Review of Literature

Rather distinct bodies of literature have built up around the topics of (i) anxiety and pre-performance instructions (2) anxiety and achievement (3) anxiety and intelligence, (4) anxiety and observational learning. These topics are of considerable general importance. For students of anxiety and other dimensions of individuality they are of major significance.

Spielberger (1966) estimates that 3500 publications related to anxiety have appeared between 1950 and 1966. Undoubtedly, the accelerating pace of research in this area has continued up to the present, therefore, it would be an impossible task to review all the literature on anxiety. Consequently, the review efforts were selectively based. In the following section, research studies reviewed deal with learning and academic achievement as influenced by anxiety and intelligence. First of all, studies dealing with the effect of anxiety (general and test) on learning and academic achievement were discussed. These were followed by two-variable studies i.e. effect of anxiety (general and test) and intelligence on learning
and academic achievement. Studies not directly related to test anxiety have also been briefly mentioned. This was followed by general overview and conclusions.

SINGLE VARIABLE STUDIES.
EFFECT OF ANXIETY ON LEARNING.

There have been many studies investigating the effects of anxiety on experimental learning tasks. Although the effects of anxiety on easy tasks have been inconsistent, the general result has been that anxiety does have a debilitating effect on complex learning such as concept formation.

Experiments have shown that anxious Ss perform less well in maze learning (Axelord, Cowen and Heilizer, 1956; Kumari 1970), reversed alphabet printing (Taylor and Rechtschaffen, 1959; Tecce, 1965; Suedfeld, Gluckenberg, and Vernon, 1967) and in general, in more difficult task. Maltzman, Eisman and Morisset (1961) reported influence of MA on performance and rational learning, but induced anxiety did not exert any effect.

Another study of interest is that of klein, Frederikson and Evans (1969) which concluded that test
anxiety had consistent curvilinear relationships with performance and there was a significant interaction of anxiety and verbal ability.

An important finding is that the performance of high anxious subjects in learning tasks is enhanced by feedback and reinforcement (Sarason and Ganzer, 1970; Horowitz, 1962; Campeau, 1968). Research indicates that anxiety has a detrimental effect on short-term memory and since memory process and learning are very difficult to separate, an interaction between anxiety, memory, and complex learning can be anticipated (Seiber and Kamaya, 1968; Paulson, 1969).

Ray, Katahn, and Snyder (1971) studied the effect of test anxiety on acquisition, retention, and generalization of a complex verbal task. The results obtained showed that there were significant differences in performance due to test anxiety for the group tested after each acquisition trial, but not for the group tested after 5 study trials. Controlling for original learning, there were significant differences due to test anxiety on both the retention and generalization tests.

McMillan, Osterhouse, Robert (1972) examined the effectiveness of systematic desensitization for reducing
anxiety of highly test-anxious students who differed in their level of generalized anxiety. The results obtained showed that no differences followed treatment between high and low general anxiety Ss in the level of self-reported examination anxiety, but low general anxiety Ss received significantly higher grades on a final examination than did high general anxiety Ss.

There is evidence (Hill and Eaton, 1977) indicating that anxious children perform poorly on cognitive and ability tasks because of motivational difficulties rather than because of learning or ability deficiencies. Highly test-anxious children were found to perform rapidly and accurately on arithmetic problems when the threat of failure was removed and when they were allowed to pace themselves without time pressure.

Ahuja (1979) reported that the results obtained by Xth grade students show that the mean performance of high, average and low anxiety groups were not significantly different from each other.

Several studies have attempted to test the hypothesis that test anxiety merely reflects poor study habits (Osterhouse, 1972; Cornish and Dilley, 1973; Horne and
Matson, 1977; Bruch, 1978; Cornish and Dilley, 1973; Horne and Matson, 1977; Bruch, 1978; Kirkland and Hollandsworth, 1980; Harris and Johnson, 1980). From these results it appears that study skills training probably does not harm a highly test-anxious person, but it may not help, either. Until researchers begin to pre-test highly test-anxious people for study-skills deficits and include low-anxious study skill-deficit people as controls; the utility of study skill training as a treatment for test anxiety will remain unknown.

