

Summer 1949

The Cowan Adolescent Adjustment Analyzer Used As An Instrument For The Evaluation of Academic Functional Efficiency.

Wilbert J. Mueller
Fort Hays Kansas State College

Follow this and additional works at: <https://scholars.fhsu.edu/theses>



Part of the [Psychology Commons](#)

Recommended Citation

Mueller, Wilbert J., "The Cowan Adolescent Adjustment Analyzer Used As An Instrument For The Evaluation of Academic Functional Efficiency." (1949). *Master's Theses*. 429.
<https://scholars.fhsu.edu/theses/429>

This Thesis is brought to you for free and open access by the Graduate School at FHSU Scholars Repository. It has been accepted for inclusion in Master's Theses by an authorized administrator of FHSU Scholars Repository.

THE COWAN ADOLESCENT ADJUSTMENT ANALYZER
USED AS AN INSTRUMENT
FOR THE EVALUATION OF ACADEMIC FUNCTIONAL EFFICIENCY

being

A thesis presented to the Graduate Faculty
of the Fort Hays Kansas State College in
partial fulfillment of the requirements for
the Degree of Master of Science

by

Wilbert J. Mueller, A.B.

Kansas Wesleyan University

Date

July 20, 1949

Approved

H. B. Reed
Major Professor

Frederick J. Taubert
Chairman Graduate Council

ACKNOWLEDGMENTS

The writer wishes to express appreciation to Dr. Homer B. Reed, under whose supervision and guidance this thesis was prepared, for his assistance, suggestions, and constructive criticisms. A posthumous acknowledgment must be made to Dr. Edwina A. Cowan for the inspiration which led to the initiation of this problem.

The writer is indebted to LaRue, his wife, for the many months spent in test scoring and tabulating much of the original data.

I. G. Scores	23
Grade Scores	24
Correlation of I. G. Scores to Grade Scores	30
Calculating A.F.E.	34
Assigning Functional Efficiency Scores	36
Functional Efficiency Scores	36
The Analyzer Compared with A.F.E.	38
VIII. COMPARISONS AT THE ELEVENTH-GRADE LEVEL	40
IX. OBSERVATIONS AND SUMMARY	53
APPENDIX PART I	55
APPENDIX PART II	69
APPENDIX PART III	72
BIBLIOGRAPHY	84

TABLE OF CONTENTS

CHAPTER	PAGE
I. INTRODUCTION	1
II. THE PRESENT STUDY.	4
III. STUDIES RELATED TO THIS PROBLEM.	8
IV. DATA USED IN THIS STUDY	13
V. PROBLEM I	15
VI. PROBLEM II	23
VII. PROBLEM III	26
Treatment of Data	26
I. Q. Scores	26
Grade Scores	28
Correlation of I. Q. Scores to Grade Scores	30
Calculating A.F.E.	30
Assigning Functional Efficiency Scores . . .	35
Functional Efficiency Scores	36
The Analyzer Compared with A.F.E.	38
VIII. COMPARISONS AT THE ELEVENTH-GRADE LEVEL	48
IX. OBSERVATIONS AND SUMMARY	53
APPENDIX PART I	55
APPENDIX PART II	69
APPENDIX PART III	79
BIBLIOGRAPHY	84

LIST OF TABLES

TABLE	PAGE
I. Cowan Adolescent Adjustment Analyzer published norms compared with norms obtained from seventh-grade group and eleventh-grade group, showing means, standard deviations, and standard deviation of the arithmetic means	17
II. Cowan Adolescent Adjustment Analyzer published norms compared with norms obtained from seventh-grade experimental group showing differences in the means and significant ratios, (t). . . .	19
III. Showing the Cowan Adolescent Adjustment Analyzer published norms compared with norms obtained from eleventh-grade experimental group showing differences in the means and significant ratio, (t).	20
IV. Norms obtained from seventh-grade experimental group compared with norms from eleventh-grade experimental group showing differences in the means and significant ratio, (t)..	22
V. Showing the paired I. Q. scores and the mal-adjusted responses in Category VI, Immaturity, of the Cowan Adolescent Adjustment Analyzer.. . .	25

TABLE

PAGE

VI.	Showing I. Q. scores distributed into nine units or step intervals of eight points each. Median I. Q. scores 105.9. Standard deviation 14.96. (N - 288).	27
VII,	Showing grade scores distributed into nine units or step intervals of .8 points each. Median grade score 5.2. Standard deviation .785. . .	29
VIII.	Showing paired seventh-grade I. Q. scores and A.F.E. scores.	37
IX.	Showing coefficients of correlation when the Cowan Adolescent Adjustment Analyzer scores were correlated by Categories with A.F.E. . . .	40
X.	Showing the arithmetic means for each Cowan Adolescent Adjustment Analyzer category at each of the A.F.E. zones. The arithmetic mean for the total seventh-grade group is shown in column marked 'norm'.	43
XI.	Seventh-grade A.F.E. 2 & 3 compared with A.F.E. 7 by The Cowan Adolescent Adjustment Analyzer categories, showing differences in the means and significant ratios (t).	45
XII.	Showing individual scores for seventh-grade A.F. E. 7 group, with Analyzer, grade, and I.Q. Scores. (N = 14)	46

TABLE

PAGE

XIII. Showing individual scores for seventh-grade A.F.E. 2 & 3 groups with Analyzer, grade, and I.Q. scores. (N = 20). 47

XIV. Showing the arithmetic means for each Cowan Adolescent Adjustment Analyzer category at each of the A.F.E. zones. The arithmetic mean for the eleventh-grade experimental group is shown in the column headed 'Norm'. . . 50

XV. Showing eleventh-grade A.F.E. 2 & 3 compared with A.F.E. 7 by the Cowan Adolescent Adjustment Analyzer categories with differences in the means and significant ratios. . . 51

1. A chart for determining zones of A.F.E. when I.Q. scores are known. S.D. = grade scores; S.D. = Standard Score; L.G. = Letter Grades. 24

2. Profile of the seventh-grade A.F.E. 2 to 7, plotted on profile chart based on the seventh-grade control group norms. 42

3. Profiles of the eleventh-grade A.F.E. 2 to 7, plotted on profile chart based on eleventh-grade control group norms. 48

