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BULLETIN No. 47

BUREAU OF EDUCATIONAL RESEARCH
COLLEGE OF EDUCATION

ATTITUDES AS FACTORS OF SCHOLASTIC SUCCESS

By

M. E. HERRIOTT

Assistant Director, Division of Psychology and Educational Research, Los Angeles Public Schools

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1929

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Bureau of Educational Research
College of Education
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PREFACE

The investigation reported in this bulletin was carried on by Dr. Herriott[1] as a means of satisfying the thesis requirements for the degree of doctor of philosophy at the University of Illinois. In a sense, therefore, it does not represent a product of the Bureau of Educational Research, but the results of the study seemed to justify its publication as a bulletin. In preparing the report for publication, the thesis manuscript—a copy of which is on file in the Library at the University of Illinois—has been condensed and revised. Most of this work was done by the author.

The problem attacked is an important one. As the author points out in the first chapter, attitudes are recognized generally as affecting success not only in school work but in other lines of endeavor as well. An examination of educational literature, however, reveals that relatively little is known concerning the effects of attitudes in relation to those due to other factors. The paucity of our knowledge concerning the influence of attitudes is due in part to the fact that we have not yet devised means for measuring them satisfactorily. Consequently one who attempts to study attitudes faces the necessity of devising measuring instruments, and those devised by Dr. Herriott constitute one of the contributions of the present study.

The conclusions reached concerning the relative potency of the factors dealt with must of course be considered tentative, but they may appropriately be labeled as contributions. The author has also contributed to our progress by indicating certain gaps in our knowledge and techniques of educational research and by making suggestions for further studies.

WALTER S. MONROE,

June 14, 1929 *Director*

[1]M. E. Herriott was Associate at the Bureau of Educational Research, University of Illinois, 1924-1929.

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ATTITUDES AS FACTORS OF SCHOLASTIC SUCCESS

CHAPTER I

THE PROBLEM AND ITS ORIENTATION

Universal recognition of attitudes as determiners of behavior. Attitudes are almost universally recognized as potent determining factors of behavior. Laymen, teachers, educationists, and psychologists may be quoted to this effect *ad infinitum*. For instance, we may quote the late Stephen S. Colvin as follows:

> The mental attitude of the worker has much to do with his efficiency. Investigators and workers in the field of "scientific management" in the industries have invariably found that no plan of waste-elimination is productive of results unless the attitude of the workman is satisfactory. The employee who has no "appetite for his job," whose sole interest is merely in "getting by" with as little effort as possible, who takes pride in shirking when he can escape detection, who watches the clock more than he does his machine, will do a low grade of work under any system of management. Further, the workman who is worried, discouraged, or at odds with the foreman, is seldom efficient. For these reasons wise industrial managers have paid more attention to plans for making the workman's attitude toward his work energetic, eager, and cheerful than they have to methods of accounting, to schemes for systematizing supplies, stores, and tools, to devices for the proper routing of materials and the assembly of finished parts, and to details of correct workmanship. Clearly it is as essential for the pupil to have a proper attitude toward his task as it is for the employee in an industrial establishment.[1]

Any one who is familiar with educational literature knows that we need not go far in order to find a multitude of similar statements by men who are qualified to speak with authority.[2]

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[1]Colvin, S. S. *An Introduction to High School Teaching.* New York: The Macmillan Company, 1917, p. 145-46. Reprinted by permission.

[2]The following contain representative statements by educationists and psychologists:

Angell, J. R. "Selection for Higher Education in a Democracy," *North Central Association Quarterly,* 1:177, 179, September, 1926.

Bagley, W. C. *Educational Values.* New York: The Macmillan Company, 1911, p. 65-66. Especially Chapters V and XIV.

Bobbitt, Franklin. "Curriculum-Making in Los Angeles," *Supplementary Educational Monographs,* No. 20. Chicago: University of Chicago, 1922, p. 33-36.

Book, W. F. *Learning How to Study and Work Effectively.* Boston: Ginn and Company, 1926, p. 140-44, 308-10, 322-32.

Book, W. F. "On the Genesis and Development of Conscious Attitudes (Bewusstseinlagen)," *Psychological Review,* 17:381-98, November, 1910.

Briggs, T. H. *Curriculum Problems.* New York: The Macmillan Company, 1926. 138 p.

Cameron, E. H. *Educational Psychology.* New York: The Century Company, 1927, p. 105, 139, 242-43, 265.

Clarke, H. M. "Conscious Attitudes," *American Journal of Psychology,* 22:214-49, April, 1911.

Clement, J. A. *Principles and Practices of Secondary Education.* New York: The Century Company, 1925, p. 107, 252.

Colvin, S. S. *An Introduction to High School Teaching.* New York: The Macmillan Company, 1917, p. 145-46.

Colvin, S. S. *The Learning Process.* New York: The Macmillan Company, 1911, p. 44, 45, 318, 326-27.

Dewey, John. *Human Nature and Conduct.* New York: Henry Holt and Company, 1922. 336 p. (*See* p. 41.)

Fisher, S. C. "The Process of Generalizing Abstraction and Its Product, the General Concept," *Psychological Monographs,* Vol. 21, No. 2, 1916. 213 p. and Appendix.

Purpose of this investigation. The purpose of the investigation being reported was to determine: (1) the significance of attitudes as factors of scholastic success in college; (2) their relation to other factors of scholastic success.

Definition of terms. Such a brief statement of the problem would be wholly inadequate without a definition of "attitudes" and "scholastic success."

Upon examination of educational and psychological literature, it was discovered that there is no unanimity of agreement as to the meaning of the term "attitude." A committee of the American Psychological Association reported four definitions which it believed to represent the usage of psychologists of good standing.

a. A stabilized *set* or *disposition.*
b. (Bewusstseinlage.) An abbreviated but comprehensive *experience,* occurring principally in connection with affective, cognitive, and conative processes and at present incompletely analyzed.
c. (Einstellung.) The specific mental *disposition* towards incoming experience whereby that experience is modified.
d. Any mode of consciousness in which a self relates itself to its environment.[3]

The first definition noted is the one adopted in the present investigation. Attitudes, such as the ambitious—indifferent attitude, were selected and each was defined or described in terms of behavior. This phase of the procedure is described in greater detail in later pages.

For the purposes of this study, "scholastic success" was defined dogmatically in terms of school marks: a straight "A" record means complete success; a straight "E" record, complete failure. In view of this definition, a very broad statement of the problem might be worded thus: Are students' attitudes important determining factors of the marks they receive in college?

Headley, L. A. *How to Study in College.* New York: Henry Holt and Company, 1926, p. 108-10, 361, 371.

Inglis, Alexander. *Principles of Secondary Education.* Boston: Houghton Mifflin Company, 1918, p. 137-39.

Judd, C. H. *Psychology of High-School Subjects.* Boston: Ginn and Company, 1915, p. 429-31.

Monroe, W. S. *Directing Learning in the High School.* Garden City, New York: Doubleday, Doran and Company, 1927, p. 161, 313.

Ruediger, W. C. *The Principles of Education.* Boston. Houghton Mifflin Company, 1910, p. 163-64.

Sullivan, E. B. "Attitude in Relation to Learning," *Psychological Monographs,* Vol. 36, No. 3, 1927, p. 1-17.

Thorndike, E. L. *Educational Psychology—Briefer Course,* New York: Teachers College, Columbia University, 1914, p. 181.

Titchener, E. B. *The Psychology of Feeling and Attention.* New York: The Macmillan Company, 1908. 404 p.

Warren, H. C. (Chairman), *et al.* "Definitions and Limitations of Psychological Terms, II," *Psychological Bulletin,* 19:230-33, April, 1922.

Warren, H. C. *Human Psychology,* Boston: Houghton Mifflin Company, 1919, p. 360-73.

Watson, J. B. *Psychology from the Standpoint of a Behaviorist.* Philadelphia: J. B. Lippincott Company, 1919, p. 216-18.

[3]Warren, H. C. (Chairman), *et al.* "Definitions and Limitations of Psychological Terms, II," *"Psychological Bulletin,* 19:230-33, April, 1922.

TABLE I. FACTORS OF SCHOLASTIC SUCCESS STUDIED IN THIRTY-TWO PREVIOUS INVESTIGATIONS[a]

Factors	Number of Investigations
I. General intelligence, evidenced by	
1. Scores on mental (intelligence) tests	18
2. Estimates by teachers	2
II. Achievement, evidenced by	
1. College entrance examination marks	
a. College Entrance Board examinations	2
b. College classification tests	5
2. Secondary-school record	1
a. Caliber or type of work	5
b. Marks, including rank	13
c. Number of units	1
3. College record	
a. Marks, by semester or year	1
b. Marks on first and second English themes	1
4. Estimated effectiveness of preparation	1
III. Non-intellectual, character, or personality traits	2
1. Attitudes	3
a. Moral	1
b. Persistence	1
c. Purpose	1
d. School attitude, including attitude toward education	3
2. Interests	3
a. Artistic	1
b. Athletic	1
c. Executive	1
d. Expressive	1
e. Home-making	1
f. Intellectual	1
g. Literary	1
h. Mechanical and constructive	1
i. Musical	1
j. Scientific and mathematical	1
k. Social	1
3. Trait characteristics	1
a. Capacity for group leadership	2
b. Confidence in own ability	1
c. Cooperativeness	1
d. Desire to excel	1
e. Force of personality	1
f. Industry and application	1
g. Initiative and aggressiveness	1
h. Prudence and forethought	1
i. Quickness of thought	1
j. Regularity and persistency	1
k. Respect for authority	1
l. Retentiveness of memory	1
m. Sense of accuracy	1
n. Sense of duty, conscientiousness	1
o. Strength and control of attention	1
p. Trustworthiness	1
q. Will power and persistence	1
r. Will-temperament (Downey test)	2
4. Emotional adjustment	4
5. Introversion-extroversion	1
IV. Environmental conditions and miscellaneous factors	
1. Age, chronological	8
2. Environmental conditions	1
3. Financial status (including outside work)	6
4. Health	5
5. Higher institution attended	1
6. Nationality	2
7. Occupation of parents (including education of)	4
8. Physical energy, amount of	1
9. Relationship (siblings, etc.)	1
10. Secondary school attended, kind and size	6
11. Student activities, part taken in	3
12. Study habits	5
13. Time elapsed between high school and college	1
14. Teaching methods and educational content	1

[a]The thirty-two investigations on which this table is based are listed in the Appendix as Bibliography A.

Previous closely related studies. All available educational writings were canvassed for reports of investigations closely related to the one outlined in the preceding pages. A fairly large number of such studies were discovered. Of these, several were dropped from further consideration, especially if not on the college level, because they were very feeble attempts and lacked suggestiveness for the present investigation. Thirty-two studies remained. Table I is a summarization of the factors related to scholastic success which were reported as having been studied in these investigations. Each factor studied by each investigator, irrespective of the amount of attention given to it, was tabulated. In so far as possible, the terminology of the different writers was retained. This retention resulted in a somewhat more extended list than would have been obtained if combinations of factors had been made; but if this had been done, the table would have become correspondingly less meaningful.

This table should be read as follows: Of the thirty-two investigations tabulated, eighteen included general intelligence, as measured by intelligence tests, among the factors of scholastic success; two included general intelligence as estimated by teachers; and so on. Examination of this table reveals two outstanding facts. First, a seemingly very large number of factors have been studied. Second, there is little agreement as to the factors studied, especially as to the particular non-intellectual, character, or personality traits.

One is led to the conclusion that most, if not all, of these studies have been merely casting about for the purpose of finding an advantageous point of attack on the problem of the factors of scholastic success. These studies, however, offer many suggestions on which to base a study more comprehensive and at the same time more intensive than any of them.

Studies reviewed. Eight of the thirty-two investigations seemed to offer particularly valuable suggestions. A ninth study, Number VII on pages 24 to 27 of this chapter, was added because of its bearing on the present problem, although not comparable in character to the other studies. These nine studies are reviewed in some detail according to the following plan:

1. Summary of the problem
   a. Purpose
   b. Group studied
   c. Factors studied
   d. Means used to secure data
   e. Treatment of data
   f. Conclusion

2. Evaluation:
   Procedure
   Results and conclusions
3. Contribution to solution of the present problem

STUDY I.[4]

1. Summary. (*a*) *Purpose.* This study is divided into two parts, only the first of which is pertinent to the investigation undertaken by the reviewer. This part deals with the announced question: "Are college students who are successful academically [make good marks] different in their moral attitudes, emotional maladjustments, and interests from those who make poor grades?"[5] The problem essentially resolved itself, however, into a question of whether the Pressey X-O Test reveals differences in character traits between students of varying degrees of scholastic success.

(b) Group Studied. The groups studied consisted of "200 underclassmen, 57 college men, and 197 college women students in the first two years."

(c) Factors studied. The factors studied consisted of moral attitudes, emotional maladjustments, and interests.

(d) Means used. The Pressey X-O Test.

(e) Treatment of data. In order to devise a means of scoring the test, four groups were selected on the basis of marks—the fifty highest students of each sex and the fifty lowest. The total number of words for each section of the test (morals, worries, and interests) were tabulated for each group and comparisons made. Words showing a difference of ten or more in the per cent of good and poor students marking them were selected. These words were combined into a "good men students' differential," a "poor men students' differential," and similarly for the women. In an attempt to determine the significance of this net differential score, "the net differential score for each group [200 men, 57 men, and 197 women] was correlated with the average grade or academic mark" and also "with scores on the University Intelligence Test."[6] An attempt was also made to secure higher correlations by combining the net differential score and intelligence test score.

(f) Conclusions. Chambers states the following conclusions: "It is possible to obtain statements of personality traits related to scholar-

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[4]Chambers, O. R. "Measurement of Personality Traits," Chapter IX, p. 71-80, of: Pressey, S. L., *et al. Research Adventures in University Teaching.* Bloomington, Illinois: Public School Publishing Company, 1927. 152 p.
[5]*Ibid.*, p. 72.
[6]*Op. cit.*, p. 75.

ship which give correlations of very appreciable size (about as large as those obtained between tests of intelligence and marks) with academic success."[7] The correlations referred to ranged from .44 to .54.

2. Evaluation. In so far as the brief report permits one to judge, the general procedure appears to be appropriate for the problem actually attacked, but wholly inadequate for a thorough study of the problem set up by the investigator. Perhaps the data were manipulated as much as their meagre nature justified; however, one would like to have some measure of reliability of the coefficients of correlation and also some measure of the linearity of the relationship between scholarship and the differential score. It seems highly possible to the reviewer that a distinctly curvilinear relationship exists.

3. Contribution to the reviewer's problem. The study does encourage one to study the so-called non-intellectual factors of college success, but the evidence is so very inconclusive that one is not encouraged to make use of the Pressey X-O Test in such an investigation until it has been tried out in a more thorough-going manner.

