CHAPTER -II

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CONCEPT OF ACADEMIC ACHIEVEMENT

Academic achievement generally refers to the degree or level of success or that of proficiency attained in some specific area concerning scholastic or academic work. In view of the several authors such as Good (1956, p.7) and Biswas and Aggarwal (1971, p.2), there seem to be considerable similarities in as much as all of them place emphasis on knowledge attained or skills developed in the academic subjects and usually designated by test scores. It is different from proficiency in the areas of different arts or physical skills. Academic or educational age, accomplishment quotient or achievement quotient are the most commonly used means to interpret the 'level' of academic achievement of pupils in general or in specific given subject matter.

The justification of measuring academic achievement is based on two fundamental assumptions of Psychology, namely, there are differences within the individual from time to time, known as behavioural oscillations, that is, academic achievement of the same individual differs from time to time, from one class to another and from one educational level to another. Besides, there are individual differences. Individuals of the same age group, same grade and of the same potential ability usually differ in their academic proficiency, whether measured by standardized measures of achievement or by teachers' grading or by marks obtained in tests and examinations. Hence, the concept of over- and under-achievement has come into existence.
CONCEPT OF OVER-AND UNDER-ACHIEVEMENT

Research evidence indicates that the concept of over- and under-achievement is not of recent origin. It can be traced back to about four decades earlier. But then this concept was not such emphasized. It, however, emerged out of observations made by statisticians and psychometricians due to the disparity between intelligence or native potential ability and the achievement scores.

This stand was supported by Eysenck and Arnold (1972, p.361) in their detailed Encyclopaedia of Psychology in which they have explicitly described that "where the intellectual level attained by a pupil is regarded as a yardstick for predicting scholastic success, departures from the performance expected are known as overachievement or underachievement." Overachievers would be characterized by higher achievement scores than predicted by their intelligence and underachievers would fall short of such expectations. Thus, these terms denote a discrepancy between expected and the actual performance and give no indication of scholastic success.

A somewhat similar connotation was given by English and English (1958, p.366) when they defined overachievement as "better performance than predicted from a measure of aptitude; specifically, receiving higher marks in school or making better scores on school achievement test, than predicted from a test of general intelligence or of academic aptitude." They (1958, p.570) further defined underachievement as "performance poorer than predicted from an aptitude measurement." Similar explanations have been given to the concepts of overachievement and underachievement by
Blishen (1969, p.518, 783) and Williamson (1939).

Holman (1973, p.398) in the *Dictionary of Behavioural Science* defined that an underachiever is "a person who does not perform as well as would be expected from known characteristics or abilities, particularly from measures of intellectual aptitude". Thorndike (1963) defined underachievement "as discrepancy of actual achievement from the 'predicted' value, predicted upon the basis of the regression equation between aptitude and achievement."

Pierce (1962), in his article about the bright achievers and underachievers, clearly mentioned that the "intelligence test score was underpredicting for those students above the regression line and over-predicting for those below the line."

Farquhar and Payne (1964) defined overachiever as the one who "exceeds an aptitude-based expectancy of academic performance", and an underachiever is the one who "falls below his expected performance."

Simpson (1970) also made a study of 'overprogressing' and 'underprogressing' students. The use of these terms was made in respect of over- and under-achievers. Wills (1969) used the term 'vulnerable child' as a "youngster whose IQ is generally in the normal range or above, but who is not achieving up to his full academic potential because of anyone or a number of dysfunctions."

The term over- and under-achievement should not, however, be confused with the terms of "high-low achievement". According to most of the studies, 'high achiever' is one whose average total achievement score lies in the top quartile or whose total
achievement score is above Mean + SD and the 'low achiever' is the one who falls in the bottom quartile or whose total achievement score is less than Mean-SD. Accordingly, an individual may be high achiever but underachiever or low achiever and still overachiever and vice versa. Gilmore (1968) has cautioned us against often confusing low achiever with the underachiever as has been done by Goff (1970).

Overview of the above discussion shows that there seems to be considerable agreement as to the definition of over- and under-achievement. Yet the phenomenon may acquire varied forms of over- and under-achieving behaviour. Allen (1964) rightly pointed out that the concept of underachievement, though widely used and researched, is yet ill-defined since under-achievers are explained merely in terms of the discrepancies between their predicted and earned grades. Such a classification is said to produce groups which are too heterogeneous to be psychologically meaningful. And the same is true of the overachievers. Thus, there is a need to differentiate over-achievers and underachievers at different ability levels.