LIST OF FIGURES

FIGURE	PAGE
1. The Cowan Adolescent Adjustment Analyzer published profile chart upon which are shown the profiles of the seventh-grade experimental group and the eleventh-grade experimental group.	16
2. Showing histogram type of graphic distribution of seventh-grade I.Q. scores and grade scores. The horizontal axes are scaled in standard deviation units. The vertical axes are scaled in percentage units. I.Q. scores and grade scores are distributed along the horizontal axes. The normal curve is shown in broken lines. . .	31
3. A chart for determining zones of A.F.E. when I.Q. scores are known. G.S. = grade scores; S.S. = Standard Score: L.G. = Letter Grades.	34
4. Profile of the seventh-grade A.F.E. 2 to 7, plotted on profile chart based on the seventh-grade control group norms.	42
5. Profiles of the eleventh-grade A.F.E. 2 to 7, plotted on profile chart based on eleventh-grade control group norms.	49

CHAPTER I

INTRODUCTION

The development of The Cowan Adolescent Adjustment Analyzer, an Instrument of Clinical Psychology, was the product of more than twenty-five years of study by its original author, the late Dr. Edwina Abbott Cowan. The original Adolescent Personality Schedule was first published in 1934. It was the result of intensive work done from January, 1930, to May, 1934. An account of this study was published in Child Development¹ in 1935. Early in 1940 intensive study was begun which was primarily directed toward exploration of the significance of the acts represented by answers to questions in the Analyzer as distinguished from each other by area of content. As a first step in this study the questionnaire was revised. This writer joined Dr. Cowan in this research and revision. These efforts resulted in an experimentally published Analyzer in 1944. A revised edition was printed in 1946. At the time of revision a preliminary edition of a Manual of Directions and Interpretive Guide was also published. It was recognized, at the time of publication, that some

1. Edwina A. Cowan, Mernerva Church McClellan, Berth M. Pratt, and Mae Skaer, "An Adolescent Personality Schedule," Child Development, 6: 77-87, March 1935.

additional research was needed before a more comprehensive manual could be published. From the data contained in this preliminary manual The Cowan Adolescent Adjustment Analyzer was critically evaluated by Drs. Harold H. Abelson and William U. Snyder in The Third Mental Measurements Yearbook² and many of the shortcomings recognized by the authors of the Analyzer were emphasized. These shortcomings deal with such factors as need for additional study in validity and reliability and sex and maturity differences. Abelson found that "despite its limitations, the new Cowan questionnaire, like its older counterpart, may well be the best available inventory for the adolescent range."³ Snyder, while also suggesting need for improvement, expressed the opinion that "this test is one of the best personality tests available for use with adolescents."⁴

Since 1946 this writer has been collaborating with Dr. Cowan in research pointing to the establishment of additional norms pertaining to the test. Dr. Cowan's

2. Oscar Krisen Buron, The Third Mental Measurements Yearbook. (New Brunswick: Rutgers University Press, 1949), 1047 pp.

3. Ibid., p. 66.

4. Ibid., p. 67.

recent sudden and tragic death has halted this work at a time when the manuscript, setting forth our findings, was in its preliminary draft in preparation for publication. This writer has, with the consent of his major advisor, therefore, incorporated certain findings which bear upon the problems treated in this study. This course was an alternate to an indefinite delay in the publication of pertinent data occasioned by Dr. Cowan's untimely death.

This study is a further contribution to needed research to enhance an already accepted instrument of clinical psychology. The area of major emphasis in the present study is academic functional efficiency. To this has been added, however, some significant data relating to the comparison of the Analyzer scores to I.Q. scores and a comparison of the scores of students in early adolescence with those in middle or late adolescence.

CHAPTER II

THE PRESENT STUDY

There are many who hold that intelligence is the primary determinant of scholastic success. Considerable research data in recent years tend to show that other factors affect the nature and extent of academic achievement. Among them are: general physical conditions such as fatigue, energy, hunger, and discomfort; effects of drugs, alcohol, and tobacco; effects of hormones and other chemical agents produced by the glands; temperature, ventilation, illumination, vision, hearing, and speech; general psychological conditions such as moods, distractions, emotional disturbances, rewards, rivalry, punishment, praise; general academic conditions such as grade placement, achievement, reading ability, and hampering academic disabilities. The American Council on Education, through its committee on the relation of emotion to the educative process,¹ published a most important contribution which emphasizes the emotions as a factor in scholastic achievement. It is outside the scope of this paper to defend the merits of an intelligence test for predicting academic efficiency.

1. Daniel Alfred Prescott, Emotion and the Educative Process. (Washington, D.C.: American Council on Education, 1938), 323 pp.

Scores from 'so called' group intelligence tests were used in this study as a basis for measurement of academic aptitude. On the basis of a relatively high coefficient of correlation (.76) with school 'selected' marks, this procedure was deemed permissible. On the basis of scores yielded by the intelligence tests, certain zones of probable efficiency were established. When a student's grades were within this predicted zone he was considered to be performing at a level of 'average' academic functional efficiency (average A.F.E.). When his grades fell below this zone he was considered to be functioning below his level of academic functional efficiency (low A.F.E.). If his grades were above or higher than his predicted efficiency he was considered to be functioning above his level of academic functional efficiency (high A.F.E.). It is assumed, therefore, that students making scores on intelligence tests at a certain level would make comparable grades if all the related factors were equal. In other words, the 'so called' intelligence test score was used as the basis for predicting academic aptitude. When a student with a given I.Q. score deviated markedly in his grades from the grades of other students of comparable I.Q. scores, it is assumed that some factor other than academic aptitude, might be in operation causing this deviation. One of the problems in this study is to

establish, if possible, such a factor by The Cowan Adolescent Adjustment Analyzer. It is recognized that of the many factors influencing achievement some of them will not be measured by this instrument. Any factor affecting the academic functional efficiency of students measured by this instrument might, therefore, include many influences. It is not the purpose of this study to isolate or identify any specific factors. This study is limited in its scope to the discovery of significant patterns in The Cowan Adolescent Adjustment Analyzer that relate to academic functional efficiency (A.F.E.). This study is divided into three different problems:

(1) Previous research has never established a characteristic difference between profiles of The Cowan Adolescent Adjustment Analyzer in early adolescence from those in late adolescence. Because this study follows the development of one group of students from early adolescence through middle to late adolescence, it seemed desirable to discover whether such a difference could be established.

(2) Some critics have questioned what was actually being measured by Category VI - Immaturity (formerly called Maturity) of the Analyzer. The opinion has been expressed that this might bear a significant relationship to intelligence. It seemed desirable to discover if this is true.