STUDY II.[8]

1. Summary. (*a*) *Purpose.* The purpose of this study was to determine the relation between intelligence and certain other traits and their influence, separately and in combination, upon the achievement of pupils in junior and senior high schools.

(b) Group studied. Two hundred eighty-five girls and 268 boys from grades seven to twelve in the Horace Mann High School for Girls and the Horace Mann School for Boys.

(c) Factors studied. In addition to general intelligence, chronological age, and scores on four standard educational achievement tests, the factors studied included the following:

1. Mental and character traits (ratings)
   a. Health
   b. Amount of physical energy
   c. General intelligence
   d. Industry or application in school
   e. School attitude
   f. Emotional balance
   g. Leadership
   h. Will power and persistence
   i. Prudence and forethought

[7] *Op. cit.*, p. 76.

[8] Flemming, C. W. "A Detailed Analysis of Achievement in the High School," *Teachers College, Columbia University Contributions to Education*, No. 196. New York: Bureau of Publications, Teachers College, Columbia University, 1925. 209 p.

j. Sense of duty. Conscientiousness
k. Desire to excel

2. Temperament
3. Leadership in extra-curricular activities

(d) Means used. Measurements were obtained by means of group intelligence tests, standard educational achievement tests, teachers' rating scale for mental and character traits, Carnegie Institute of Technology adaptation of the Downey Group Will-Temperament Test, and a point scale for weighting the value of each student office held in extra-curricular activities.

(e) Treatment of data. Simple, partial, and multiple coefficients of correlation were computed, 2500 zero correlations being found. Appropriate attendant statistical procedures were employed, such as use of Kelley's table of k.

(f) Conclusions. All variables except chronological age-in-grade and three of the tests of will-temperament yielded positive correlation with school achievement, and also with school leadership. The factors appearing to contribute most to school achievement were: general intelligence, school attitude, industry, desire to excel, energy, emotional balance, chronological age, and physical energy. The factors varied somewhat from the junior to the senior high school. The best combination of factors in the junior high school (Terman test results, school attitude, desire to excel, energy, and emotional balance) gives a multiple coefficient of .8103; and the best combination in the senior high school (Terman test results, Otis mental test results, industry, chronological age, and physical energy) gives a multiple coefficient of .7752. Use of the teachers' estimates of intelligence resulted in higher coefficients.

2. Evaluation: *Procedure.* The procedure is reported in great detail and appears to have been worked out in a careful and critical manner. It appears, however, rather strange that Flemming should include a teacher's estimate of intelligence or of health among the factors studied when she is as well informed as she appears to be in the field of tests. She might have made a somewhat more refined enumeration of personality traits. Furthermore, it is difficult to see how one making such an elaborate investigation could omit study habits as a determining factor of school achievement.

Perhaps it would be too much to ask the investigator to add the interview technique to that already used, especially considering the amount of labor already expended, but it does seem that many things might have been discovered through the personal interview which were

lost in mass data. The individual is completely ignored under the procedure followed. On the whole, however, this study presents the most inclusive and thorough-going investigation of the various factors contributing to school success with which the reviewer is acquainted. For a study of mass data, the statistical procedures appear to be sound, although the appropriateness of the partial and multiple correlation technique has been questioned recently.

Results. The data seem to have been manipulated in all feasible ways, and the conclusions seem justified on the basis of the data presented.

3. Contributions to the reviewer's problem. This study encourages one to seek to ascertain the major factors contributing to school achievement. It indicates that general intelligence is the basic factor, but that personality traits are also of considerable significance. It appears, however, that these traits either have been measured less effectively or else the ones selected are less significant on the higher educational level of the senior high school. Consequently, it may be inferred that on the college level they would be found to be still less potent factors or less well measured. This leads one to seek more thorough measures of such traits as well as to consider other possible traits, such as previous training and study habits. It does not seem profitable to continue the use of the Downey Will-Temperament Test, reading tests, and estimates of intelligence and of some of the general personality, character, and physiological traits.

STUDY III.[9]

1. Summary. (*a*) *Purpose.* Although never explicitly stated by the author, the purpose of this study seems to have been to develop a rating scale for "personal traits and attitudes" of pupils in the junior and senior high school. After the scale was constructed, the problem resolved itself into ascertaining the relation of trait to trait, of traits to intelligence, and of traits to school success, both in the secondary school and college.

(b) Group studied. The group studied varied from phase to phase of the problem. Some groups were as small as nine college students, whereas one was as large as 1030 high-school pupils. The groups ranged in personnel from entering junior-high-school pupils to freshmen in college.

[9]Hughes, W. H. "Some Uses of a Personal Trait Rating Scale in the Solution of Certain High School Problems." Ph.D. thesis, University of California, 1927.

(c) Factors studied. The following traits were included:

1. Regularity and persistency
2. Trustworthiness
3. Sense of accuracy
4. Confidence in own ability
5. Initiative and aggressiveness
6. Respect for authority
7. Cooperativeness
8. Force of personality
9. Capacity for group leadership
10. Quickness of thought
11. Strength and control of attention
12. Retentiveness of memory

General intelligence was also studied for some groups of students, and ten special interests, social, literary, artistic, and so forth, were listed on the rating scale but were not discussed in the report.

(d) Means used. A rating scale developed by Hughes was used. The pupils were rated by from three to six teachers at a time, many of them over a period of two or three years. Intelligence was measured with the Army Alpha test for some students and with the Thorndike test for others. For some, no information is given as to the test used.

(e) Treatment of data. Many coefficients of correlation were computed. Other relationships were shown graphically. In other cases, percentages were used. In still others, the raw figures only were used.

(f) Conclusions. "While the method of trait rating employed is far from infallible, its results do indicate a very considerable reliability from year to year—considerably beyond what should be expected from mere guessing."[10]

The traits ranged in correlation with each other from a coefficient of .83 for force of personality and leadership in group activities to .41 for regularity—persistency and leadership in group activities. "For every pair of traits . . . . the discrepancies were such that the rating of a student on any one of them could not, with certainty, be substituted as a rating on any other trait of the scale."[11] ". . . . the correlation between these traits and intelligence quotients was positive, but at the same time . . . . there were students in every intelligence level rated superior and also inferior."[12]

Honor students in high school were in general decidedly superior in the traits considered to the average of an entire class. In only four traits, confidence in own ability, initiative-aggressiveness, force of personality, and group leadership, did they show any tendency to fall markedly below the average, and then only in scattering cases.

[10] *Op. cit.*, p. 114.
[11] *Op. cit.*, p. 115.
[12] *Op. cit.*, p. 116.

". . . . with respect to all of these twelve traits those sent to college were somewhat superior to the rank and file of their class in high school. A larger percentage of the college entrants received ratings in the upper levels of each trait and a smaller percentage in the lower levels. The difference, however, in favor of the college entrants was not nearly as great as was found for the honor students" in the total high school graduating class referred to in the preceding paragraph.[13] The trait superiority of those entering the Pasadena junior college "was not nearly so great" as was that of those who entered other colleges and universities.[14]

"Although the findings varied from college to college . . . . for many of the traits and college achievement the correlations were higher than for intelligence scores and college achievement."[15]

2. Evaluation: *Procedure.* The procedure of this study appeals to one as being particularly opportunistic. There was no very definitely defined problem, data were gathered much as opportunity afforded, and whatever uses were made of the data were determined by the nature of the available data. No doubt this was largely due to the fact that the study was carried on under "practical" school conditions as a part of the regular school procedure, and in consequence, these conditions imposed many restrictions on the gathering of data which are not forced upon a more laboratory-like situation. This study is to be particularly commended for the presentation of data indicative of the reliability of the measures of non-intellectual traits.

Results. In so far as the study goes, all conclusions appear to be fully justified. The investigation, however, can be termed only a tentative survey of the field.

3. Contributions to the reviewer's problem. The refinements of the character and of the use of rating scales suggested by this study constitute the most valuable contributions on the side of technique. The results obtained encourage one in the belief that the relation of non-intellectual traits to scholastic success justifies a more rigorous study.

STUDY IV.[16]

1. Summary. (*a*) *Purpose.* ". . . . to ascertain how accurately the academic success of 450 Liberal Arts freshmen could have been predicted."[17]

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[13] *Op. cit.*, p. 119.
[14] *Op. cit.*, p. 120.
[15] *Op. cit.*, p. 120.
[16] May, M. A. "Predicting Academic Success," *Journal of Educational Psychology*, 14:429-40, October, 1923.
[17] *Ibid.*, p. 430.

(b) Group studied. Four hundred fifty Liberal Arts freshmen, presumably at Syracuse University.

(c) Factors studied:

1. Intelligence as measured by mental examinations
2. High-school preparation
   a. Average high-school or entrance examination marks
   b. Number of high-school units offered for entrance
3. Time spent in study in college

(d) Means used. The Miller Mental Ability Test and the Dartmouth Completion of Definitions Test were used to measure intelligence. The average grade on work offered for entrance was taken, either the Regents Examination marks in the State of New York, College Entrance Examination marks, or high-school marks, depending upon which were available, the first two being given the preference. The number of high-school units was easily determined from the usual records. The time spent in study was obtained by means of a record of the way time was spent during a week and also by means of another card giving the amount of time spent studying each subject.

(e) Treatment of data. Simple, partial, and multiple coefficients of correlation were calculated. Also, the regression equation was used to predict college marks from the several variables.

(f) Conclusions. ". . . . the most reliable means of predicting academic success is a combination of intelligence and degree of application."[18] No causal relationship was discovered between the number of units a student offers for entrance and his academic success. ". . . . we may assume, until we have evidence to the contrary, that the quality of high school work as measured by grades, is a factor of success in college, although a relatively minor factor."[19]

2. Evaluation: *Procedure.* For a study that attempts to examine into the influence of these particular four factors, the technique seems reasonably adequate. Other studies, however, have shown the fruitlessness of taking either the number of high-school units or high-school grades as measures of preparation. Training tests would probably have been more reliable as measures of preparation. The investigator points out the weakness of his questionnaire technique in obtaining study-time records.

Results. In the main, the conclusions stated seem justified, although there seem to be some roughness in the data and approximations in the calculations which might materially affect the results if

[18] *Op. cit.*, p. 439.
[19] *Op. cit.*, p. 438.

they extended far enough.[20] The investigator does not seem fully justified in assuming that a partial correlation of .318 between honor points and high-school marks, with intelligence and study time held constant, shows "that the quality of high-school work as measured by grades is a factor of success in college, although a relatively minor factor." The probability is strong that both are largely the result of some common factors, such as attitude toward school work, although an adequate measure of the quality of high-school preparation would in all probability give some value to the quality of such work as a factor of college success. One is inclined, however, to accept the results in the main as valid and significant.

3. Contribution to the reviewer's problem. This study emphasizes the need for measuring non-intellectual factors of college success. Measures of intelligence and industry must be used. If the influence of previous preparation is to be taken into consideration, some measure other than marks is needed. May suggests other factors needing investigation. His total list includes:

1. General intelligence
2. Previous preparation
3. Industry
4. Mental efficiency
5. Interests and motives
6. Character and personality traits
7. Health, and physical and social environment

STUDY V.[21]

1. Summary. (*a*) *Purpose.* Ohmann stated four problems:

1. What are the causes of scholastic deficiency among students of engineering?
2. To what extent may the technique for mass measurement and control be applied to the diagnosis of the problems of the individual student?
3. What other methods of individual psychology may be employed in the analysis of student difficulties—and how?
4. What may psychology offer to the problem of over-coming scholastic difficulties and effecting adjustments among individual students?[22]

The report of this investigation indicates that all of these problems were given attention after a fashion, although the first one received major consideration.

(b) Group studied. The group consisted of 128 engineering students, mostly freshmen and sophomores, in the University of Iowa,

[20]The coefficients of correlation on page 434 appear to be approximations and not carried far enough for use in calculating partial and multiple coefficients. Substitution of May's own figures in the formulae on p. 434 produce different results from those reported by him: The equation for the number of honor points predicted for a given individual is $.425 \times 140 - 24.26 = 35.24$ instead of $42 \times 140 - 25 = 34$; the standard deviation of the distributed honor points is 8.96 instead of 8.9.

[21]Ohmann, O. A. "A Study of the Causes of Scholastic Deficiencies in Engineering by the Individual Case Method," *University of Iowa Studies in Education,* Vol. 3, No. 7. Iowa City: University of Iowa, 1927. 58 p.

[22]*Op. cit.,* p. 7.

who exhibited serious defects in their university work during the school years of 1924-25 and 1925-26.

(c) Factors studied. As classified by Ohmann, the factors studied were:

1. Physical factors
2. Motor factors
3. Intellectual factors
4. Study methods and habits
5. Motivation and interests
6. Environmental factors
7. Educational background
8. Emotional factors
9. Teaching methods and educational content

These were divided into many sub-factors.

(d) Means used. Available data with reference to each student were taken from the files of the Dean of Men. The student was then called in for interview. In addition to information secured through interview conversations, whatever tests the interviewer deemed advisable were given. An outline of factors was used as a guide in the interview. Following the diagnosis, remedial work appropriate to each case was undertaken.

(e) Treatment of data. Each case when summarized as a case history contained a statement of the causes of deficiency as diagnosed by the investigator. Most cases involved more than one cause, so that each cause was evaluated by the investigator as being of first, second, third, or fourth rank in potency. This evaluation was based upon the observation made in the interviews and upon the results of tests given. The causes were finally summarized into one table intended to show the relative significance of different causal factors.

(f) Conclusions. The conclusions may be briefly summarized as answers to the four problems:

(1) The following factors were found to be causes of deficiency in proportion to the "significant scores" given:

Motivation and interests	265
Intellectual factors	265
Emotional factors	221
Educational factors	202
Environmental factors	148
Study habits and methods	113
Physical factors	90
Teaching methods and content	32
Motor factors	28

(2) Ohmann considers the techniques of mass measurement inadequate for diagnosis of the problem of the individual.

(3) The interview method is advocated as indispensable to supplement mass methods.

(4) The answer to the last problem of what psychology has to offer appears to be that a guidance clinic should be established.

2. Evaluation: *Procedure.* The interview technique used in this study seems to have been very superior. Most of the value of the study lies in the results secured by means of the interview. The use of objective measures was wholly inadequate: many of the tests were unstandardized in any sense of the term; not enough data were available to make comparisons valid; tests were not validated nor shown to be reliable; only a very small per cent of the students were given more than four or five tests (and many were given fewer); and no comparisons were made with students who were not having difficulty.

Results. The testing was so limited that the investigator was not justified in summarizing causes in the manner he did. There is little reason to believe that another investigator using the same technique with a similar group would arrive at substantially the same results.

3. Contributions to the reviewer's problem. This study tends to confirm the probable significance of non-intellectual traits to scholastic success; good use can be made of the interview technique employed by this investigator; and the weaknesses of the general procedure should be avoided.

