A STUDY OF THREE GROUPS OF COLLEGE PREPARATORY STUDENTS WHO DIFFER IN RELATIVE ACHIEVEMENT

A Dissertation

Presented to

the Faculty of the School of Education

the University of Houston

In Partial Fulfillment

of the Requirements for the Degree

Doctor of Education

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by

Carl Eugene Reed

August 1955

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The purpose of this study was to identify traits which are characteristic of three different groups—overachievers, achievers, and underachievers. These groups were defined by comparing the ranks of students on standard achievement tests with their ranks on intelligence tests. The population from which the three groups was drawn consisted of 151 students of grades nine, ten, and eleven in a private preparatory school in Houston, Texas.

Data were gathered from school records, scores on intelligence and reading tests, scores on the Kuder Preference Record and the Mental Health Analysis, responses to questions on the Student Check List, and ratings from a Teacher's Rating Scale. Differences between the overachiever, achiever, and underachiever groups were located by studying the means of scores of the separate groups and the distributions of extreme scores.

The overachiever, achiever, and underachiever groups were found not to differ significantly in age, school attendance, grade points earned, or number of subjects carried.

Significant differences found show that the overachiever group contains nearly twice as many girls as boys,

has less general intelligence and language ability than the other two groups, shows evidence of sensitivity to psychological pressures, and is rated high by teachers in areas of home and class work, class habits, attitudes toward people, and attitudes toward school. The underachiever group contains more than twice as many boys as girls, has relatively high general intelligence and language ability, seems not disturbed by psychological or social pressures, is rated by teachers high in mental alertness and low in conformity to patterns of behavior prescribed for the school. The achiever group has an intermediate position between the extremes represented by the overachiever and the underachiever groups in respect to most of the traits investigated.

Conclusions reached in this study add to the understanding of groups in which the members have achievements differing significantly from their levels of ability.

ACKNOWLEDGMENTS

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CHAPTER I

INTRODUCTION

Among the many perplexing problems facing teachers, supervisors, and administrators is the complex and frustrating one of the student whose achievements seem always to lag behind his apparent level of ability. Many educators wonder why this should be when they also observe another in the same class whose achievements seem always to be better than his ability. Such observed disparities between measured achievements and abilities lead to the pronouncement of hypotheses and the study of some of them. However, there remain many problems to solve in the areas of discovering and evaluating the factors associated with these disparities.

1. THE PROBLEM

Statement of the problem. This problem is an attempt to discover some of the significant trait differences between three groups of students selected by comparing their scholastic achievements as measured by standardized achievement tests with their scholastic abilities as indicated by their scores on intelligence tests.

Significance of the study. Most educators would like to know more about these factors which are associated with

success in school subjects. Some of these factors are fairly obvious but perhaps oversimplified. "Poor work habits" may accurately describe the able student who fails to achieve. "Good steady plugger" may fit the student with low intelligence scores and a good school record. However, these phrases do not refer to specific traits or to an accurate appraisal of the differences between such students. Consequently, administrators and teachers have difficulty in employing devices to stimulate the student who does not achieve. Perhaps they are even less effective in guiding students with scholastic success and low abilities from ambitions which seem presently to be warping the students' development or to presage eventual major failures. This study aims to point out some of the differences which seem definitely enough connected with achievement to warrant action by teacher and administrator.

Major premises. Students may be separated into three groups: overachievers, achievers, and underachievers. Each group differs significantly in certain traits from the other two groups. These differences will show up in data taken from tests, grades, rating scales, check lists, and other devices.

2. DESIGN OF STUDY

<u>Population to be studied</u>. The subjects of this study
are the students of the ninth, tenth, and eleventh grades
of a private preparatory high school in Houston, Texas. All
students of this school are preparing for eventual matricu-
lation at some college. All are enrolled in at least four
courses from the subject areas of English, mathematics, his-
tory, foreign language, and science. Only those students
whose records are complete enough to furnish data for the
study are included.

<u>Data to be used</u>. Test results and other data used
are all recent, having been collected over the past two
years. All data are included in the records of the school.

<u>Ranking</u>. Students within each grade will be ranked
by examining their scores on intelligence tests. The one
with the highest score will be ranked number one, second
highest number two, and so forth. In the event that two or
more students have the same score, they will be assigned a
rank equal to the average of the ranks which would have
been assigned to an equal number of students if the scores
had been different.

The same sort of ranking of students will be made
from the scaled scores of the Cooperative Tests in each of
two subject-matter areas, English and mathematics.

Index of relative achievement. The achievement rank
of each student in each subject will be subtracted from the
intelligence rank of that student. The differences found
will be considered indices of relative achievement. A
positive difference will be considered an index of over-
achievement and a negative difference an index of under-
achievement. A combined index of relative achievement will
be calculated by adding the two indices found.

Isolation of groups. In order to establish the three
different student groups and to separate them adequately
from each other, each class group will be divided into five
approximately equal subgroups according to the size of the
combined relative achievement indices. Thus, the twenty per
cent of the group whose indices are most positive, and the
twenty per cent whose indices are smallest, and the twenty
per cent whose indices are most negative will be separated
by two groups: the twenty per cent whose relative achieve-
ment indices are small and positive, and the twenty per cent
whose indices are small and negative.

Factors to be studied. The three groups thus defined
will be studied statistically in order to determine signif-
icant differences in these areas:

1. Age in months.
2. Boy-girl proportion.
3. Intelligence quotient.
4. American Council on Education Psychological Exam-
     ination for High School Students.
        a. Language scores (grades 9, 10).
        b. Quantitative scores (grades 9,10).
5. Reading scores from the Cooperative English Test
     C_1, Reading Comprehension (grades 10, 11).
6. Grade points.
7. Number of subjects carried.
8. Attendance.
9. Teacher's Rating Scale.
10. Student Check List.
11. Kuder Interest Inventory (grades 10, 11).
12. Mental Health Analysis (grades 10, 11).

3. DEFINITION OF TERMS

Relative achievement index. This term is defined as
the difference obtained by subtracting the rank of a student
on a given achievement test from his intelligence rank. The
proper algebraic sign is retained to indicate the direction
of the difference.

Combined relative achievement index. This term is
defined as the algebraic sum of the relative achievement
indices in English and mathematics. For each student, this
term is a measure of the relationship between his intelli-
gence and his achievement in two scholastic subjects.

Achievers. In this study the achievers are the members of the twenty per cent of each class whose combined relative achievement indices are smallest.

Overachievers. These students comprise the twenty per cent of each class whose combined relative achievement indices have the largest positive values.

Underachievers. These are students in that twenty per cent of each class whose combined relative achievement indices have the largest negative values.

Significant differences. Differences discovered between groups shall be considered significant if those differences could have occurred by chance alone no more than five times out of one hundred.

Other terms. All other terms used will be consistent with the definitions found in Good, Dictionary of Education.

4. ORGANIZATION OF REPORT

In addition to this chapter this report consists of six additional chapters, a bibliography, and an appendix.

Chapter II contains summaries of representative studies, several of which present findings of factors operating to influence achievement. Other studies reported are

more closely associated with factors of relative achievement as investigated in this study.

Chapter III defines the most important areas to be covered within the scope of the study.

Chapter IV reviews the principal procedures used in handling data, ranking students, and separating the groups to be studied.

Chapter V describes the statistical theories and formulas used in the treatment of the data of the problem.

Chapter VI contains the results of the study, that is, the evidence of trait differences between the groups and the degrees of confidence which may be placed in the observed differences.

Chapter VII consists of a summary of the trait differences discovered, a discussion of the values of the instruments used, and a presentation of some of the challenging implications.

The Appendix contains copies of the Student Check List and the Teacher's Rating Scale.

CHAPTER II

REVIEW OF LITERATURE

Since this particular problem is concerned with achievement generally and relative achievement specifically, some review of these areas is deemed advisable.

It is perhaps unnecessary to develop the concept of achievement. As a general idea it has been an ever present feature of our culture--related to such divergent criteria as social position, personal wealth, and practical usefulness. In the field of education, achievement has come to mean an acquired characteristic reflecting an ability, capacity, or tendency to do something. This concept is quite clearly differentiated from intelligence which is considered an in-born ability or capacity.

Generally, attempts to measure these capacities make use of performances on a test or tests so constructed that an achievement or intelligence status of a person can be inferred from the observed results. Neither capacity nor ability can be measured directly since each consists of a complex human factor involving both heredity and environment. However, both are deemed susceptible of indirect measurement, usually by tests.

Because the abilities involved are indirectly eval-
uated, their measures have been related to the measures
obtained from normal groups rather than to an arbitrary
scale starting at zero. This fact does not restrict their
usefulness in making comparisons between individuals or
groups or in making predictions about certain future per-
formances.

The comparison between individuals or between groups
is a study in individual differences. To some extent such
comparison also involves the idea of trait differences,
since an individual seems never to be possessed of all
traits in equal amounts.

Galton is considered to have initiated studies of
the problems of variability in human nature. A compara-
tively recent review of studies of individual differences
by Ellis[1] led to his conclusion that "laws" governing vari-
ability were complex and could not be summarized in a few
simple statements. Wechsler's work[2] pointed out that in-
dividual differences are real and important but not as great

[1]R. S. Ellis, "The 'Laws' of Relative Variability of
Mental Traits," Psychological Bulletin, 44:31-33, January,
1947.

[2]David Wechsler, The Range of Human Capacities
(Baltimore: Williams and Watkins), 1935, p. 155.

as has been assumed. Traxler[3] noted three generally accepted assumptions: (1) few individuals have equally strong aptitudes in all directions, (2) individuals differ from one another in every aptitude, both broad and specific, and (3) differences among individuals and within an individual tend to persist.

There is general agreement that groups vary widely in achievement and that these variations frequently do not coincide with like variations in intelligence. Travers,[4] after reviewing one thousand studies of attempts to predict achievement, concluded that contributions of these studies are small. He further observed that tests are based on the assumption that an individual's own characteristics are responsible for his success and that a person with the right aptitudes will succeed when actually, in our society, unplanned events shape whole careers and are outside the domain of tests. He cited the need of knowledge about the extent to which commonly occurring variations in the student's environment affect the achievement of various outcomes.

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[3]Arthur E. Traxler, Techniques of Guidance (New York: Harper and Brothers), 1935, pp. 43-44.

[4]R. M. W. Travers, "Prediction of Achievement," School and Society, 70:293-4, November, 1949.

Some of the possible variations which have been studied are physical. As an example, Jenkins[5] found that the visual performance of a group of boys was as closely associated with school success as was their scores on the Primary Mental Abilities Test. He did not find such an association for the group of girls he studied.

Many studies such as that of Ames[6] report correlation of aptitude tests and scholastic achievement. She found a correlation of .54 between the Otis Test and school achievement and one of .72 between the Otis Test plus a thirteen-trait rating scale and school achievement. From a factorial study of fifteen variables she studied she obtained two factors: one, the ability to succeed socially which was not connected with scholastic achievement, and the other, the ability to conform to school situations which was directly related to school situations which was directly related to school achievement.

In a factorial study of eighty-eight women psychology

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[5]N. C. Jenkins, "Visual Performance and Scholastic Success," School Review, 61:544-7, December, 1953.

[6]Viola C. Ames, "Factors Related to High School Achievement," Journal of Educational Psychology, 34:235-36, April, 1943.

students, Carroll[7] concluded that tests of verbal knowledge and reasoning ability make independent contributions to the prediction of scholastic success. This conclusion has considerable corroboration. Chein[8] found that verbal tests were the most satisfactory for differentiating between good college students and poor ones. Holzinger and Swineford[9] found that the "general" or g-factor common to many tests was a better predictor of success in plane geometry than IQ, but not as good a predictor of English achievement. In another study designed to find significant differences between boys and girls in mathematics, Houlahan[10] carried out a factorial analysis of several factors and also made a comparison of his results with those of three previous studies. He found that the boys of his population made achievements significantly greater than girls, at the same

[7]J. B. Carroll, "The Factorial Representation of Mental Ability and Academic Achievement," Educational and Psychological Measurement, 3:330, Winter, 1943.

[8]Isidor Chein, "An Empirical Study of Verbal, Numerical, and Spacial Factors in Mental Organization," Psychological Record, III:91-94, January, 1939.

[9]K. J. Holzinger and F. Swineford, "The Relation of Two Bifactors to Achievement in Geometry and Other Subjects," Journal of Educational Psychology, 37:264, May, 1946.

[10]F. J. Houlahan, "Secondary School Boys' and Girls' Achievement and Intelligence," Catholic Educational Review, 51:298, May, 1953.

time inferring that "the evidence seems to indicate that boys and girls are not really doing the same thing, when they are taking these tests."

In an earlier study Embree[11] reached the conclusion that high school success cannot be more accurately predicted for students of one level of intelligence than it can for those of the two other levels he studied. He did note the tendency of inter-relationships to be less decisive in cases of pupils above the 130 IQ.

Acceleration or non-acceleration in school was not a significant factor in the academic achievement of gifted students according to the results of Justman's research.[12]

In a rather searching investigation of many potential factors, Anspaugh[13] studied 165 superior students and 165 inferior students. He found significant correlations of only a few factors with scholarship. Among factors showing no significant correlations were attendance at religious services, membership of parents in PTA, social clubs, or

[11]R. B. Embree, "Predicting High School Success at Various Levels of Intelligence," Journal of Educational Psychology, 28:90, January, 1937.

[12]Joseph Justman, "Academic Achievement of Intellectually Gifted Accelerants and Non-accelerants in Senior High School," School Review, 62:473, November, 1954.

[13]G. E. Anspaugh, "Qualities Related to High Scholarship in Secondary School," School Review, 61:337-40, September, 1953.

religiously affiliated groups, available quiet study place at home, and home life with one or neither parent. Dating was only slightly more common with the inferior students who also were absent more often and held more paying after school jobs. More superior students were engaged in school service. The most significant correlation was found between hours of school work at home and school marks.

Another effort to find relationships between non-intellectual factors and high school achievement was McQuary's work.[14] In a factorial analysis of twenty-three non-intellectual variables in a population of male freshmen at the University of Wisconsin, only two types of variables were found to be necessary to account for grade points earned by freshmen. One type of factor was made up of pencil-and-paper tests and rank in high school class. The other group of factors found to contribute somewhat to predicting success consisted of high school rank, size of community, high school extra-curricular participation, and high school grades. Such factors as the occupational level of the student's father proved to be unrelated to success in college freshman work.

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[14]J. P. McQuary, "Some Relationships Between Non-intellectual Characteristics and Academic Achievement," Journal of Educational Psychology, 44:226-28, April, 1953.

A study completed by Gough[15] included an item analysis of the Minnesota Multiphasic Personality Inventory. He found that thirty-four of the items correlated .43 with Honor Point Ratio, leading to the conclusion that responses to these items can contribute significantly to the prediction of academic success.

A statistically sound psychological study conducted by Cattell[16] led him to a pertinent conclusion:

> Actual experience and statistical treatment show that no one factor can account for more than a small fraction of the total causation of individual differences and the magnitude of that fraction can be put beyond verbal dispute by precise calculation.

As shown by a later study, Cattell[17] continued to search for and define such factors as might be associated with ability. He found three personality factors associated with mathematics ability and three with verbal ability. In addition he made the basic observation that:

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[15]Harrison C. Gough, "Factors Relating to the Academic Achievement of High School Students," *Journal of Educational Psychology*, 40:75, February, 1949.

[16]R. B. Cattell, "Interpretation of the Twelve Primary Personality Factors," *Character and Personality*, 13:89, March-June, 1944.

[17]R. B. Cattell, "Personality Traits Associated With Abilities," *Journal of Educational Psychology*, 36:486, November, 1945.

Interrelations of abilities and personality traits proceeds causally in both directions, and with direct and indirect connections. Temperamental interests and aversions develop abilities in their service. Abilities favor certain kinds of dynamic adjustment.

Schulz and Green[18] reported some success in predicting academic achievement with the results of an attitude-interest questionnaire intended to measure non-intellectual factors associated with academic achievement in college. A cross validation of the instrument yielded low positive correlation coefficients suggestive of a limited but stable relationship.

A more recent study by Brown and Holtzman[19] showed that a study-attitude questionnaire may have unique predictive value for academic achievement. The instrument they used proved to be only slightly related to scholastic aptitude but definitely related to achievement.