(3) The major problem of this study was to determine if The Cowan Adolescent Adjustment Analyzer reveals any significant personality characteristics which are related to academic functional efficiency.

Other influences which might be expected to affect the academic efficiency of students. Some other factors besides intelligence have been shown to affect the support of this in other studies including environmental

Also, in a study of readings related to high school students, it was found that fifteen percent of the students between twelve and fourteen percent of the students were able to handle reading above the level of their class even though their individual IQ scores were the average I.Q. for their class.

Olney and Hunter have also shown that "achievement is related to the amount of total growth."

Olney and Levy, in a comparative study of the reading ability and achievement of two groups of students

1. Viola Jones, "Factors Related to High School Achievement," Journal of Educational Psychology, vol. 34: 236, April, 1943.

2. William G. Green, and Byron G. Porter, "Correlation of Growth - Their Significance to Teachers," Childhood Education, 31: 52-53, February, 1935.

CHAPTER III

STUDIES RELATED TO THIS PROBLEM

Intelligence tests alone do not have sufficiently high prognostic value to rule out the possibility that other influences might be in operation to affect the academic efficiency of students. Some other factors besides intelligence have been shown to affect it. In support of this we quote from the following authorities:

Ames,¹ in a study of factors related to high school achievement, found that fifteen percent of one class and between twelve and fourteen percent of two other classes were able to achieve grades above the mean grade of their class even though their individual I.Q.'s were below the average I.Q. for their class.

Olson and Hughes have been among those who have shown that "achievement in school tends to be an expression of total growth."²

Assum and Levy, in a comparative study of the academic ability and achievement of two groups of college

1. Viola Ames, "Factors Related to High School Achievement," Journal of Educational Psychology, 34: 229-236, April, 1943.

2. Williard C. Olson, and Byron O. Hughes, "Concepts of Growth - Their Significance to Teachers," Childhood Education, 21: 53-63, October, 1944.

students, found that maladjusted students were comparable in academic ability to the adjusted group. However, in regard to academic achievement a difference was found in favor of the adjusted group.³

Horney, while not speaking specifically about academic functional efficiency, states that:

There are two characteristics, however, which one may discern in all neuroses without having an intimate knowledge of the personality structure: a certain rigidity in reaction and a discrepancy between potentialities and accomplishments.⁴

Cattell, in a study of personality traits associated with abilities, states:

When one considers 'abilities' in company with a wide range of personality variables, their affinity to broad personality factors is revealed. Ability tests given under special conditions which tend to bring out their pure natural aptitude character may resolve largely into factors of pure ability modality; but tests having more the characters of skills and achievements, or temperamental facilities, are likely to be better interpreted by being experimentally associated with a representative set of personality variables, when the factors emerging will be found to have rather the character of

3. Arthur L. Assum, and Sidney J. Levy, "A Comparative Study of the Academic Ability and Achievement of Two Groups of College Students," The Journal of Educational Psychology, 38: 307-310, May, 1947.

4. Karen Horney, The Neurotic Personality of Our Time. (New York: W.W. Norton & Co., Inc., [1937]), p. 22.

'wholistic' factors, involving dynamic and temperamental aspects of behavior.⁵

Dunkel, in a study of the effect of personality on language achievement, found that:

It seemed most likely that what may be roughly identified as a mildly 'compulsive' personality would be that with the greatest probability of success in elementary Latin - at least as it is commonly taught. The meticulous student who gives close attention to details, who keeps a relatively tight rein on his imagination and impulses, and who is somewhat introversive, appeared likely to have a better chance of success. Conversely, the more impulsive happy-go-lucky, or phantasy-making personalities would seem likely to have found elementary Latin less congenial and, hence, to have been less successful in it than their basic verbal ability would make possible.⁶

Betts believes that:

In some instances, children have emotional and personality problems that interfere with reading. In other instances, frustration in reading situations has clearly produced the personality problem. The latter holds true in the majority of cases.⁷

Moore found the educational retardation of 152 delinquent boys ranged from 2.8 to 5.5 years with an

5. Raymond B. Cattell, "Personality Traits Associated with Abilities. II: With Verbal and Mathematical Abilities," Journal of Educational Psychology, 36: 485-486, November, 1945.

6. Harold B. Dunkel, "The Effect of Personality on Language Achievement," Journal of Educational Psychology, 38: 177-182, March, 1947.

7. Emmett A. Betts, Foundations of Reading Instruction. (New York: American Book Company, 1946), p. 143.

average of 4.5.⁸ Lane and Witty,⁹ in another study of delinquents, studied 700 boys who had an average chronological age of 14.5 years and an average mental age of nearly 13 years, but showed an educational age of only 11.5 years.

Babcock states that:

All our observations have tended to show that mental abilities such as abstracting, reasoning, and generalizing cannot be taught. Neither slum clearance nor changes in diet can give abilities of this sort to persons who lack them. However, the efficiency with which an individual's natural ability can function may sometimes be increased by improving the physiological and environmental conditions and this tends to increase the breadth if not the level of intelligence.¹⁰

Ames found that the ability to succeed socially has no relationship to high school achievement but that the ability to conform to the school situations was related to scholastic achievement. She found that the correlation between the scholastic achievement and the score on an Otis Intelligence Test was .54 but when the personality factor was included the coefficient of corre-

8. Joseph E. Moore, "A Comparative Study of the Intelligence of Delinquent and Dependent Boys," Journal of Educational Psychology, 28: 355-366, May, 1937.

9. Howard A. Lane and Paul A. Witty, "The Educational Attainment of Delinquent Boys," Journal of Educational Psychology, 25: 695-702, December 1934.

10. Harriet Babcock, Time and the Mind. (Cambridge, Mass.: Sci-Art Publishers, Harvard Square, 1941), p. 185.

lation was raised to .72.¹¹

Summarizing from these authorities, it appears that the I.Q. is not necessarily constant but may reflect environmental influences and even aspects of behavior. The I.Q. does not appear to be an accurate prognostic indicator of grade achievement - that academic frustration may produce personality problems and that maladjustment and delinquency often result in retarded achievement - and that conformity to the school situations ~~is~~ related to scholastic achievement.