STUDY VI.[23]

1. Summary. (*a*) *Purpose.* This study is divided into two parts, both aiming to discover factors involved in academic success.

(b) Group studied. The first part of the study dealt with 25 "A" students and 25 "E" students. The second dealt with the 50 best and the 50 poorest students in a group of 200.

(c) Factors studied. The first part of the study inquired into the following factors:

1. Factors to which students attribute their success
2. Ways of going about reading assignments
3. Reviews
4. Notes
5. Writing difficulties
6. Application of facts learned
7. Physical condition
8. Extra-curricular activities engaged in
9. Outside remunerative work

The second part of the investigation inquired into study methods and related factors classified under similar captions.

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[23]Pressey, L. C. "What are the Crucial Differences Between Good and Poor Students?" Chapter I, p. 4-10, of:
Pressey, S. L., *et al. Research Adventures in University Teaching.* Bloomington, Illinois: Public School Publishing Company, 1927. 152 p.

(d) Means used. The interview method was employed for the first part of the investigation. A questionnaire of thirty items was employed for the second part.

(e) Treatment of data. The number or the per cent of students, good or poor, was reported for each factor or item.

(f) Conclusions. The good students had an advantage over the poor students on seven counts:

1. They had fewer physical handicaps and better health
2. Fewer of them were earning their way
3. They had more regular work habits
4. They read more selectively and made more use of reading aids, such as topic headings, summaries, the dictionary, and so forth
5. Their notes were more thoroughly organized and systematized
6. They reviewed more often and more selectively
7. They had a better command of the mechanics of English composition

2. Evaluation: *Procedure.* As a discovery procedure, the combination of interview followed by a more tangible technique such as the questionnaire is productive of worth-while results. The use of paired groups is an accepted procedure in other types of educational investigation which has seemingly never before been applied to the problems of this type.

Results. Owing to the rather rudimentary nature of the interview technique and the fact that the investigation was not carried beyond the interview-questionnaire stage, the results are only mildly indicative of the factors of scholastic success.

3. Contributions to the reviewer's problem. This study makes its chief contribution in rather insistently pointing toward the importance of study habits as factors of scholastic success.

STUDY VII.[24]

1. Summary. *(a) Purpose.* The purpose of this investigation was to discover the effectiveness of a "How to Study" class in training failing students to do efficient college work.

(b) Group studied. The "How to Study" group (in 1926) consisted of thirty-one students—seventeen freshmen, twelve sophomores, and two juniors—who were either on probation or very low in their academic standing. The control group consisted of students of the previous year who were paired with these students as to intelligence and scholastic and academic standing.

(c) Factors studied. The students were first studied as to their defects of study method and preparation and background conditions

[24]Pressey, L. C. "A Class of Probation Students," Chapter II, p. 11-21, of: Pressey, S. L., *et al. Research Adventures in University Teaching.* Bloomington, Illinois: Public School Publishing Company, 1927. 152 p.

such as intelligence, outside work and so forth. The group was then given training in the tool subjects of arithmetic, reading, spelling, writing, in the mechanics of English composition, and in how to study and work effectively. Mental hygiene was given some attention.

The success of the treatment was judged on the basis of persistence in college and marks attained.

(d) Means used. The interview method (including some testing) was used to secure information with regard to study methods and preparation. Training was given in a regularly organized class. There were lectures, laboratory work, and individual treatment of special defects.

(e) Treatment of data. The data were presented in simple tabular form without other statistical treatment than the finding of ratios.

(f) Conclusions. "Careful analyses and comparisons with control groups show that the group markedly improved in college work as a result of this treatment. Further, this improvement was not merely for the period of the course; the 'experimental' group continued to do better than the control group during the following quarter."[25]

2. Evaluation: *Procedure.* The interview method, making use of tests, seems to be an effective method for securing a working knowledge of the status of students before beginning "treatment." The remedial work undertaken seems to have been well adjusted to the weaknesses found and the limitations of time available to devote to such instruction. The treatment of data was adequate except when comparison was made between the two groups so as to show the persistence of effect on the "'experimental" group.

Results. There can be little or no doubt of the immediate helpful influence of the remedial instruction. The data for the persistence of effect, however, are not so convincing as for the improvement shown. Particularly, one cannot be sure of the students who were "out under rules." No doubt many more of the "control" group than of the "experimental" group were "out" at the end of the first quarter, which largely invalidates comparisons for the second quarter. The data on this point, in so far as they are presented, are inadequate.

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[25]This study was accompanied by careful case studies of the individual students. These case studies emphasized the distinctively individual nature of the problem presented by each student; also, that each case was the product of a very complex total situation of which no one criterion could be taken as a satisfactory index. The recognized classification of factors was: (1) immediate situation, (2) temperamental response, and (3) background factors. The last included a heterogeneous group of factors such as intelligence, training, home conditions, and so forth. The report of these cases was made by:

Ferguson, Jessie. "A Few Case Studies of Probation Students, with Notes Regarding Remedial Instruction." Chapter III, p. 22-29, of Pressey, *op. cit.*

3. Contributions to the reviewer's problem. The chief contribution of this study is the evidence that it presents in regard to the importance of study habits as factors of scholastic success.

STUDY VIII[26]

1. Summary. (*a*) *Purpose.* "The present study is an effort (a) to determine the relative importance of these factors [character traits] in contributing to success in junior high school and (b) to measure the extent to which these same factors contribute to the score on a scale of intelligence.[27]

(b) Group studied. One hundred sixteen seventh-grade pupils in a large junior high school.

(c) Factors studied:

1. General intelligence
2. General health
3. School attitude
4. Preparation
5. General ability
6. Marks in four promotion subjects (English, history, geography, and arithmetic)

(d) Means used. General intelligence was measured by an intelligence test developed at Indiana University. General health, school attitude, preparation, and general ability were estimated on a rating scale patterned after the officers' rating scale used in the army, each child being rated by the teachers of the four promotion subjects—English, history, geography, and arithmetic. The marks given in the four promotion subjects were averaged to give a statement of school success during the school year.

(e) Treatment of data. The method of partial correlation was used.

(f) Conclusions. "The data give a minus third-order correlation between general health and school marks, and a relatively low correlation between preparation and marks; the high correlation [.43] of 'school attitude' with marks is the striking feature of the situation.

"The scale of intelligence is found to measure about equally preparation and ability; the correlation with school attitude is negligible.

"The tests thus fall short in failing to take account of 'school attitude'—that is, of character traits as conditions of school success."[28]

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[26]Pressey, S. L. "An Attempt to Measure the Comparative Importance of General Intelligence and Certain Character Traits in Contributing to Success in School," *Elementary School Journal*, 21:220-29, November, 1920.

[27]*Ibid.*, p. 220-21.

[28]*Op. cit.*, p. 229.

2. Evaluation: *Procedure.* The procedure is in general appropriate and perhaps as good as was available at the time. However, certain weaknesses are glaring. In the first place, the same teachers rated the pupils on their traits and gave them their marks a short time after. This weakness is recognized by the investigator but was not sufficiently guarded against. In the second place, no adequate precautions were taken to avoid the "halo" effect[29] in rating. In the third place, it seems a wholly inadequate procedure to have teachers rate pupils' health. Why not have the school nurse or physician do this? And in the fourth place, could not standardized tests have been used more effectively than teachers' ratings to evaluate the preparation of the pupils?

Results. Despite these conditioning factors, the results seem indicative of the true nature of conditions; in fact, if conducted more carefully, such a study might reveal, even more strikingly, the potency of "school attitude."

3. Contributions to the reviewer's problem. This study tends to confirm the reviewer in the belief that there is need for determining the importance of attitude as a factor of school success. Certain apparently vitiating errors were made by this investigator which should be avoided in any future investigation of related problems.

STUDY IX.[30]

1. Summary. *(a) Purpose.* The prime purpose of this study was to determine the nature of the emotional constitution, as revealed by the Colgate Mental Hygiene Tests, which is conducive to success in the "occupation of college student."

(b) Group studied. Two groups of failing students were studied: freshmen of the classes of 1928 and of 1929.

(c) Factors studied. Extroversion-introversion tendencies and emotional stability as revealed by psychoneurotic traits were studied.

(d) Means used. "A standard intelligence and the two Colgate Mental Hygiene Tests" were used.

(e) Treatment of data. The number of failures was inspected to see from which group (high or low) the most failures came. On the basis of all the data, the students were divided into two groups of four types each and these were ranked within each group in order of scholastic difficulty.

[29]The "halo" effect is a phenomenon common to all or almost all judgments, especially in judging human character and capacities. A favorable impression relative to one trait predisposes to a like impression relative to other traits. The same sort of thing is true of unfavorable impressions.

[30]Young, J. B. "How Emotional Traits Predispose to College Failure," *Journal of Educational Psychology,* 18:631-36, December, 1927.

(f) Conclusions. In the intelligence-introvert-extrovert group: (1) those above average in intelligence and introvert have about half the number of failures as the following three groups, which have exactly the same number; (2) those above average in intelligence and extrovert; (3) those below average intelligence and introvert; and (4) those below average intelligence and extrovert.

In the psychoneurotic-introvert-extrovert group, the order from the fewest to the most failures is: (1) those unstable emotionally and introvert; (2) unstable emotionally and extrovert; (3) stable emotionally and introvert; and (4) stable emotionally and extrovert.

2. Evaluation: *Procedure.* Limiting the study to failing students makes it impossible to treat the data in as exhaustive a manner as seems desirable. There is no evidence to show the distribution of the various groups in the student body as a whole. It appears that more complete data must have been available so that the study could have been extended to the entire student body. It might have been possible to have applied more intensive statistical procedures to these data.

Conclusions. As given, the conclusions appear valid; but one cannot, with safety, go beyond the bare facts.

3. Contributions to the reviewer's problem. On the face of it, this study seems to show that a significant relationship exists between success in college and the factors of intelligence, introversion-extroversion, and emotional stability. These factors should probably be given due consideration in any study of the factors of college success.

Conclusions from these studies pertinent to the present problem. *(a) The significance of factors of scholastic success.* From the foregoing review of studies closely related to the present one, the conclusion is reached that in any attempt to measure the influence of any one factor or set of factors on college success, it is necessary to take into consideration as wide a range of factors as possible. However, these studies indicate that certain factors are of greater significance than others, and hence, that the range of factors to be studied may be reasonably limited to a comparatively small number. General intelligence, as evidenced by intelligence tests or examinations, appears to be one of the most, if not the most, significant factor. Supplemental to this foundation factor are others whose influences have more or less baffled investigators in their attempts to discover them. First in tangibility among these is the subject-matter training or foundation which the student possesses at the time of entering upon the field of study in which his success is measured. Second in tangibility is the factor of study habits. These appear highly significant

but elusive. Most elusive and intangible are non-intellectual, personality, or character traits, which appear to consist largely of attitudes. A review of such attempts as the ones summarized in this and the preceding chapter leaves one with the feeling that such traits may be on a par with general intelligence in their influence on scholastic success. In addition to these four major factors—general intelligence, subject-matter foundation, study habits, and non-intellectual traits—there may be a few other semi-specialized abilities that have an important bearing on success in particular subjects, such as mathematical ability for success in physics or color discrimination for success in the fine arts. Of such abilities, reading ability is probably the most generalized. It seems that reading ability, at least, should be included with the four factors previously mentioned. It is probable that there are other similar factors which should be considered in a study of success in specialized fields. Most such factors, however, would be classifiable under the major factor of subject-matter foundation. It hardly seems desirable thus to classify reading ability.

(b) Techniques employed. Two major techniques stand out from the review of the previous studies. The first may be termed as statistical, with simple, partial, and multiple correlation and regression as the principal procedures used after mass data have been secured. Mass data are secured in the main by means of tests, various sorts of reaction sheets (such as check lists), and records (such as the daily schedule). The second technique may be termed the interview-case-study method. In addition to data secured by means of tests and the like, the individual is interviewed for additional data. The attempt is made not to lose sight of the individual in the manipulation of data, as well as to use the interview in order to supplement the more formal devices for securing data. The studies that have made use of this latter technique have made valuable contributions by bringing to light factors of apparent importance, but have not been able to indicate the relative significance of the various factors discovered or considered. No doubt this is largely due to the limitations of time and devices. The interview needs to be followed up by a searching study of the factors revealed. It seems that the technique of the interview-case-study method may continue to be applied to advantage in the future. Many new leads may be discovered as well as old ones refined. On the other hand, it appears that enough pioneering work has been done so that statistical methods may be used to advantage. In fact they should be applied, so as to evaluate the influence of non-intellectual, character, or personality traits to which all investigations

of the interview-case-study type, as well as many of a more purely statistical nature, point as being among the prime factors of scholastic success.

Any study that undertakes to evaluate such non-intellectual traits must give due consideration to a number of other factors of scholastic success; in fact, the real need is not so much to apply statistical methods to the study of the influence of non-intellectual traits alone on scholastic success as to study their influence on success in relation to other factors. From the resumé of previous studies presented in the preceding pages, it is fairly evident that the factors upon which such an investigation should be based are: (1) general intelligence, (2) previous subject-matter preparation, (3) study habits, (4) reading ability, and (5) non-intellectual, personality, or character traits.

The studies reviewed in this chapter, as well as other related investigations, such as specialized psychological studies, show that we have fairly satisfactory measuring instruments for general intelligence, for previous subject-matter preparation in some fields, and for reading ability below the college level. The techniques for developing reading tests are relatively simple, and consequently the need on the college level should be rather easily supplied. The instruments for evaluating study habits are more cumbersome and less satisfactory, but if used with discretion and care, the results will usually be helpful. For the measurement of attitudes, the only instrument that gives promise of satisfactory results is the rating scale. The studies by Hughes and by Flemming, particularly the former, lay a fairly good foundation. If their lead is followed, a successful study of the factors of scholastic success should be possible.

CHAPTER II

PROCEDURE FOLLOWED IN SECURING DATA

The groups of students studied. The two groups selected consisted of students at the University of Illinois taking the elementary courses in educational psychology (Education 25) and technique of teaching (Education 10) during the second semester of 1927-28. The first of these courses is considered a prerequisite for the second. Originally, there were approximately 450 Education 25 students and 350 Education 10 students. As explained in the following chapter, these groups dwindled to 260 and 113 students, respectively. The Education 25 group consisted in the main of juniors, with a fair sprinkling of sophomores. The Education 10 group consisted of juniors and seniors, with the former slightly predominating. In both groups women students were decidedly in the majority. The data presented in Chapter III describe the groups in greater detail.

The factors studied. The review of previous investigations led to the conclusion that the factors of scholastic success which gave the greatest promise for fruitful investigation are: previous training, intelligence, reading ability, study habits, and attitudes. These factors were taken as the nucleus of this investigation, and the following means were employed to secure measures of them.