A clinical approach focussed primarily on understanding the problem of underachievement as a whole was reported by Kimball.[20] After working with twenty boys with

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[18]D. G. Schulz and B. G. Green, "Predicting Academic Achievement with a New Attitude-Interest Questionnaire," Educational and Psychological Measurement, 1:64, January, 1953.

[19]W. F. Brown and W. H. Holtzman, "A Study-attitude Questionnaire for Predicting Academic Success," Journal of Educational Psychology, 46:83, February, 1955.

[20]Barbara Kimball, "Case Studies in Educational Failure During Adolescence," American Journal of Orthopsychiatry, 23:415, April, 1953.

high IQ's and low levels of scholastic achievement at a private preparatory school, she concluded that most of them had poor father-relationships, were passive and feminine, were unable to express negative feelings directly, and were more likely to have a history of asthma or hay-fever. In an earlier work the same author[21] used a sentence completion test and the Thematic Appreciation Test to study twenty preparatory school boys who were failing badly. The findings indicated poor relationships with the father and aggressive feelings as a source of anxiety and guilt.

Kurtz and Swenson[22] used test data, reports on interviews with teachers, parents, and the children themselves, together with classroom observations and newspaper clippings to identify factors in addition to measured intelligence which may be related to achievement. Though not supported statistically, they concluded that plus achievers generally had pleasant home lives in which the parents show interest in the children who, in turn, are eager to please their parents while the minus achievers have a less pleasant

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[21]Barbara Kimball, "The Sentence Completion Technique in a Study of Scholastic Underachievement," Journal of Consulting Psychology, 16:358, October, 1952.

[22]John J. Kurtz and Esther J. Swenson, "Factors Related to Over-achievement and Under-achievement in School," School Review, 59:478-80, November, 1951.

home atmosphere, are not anxious to please their parents, who, in turn, do not expect much of them. In addition, the plus achievers appeared to have more supportive peer relations, to be more alert and attentive, to show less aversion for book learning and home-work, and to have higher educational and vocational aims than the minus achievers did.

At the college level Owens and Johnson[23] found a somewhat different picture of adjustment in students. The group of underachievers they studied by an item analysis of the Minnesota Multiphasic Personality Inventory were characterized by good social adjustment, a fact which implied that social orientation and participation may account for the underachievement.

In a searching study of junior high school students, Cohler[24] used questionnaires, tests, ratings, and school history data to identify traits of the non-achievers of superior intelligence. He showed that levels of expectancy based on mental age were of little value for the bright

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[23]William A. Owens and Wilma C. Johnson, "Some Measured Personality Traits of Collegiate Underachievers," *Journal of Educational Psychology*, 40:43-44, January, 1949.

[24]Milton J. Cohler, "Scholastic Status of Achievers and Non-achievers of Superior Intelligence," *Journal of Educational Psychology*, 32:607-10, November, 1941.

child and that the bright child does not reach even the
limited objectives of standard achievement tests though
favored by high intelligence. Kindergarten attendance, fre-
quency of transfer, and acceleration were other factors
which had no significant effect on relative achievement.

Gowen[25] made a later study of the underachieving
gifted child which supports conclusions already cited in
this chapter. The gifted underachiever he describes has
traits of being self-sufficient and unsociable, harder to
reach, and benefitted less from exposure to normal social-
izing effects of his peers. He is also identified less with
his parents, who themselves tend to be less supporting of
him and his increased needs than is the case with over-
achievers.

SUMMARY

Numerous studies have been undertaken to establish
the factors predictive of relative achievement. Additional
investigations need to be conducted for the purpose of
isolating traits which are characteristic of overachievers,
achievers, and underachievers.

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[25]John Curtis Gowen, "The Underachieving Gifted
Child," Journal of Exceptional Children, 21:247-49, April,
1955.

CHAPTER III

THE SCOPE OF THE STUDY

Population of the study. Students included in this study were drawn from grades nine, ten, and eleven of a private, four-year high school. A major objective of this school is college preparation. Since entrance requirements of the school operate to exclude students of low scholastic aptitude and those with limited scholastic goals, this population is not in some ways representative of high school students in general.

Sample studied. All students in the three grades were studied excepting those who joined the student body during the year, those who were repeating a course, and those who were absent during the regular administration of one or more of the criterion tests. The resulting sample represents 84.5 per cent of the total membership of these classes. The representativeness of this sample is furnished in Table I, in which the registrations in the three classes and the sample are compared as to size, boy-girl proportions, mean ages, and mean IQ's.

Materials used. The criterion tests used were:

1. Otis Quick-Scoring Mental Ability Test, Gamma Edition, Form Em.

TABLE I

COMPARISON OF SAMPLE WITH POPULATION

Class		Boys	Girls	Per Cent Boys	Per Cent Girls	Mean Age	Mean IQ
1958	P*	31	28	52.5	47.5	175.4	113.1
	S*	26	25	51.0	49.0	174.2	111.3
1957	P	29	31	48.4	51.6	186.7	113.5
	S	24	28	46.2	53.8	186.4	113.2
1956	P	19	17	52.8	47.2	197.6	117.6
	S	16	12	57.2	42.8	197.6	120.8
Total	P	79	76	51.0	49.0	185.7	115.1
	S	66	65	50.4	49.6	184.6	114.2

*P - population

*S - sample

2. American Council on Education Psychological
   Examination for High School Students, 1948
   Edition.
3. Cooperative English Test. Test A: Mechanics
   of Expression.
4. Cooperative Algebra Test. Elementary Algebra
   through Quadratics.
5. Cooperative Algebra Test. Intermediate:
   Quadratics and beyond.
6. Cooperative Plane Geometry Test.

These tests are widely used; the Otis and American

Council on Education tests are considered valid tests of

scholastic aptitude and the Cooperative tests valid tests of

achievement in the areas indicated by their titles.

The reliability of the Otis Quick-Scoring Test, Gamma

Edition, Form Em, has been reported as .91.[1] The Cooperative

Elementary Algebra Test is said to have a reliability of

.883, the Cooperative Intermediate Algebra Test a reliabil-

ity of .896, and the Cooperative Plane Geometry Test a

reliability of .900.[2] While no reference could be dis-

covered in available literature concerning the reliabilities

of the American Council on Education Psychological Examina-

tion, 1948 High School Edition, or the Cooperative English

Test A, these have evolved from other forms whose reliabil-

ities are reported as very close to .90. The continued wide

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[1]Arthur S. Otis, Manual of Directions for Gamma Test,
World Book Company, New York, 1954, p. 5.

[2]Agatha Townsend, "The Cooperative Mathematics Test
Program," Educational Records Bulletin, 54:90, July, 1950.

use of these tests further reflects their stability.

Devices for studying trait differences. School records are the sources for such data as age, sex, attendance, grades, and number of subjects. Intelligence quotients were obtained from records of the most recent administration of the Otis Quick-Scoting Test of Mental Ability. Language and quantitative scores came from the American Council on Education Psychological Examination, 1948 High School Edition.

Experimental trials of three instruments, a Student Check List, a Teacher's Rating Scale, and a Mental Health Analysis provided additional data.

The Student Check List was devised to focus the attention of students on some areas which were considered, by the writer and fellow teachers, to have possible bearing on school success. "Self-Analysis" was inserted in the title because of the interest many students have shown in their own traits. The thirty-eight questions in this device required answers to be checked "yes" or "no". A copy has been placed in the Appendix.

The Teacher's Rating Scale was assembled by selecting from many similar studies, rating scales, check lists, pairs of words and phrases descriptive of traits which could

be arranged so that one of each pair would represent one
extreme while the second would represent the opposite ex-
treme, e.g., lazy - industrious. Forty-nine such pairs
were included. Ratings on a scale of one to five inclusive
were intended to furnish some estimate of forty-nine traits
for each student with the rating of one assigned to the ex-
treme deemed less desirable and a rating of five assigned
to the more desirable extreme. An example of this scale
has been included in the Appendix.

The stability of this rating scale was estimated by
using the test-retest method. One month after the rating
scales had been turned in, eighteen scales were distributed
to six different teachers with instructions to rate eighteen
students, not subjects of this study, who had been rated
previously by the same teachers. Thirteen of the scales
were returned. Ratings on them were compared with the orig-
inal ratings. Of the 637 possible ratings, 375, or 58.9
per cent, showed no change in rating; 230, or 36.1 per cent,
were changed one place on the scale; 30, or 4.7 per cent,
were changed two scale positions; and two, or 0.3 per cent,
were changed three places on the five place scale. While
these findings do not establish a definite reliability of
this scale, they do indicate that ratings taken from it tend
not to vary greatly.

Kuder Preference Record. The Kuder Preference
Record purports to measure interests in ten different areas.
These areas correspond to ten separate scales which are
designated outdoor, mechanical, computational, scientific,
persuasive, artistic, literary, musical, social service, and
clerical. Reliabilities claimed for these scales range from
.84 to .93.[3] Kuder Preference Record scores are interpreted
by referring to a profile sheet on which norms are tabulated.

Mental Health Analysis. The Mental Health Analysis
was devised to assess some of the functionally related
groups of symptoms of mental health. The reliability re-
ported by the authors is .926 for the complete analysis.[4]
It is organized into two sections of five categories each.
Section one is designed to ascertain the presence of mental
health liabilities in categories labeled behavioral im-
maturity, emotional instability, feelings of inadequacy,
physical defects, and nervous manifestations. Section two
is designed to ascertain the presence of mental health assets

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[3]G. Frederick Kuder, Examiner Manual for the Kuder
Preference Record, Science Research Associates, Chicago,
1953, p. 20.

[4]Louis P. Thorpe and Willis W. Clark, Manual of
Directions, Mental Health Analysis-Secondary Series,
California Test Bureau, Los Angeles, 1945.

in categories called close personal relationships, inter-
personal skills, social participation, satisfying work and
recreation, and outlook and goals.

Hypotheses to be tested. A major consideration in
determining the scope of a problem of this kind is the
number of hypotheses to be tested. The hypotheses of this
study are limited to those which may be stated about certain
trait differences between the individuals in three selected
groups. Though there are many possible trait differences,
this study has been limited to those which seem to offer a
means of describing the selected groups in terms which might
be used by teachers and administrators to plan more effec-
tively for the individual's program, courses, and activities.
Another practical limitation is that the differences are
only those which might be reflected in school records, in
results of testing programs, and in summaries of rating
scales and questionnaires. No attempt is made to increase
the scope of the study by employing complicated devices such
as projective techniques or special professional services
such as those of a statistician or a clinical psychologist.

Of the many traits in which the groups chosen for
this study may differ, these are ones which fit within the
limits just described:

1. Age
2. Boy-girl distribution
3. Intelligence
4. Language ability
5. Quantitative ability
6. Reading ability
7. Attendance
8. Grade points
9. Number of subjects
10. Responses to a student's check list
11. Mental health factors
12. Teacher's ratings

The three groups to be studied may be found to differ in one or more of these traits.

A convenient means of establishing the pattern of this study is by using null hypotheses, which are simple statements that the three groups studied do not differ significantly in respect to a given trait. "Significant" differences have low probabilities of occurring by accidents of sampling and correspondingly high probabilities of being characteristic of the groups studied. Tests of "significant" differences will be described in Chapter V on Statistical Techniques.

SUMMARY

Students included in this study were drawn from grades nine, ten, and eleven of a private preparatory school.

Tests from the regular testing program of the school

were used as criteria of intelligence and achievement. Descriptive data were gathered from school records and the results of experimental trials of the Mental Health Analysis, the Teacher's Rating Scale, and the Student Check List.

Hypotheses selected for investigation were stated in terms of trait differences between three selected groups. They were limited to those trait differences which might be reflected in school records, tests, and experimental instruments used in the school.

CHAPTER IV

PROCEDURES OF STUDY

Data used. The data of this study of students from
the classes of 1956, 1957, and 1958 were collected during
the years 1953 - 55. They were taken from school records
and from the results of a regular testing program of the
school, supplemented by results of experiments with the
Mental Health Analysis, the Teacher's Rating Scale, and the
Student Check list.

Criterion data. The criterion tests were the Otis
Quick-Scoring Mental Ability Test, Gamma Edition; the
American Council on Education Psychological Examination,
1948 High School Edition; the Cooperative English Test C_1;
the Cooperative Elementary Algebra Test; the Cooperative
Intermediate Algebra Test, and the Cooperative Plane Geometry
Test.

The criterion scores of ability for students of the
class of 1956 were the raw scores from Otis Tests. For
students of the class of 1957 and 1958, the criterion scores
of ability were composite scores formed by adding the raw
scores from the Otis Test to the raw scores from the Amer-
ican Council on Education Psychological Examination.

The criterion scores of achievement in English for students of the three classes were the standard scores from the Cooperative English Test C_1. The criterion scores of achievement in mathematics were the standard scores from the Cooperative Elementary Algebra Test for students of the class of 1958, from the Cooperative Intermediate Algebra Test for students of the class of 1957, and from the Cooperative Plane Geometry Test for students of the class of 1956. These data are tabulated in Tables II, III, and IV.

Ranking of students. Criterion scores for each individual student of the sample were recorded on three inch by five inch cards. These cards were then arranged in order of decreasing scores for the criterion of ability. The student with the highest score was assigned a rank of one, the one with the next highest a rank of two, and so forth. When criterion scores were the same for two or more students, the rank assigned to each was the average of the ranks which would have been assigned the same number of students if their scores had differed. For example, in Table II students 1, 2, and 3 are each given a rank of 2 (the average of 1, 2, and 3) since they each have the same score, 73.

The same method of ranking was applied to each student for each of the two criteria of achievement. These ranks,

TABLE II

CLASS OF 1956
SCORES AND RANKS OF STUDENTS ON CRITERION TESTS

Student	Intelligence		English		Mathematics	
	Score	Rank	Score	Rank	Score	Rank
1	73	2	74	1.5	71	5
2	73	2	74	1.5	69	7
3	73	2	63	9	72	4
4	72	5	63	9	69	7
5	72	5	72	3.5	76	1
6	72	5	62	12	64	16.5
7	69	7	60	15	67	11
8	68	8	72	3.5	65	15
9	67	9	66	5.5	66	13.5
10	66	10	62	12	62	20.5
11	65	11.5	58	19.5	69	7
12	65	11.5	62	12	67	11
13	64	13	57	21	66	13.5
14	63	14	60	15	73	3
15	62	15	63	9	63	18.5
16	60	16	66	5.5	63	18.5
17	57	17.5	55	22.5	68	9
18	57	17.5	64	7	67	11
19	54	19.5	39	28	56	25
20	54	19.5	59	17.5	56	25
21	53	21	59	17.5	62	20.5
22	50	22	54	24	56	25
23	47	24.5	48	26	57	22
24	47	24.5	60	15	56	25
25	47	24.5	44	27	56	25
26	47	24.5	50	25	75	2
27	44	27	58	19.5	55	28
28	43	28	55	22.5	64	16.5

TABLE III

CLASS OF 1957
SCORES AND RANKS OF STUDENTS ON CRITERION TESTS

Student	Intelligence		English		Mathematics	
	Score	Rank	Score	Rank	Score	Rank
1	194	1	76	1	61	7
2	187	2	62	12	65	2
3	183	3	55	25	57	22.5
4	181	4	70	3	68	1
5	171	5	57	21.5	58	17.5
6	169	6	62	12	59	12
7	168	7	68	4.5	42	48
8	164	8	61	14.5	58	17.5
9	163	9.5	55	25	49	41
10	163	9.5	50	32	62	4.5
11	162	12	59	17	55	26
12	162	12	67	6.5	54	29.5
13	162	12	53	27	49	41
14	159	14	74	2	58	17.5
15	158	15	58	18.5	64	3
16	157	17.5	52	28	59	12
17	157	17.5	57	21.5	58	17.5
18	157	17.5	60	16	52	36
19	157	17.5	57	21.5	58	17.5
20	154	20	63	10	54	29.5
21	151	21	51	29.5	62	4.5
22	150	22	64	9	53	33.5
23	149	23	68	4.5	60	9.5
24	148	24.5	61	14.5	58	17.5
25	148	24.5	62	12	59	12
26	147	26	46	43.5	54	29.5
27	145	27	43	47.5	58	17.5
28	143	28.5	57	21.5	57	22.5
29	143	28.5	47	40	54	29.5
30	141	31	67	6.5	56	24.5
31	141	31	48	36	51	38.5
32	141	31	42	49	61	7
33	139	33	55	25	54	29.5
34	135	34	50	32	56	24.5
35	134	35	46	43.5	46	43.5
36	133	36	47	40	44	45.5
37	131	37	65	8	60	9.5