Gupta (1980) studied the effect of induced anxiety on test performance. The results obtained indicated that Ss who were presented the incentive scored higher than those who were given threat and the test affected the performance of students. Another recent study by Gupta and Gupta (1980) indicates that worry and anxiety are important determinants that effect the performance of students.

In general, these findings have suggested that anxiety does have a debilitative effect on the learning of various tasks. This may be due to the 'personalizing' of the threat situation by the learner. Sarason (1980), Wine (1971) suggest that high test-anxious subjects have
more task 'irrelevant' thoughts that prevent them from focusing on the task.

ANXIETY AND INTELLIGENCE

A low negative correlation between intelligence and anxiety is the result of the majority of investigations (Grice, 1955; Singhal, 1974). However, relationships are higher and more consistent in studies of children (Ruebush, 1963) than in studies of college students. Spielberger had earlier (1958) pointed out that selection factors that operate in college students reduce the range of intellectual ability present in the sample, and thus lower the correlation between these two variables.

Other studies that have reported similar findings are those by Dana (1957); Sarason (1956); Sharma (1977).

More consistent results have been found when the TAS or TAS C was used as a measure of anxiety than when the MAS or CMS was used (Forbes; 1969; Sarason et al., 1960, Sarason and Minard, 1962; Sarason, 1963). This result is reasonable in that intelligence is determined in a testing situation, and the TAS and TAS C
are probably more sensitive to this type of anxiety than is the MAS or the CAMS. In addition, correlations similar to those obtained with the TAS are obtained with the SAS, that is, the school Anxiety Scale (Phillips et al., 1969).

In interpreting the relationship between anxiety and intelligence, Sarason et al., 1960) take the position that anxiety is the etiologically significant factor. One of the arguments on which their case rests is that the relationship between anxiety and intelligence test performance depends on the situational context. That is, when a test is administered in a highly test-like atmosphere, the relationship obtained is greater than when it is administered in a more neutral relaxed atmosphere (Zwibalson, 1956).

Dyke and Agnew (1963) reported negative correlations between digit span performance and anxiety, while Jurjerich (1963) reported a positive relationship and Jackson and Bloomberg (1958) and Matarazzo (1955) reported no relationship. Atchison (1968) established that level of anxiety tended to be positively related to both intellectual and non-intellectual factors for both high and low
groups. Thus the evidence is not consistent.

EFFECTS OF ANXIETY AND INTELLIGENCE ON LEARNING.

The relationship of intelligence and learning has been studied for many years. Most of the research failed to find a significant relationship between these two variables. Results of Carver and Dubois's (1967) study negated the generalization that learning and intelligence are unrelated, the relationship found was significant but low.

Stevenson, Klein and Miller (1968) obtained significant correlations between laboratory tests of learning with intelligence as well as performance in school setting. Some studies reported positive relation of I Q and performance in a paired associate learning task (Ring and Palermo, 1961; Iscoe and Sember, 1964; Rieber, 1964; Rapier, 1968; Gallagher, 1969). Some others have reported negative evidence (eg; Ring and Palermo 1961; Girardeair and Ellis, 1964; Vergason, 1964).

Vibha (1972) in her doctoral dissertation evaluated the relationship of learning with intelligence. Results obtained showed that tasks involving verbal mediation correlated with intelligence and school learning.
Digit learning task correlated significantly with intelligence measures. Ruebush (1960) reported that HA Ss of low and middle levels of ability perform better than LA Ss on a task requiring a cautious approach. It can be inferred, therefore, that besides anxiety and intelligence, nature of task involved has also to be considered.

Katahn (1966) on a task of moderate difficulty found interactive effects of anxiety and intelligence. Callens (1969) reported performance of high anxious and high intelligence (HA-HI) Ss, on digit span to be the best one. Results of Fischer and Awrey's (1973) study revealed a significant main effect of intelligence and also its interaction with anxiety. Doyol and Forsyth (1972) reported no significant relationship between anxiety and intelligence on a problem solving task.