1. Previous training. Psychology 1 is a prerequisite for Education 25, and Education 25 is a prerequisite for Education 10. Consequently, the marks received in Psychology 1 and Education 25 constitute one set of measures of previous training for Education 25 and Education 10, respectively. However, in view of studies of teachers' marks, it was doubted whether these marks were adequate measures of previous training, particularly in the case of Psychology 1, which is taught in a different department by instructors who have very little or no contact with Education 25, and who teach the course with reference to the problems of pure psychology rather than of educational psychology. Consequently, two training tests (one for each subject) were constructed on the subject-matter of Psychology 1 and Education 25.[1] Several hundred test items used by Psychology 1 and Education 25 instructors were assembled and submitted to Educa-

[1]Some of the basic ideas for these tests were taken from the Iowa Placement Examinations. *See*:
Stoddard, G. D. "Iowa Placement Examinations," *University of Iowa Studies in Education*, Vol. 3, No. 2. Iowa City: University of Iowa, 1925. 103 p.

tion 25 and 10 instructors, respectively. Detailed instructions were given for the guidance of the instructors in evaluating them. On the basis of the judgments of the instructors, two tests consisting of 73 and 70 items, respectively, were constructed.[2] Thus, two measures of previous training were made available: (1) marks in the prerequisite course, and (2) scores on the training test.

2. Intelligence. *The Brown University Psychological Examination* was selected for measuring intelligence.[3] In order to economize time, Part E was given to the Education 25 group and Part F to the Education 10 group.

3. Reading ability. Since none of the available reading tests seemed suitable, one was constructed with the following points in mind: (1) rate of reading and comprehension should be measured separately; (2) the subject-matter of the test should be educational material that the students had not read before; (3) for measuring reading rate, the material should be relatively simple, and the form of the test and the directions should be planned to give all readers essentially the same mind set; (4) the test for measuring comprehension[4] should be designed to stimulate: (a) reading to understand, (b) reading to remember, (c) reading for information, and (d) reading with a critical attitude toward statements of the author. These four were thought to be the dominant reading purposes of students while studying Education 25 and 10. Consequently, the comprehension part of the reading test was constructed so as to engender these four reading purposes[5] and test the resulting comprehension.

4. Study habits. When this investigation was begun, and even after fairly definite plans had been formulated, it was thought that it would be possible to use the study-habits test being developed at Ohio State University. Since this test has not as yet proved satisfactory, it was necessary to develop other means. In a study of "honor" engineering students,[6] the writer developed a study-habits

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[2]My thanks are especially due Dr. E. F. Potthoff, instructor in Education 25, for his able assistance in constructing these two tests.

[3]For the basis of this decision, *see:*

Kelley, T. L. *Interpretation of Educational Measurements.* Yonkers-on-Hudson, New York: World Book Company, 1927, p. 228.

McPhail, A. H. *The Intelligence of College Students.* Baltimore: Warwick and York, Inc., 1924. 176 p.

Freeman, F. N. *Mental Tests.* Boston: Houghton Mifflin Company, 1926, p. 184.

[4]The idea for the form of the comprehension part of the reading test was suggested by certain experimental reading tests developed by the University of Illinois Bureau of Educational Research. For a report of the results of giving one of these tests, *see:*

Monroe, W. S. and Mohlman, D. K. "Errors Made by High School Students in One Type of Textbook Study," *School Review,* 31:36-47, January, 1923.

[5]For a list of seven reading purposes, *see:*

Monroe, W. S. *Directing Learning in the High School.* Garden City, New York: Doubleday, Doran and Company, 1927, p. 195-97.

[6]Herriott, M. E. "Why 'Honor' Engineering Students Think They Succeed in College," *School and Society,* 28:829-30, December 29, 1928. *See also:*

Herriott, M. E. "'Honor' Engineering Students, Their Characteristics and Reasons for Success," *Journal of Engineering Education,* 19:871-83, May, 1929.

questionnaire that gave promise of being a fairly reliable and valid measuring instrument. For use in the present investigation, this questionnaire was modified so as to apply specifically to education courses, and to make for a high degree of objectivity in scoring.[7]

Previous studies suggest that not only the way students go about the task of studying but the time they devote to it is an important factor in their success. The most commonly used method of obtaining time data is to have students make estimates. Experience shows, however, that such estimates are not accurate and investigators have developed the time schedule as a device for determining the time devoted to study.[8] In order to avoid in so far as possible any "padding" of study-time that the students might do, they were asked to keep a complete schedule of their activities for a week, giving the time devoted to each activity and specifying its exact nature.

5. Attitudes. *(a) Attitudes given consideration.* A record was made of terms descriptive of attitudes which apeared in educational and psychological literature. This list was considerably extended by application of the hypothesis that for every positive attitude, such as self-confidence, there is a corresponding negative attitude, such as dependence. Development of this hypothesis led to the conclusion that these paired positive and negative attitudes were in reality but two aspects of the same attitude. The preliminary list consisted of the following fourteen positive-negative attitudes:

1. Scientific—Biased
2. Self-confident—Dependent
3. Eager-to-learn—Self-satisfied
4. Persevering—Vacillating
5. Problem, interrogative—Lesson-getting, acquiescent
6. Expressive—Reticent
7. Cheerful—Despondent
8. Responsibility-seeking—Irresponsible
9. Critical—Non-critical
10. Evaluative—Non-evaluative
11. Analytic—Non-analytic
12. Authority-respecting—Authority-despising
13. Serious—Frivolous
14. Ambitious—Indifferent

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[7]For a copy of the study-habits questionnaire, *see* Appendix B.

[8]*See,* for instance:
Sturtevant, S. M. and Strang, Ruth. "The Daily Schedule as an Aid to Advisers," *Teachers College Record,* 29:31-45, October, 1927.

This list was submitted to all twelve instructors in Education 25 and 10 for evaluation. In their combined opinion the following were found to be the outstanding attitudes conditioning scholastic success:

1. Ambitious—Indifferent
2. Cheerful—Despondent
3. Evaluative—Non-evaluative
4. Persevering—Vacillating
5. Self-confident—Dependent

(b) Method of rating attitudes. No measuring instruments comparable to intelligence tests and standardized subject-matter tests have been developed in the field of personality and character measurement. Consequently, the method of rating was adopted as the means of "measuring" attitudes. The use of a rating scale for traits of character, such as attitudes, is hedged about by many sources of error, and consequently must be guarded in as many ways as possible. Flemming[9] and Hughes[10] have made what are probably the two best summaries of the dangers involved and precautions to be taken in trait rating. The principles advocated by these writers were given as full consideration as possible in developing the technique employed in this part of the present investigation.

In the first place, the traits (attitudes) were so chosen and defined as to be as unitary in each case as seemed possible. That is, an attempt was made to prevent each factor from overlapping with any other. Second, the attitudes were described in terms of behavior; as for example, the ambitious—indifferent attitude was defined as follows:

> On one hand, tending to seek superiority, power, and attainment, particularly high grades, in the course; tending to aim at superior accomplishment. On the other hand, tending to do tasks just well enough to 'get by'; tending not to seek superior accomplishment.

The brief descriptions of the attitudes were supplemented by descriptions of typical individual cases. Two descriptions were given for each attitude; one a rather strongly positive manifestation, the other a negative manifestation of the attitude. Third, the instructions directed that the familiar sorting procedure be used in rating, the normal probability curve serving as a guide in making the distribution of ratings. Fourth, in making the ratings an individual student card was used for each attitude. On this card was a scale divided proportionately into five major divisions embracing 7, 24, 38, 24, and 7 per

[9]Flemming, C. W. "A Detailed Analysis of Achievement in the High School," *Teachers College, Columbia University Contributions to Education,* No. 196. New York: Bureau of Publications, Teachers College, Columbia University, 1925, p. 35-47.

[10]Hughes, W. H. "Some Uses of a Personal Trait Rating Scale in the Solution of Certain High School Problems." Ph.D. Thesis, University of California, 1927, p. 2-3.

cent of the scale, respectively. Fifth, inasmuch as there was a separate card for each attitude, those making the ratings were enabled to rate all students on one trait at a time, and sufficient time was allowed to elapse between ratings so that the raters were able in large measure to avoid remembering judgments rendered previously. Sixth, the raters were instructors in the two courses and were thoroughly competent as individuals to make such judgments. All had had considerable teaching experience and were well trained in educational techniques. The two principal limitations on their competence were: (1) their acquaintance with the students was confined in the main to one semester in the classroom; and (2) their judgments would thus be likely to be biased by the scholastic accomplishments of the students.[11]

Summary. This investigation was based upon approximately 450 Education 25 and 350 Education 10 students, the numbers later dwindling to 260 and 113, respectively. Tests, rating scales, and a questionnaire were either adopted or developed as means for measuring the following factors presumed to be significant determiners of scholastic success: previous training, intelligence, reading ability, study habits, and certain attitudes; namely, the ambitious—indifferent, cheerful—despondent, evaluative—non-evaluative, persevering—vacillating, and self-confident—dependent attitudes.[12]

[11]For the rating cards used and the instructions for rating attitudes, *see* Appendix C.

[12]Thus far, the assumption that these are causal factors of scholastic success has been tacit rather than explicit. This is an assumption that is in keeping with common observation and critical thinking. True, scholastic success may react upon, must surely and should react upon, many of these factors and thus change them even during the course of the investigation. But this is a condition that must be accepted. It cannot be controlled. Probably it is negligible under the circumstances of investigations conducted along the lines of the present one.

The assumption that these are causal factors of scholastic success is accepted in this investigation. The procedure of the study is not such as to confirm or deny this hypothesis.

CHAPTER III

THE DATA[1]

A. GENERAL CHARACTER OF THE RAW DATA

The groups remaining for study. The procedure outlined in the preceding chapter resulted in a complete set of scores and ratings for only 260 students of educational psychology (Education 25) and 113 students of methods of teaching (Education 10). Owing to the purpose of the study and the proposed statistical treatment of the data, it was possible to retain data for only those individuals for whom all items of information were complete. Obviously, some students failed to take certain tests, and instructors did not find it possible to rate all students on all attitudes. Furthermore, inspection of the data and a priori reasoning led to the belief that those students should also be eliminated who were taking both Education 10 and 25 at the same time; also those who had had the equivalent of either Psychology 1 (General Psychology) or Education 25 in some other institution and consequently did not have marks in these courses at the University of Illinois. Thus, the total of approximately four hundred fifty Education 25 students and three hundred fifty Education 10 students was reduced as stated above.

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[1]The statistical procedures employed are not discussed at length, inasmuch as they are relatively simple and familiar to most workers in the field of educational research. However, a few brief statements are in order. The zero order coefficients of correlation were computed by Ayres' method, the measures being grouped in frequency tables. The means and standard deviations of the distributions were computed from the same frequency tables. The coefficients of partial correlation were computed by means of the general formula

$$r_{12.3\ldots n} = \frac{r_{12\cdot 34\ldots(n-1)} - r_{1n\cdot 34\ldots(n-1)} \cdot r_{2n\cdot 34\ldots(n-1)}}{\sqrt{(1 - r^2_{1n\cdot 34\ldots(n-1)})\,(1 - r^2_{2n\cdot 34\ldots(n-1)})}}.$$

The probable errors of the coefficients of correlation were taken from Holzinger, K. J. *Statistical Tables for Students in Education and Psychology.* Chicago: University of Chicago Press, 1925, p. 60-69. The probable errors of the means were computed by the following formula:

$$\text{P.E.}_M = .6745\frac{\sigma}{\sqrt{N}}$$

The probable errors of the standard deviations were computed by the following formula:

$$\text{P.E.}_\sigma = .6745\frac{\sigma}{\sqrt{2N}}$$

Holzinger, *Ibid.*, p. 58-59, was used to obtain the values of the terms in these formulae that were common to all of the computations involving that particular formula.

It has been stated that these statistical procedures are "relatively simple and familiar to most workers in the field of educational research." This statement does not mean to imply that no "statistical hazards" are involved in their use. However, the statistical procedures employed are generally accepted devices for use in investigations of the character undertaken by the writer. Inasmuch as the purpose of the present chapter is to describe the data involved, it is not appropriate to launch into a lengthy discussion of the relative merits of the various procedures employed. The "hazards" involved are given due consideration and weight in the following chapter, in which the data are interpreted and conclusions drawn.

TABLE II. COMPARATIVE DATA FOR ALL EDUCATION 10 STUDENTS AND THE 113 USED IN THIS STUDY

	Mean Scores	
	Whole Group[a]	Selected 113
Mark in Course	3.33(266)	3.47
Intelligence	58.47(252)	59.05
Reading Rate	251.03(253)	258.32
Reading Comprehension	51.14(253)	51.77

[a]The "whole group" was limited to those students who had had Education 25 at the University of Illinois. Seventy-seven others were taking Education 25 at the same time and eleven had transferred, having had equivalent training elsewhere. The numbers in parentheses indicate the number of students for which each mean was calculated.

Such a large reduction in numbers raises the question at once as to whether any important factors of selection operated to cause the remaining group not to be representative of the group as a whole. There appears to be little reason to believe that the factors of elimination operated in any but a random fashion, and thus the group remaining for whom the data are complete is thought to be a representative sample of the whole group. Comparison of the means given in Table II indicates that although the 113 students for whom complete records were obtained have slightly higher means, the differences do not seem to indicate any considerable degree of selection.

The kinds of raw data. The time schedule as administered seemed inadequate for the demands of this study. If the group had been further reduced so as to include only those for whom data on study time were available, the number of students studied would have been reduced by approximately 25 per cent, and such further reduction did not seem justifiable, especially in view of the obviously faulty character of the study-time data. Thus, the final set of raw data consists of the following for each of the two groups:

1. Marks in prerequisite course (Psychology 1 for Education 25 students; Education 25 for Education 10 students)
2. Scores on training test, covering the subject-matter of the prerequisite course
3. Scores on intelligence test
4. Scores on reading test
   a. Rate score
   b. Comprehension score
5. Scores from study-habits questionnaire
6. Attitude ratings
   a. Ambitious—indifferent attitude

b. Cheerful—despondent attitude
c. Evaluative—non-evaluative attitude
d. Persevering—vacillating attitude
e. Self-confident—dependent attitude

7. Marks in present course (Education 10 or 25)

Master tables. The coefficients of zero order are given in Table III (Education 25) and Table IV (Education 10). These tables should be read as follows, taking data from Table III for the purpose of illustration. The zero-order coefficient of correlation between the mark in the prerequisite course, Psychology 1 in this instance, and the training test based upon the subject-matter of Psychology 1 was .4556; between the mark in the prerequisite course and the intelligence test, it was .3935; between the mark in the prerequisite course and the mark in Education 25, .4332. The mean of the distribution of marks in the prerequisite course was 3.15. The standard deviation of this distribution was 0.85 and the range of the distribution was from two to five, the letter marks E to A being given numerical values from one to five, respectively. The remainder of this and the other table should be read in similar manner.