TABLE III (continued)

Student	Intelligence		English		Mathematics	
	Score	Rank	Score	Rank	Score	Rank
38	129	38	44	46	54	29.5
39	128	39	40	50	53	33.5
40	126	40	48	36	61	7
41	123	41	43	47.5	40	49
42	120	42	58	18.5	46	43.5
43	116	43	49	34	39	50
44	113	44.5	45	45	52	36
45	113	44.5	47	40	34	52
46	112	46	47	40	51	38.5
47	108	47	35	51	48	17.5
48	107	48	48	36	44	45.5
49	105	49	33	52	43	47
50	101	50	47	40	49	41
51	99	51	50	32	38	51
52	93	52	51	29.5	52	36

TABLE IV

CLASS OF 1958
SCORES AND RANKS OF STUDENTS ON CRITERION TESTS

Student	Intelligence		English		Mathematics	
	Score	Rank	Score	Rank	Score	Rank
1	171	1	66	1	64	10
2	167	2	58	7	69	2.5
3	164	3	62	3	58	23
4	163	4	57	8.5	63	13
5	156	5.5	60	6	66	7
6	156	5.5	62	3	66	7
7	152	7	54	12	67	5
8	150	8	52	14	51	35
9	149	9	57	8.5	63	13
10	147	10	44	35.5	61	18.5
11	146	11	44	35.5	62	16
12	143	12	61	5	60	20.5
13	137	13	50	20.5	69	2.5
14	136	14	52	14	59	22
15	135	15	50	20.5	62	16
16	134	16	55	11	61	18.5
17	133	17	44	35.5	64	10
18	131	18	50	20.5	51	35
19	130	19	45	30	51	35
20	129	20	49	23	66	7
21	127	21.5	51	17	68	4
22	127	21.5	52	14	55	26.5
23	126	23	36	48	51	35
24	124	24	46	27	48	40.5
25	123	25.5	47	25	53	30.5
26	123	25.5	45	30	60	20.5
27	121	27	44	35.5	47	42
28	119	28	48	24	46	43.5
29	118	29	56	10	56	24.5
30	114	30	43	38.5	51	35
31	111	31	62	3	46	43.5
32	110	33	51	17	50	38.5
33	110	33	39	42.5	62	16
34	110	33	45	30	48	40.5
35	107	35	51	17	56	24.5
36	106	37	29	51	54	28
37	106	37	43	38.5	53	30.5

TABLE IV (continued)

Student	Intelligence		English		Mathematics	
	Score	Rank	Score	Rank	Score	Rank
38	106	37	31	50	63	13
39	105	39	32	49	38	50.5
40	103	40	41	40	41	48.5
41	100	41.5	44	35.5	55	26.5
42	100	41.5	46	27	70	1
43	99	43.5	38	45.5	53	30.5
44	99	43.5	38	45.5	64	10
45	96	45.5	50	20.5	38	50.5
46	96	45.5	44	35.5	42	46.5
47	95	47.5	40	41	53	30.5
48	95	47.5	39	42.5	41	48.5
49	92	49	38	45.5	42	46.5
50	91	50	46	27	45	45
51	88	51	38	45.5	50	38.5

together with criterion scores, are arranged in Tables II, III, and IV.

Establishing indices of relative achievement. Having established the rank of each student in respect to scholastic ability and in respect to achievement in English and in mathematics, two relative achievement indices were found for each student. A relative achievement index for English was established for each student by subtracting his English achievement rank from his intelligence rank, retaining the proper algebraic sign to indicate the difference. For instance, in Table II, student number 1 has an intelligence rank of 2 and an English achievement rank of 1.5; therefore his relative achievement index for English is 0.5. The same student, with an intelligence rank of 2 and a mathematics rank of 5, has a relative achievement index for mathematics of -3.

Adding the two relative achievement indices, 0.5 for English and -3 for mathematics, gives a combined relative achievement index of -2.5. These indices were computed for each member of each class and tabulated in Tables V, VI, and VII.

The combined relative achievement indices were the bases for separating each class into the groups which were the subjects of this study.

TABLE V

CLASS OF 1956
DETERMINATION OF RELATIVE ACHIEVEMENT INDICES
AND COMBINED RELATIVE ACHIEVEMENT INDICES
FOR ALL STUDENTS

Student	Relative Achievement Indices		
	English	Mathematics	Combined
1	0.5	-3.0	-2.5 a*
2	0.5	-5.0	-4.5
3	-7.0	-2.0	-9.0 u**
4	-4.0	-2.0	-6.0
5	1.5	4.0	5.5
6	-7.0	-11.0	-18.5 u
7	-8.0	-4.0	-12.0 u
8	4.5	-7.0	-2.5 a
9	3.5	-4.5	-1.0 a
10	-2.0	-10.5	-12.5 u
11	-8.0	4.5	-3.5
12	-0.5	0.5	0.0 a
13	-8.0	-0.5	-8.5 u
14	-1.0	11.0	10.0 o***
15	6.0	-3.5	2.5 a
16	10.5	-2.5	8.0 o
17	-5.0	8.5	3.5
18	10.5	6.5	17.0
19	-8.5	-5.5	-14.0 u
20	2.0	-5.5	-3.5
21	3.5	0.5	4.0
22	-2.0	-3.0	-5.0
23	-1.5	2.5	1.0 a
24	9.5	-0.5	9.0 o
25	-3.5	-0.5	-4.0
26	-0.5	22.5	22.0 o
27	7.5	-1.0	6.5
28	5.5	11.5	17.5 o

*Denotes achiever
**Denotes underachiever
***Denotes overachiever

TABLE VI

CLASS OF 1957
DETERMINATION OF RELATIVE ACHIEVEMENT INDICES
AND COMBINED RELATIVE ACHIEVEMENT INDICES
FOR ALL STUDENTS

Student	Relative Achievement Indices			
	English	Mathematics	Combined	
1	0.0	-6.0	-6.0	
2	-10.0	0.0	-10.0	
3	-22.0	-19.5	-41.5	u*
4	1.0	3.0	4.0	a*
5	-16.5	-12.5	-29.0	u
6	-6.0	-6.0	-12.0	
7	2.5	-41.0	-38.5	u
8	-6.5	-9.5	-16.5	
9	-15.5	-31.5	-47.0	u
10	-22.5	5.0	-17.5	u
11	-5.0	-14.0	-19.0	u
12	5.5	-17.5	-12.0	
13	-15.0	-29.0	-44.0	u
14	12.0	-3.5	8.5	
15	-3.5	12.0	9.0	
16	-10.5	5.5	-5.0	a
17	-4.0	0.0	-4.0	a
18	1.5	-18.5	-17.5	u
19	-4.0	0.0	-4.0	a
20	10.0	-19.5	-9.5	
21	-8.5	16.5	8.0	
22	13.0	-11.5	1.5	a
23	18.5	13.5	32.0	o***
24	10.0	7.0	17.0	
25	12.5	12.5	25.0	o
26	-17.5	-3.5	-21.0	u
27	-20.5	9.5	-11.0	
28	7.0	6.0	13.0	
29	-11.5	-1.0	-12.0	
30	24.5	6.5	31.0	o
31	-5.0	-7.5	-12.5	
32	-17.0	24.0	7.0	
33	8.0	3.5	11.5	
34	2.0	9.5	11.5	
35	-8.5	-8.5	-17.0	u

TABLE VI (continued)

Student	Relative Achievement Indices		
	English	Mathematics	Combined
36	-4.0	-9.5	-13.5
37	29.0	27.5	56.5 o
38	-8.0	-8.5	-16.5
39	-11.0	5.5	-5.5 a
40	4.0	33.0	37.0 o
41	-6.5	-8.0	-14.5
42	23.5	-1.5	22.0 o
43	9.0	-7.0	2.0 a
44	-6.5	8.0	1.5 a
45	4.5	-7.5	-3.0 a
46	6.0	7.5	13.5
47	-4.0	29.5	25.5 o
48	12.0	2.5	14.5
49	-3.0	2.0	-1.0 a
50	10.0	9.0	19.0 o
51	19.0	0.0	19.0 o
52	22.5	16.0	38.5 o

*Denotes underachievers
**Denotes achievers
***Denotes overachievers

TABLE VII

CLASS OF 1958
DETERMINATION OF RELATIVE ACHIEVEMENT INDICES
AND COMBINED RELATIVE ACHIEVEMENT INDICES
FOR ALL STUDENTS

Student	Relative Achievement Indices			
	English	Mathematics	Combined	
1	0.0	-9.0	-9.0	
2	-5.0	-0.5	-5.5	
3	0.0	-20.0	-20.0	u*
4	-4.5	-9.0	-13.5	
5	-0.5	-1.5	-2.0	a**
6	2.5	-1.5	1.0	a
7	-5.0	2.0	-3.0	a
8	-6.0	-27.0	-33.0	u
9	0.5	-4.0	-3.5	
10	-25.5	-8.5	-34.0	u
11	-24.5	-5.0	-29.0	u
12	7.0	-8.5	-1.5	a
13	-7.5	10.5	3.0	a
14	0.0	-8.0	-8.0	
15	-5.5	-1.0	-6.5	
16	5.0	-2.5	2.5	a
17	-18.5	7.0	-11.5	
18	-2.5	-17.5	-19.5	u
19	-11.0	-16.0	-27.0	u
20	-3.0	13.0	10.0	
21	4.5	17.5	22.0	o***
22	7.5	-5.0	2.5	a
23	-25.0	-12.0	-37.0	u
24	-3.0	-16.5	-19.5	u
25	0.5	-5.0	-4.5	a
26	-4.5	5.0	0.5	a
27	-8.5	-15.0	-23.5	u
28	4.0	-15.5	-11.5	
29	19.0	4.5	23.5	o
30	-8.5	-5.0	-13.5	
31	28.0	-12.5	15.5	
32	16.0	-5.5	10.5	
33	-10.5	17.0	6.5	
34	3.0	-7.5	-4.5	a
35	18.0	10.5	28.5	o

TABLE VII (continued)

Student	Relative Achievement Indices			
	English	Mathematics	Combined	
36	-14.0	9.0	-5.0	
37	-1.5	6.5	5.0	
38	-13.0	24.0	11.0	
39	-10.0	-11.5	-21.5	u
40	0.0	-8.5	-8.0	
41	6.0	15.0	21.5	o
42	14.5	40.5	55.0	o
43	-2.0	13.0	11.0	
44	-2.0	33.5	31.5	o
45	25.0	-5.0	20.0	o
46	10.0	-1.0	9.0	
47	6.5	17.0	23.5	o
48	5.0	-1.0	4.0	a
49	3.5	2.5	6.0	
50	23.0	5.0	28.0	o
51	5.5	12.5	18.0	o

*Denotes underachievers
**Denotes achievers
***Denotes underachievers

Separation of groups. Each of the three classes
was divided into five groups, three of which were subjects
of this study and two of which served to make distinct
separations between the three groups studied. Each of the
three groups contained approximately twenty per cent of the
class from which it was selected. For example, the class
of 1956 consisted of twenty-eight possible students for
study, of which six were selected for each of the three
groups studied. The class of 1957 consisted of fifty-two
students, of which ten were selected for each of the three
groups. The class of 1958 consisted of fifty-one students,
of which ten were selected for each of the three groups
studied.

From each class the students with the largest pos-
itive combined relative achievement indices were placed in
one group and were called "overachievers." In Tables V,
VI, and VII they were designated with an "o" in the columns
for combined relative achievement indices.

The students with combined relative achievement in-
dices having the smallest deviation from zero made up an-
other group called "achievers." In Tables V, VI, and VII
they were identified by an "a" in the columns for combined
relative achievement indices.

The students with the largest negative combined relative achievement indices were included in a third group called "underachievers." In Tables V, VI, and VII they were identified by a "u" in the columns for combined relative achievement indices.

The remaining students were not subjects of this study. Some of them had positive and some negative combined relative achievement indices of intermediate values. They were used to make a separation between the three groups studied. For example, six students of the class of 1956, as shown in Table V, had negative combined relative achievement indices ranging from -3.5 to -6.0 separating the achievers from the underachievers. There were four students with positive combined relative achievement indices ranging from 3.5 to 6.5 separating the overachievers from the achievers.

The twenty-six overachievers identified in Tables V, VI, and VII have combined relative achievement indices ranging from 8.0 to 56.5. These indices, together with data on age, IQ, language scores, quantitative scores, attendance, grade points earned, number of subjects in program, reading scores, and sex designation, are tabulated in Table VIII.

The twenty-six achievers identified in Tables V, VI,

TABLE VIII

OVERACHIEVERS: FACTORS FROM ACADEMIC RECORDS
AND COMBINED RELATIVE ACHIEVEMENT INDICES

Student		Combined Relative Achievement Indices	Age in Months	Otis Gamma IQ	Language Scores	Quantitative Scores	Attendance, Half Days Present	Grade Points (A=5,B=4,C=3,D=2,F=0)	Number of Subjects in Program	Reading Scores	Sex
Class	26	22.0	204	106			286	17	4	50	M*
of	28	17.0	194	103			328	13	4	55	F*
1956	18	17.0	195	117			320	15	4	54	F
	14	10.0	203	122			330	15	4	58	M
	24	9.0	197	107			330	17	4	47	F
	16	8.0	198	120			335	15	4	65	M
Class	37	56.5	181	113	56	25	311	16	4	51	F
of	52	38.5	185	100	39	16	327	15	5	52	F
1957	40	37.0	182	111	61	17	313	24	5	60	F
	23	32.0	194	114	70	25	334	20	4	60	M
	30	31.0	179	111	66	27	340	17	4	46	F
	47	25.5	182	112	45	14	334	16	4	50	M
	25	25.0	189	119	70	20	337	22	5	55	F
	42	22.0	184	107	55	20	324	12	4	46	F
	50	19.0	190	102	42	18	327	12	4	38	F
	51	19.0	186	104	43	14	324	11	4	38	F
Class	42	55.0	181	109	32	22	306	14	4		M
of	44	31.5	181	104	36	22	321	17	4		F
1958	35	28.5	167	106	54	14	311	14	4		M
	50	28.0	181	101	37	16	326	14	4		F
	47	23.5	171	100	49	12	335	17	5		M
	29	23.5	176	113	49	20	331	16	4		F
	21	22.0	179	112	51	27	324	19	4		F
	41	21.5	176	100	46	18	313	13	4		M
	45	20.0	171	114	33	15	310	11	4		F
	51	18.0	173	101	37	15	338	19	5		F
Mean		25.4	184.6	108.8	48.6	18.9	323.6	15.8	4.19	51.6	

*M - Male
*F - Female

TABLE IX

ACHIEVERS: FACTORS FROM ACADEMIC RECORDS
AND COMBINED RELATIVE ACHIEVEMENT INDICES

Student	Combined Relative Achievement Indices	Age in Months	Otis Gamma IQ	Language Scores	Quantitative Scores	Attendance, Half Days Present	Grade Points (A=5,B=4,C=3,D=2,E=0)	Number of Subjects in Program	Reading Scores	Sex
Class of 1956 1	-2.5	191	134			327	23	5	65	M*
9	-1.0	207	126			314	16	4	59	F*
12	0.0	193	125			317	23	5	57	F
15	2.5	197	122			340	21	5	56	M
23	1.0	207	106			327	9	4	48	F
8	-2.5	195	128			331	22	5	51	F
Class of 1957 49	-1.0	191	98	50	18	324	12	4	41	F
22	1.5	190	114	77	20	328	19	5	55	M
44	1.5	181	100	61	15	334	16	4	46	M
43	2.0	187	98	60	20	341	15	4	42	F
45	-3.0	189	99	58	17	335	13	4	46	F
17	-4.0	187	113	89	17	329	17	4	58	F
19	-4.0	189	116	75	27	338	13	4	52	M
4	4.0	185	130	84	29	328	25	5		M
16	-5.0	194	119	79	19	326	15	4	60	M
39	-5.5	183	109	63	18	326	15	4	46	M
Class of 1958 26	0.5	169	111	48	30	328	14	4		M
6	1.0	175	120	72	28	342	24	5		F
12	-1.5	168	121	66	23	318	16	4		F
5	-2.0	169	116	78	28	315	20	4		F
16	2.5	166	119	57	25	324	19	4		F
22	2.5	172	114	59	19	325	20	5		F
7	-3.0	176	128	61	27	336	19	4		F
13	3.0	167	120	56	28	337	23	5		M
48	4.0	171	99	46	16	329	11	4		M
25	-4.5	188	108	60	16	337	13	4		M
Mean	-.52	184.1	115.1	65.0	22.0	329.1	17.4	4.34	52.1	