Cipperly (1969) made a similar attempt to refine the concept of underachievement through an investigative case study. He studied the potentially effective but low performing college students and reached the conclusion that there was not one type, rather a variety of types or forms of underachieving behaviour. In that investigation, he classified the behaviour into four forms as 'chronic', 'situational', 'transitional' and 'masked or hidden' under-achieving behaviour. This highlights the fact that the concept of underachievement is not
a static one, rather time, persistence and situational factors are important in distinguishing between different forms of under-achievement even on the same level of ability.

APPROACHES TO IDENTIFY OVERACHIEVERS AND UNDERACHIEVERS

Numerous attempts have been made by various researchers to identify over- and under-achievers as is evidenced by the research literature in this field. Such attempts made to identify over- and under-achievers have revealed the possibility of employing different approaches or techniques in this regard. Farquhar and Payne (1964), on the basis of reported research literature in the field, have classified the techniques of identifying over- and under-achievers under four main categories, that is, (i) central tendency splits; (ii) arbitrary partitions by eliminating the middle group; (iii) relative discrepancy splits and (iv) regression model selection. In more simple terms, these can be classified as below:

(i) regression equation method; (ii) percentile method; (iii) percentage difference method; (iv) index of achievement method; (v) inventories and batteries used to identify over- and under-achievers; (vi) stanine method; (vii) ranking method; (viii) percentage position method; (ix) grade placement deviation method; (x) grading method and (xi) teachers' rating method.

Regression Equation Method

It is very popular and is considered to be the most scientific method cherished in modern times. Here the regression of
the criterion variable is seen on predictor variable. The criterion variable may be in the form of grade point averages (GPA), examination marks or score earned on omnibus achievement test in one or two or more school subjects. With the help of regression equation, achievement of one form or the other, is predicted on the basis of intelligence. A cut off point is arbitrarily decided by the investigator and those whose predicted achievement is less than actual achievement are termed as achievers or overachievers and those whose predicted achievement is greater than actual achievement are termed as underachievers.

Thorndike has stressed this method in his monograph (1963, p.45). He observed: "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 scores for individuals at any given aptitude level." He further said that this predicted value is an unbiased estimate of an individual's achievement. However, he has cautioned about four sources of errors while making predictions about achievement on the basis of intelligence. They are (i) errors of measurement, (ii) heterogeneity of the criterion of achievement, (iii) limited scope in the predictors, that is, prediction cannot be based on all possible determiners of achievement, and lastly (iv) the impact of varied experiences upon the individual during the time gap between prediction and the maturity of the criterion measure.
This technique of regression equation was followed by several workers in this field. Farquhar and Payne (1964) developed 'Two-Step Regression' technique to identify over- and under-achievers in connection with a project sponsored by U.S. Office of Education. Overachievers were those individuals whose grade-point average fell one standard error of estimate above the regression line and underachievers were designated as those whose grade-point average fell one standard error of estimate above the regression line. Earlier the technique used by DuBois (1948) is quite similar to it.

Morrison (1967) identified achievers and under-achievers from prediction of grade point averages (GPA) based on intelligence quotient. A regression equation was derived and a standard error of estimate was computed. Achievers were those who were placed within plus or minus one-half standard error of estimate and the underachievers were placed below minus one-half standard error of estimate. Research was, however, limited to those of average and above average aptitude, that is, those with intelligence quotient below 95 were not included in the sample.

Oakland (1968, 1969) in his two different studies identified oversachievers and undersachievers on the basis of discrepancy between obtained GPA and predicted GPA from the regression of GPA on DAT (Differential Aptitude Test).

O'Shea (1966) identified academically bright oversachievers and undersachievers of 7th, 8th and 9th grade boys. Individuals for whom actual grade average was one standard error of estimate or more above predicted grade average (predicted on the basis of
Otis Pete Scores) or one standard error of estimate or more below predicted grade average were designated as high and low achiever respectively.

Another significant study was done by Carwise (1968) Junior high school subjects were identified as overachievers and under-achievers. IQ and GPA were used as a regression equation to forecast the most likely GPA of each student when prediction was based on IQ score. Students whose actual GPA fell at least one SE of estimate above or below the regression line prediction of achievement were identified as overachievers and underachievers respectively. They were further divided into which third of the distribution contained his IQ score. Upper third contained high ability over- and under-achievers, middle third contained average ability over- and under-achievers and the bottom third of the IQ distribution contained low ability over- and under-achievers.

Jackson et al. (1969) identified fourth grade underachievers through regression equation and divided them into experimental and control groups.

Almeida (1969) identified third grade pupils as over-achievers, average achievers and underachievers on the basis of the difference between actual and predicted mean grades on the final examination. Prediction was made on the basis of regression equations and the cut off points between the three levels of achievement were arbitrarily set at .67 standard error of estimate.