The two tables are placed together in order to facilitate many important comparisons. It will be noted that the last three lines of these two tables present the essential features of the distributions of the raw data. The following brief discussions of the raw data are based in the main upon the characteristics thus presented. Only occasionally are other facts noted which are not apparent in these tables.

Marks in preceding courses. The distributions of marks in prerequisite courses, Psychology 1 for Education 25, and Education 25 for Education 10, differ only slightly. In neither case were there students taking either Education 25 or 10 who had not made a passing mark in the prerequisite course. This lowers the range of the distributions and makes for lower coefficients of correlation between these and distributions of other measures than would likely be found with a wider range of abilities in the prerequisite courses. Statistically, the difference between the means of these two distributions is significant, inasmuch as it is approximately three times the probable error of the difference. So far as this study is concerned, probably no importance should be attached to this difference.

Scores on training tests. The two training tests produced distributions that were very similar, although the test for Education 10 students was relatively easier and produced somewhat less typical

TABLE III. "MASTER" TABLE SHOWING ZERO ORDER AND TENTH ORDER PARTIAL COEFFICIENTS OF CORRELATION; ALSO MEANS, STANDARD DEVIATIONS, AND RANGES OF DISTRIBUTIONS OF DATA ON ELEVEN FACTORS AND ONE CRITERION OF SCHOLASTIC SUCCESS FOR 260 EDUCATION 25 STUDENTS[a]

	Zero Order Coefficients											
				Reading			Attitudes					
	Mark in Prerequisite Course	Training Test	Intelligence Test	Rate	Comprehension	Study Habits	Ambitious—Indifferent	Cheerful—Despondent	Evaluative—Non-evaluative	Persevering—Vacillating	Self-Confident—Dependent	Mark in Course
1. Mark in Prerequisite Course.		.4556	.3935	.1050	.4019	−.0444	.2933	.1470	.3489	.2759	.2472	.4332
2. Training Test	.4556		.5118	.3619	.5459	−.0528	.2573	.2129	.4308	.2623	.3466	.5122
3. Intelligence Test	.3935	.5118		.2440	.5027	−.1209	.3073	.1448	.4018	.2161	.2796	.4619
4. Reading Rate	.1050	.3619	.2440		.3456	−.0891	.0506	.0542	.1434	.1155	.2222	.1857
5. Reading Comprehension	.4019	.5459	.5027	.3456		.0222	.2337	.1389	.3979	.2687	.3041	.4572
6. Study Habits	−.0444	−.0528	−.1209	−.0891	.0222		.1141	.1284	.0641	.0318	.0120	.0888
7. Ambitious—Indifferent	.2933	.2573	.3073	.0506	.2337	.1141		.4268	.6464	.6272	.5321	.6329
8. Cheerful—Despondent	.1470	.2129	.1448	.0542	.1389	.1284	.4268		.4842	.3095	.4863	.4002
9. Evaluative—Non-evaluative	.3489	.4308	.4018	.1434	.3979	.0641	.6464	.4842		.6317	.7132	.7121
10. Persevering—Vacillating	.2759	.2623	.2161	.1155	.2687	.0318	.6272	.3095	.6317		.5384	.5941
11. Self-confident—Dependent	.2472	.3466	.2796	.2222	.3041	.0120	.5321	.4863	.7132	.5384		.5538
12. Mark in Course	.4332	.5122	.4619	.1857	.4572	.0888	.6329	.4002	.7121	.5941	.5538	
Mean of Distribution	3.15	37.18	55.38	224.08	51.50	1.76	3.12	3.11	3.03	3.14	3.08	3.30
S.D. of Distribution	0.85	7.85	11.75	44.48	16.85	0.29	1.01	0.98	1.01	0.93	0.98	1.00
Range of Distribution	2–5	17.5–62.5	22.5–82.5	130–410	7.5–87.5	0.7–2.6	1–5	1–5	1–5	1–5	1–5	1–5

[a]Because of limitations of space, the probable errors of the coefficients of correlation and other measures given in the table above are not included. The probable errors of all coefficients of correlation greater than .63 are .02; of all those from .41 to .63, inclusive, they are .03; and for all those less than .41 they are .04. The probable errors of the means are in most cases approximately 1 per cent as large as the means themselves and those of the standard deviations about 3 per cent as large as the standard deviations themselves.

TABLE IV. "MASTER" TABLE SHOWING ZERO ORDER AND TENTH ORDER PARTIAL COEFFICIENTS OF CORRELATION; ALSO MEANS, STANDARD DEVIATIONS, AND RANGES OF DISTRIBUTIONS OF DATA ON ELEVEN FACTORS AND ONE CRITERION OF SCHOLASTIC SUCCESS FOR 113 EDUCATION 10 STUDENTS[a]

	Zero Order Coefficients											
				Reading			Attitudes					
	Mark in Prerequisite Course	Training Test	Intelligence Test	Rate	Comprehension	Study Habits	Ambitious—Indifferent	Cheerful—Despondent	Evaluative—Non-evaluative	Persevering—Vacillating	Self-Confident—Dependent	Mark in Course
1. Mark in Prerequisite Course		.5232	.4680	.0555	.4725	−.0111	.4455	.0884	.3908	.4048	.3370	.5495
2. Training Test	.5232		.4324	.2463	.4576	−.0641	.3494	.0646	.2674	.3678	.4152	.4213
3. Intelligence Test	.4680	.4324		.2241	.4539	−.1363	.1477	−.1384	.2535	.2155	.1608	.3698
4. Reading Rate	.0555	.2463	.2241		.2587	−.0764	.0257	−.0036	.0547	−.0161	.0730	.1102
5. Reading Comprehension	.4725	.4576	.4539	.2587		−.0939	.2914	.1184	.3363	.2588	.2751	.3980
6. Study Habits	−.0111	−.0641	−.1363	−.0764	−.0939		.1664	.1108	−.0007	.1591	−.0211	.1678
7. Ambitious—Indifferent	.4455	.3494	.1477	.0257	.2914	.1664		.3836	.5256	.7598	.5791	.6973
8. Cheerful—Despondent	.0884	.0646	−.1384	−.0036	.1184	.1108	.3836		.3882	.4260	.4684	.2772
9. Evaluative—Non-evaluative	.3908	.2674	.2535	.0547	.3363	−.0007	.5256	.3882		.5337	.7228	.5648
10. Persevering—Vacillating	.4048	.3678	.2155	−.0161	.2588	.1591	.7598	.4260	.5337		.6071	.6504
11. Self-confident—Dependent	.3370	.4152	.1608	.0730	.2751	−.0211	.5791	.4684	.7228	.6071		.5512
12. Mark in Course	.5495	.4213	.3698	.1102	.3980	.1678	.6973	.2772	.5648	.6504	.5512	
Mean of Distribution	3.39	40.38	59.05	258.32	51.77	1.75	3.46	3.40	3.31	3.34	3.42	3.47
S.D. of Distribution	0.90	10.83	10.58	48.66	16.20	0.28	0.90	0.72	0.89	0.86	0.92	0.92
Range of Distribution	2–5	17.5–67.5	27.5–82.5	130–410	17.5–92.5	1.0–2.3	1–5	2–5	1–5	1–5	1–5	1–5

[a]Because of limitations of space, the probable errors of the coefficients of correlation and other measures given in the table above are not included. The probable errors of all coefficients of correlation greater than .68 are .03; of all those from .58 to .68, inclusive, they are .04; for all those from .38 to .57, inclusive, .05; and for all less than .38 they are .06. The probable errors of the means are from 1 to 2 per cent as large as the means themselves, and those of the standard deviations from 4 to 5 per cent as large as the standard deviations themselves.

results, the range and standard deviation being greater than for the other test.

Intelligence test scores. In the case of intelligence, the Education 10 group is superior to the other by a statistically significant amount, the difference between the means being more than four times greater than its probable error. Even so, in view of the approximate equivalence of the two distributions, the difference is of no apparent importance so far as this study is concerned.

Reading test scores. *(a) Rate scores.* Here again the Education 10 group is somewhat superior to the Education 25 group, but in view of the similarity of the two distributions, no significance need be attached to this fact. *(b) Comprehension Scores.* In the case of reading comprehension scores, no significant difference appears between the groups. Of most apparent interest in these distributions are the rather large standard deviations; that is, they are large as compared with the standard deviations for some other distributions, such as those for the intelligence-test and the training-test scores, distributions which have means and ranges roughly comparable to the means and ranges of the distributions of the reading-comprehension scores.

Scores from study-habits questionnaire. No significant differences appear between the distributions of study-habits scores for the two groups, unless it be the larger range for the Education 25 students. The means and standard deviations of the two distributions, however, are approximately equivalent.

Attitude ratings. The points of similarity and difference between the distributions of attitude ratings for the two groups of students are very nearly the same for all five attitudes. Examination of the data relative to these ratings makes evident three sets of facts: (1) the means for the Education 10 group are uniformly higher by a statistically significant amount than those for the Education 25 group; (2) standard deviations for the Education 10 group are uniformly smaller than for the other, but scarcely by a significant amount; (3) the means of the distributions of these ratings are approximately the same as the means of the marks for these two groups in their respective prerequisite courses. The distributions of marks in Education 25 and 10 are only slightly different from the distributions in the prerequisite courses. The range is greater, inasmuch as some students failed in Education 25 and 10; the means are somewhat higher; and the standard deviations are larger. Although the Education 10 group has a higher mean, the difference is not statistically significant.

Summary of character of raw data. A broad view of the data presented in the last three lines of Tables III and IV, and the brief discussion of them which has just been presented, leads one to make certain generalizations with regard to the raw data. The principal observations may be stated under four heads: (1) the Education 10 group is almost uniformly superior by a slight but statistically significant amount; (2) despite the data being gathered in a variety of ways, and relative to many different aspects, there is a certain consistency about them as evidenced by means, standard deviations, probable errors, apparent skewness (not evident in data presented here), and the relations between the various sets of data, all of which encourage one to have confidence in their validity; (3) the standard deviations are small enough in the main to give further confidence in the character of the data; and (4) the probable errors are almost all comparatively small and indicate that reasonable dependence may be placed in the reliability and validity of the data.

B. THE ZERO ORDER COEFFICIENTS OF CORRELATION

The larger part of Tables III and IV is made up of the zero-order coefficients of correlation. A cursory examination of these coefficients brings certain general conditions to the attention: (1) most of the coefficients are positive and large enough when compared to their probable errors to indicate that they are significant; (2) what few negative coefficients there are, are confined almost entirely to correlation between scores from the study-habits questionnaire and other scores; (3) in general, the coefficients for Education 25 are larger than for Education 10; (4) in the main, however, the two sets of zero-order coefficients are very similar; and finally, (5) the coefficients of correlation between the various attitude ratings and the criterion of success are almost all of considerable size, only one being less than .30 and only two being less than .50. These are the two coefficients of correlation between the cheerful—despondent attitude ratings and the criterion of scholastic success, the marks in both courses.

C. PARTIAL COEFFICIENTS OF CORRELATION OF THE TENTH ORDER

In Table V are given the partial coefficients of correlation between the criterion of scholastic success (mark in the course) and the eleven factors of success, as measured by the various devices used. Each of these partial coefficients is the coefficient of correlation that re-

TABLE V. TENTH ORDER PARTIAL COEFFICIENTS OF CORRELATION BETWEEN THE CRITERION OF SCHOLASTIC SUCCESS AND ELEVEN FACTORS OF SUCCESS

Factors	260 Educ. 25 Students[a]	113 Educ. 10 Students[b]	Difference[c]
Mark in Prerequisite Course	.1296	.2641	.1345
Score on Training Test	.2207	.0094	.2113
Intelligence Test Score	.1809	.1227	.0582
Reading Rate Score	.0441	.0011	.0430
Reading Comprehension Score	.0348	.0781	.0433
Study-Habits Score	.1158	.2045	.0887
Ambitious—Indifferent Rating	−.1302	.0621	.1923
Cheerful—Despondent Rating	.0768	−.0311	.1079
Evaluative—Non-evaluative Rating	.4742	.1489	.3253
Persevering—Vacillating Rating	.4851	.2604	.2247
Self-confident—Dependent Rating	−.2173	.1033	.3206

[a]The probable errors for the coefficients in this column, except the two above .40, are .04. For these two they are .03.

[b]The probable errors for all the coefficients in this column are .06.

[c]The probable errors for most of the differences in this column are .08. For the first, sixth, ninth, and tenth they are .07.

mains between the criterion of scholastic success and the given factor (as measured by the means employed) after the influence of the other ten factors has been "partialled out"; that is, it is the coefficient of correlation between the criterion and the factor under consideration with the other ten factors held constant, or eliminated. It is evident from Table V that of the eleven partial coefficients of correlation between the mark in the course and the factors of success, two of the coefficients, those for reading rate and for study habits, stand out in both sets of data as being distinctly below the others. Only one of the four is as large as three times its probable error.

A cursory glance at this table leads one almost at once to the conclusion that little similarity exists between the results compared; the discrepancies seem rather glaring. But a more careful consideration of these data leads to a very different conclusion. For one thing, many of the apparent discrepancies are due to the tendency for the coefficients to be larger for the Education 25 group than for the Education 10 group, a tendency already noted for the zero-order coefficients. Another source of apparent difference appears in the first two coefficients in each set. These are coefficients for two purported measures of previous training. In the case of Education 25, the training test proved to be the better measure of factors operating for success in the course; whereas in Education 10, the mark in the prerequisite course proved to be much the better measure. From the size of the coefficients involved, it appears that previous training is a conditioning factor of success of about equal potency in both courses.

In so far as the differences between the coefficients for intelligence, reading rate, reading comprehension, and study habits are concerned, they are negligible. Probably the same should be said for

the difference appearing between the coefficients for the cheerful—despondent attitude, as both approximate zero.

As for the differences involved with the evaluative—non-evaluative and the persevering—vacillating attitudes, they have not the weight one might at first impute to them, for upon comparison of these coefficients with the others, it is seen that they exhibit the same tendencies for both courses, particularly the tendency to be larger than other coefficients, but that there is a somewhat greater accentuation in the case of Education 25 as compared with Education 10.

Finally, the two discrepancies obtaining in the cases of the ambitious—indifferent and self-confident—dependent attitudes must be considered. These are among the largest and the least reconcilable of all the discrepancies appearing in this table, particularly since the coefficients are negative for Education 25 and positive for Education 10. In the case of the two positive coefficients, however, one is scarcely as large as its P.E., and the other is only a little larger. In the case of the ambitious—indifferent attitude, the difference between the coefficients is not quite three times the P.E. of the difference. This leaves the discrepancy between the coefficients for the self-confident—dependent attitude in the two courses the least reconcilable and probably the only difference of any importance appearing in this table.

