Chapter I

INTRODUCTION

Intelligence and academic achievement have been considered to be very closely related phenomena since the very inception of the concept of 'measured intelligence'. Binet's pioneering efforts in the field of intelligence testing were rooted in his attempts to find an explanation for educational retardation in the course of his work with educationally backward children. He even validated his tests of intelligence against scholastic achievement indicating a circularity of argument that children with higher intelligence achieve proportionally higher than children with lower intelligence, therefore, children with higher achievement should necessarily be higher in intelligence.

On the basis of this realisation of a close relationship between the two abilities, scholastic and mental, exhibited in quite frequently noticed high correlations (Jordan, 1923; Edds and McCall, 1933; Eysenck, 1947; Wellman, 1957; Edward and Tyler, 1965; Glossop, Appleyard and Roberts, 1979; Roberge and Flexer, 1981), intelligence has been taken to be the single most important predictor of scholastic achievement.
The terms overachievement and underachievement, which owe their origin to the genius of Burt (1937), started appearing on the horizon of achievement prediction quite early. Those who achieved higher than expected on the basis of intelligence were called by Burt overachievers and those who achieved lower were called underachievers. The concept, however, took a long time to get clarified and reach the methodological precision where it stands today.

From amongst the early investigators the names of Monroe and Buckingham (1920), Franzen (1920), Pintner (1922), Peters (1926) and Burt (1937) are worth mentioning for their efforts to unravel the mystery in the prediction of achievement through intelligence.

Following the developments in the field of intelligence testing and basing their efforts on the assumption that pupil's mental age represents "the capacity to learn", Monroe and Buckingham (1920) developed the concept of 'achievement quotient', a ratio between achievement age and mental age, which was expected to be unity, or hundred, for each pupil according to the "capacity" concept. The ratio was, however, not always found to be hundred and the number of cases falling higher or lower was disturbing.

Franzen (1920), another supporter of the 'capacity' theory, probably interpreting these deviations in terms of procedural weaknesses came up with an improved idea of a ratio between
"educational age" and chronological age, which he called EQ, and a further ratio between EQ and IQ as AQ. His argument started with the statement, again based on capacity belief, that "the optimum AQ is hundred", the maximum "potential achievement". The term 'potential achievement' saved him from explaining the negative deviation from the norm of hundred because, obviously, every one may not work to his full capacity. But to his utter surprise some of his pupils showed AQs more than 100. Again blaming the technique he restructured it, and put forward the idea of Subject Ratios (SR), computed with the ratio between "subject age" and chronological age (SQ) and then the ratio of subject quotient (SQ) and intelligence quotient, maintaining again that the SRs should be 100. Once again the positive and negative discrepancies were very much there.

Not only that. In Franzens work then emerged an even stranger phenomenon. It was noticed that children with high IQs tended more to have proportionately lower SQs while children with low IQs showed greater tendency to achieve higher SQs than expected. At this juncture Franzen, apparently growing tired of unexpected results, gave his explanation in terms of there being something wrong with the tools and left the matter at that.

Pintner (1922) probably scrutinising his results more closely hit upon the fact that by and large pupils of below
average IQs tended to achieve higher than expected and the pupils of above average IQs showed a tendency to achieve below their predicted achievement. The data of Peters (1926) and Burt (1937) also confirmed the observation. It is surprising that even Burt, a great statistician of his time, did not recognise in these results the clear effect of regression towards the mean, a tendency observed in all human behaviour.

What a modern psychologist would have recognised as the obvious effect of regression had thus become a confounding problem only to be explained away through some appealing logic. Today, what may look ridiculous, was accepted as a convincing explanation of the observed over and under achievement "that the tendency of the school is to push ahead the mentally slow and at the same time to neglect the bright as soon as they have achieved average work". (Pintner, 1922, p.66).