11. Ames, op. cit., pp. 229-236.

CHAPTER IV

DATA USED IN THIS STUDY

The data for this study were obtained from students and from school records. The experimental group was made up of the entire seventh-grade population of a middle-size Midwestern Kansas community. The initial data consisted of information taken from the experimental edition of The Cowan Adolescent Adjustment Analyzer which was administered in the spring of 1945. Three hundred Analyzers were administered. From this number twelve were taken out because they were incomplete or illegible, leaving a total of two hundred eighty-eight cases.

In the spring of 1949 arrangements were made to secure the academic records of these same students for the five years, 1945 to 1949. They were then eleventh-graders. Arrangements were also made to again administer the Analyzer to the students who were ^till in the same school system. Two situations prevented carrying through these plans to completion. First, it was found that academic records for the eleventh-grade would not be available in time to be made a part of this study. It had been planned to administer the Analyzer to the eleventh-grade on the last day of school but through a misunderstanding some of the classes

were dismissed before The Cowan Adolescent Adjustment Analyzer was administered to all students. As a result only one hundred twenty-four Analyzer studies were secured although there were one hundred ninety-six of the original seventh-grade population who completed the tenth-grade.

The I.Q. and grade scores were secured from school records. One I.Q. test had been administered at the sixth-grade level and one at the ninth-grade level. In both instances the school had used the Henmon-Nelson Test of Mental Ability.

The school grades were secured from the school records and for this study only the 'solid' subject grades were used. These included the grades awarded in the subjects of English, social studies, arithmetic, algebra, geometry, languages, etc. Grades in chorus, glee club, music, penmanship, art, physical education, orchestra, and band were not included.

This procedure was decided upon because it was concluded that these 'solid' subjects would bear a closer relationship to academic aptitude as measured by the Henmon-Nelson Test of Mental Ability. The relatively high coefficient of correlation (.76) which was produced when the grades were correlated with the I.Q. scores, is probably due to the result of this factor of 'selection' of the grades.

CHAPTER V

PROBLEM I

In the preliminary edition of A Manual of Directions and Interpretive Guide for The Cowan Adolescent Adjustment Analyzer, the following limiting statement is made:

Instruments of clinical psychology are used on different occasions for different objectives and no sound general procedure can be outlined for interpreting the objective of the Analyzer to all persons.¹

Interpretation of the objective in each instance must be a matter of the clinician's judgment. At the time of publication group norms were established and published and it was determined from the study of the data to use only a single set of norms for all adolescents. Numerous users of the instrument have since asked for information which might be helpful in determining if there were significant differences between responses given by young adolescents as compared with older adolescents. In view of the fact that the data employed in this study permitted such an evaluation it was determined to include this problem.

All of the seventh-grade Analyzers were scored by

1. Edwina A. Cowan, Wilbert J. Mueller, and Edra Weathers, A Manual of Directions and Interpretive Guide for The Cowan Adolescent Adjustment Analyzer. Preliminary Edition. (Emporia: Bureau of Educational Measurements, Kansas State Teachers College, 1946), 8 pp.

PROFILE
CHART

CATEGORIES	No. of Resp.	T SCORE										
		30	40	50	60	70	80	90				
I Fear		0	1	2	3	4	5	6	7	8	9	10
II Family Emotion		0	1	2	3	4	5	6	7	8	9	10
III Family Authority		0	1	2	3	4	5	6	7	8	9	10
IV Feeling of Inadequacy		0	1	2	3	4	5	6	7	8	9	10
V Non-family Authority		0	1	2	3	4	5	6	7	8	9	10
VI Maturity		0	1	2	3	4	5	6	7	8	9	10
VII Escape		0	1	2	3	4	5	6	7	8	9	10
VIII Neurotic		0	1	2	3	4	5	6	7	8	9	10
IX Compensation		0	1	2	3	4	5	6	7	8	9	10

Profile of Seventh-grade Experimental Group:-----
 Profile of Eleventh-grade Experimental Group:-----

Figure 1. The Cowan Adolescent Adjustment Analyzer published profile chart upon which are shown the profiles of the seventh-grade experimental group and the eleventh-grade experimental group.

accepted methods for the mean, sigma, and the standard error of the mean for each category. The eleventh-grade Analyzer records were likewise scored, and all of these scores were then compared with the published norms which are shown in Table I.

A study of Table I reveals trends which appear to be significant. Figure 1 shows a graphic presentation of the two profiles from data shown in Table I drawn on the publisher's profile chart. It appears from these profiles that there is considerable change between the seventh-grade profile and the eleventh-grade profile. Comparison of the two sets of data confirms this observation.

TABLE I

COWAN ADOLESCENT ADJUSTMENT ANALYZER PUBLISHED NORMS
 COMPARED WITH NORMS OBTAINED FROM SEVENTH GRADE GROUP
 AND ELEVENTH GRADE GROUP, SHOWING MEANS, STANDARD
 DEVIATIONS, AND STANDARD ERROR OF THE ARITHMETIC MEANS.

Cat'y	Published Norms N - 500			7th Grade Norms N - 288			11th Grade Norms N - 124		
	Mean	SD	SD _D	Mean	SD	SD _D	Mean	SD	SD _D
I	3.20	2.14	.095	3.76	2.27	.134	2.68	1.90	.171
II	2.60	1.88	.084	3.38	1.83	.108	2.48	1.92	.172
III	2.20	1.92	.086	2.31	1.81	.108	1.70	1.77	.159
IV	3.80	2.08	.093	4.35	1.99	.117	3.00	1.98	.178
V	2.76	2.09	.093	2.56	1.71	.101	2.20	1.79	.161
VI	2.78	1.81	.081	3.12	1.94	.113	2.00	1.66	.149
VII	2.92	1.80	.081	3.51	1.94	.114	2.35	1.70	.153
VIII	3.10	2.08	.093	4.06	2.02	.119	2.38	1.77	.159
IX	3.10	2.18	.097	2.96	2.18	.128	2.00	1.84	.165

Table II shows the seventh-grade profile compared with the published norms. The differences having smallest statistical significance are shown to be in Category III - Family Authority; Category V - Non-family Authority; and Category IX - Compensations. It appears, therefore, that the seventh-grade student or younger adolescent is very like his older contemporary in these categories.

The eleventh-grade group was likewise compared to the norms established by the publishers. Table III shows these scores. Many more significant deviations from these norms are observed in a study of their profile. In this instance there is less deviation in the area of family emotion but more significant deviations may be observed in Category IV - Feeling of Inferiority; Category VI - Immaturity; and Category IX - Compensation. It appears that the older adolescent, who is still in school, responds to fewer maladjusted answers in the category of maturity while at the same time responding to slightly fewer maladjusted answers in all of the other categories. In other words the entire profile of the eleventh-grade group seems to be moving in the direction of fewer maladjusted responses, which the test authors have referred to as the more 'conforming' profile.

