance, whereas at lower levels of intelligence anxiety is more likely to disrupt performance, and

(iv) preparation acts as a moderator variable in test anxiety. Students who feel initially well prepared, perform better than those who feel poorly prepared.

Despite occasional contrary evidence (e.g., Cooley & Spiegler, 1980) Cognitive Training does make a difference in people's cognitive functioning. Since test anxious people are mainly preoccupied with a negative self-focus, rather than being task oriented, interventions designed to increase their task focus by teaching the anxious subjects skills to change their negative self focus to a positive self focus and thus directly influencing and changing the attentional styles of test anxious students have proved effective. Wine's (1871) Attentional Training is especially beneficial in alleviating and changing the cognitive worry, and task generated interference responses.

3.6 Worry and Emotionality Components of Test Anxiety and Performance
Research has shown worry to be inversely related to both performance (Deffenbacher, 1977, 1978, 1980, 1984; Doctor & Altman, 1969; Morris & Liebert, 1970) and performance expectations (Doctor & Altman, 1969; Liebert & Morris, 1967; Morris & Liebert, 1970). Emotionality, on the other hand, is negatively related to performance, in a few studies (Doctor & Altman, 1969; Morris & Liebert, 1970; Spiegler, Morris & Liebert, 1968) but wholly unrelated in others (Liebert & Morris, 1967; Morris & Liebert, 1970; Spiegler et al, 1968). Worry has been found to be more strongly and consistently inversely related to academic performance be it examination scores or grades (Deffenbacher, et al, 1981; Morris & Liebert, 1970; Morris, Finkelstein & Fisher, 1976; Morris Kellaway & Smith, 1978; Sharma & Rao, 1983a, 1983b). The conceptual distinction between Worry and Emotionality has been empirically supported in both experimental correlational and factor analytic research (Deffenbacher, 1980; Hagtvet, 1976; Ploeg, 1983; Spielberger et al, 1978; Spielberger, 1980; Schwarzer 1984).

Deffenbacher (1977, 1980) posits that while test performance does not seem to be influenced by Emotionality at low levels of Worry, Emotionality has debilitating effects on performance at high levels of Worry. Results from Deffenbacher's (1978) study also supported these predictions, the high anxiety-high stress group reported maximum worry and task generated interference as
compared with emotionality. Later, Sharma and Rao (1983) found that though both Worry and Emotionality affected performance negatively, Worry was more inversely related to performance than Emotionality. Culler and Holahan (1980) found that high test-anxious individuals reported poorer study skills because they spent less time studying and more time worrying. The cognitive-attentional hypothesis, for example, claims that in a state of anxiety a person's attention is divided between the task and the self (Sarason, 1975, 1980; Wine 1971, 1980) thus becoming self preoccupied and not in concentrating sufficiently on the task in hand. The Worry component in test anxiety consists mainly of such self related cognitions (Deffenbacher, 1980; Morris, Franklin & Ponath, 1983). Self awareness or self-consciousness increases the likelihood of anxious self preoccupation. Mills (1982) concludes that it is only that group of individuals whose anxiety level prevents them from controlling worrisome thoughts experienced during performance of tasks under high stress whose performance is impaired. Deffenbacher (1984) has reported, that the high test-anxious subjects, regardless of sex, perform poorly report more worry, emotionality and task generated interference than their low anxious peers. A regression of state anxiety measures upon performance for the extreme anxiety groups reveals that only worry regressed upon performance ($R = .56 P < .001$).
The Worry construct has also been incorporated in the framework of Trait-State Anxiety theory (Spielberger et al., 1976, 1978) as a major component of test anxiety indicating self-centred responses. The self focusing aspect of Worry has been considered a key construct in a cognitive attentional approach to test anxiety (Sarason, 1972, 1975a, b; Wine, 1971, 1980). This aspect has probably been explicated most thoroughly by Sarason (1975b) who states, "..... anxiety while important is not quite so pivotal. Perhaps the most basic process is not anxiety, but self-preoccupation or self-focusing".

Since excessive worrying directly interferes with devoting adequate attention to the task, performance suffers, therefore, intervention procedures designed after Wine's Attentional Skills Training procedure are gaining in effectiveness in improving performance and alleviating state-worry, since this procedure trains a test anxious person to attend more to the task and less to the self.

Various studies by investigators (e.g., Hahnloser, 1974; Holroyd, 1976; Lavigne, 1974; Meichenbaum, 1977; Wine, 1980) have highlighted the efficiency of Attentional training, as this intervention directly influences in reducing the high test-anxious subjects' worry. Deffenbacher's (1980) cognitive coping skills has also proven to be effective in reducing the test anxious individuals worrying tendency. Deffenbacher (1984) in naturally
occurring exams, found that worry was reported at a significantly higher level than either both task generated interference and emotionality. Unlike the more general analysis emotionality and task generated interference levels were not significantly different for the high anxious. These findings are consistent with recent findings of Deffenbacher and Hazaleus (1981, 1985) and suggest greater importance of worrisome ruminations than has been suggested in some earlier reports (Bruch, 1981; Galassi et al, 1981).