*M - Male
*F - Female

TABLE X

UNDERACHIEVERS: FACTORS FROM ACADEMIC RECORDS AND COMBINED RELATIVE ACHIEVEMENT INDICES

Student		Combined Relative Achievement Indices	Age in Months	Otis Gamma IQ	Language Scores	Quantitative Scores	Attendance, Half Days Present	Grade Points (A=5,B=4,C=3,D=2,F=0)	Number of Subjects in Program	Reading Scores	Sex
Class of 1956	3	-9.0	201	132			338	20	5	59	F*
	6	-18.5	196	132			317	17	4		M*
	7	-12.0	196	129			341	18	5	55	M
	10	-12.5	192	127			312	14	4		M
	13	-8.5	194	124			302	13	5	67	M
	19	-16.0	197	114			335	15	4	46	M
Class of 1957	9	-47.0	184	123	73	29	276	18	5	52	F
	13	-44.0	192	114	88	20	316	15	4	55	F
	3	-41.5	189	124	86	34	325	23	5	57	M
	7	-38.5	179	123	83	25	323	19	5	54	F
	5	-29.0	183	123	84	26	310	22	5	56	F
	26	-21.0	186	115	60	34	317	14	4	45	M
	11	-19.0	182	126	71	28	321	13	4		M
	10	-17.5	191	127	71	26	311	21	5	56	M
	18	+17.5	184	122	69	28	319	16	4	49	F
	35	-17.0	193	110	57	27	335	11	4	45	M
Class of 1958	23	-37.0	184	110	58	20	338	14	4		M
	10	-34.0	175	120	56	35	324	20	5		M
	8	-33.0	171	117	80	19	320	19	4		F
	11	-29.5	174	117	68	26	332	14	4		M
	19	-27.0	172	107	63	25	331	16	4		M
	27	-23.5	169	110	56	21	330	13	4		M
	39	-21.5	177	100	51	18	323	11	4		M
	3	-20.0	173	124	86	19	319	19	4		F
	18	-19.5	178	108	62	25	322	12	4		M
	24	-19.5	177	110	63	15	335	13	4		M
Mean		-24.3	184.2	118.8	69.3	25.0	322.0	16.2	4.35	53.5	

*M - Male
*F - Female

and VII have combined relative achievement indices ranging
from -5.5 to 4.0. Data for this group are tabulated in
Table IX.

The twenty-six underachievers identified in Tables
V, VI, and VII have combined relative achievement indices
ranging from - 47.0 to -8.5. Data for this group are tab-
ulated in Table X.

Data which may serve the purpose of identifying the
traits of the overachiever, achiever, and underachiever
groups are tabulated in the Tables of Chapter VI.

SUMMARY

Criterion tests of intelligence were the Otis Quick
Scoring Mental Ability Test and the American Council on
Education Psychological Examination. Criterion tests of
achievement were the Cooperative Tests in English, elemen-
tary and intermediate algebra, and plane geometry.

From rankings of each student on criterion tests,
combined relative achievement indices were computed as
bases for defining groups of overachievers, achievers, and
underachievers.

CHAPTER V

STATISTICAL TECHNIQUES

Small sample theory. The treatment of the data of this study was based on the use of small sample theories and formulas. Two basic assumptions were necessary: one, that the number of cases involved is less than thirty and, two, that the universe of values for the trait being studied, and as measured, form a normal distribution.[1] The use of the normal probability table, based on areas cut off under a normal probability (Gaussian) curve, is properly excluded in small sample studies, since these samples tend to have distributions which are peaked rather than normal. And, although small sample theories do not lead to precise results, they do furnish a means of estimating the probability that the obtained statistics could have arisen by chance alone, thus providing a level of confidence for accepting or rejecting the proposed null hypothesis that the two samples are not different.

Tests of significance. In this study it is important to know whether or not the difference between two means is

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[1]Quinn McNemar, Psychological Statistics, John Wiley and Sons, Inc., New York, 1949, p. 216.

significant. Two possibilities exist; these means come from two different populations, or these are means of two groups which should be considered as two parts of the same population.

A statistic which is valuable as a test of significance is "t" which, simply expressed, is the ratio of any normally distributed variate to its estimated standard error. The sampling distribution of t has been found to be independent of all except one factor, the number of "degrees of freedom"[2] which, in turn, is a function of the number of cases and the statistics concerned with the number of cases. The use of t determines a level of confidence in the possibility that a given result may have occurred only by chance. Tables of values of t give the level of confidence for various "degrees of freedom."[3] The levels of confidence most used are the five per cent and the one per cent levels. These show that the computed statistics might have occurred five times out of one hundred and once out of one hundred times by chance alone.

If, as in this study, a test of the significance of

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[2]E. F. Lindquist, Statistical Analysis in Educational Research (Boston: Houghton Mifflin Company, 1940), p. 54.

[3]Quinn McNemar, op. cit., p. 352.

the difference between two means is desired, a convenient formula to use is[4]

$$t = \frac{M_1 - M_2}{\sqrt{S_1^2 + S_2^2}}$$

in which M_1 and M_2 are the means of the sample and S_1^2 and S_2^2 are the corresponding variances.

Another formula useful for computing the values of t when the differences between two unrelated means is concerned has been derived by Lindquist[5]:

$$t = \frac{M_1 - M_2}{\sqrt{\left(\dfrac{\sum d_1^2 + \sum d_2^2}{n_1 - n_2 - 2}\right)\left(\dfrac{1}{n_1} + \dfrac{1}{n_2}\right)}}$$

where $\sum d_1^2$ and $\sum d_2^2$ are the sums of the squares of the deviations from the respective means M_1 and M_2, and n_1 and n_2 are the respective numbers of scores involved.

In either case the value of t indicates a level of confidence (obtained by reference to the proper table) that the difference between the means is due to some causal

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[4] J. P. Guilford, Fundamental Statistics in Psychology and Education (New York: McGraw-Hill, 1950), pp. 213-14.

[5] E. F. Lindquist, op. cit., p. 57.

factors. The value of t, regardless of the level of confidence found, does not point to a causal factor or the direction in which it operates.

The statistical devices already described are valuable within the stated limits. It will be noted that they are not easily applied to cases for which only categorical information exists. Since such cases are frequently encountered in studying responses to such devices as check lists and questionnaires where the category of the response is more important than its size or quality, it is necessary to have a means of judging the significance of any differences observed.

A well established test of significance for use in such cases is the quantity chi square (χ^2) which is useful for contingency-type situations in which the fundamental problem is that of comparing two or more groups in respect to multiple responses. This statistic is computed from the formula[6]

$$\chi^2 = (\frac{O - E}{E})^2$$

where O is the observed frequencies in separate categories and E is the expected frequencies, that is, the frequencies

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[6]Quinn McNemar, op. cit., p. 199.

which would exist if there were no relationship between the given variables.[7] It should be noted that χ^2 is the sum of several separate quantities and that the size of each of these is determined by the difference between the observed and expected frequencies. In addition, as is true with t, it must be assumed that the sampling distribution of frequencies about a given E follows the normal curve. In effect this rules out frequencies of E so small that the distribution of frequencies about it would be decidedly skewed. Therefore, it is considered a violation of fundamental assumptions to apply this technique to cases where individual categories have frequencies of five or less.

In investigating the significance of a given value of χ^2 from established tables, it is necessary to know the number of "degrees of freedom" in the contingency-type table from which χ^2 was computed. If that table consists of k rows and n columns and the marginal totals are used for setting up expected frequencies, then the number of "degrees of freedom" is taken to be the product (k - 1) (n - 1).[8]

As in the use of t, the table values specify the

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[7]Ibid., pp. 179-180.

[8]Quinn McNemar, op. cit., p. 193.

probabilities of obtaining a given x^2 value by chance.
Accordingly, these values are bases for accepting or re-
jecting a given null hypothesis. If the size of x^2 is
large enough to reflect a small probability of chance
occurrence, then the null hypothesis is rejected with the
resulting implication that actual differences between groups
do exist.

Uses of tests of significance. Two methods are used
for locating differences between groups. One, comparison
of the means of the groups, is used in cases where the
available data are scores on tests, ages, attendance, grade
points, and subjects carried. In these cases t is used as
the test of significance of the observed differences between
the means. The other, comparisons of distributions, is used
with boy-girl ratios, responses to questions in the Student
Check List, high and low ratings on the Teacher's Rating
Scale, and extreme scores on the Kuder Preference Record
and the Mental Health Analysis. In these cases the cate-
gory of the response is considered important, so the dis-
tributions are examined by applying the x^2 technique.

SUMMARY

Small sample theories and formulas formed the statis-
tical bases for this study.

The significances of differences between means were tested by computing values of "t" and comparing these values with those found in standard statistical tables.

The significances of distributions were investigated by using χ^2 tests and comparing computed values of χ^2 with those in standard statistical tables.

Differences or distributions were considered "significant" if they could have occurred no more than five out of one hundred times by accident of sampling.

CHAPTER VI

RESULTS OF STUDY

The effectiveness of using total relative achievement indices for defining and separating the overachievers, achievers, and underachievers may be judged by examining the statistics in Table XI.

In all cases the achievers have small total relative achievement indices ranging between -5.5 and 4.5. Both the overachievers and the underachievers are well separated from this group, as may be seen by examination of ranges and means of total relative achievement indices.

TESTS OF NULL HYPOTHESES

In accordance with the design of the study null hypotheses were tested for each of the trait differences studied. The null hypotheses (that there are no differences between the overachievers, achievers, and underachievers) were accepted if the observed differences could have been attributed to chance more than five times out of one hundred. The null hypotheses were rejected if the observed differences could have occurred by chance five times or less in one hundred.

TABLE XI

ANALYSIS OF COMBINED RELATIVE ACHIEVEMENT INDICES
BY CLASS AND BY GROUP*

Class	Group	Number of Pupils	Range of Combined Relative Achievement Indices	Mean	Standard Deviation
1956	Overachiever	6	8.0 to 22.0	13.83	5.15
	Achiever	6	-2.5 to 2.5	-0.42	1.73
	Underachiever	6	-18.5 to -8.5	-12.75	3.57
1957	Overachiever	10	19.0 to 56.5	30.55	10.58
	Achiever	10	-5.5 to 4.0	-1.35	3.10
	Underachiever	10	-47.0 to -17.0	-29.20	11.70
1958	Overachiever	10	18.0 to 55.0	27.15	10.35
	Achiever	10	-4.5 to 4.0	0.25	2.71
	Underachiever	10	-37.0 to -19.5	-26.45	6.26
Total	Overachiever	26	8.0 to 56.5	25.38	10.51
	Achiever	26	-5.5 to 4.5	-0.52	3.40
	Underachiever	26	-27.0 to -8.5	-24.34	10.61

*Computed from Tables VIII, IX, and X, pages 44, 45, 46.

Age. Examination of the data in Tables XII and XIII
furnishes evidence for acceptance of the null hypothesis
that the three groups do not differ in respect to age. The
t-statistics show very small values. The largest, t = 1.412,
reflects the probability that the difference between these
means might have occurred by chance more than twenty times
out of one hundred. Such a probability does not permit a
confident rejection of the null hypothesis even though there
remains the possibility that factors other than chance may
have produced the observed difference between the means.

Boy-girl distribution. A summary of the data of
Tables VIII, IX, and X shows the boy-girl distribution to
be as indicated in Table XIV. The totals reveal almost
twice as many girls as boys (seventeen girls, nine boys) in
the overachiever group, approximately equal numbers (fourteen
girls, twelve boys) in the achiever group, and slightly more
than twice as many boys as girls (eighteen boys, eight girls)
among the underachievers. The distribution of the totals
could have occurred by chance less than five times in one
hundred since the χ^2 value is 6.46.

While these proportions do not hold for any class, a
degree of consistency is apparent for in no class do boys
outnumber the girls in the overachiever group and in no

TABLE XII

ANALYSIS OF AGES

Class	Group	Number of Pupils	Range of Ages in Months	Mean	Standard Deviation
1956	Overachievers	6	194-204	198.5	3.78
	Achievers	6	191-207	198.3	6.35
	Underachievers	6	192-201	196.0	2.77
1957	Overachievers	10	179-194	185.2	4.40
	Achievers	10	181-194	187.6	3.67
	Underachievers	10	179-193	186.3	4.47
1958	Overachievers	10	167-181	175.6	4.72
	Achievers	10	167-188	172.1	6.14
	Underachievers	10	169-184	175.0	4.05

TABLE XIII

DIFFERENCES OF MEANS OF AGES
AND CORRESPONDING t VALUES

Groups Compared	Class of 1956 Difference of Means	t	Class of 1957 Difference of Means	t	Class of 1958 Difference of Means	t
*O - A	0.2	0.061	-2.4	-1.256	3.5	1.356
O - U	2.5	1.190	-1.1	-0.527	0.6	0.289
A - U	2.3	.744	1.3	0.674	-2.9	-1.185

*O - overachiever, A - achiever, U - underachiever

class do girls outnumber the boys in the underachiever group.

TABLE XIV

DISTRIBUTION OF BOYS AND GIRLS IN THE OVERACHIEVER, ACHIEVER, AND UNDERACHIEVER GROUPS

	Overachievers		Achievers		Underachievers	
Class	Boys	Girls	Boys	Girls	Boys	Girls
1956	3	3	2	4	5	1
1957	2	8	6	4	5	5
1958	4	6	4	6	8	2
Total	9	17	12	14	18	8

IQ. The essential data concerning IQ scores are arranged in Tables XV and XVI. The numbers underlined are values of t which will not permit the rejection of the null hypothesis at the five per cent level of confidence. They were read from a standard statistical table which was entered at the number of degrees of freedom appropriate for the particular group.

The differences observed between means of the over-achievers and the means of the underachievers (-13.8, -11.4, -6.3, and -10.0) are consistent, in each case re-flecting the higher IQ of the underachievers. The

TABLE XV

ANALYSIS OF IQ SCORES

Class	Group	Number	Range of Scores	Mean	Standard Deviation
1956	Overachievers	6	106-122	112.5	7.14
	Achievers	6	106-134	123.5	8.64
	Underachievers	6	114-132	126.3	6.18
1957	Overachievers	10	100-119	109.3	5.62
	Achievers	10	98-130	109.6	10.25
	Underachievers	10	110-127	120.7	5.37
1958	Overachievers	10	100-114	106.0	4.98
	Achievers	10	99-128	115.6	7.68
	Underachievers	10	100-124	112.3	6.74
Total	Overachievers	26	100-122	108.8	6.37
	Achievers	26	98-137	115.1	10.39
	Underachievers	26	100-132	118.8	8.25

TABLE XVI

DIFFERENCES OF MEANS OF IQ SCORES AND
CORRESPONDING t VALUES

Groups Compared	Class of 1956 Difference of Means	t	Class of 1957 Difference of Means	t	Class of 1958 Difference of Means	t	Total Difference of Means	t
*O - A	-11.0	-2.16	- 0.3	- .077	-9.6	-3.15	- 6.3	-2.66
O - U	-13.8	-3.21	-11.4	-4.41	-6.3	-2.26	-10.0	-4.81
A - U	-2.8	- .59	-11.1	-2.87	3.3	.968	-3.7	-1.39

*O - overachievers, A - achievers, U - underachievers.

differences observed are also significant since they could
not have occurred by accident more than five times out of
one hundred as shown by the values of t (-3.21, -4.41,
-2.26, and -4.81).

Other significant differences are apparent between
the mean of all the overachievers and that of all the
achievers (-6.3), between the mean of the overachievers and
that of the achievers (-9.6) in the class of 1958, and be-
tween the mean of the achievers and that of the under-
achievers (-11.1) in the class of 1957. In each of these
cases the values of t (-2.66, -3.15, and -2.87) warrant re-
jecting the null hypothesis that there are no significant
differences between the groups. In addition, the direction
of the differences in the classes, with one exception, lo-
cates the achievers between the overachievers and the under-
achievers in the matter of intelligence.