Attention is called to the fact that in this study

TABLE II

COWAN ADOLESCENT ADJUSTMENT ANALYZER PUBLISHED NORMS COMPARED WITH NORMS OBTAINED FROM SEVENTH-GRADE EXPERIMENTAL GROUP SHOWING DIFFERENCES IN THE MEANS AND SIGNIFICANT RATIOS (t).

Cate- gory	Publ. Means	7th Gr. Means	Mean Diff.	SD _D	Sign. ratio	Chances in 100*.
I	3.20	3.76	.56	.164	3.41	100
II	2.60	3.38	.78	.136	5.73	100
III	2.20	2.31	.11	.138	.79	79
IV	3.80	4.35	.55	.149	3.69	100
V	2.76	2.56	.20	.138	1.43	92
VI	2.78	3.12	.34	.139	2.44	99
VII	2.92	3.51	.59	.140	4.21	100
VIII	3.10	4.06	.96	.147	6.53	100
IX	3.10	2.96	.14	.159	.98	83

*Chances in 100 that difference is significant.

TABLE III

THE COWAN ADOLESCENT ADJUSTMENT ANALYZER PUBLISHED NORMS COMPARED WITH NORMS OBTAINED FROM ELEVENTH-GRADE EXPERIMENTAL GROUP SHOWING DIFFERENCES IN THE MEANS AND SIGNIFICANT RATIOS (t).

Category	Publ. Means	11th Gr. Means	Mean Diff.	SD _D	Sign. ratio	Chances in 100*
I	3.20	2.68	.52	.196	2.65	99
II	2.60	2.48	.12	.191	.62	73
III	2.20	1.70	.50	.181	2.76	100
IV	3.80	3.00	.80	.201	3.98	100
V	2.76	2.20	.56	.186	3.01	100
VI	2.78	2.00	.78	.170	4.58	100
VII	2.92	2.35	.57	.173	3.29	100
VIII	3.10	2.38	.72	.184	3.91	100
IX	3.10	2.00	1.10	.191	5.75	100

*Chances in 100 that difference is significant.

both groups responded to fewer maladjusted answers in Category IX - Compensation, than are shown as a median on the published norms. No explanation is offered for this fact. It would seem sufficiently significant, however, to warrant further study.

A still more significant evaluation of the seventh-grade group as compared to the eleventh-grade group is revealed when these two profiles are compared with each other. Table IV shows these differences clearly. It will be noted that in only one instance is the critical ratio less than three - in Category V, Non-family Authority. These two groups seems to deviate the least in this Category.

While the numbers in this study are comparatively small it appears that the findings warrant further study to establish the need for separate norms for early and late adolescent groups. These findings seem to point to the need for separate norms.

TABLE IV

NORMS OBTAINED FROM SEVENTH-GRADE EXPERIMENTAL GROUP COMPARED WITH NORMS FROM ELEVENTH-GRADE EXPERIMENTAL GROUP SHOWING DIFFERENCES IN THE MEANS AND SIGNIFICANT RATIO (t).

Category	7th Gr Means	11th Gr Means	Mean Diff.	SD _D	Sign. ratio	Chances in 100*
I	3.76	2.68	1.08	.217	4.97	100
II	3.38	2.48	.90	.203	4.47	100
III	2.31	1.70	.61	.193	3.10	100
IV	4.35	3.00	1.35	.213	6.33	100
V	2.56	2.20	.36	.190	1.89	97
VI	3.12	2.00	1.12	.187	5.98	100
VII	3.51	2.35	1.16	.191	6.07	100
VIII	4.06	2.38	1.68	.199	8.44	100
IX	2.96	2.00	.96	.209	4.59	100

*Chances in 100 that difference is significant.

CHAPTER VI

PROBLEM II

The authors of The Cowan Adolescent Adjustment Analyzer do not, as yet, claim that any category measures specifically any particular personality characteristic. What is said to be significant is the individual's responses to the questions. The responses are classified into nine different categories as follows:

- I Fear
- II Family Emotion
- III Family Authority
- IV Feeling of Inadequacy
- V Non-family Authority
- VI Immaturity (formerly Maturity)
- VII Escape
- VIII Neurotic
- IX Compensation

Each significant response within a category represents a maladjusted answer. For more complete interpretation of scoring see specimen Manual of Directions and Interpretive Guide for the Analyzer in Part II of the Appendix. A specimen of the Analyzer is shown in Part III of the Appendix.

Thus one or two maladjusted responses in Category VI - Immaturity, might be assumed to suggest more maturity than five or more maladjusted responses which might suggest more immaturity. Such a statement is not, however,

made by the authors of the Analyzer. What is considered significant is that an individual has admitted to a given number of maladjusted responses. It has been suggested by some users of the instrument that the responses in this particular category measure maturity; however, this fact has not yet been confirmed by research. The problem was included in this study and the findings are reported.

Table V shows a complete tabulation of the frequency of paired maladjusted responses in Category VI and I.Q. scores. When these scores were correlated they produced a coefficient of correlation of $-.347$. The minus factor is the product of the method of treatment of the scores. The fewer maladjusted responses could point to greater maturity whereas the lower I.Q. scores could be expected to reveal less maturity - the larger numbers of maladjusted responses would tend to show greater immaturity whereas the high I.Q. scores would indicate more maturity.

It may be concluded, therefore, from these data, that there is a positive, though slight, relationship between Category VI - Immaturity and the intelligence test scores. In other words, students with high I.Q. scores tend to admit to fewer maladjusted responses in Category VI, Immaturity, whereas students with low I.Q. scores tend to admit to more maladjusted responses in this particular category.