Concluding statement. Inasmuch as this chapter is merely a presentation of the data obtained by the procedures outlined in the preceding chapter, and upon which the conclusions and inferences of the following chapter are based, there is little need or opportunity for summarization. Tables III and IV are essentially summary tables and present the data in such a compact form that little need be added save the brief discussions of the preceding pages.

CHAPTER IV

CONCLUSIONS, LIMITATIONS OF DATA, AND CONSTRUCTIVE PROPOSALS

The following conclusions are stated with full cognizance of the limitations of the data. These limitations are discussed in the third division of this chapter. The second division is devoted to comparing the results of this investigation with the results of the investigations summarized in Chapter I. A discussion of the ways in which the study might be materially improved if substantially the same investigation were to be carried on again constitutes the fourth and final division of this chapter.

A. CONCLUSIONS

For one who has followed the account of this investigation, and particularly in view of the later discussion of the limitations of the data, there is no need to emphasize the tentative nature of these conclusions. However, the data are so consistent, and the methods of obtaining them were so safeguarded that conclusions based upon them appear worthy of careful consideration and tentative acceptance until more comprehensive and reliable data are obtained.

There are five major conclusions.

1. The major factors of scholastic success are:

a. Previous preparation
b. Intelligence
c. Study habits
d. Evaluative—non-evaluative attitude
e. Persevering—vacillating attitude
f. Self-confident—dependent attitude

The first five are related to success in a positive way; that is, a high score or rating[1] on any of them is indicative of success. The self-confident—dependent attitude appears to be related to success in a negative way; that is, a low score on this attitude is indicative of success. The obtained results for the first five factors are in agreement with what is to be expected. But the result for the self-confident—dependent attitude is contradictory to common expectation. Two

[1]A high score or rating means that one's previous preparation is good, his intelligence high, his study habits good, that he exhibits more of a tendency to evaluate than not to evaluate, to persevere rather than to vacillate, to be self-confident rather than dependent.

possible explanations present themselves. First, it may be that the instructors teach in such a way as to penalize self-confidence and to reward the student whose dependence results in an unquestioning acceptance of the infallibility of instructor and text. On the other hand, it may be that this attitude was interpreted by the raters as denoting cocksureness, an "I-know-it-already, what's-the-use-of-studying-the-text" attitude as opposed to a feeling that there is much to be learned that should be learned. With the data at hand, it is not possible to determine which of these explanations, if either, is the correct one.

In this connection, it is not possible to pass over those factors that exhibited, according to the final partial correlations, relatively little or no relationship to scholastic success. These are: reading rate, reading comprehension, ambitious—indifferent attitude, and cheerful—despondent attitude. Neither in the zero order nor partial coefficients did reading rate appear to be an important factor. In the zero order coefficients, reading comprehension appeared as an important factor, having coefficients of .4572 and .3980 for Education 25 and 10, respectively. But in the process of partialling, these were reduced to approximately zero. This was due to the high zero order coefficients between reading comprehension and other factors, particularly mark in preceding course, score on training test, and intelligence examination score. Thus, the apparent influence of reading comprehension was dissipated because the measure of it was also a measure to a large extent of other primary factors. As for the ambitious—indifferent attitude, an analysis of its coefficients of correlation is very similar to that for reading comprehension, except that its original high coefficient of correlation with success is dissipated because of the high coefficients between this attitude and the other four attitudes, particularly the evaluative—non-evaluative and persevering—vacillating attitudes. Its original coefficient of correlation with success was the lowest of those for the five attitudes, and with fairly high coefficients with the other four attitudes, this original coefficient was naturally dissipated by means of partialling.

2. The unit character of factors. So far as scholastic success is concerned, the five factors that had significant partial coefficients of correlation with the criterion are "unitary" factors, or at least may be so considered. Perhaps the self-confident—dependent attitude should be added to these five, particularly if more carefully defined. On the other hand, reading comprehension, the ambitious—indifferent, and the cheerful—despondent attitudes are "composite" factors of which

the elements are so largely measured in measuring other factors as to dissipate their apparent influence. Reading rate is also bound up with other factors, but even in the zero order coefficients did not appear to be of any particular importance.[2]

3. The significance of "non-intellectual" traits. These data support the belief expressed by many authorities that traits such as study habits and attitudes are factors of success comparable to the seemingly more tangible and more usually measured factors such as intelligence and previous preparation. These data, however, do not justify a statement as to the relative importance of intellectual and non-intellectual traits.

4. Limitations of prediction of scholastic success. There is good reason for concluding from the facts presented that prediction of scholastic success can never be highly satisfactory so long as there is no adequate measure of "non-intellectual" factors such as study-habits and attitudes. In this connection it is worthy of mention that these data give added justification for the procedure that has been often advocated and frequently adopted in sectioning classes into homogeneous groups; that is, the original sectioning is done on the basis of such measures as past record and intelligence test scores, and adjustments made on the basis of teacher judgments. Probably these judgments are affected in the main by factors such as pupil attitudes.

5. Need for developing desirable "non-intellectual" traits. Finally, these data make evident the need for engendering those study habits, attitudes, and the like that are conducive to scholastic success. This responsibility devolves upon teachers in two ways: first, they should so conduct their own classes as to arouse and engender these desirable study habits, attitudes, and the like with respect to the course immediately concerned; and second, they should seek to help students to generalize these traits so that they will be effective controls of conduct in other courses.

B. COMPARISON WITH RESULTS OF PREVIOUS INVESTIGATIONS

This study has yielded certain results that are corroborative of results obtained by some of the investigations summarized in the first chapter. These results may be referred to and commented upon rather briefly.

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[2]Characteristics of the data supporting and conditioning this conclusion are discussed more fully in the section of this chapter in which limitations of the data are considered.

1. Previous preparation. None of the studies reviewed in Chapter I was conducted in such a manner as to yield comparable results as to the potency of previous preparation as a factor conditioning scholastic success. May[3] used two measures of high-school preparation but did not obtain significant results. Elsewhere, Pressey[4] has shown that "many college students are distressingly lacking in . . . minimal essentials of background information belonging to the grammar-school level."[5] From his studies, he infers that this lack is the source of much of the difficulty that college students experience. In so far as Pressey's conclusions embrace the idea that subject-matter preparation is an important factor of scholastic success, the results of the present investigation are comparable to his.

2. Intelligence. All of the previous investigators who have taken general intelligence into consideration have concluded that it is one of the prime factors of scholastic success, but none has found it to be the only factor of importance.

3. Reading ability. The relative contribution of reading ability as determined by the present investigation is in full agreement with the results obtained by Flemming.[6] She found that the coefficient of correlation between reading comprehension and general intelligence was so high that in computing multiple-ratio coefficients of correlation between the criterion of scholastic success and other factors, the inclusion of reading comprehension adds almost nothing (only .0022) to the coefficient (.8021) obtained by using certain measures of general intelligence alone.[7]

4. Study habits. May[8] included the factor of time spent in study, one aspect of study habits, and concluded that it was of considerable importance, although he conceived of it as a measure of "degree application." Ohmann[9] found "study habits and methods" to be among "causes of deficiency." Pressey[10] found that differences in study habits were among the major "crucial differences between good and poor students," and that probation students were materially benefitted by taking a "how to study" course.

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[3]Study No. IV, *see* p. 16.
[4]Pressey, S. L. "Background Educational Factors Conditioning College Success," *Sixteenth Yearbook of the National Society of College Teachers of Education.* Chicago: University of Chicago Press, 1928, p. 24-29.
[5]*Op. cit.*, p. 26.
[6]Study No. II, *see* p. 12.
[7]Flemming, C. W. "A Detailed Analysis of Achievement in the High School," *Teachers College, Columbia University Contributions to Education,* No. 196. New York: Bureau of Publications, Teachers College, Columbia University, 1925, p. 149.
[8]Study No. IV, *see* p. 16.
[9]Study No. V, *see* p. 18.
[10]Studies No. VI and VII, *see* p. 20, 21.

5. Ambitious—indifferent attitude. If this attitude is considered as an approximation of Flemming's[11] "desire to excel," to which it is only roughly comparable, we find similar results. The original zero order coefficients between "desire to excel" and the criterion of success in Flemming's study were fairly high (.6975 and .4598) but except for a very few combinations, the addition of "desire to excel" made an almost negligible contribution to the multiple-ratio coefficients. None of the other studies reviewed furnishes even roughly comparable data.

6. Cheerful—despondent attitude, and

7. Evaluative—non-evaluative attitude. No comparable data are available relative to either of these factors.

8. Persevering—vacillating attitude. May[12] conceived of time spent in study as a measure of degree of application or industry. His results indicated this to be an important factor. Flemming[13] found "industry and application in school" and "will power and persistence" to be of some importance, the former being somewhat more significant than "desire to excel." Hughes[14] found "regularity and persistency" to be one of the important traits making for scholastic success.

9. Self-confident—dependent attitude. Hughes[15] found that "confidence in own ability" was one of the few traits in which there was any tendency for honor students to fall markedly below the average. This tends to corroborate the apparent indication in the present study that there is a negative correlation between the self-confident—dependent attitude and school marks.

C. LIMITATIONS OF THE DATA

The limitations of the data fall logically under two divisions: first, those limitations relating to the validity and reliability of the measures under consideration, and second, those limitations incurred by reason of the statistical procedures used in manipulating the original data.

Validity of measures used. The intelligence test is the only one of the measuring instruments that has been standardized and validated in any real sense of the terms. In the case of the other instruments used, an earnest attempt was made to conform to generally accepted

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[11]Study No. II, *see* p. 12.
[12]Study No. IV, *see* p. 16.
[13]Study No. II, *see* p. 12.
[14]Study No. III, *see* p. 14.
[15]*Ibid.*

principles of test construction and to take all possible precautions in their use. Careful inspection leads one to believe that the means used measure within reasonable limits those factors that they purport to measure. Although some overlapping is apparent, it is certain that most of the measures secured are of different factors. Probably the independence of the various measures is obscured to a considerable extent, however, because of the impossibility of allowing for attenuation of the coefficients of correlation.

Certain specific limitations should be considered for each instrument employed, or at least for most of them. They will be taken up in the order in which they appear in the master table to which reference has frequently been made.

1. Marks in preceding course. It is not at all possible to tell to what extent teacher's marks are measures of that which is learned in a given course. What is learned, however, is probably the most important element that enters into the determination of a mark. As was pointed out in Chapter II, it was thought that marks in Psychology 1 were hardly adequate measures of that part of the course which was of most importance as a basis for the succeeding course. This inference is substantiated in large measure by the higher coefficient of correlation between marks in the prerequisite course and the criterion of success for Education 10, inasmuch as the general tendency is for the higher coefficients to be for Education 25. Furthermore, the training test covering Psychology 1 subject-matter appears, especially in the final partial coefficients, to be superior as a measure of a factor of scholastic success to the marks in Psychology 1. The relative value of these two measures is reversed with respect to Education 25 as a preparation for Education 10.

2. Training-test scores. As explained in Chapter II, the training tests were constructed from test items originally used by instructors teaching the preceding courses. The items used were selected on the basis of the statements of instructors as to the knowledge they assumed their students had obtained from the prerequisite course as a basis for Education 25 or 10. The tests were constructed according to recognized principles of making new-type tests. Perhaps the tests did measure intelligence, reading-rate, and reading comprehension to a certain extent, as is indicated by the coefficients of correlation, but it appears that basically they measured knowledge of the subject-matter of the courses on which they were based.

3. Intelligence test scores. *The Brown University Mental Examination* is recognized by competent authorities as one of the best of

such examinations for college students. Under the circumstances of this investigation, its validity can only be accepted.

4. Reading rate. It has been shown that reading rate varies markedly with various types of content and various reading purposes.[16] It is not possible to tell whether the test of reading rate gave a measure of the optimum, of the representative, or of some other rate of reading. It did, however, give a measure of rate of reading certain material under well-defined conditions. Whether this is the rate that should be measured, is, of course, still a question. In justification of the validity of the measures of rate, it may be pointed out that the content and the purposes set by the reading test appear to be typical of the reading required in the field of education.

5. Reading comprehension. The test of reading comprehension produced scores that correlated so highly with marks in the preceding course, training-test scores, intelligence test scores, and ratings of the evaluative—non-evaluative attitude that the zero order coefficient with the criterion of success was dissipated by the process of partialling. The two most likely explanations appear to be that either reading comprehension is a product and composite of the factors with which the scores on this test correlated closely, or the test used is not a measure of reading comprehension but of a composite of these other factors. The second view seems to be the more tenable in this case because: (1) the test was composed of educational subject-matter and thus scores on it are more likely to be affected by previous training in education of the students than if the test were composed of other material; (2) it employed new-type test devices that seem to call for the exercise of ingenuity and thus perforce measure intelligence as it is measured to a large extent at present; and (3) most of the exercises of the reading test called for discrimination and thus it would be natural for the evaluative—non-evaluative attitude to play a significant part in determining the outcome of the test. The writer is inclined to combine these two views for a full explanation of the results obtained: first, reading comprehension is really a composite rather than a unit, and second, the test used confused the issue by employing educational content, thus making for a poor measure of reading comprehension if such exists as a separate entity.

6. Study-habits score. There is very little if anything in the data by which one may even infer the validity of the study-habits questionnaire. Being a questionnaire, it was subject to the "personal equation"

[16]For the report of one study *see:*
Judd, C. H. and Buswell, G. T. "Silent Reading: A Study of the Various Types," *Supplementary Educational Monographs,* No. 23. Chicago: University of Chicago, 1922. 160 p.

to a greater extent probably than any of the measures already discussed. However, the relatively low coefficients of correlation between the study-habits scores and the other measures, as well as the fact that the coefficient of correlation with the criterion of success rose upon holding all other factors constant, indicates that it at least measures something that is in the main distinct from those things measured by other instruments used in this study.

7. Attitude ratings. Although as described in Chapter II, the rating of attitudes was hedged about by as many safeguards as seemed possible, the validity of the ratings is subject to question. The two most serious limitations are due to the fact that the ratings were made by the instructors and near the time of giving semester grades. This means that a "halo" effect was probably unavoidable despite the care taken, such as providing an individual student card for each attitude. This should not, however, be a serious difficulty, for the "halo" effect should be entirely removed by the process of partialling. The other, and undoubtedly more serious limitation, is that due to the seeming inability of instructors to know the students in any but a class situation and a pupil-teacher relation. Such restricted circumstances certainly placed a serious handicap upon the instructors in making ratings. This situation means that however perfect the instructors may have been as judges of attitudes, they had only a limited sampling of behavior on which to base their judgments, a sampling obtained under peculiar circumstances that probably made for a biased judgment. This rather severe criticism, however, is modified to a considerable extent by the fact that the class, teacher-pupil situation is one of the major situations in which the scholastic success of students is determined and one in which attitudes are frequently manifested to a marked degree.

Reliability of measures used. The coefficient of reliability for the *Brown University Mental Examination* is .837.