This appears to be the earliest break through in the direction of recognising the influence of a non-intellectual factor in achievement. Although these early workers had not been able to recognise the regression effect in achievement behaviour which is exhibited in the downward movement of high scorers and the upward movement of the low scorers towards the group mean scores, they accepted the influence of school on achievement, thus, at least implicitly,
weakening the position of intelligence as the absolute
determiner of achievement. The concept of intelligence as
the standard capacity of scholastic achievement, which was
rather an implied denial of other possible non-intellectual
factors operating on achievement, however, continued for
a long time.

It is quite recently that the controversy surrounding
the accomplishment quotient as the most reliable and precise
measure of potential achievement has subsided into a sort of
consensus that intelligence is the most important yet an
imperfect predictor of school attainment (Crane, 1959; Burt,
1959). It is now recognised that the very concept of over
and under achievement implies the possibility of some
'additional' non-intellective factors operating on scholastic
achievement (Thorndike, 1963, p.2) calling for continued
research work in the non cognitive domains, personal as
well as environmental.

Stimulated by this possibility investigators in the field
have shown a resurgence of interest in recent years in
exploring the temperamental and environmental factors in
relation to academic achievement.

In search of non-intellectual factors influencing achieve­
ment there has been a proliferation of studies exploring the
linear relationship between academic performance and certain
personality dimensions like anxiety (Rai, 1974; Vora, 1978;

The findings of studies, mentioned above, though not very conclusive and unequivocal, suggest some personal and environmental factors going with high and low achievement.

The high success groups have generally been found to be better adjusted, more achievement-motivated and prone to introversion. They are also found to possess better study habits and lower level of anxiety. The low success groups, on the other hand, appear to be poor in adjustment, study habits and need achievement. The low achievers have also been found to be prone to extroversion and ergic tension or anxiety.

Ethnicity has not been found to be a significant determinant of school attainment while academic climate at home and school has been found playing an important role on
childrens' scholastic performance.

Much of the research work in the field, however, suffers from conceptual and methodological lacunae as far as the concept of over and under achievement is concerned. As may be seen from the foregoing account, high and low success or success and failure are taken for study instead of what is known as 'discrepant achievement' or over and under achievement.

Some studies which have given thought to this aspect have calculated discrepant achievement from simple comparison between ability and achievement scores (Shaw and McCuen, 1960; Curry, 1961). Some others have worked out discrepancies from the group achievement means at different IQ ranges of the groups (Parsley and others, 1964; Jarvis, 1965). Still others have controlled intelligence at a particular level of IQ and have worked out over and under achievement from some arbitrary norm for the group (Jayagopal, 1974; Tandon, 1978).

For conducting any research work on over and under achievement it is essential to have a clear understanding of the phenomenon from definitive and methodological points of view. As suggested by Thorndike, it is necessary to define over and under achievement as discrepancies of actual achievement from the predicted achievement, 'predicted upon the basis of the regression equation between aptitude and achievement'
(Thorndike, 1963, p.13). As such, over achievement would refer to positive discrepancy and under achievement to negative discrepancy of the actual achievement from the predicted value, predicted on the basis of intelligence which has been accepted as the single most important predictor of academic achievement. Thorndike further argues that "we must predict achievement from aptitude, on the basis of the known correlation between the aptitude measure and the achievement measure. The prediction equation, or regression equation tells us the average or typical achievement score for individuals at any given aptitude level" (Thorndike, 1963, p.45).

It is since 1963, when Thorndike for the first time clarified the concept and suggested the essential methodology of identifying over and under achievement, that investigators have been found showing a relatively clearer understanding of the phenomenon. There have also been quite a few studies exploring the non-intellectual factors entering into over and under achievement (Rao, 1963; Taylor, 1964; Gawronski, 1965; Morrison, 1969; Vanarasi, 1970; Dhaliwal, 1971; Maria, 1974; Agrawal, 1976).

Certain personality factors going with over and under achievement have been discovered but the results are equivocal and inconclusive. By and large over achievement has been found associated with good adjustment, superior
study habits and emotional stability, and under achievement with poor personal and social adjustment, poor study habits and emotional instability.