TABLE V

SHOWING THE PAIRED I.Q. SCORES AND THE MALADJUSTED RESPONSES IN CATEGORY VI, IMMATURITY, OF THE COWAN ADOLESCENT ADJUSTMENT ANALYZER. ($r = -.347$)

I.Q. Scores	Maladjusted responses in Category VI.										
	0	1	2	3	4	5	6	7	8	9	10
135 and above	2	3	1	1							
127.5 - 134.9	2	3	5	3	1						
120.0 - 127.4	4	4	9	6	6	4	1	1	1		
112.5 - 119.9	5	8	9	11	5	4	2	1	1		
105.0 - 112.4	4	9	9	10	9	7	6				
97.5 - 104.9	4	8	9	8	4	6	1		2		1
90.0 - 97.4	1	5	7	13	9	3	3	2	2	2	
82.5 - 89.9	1	1	1	3	7	5	2	2			
75.0 - 82.4			1	3	5	3	2		1		
Below 75	1			1		1	1				

I.Q. scores were arbitrarily distributed into five step intervals with eight I.Q. points in each interval. Table VI shows the distribution. The median I.Q. for the distribution was found to be 100, which is very close to the mean of 100. For convenience of plotting the data, the median was moved to 100 and 110 was used for the

CHAPTER VII

PROBLEM III

The entire educational system from kindergarten through college is concerned with the problem of academic achievement. It has long been known that not all students with comparable mental ability achieve comparable grades. For the purposes of this study we have accepted certain I.Q. scores as a basis for predicting academic ability. The relationship of academic ability, thus appraised, to achievement, as reflected by school grades, we have chosen to term academic functional efficiency (A.F.E.).

In order to establish a basis for comparison of ability and achievement the following statistical procedures were followed.

Treatment of Data

I.Q. Scores

I.Q. scores were arbitrarily distributed into nine step intervals with eight I.Q. points in each interval. Table VI shows the distribution. The median I.Q. for the distribution was found to be 105.9, standard deviation was 14.96. For convenience of handling the data, the median was moved to 105 and 15.0 was used for the

TABLE VI

SHOWING I.Q. SCORES DISTRIBUTED INTO NINE UNITS OR STEP INTERVALS OF EIGHT POINTS EACH. MEDIAN I.Q. SCORE 105.9. STANDARD DEVIATION 14.96. (N = 288)

I.Q. Scores	Frequency	Percentage
128 and above	21	7.3
120 - 127.9	38	13.1
112 - 119.9	51	17.7
104 - 111.9	52	18.0
96 - 103.9	54	18.7
88 - 95.9	42	14.6
80 - 87.9	19	6.6
72 - 79.9	9	3.1
Below 72	2	.7

It is interesting to note that while 7.3% of the I.Q. scores are above 120 there are only 5.0% A grades. There are 20.4% I.Q. scores above 110 but only 10.4% B+ grades. This seems to be in line with statements often heard among educators that the superior students do

standard deviation or sigma unit.

Grade Scores.

The school system employed a system of letter grades for marks or grade evaluation. It was necessary, therefore, to convert the letter grades into numerical values for statistical treatment. We elected to follow Bingham¹ and converted letter grades into standard scale scores. Thus the letter A was given a numerical value of 7; B 6; C 5; D 4; and F 3. For the seventh-grade group all of the 'solid subject' grades were converted into numerical values according to the above formula and averaged. This average was in terms of a numerical value similar to standard scale scores. When all of the grades had thus been computed a mean of 5.2 was found, standard deviation, .785. For convenience in statistical handling, the sigma interval used was placed at .80. Table VII shows the distribution of grades.

It is interesting to note that while 7.3% of the I.Q. scores are above 128 there are only 2.8% A grades. There are 20.4% I.Q. scores above 120 but only 10.4% A- or B+ grades. This seems to be in line with statements often heard among educators that the superior students do

1. Walter Van Dyke Bingham, Aptitude and Aptitude Testing. (New York: Harper and Brothers Publishers, [c. 1937]. 390 pp.

TABLE VII

SHOWING GRADE SCORES DISTRIBUTED INTO NINE
 UNITS OR STEP INTERVALS OF .8 POINTS EACH.
 MEDIAN GRADE SCORE 5.2. STANDARD DEVIATION
 .785. (N = 288)

Grade Scores	Frequency	Percentage
6.75 and above	8	2.8
6.25 - 6.74	22	7.6
5.75 - 6.24	36	12.5
5.25 - 5.74	57	19.8
4.75 - 5.24	88	30.5
4.25 - 4.74	43	14.9
3.75 - 4.24	30	10.4
3.25 - 3.74	3	1.0
Below 3.25	1	.3

not make a proportionate number of superior grades. Figure 2 shows a graphic presentation of this comparison. The question is often asked in educational circles if the superior student is really challenged by higher goals or if the standards of the school system are set by the slower students. It appears that more research is needed to throw light upon this problem.

Correlation of I.Q. Scores to Grade Scores

On the basis of the means and standard deviations established from the above treatment of the data, the I.Q. scores and grade scores were distributed according to the step intervals suggested by the deviations established above. When correlated by means of the Pearson product-moment coefficient of correlation, the coefficient was found to be .7615.

Calculating A.F.E.

Zones of probable academic functional efficiency were calculated from a diagram or chart similar to a scatter-gram. The horizontal axis was marked off in sigma or standard scale units. Using the standard scale the grade scores were distributed according to the sigma distribution yielded from the above treatment of the grade score data. Thus at the middle point was located grade point 5.2 (median score