Two studies which found the relationship of anxiety and intelligence on performance to be curvilinear are by Stabler and Dyal (1963) and Zlotowing (1963).

With a concept identification task of moderate difficulty, Denny (1966) found that high intelligence
subjects exhibiting high level of anxiety perform better than those with low anxiety, but this difference is reversed for subjects of low intelligence and the findings were consistent with expectations based on Drive theory. A similar study has been conducted by Sinha (1968).

Moores and Valliant (1983) conducted a research to study the interactive effects of anxiety and intelligence on recognition and recall. Findings showed that the digit span variable was indicative of recallers greater short-term memory. A tendency to be anxious on tests of recall was noted.

Mc Cann, and Stewin (1984) explored the relationships of anxiety and ability to conceptual level in 90 male and 134 female 11th and 12th graders in Canada. Results show that higher anxiety may minimize the correlation between ability and conceptual level, but scores for conceptual level cannot be seen largely as a function of ability and anxiety constructs.

To conclude, it can be said that anxiety and intelligence have an interactive effect on complex learning tasks. A plausible explanation of the negative
relationship between anxiety and intelligence test scores involves speed of performance. It is fairly well established that anxiety commonly has the effect of slowing performance on complex tasks (Hill and Eaton, 1977). Some intelligence tests and parts of tests are timed; others are not. In some cases test items are recorded as failed if performance is not completed within a specified time limit. In other instances score bonuses are awarded for correct responses given with a time limit (WAIS,R 1981). The high anxious Ss perform more effectively on the untimed sub tests and less effectively on the timed sub-tests, than the low-anxious group. The effects tend to cancel out, so that the net effect on the total score is minimal. This affords an explanation of why anxiety scores are usually found to be unrelated to total intelligence test scores. It also explains the occasionally reported low negative relationship with IQ scores when the entire test is timed (Metazazzo et al., 1954; Siegman, 1956).

ANXIETY AND ACADEMIC ACHIEVEMENT

{SCHOOL AND COLLEGE}

Several studies have reported low negative but significant correlation between anxiety (CMAS) scores and achievement measures (e.g. Mc Candless and Casteneda,
Essentially the same relationship holds when other anxiety index such as TASC is used (Broen, 1959; Atkinson and Litwin, 1960; Sarason, 1963; Ruebush, 1963; Carrier and Jewell, 1966; Muroy, 1968).

Sarason (1963) suggested that anxiety scales which are specific to certain kinds of situations may prove to be more useful in academic situations than the general anxiety scale. His results supported this suggestion and there was a more significant negative correlation between test anxiety and achievement than between general anxiety and achievement. Negative correlation was stronger for females than males.

In some studies more than one anxiety measure has been used. Lunnborg (1964) gave three anxiety scales, the TASC, CMAS, GASC, to 213 boys and girls in grades IV to VI. There was a negative correlation between anxiety and achievement measures for each grade. The negative correlation between anxiety (TASC) scores and achievement scores tended to be larger than was the case for other two general anxiety measures. Further,
the negative correlation tended to be larger for boys than for girls. Similar results have been reported for elementary school children by Sarason et al. (1960); Stevenson and Odom (1965); Frost (1968); Levy, Grooch, and Keller (1969). But in Stevenson and Odom's (1965) results the negative correlation between test anxiety and achievement was equally strong for both boys and girls. Similar results have been reported by Hill and Sarason (1966); Gaudry and Spielberger (1971).

The studies on the school sample have supported the Yerkes-Dodson law, which states that the relationship between motivation (anxiety) and learning takes the form of inverted U-shaped curve which means that the optimum level of motivation for effective performance, lies in the middle ranges, rather than at the high or low ends of the curve (Cox, 1960; Sharma, 1970).

Another study in line with the Yerkes-Dodson law is by Laith and Davis (1972), on school as well as college sample. They found inverted U relationship between GA (New Junior Maudsley Inventory) and achievement. They further found that average or above average anxiety is facilitating to younger school children, whereas, for older Ss it becomes more debilitating, and hinders
achievement.