The data of Tables XV and XVI, considered in the
light of the method of defining and identifying the over-
achievers, achievers, and underachievers, lead to an ad-
ditional study of the groups. The possibility exists that
the difference in means of IQ scores may have been biased
by the design of the study. That is, those with best in-
telligence ranks may have total relative achievement indices,
which, if positive, are very small but which, if negative,

have a wider range of values. These students, then, have
some chances of being labelled achievers, many chances of
being labelled underachievers, but few chances of being
among the overachievers.

At the other end of the intelligence ranks, students
have some chances of being labelled achievers, but many
more of being labelled overachievers. From the middle of
the scale students have about equal chances of being placed
in any one of the three categories.

The design of this study as a major operating factor
in producing a bias in observed differences in IQ scores
may be questioned on two counts. First, from Table XVI,
one of the observed differences between the means (3.3) is
inconsistent with the rest, another (-0.3) is very close to
zero, and another (-2.8) is very small. All three have t
values sufficiently low (.968, -0.077, and -0.59) to make
impossible the rejection of the null hypothesis concerning
these groups.

Second, a study of the frequence polygons in Figure
1 points up some of the data in Table XV supplemented by a
frequency polygon showing the IQ distribution of students
in the grades studied. The considerable amount of over-
lapping of the polygons, with all of the scores of the over-
achievers falling within the range of the scores of the
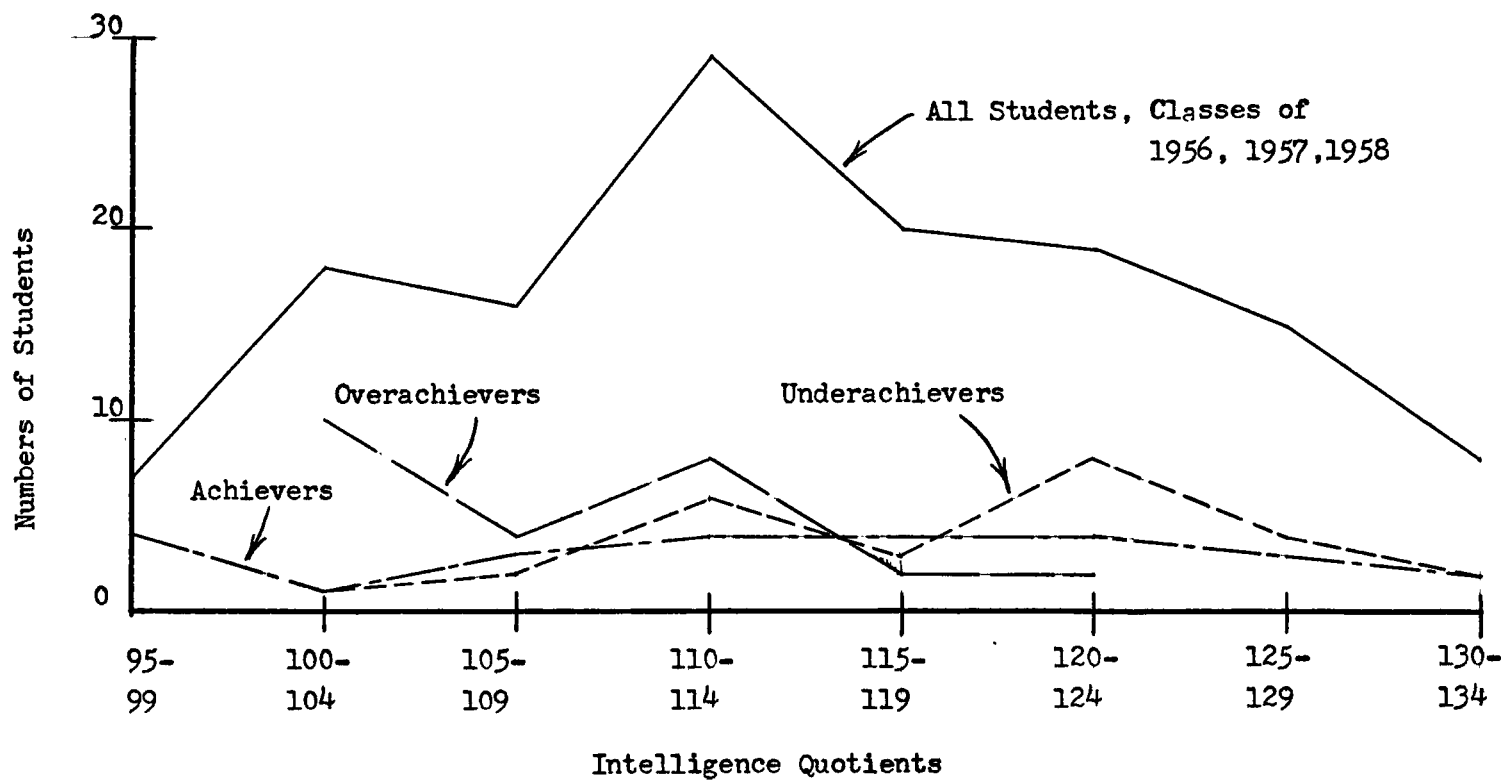
Figure 1

Distribution of Intelligence Quotients For All Students And
For Overachievers, Achievers, And Underachievers

underachievers and with seventy-seven per cent of the under-
achievers falling within the range of the scores of the
overachievers, casts further doubt on the ability of the
design of the study to produce differences noted in intel-
ligence.

An additional observation is that these observed
differences follow much the same pattern as found by other
investigators. Cohler[1] found a steady increase of dis-
parity between intelligence and achievement with increasing
IQ.

From the above considerations it seems reasonable
to assume that the design of this study does not include a
bias which operates effectively enough by itself to concen-
trate the overachievers among the less intelligent and the
underachievers among the more intelligent members of a
school class.

Language factor. The language factor of the American
Council on Education Psychological Examination produced
scores summarized in Tables XVII and XVIII. The observed
differences (-4.6, -4.0, and -4.35) between the means of

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[1]Milton J. Cohler, "Scholastic Status of Achievers
and Nonachievers of Superior Intelligence," Journal of
Educational Psychology, 32:603-10, 1941.

TABLE XVII

ANALYSIS OF LANGUAGE SCORES

Class	Group	Number	Range of Language Scores	Mean	Standard Deviation
1957	Overachievers	10	39 - 66	54.7	11.29
	Achievers	10	50 - 89	69.6	12.18
	Underachievers	10	57 - 83	74.2	10.24
1958	Overachievers	10	32 - 54	42.4	7.77
	Achievers	10	46 - 78	60.3	9.33
	Underachievers	10	51 - 86	64.3	10.46
Total	Overachievers	20	32 - 66	48.6	11.48
	Achievers	20	46 - 89	64.95	11.78
	Underachievers	20	51 - 83	69.3	11.47

TABLE XVIII

DIFFERENCES OF MEANS OF LANGUAGE
SCORES AND CORRESPONDING t VALUES

Groups Compared	Class of 1957 Difference of Means	t	Class of 1958 Difference of Means	t	Total Difference of Means	t
*O - A	-14.7	-2.79	-18.9	-4.67	-16.35	-2.98
O - U	-19.5	-3.84	-21.9	-5.03	-20.7	-3.78
A - U	- 4.6	- .868	- 4.0	- .855	- 4.35	-0.804

*O - overachievers,　　A - achievers,　U - underachievers

the achievers and the means of the underachievers may well have occurred by chance since the corresponding values of t (-.868, -.855, and -.804) are small. For these groups the null hypothesis must be accepted. For the differences found between the overachievers and the achievers and the differences between the overachievers and the underachievers, the null hypothesis is rejected. The rejection may be made with confidence at the two per cent level as indicated by the smallest value of t (-2.79).

The inferences are that actual language differences do exist between the overachievers and the achievers and between the overachievers and the underachievers. Furthermore, these differences point to the fact that the overachievers are inferior to both the achievers and the underachievers in the amount of language ability they possess.

Since the language factor is a part of one criterion test, the significant differences found may be censured as being inherent in the design of the study. The validity of such a criticism may be investigated by studying language factor differences between matched pairs of students, taking one of the pair from the overachiever group and the other from the underachiever group. The pairs chosen had no age differences greater than four months and no IQ's differing

by more than four, these being arbitrary limits set on the matching. Ten such pairs were found and data for them are reported in Table XIX.

With the influence of age and intelligence reduced to a minimum by the matching, the differences between the language abilities of the overachievers and those of the underachievers becomes more striking. In only one pair does the overachiever have higher language score than the under-achiever.

Quantitative factor. Tables XX and XXI summarize the findings of the study in respect to the quantitative scores from the American Council on Education Psychological Examination. Values of t falling below the five per cent level of confidence have been underlined.

The differences (-8.1, -7.7, -5.9, and -6.5) recorded in Table XXI are significant as shown by corresponding t values (-4.09, -3.99, -2.67, and -2.63). The class of 1957 has significant differences between the means of over-achievers and underachievers (-8.1) and also between the means of the achievers and the underachievers (-7.7). The class of 1958 has a significant difference (-5.9) between the means of the overachievers and the achievers. The total of both classes has a significant difference (-6.15) between

TABLE XIX

LANGUAGE SCORES OF MATCHED PAIRS

Class	Number of Student		Age		IQ		Language Score	
	*O	*U	O	U	O	U	O	U
1957	23	35	194	193	114	110	70	57
	25	9	189	184	119	123	70	73
	47	26	182	186	112	115	45	60
1958	42	23	181	184	109	110	32	58
	41	39	176	177	100	100	46	51
	35	27	167	169	106	110	54	56
	45	8	171	171	114	117	33	80
	44	18	181	178	104	108	36	62
	29	11	176	174	113	117	49	68
	21	24	179	177	112	110	51	63
Mean			179.6	179.3	110.3	112.0	48.6	62.8

*O - overachievers

*U - underachievers

TABLE XX

ANALYSIS OF QUANTITATIVE SCORES

Class	Group	Number of Students	Range of Scores	Mean	Standard Deviation
1957	Overachievers	10	14 - 27	19.6	4.45
	Achievers	10	17 - 29	20.0	4.27
	Underachievers	10	20 - 34	27.7	3.93
1958	Overachievers	10	12 - 27	18.1	4.37
	Achievers	10	16 - 30	24.0	4.98
	Underachievers	10	15 - 35	22.3	5.39
Total	Overachievers	20	12 - 27	18.85	4.47
	Achievers	20	15 - 30	22.0	5.05
	Underachievers	20	15 - 35	25.0	5.43

TABLE XXI

DIFFERENCES OF MEANS OF QUANTITATIVE SCORES
AND CORRESPONDING t VALUES

Groups Compared	Class of 1957 Difference of Means	t	Class of 1958 Difference of Means	t	Total Difference of Means	t
*O - A	-0.4	-0.195	-5.9	-2.67	-3.15	-1.40
O - U	-8.1	-4.09	-4.2	-1.81	-6.15	-2.63
A - U	-7.7	-3.99	1.7	.694	-3.0	-1.22

*O - overachievers, A - achievers, U - underachievers.

the means of the overachievers and the underachievers.
These differences do not warrant making a general statement
rejecting the null hypothesis that overachievers, achievers,
and underachievers do not differ in quantitative ability,
because the significant differences do not show a consist-
ent pattern.

While the underachiever group of the class of 1957
shows more quantitative ability than the overachievers or
the achievers, in the class of 1958 it is the achiever group
which reveals the greatest quantitative ability.

Reading. The null hypothesis that there are no dif-
ferences between the means of reading scores of the over-
achievers, achievers, and underachievers can be accepted on
the basis of the statistics assembled in Tables XXII and
XXIII. The largest difference (-2.5) occurs twice and the
corresponding t values (-.854 and -.897) are so small that
there are few chances of accepting the hypothesis when
actual differences do exist. While the differences ob-
served suggest that the underachievers have a slight superi-
ority in reading ability, the statistics do not permit such
a conclusion to be made with any degree of confidence.
Furthermore, neither the differences nor the corresponding
values of t suggest that additional scores for each group
would materially change the results summarized in Tables

TABLE XXII

ANALYSIS OF READING SCORES

Class	Group	Number of Students	Range of Scores	Mean	Standard Deviation
1956	Overachievers	6	50 - 65	54.8	5.76
	Achievers	6	48 - 65	55.5	6.02
	Underachievers	4	46 - 67	56.8	7.56
1957	Overachievers	10	38 - 60	49.6	7.41
	Achievers	9	41 - 60	49.6	5.21
	Underachievers	9	45 - 57	52.1	4.43
Total	Overachievers	16	38 - 65	51.56	7.29
	Achievers	15	41 - 65	51.93	6.72
	Underachievers	13	45 - 67	53.54	5.99

TABLE XXIII

DIFFERENCES OF MEANS OF READING SCORES AND
CORRESPONDING t VALUES

Groups Compared	Class of 1956 Difference of Means	t	Class of 1957 Difference of Means	t	Total Difference of Means	t
*O - A	-0.7	-0.189	0.0	0.0	-0.37	-0.142
O - U	-2.0	-0.395	-2.5	-0.854	-1.98	-0.811
A - U	-1.3	-0.253	-2.5	-0.897	-1.61	-0.643

*O - overachievers,   A - achievers,   U - underachievers

XXII and XXIII.

Attendance. Tables XXIV and XXV present the statis-
tics computed from the attendance data. The differences
between the means of the three groups compared are small
when compared to the corresponding means. The correspond-
ing t values, with a single exception, do not permit a
rejection of the null hypothesis at the five per cent level
of confidence. The single exception (t = 3.24) indicates a
significant difference (7.1) which applies only to the
difference between the means of the total of the achievers
and the total of the underachievers. This exception, con-
sidered in the absence of additional significant differ-
ences, cannot be used as a basis for rejecting the null
hypothesis. Consequently the null hypothesis is accepted
and the inference drawn that there are no significant dif-
ferences between the overachievers, achievers, and under-
achievers in respect to their attendance records.

Grade points. Tables XXVI and XXVII contain the
statistics computed from grade point data for the totals
of the overachiever, achiever, and underachiever groups.
The differences (-1.6, -0.4, and 1.2) reported in Table
XXVII are small and the corresponding t values (-1.51,
-0.377, and 1.13) do not permit rejecting the null hypothesis

TABLE XXIV

ANALYSIS OF ATTENDANCE

Class	Group	Number of Students	Range in Half Days Present	Mean	Standard Deviation
	*O	6	286 - 335	321.5	16.49
1956	*A	6	314 - 342	326.0	8.86
	*U	6	302 - 341	324.2	2.41
	O	10	311 - 340	327.1	9.15
1957	A	10	324 - 341	330.9	5.43
	U	10	276 - 335	315.3	14.77
	O	10	306 - 338	321.5	10.61
1958	A	10	315 - 342	329.1	8.40
	U	10	319 - 338	327.4	6.30
Total	O	26	286 - 340	323.6	12.08
	A	26	314 - 342	329.1	8.08
	U	26	276 - 341	322.0	7.39

*O - overachievers,   A - achievers,   U - underachievers

TABLE XXV

DIFFERENCES OF MEANS OF ATTENDANCE AND
CORRESPONDING t VALUES

Groups Compared	Class of 1956 Difference of Means	t	Class of 1957 Difference of Means	t	Class of 1958 Difference of Means	t	Total Difference of Means	t
*O - A	-4.5	-0.539	-3.8	-1.07	-7.6	-1.685	-5.5	-.991
O - U	-2.7	-0.364	11.8	2.1	-5.9	-1.431	1.6	0.566
A - U	1.8	-0.438	15.6	2.09	1.7	0.486	7.1	3.24

*O - overachievers,   A - achievers,   U - underachievers

at the five per cent level of confidence. Therefore the
inference drawn is that, in respect to grade points earned,
no significant differences exist between the overachievers,
achiever, and underachiever groups.

TABLE XXVI

ANALYSIS OF GRADE POINTS

Group	Number of Students	Range of Grade Points	Mean	Standard Deviation
Overachievers	26	11 - 24	15.8	3.17
Achievers	26	9 - 25	17.4	4.32
Underachievers	26	11 - 23	16.2	3.15

TABLE XXVII

DIFFERENCES OF MEANS OF GRADE POINTS AND
CORRESPONDING t VALUES

Groups Compared	Difference of Means	t
*O - A	-1.6	-1.51
O - U	-0.4	-0.377
A - U	1.2	1.13

*O - overachievers, A - achievers, U - underachievers.