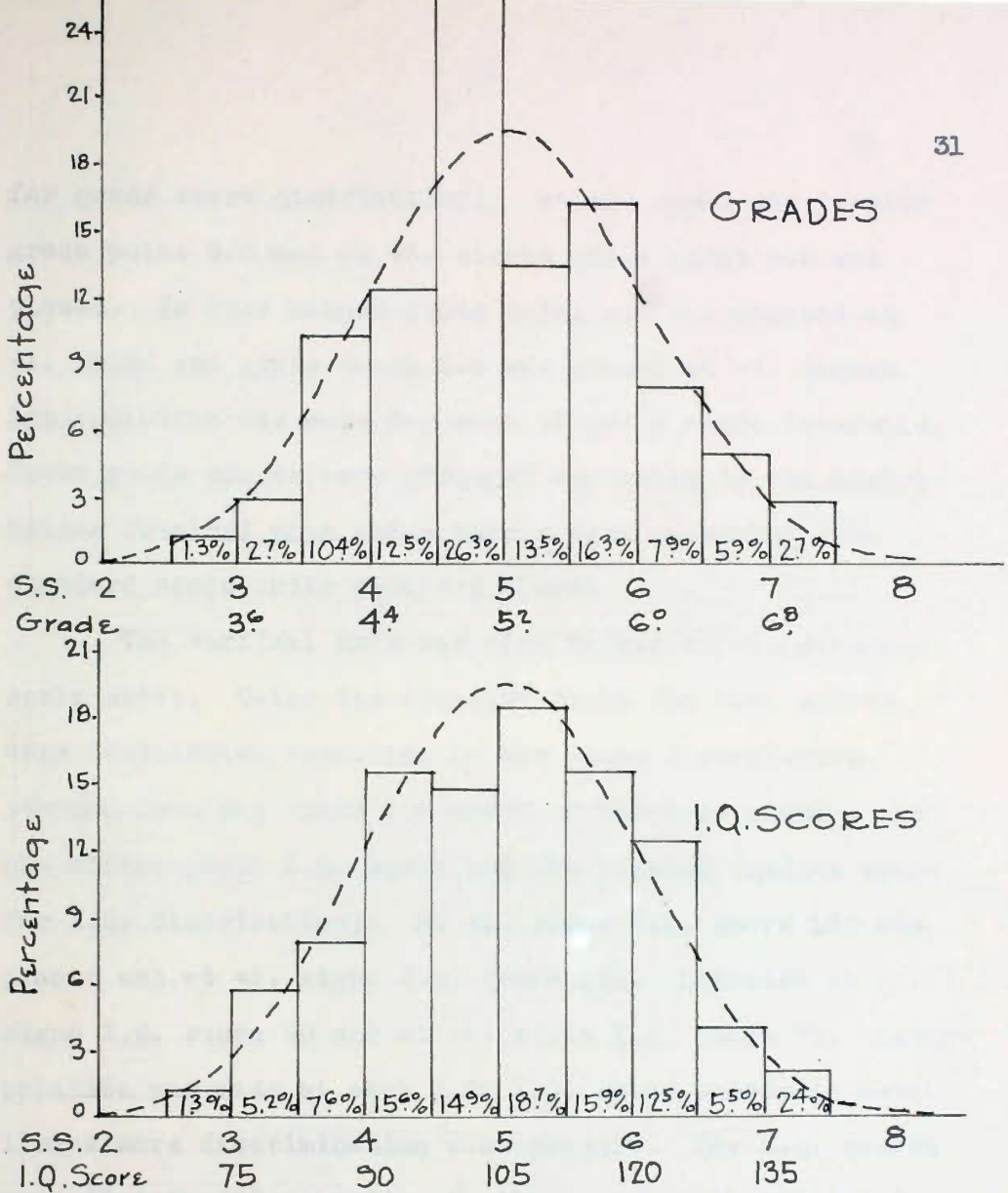


Figure 2. Showing histogram type of graphic distribution of seventh-grade I.Q. scores and grade scores. The horizontal axes are scaled in standard deviation units. The vertical axes are scaled in percentage units. I.Q. scores and grade scores are distributed along the horizontal axes. The normal curve is shown in broken lines.

for grade score distribution). At +1. sigma was located grade point 6.0 and at +2. sigmas grade point 6.8 was placed. In like manner grade point 4.4 was located at -1. sigma and grade score 3.6 was placed at -2. sigmas. Interpolation was made for each .2 grade score intervals. These grade scores were arranged according to the distribution obtained when these scores were converted into standard score units reported above.

The vertical axis was also marked off in standard scale units. Using the standard scale the I.Q. scores were distributed according to the sigma distribution yielded from the above treatment of the I.Q. scores. At the middle point I.Q. score 105 was located (median score for I.Q. distribution). At +1. sigma I.Q. score 120 was placed and at +2. sigma I.Q. score 135. Likewise at -1. sigma I.Q. score 90 and at -2. sigma I.Q. score 75. Interpolation was made at each 3.75 I.Q. score points to establish a more discriminating zone measure. The I.Q. scores were distributed according to the arrangement suggested when the I.Q. scores were converted into standard score units reported above.

Each point along each axis is now an axis of reference. Since the correlation of the data produced a coefficient less than 1. it was necessary to introduce a correction or regression line to increase the predictive value.

Bingham's² regression formula was used which yielded a correction of approximately .5 sigma at ± 2.5 sigmas from the median. The slope of the regression line was drawn on the diagram to conform to the regression. At the point where this line intersected each step interval on the vertical or I.Q. score axis, the point was widened to a zone .5 sigma to the right and .5 sigma to the left, i.e., one sigma wide. This zone was called A.F.E. 5 to signify the zone of 'probable' academic efficiency. (See Figure 3).

For convenience in identifying zones of A.F.E., .5 sigma steps were marked off to the right (above) and to the left (below) this middle zone at each I.Q. step interval. The step interval for these zones on the vertical or I.Q. axis was 3.75. For convenience the A.F.E. zones were also assigned numerical values from 1 to 9 similar to the standard scale. Zone 5 thus became the 'predicted' zone of probable efficiency. Zone 4 extended .5 sigma to the left or below the middle zone. Similarly zone 3 extended another .5 sigma below zone 4 or one sigma below zone 5. Zone 2 was likewise .5 sigma below zone 3. All of the area below zone 2 was considered as zone 1. In like manner zones 6, 7, 8, and 9 represent