The fact, however, that the conclusions derived from these studies are not consistent with each other and sometimes are even conflicting, leads one to believe that there is much room for further exploration in the field.

In the first place the studies mentioned above have derived over and under achievement from the total achievement scores of the subjects with the implied assumption that the total achievement scores represented the levels of subjects' abilities in different school subjects, when there is no doubt that students' achievement in different subjects is not uniform enough to be represented by any statistical averaging process. Achievement in one subject may not be the same as in another.

There is sufficient empirical evidence to suggest intra-individual differences observed in academic attainments in various school subjects (Cooks, 1941; Blair, 1956; Anastasi, 1958). The findings indicate that a high or low achiever in any one subject is not necessarily high or low achiever in all the other school subjects.

It also stands to reason to believe that individuals' differential involvement with different school subjects has, along with other causal factors, a temperamental bias. Hence
students over achieving or under achieving in different scholastic streams might show quite varied clusters of personal and temperamental characteristics.

Ridding (1966) for example found over achievers in English more dominant and extroverted and in Arithmetic more surgent than the under achievers. Over achievers in science were found by Saxena (1972) to be more adjusted than the under achievers, and in Abraham's study (1974) over achievers in English proved to be superior to the under achievers in personal and social adjustment.

There is, however, a relative paucity of work in the area of over under achievement in different school subjects. Even the researchers who have directed their studies to exploring over and under achievement in school subjects have left many questions unanswered.

One basic question of generality or specificity of over and under achievement, that is, whether over and under achievers in one subject area are respectively over and under achievers in other subject areas as well does not seem to have interested investigators in the field. Besides, with very few exceptions, personality characteristics have been related to over and under achievement within a subject, rather than over the whole spectrum of an individual's achievement in various subject areas.
There is also a dearth of studies on sex differences in over and under achievement, particularly in relation to different school subjects.

In view of the above discussion and following the lead given by early workers in the field whose investigations took into account SQs and SRs and AQs, it may be hypothesised that over achievement in different school subjects when seen in relation to personality characteristics might yield differential results.

The present investigation, therefore, proposes to explore certain personal factors that would possibly be associated with over and under achievement in four different school subject areas, namely, Hindi, English, Mathematics and Science.

The study also aims at investigating sex differences along different personality dimensions in relation to over and under achievement in each of the four selected school subjects. This proposition too derives upon certain empirical findings evidencing sex differences in temperamentally biased aptitudes for specific scholastic areas. Boys have been found showing interest in school subjects some times quite different from the ones girls are interested in (Tyler, 1965).

Though the gulf of difference in personal and academic
areas between the two sexes has been found narrowing down, yet quite understandable amount of difference is still available (Turner, 1971; Johnson, 1972), and more so in factors of personality (Douvan and Adelson, 1966). Thus the probability of difference along certain personality characteristics in relation to over and under achievement in different subject areas between boys and girls can reasonably be studied.

Thus, stating rather precisely, the specific objectives of the present investigation would be:

i) To identify the differential personality factors going with over and under achievement in each of the four subjects selected for the study, Hindi, English, Mathematics and Science, among the male and female subjects separately.

ii) To investigate sex differences within the groups of over achievers and under achievers in individual subject areas along different personality dimensions.

iii) To determine whether over under achievement is a general phenomenon or a specific one with reference to different school subjects.

In view of the above discussion and in the light of research evidence discussed in Chapter II, the following working hypotheses were formulated:
1. Over and under achievers in different subjects would possess different combinations of personality characteristics.

2. Boys and girls would reveal differences along personality characteristics within the groups of over and under achievers in each of the four selected knowledge areas, Hindi, English, Mathematics and Science.

3. Over and under achievers in one subject will not necessarily be over and under achievers in all the other subjects, and there will be very small 'common proportion' along different school subjects. Over and under achievement is, therefore, expected to be specific with specific subjects.