Inasmuch as all the other measures employed in this study were either devised in only one form for immediate use or were of the nature of ratings of which only one of each kind was made, it is not possible to report any measures of reliability.

Limitations of statistical procedures employed. Of the various statistical procedures employed in this investigation, the only ones in need of explicit consideration with respect to limitations are the processes of correlation, simple and partial. In one of the best discussions of the dangers involved in making statistical studies, the limitations of

correlation are pointed out by Burks and Kelley.[17] They were particularly concerned about the use of correlation in problems of causation. Inasmuch as this investigation of the factors of success is a causation study, their conclusions are particularly applicable. After presenting a convincing argument based upon suitable data, Burks concluded that

> . . . . in any study of causation we are partialling out too much when we render constant factors which may in part or in whole be caused by either of the two factors whose true relationship is to be measured, or by still other unmeasured remote causes which also affect either of the two isolated factors.[18]

Over against this statement, Kelley placed the proposition that so long as variables contain chance factors, too little is partialled out unless the chance factors are also held constant.[19] If the original zero order coefficients are corrected for attenuation, chance factors are partialled out.

Unquestionably, both of these limitations are applicable to the data and to the use made of correlation in this study. How large the resulting errors are, it is impossible to tell. That they tend to balance each other is a source of satisfaction. It is the opinion of the writer that too much rather than too little has been partialled out in most instances, probably a great deal too much. As a result, most, if not all, of the final coefficients of partial correlation are entirely too small.

Kelley also calls attention to the difficulties in interpretation of correlation coefficients, both partial and zero order, due to the inadequacy of mental measuring instruments.[20] That is, when a test or other similar device, however reliable it may be, does not measure that which it is said to measure, or at least only part of the score obtained by means of it is due to the factor presumed to be measured, then it is not possible to give a precise interpretation to coefficients of correlation between such measures.

To summarize, there are three fundamental difficulties in the use and interpretation of coefficients of correlation, particularly coefficients of partial correlation: (1) too much is partialled out when the factors

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[17]Burks, B. S. and Kelley, T. L. "Statistical Hazards in Nature-Nurture Investigations," Chapter II, p. 9-38 of:
Terman, L. M., *et al.* "Nature and Nurture, Their Influence Upon Intelligence," *Twenty-Seventh Yearbook of the National Society for the Study of Education,* Part I. Bloomington, Illinois: Public School Publishing Company, 1928. 465 p.
For other discussions of the use and limitations of correlation, especially partial correlation *see:*
Burks, B. S. "On the Inadequacy of the Partial and Multiple Correlation Technique," *Journal of Educational Psychology,* 17:532-40, 625-30; November, December, 1926. Bibliography included.
Hull, C. L. *Aptitude Testing.* Yonkers-on-Hudson, New York: World Book Company, 1928, p. 249-53.
[18]Burks and Kelley, *op. cit.,* p. 12-13. Italicized in the original.
[19]*Ibid.,* p. 35.
[20]*Ibid.,* p. 36-37.

rendered constant are to any extent caused by either of the two factors whose true relationship is sought or by any of their remote causes; (2) too little is partialled out unless all chance factors are also held constant; and (3) coefficients are not subject to precise interpretations so long as our mental measures measure something other than that which they are presumed to measure.

All of these limitations appear to condition seriously the conclusions based upon the data secured in this investigation. The writer does not believe, however, that the conclusions are invalidated so completely as to make it impossible to place any reliance in them whatsoever. But on the other hand, the objects of this study are by no means removed from the field of controversy. We must still forego the pleasures of statistical certainty in this as well as in many other fields.

D. INDIRECT OUTCOMES FROM THE INVESTIGATION

The conclusions stated in the first part of this chapter may be appropriately labeled "intrinsic outcomes," for they are the products toward which the investigation was directed. But from many scientific investigations, especially in a field such as education where the scientific method is in the early stages of development, there are often by-products of considerable importance. These incidental or indirect outcomes may be suggestions for the refinement of method or indications of gaps in fundamental aspects of the science. The present study yields both sorts of indirect outcomes.

Possible refinements of technique. 1. *The group studied.* The circumstances under which the present study was conducted made it advantageous to have two separate groups, but another investigation would undoubtedly profit by being confined to a single group of manageable size, perhaps two or three hundred students. The groups should be so selected that they might be studied in relation to two or more school subjects, so that the influence of the various factors of scholastic success could be studied for the same group of students under more than one set of circumstances. Such an arrangement could be provided where there is a relatively fixed curriculum, such as is commonly found in professional colleges. Proper limitation of the size of the group should enable the investigator to concentrate his energies and hence make it possible to secure complete data from a larger proportion of the group and to supplement the quantitative part of the investigation with intensive case studies. Of course, if the time and resources of the investigator permitted, it would be profitable to extend the size of the group or multiply the number of groups as

much as possible. But this extension should not be undertaken at the expense of thoroughness.

2. *The factors studied.* In view of the results obtained, elusive and tentative as they are, it appears that another investigation might well be confined to a smaller, better defined group of factors. Those that give the greatest promise of bearing fruit are:

1. Preparation (meaning preparation in foundation subject-matter)
2. Intelligence
3. Study habits
4. Attitudes
   a. Evaluative—non-evaluative
   b. Persevering—vacillating
   c. Self-confident—dependent
   d. Possibly one or two other attitudes or character traits judiciously selected

Such limitation of the factors under consideration would enable the investigator to make a more intensive and thorough study of them than has been possible under the circumstances of the present investigation.

3. *Means of measurement.* As to the means employed, it is desirable to improve them in every way possible. Perhaps with our present state of knowledge, it is not possible to establish the validity of even the tests of intelligence or of previous preparation, but they at least measure something and it would seem that we are justified in labeling that something as meaningfully as our knowledge permits.[21] The greatest apparent gains immediately possible are to be made in establishing the reliability of the measures used. In the first place, this demands that at least two comparable and as nearly as possible equivalent measures be provided for each of the factors studied. In the case of attitudes, so long as we are restricted to a rating technique, two or more independent qualified raters should be provided who are in no way responsible for giving grades to the students under consideration. These raters should be familiar with the entire group concerned rather than with small segments of it. Probably another study of the factors of scholastic success should take another definition of success, or have a double definition: definitions in terms of marks and in terms of command of subject-matter. It would be necessary in that event to add some fairly objective measure of command of subject-matter.

[21]It is chiefly because of our inability to establish the validity of our measures that Courtis has labeled education a "pseudo-science."
Courtis, S. A. "Education—A 'Pseudo-Science,'" *Journal of Educational Research,* 17:131-32, February, 1928.

Fundamental gaps in the science of education. All of the preceding considerations are, however, practically "knocked into a cocked hat" when attention is directed to gaps in certain fundamental aspects of our science. There are three such major gaps intimately concerned with studies of the nature of the investigation being reported.

The first of these is the lack of any adequate knowledge or generally accepted theories as to the nature of attitudes and related traits or characteristics. It would be possible, however, to progress reasonably well without such theories or knowledge if unit traits or larger entities as character or personality had fairly adequate measures devised for them, much on the order of those for intelligence. But as yet the psychologist is pretty much at sea on this matter. Undoubtedly, a solution by the psychologist would enable the educator to make enormous advances in his science.

Second is the lack of adequate measuring instruments for all phases of mental life. This is a lack that is most keenly felt on the college level. However, there is grave need everywhere for establishing the validity of educational measurements.

The third gap is the absence of any established statistical technique for use in manipulating data of the nature of those presented in Chapter III. Serious doubts have been cast upon the use of coefficients of partial correlation, as was shown in the second part of the present chapter, but no acceptable substitute has been found.[22]

E. IN RETROSPECT

The writer, by way of summarizing his final attitude toward this and related investigations, can only affirm that it is one of confidence that the many efforts which are being directed at the gross problem of the relation of the maze of factors of human nature to scholastic success and toward the primary problems of resolving and defining "non-intellectual" factors, of developing adequate measuring instruments for mental abilities, and of developing adequate statistical methods, must in time eventuate in results highly valuable to the educator. His feelings at the close of this investigation have been admirably ex-

[22]This last section of the chapter is not written without cognizance of the fact that these fundamental problems are being attacked with considerable vigor by those who are qualified to delve into them. For example, psychologists are aware of the need for identifying traits of character and other "non-intellectual" factors. For one of the most up-to-date bibliographies containing important references on this point, *see:*

Sullivan, E. B. "Attitude in Relation to Learning," *Psychological Monographs,* Vol. 36, No. 3, 1927, p. 142-49.

Perhaps the most elaborate attempt just at present to develop adequate measuring instruments is that being sponsored by the American Council on Education. *See:*

"Personnel Methods," *Educational Record Supplement,* No. 8, July, 1928. 68 p.

Of the efforts to develop valid statistical techniques for use in distinguishing mental abilities, Kelley should be especially mentioned. *See:*

Kelley, T. L. *Crossroads in the Mind of Man. A Study of Differentiable Mental Abilities.* Stanford University, California: Stanford University Press, 1928. 238 p.

pressed by Titchener as being his feelings at the close of his resumé of the experimental method in psychology. The only essential difference is the object of the feeling. The writer can do no better than to quote Titchener.[23]

I am now at an end. I finished writing the last paragraph with a feeling confounded, in Wundtian terms, of pleasantness, relaxation, and tranquillization. We set out from uncertainty and chaos; and we have at last achieved a fairly definite point of view, and have laid out a programme of experimental work for the future. Unfortunately, affective processes move between opposites: and that first feeling—which in my own poverty-stricken terminology would be merely a feeling of relief—soon gave way to a feeling of unpleasantness, tension, and depression. We know so very little of the subject of these Lectures, and the work that we have found to do will take so long in the doing! But feelings, again, are subject to *Abstumpfung,* show the phenomena of adaptation; and the feeling of depression passed as the feeling of relief had passed before it. The professional attitude came to its rights. And the attitude, in the case of the experimental psychologists, is—how shall I describe it?—an attitude of patient confidence. We must be patient, because of all the objects of human inquiry mind is the most baffling and the most complex; we must expect that the systems of to-day may have only an historical interest for the next generation. But we may have absolute confidence in our method, because the method has proved itself in the past; it has done far more for psychology than is generally acknowledged, far more even than is recognized in the ordinary textbook of psychology: for the law of attentional inertia holds in science as it holds in ordinary life. There is not the slightest doubt that the patient application of the experimental method will presently solve the problems of feeling and attention.

[23]Titchener, E. B. *The Psychology of Feeling and Attention.* New York: The Macmillan Company, 1908, p. 316-17. Reprinted by permission.

APPENDIX A

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The following thirty-two references are the studies on which Table I in Chapter I, page 9, is based. Those studies reviewed in Chapter I are marked with a star (*).

Inasmuch as one study was reviewed which was not among those listed in Table I, this study is appended to the following thirty-two references.

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APPENDIX B

STUDY-HABITS QUESTIONNAIRE, WITH SCORING KEY

General Instructions: To be read by instructor and students together.

Your answers to this questionnaire will be held in strict confidence by the investigator and will in no way affect your grade in this course. In fact, your instructor has agreed not to look at your replies but will turn the questionnaire over directly to the investigator. It is essential that you reply with the utmost frankness and as accurately as possible. The purpose of the investigation is to learn how university students study. However, since this questionnaire deals with study habits, it should prove very interesting to you as a student of education.

Answer each question on the basis of what you do in studying your lessons in this course, leaving out of consideration what you may do in studying other lessons.

Please do not guess. If you are uncertain of the answer to any question, place a question mark (?) in the margin beside the place left for the answer; or, if more than one answer is true, check each true answer. However, in most instances only one answer will be true.

Tell how you actually study, *not* the way you think you should study. The thing of importance in this investigation is to learn how university students really study, not the way someone may think they ought to study.

Answer each question by placing a check (V) opposite each answer that is true.

Student.....
(surname first)

Educ....., Sec....., Date....., 192.....

Instructor.....

You may refer back to these directions as often as you wish while answering the questions on the following pages. This is not a test; it is simply a questionnaire.

1. Do you follow a fairly definite study schedule; that is, do you have a fixed time at which you study your lessons for this course?
   - Yes, all of the time..... .....
   - Yes, most of the time..... .....
   - No..... .....
2. Do you study your lessons for this course at the same place?
   Always..... Usually..... Occasionally..... Never.....
3. When do you ordinarily study your assignments?
   - Soon after they are made.... .....
   - Just before the next class meeting..... .....
   - At some intermediate time... .....
4. How do you ordinarily do all of your studying on an assignment?
   - All at one time..... .....
   - At two different times..... .....
   - At three or more different times..... .....

5. Do you usually do your assignments hastily or leisurely?
   In great haste, with some work still unfinished..... .....
   With dispatch and all work completed..... .....
   Leisurely, but with no time wasted..... .....
   So leisurely that time is wasted..... .....
6. Before beginning an assignment, do you recall the main points of the preceding lesson?
   Always..... Usually..... Occasionally..... Never.....
7. When beginning to study an assignment, do you think over or get clearly in mind what your instructor has asked you to do?
   Always..... Usually..... Occasionally..... Never.....
8. Do you read over an assignment rapidly, sketching or skimming, so as to get a general idea of the author's treatment and then study in greater detail?
   Always..... Usually..... Occasionally..... Never.....
9. Do you study a reading assignment by studying in detail from the first without getting a general view of the author's treatment?
   Always..... Usually..... Occasionally..... Never.....
10. Do you underline, make marginal notes, or otherwise mark the more important points in your textbook?
    Always..... Usually..... Occasionally..... Never.....
11. As you read, do you keep other notes, for instance in a notebook?
    Almost always..... Frequently..... Occasionally..... Never.....
12. Do you make a memorandum of items in the textbook which need explanation?
    Almost always..... Frequently..... Occasionally..... Never.....
13. If so, do you ask about them, either in class or in conference with your instructor?
    Always..... Usually..... Occasionally..... Never.....
14. Do you take your notes on reading in outline form?
    Always..... Usually..... Occasionally..... Never.....
15. Do you take your notes on just anything that is handy, such as envelopes, odd sheets, and fly leaves of the text?
    Always..... Usually..... Occasionally..... Never.....
16. Do you take your class notes in their final form in class, or do you write them up in permanent form afterward?
    Final: Always..... Usually..... Occasionally..... Never.....
    Rewrite: Always..... Usually..... Occasionally..... Never.....
17. Do you allow unfamiliar words to pass without being sure of their meaning?
    Almost always..... Frequently..... Occasionally..... Never.....
18. Do you try to determine the reasons for statements the author makes?
    Always..... Usually..... Occasionally..... Never.....
19. Do you try to determine the reasons for statements the instructor makes?
    Always..... Usually..... Occasionally..... Never.....
20. Do you try to connect important points in the course with something in your own experience?
    Almost always..... Frequently..... Occasionally..... Never.....

21. Do you attempt to commit to memory all points you consider important, such as principles and lists of important facts?