Sinha (1972) found that anxiety (TMAS) was significantly and negatively related to academic achievement. Tryon, Laib and Tryon (1973) demonstrated that high achievers increased, low achievers decreased, middle achievers remained unchanged in test anxiety with increased grade placement. Females in general and female high achievers were high in test anxiety than males.

There are some studies which found no relationship between anxiety and achievement measured on the school sample (Wirst and Broen, 1967; Kitano, 1960; L'abate, 1960; Chasbell and Thomas, 1967).

Carrier and Jewell (1966) used TAS and AAT and correlated these scores with final examination scores of 125 multiple choice question. They obtained significant negative correlation. Sessenrath (1967) and Endler (1964) reported 15 significant negative correlation between test anxiety and achievement. On Indian college students, Sinha (1966), Saxena (1965), and Hundal, Sudhakar and Sidhu (1972), Rao (1974): have reported low negative but significant co-efficients of correlation.
Osterhouse (1975) found linear trend between anxiety level and academic performance. Moderate test anxious Ss tended to obtain slightly higher examination scores as compared to HA and LA Ss.

Prell (1973) studied influence of anxiety on three measures of examinations term paper, essay type and multiple choice test. The correlation between the debilitating anxiety score and total achievement was significant for the whole group. The total scores based on all three measures was most strongly correlated with achievement in the multiple choice test, less strongly with essay achievement, and least strongly with term achievement. Anxious Ss, especially females, were reported to have a significantly lower essay score.

Bisht (1979) found that academic achievement of high, moderate, and low anxious students were significantly different and the correlation between anxiety and academic achievement was significant but negative. Jindal and Panda's (1982) results indicated that low achieving boys had a high level of general anxiety; low achievers, irrespective of sex, were more anxious than high achievers. Girls, in general, irrespective of achievement level, possessed more anxiety than boys.
A recent study by Verma (1984) indicates that anxiety and school achievement are positively correlated. Subjects having high level of anxiety were found to be high achievers than subjects having low level of anxiety.

Most of the studies reviewed have suggested a negative relationship or a curvilinear relationship between anxiety and academic achievement. However, there are some studies that have found no relationship between these two variables (Sarason, 1956; Matarazzo et al., 1964; Grooms and Endler, 1960; Singh, 1966; Buchin, 1966; Singhal, 1974).

ANXIETY INTELLIGENCE AND ACADEMIC ACHIEVEMENT:

Most of the studies reported earlier did not control intelligence or systematically vary it. This raises the possibility that the relationship between anxiety scores and academic achievement scores may be influenced by the variable of intelligence.

Accordingly, Gaudry and Fitzgerald (1971) analyzed the performance of junior high school pupils on a variety of school subjects as a function of test anxiety and intelligence. Considerable support was found for the experimental hypotheses that anxiety would facilitate
performance of most able students while lowering that of the remainder when compared with their low anxiety counterparts. HA was found to be associated with the greatest performance deficit at the second highest of the five levels of ability.

Gjesme's (1972) results supported the predictions that subjective probability of failure in school work is determined by the individual's knowledge of his own relative ability and inversely related to the pupil's level of ability. Girls tended to over estimate their probability of failure.

Nickel, Schiluter, and Fenner (1973) examined performance of extreme groups of anxiety in mother tongue (German) and mathematics for correlations and comparisons and found that girls admitted more anxiety at the age of 12. Anxiety diminished with age and intelligence and many more factors as quality of education, higher social class, increasing introversion, and dominance of the teacher.

Spielberger (1962) found that anxious students (MAS) in the middle ranges of ability obtained lower grades than non-anxious students of comparable ability.
Students of low ability earned poor grades irrespective of their anxiety level. For the very superior students, it appeared that anxiety had actually facilitated performance. But Pervin (1967), using Alpert and Haber's (1960) AAT, correlated anxiety with measures of academic performance. Low negative correlation was obtained. The moderator analysis did not indicate that anxiety was differentially related to performance for different ability levels.

Bauermeister and Colon (1974) examined the relationship between anxiety (STATE-TRAIT), Sex, general ability, academic achievement. LA and female Ss showed higher academic achievement.