Number of subjects. An examination of Tables XXVIII
and XXIX shows that the null hypothesis (that there are no
significant differences between the overachievers, achievers,

and underachievers in respect to the numbers of subjects
in their programs) should be accepted. The observed dif-
ficrences (-0.15, -0.16, and -0.01) are small and the
corresponding values of t (1.21, 1.29, and .742) provide
no evidence for rejecting the null hypothesis. The infer-
ence is that overachievers, achievers, and underachievers
do not differ significantly in the number of subjects in
their programs.

TABLE XXVIII

ANALYSIS OF NUMBER OF SUBJECTS

Group	Number of Students	Range of Number of Subjects	Mean	Standard Deviation
Overachievers	26	4 - 5	4.19	.394
Achievers	26	4 - 5	4.35	.476
Underachievers	26	4 - 5	4.35	.476

TABLE XXIX

DIFFERENCES OF MEANS OF NUMBER OF SUBJECTS
AND CORRESPONDING t VALUES

Groups Compared	Difference of Means	t
*O - A	-0.15	1.21
O - U	-0.16	1.29
A - U	-0.01	.742

*O - overachievers, A - achievers, U - underachievers

Student Check List for Self-Analysis.[1] The Check

List was completed by all (26) of the overachiever group,

by twenty-five of the twenty-six achievers, and by twenty-

four of the twenty-six underachievers. Only 1.2 per cent

of the questions were not answered at all (instructions for

the check list contained this provision for cases of in-

decision). Few of the questions evidenced distinctions be-

tween the three groups.

A study of Table XXX locates only four questions

(18, 22, 27, and 36) in which there are distinct differences

in the number of "yes" answers among the three groups. The

x^2 test of significance of the distribution of the combined

answers of these four questions yields a value (x^2 = 9.87)

which implies that for this combination of questions chance

will produce such differences between the overachievers,

achievers, and underachievers less than once out of one

hundred times. The distribution of "yes" answers on these

questions, taken singly, as indicated by x^2 values of 2.85

to 3.64, might occur by chance about ten per cent of the

time.

The inference may be drawn that overachievers are

----

[1]A copy of the Student Check List has been placed in
the Appendix.

TABLE XXX

ANALYSIS OF STUDENT CHECK LIST

Question	Numbers of Questions Answered "Yes"			Numbers of Questions Answered "No"		
	*O	*A	*U	O	A	U
1	18	18	17	8	6	7
2	14	16	17	12	9	7
3	25	25	21	1	0	3
4	7	12	5	18	13	17
5	23	24	21	3	1	3
6	5	6	6	21	17	18
7	8	4	4	17	21	19
8	11	13	12	15	12	12
9	6	9	5	20	16	18
10	10	10	7	15	15	17
11	8	5	6	18	20	17
12	13	17	13	9	8	11
13	24	20	22	2	5	2
14	12	6	13	14	18	11
15	12	10	6	14	15	18
16	12	15	16	14	10	7
17	10	15	4	16	10	20
18	20	15	13	5	8	10
19	3	5	2	23	20	22
20	14	15	14	12	10	10
21	13	9	14	11	16	10
22	16	13	9	10	11	15
23	4	3	7	22	22	17
24	10	6	3	16	19	20
25	11	11	12	14	13	11
26	3	5	5	23	20	18
27	23	20	18	3	5	6
28	20	21	17	5	4	7
29	12	13	13	13	12	10
30	6	6	6	19	19	18
31	8	9	4	18	15	19
32	9	12	4	15	13	20
33	9	13	8	17	12	15
34	2	3	4	24	22	20
35	23	23	21	2	2	2
36	19	14	10	7	11	12
37	8	9	10	17	16	14
38	10	10	11	16	15	13

*O - overachievers   A - achievers U - underachievers

somewhat more likely to consider other members of the class better students than themselves (question 18), to memorize by both writing and repeating aloud (question 22), to think that they get enough rest (question 27), and to worry about tests (question 36). The percentages of each of the three groups making "yes" answers to these questions are tabulated in Table XXXI.

The columns of "no" answers in Table XXX reveal four questions in which there are distinct differences in the frequencies reported for the three groups. Combining the frequencies for these four questions (2, 16, 26, 34) and using the χ^2 test of the significance of the distribution, results in $\chi^2 = 4.60$, which reflects a probability of approximately ten per cent that the distribution occurred by chance alone. Accordingly, the null hypothesis, that there are no significant differences between the overachievers, achievers, and underachievers in respect to their answers to these four questions, cannot be confidently rejected.

Consequently, little confidence may be placed in the analysis set forth in Table XXXII in which there are some indications that underachievers are more likely than the other two groups to report themselves as systematic and regular in their work (question 2), to consider that they volunteer frequently (question 16) to feel dissatisfied

TABLE XXXI

ANALYSIS OF "YES" ANSWERS TO FOUR STUDENT
CHECK LIST QUESTIONS

	Overachievers		Achievers		Underachievers	
Question	Number of "Yes" Answers	Per Cent	Number of "Yes" Answers	Per Cent	Number of "Yes" Answers	Per Cent
18	20	77.0	15	60.0	13	54.2
22	16	61.6	13	52.0	9	37.5
27	23	88.5	20	80.0	18	75.0
36	19	73.1	14	56.0	10	41.7

TABLE XXXII

ANALYSIS OF "NO" ANSWERS TO FOUR STUDENT
CHECK LIST QUESTIONS

	Overachievers		Achievers		Underachievers	
Question	Number of "No" Answers	Per Cent	Number of "No" Answers	Per Cent	Number of "No" Answers	Per Cent
2	12	46.2	9	36	9	29.2
15	14	53.8	10	40	7	29.2
26	23	88.6	20	80	18	75.0
34	24	92.5	22	88	20	83.5

with average marks (question 26), and to be less sure that
they pass in work on time (question 34).

Mental Health Analysis. From the experimental run
of the Mental Health Analysis, scores were available for
87.5 per cent of the overachievers, 68.8 per cent of the
achievers, and 75.0 per cent of the underachievers from the
classes of 1956 and 1957. These students were considered
random samples since presence in school on the day of the
analysis was administered was the only controlling factor.
Scores of these students are tabulated in Tables XXXIII and
XXXIV.

After a study of the range, means, and standard
deviations of the scores of the Mental Health Analysis re-
vealed no significant differences between the overachievers,
achievers, and underachiever groups, the writer decided to
examine only the extreme scores. Accordingly, Tables XXXIII
and XXXIV were analyzed again and a tabulation of scores
at or above the eightieth percentile, as reported in the
Manual of Directions, was made for the three groups and re-
ported in Tables XXXV, XXXVI and XXXVII. A similar tabu-
lation of scores at or below the twentieth percentile was
completed and reported in Tables XXXVIII, XXXIX, and XL.
Since there appeared only one frequency (3) below five in

TABLE XXXIII

SCORES OF STUDENTS ON MENTAL HEALTH ANALYSIS
SUBTESTS OF MENTAL HEALTH ASSETS

Group	Class	Student	Close Personal Relationships	Inter-personal Skills	Social Participation	Satisfying Work and Recreation	Outlook and Goals	Total
Over-achievers	Class of 1956	14	20	15	18	15	20	88
		26	17	13	9	10	19	78
		24	20	20	20	16	20	96
		42	20	16	18	15	17	86
		51	17	10	15	13	18	73
		43	20	18	19	13	18	88
	Class of 1957	37	16	13	12	12	17	70
		30	13	14	13	13	15	68
		50	18	19	17	9	17	80
		52	18	18	17	8	17	78
		40	16	19	13	15	19	82
		25	19	19	20	18	19	95
		23	20	16	18	16	19	89
		47	11	15	8	14	18	66
	Group Mean		17.5	16.1	15.5	13.3	18.1	81.2
Achievers	Class of 1956	12	18	17	18	9	18	80
		9	20	17	18	13	19	87
		15	19	18	20	18	18	93
		49	19	18	17	11	19	84
		45	20	17	20	17	19	93
	Class of 1957	17	19	13	18	13	19	82
		16	19	17	19	16	18	89
		39	18	13	12	17	18	78
		44	19	15	18	14	19	85
		22	18	12	14	12	16	72
		19	18	8	13	11	16	66
	Group Mean		18.8	15.0	17.0	13.7	18.1	82.6

TABLE XXXIII (continued)

Group	Class	Student	Close Personal Relationships	Inter-personal Skills	Social Participation	Satisfying Work and Recreation	Outlook and Goals	Total
Under-achievers	Class of 1956	13	20	16	20	16	19	91
		3	17	16	14	17	19	83
		19	17	18	20	20	18	93
		7	17	15	17	12	16	77
		18	18	15	16	11	19	79
		7	20	17	20	19	19	95
	Class of 1957	5	10	15	13	11	19	68
		13	18	15	17	15	18	83
		3	20	16	19	16	19	90
		10	20	18	18	16	20	92
		35	19	17	18	15	17	86
		26	18	17	14	14	18	81
	Group Mean		17.8	16.2	17.2	15.2	18.4	84.6

TABLE XXXIV

SCORES OF STUDENTS ON MENTAL HEALTH ANALYSIS
SUBTESTS OF MENTAL HEALTH LIABILITIES

Group	Class	Student	Behavioral Immaturity	Emotional Instability	Feelings of Inadequacy	Physical Defects	Nervous Manifestations	Total
Over-Achievers	Class of 1956	14	7	10	15	18	15	65
		26	19	17	18	20	19	93
		24	15	17	18	20	18	88
		42	17	13	20	20	18	88
		51	17	13	16	19	18	83
		43	15	7	11	11	13	57
	Class of 1957	37	10	8	17	19	17	71
		30	16	7	11	17	17	63
		50	11	12	7	18	13	61
		52	10	5	14	18	17	64
		40	17	16	15	16	17	81
		25	17	18	18	20	20	93
		23	16	15	17	19	16	83
		47	17	14	10	19	13	69
Group Mean			14.6	12.3	14.8	18.1	16.5	76.0
Achievers	Class of 1956	12	17	6	11	16	16	66
		9	19	12	20	19	13	83
		15	16	11	16	20	17	80
		40	14	9	9	19	16	67
		45	12	2	7	13	14	48
	Class of 1957	17						
		16	17	11	13	19	18	78
		39	13	12	10	17	12	64
		44	13	10	16	20	17	76
		22	16	13	15	20	18	82
		19	19	18	15	20	20	92
Group Mean			15.9	10.9	13.6	18.3	16.2	74.8

TABLE XXXIV (continued)

Group	Class	Student	Behavioral Immaturity	Emotional Instability	Feelings of Inadequacy	Physical Defects	Nervous Manifestations	Total
Under-Achievers	Class of 1956	13	12	14	17	19	19	81
		3	17	16	18	18	19	88
		19	15	16	17	20	18	76
		7	16	13	13	20	17	79
		18	18	18	18	20	19	93
		7	17	17	20	18	18	90
	Class of 1957	5	12	3	10	19	12	56
		13	18	15	18	19	20	90
		3	14	18	18	20	17	87
		10	17	14	17	20	18	86
		35	17	15	16	20	17	85
		26	15	11	16	19	16	77
	Group Mean		15.7	14.2	16.5	19.3	17.5	82.3

TABLE XXXV

FREQUENCIES OF MENTAL HEALTH ASSETS SCORES
AT OR ABOVE THE EIGHTIETH PERCENTILE

Group	Number	Close Personal Relationships	Inter-personal Skills	Social Participation	Satisfying Work and Recreation	Outlook and Goals	Total
Overachievers	14	5	6	6	1	9	27
Achievers	11	6	6	7	3	9	31
Underchievers	12	5	5	6	3	10	29

TABLE XXXVI

FREQUENCIES OF MENTAL HEALTH LIABILITIES SCORES
AT OR ABOVE THE EIGHTIETH PERCENTILE

Group	Number	Behavioral Immaturity	Emotional Instability	Feelings of Inadequacy	Physical Defects	Nervous Manifestation	Total
Overachievers	14	5	4	5	8	4	26
Achievers	11	3	2	2	6	3	18
Underchievers	12	6	7	8	10	7	38

TABLE XXXVII

ANALYSIS OF FREQUENCIES IN TABLES XXXV AND XXXVI

Group	Total Numbers of Scores	Per Cent of Possible Scores of Groups
Overachievers	53	37.9
Achievers	49	44.5
Underachievers	67	55.8

TABLE XXXVIII

FREQUENCIES OF MENTAL HEALTH ASSETS SCORES
AT OR BELOW THE TWENTIETH PERCENTILE

Group	Number	Close Personal Relationships	Inter personal Skills	Social Participation	Satisfying work and recreation	Outlook and Goals	Total
Overachievers	14	4	1	3	3	0	9
Achievers	11	0	2	1	3	0	6
Underachievers	12	0	0	0	0	0	0

TABLE XXXIX

FREQUENCIES OF MENTAL HEALTH LIABILITIES SCORES
AT OR BELOW THE TWENTIETH
PERCENTILE

Group	Number	Behavioral Immaturity	Emotional Instability	Feelings of Inadequacy	Physical Defects	Nervous Manifestations	Total
Overachievers	14	4	4	3	1	0	12
Achievers	11	0	2	4	1	1	8
Underachievers	12	0	1	1	0	1	3

TABLE XL

ANALYSIS OF FREQUENCIES IN
TABLES XXXVIII AND XXXIX

Group	Total number of scores	Per cent of Possible scores of group
Overachievers	21	15.0
Achievers	14	12.7
Underachievers	3	2.5

Tables XXXVII and XL, a χ^2 test was used to test the significance of frequencies reported. The resulting value, $\chi^2 = 14.15$ for two degrees of freedom, indicated that these frequencies would not have occurred by chance more than one time in one thousand.

An examination of Table XXXVII reveals that the largest percentage of scores above the eightieth percentile is reported for the underachievers. Such high scores are interpreted in the Manual of Directions for the Mental Health Analysis as showing relative freedom from psychological problems. This fact also coincides with one revealed in Table XL, where the underachievers show the smallest percentage of scores below the twentieth percentile. Reference to the same two tables show the overachievers with the lowest percentage of scores above the eightieth percentile and the highest percentage of scores below the twentieth percentile.

While a pattern is not clearly distinguishable in the frequencies reported in each of the ten categories of Tables XXXV and XXXVI, such a pattern does appear in the ten categories of Tables XXXVIII and XXXIX. In these tables three of the scores of the underachievers fall below the twentieth percentile, while in each of two categories (behavioral immaturity and close personal relationship) the

scores of four overachievers are the only ones recorded.
In another category (emotional instability) the over-
achievers have four scores reported below the twentieth per-
centile while the achievers and underachievers have two
scores and one score respectively. Unfortunately, such
small frequencies are only suggestive of conclusions since
they are not susceptible to accurate tests of significance.

The inference drawn from these statistics is that
underachievers feel themselves somewhat freer from psycho-
logical stresses than do either achievers or overachievers,
and that overachievers feel these stresses somewhat more
than either achievers or underachievers.

Kuder Preference Record. The regular administration
of the Kuder Preference Record produced scores which were
available for 87.5 per cent of the overachievers, 93.8 per
cent of the achievers, and 81.3 per cent of the under-
achievers from the classes of 1956 and 1957. These students
were considered random samples since administration of the
record was not done selectively. Scores of these students
are tabulated in Tables XLI and XLII.