Always..... Usually..... Occasionally..... Never.....

22. On the average, about what proportion of the total time spent in studying a lesson do you spend in thinking about what you have read?

Less than 10 per cent..... .....
10-25 per cent..... .....
26-50 per cent..... .....
51-75 per cent..... .....
More than 75 per cent..... .....

23. While studying, do you recite your lessons to yourself, either aloud or in a whisper?

Always..... Usually..... Occasionally..... Never.....

24. At the end of your study of a lesson, do you write out either a summary or an outline?

Always..... Usually..... Occasionally..... Never.....

25. While studying, do you formulate questions such as your instructor might ask about the lesson, or questions which involve the most important ideas of the lesson?

Almost always..... Frequently..... Occasionally..... Never.....

26. Do you supplement the study of a textbook assignment by reading unassigned references on the same topics?

Almost always..... Frequently..... Occasionally..... Never.....

27. Do you ever do what is not assigned, thinking that it has been assigned?

Almost always..... Frequently..... Occasionally..... Never.....

28. Do you review your textbook with some care?

	Always	Usually	Occasionally	Never
Daily				
When in need of facts previously learned				
When writing a paper				
To answer questions in an assignment				
Before announced quizzes or examinations				

29. Do you use facts learned in other classes this semester to help in this course?

Almost always..... Frequently..... Occasionally..... Never.....

30. Do you use facts learned in this class to help in other courses?

Almost always..... Frequently..... Occasionally..... Never.....

31. Do you assist others to learn their lessons in this course?

Almost always..... Frequently..... Occasionally..... Never.....

32. Do you supplement what the textbook says by supplying examples of your your own, thinking of what someone else has said along the same line, and the like?

Almost always..... Frequently..... Occasionally..... Never.....

33. Do you in similar ways supplement what the instructor says?
Almost always..... Frequently..... Occasionally..... Never.....

34. Which of the phrases below best describes your purpose when studying textbook assignments in this course? (Check more than one if your purpose is a combination of these.)

Reading to understand what the author says..... .....
Reading to remember what the author says..... .....
Reading in search of information..... .....
Reading with a critical attitude toward statements of the author.... .....
Making an analytical study of the text..... .....
Reading for enjoyment..... .....

Look back over the questionnaire and see if you have marked it in exactly the way you intended.

Any remarks you wish to make on the questionnaire or your study habits will be heartily welcomed. Use the space below.

SCORING KEY FOR STUDY-HABITS QUESTIONNAIRE

1.—3
2
0
2.—3, 2, 1, 0
3.—3
0
1
4.—1
3
2
5.—1
3
2
1
6.—3, 2, 1, 0
7.—3, 2, 1, 0
8.—3, 2, 1, 0
9.—0, 1, 2, 3
10.—3, 2, 1, 0
11.—3, 2, 1, 0
12.—3, 2, 1, 0
13.—3, 2, 1, 0
14.—3, 2, 1, 0
15.—0, 1, 2, 3
16.—0, 1, 2, 3
3, 2, 1, 0
17.—0, 1, 2, 3
18.—3, 2, 1, 0
19.—3, 2, 1, 0
20.—3, 2, 1, 0
21.—3, 2, 1, 0
22.—0
1
2
2
3
23.—0, 1, 2, 3
24.—3, 2, 1, 0
25.—3, 2, 1, 0
26.—3, 2, 1, 0
27.—0, 1, 2, 3
28.—3, 2, 1, 0
3, 2, 1, 0
3, 2, 1, 0
3, 2, 1, 0
3, 2, 1, 0
29.—3, 2, 1, 0
30.—3, 2, 1, 0
31.—3, 2, 1, 0
32.—3, 2, 1, 0
33.—3, 2, 1, 0
34.—2 (Total
1 in
2 order
3 to
3 find
3 score)

APPENDIX C

ATTITUDE-RATING CARDS AND DIRECTIONS FOR USING

The Assumption

In rating the students' attitudes according to the accompanying scheme, the three major assumptions are:

1. That the two attitudes of each pair are opposites; that in any given situation a student exhibits one or the other or neither, but not both, and thus can be rated along a scale which has one attitude at one extreme and the other attitude at the other extreme. Hence, the two attitudes in reality form a unit; that is, they are really two aspects of one attitude.

2. That in any considerable unselected group of university students the distribution of degree of manifestation of any given dual attitude approximates the normal probability curve, slightly skewed toward the more favorable aspect of the dual attitude. With juniors and seniors, this skewness is probably somewhat more pronounced than with freshmen and sophomores.

3. That attitudes are manifested in behavior and may be inferred with considerable certainty by an experienced and competent observer of that behavior.

The Instructions

In rating students' attitudes, the familiar sorting procedure should be used. In doing this, take the cards for any one dual attitude for all of the students under your instruction in Education 10 or 25. Sort them into five groups according to your estimate of the extent to which each student manifests the given dual attitude (this includes the aspect of the attitude as well as the extent). In so far as possible, arrange the cards in order within each group.

Bear in mind in thus sorting the cards that in any large unselected group of university students the distribution will probably conform rather closely to the normal probability curve, possibly slightly skewed. As used in this study, the base line of the curve is divided into five parts, embracing 7%, 24%, 38%, 24%, and 7% of the cases respectively, if a perfectly normal distribution is adhered to. However, the students of any given group, especially if small, may not conform to this distribution to any appreciable extent.

Having assured yourself that you may have made your best judgment, check the point on the scale at which you believe each student should be rated with reference to that particular attitude. Vertical lines are provided on the scale for the convenience of raters, but any point on the scale may be checked; in fact, most checks will probably not come exactly at the vertical lines.

In order that your memory may be disabused in so far as possible of your estimate of any particular student's attitude already rated, allow two or three days to elapse before rating your students on another attitude. Use the foregoing procedure on each of the five attitudes. Do everything possible to avoid the "halo" effect, for it must not be assumed that there is no correlation between these attitudes. Rate them in the following order:

1. Ambitious—Indifferent
2. Cheerful—Despondent
3. Evaluative—Non-evaluative
4. Persevering—Vacillating
5. Self-confident—Dependent

No doubt every instructor will have a few students whom he feels it is utterly impossible for him to rate. Such students should not be rated. It is better to omit than to make a purely chance rating. However, it is not expected that anyone will throw out any considerable number of students on this account.

The following "cases" are provided for the purpose of helping the different raters to have more nearly the same standards than they would have if they worked entirely independently. Please study the two cases for any given dual attitude before rating your students relative to that attitude.

Two Examples of the Ambitious—Indifferent Attitude

Case A

Miss ..... is registered in L. A. and S. She is studying education because she may teach some day, and even if she does not, she thinks that the training will help her in mission work, in which she is interested. She has largely supported herself while in the university. Because she has felt that she could not do the best school work while working on the outside she has carried the barest minimum necessary for graduation in four years. At times she has contemplated dropping out of school and teaching a year or two in order that she might lighten her load while in school, but has decided against this because of the possibilitiy of never returning. She wishes to get the best training possible in education, particularly so that she can teach whereever she may wish. For this reason she wishes to take practice teaching and is going to attend one summer session so that she will have enough extra credits to balance practice teaching, which is not recognized for credit in L. A. and S. She would not need to do this if she would transfer to the College of Education, but by doing that she would lose the opportunity of making Phi Beta Kappa, an honor that she hopes to achieve.

Case B

Mr. ..... was registered in Education 10. He has taken Educational Psychology in the University of ..... . He frankly said that he was glad that he had had it there where it was easy and the instructor was away half of the time. He saw no use of taking Education 10 other than it was a required course. He felt that he had done his duty if he got as much as a "D" out of the course. He wanted to become a coach and saw no relation between Education and coaching.

The scale below shows the way these two cases were rated by competent judges.

On one hand, tending to seek superiority, power and attainment, particularly high grades, in the course; tending to aim at superior accomplishment.

On the other hand, tending to do tasks just well enough to "get by"; tending not to seek superior accomplishment.

Two Examples of the Cheerful—Despondent Attitude

Case C

Miss ..... was a music supervisor in ..... . However, she found time to take Education 10 and 25 during the same semester. She was usually smiling and often laughed over the more or less prosaic work of the course, not merely at the attempted witticisms of the instructor. She was always able to see the humorous side of events and brought many humorously interesting incidents from observation of her teachers. She was apparently in the best of health, almost "roly-poly." Her plump appearance, a constant smile, a ready laugh, and ability to see the humorous side of almost any situation in which this was possible were her outstanding characteristics.

Case D

Miss ..... had recently had her engagement broken off. She let this prey upon her until she found it almost impossible to keep her mind off of it for any considerable length of time. Having always been a good student prior to this occurrence, failure in her studies was somewhat of a shock to her. She got the impression that she was in a hopeless mental condition, that it was of no avail for her to study, that she "just could not learn." She never smiled. Whenever she tried to have a conference with her instructor, she usually broke into tears.

The scale below shows the way these two cases were rated by competent judges.

On one hand, tending to be contented, happy; tending to enjoy doing whatever the course may bring forth.

On the other hand, tending to be discouraged, dispirited, depressed by the work of the course.

Two Examples of the Evaluative—Non-Evaluative Attitude

Case E

Mr. ..... was a sophomore taking Education 10 and 25 at the same time. He always paid close attention to the discussion in class and frequently made some statement at the end in which he indicated that which he considered to be most significant with regard to the subject discussed; sometimes this was something that had been said in class; frequently it was something that had been left unsaid but that had appeared significant to him when he studied the lesson. He stated that the most important difference between the way he studied one course and the way he studied the other (Ed. 10 and 25) was that in one he made out a list of objectives for each lesson, usually with the aid of the instructor, as a guide to his study, while in the other course he accepted the list presented by the author of the textbook at the beginning of each chapter.

Case F

Miss ..... was a hard-working student who learned by memorizing. She could always repeat the words of the text but did not differentiate between the important and unimportant elements. When called upon to summarize a portion of the text, she invariably told everything in it without placing emphasis upon any part of it. When asked to give only one or two of the most significant facts, she was just as apt to give the least important ones as any others.

The scale below shows the way these two cases were rated by competent judges.

On one hand, tending to appraise carefully the thought or products of thought of instructor or others, such as those expressed in the text; tending to place emphasis on the more important.

On the other hand, tending to accept the thought or products of thought of instructor or others without appraisal, giving equal rank to all.

Two Examples of the Persevering—Vacillating Attitude

Case G

Miss ..... was absent from class a great deal because of poor health but this did not deter her from doing all of the work of the course. On one occasion she had to take a very heavy dose of medicine to relieve her pain while she made up the first hour quiz. In class, she often expressed an opinion differing from ideas set forth by others. No matter whether her opinion was expressed first or later, she always supported it with arguments and was loath to leave the discussion until the others agreed with her or she got their point of view.

Case H

Mr. ..... was taking Education 10 because it was required of Coaching School students, and having been something of an athlete in one of our southern universities, he thought that he would like to be a coach. He had begun his college work with the idea of becoming a physician, but had changed his mind two or three times since. During the semester he was taking Education 10, he decided that he would change to Law. If he did that, there would be no need of having credit in Education 10, so he attended class merely to keep out of difficulties with the authorities. Later, he found that he did not have sufficient university credit to get into Law. He then decided that he wanted his credit in Education 10, for he thought that the easiest way to get a degree would be to continue in the Coaching School.

The scale below shows the way these two cases were rated by competent judges.

On one hand, tending to maintain a purpose, such as accomplishment of an assignment, in spite of difficulties; tending to maintain an opinion, yet yielding to reason.

On the other hand, tending to fluctuate in mind, opinion, or purpose.

Two Examples of the Self-Confident—Dependent Attitude

Case I

Mr. ....., although not given to talking much, never appeared reticent to express an opinion differing from one held by the instructor or fellow students. When presented with a problem, he usually went about solving it in his own way, frequently arriving at a solution by a different route from the others; often it was a different solution. If there were any circumstances that placed him at a disadvantage, he seldom mentioned them, but let his deeds answer for themselves.

Case J

Mr. ....., although usually ready to express an opinion, always appeared to be seeking the opinion of the instructor so that he might conform to it. His opinions were easily determined or changed by remarks of his fellow students. Not once during the entire semester did he answer a question in a really independent manner. He frequently volunteered in discussion, but never first. He waited until he sensed the opinion of the others. When called upon first, his answers were "bookish." His motto seemed to be "I strive to please."

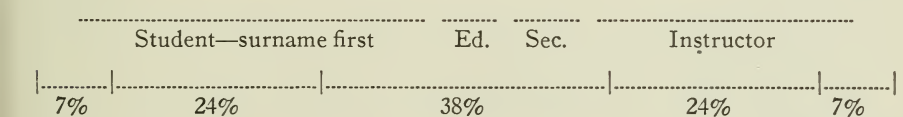
The scale below shows the way these two cases were rated by competent judges.

On one hand, tending to rely upon own ability in meeting new situations, solving problems, and so forth.

On the other hand, tending to rely upon the judgment of others; tending to call upon others for confirmation, help, or support rather than to rely upon self.

ATTITUDE RATING CARDS

The following are samples of the five rating cards used for the purpose of securing attitude ratings. Each instructor was provided with one card for each attitude for each student under his instruction. The student's and instructor's names and the course and section numbers were entered on the cards, so that the only marking the instructors had to do was to place a check on the scale.



On one hand, tending to seek superiority, power, and attainment, particularly high grades, in the course; tending to aim at superior accomplishment.

On the other hand, tending to do tasks just well enough to "get by"; tending not to seek superior accomplishment.

Student—surname first Ed. Sec. Instructor

7% 24% 38% 24% 7%

CHEERFUL DESPONDENT

On one hand, tending to be contented, happy; tending to enjoy doing whatever the course may bring forth.

On the other hand, tending to be discouraged, dispirited, depressed by the work of the course.

Student—surname first Ed. Sec. Instructor

7% 24% 38% 24% 7%

EVALUATIVE NON-EVALUATIVE

On one hand, tending to appraise carefully the thought or products of thought of instructor or others, such as those expressed in the text; tending to place emphasis on the more important.

On the other hand, tending to accept the thought or products of thought of instructor or others without appraisal, giving equal rank to all.

Student—surname first Ed. Sec. Instructor

7% 24% 38% 24% 7%

PERSEVERING VACILLATING

On one hand, tending to maintain a purpose, such as accomplishment of an assignment, in spite of difficulties; tending to maintain an opinion, yet yielding to reason.

On the other hand, tending to fluctuate in mind, opinion, or purpose.

Student—surname first Ed. Sec. Instructor

7% 24% 38% 24% 7%

SELF-CONFIDENT DEPENDENT

On one hand, tending to rely upon own ability in meeting new situations, solving problems, and so forth.

On the other hand, tending to rely upon the judgment of others; tending to call upon others for confirmation, help, or support, rather than to rely upon self.