Riggs (1970) studied non-intellectual associates with differential levels of academic over- and under-achievement. Academic over- and under-achievers were identified as those
whose fall semester, 1969, actual GPA exceeded (oversachievers) or fell below (underachievers), their predicted GPA by $\pm$SE of the estimate or more.

Arndt (1971) also used regression model selection technique to differentiate the three levels of achievement. Plus and minus one SE of estimate were used as the dividing points.

Besides, Peters (1968), Pierce (1962) Diwan (1970), Perkins (1965), Dhalwal (1971), Simons and Bibb (1974) and many others utilized this very approach to identify different levels of discrepancy scores between predicted achievement and actual achievement.

Percentile Method

Use of this method requires the calculation of percentiles for both intelligence scores and achievement scores. Then the differences between the percentile ranks on achievement and intelligence are worked out with due consideration to the algebraic signs. A cut off point is arbitrarily set up by the investigator and those students whose academic scores are above their intelligence scores according to that cut-off point, are regarded as oversachievers and conversely the underachievers are those students whose academic scores are below their intelligence scores according to that cut-off point.

First systematic use of this method was made by Gowan (1960) he identified gifted underachievers with an IQ of 130+. According to this method the percentiles for both achievement scores and intelligence test scores were calculated. Those students whose academic scores were 30 percentile or more below their intelligence
scores were identified as underachievers. Alike procedure was followed by Mohan (1972).

Tamagini (1969) compared local intelligence percentile bands with local achievement percentile bands for each potential subject to classify them into achievers and underachievers. Achievers and underachievers were defined by a discrepancy between measured ability and measured intelligence in the form of percentiles.

Kisch (1968) used this method in a somewhat modified form. He selected two groups of students. One group of students represented those whose grades were significantly below those predicted by their verbal score on the scholastic aptitude test (underachievers) and the other with identical verbal aptitude but whose freshman grades were above 50th percentile (oversachievers).

Partial use of this method was made by Angelino and Hall (1960), Shaw and McCuen (1960) and Short (1968). Short used percentile method to stratify two groups on SCAT scores. Those scoring at the 75th percentile or above were classified as high ability group and those who scored at the 25th percentile or below were placed in the low ability group. The two groups were further divided on the basis of high school achievement and college attendance.

Frankel (1960) identified an achiever as a "student in the top or first quartile of his class with a scholastic average of at least 89 per cent for the 10th and 11th years. And the underachiever was identified as "a student in lowest or fourth quartile of the same class with a scholastic average of 79 per cent or less."
Percentage Difference Method

Another convenient approach which is sometimes resorted to is the percentage method. Here the percentages of scores on both achievement test and intelligence test are calculated. Then the difference between achievement and intelligence in terms of percentages is worked out and if the difference is significant at any arbitrarily decided level, for example, .05 or .01 then the subjects are identified as overachievers and underachievers. Gupta (1969) made use of this method. He converted raw scores of intelligence and achievement into percentages. Differences between them were worked out. Mean ± 1.96 SEM were the cutting points beyond which were identified over- and under-achievers.

Index of Achievement Method

This method consists of calculating the ratio of achievement scores to intelligence scores when both are converted into T-scores. Joshi and Sharma (1967) used this method. They converted intelligence and achievement scores into T-scores and calculated the index of achievement by the formula TA (ACH) divided by TI (Int). If index of achievement was > 1, subjects were designated as overachievers; and if < 1, then that indicated underachievement. To get the exact limits of overachievers and underachievers, the significance of mean of indices was determined. Mean ± 1.96 SEM referred to the limits of the normal group of students. Gupta (1969) also used this very method to compare different criteria of identifying overachievers and underachievers.
Inventories and Batteries

Some investigators have constructed objectively scoreable inventories and test batteries to identify overachievers and underachievers quickly. Johnson (1969) developed and cross validated objectively scoreable true-false inventory which distinguished overachievers and underachievers and high ability par achievers from low ability par achievers from their self-reported behaviour. The inventory scores designated overachievers, underachievers, high ability par achievers, middle ability par achievers and low ability par achievers on the basis of comparison of their standardized ability scores and grade point average scores. Johnson (1971) developed learning disabilities battery of 12 subtests to discriminate between high and low achievers.

Stanine Method

Stanine method may be used in the form of 'stanine difference method' or 'stanine ratio method'. In both the methods achievement scores and intelligence scores are computed in terms of stanines. Stanine difference method was used by Davis (1964) and Thomas (1969). In Thomas's study, academic overachievers and undersachievers were determined by placing aptitude scores (Hemann-Nelson Test of Mental Ability) and grade point average (English, History, and Mathematics) in stanine scales. Those students whose grade stanines were two or more stanines beyond their mental abilities were designated as overachievers. Average achievers were those students whose grade stanines were within two stanines of their mental abilities stanines. And those students whose grade stanines were two or more stanines below their mental abilities stanines were classified as undersachievers.
Ranking Method.