A study of the scores, their ranges, and means does
not reveal significant differences between the overachiever,
achiever, and underachiever groups. Another analysis of

TABLE XLI

SCORES OF GIRLS ON KUDER PREFERENCE RECORD

Overachievers Class Student		Outdoor	Mechanical	Computational	Scientific	Persuasive	Artistic	Literary	Musical	Social Service	Clerical
Class	24	43	38	19	37	39	26	15	25	46	34
of	28	42	37	28	23	23	31	17	5	48	68
1956	37	43	21	28	33	20	30	5	14	60	43
	52	50	25	14	47	30	28	15	10	60	36
Class	40	54	29	31	31	29	45	21	2	68	23
of	25	15	13	27	35	38	24	29	15	63	52
1957	42	29	13	31	20	62	27	19	18	56	61
	50	21	11	11	17	51	41	27	21	45	66
	51	29	8	28	37	36	47	19	12	46	65
Mean		36.2	21.7	24.1	31.1	36.4	33.2	18.6	13.6	54.7	49.8
Achievers											
Class	8	24	20	23	26	51	39	3	22	56	52
of	9	43	37	24	37	32	31	14	15	22	70
1956	12	24	30	35	24	32	40	9	18	45	63
	23	56	22	29	41	24	41	20	14	30	44
Class	49	38	35	19	21	51	24	26	27	20	62
of	43	44	23	12	48	28	25	13	18	55	47
1957	45	28	18	23	40	40	41	8	18	65	35
	17	21	16	12	16	48	40	15	27	35	75
Mean		34.8	25.1	22.1	31.6	38.4	35.1	13.5	19.9	41.0	56.0
Under-Achievers											
Class of 1956	3	44	33	11	36	34	44	19	11	20	36
Class of 1957	9	68	26	26	34	17	34	32	22	49	29
	13	46	21	9	20	43	41	34	14	37	46
	5	30	23	18	27	43	34	24	15	56	32
	18	35	19	13	30	52	38	16	7	53	54
Mean		44.6	24.4	15.4	39.4	37.8	38.2	25.0	13.8	43.0	39.4

TABLE XLII

SCORES OF BOYS ON KUDER PREFERENCE RECORD

Overachievers		Outdoor	Mechanical	Computational	Scientific	Persuasive	Artistic	Literary	Musical	Social Service	Clerical
Class	Student										
Class	14	29	58	37	57	40	14	5	21	31	47
of	16	66	51	12	51	26	36	18	23	34	23
1956	26	60	51	35	61	47	13	24	21	15	48
Class	23	29	34	22	46	42	25	33	11	41	39
of	47	49	40	26	57	36	34	29	4	32	42
1957											
	Mean	46.6	46.8	26.4	54.4	38.2	24.4	21.0	16.0	30.6	39.8
Achievers											
Class	1	70	45	46	68	14	21	5	10	44	49
of	15	61	39	7	62	42	43	10	5	37	32
1956											
Class	44	38	51	21	53	43	10	27	6	31	63
of	19	42	31	27	56	23	32	23	23	50	24
1957	4	28	30	36	43	44	45	31	7	35	49
	16	62	30	38	40	27	26	25	5	32	55
	39	46	34	25	58	20	27	28	6	46	46
	Mean	49.6	37.1	28.6	54.3	30.4	29.1	21.3	8.9	39.3	45.4
Under-Achievers											
Class of 1956	6	39	42	53	64	33	21	17	8	19	63
	7	55	24	27	53	41	11	26	17	49	41
	13	49	49	32	55	36	20	26	3	27	55
Class of	19	64	46	23	62	25	19	7	9	46	45
1957	26	39	41	26	36	54	29	25	9	32	46
	11	23	58	16	47	42	38	16	3	39	48
	10	42	48	20	63	43	23	6	8	35	35
	Mean	44.4	44.0	28.1	54.3	39.9	23.0	17.6	8.1	34.9	47.6

these data was made, tabulating only the extreme scores.
Table XLIII is a compilation of the frequencies of scores
above the eightieth percentile as shown on the Profile
Sheet for the Kuder Preference Record. Table XLIV is a
compilation of the frequencies of scores below the twentieth
percentile.

Since the small number of frequencies precludes the
accurate use of contingency tables or tests of significance,
it is worthwhile only to note the differences suggested.
Consideration of the tabulation of girls' scores shows that
the overachievers have more scores above the eightieth per-
centile than do achievers or underachievers in computational
and social service areas. An inference which might be drawn
from the preceding statements is that about half (55.5 per
cent) of the overachieving girls show strong interest (above
the eightieth percentile) in computation and about half
(44.4 per cent) show strong interest in social service.

A review of the tabulation of the boys' scores fails
to locate a pattern of the frequencies which might be in-
terpreted as showing either strong or weak interests in any
of the areas comprising the Kuder Preference Record. Com-
bining the tabulation of the boys' frequencies and the girls'
frequencies produces totals which reveal no definite patterns

TABLE XLIII

FREQUENCIES OF KUDER PREFERENCE RECORD SCORES
AT OR ABOVE THE EIGHTIETH PERCENTILE

	Number	Outdoor	Mechanical	Computational	Scientific	Persuasive	Artistic	Literary	Musical	Social Service	Clerical	Total
Girls:												
Overachievers	9	4	2	5	1	2	2	2	1	4	0	23
Achievers	8	3	3	2	3	3	5	0	2	1	1	23
Underachievers	5	3	1	0	0	1	3	2	0	0	0	10
Boys:												
Overachievers	5	1	1	2	3	0	1	3	3	0	0	14
Achievers	7	2	0	3	5	0	2	4	1	2	2	21
Underachievers	8	1	1	2	5	1	1	3	0	2	2	18
Total:												
Overachievers	14	5	3	7	4	2	3	5	4	4	0	37
Achievers	15	5	3	5	8	3	7	4	3	3	3	44
Underachievers	13	4	2	2	5	2	4	5	0	2	2	28

TABLE XLIV

FREQUENCIES OF KUDER PREFERENCE RECORD SCORES
AT OR BELOW THE TWENTIETH PERCENTILE

	Number	Outdoor	Mechanical	Computational	Scientific	Persuasive	Artistic	Literary	Musical	Social Service	Clerical	Total
Girls:												
Overachievers	9	2	4	2	1	4	0	1	4	0	4	22
Achievers	8	1	1	2	1	1	0	4	0	4	2	16
Underachievers	5	0	0	3	0	1	0	0	2	2	3	11
Boys:												
Overachievers	5	2	1	1	0	1	2	1	1	1	1	11
Achievers	7	1	4	1	0	4	1	2	5	1	2	21
Underachievers	8	1	1	1	0	1	1	2	2	2	1	12
Total:												
Overachievers	14	4	5	3	1	5	2	2	5	1	5	33
Achievers	15	2	5	3	1	5	1	6	5	5	4	37
Underachievers	13	1	1	4	0	2	1	2	4	4	4	23

of interests. Therefore, the conclusion is reached that overachievers, achievers, and underachievers do not differ significantly in their responses to the Kuder Preference Record.

Teacher's Rating Scale.[2] The experiment with the Teacher's Rating Scale produced ratings for 46.2 per cent of the overachievers, 50 per cent of the achievers, and 50 per cent of the underachievers. Frequencies of the extreme ratings (1, 2, and 5) are tabulated in Tables XLV and XLVI. Since numbers were too small to use x^2 tests of significance for the distributions of frequencies for each item, such tests were performed only for the total distributions in each of the four areas into which the scale was divided. The null hypothesis, that there are no significant differences between the three groups in respect to the frequencies of extreme ratings, must be rejected in all four areas, home and written work, class habits, observed attitudes toward people, and observed attitudes toward school.

In the area labeled "home and written work," $x^2 = 9.13$ indicates that the distribution of the totals for these three groups would have occurred between one and two times in one

_____

[2]Appendix.

TABLE XLV

NUMBERS OF STUDENTS WITH HIGH RATINGS
ON THE TEACHER'S RATING SCALE

Area	Question	Number of Students With High Ratings		
		Over-Achievers	Achievers	Under-Achievers
Home and written work	1	2	5	3
	2	3	5	0
	3	5	2	1
	4	3	2	1
	5	5	6	2
Total		18	20	7
Class habits	1	2	4	3
	2	1	3	2
	3	2	4	2
	4	1	3	2
	5	3	4	1
	6	1	1	1
	7	3	4	2
	8	2	2	2
	9	3	2	2
	10	5	4	3
	11	2	1	1
	12	4	3	1
	13	6	5	2
	14	5	6	3
	15	2	1	0
	16	2	0	5
	17	1	1	2
	18	2	4	2
	19	2	1	2
	20	6	4	3
	21	9	6	8
Total		64	67	49

TABLE XLV (continued)

Area	Question	Number of Students With High Ratings Over-Achievers	Achievers	Under-Achievers
Observed	1	9	6	5
attitudes	2	2	4	0
toward	3	0	0	2
people	4	1	0	0
	5	4	2	1
	6	1	1	1
	7	3	3	0
	8	4	0	0
	9	3	0	0
	10	7	5	0
	11	2	1	0
	12	2	0	2
	13	5	6	2
	14	1	3	0
Total		44	31	13
Observed	1	2	3	1
attitudes	2	3	4	2
toward	3	5	2	2
school	4	2	4	3
	5	5	4	1
	6	7	5	2
	7	4	4	2
	8	8	6	3
	9	4	5	4
Total		39	37	20

TABLE XLVI

NUMBERS OF STUDENTS WITH LOW RATINGS
ON THE TEACHER'S RATING SCALE

Area	Question	Number of Students With Low Ratings		
		Over-Achievers	Achievers	Under-Achievers
Home and written work	1	2	2	2
	2	2	3	4
	3	2	3	3
	4	3	2	4
	5	1	3	4
Total		7	13	17
Class habits	1	3	2	3
	2	0	3	4
	3	3	2	4
	4	2	2	4
	5	3	1	4
	6	4	3	2
	7	1	2	4
	8	1	2	1
	9	2	2	1
	10	1	3	4
	11	3	3	6
	12	3	1	2
	13	1	1	3
	14	1	0	2
	15	2	1	4
	16	2	1	1
	17	4	1	1
	18	3	2	2
	19	3	3	5
	20	1	0	0
	21	1	0	0
Total		44	35	57

TABLE XLVI (continued)

Area	Question	Number of Students With Low Ratings		
		Over-Achievers	Achievers	Under-Achievers
Observed	1	1	1	1
attitudes	2	1	1	3
toward	3	3	3	2
people	4	4	3	3
	5	1	1	3
	6	0	1	1
	7	0	0	1
	8	1	0	1
	9	1	1	1
	10	1	0	2
	11	1	1	2
	12	0	2	1
	13	1	0	1
	14	1	1	3
Total		16	15	25
Observed	1	1	0	0
attitudes	2	2	2	4
toward	3	1	2	3
school	4	1	0	0
	5	1	0	1
	6	1	1	2
	7	1	2	1
	8	0	0	2
	9	2	1	4
Total		10	8	17

hundred by chance alone. The area of "class habits" has a distribution of total ratings which could have occurred only two times in one hundred by accident of sampling as shown by the value 8.17 for χ^2. In the area of "observed attitudes toward people" the distribution of total frequencies might have occurred less than once in one hundred times by chance since χ^2 for this distribution has a value of 15.27. The χ^2 value of 9.55 found for the area labelled "observed attitudes toward school" shows chances of less than one in one hundred that the distribution was an accident of sampling.

The scores contributing most to the totals found in each of the four areas of the Teacher's Rating Scale may be identified by eliminating items in which the frequencies reported for the overachievers, achievers, and underachievers are equal and those in which the three frequencies have no differences of more than two. The remaining items have been classified in Table XLVII and Table XLVIII, showing the group in which fifty per cent or more of the ratings appear.

Examination of Table XLVII shows that the underachiever group received fifty per cent or more of the low ratings (1 or 2) on thirteen items of the forty-nine item rating scale. Reference to the Teacher's Rating Scale in the Appendix permits identification of these thirteen items.

TABLE XLVII

GROUPS HAVING FIFTY PER CENT OR MORE OF
THE LOW RATINGS ASSIGNED AN ITEM

Area	Item	Group
Home and written work	5	Underachievers
Class habits	2	Underachievers
	4	Underachievers
	5	Underachievers
	7	Underachievers
	10	Underachievers
	11	Underachievers
	13	Underachievers
	15	Underachievers
	17	Overachievers
Observed attitudes toward people	2	Underachievers
	5	Underachievers
	14	Underachievers
Observed attitudes toward school	9	Underachievers

TABLE XLVIII

GROUPS WITH FIFTY PER CENT OR MORE OF
THE HIGH RATINGS ASSIGNED AN ITEM

Area	Item	Group
Home and written work	1	Achievers
	2	Achievers
	3	Overachievers
Class Habits	2	Achievers
	4	Achievers
	5	Achievers
	12	Overachievers
	16	Underachievers
Observed attitudes toward people	2	Achievers
	5	Overachievers
	7	*Overachievers
		*Achievers
	8	Overachievers
	9	Overachievers
	10	Overachievers
	14	Achievers
Observed attitudes toward school	3	Overachievers
	5	Overachievers
	6	Overachievers

* Each of these groups received fifty per cent of the high ratings assigned this item.

From such examination and reference the inference may be drawn that the underachievers are more likely than the over-achievers or the achievers to be late with home or written work, lazy, habitually distractive, talkative, indifferent, erratic, wasteful, mischievous, needing supervision, argu-mentative, inclined to "show-off," and easily upset. While such a combination of qualities probably would not be found in any single underachiever, there is some indication that all of these qualities could be identified in a large group of underachievers.

The achievers did not receive fifty per cent or more of the low ratings for any item. The overachievers received more than fifty per cent of the low ratings in only one item, number 17 in the area of class habits. The implication is that considerable numbers of the overachievers are not eager to recite.

A similar study of Table XLVIII reveals that few underachievers are rated highest (5) on any item excepting number 16 in the area of "class habits." While none of the achievers received the highest rating on this item and only two (16.7 per cent) of the overachievers, there were five (38.5 per cent) of the underachievers who were so rated. One may infer that teachers are inclined to rate more under-achievers as mentally quick.

Table XLVIII also shows that the achievers received fifty per cent or more of the highest ratings on seven items. This fact implies that they are somewhat more likely than the other two groups to have their work complete, to be careful and industrious, to be able to concentrate, to be quiet rather than talkative, to be cooperative, and to be emotionally stable.

The overachievers, as indicated in Table XLVIII, received fifty per cent or more of the highest ratings on ten items. Consequently they, somewhat more than the achievers or underachievers, are likely to be considered neat, mindful of their own business, modest, cheerful, poised, loyal, obedient and responsive, careful of property, capable of stimulation, and friendly with teachers.

The observations set forth in the preceding paragraphs indicate definite differences between the over-achievers, achievers, and underachievers of the population when the method of study deals only with the highest and lowest ratings.

SUMMARY

The overachiever, achiever, and underachiever groups were found to have common characteristics of age, reading ability, number of grade points earned, number of subjects

in their programs, and attendance. No significant differ-
ences between the three groups were discovered in respect
to these traits and it appears that, for this population,
they are traits having little or no bearing on the relative
achievement of students.

Trait differences found in responses to the Kuder
Preference Record and the Student Check List did not meet
the criterion of significance. Trait differences located
in intelligence test scores, boy-girl distribution, lan-
guage scores, the Mental Health Analysis, and the Teacher's
Rating Scale did meet the criterion of significance.

The significant trait differences in intelligence
point to the underachievers as the most intelligent of the
three groups and to the overachievers as the least intel-
ligent.

The language ability of the overachiever group was
discovered to be significantly less than that of the
achievers or the underachievers. This trait difference was
substantiated when ten pairs of overachievers and under-
achievers were matched to minimize the influence of IQ and
age.

Girls outnumbered boys nearly two to one in the
overachiever group studied. The achiever group had very

nearly equal numbers of boys and girls. Boys outnumbered girls more than two to one in the underachiever group. The observed distribution was significant at the five per cent level.

The significant results of the Mental Health Analysis pictured the underachiever group as showing very few symptoms of social or psychological pressures. The achiever group revealed some of these symptoms. The overachiever group reflected more of such pressures than either the achievers or underachievers.

According to critical factors on the Teacher's Rating Scale the overachiever group had the highest ratings in traits involving home and written work, class habits, observed attitudes toward people, and observed attitudes toward school. With the exception of a high rating in mental alertness, the underachiever group was found to have the lowest ratings in these areas. The achiever group had a significant number of the highest ratings in home and written work, class habits, and observed attitudes toward people.

CHAPTER VII

CONCLUSIONS AND IMPLICATIONS

The problem was to locate and describe traits which
are characteristic of three groups of college preparatory
students. These three groups were labelled overachievers,
achievers, and underachievers. They were defined by com-
paring the ranks of students on criterion tests of achieve-
ment with ranks on criterion tests of intelligence.

Data were gathered from three general sources:
school records, ratings of teachers, and responses of the
students themselves on such instruments as tests and check
lists.

Discovered trait differences were significant enough
to identify traits which were characteristic of the over-
achiever, achiever, and underachiever groups drawn from the
population studied. The identified traits were considered
descriptive characteristics of these three groups.