Lewis and Adank (1975) found positive inter-relationships among the measures of intelligence, achievement and self esteem, for all groups exposed to different models of instructions (individualized and traditional self-contained model). There was a lack of significant negative correlation for the group exposed to individualized instructions.

Singhal (1974) found the relationship between anxiety and intelligence to be significant but negative.
In his results the achievement scores showed a positive significant correlation with intelligence. Basu, Kumar and Bose (1979) found that correlation between anxiety (MAS, adapted in Bengali by Basu, 1975) and intelligence (Bellevue Intelligence tests) were negative. All correlations between school achievement and intelligence were significant. Most of the correlations between these two variables were, however, negative.

**OVERVIEW:**

A review of the studies showed that there was conflicting evidence as to the nature of the relationship between anxiety and intelligence both at school and college level. This was not very surprising because a number of extraneous variables like differences in age, socio-economic status, cultural background, educational system, and actual differences in the criterion of achievement tests used, all effect the study. All these variables cannot be controlled at the same time, the result being that there were numerous evidences of conflicting and biased results. For example, Indian students who are examined less frequently but through a more stressful examination way show different anxiety-achievement relationship than their counterparts in western countries (Sharma 1970).
Another limiting factor could be that from the beginning, the study of human anxiety has been handicapped by the absence of a consensual operational definition of the construct. The multiplicity of definitions makes for confusion and difficulty in understanding conflicting experimental findings. When the results of two investigations, similar except for the construct definition are in conflict, there is always the possibility that the conflict could be a consequence of the differences in definition.

It is also essential to differentiate between GE (general emotionality) and anxiety. Anxiety as a concept implies direction as well as level, where as GE may imply level of arousal (without any specific directionality). Inspite of these factors, the research review's most consistent finding was that there is a negative correlation between different measures of anxiety and various measures of achievement. It has also been found that specific anxiety scales eq. (TASC, TAQ, AAT) are better predictors of academic success than the general anxiety scales.

There is evidence that supports the proposition that anxiety and intelligence have interactive effects of performance. A low negative correlation between
intelligence and anxiety has been found by the majority of investigations. The relationship is higher and more consistent in the studies of children when TAS or TASQ is used (Ruebush, 1963). It has also been established that low negative relationships between anxiety and intelligence are a result of timed tests (Matarazzo et al., 1964) Siegman, 1956).

The relationships between anxiety and learning, anxiety and academic achievement are complex and cannot be ascertained easily. The researches reviewed in this chapter are however consistent on one basic issue, i.e. HA has a debilitating effect on learning of new materials, and on the academic achievement of school children. Some studies did not, however, consider the variable of intelligence and disregarded its effects on learning and academic achievement. Spielberger (1966) proved that the inconsistency of these results was because individual differences in intelligence were not considered at the outset. Subsequent studies established without a shade of doubt that the intelligence of the individual affects his learning and academic achievement.

Most of the researches reviewed have involved the use of various correlational techniques. While these
methods of analysis have distinct advantage in terms of ease of communication, they do have definite weaknesses. Firstly, cause-effect generalizations can not be made. Further, correlations average out the relationship over the whole sample, ignoring possible differences between sub-groups. It would be better if multivariate experimental designs are used while analysing various experimental studies (e.g. spietberger, 1962, Gaudry and Fitzgerald, 1971).

It was clear that anxiety factors also played a considerable role in learning and academic achievement. A number of questions arise after the review of various findings. How far can remedial measures, counselling and systematic desensitization reduce the debilitating effect of test anxiety? Does the negative relationship between anxiety and intelligence indicate that those who are intelligent are more capable of coping with their environment and are, therefore, less anxious? Does this relationship indicate that anxious people have a greater difficulty attending to and retaining information, specifically information that is incidentally learned? Does anxiety interfere with intelligence test-taking per se, that is does anxiety lower performance on the tests that would have been higher if anxiety had not been present?
To conclude, the area of anxiety-learning-achievement has great significance for psychological theory and educational practice. Anxiety can impel a man to self improvement achievement and competence, or can distort and impoverish his existence. The urgent need is to acquire the knowledge to utilize anxiety constructively, to be its master and not its slave.