Here the ranks in class achievement are used to identify over- and under-achievers. But ranks in themselves do not tell anything about over- and under-achievement unless and until it is compared with scholastic aptitude.

Flaugher (1969) used an iterative multiple moderator approach to the identification of over- and under-achievers. They used two criteria as predictors of academic achievement, that is, high school ranks and short forms of scholastic aptitudes.

Weldon (1971), in his study, emphasised the fact that the best single predictor of academic success was 'rank' in high school class.

Muthayya (1962) classified first five ranks in the final promotion examination as overachievers and last five ranks as underachievers while taking the sample of VIII, IX and X classes with no difference in intelligence between the high and low ranking students. This classification speaks of high and low achievers instead of over- and under-achievers.
Percentage Position Method

Similar to 'Percentage Difference Method' is percentage position method. According to this approach over- and under-achievers are identified by comparison of their percentage position with regard to achievement and intelligence.

Goldberg and associates (1959) made a first systematic attempt to use this method. They defined underachieving gifted as those having IQs above 120 and whose grades were below 80% of the class standing.

Dehaan and Haringhurst (1961) studied the gifted under-achievers. They defined them as those whose capacity is in the upper 10th or quarter of their class but whose grades were average or below average.

Seiden (1969) studied the low achievement of high ability students. Subjects were selected on the basis of their high scores in the top 15 per cent of the population on the same intelligence level. Criterion score was an arithmetic average of grades earned in academic courses.

Simpson (1970) discriminated between underprogressing and overprogressing students. Underprogressing group consisted of all the senior boys who ranked in the upper quintile of their class on the basis of grade point average for grade XI, but who did not rank in the upper quintile on the basis of IQ.

Watte (1970) identified the top 20 per cent of the senior boys on the basis of IQ and the top 20 per cent on the basis of GPA. Those who appeared on both the lists were considered as
normal achievers. Those who were in the upper 20 per cent on IQ but not in the upper quartile on GPA were designated as underachievers and vice versa for overachievers.

Grade Placement Deviation

This method means the discrepancy between the actual grade placement and the expected grade placement of the student. Those who are placed in grade lower than expected are identified as underachievers and those who are placed in grade upper than the expected are discriminated as overachievers. Holmes and Finley (1957) developed a formula to find out grade placement deviation (GPD).

\[
GPD = AGP - (CaGP + K)
\]

Where:
- \( AGP \) = Actual grade Placement.
- \( CaGP \) = Grade placement expected from chronological age.
- \( K \) = A constant = 5.0 (to give all GPD value a positive sign).

Grading Method

While applying this partially qualitative approach grading of A, B, C and so on in different academic subjects is compared with students of a particular ability range. For example, if a student belonging to a superior ability range gets a C grading, he is identified as an underachiever. Birr (1969) in his study used this method to identify underachievers who were drawn from the total number of approximately 1300 students. The population
was refined to include only 120 students who achieved a C level GPA at the end of first grading period in mathematics, language, social studies and arts and whose IQ ranged from 89 to 137.

Teachers' Rating Method

This is one of the valuable qualitative techniques to identify overachievers and underachievers. Teachers have face-to-face intimate contact with their students and their ratings can be invaluable to spot out overachievers and underachievers, particularly the latter. Teacher's ratings can be in the form of report cards also.

Dwe (1968) laid lot of importance on this tool as a significant one to identify overachievers and underachievers.

Swift and Spivock (1969) showed that underachievement is depicted not only through achievement scores but is also evident in his broader functioning in the classroom and as the teacher is with the student for a significant quarter of the day, she observes all such type of behaviour.

Olsen (1969) sorted out underachievers as those who were identified as underachievers by their teachers and also who scored two months or more below grade level on a standardized achievement test.

Edwards (1969) used three criteria to identify three levels of achievement, that is, over, average and underachievement. The criteria used were (i) Otis Quick Scoring Intelligence Test, (ii) California Achievement Test and (iii) Teacher's evaluation of the students. Teachers identified underachievers as having
less than 'C'; average achievers as 'C' grade students and
oversachievers as 'B' or above. Teachers' evaluation and
achievement test results had to agree in order for a student
to be retained in the sample population.

Helfenbein (1970), however, has cautioned against the
use of teachers' judgement alone as it was not found to be
a reliable predictor of achievement performance of either
boys or girls. Any way, if this method is used as supple-
mentary to some other scientific and objective method, it
can prove to be effective.