CONCLUSIONS

Characteristic traits of the overachiever group.
This group consisted of students who achieved more than
might have been expected from their intelligence tests.
From the results reported in Chapter VI, the overachiever

group contains about twice as many girls as boys. These students are less well equipped mentally than either the achievers or the underachievers, a fact which may be inferred from their relatively low IQ's and language scores.

A study of the Mental Health Analysis scores shows the overachievers to reflect more psychological pressure than achievers or underachievers. That they tend to be somewhat unsure of themselves is indicated by the fact that several report feeling others better than themselves, worrying about tests, and having few close personal relationships.

The Teacher's Rating Scale results adds more to the description of the overachiever group. Many of them are reluctant to recite in class, that is, they are inclined to volunteer little. However, from a more positive point of view, teachers give many overachievers the highest ratings in such traits as neatness, poise, loyalty, obedience and responsiveness, being mindful of own business, careful of property, capable of stimulation, and friendliness with teachers.

While the results of the Rating Scale may be questioned from the viewpoint that these traits are ones which teachers would normally apply to "good" students anyway,

it must be remembered that these overachievers were se-
lected by using only objective test criteria and that some
of them are not receiving high grades in their courses.

Collectively, these traits picture the typical over-
achiever as being of relatively limited capacity, somewhat
aware of his status, but doing well in the business of
"keeping up" and in conforming to most of the requirements
of school.

Characteristic traits of the underachiever group.
As defined by the criteria, the underachiever group has
achievements below what might be expected from their
scores on intelligence tests. The group contains about
twice as many boys as girls. Quite a number of the most
intelligent students are found in this group. Most of
them also have superior language abilities.

The Mental Health Analysis scores shows that stu-
dents in this group have few symptoms of social or psy-
chological pressures. In none of the ten categories of
the Mental Health Analysis did the underachievers have
fifty per cent of the low scores reported. In general, the
scores of the underachiever group shows them to be better
adjusted than the achievers or the overachievers.

As indicated by a study of ratings from the Teacher's
Rating Scale, teachers consider the underachievers as men-
tally quick. While the group as a whole earns as many
grade points and carries as many subjects in their programs
as the achiever or overachiever groups, teachers do not
rate this group highly. The typical underachiever is con-
sidered by his teachers to be lazy, frequently late with
home or written work, habitually distractive, talkative,
indifferent, erratic, wasteful, mischievous, requiring
supervision, argumentative, easily upset, and inclined to
"show off."

Obviously such a collection of traits is seldom
characteristic of any one underachiever but is likely to
be observed in a group of several such students. These
traits reveal the underachiever group as one which finds
it difficult to conform to school routines.

Characteristic traits of the achiever group. The
students of this group have achievements which might be
expected from consideration of their intelligence scores.
The group consists of about equal numbers of boys and
girls. The mean IQ of this group is between the extremes
as represented by the overachievers and the underachievers.
The distribution of IQ's indicates that the typical achiever

may come from any place in the IQ range. In other words,
the achiever may be among those of highest, average, or
lowest ability. The same observation may be made about the
language ability of the achiever.

A study of the Mental Health Analysis scores also
places the achiever group between the extremes represented
by the overachievers and the underachievers. It may be
inferred that the achiever group is somewhat less respon-
sive to social and psychological pressures than the over-
achievers but somewhat more responsive than the under-
achievers.

The Teacher's Rating Scale did point out that, of
the three groups, only the achievers did not receive fifty
per cent or more of the low ratings on items which made dis-
tinctions between the groups. In addition, they did receive
fifty per cent or more of the high ratings on seven such
items. These items reveal the achiever as being able to
concentrate, as usually having home and written work com-
plete, and as being careful, industrious, cooperative,
emotionally stable, and quiet rather than talkative.

The composite picture of the achiever reveals a stu-
dent who seems to fit into the pattern of school life and
to make reasonable adjustments to social and psychological
pressures.

<u>Traits</u> <u>common</u> <u>to</u> <u>the</u> <u>three</u> <u>groups</u>. Though age,
reading ability, attendance, number of courses in the stu-
dent's program, and grade points earned have a logical re-
lation to achievement in general, these traits did not
provide differences significant enough to distinguish be-
tween the three groups organized by the criteria. Con-
sequently, these traits must be considered common charac-
teristics of overachievers, achievers, and underachievers.

Reading scores, as measured by the Cooperative
English Test C_1, yielded no significant differences between
overachievers, achievers, and underachievers. It may be
inferred that reading abilities are of minor importance in
distinguishing between the three groups studied.

While differences in interest patterns of the three
groups might have been anticipated, the Kuder Preference
Record scores revealed no significant differences. A study
of the ranges and means of the scores in each of the ten
scales led to a conclusion that the overachiever, achiever,
and underachiever groups were much alike in their interests.
A study of the extreme scores resulted in much the same
conclusion, with only a slight suggestion that the under-
achievers might have less definite interests.

Thirty of the thirty-eight questions in the Student
Check List received approximately the same distributions

of "yes" and "no" answers from all three groups. Nineteen
of the forty-nine items on the Teacher's Rating Scale had
few extreme ratings for any one of the three groups. These
questions and items reflect traits common to the three groups.

While the results of this study reveal many traits
which may be equally descriptive of any one of the three
groups, these traits were not summarized. They were not in-
cluded in the scope of the study.

IMPLICATIONS

Characteristic traits as aids to understanding stu-
dent problems. The conclusions reached in this study are
contributions to the accurate description of groups of over-
achievers, achievers, and underachievers. Though these
contributions are limited by the scope of the study, they
increase the understanding of problems of students by point-
ing out traits which frequently characterize those students.

The traits of the overachievers aid in understanding
students of limited mental and language abilities who are
striving to "keep up" with course content and assignments
pitched somewhat above their abilities. On the surface, the
status of the overachiever seems desirable, certainly most
acceptable to parents, teachers, and school administrators.

However, some attention must be focussed on the reasons for such overachievement. While most of the reasons may be laudable, others may be symptomatic of social or psychological imbalances.

This is especially true since the traits discovered reveal the overachievers as being more sensitive to social and psychological pressures. While it is difficult to evaluate the possible results of such psychological pressures, it seems probable that some may produce ultimate frustrations and maladjustments great enough to negate the benefits of overachievement. If such results can be foreseen, preventive action would be a necessity.

The characteristic traits of the achiever group cover a wide range of abilities and adjustments. This group has few undesirable traits and few indications of poor adjustment or feelings of inadequacy. The characteristics of achievers seem to imply that they are generally well adapted to the demands of the school program.

The group of underachievers has characteristic traits which picture these students as well balanced, able individuals who are frequently non-conformists. From the results of the Teacher's Rating Scale, it is evident that teachers recognize their abilities but have not been able to inspire

them to additional constructive effort or to complete co-operation in school routines. Understanding the under-achievers seems to be especially important because these students generally have abilities which could be used for much better achievement.

The traits of the overachiever, achiever, and under-achiever groups suggest the need for investigating impli-cations such as the following.

Applications of the trait differences. The differ-ences between the groups in boy-girl distributions with girls predominating as overachievers and boys as under-achievers imply two possibilities. First, there is a strong possibility that the girls in this age-range are better fitted for academic work than boys are. Second, it is equally possible that the converse is true--that academic work as organized and presented has been slanted more to the capacities and needs of girls. In either case a review of the curriculum, course content, and perhaps even methods of teaching might be a fruitful means of reducing observed disparities.

Another of the thought provoking differences between the three groups is the area of general intelligence and language ability. The observed occurrence of decreasing

relative achievement with increasing intelligence and verbal ability undoubtedly springs from causes which are numerous, complex, and probably interrelated. The fact that so many of the most intelligent are underachievers points to a waste of talent or at least to a serious lack of application of such talent. Again there is the implication that curriculum, courses, and methods of teaching need additional study with the specific purpose of finding better means of challenging bright pupils.

Several inferential questions might serve as spring boards for such study. Are contents of courses and/or methods devised to favor the group intermediate in intelligence? Are methods and contents too inflexible? Is the underachiever little stimulated because he is actually brighter or mentally quicker than his teachers? Are teachers too unfamiliar with the background of experience of the underachiever? Answers to these questions may be difficult to find and yet a search for them might prove more fruitful than relegating reasons for underachievement to ill-defined "motivational factors" or "lack of drive."

The same problem may be attacked from another angle, one perhaps less in harmony with the viewpoints of school personnel. One might ask whether underachievement is necessarily undesirable. There is the possibility that such

underachievement in school work coincides with highly de-
sirable growth in other directions.

The results of the Mental Health Analysis show that
the underachievers probably have adjusted well to psychologi-
cal pressures. The lack of conformity with school routine
which teachers are prone to find in the underachiever group,
together with the energy displayed in many annoying class-
room traits, may presage an innate inventiveness and flair
for original activity which may ultimately result in the
greatest good for society. The nonconformist in thought
and action frequently has been a valuable contributor to
many areas of progress.

One incongruity appears in the traits of the under-
achievers. The Mental Health Analysis characterizes the
underachievers as being well adjusted to psychological
pressures while one item on the Teacher's Rating Scale
characterizes them as being "easily upset." These findings,
on the surface, appear to be contradictory. However, there
are plausible explanations of the contradictions. The
Mental Health Analysis, with two hundred items, covers a
wide range of situations. The single item on the Teacher's
Rating Scale refers only to an observed attitude toward
people, reported by the teachers from classroom situations
in which the underachiever is likely to be a nonconformist.

Consequently, teachers may have derived this characteristic from overt behavior which is more reflective of alertness, physical energy, and perceptual sensitivity than it is of emotional reactions. Consequently, further study is necessary before concluding that a real contradiction of traits exists.

Inquiries into the developmental patterns of the overachievers and of the underachievers could conceivably force conclusions that these are natural patterns of growth for these individuals. If so, it would seem logical to encourage the overachiever in his pattern of cooperation and conformity and also the underachiever in his pattern of more original thought and action. At present it would seem that the overachiever and the achiever is a pleasure to work with in school while the underachiever is more of an annoyance.

Trait differences such as those located and identified in this problem furnish the setting of complex educational problems, the solutions of which depend on the use of much time, energy, and intelligence. The value of partial solutions to these problems depends to a great extent on the degree to which they may be extended to other problems or put into active practice.

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APPENDIX

STUDENT CHECK LIST FOR SELF ANALYSIS

Name _____ Class _____ Date _____

    In order to find out more about things which often affect your school work, your teachers would like to have your frank and honest answers to each of the following questions. Consider that these questions refer to your school work as a whole and not to any one class. Check your answers in the proper column. Do not skip any question unless you honestly cannot decide.

	Yes	No
1. Do you enjoy reading and studying from books? 1.		
2. Are you usually systematic and regular in your work? 2.		
3. Do you have a good dictionary? 3.		
4. Do you usually look up new words in the dictionary? 4.		
5. Do you keep a record of assignments where you can easily refer to it? 5.		
6. Do you often leave tasks unfinished? 6.		
7. Is it hard for you to understand material in your texts? 7.		
8. Is is difficult to understand some of the explanations of your teachers? 8.		
9. Do you usually read an assignment twice? 9.		
10. Do you make written notes or outlines of text material? 10.		
11. Do you often fail to complete ALL of the assignment° 11.		
12. Do you feel that you know your teachers personally? 12.		
13. Do you ask your teachers questions about the lesson when things are not clear? 13.		
14. Do you often let your studies go when some person asks you to go somewhere? 14.		
15. Do you have difficulty in expressing your ideas clearly in writing? 15.		
16. Do you frequently volunteer in class? 16.		
17. Are you self-conscious about reciting in class? 17.		
18. Do you feel that other members of the class are better students than yourself? 18.		
19. Do you have a written study plan or time budget? 19.		

		Yes	No
20. Do you often waste time getting started on your lessons?	20.		
21. Do you often get help from other students when you are in difficulty?	21.		
22. When you memorize rules or vocabularies, do you write them out and also repeat them aloud?	22.		
23. Do outside activities take too much of your time?	23.		
24. Have you ever avoided taking difficult subjects?	24.		
25. Do you often let your assignments go until the last minute?	25.		
26. Are you satisfied with average marks?	26.		
27. Do you get enough rest?	27.		
28. Do you look over your papers before handing them in?	28.		
29. Are you inclined to be lazy?	29.		
30. Are you satisfied with your present marks?	30.		
31. Do you often study hard without results?	31.		
32. Do you usually spend as much time in study as you do in class?	32.		
33. Do you take time to look up all mistakes on papers that are returned?	33.		
34. Are you often late passing in required work?	34.		
35. Do you make a special effort in preparing tests?	35.		
36. Are you worried about your ability to do well on tests?	36.		
37. Do you often play records or the radio when doing homework?	37.		
38. Are you often bothered by telephone calls or by members of your family when doing homework?	38.		

TEACHER'S RATING SCALE

Name _____ Class _____ Date _____

In the following rating scale, please encircle the number which indicates your best estimate of this student's traits within the range described by the descriptive words or phrases.

Home and Written Work

1. Frequently incomplete ----- complete	1 2 3 4 5
2. Careless ------------------- careful	1 2 3 4 5
3. Untidy --------------------- neat	1 2 3 4 5
4. Inaccurate ----------------- accurate	1 2 3 4 5
5. Late ----------------------- on time	1 2 3 4 5

Class Habits

1. Inattentive --------------- attentive	1 2 3 4 5
2. Lazy ---------------------- industrious	1 2 3 4 5
3. Easily gives up ----------- persistent	1 2 3 4 5
4. Habitually distractive ---- usually concentrates	1 2 3 4 5
5. Talkative ----------------- quiet	1 2 3 4 5
6. Slow worker --------------- fast worker	1 2 3 4 5
7. Indifferent --------------- serious purpose	1 2 3 4 5
8. Difficult to change ------- adaptable	1 2 3 4 5
9. Disinterested ------------- inquisitive	1 2 3 4 5
10. Erratic ------------------ dependable	1 2 3 4 5
11. Wasteful ----------------- efficient	1 2 3 4 5
12. Meddlesome --------------- minds own business	1 2 3 4 5
13. Mischievous -------------- well-behaved	1 2 3 4 5
14. Tardy -------------------- punctual	1 2 3 4 5

15. Needs constant supervision -- resourceful	1	2	3	4	5
16. Mentally slow ----------------- mentally quick	1	2	3	4	5
17. Avoids reciting ------------- eager to respond	1	2	3	4	5
18. Depressed by mistakes -------- works on weaknesses	1	2	3	4	5
19. Shuns the difficult ---------- challenged by the difficult	1	2	3	4	5
20. Resents suggestions ---------- usually follows direction	1	2	3	4	5
21. Dishonest -------------------- honest	1	2	3	4	5

Observed Attitudes towards People

1. Rude ------------------------- courteous	1	2	3	4	5
2. Argues for own way ----------- cooperative	1	2	3	4	5
3. Retiring --------------------- dominating	1	2	3	4	5
4. Bothers others -------------- helpful to others	1	2	3	4	5
5. Likes to show off ----------- modest	1	2	3	4	5
6. Fears attention ------------- willing to volunteer	1	2	3	4	5
7. Tolerates teachers ---------- considers teachers friends	1	2	3	4	5
8. Moody ----------------------- cheerful	1	2	3	4	5
9. Nervous --------------------- poised	1	2	3	4	5
10. Vacillating ---------------- loyal	1	2	3	4	5
11. Overcautious --------------- competitive	1	2	3	4	5
12. Reserved ------------------- gregarious	1	2	3	4	5
13. Disrespectful -------------- respectful	1	2	3	4	5
14. Easily upset --------------- emotionally stable	1	2	3	4	5

Observed Attitudes toward School

1. Resents school ------------- likes school	1	2	3	4	5
2. Aimless -------------------- ambitious	1	2	3	4	5

3. Indifferent to success ------ can be stimulated   1 2 3 4 5
   or failure
4. Little interest in ---------- good citizen   1 2 3 4 5
   school affairs
5. Destroys property ----------- careful of property   1 2 3 4 5

6. Frequently disciplined ------ obedient and responsive 1 2 3 4 5

7. Leaves litter about --------- neat and orderly   1 2 3 4 5

8. Poor attendance ------------- good attendance   1 2 3 4 5

9. Needs constant supervision-- can be left on own   1 2 3 4 5