3.7 An Overview of the Research and the Present Study

The studies described in this chapter dealt mainly with the particular characteristics of test anxious persons, their feelings about ability, self and task pleasantness, the attentional training treatment procedure and the relationship of test anxiety to performance on different tasks of varied difficulty under evaluative stress conditions, mostly in Western cultures. It has been indicated by Sharma and Rao (1984) that not much research has been conducted on test anxiety in India. Moreover, Sarason (1984) claims that the relationship between how anxiety in test situations is experienced and how this experience affects performance is still unclear. The present study has attempted to explain the 'hows' and 'whys' of this debilitating procedure.
The studies reviewed have followed a regular pattern, in the sense that firstly the high test-anxious persons have been identified with their singularly debilitating characteristics as compared to their low anxious counterparts. Researchers have claimed that the high anxious subjects are not demonstrably less capable or lacking ability, they simply tend to 'freeze up' during test or evaluative situations. Classroom tests which are highly stressful experiences for most people, lead the highly test anxious subject exposed to 'evaluative' stress to describe such a situation as a 'real rugged situation'. The highly test anxious subjects thus tend to become more self derogatory, and suffer from irrelevant thoughts, totally unrelated to the task in hand. Therefore, Attentional Skills Training Procedure modified after Wine's (1971a), Holroyd's (1976) & Meichenbaum's (1972) treatment programmes has been observed to be an effective coping strategy, operating in cognitive modification. The effectiveness of this cognitive treatment strategy has mainly been observed in modifying or alleviating the process measure of state-worry experienced during test situations, which is the main factor interfering with successful performance. Moreover, Wine (1980) has specified that there are cognitive and attentional differences between the high and low test-anxious. The cognitive structure and self statements of the low test-anxious individuals are not simply the opposite of the high test-anxious, but only differ in quality. However, much of the assessment research is
based on the assumption that the appropriate comparison group for high test-anxious students and, the ideal state during a test is one of low test anxiety (Carver & Scheier, 1984; Sarason, 1972, 1975, 1978; Wine, 1971, 1980, 1982). Therefore, Wine's (1980) bidirectional cognitive-attentional model of test anxiety stresses that complex cognitive treatment packages might be the most effective treatment for test anxiety.

Furthermore, according to Becker (1982), making distinctions between the levels of state anxiety at three different points of time (before, during and after examinations) or by the same token, before, during and after the treatment, are proving worthwhile in experimental research. None of the treatment approaches so far have used such procedures, except for some (Deffenbacher et al, 1979; Deffenbacher et al, 1980; Deffenbacher & Michael, 1980) where state anxiety scores were taken separately followed by post-treatment scores. Tobias (1977a) has also pointed out, that the use of these brief state anxiety or worry indices clearly demonstrate that anxiety is differentially related to a research task. More importantly, the use of ego-involving instructions coupled with moderately difficult tasks, which further elevate the state anxiety or worry levels of the test anxious subjects, act as the most appropriate test of the effect of treatment.

The present study is an empirical test of the Attentional interpretation of the test anxiety theory in an Indian setting.
One of the primary objectives of this study is to see whether this interpretation developed on the basis of the observation of Western samples is valid in Indian settings or not. In effect, this study attempts to fill in this gap in the test anxiety literature, by answering the query whether there are cultural differences with respect to the level and nature of anxiety experience and its treatment. In fact in the words of Diaz-Guerrero (1976), "given the obvious pertinence to the problems of mental health and neurosis in all cultures, cross-cultural investigations of test anxious and state trait anxiety should be given high priority." The empirical test of Attentional Theory involves not only the self report measures but also the performance measures (with task difficulty controlled but the nature of tasks varied) as outcome measures. Only one Indian study has so far been done in India employing Attentional Skills Training as a cognitive coping strategy (Sud, A. 1984) wherein however no significant improvements in performance were observed of on learning tasks either the high or low test-anxious high school girls.

The main focus of this study is to investigate the effects of Attentional Skills Training in alleviating the state-worry scores of the high test-anxious boys and girls performing moderately difficult tasks under evaluative stress conditions. As reported earlier, since much of the assessment research is based
on the assumption that the appropriate comparison group for high test-anxious students or the ideal state during a test is one of low test anxiety (Sarason, 1972, 1975, 1978; Wine, 1971, 1980, 1982); therefore, the low test-anxious students have been included in this study and exposed to differential stress conditions and have also been studied as a control group. It is hoped that this study will have wide ranging implications in the development of treatment of test anxiety, appropriate and effective for all cultures.

3.8 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 anxious-control counterparts.

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 Spent on the Task with Attentional Skills Training than their high anxious-control, low anxious-ego stress or low anxious-control counterparts.
TABLE 4.1

A 2x2x2 (TA x AST x ES) Factorial Design on the basis of Test Anxiety levels, Treatment and Ego Stress conditions for Boys and Girls.

**A Test Anxiety**
(TA N=120)

<table>
<thead>
<tr>
<th>High Test Anxious</th>
<th>Low Test Anxious</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>T₁</strong></td>
<td><strong>T₂</strong></td>
</tr>
<tr>
<td>No Attentional Skills Training</td>
<td>Attentional Skills Training</td>
</tr>
<tr>
<td>(No AST N=30)</td>
<td>(AST N=30)</td>
</tr>
<tr>
<td><strong>B₁</strong></td>
<td><strong>B₂</strong></td>
</tr>
<tr>
<td>Ego Stress</td>
<td>Control</td>
</tr>
<tr>
<td>(ES N=15)</td>
<td>(C N=15)</td>
</tr>
</tbody>
</table>

| **T₁**              | **T₂**              |
| No Attentional Skills Training | Attentional Skills Training |
| (No AST N=30)       | (AST N=30)          |
| **B₁**              | **B₂**              |
| Ego Stress          | Control             |
| (ES N=15)           | (C N=15)            |

**Notations:**

(TA) A - Test Anxiety

(HTA) A₁ - High Test Anxious

(LTA) A₂ - Low Test Anxious

(No-AST) T₁ - No Attentional Skills Training

(AST) T₂ - Attentional Skills Training

(ES) B₁ - Ego Stress

(C) B₂ - Control