2. Ibid., p. 262.

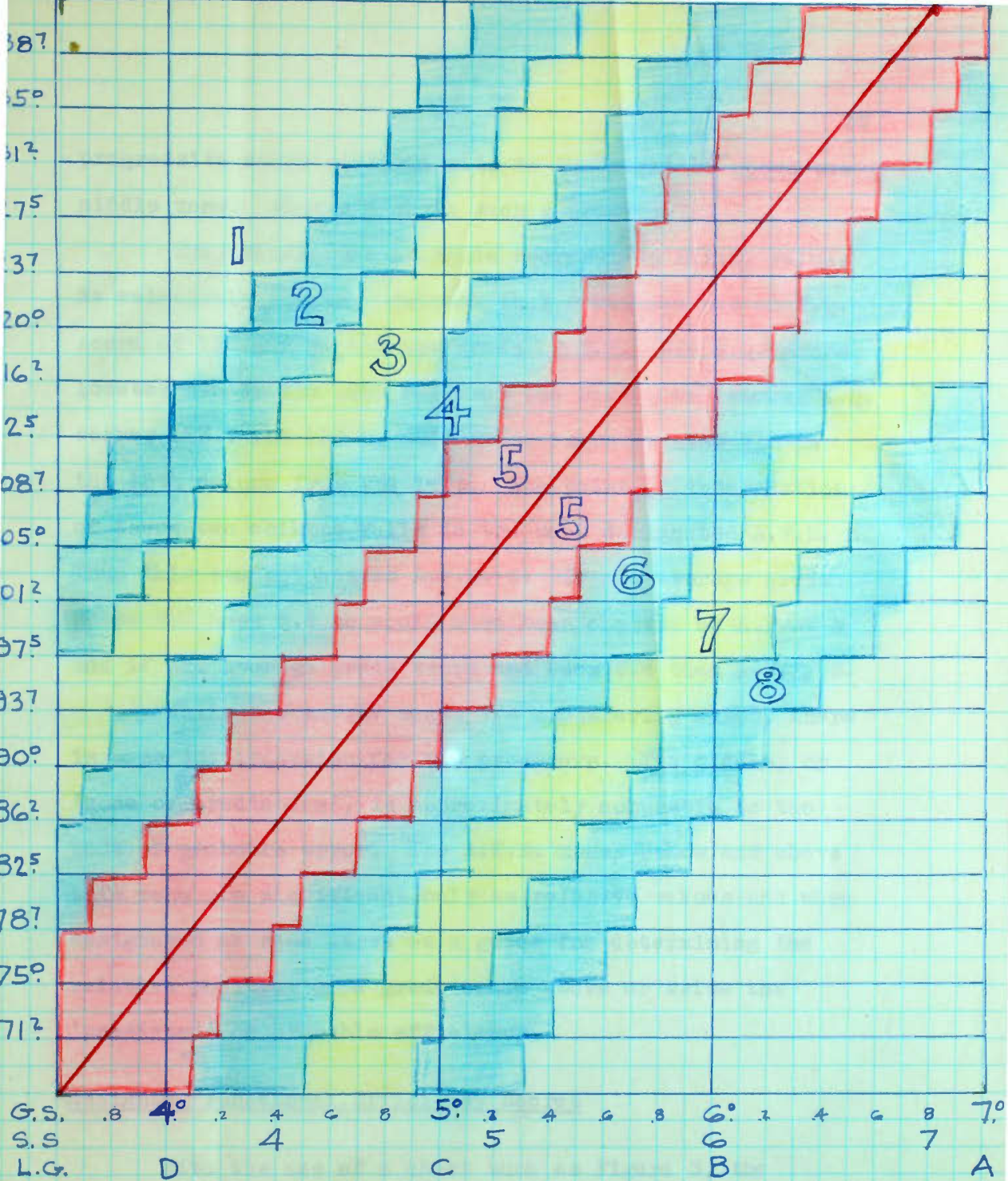


Figure 3. A chart for determining zones of A.F.E. when I.Q. scores and grade scores are known. G.S. = Grade Scores; S.S. = Standard Scores; L.G. = Letter Grades.

progressive steps .5 sigma wide to the right or above the middle zone. Figure 3 shows such a diagram.

The translation of grade scores into A.F.E. values is relatively simple. Suppose that a student has an I.Q. score of 125 and an average grade of 5.8. His I.Q. score locates him in the 16th row from the bottom or between I.Q. scores 123.7 and 127.5. His grade score locates him in the 13th column from the left. The point of intersection of these two columns falls in the zone designated A.F.E. 5. Thus this student has an A.F.E. 5. If his average grade score had been 5.2 he would have been classed as A.F.E. 3 and if the average grade score had been 6.6 then A.F.E. 6.

While the A.F.E. zones are arbitrarily fixed, there is some justification for the procedure. The middle, or 'zone of prediction', is approximately comparable to the zone of probable error. The A.F.E. zones below and above this zone are significant only as relative values and when designated as such serve as a guide for determining the relative position of a grade score above or below the 'predicted' or probable efficiency.

Assigning Functional Efficiency Scores

With the use of a chart such as Figure 3, the average seventh-grade grades were evaluated by comparing

them with the students I.Q. scores. This relationship is the basis for the A.F.E. - academic functional efficiency scores. Thus each student had three significant scores: (1) the average seventh-grade grade, which had been converted into a numerical value and (2) an I.Q. score* and (3) an A.F.E. score.

Functional Efficiency Scores.

Deviations in A.F.E. from the 'normal' or 'predicted' zone do not seem to be related to or affected by the I.Q. scores. There are approximately the same number of low A.F.E. (underachievers) as there are high A.F.E. (overachievers) in each I.Q. group. Table VIII shows a distribution of the paired seventh-grade I.Q. scores and functional efficiency scores. These scores, when correlated, produced a coefficient of correlation .0577. It is concluded, therefore, that levels of functional efficiency are not significantly related to any particular level of academic ability or intelligence as revealed by the I. Q. scores used in this study.

*In some instances the scores from only one test were used. If the student continued through the ninth grade, a second I.Q. score was available. The I.Q. scores were then averaged and the average score used.

TABLE VIII

SHOWING PAIRED SEVENTH-GRADE I.Q. SCORES AND A.F.E. SCORES.
(r .0577) (N 288)

I.Q. Scores	A.F.E. Zones						
	2	3	4	5	6	7	8
135 and above	-	-	2	5	-	-	-
127.5 - 134.9	-	1	2	9	3	1	-
120.0 - 127.4	2	2	8	13	9	2	-
112.5 - 119.9	-	2	9	31	3	1	-
105 - 112.4	-	3	7	33	6	5	-
97.5 - 104.9	-	3	5	31	2	2	-
90.0 - 97.4	1	2	9	26	6	1	-
82.5 - 89.9	-	2	1	8	11	-	-
75.0 - 82.4	1	1	0	7	4	2	-
Below 75	-	-	-	2	2	-	-

The Analyzer compared with A.F.E.

The summary of research quoted in Chapter III supports the position that while intelligence might be the primary determinant of a student's success there are, nevertheless, numerous other factors which either affect his intellectual efficiency, his motivation, or the teacher's appraisal of his ability. In Chapter II were listed a number of factors often mentioned as relating to academic achievement. Some studies have shown personality characteristics to be related to a student's success in school. The field is wide open for speculation and the armchair analysts of education advance numerous theories. Some believe that a clever personality is awarded better grades while other express the belief that the naturally superior student is really being held back by his less gifted brother. While it is recognized that many factors could account for different levels of A.F.E, this study concerned itself with the study of such factors as were measured by The Cowan Adolescent Adjustment Analyzer. While the higher grades are made by the more gifted students and the low grades by the less gifted, high or low A.F.E. bears no relationship to high or low intelligence as measured by group intelligence tests used in this study. A.F.E. must, therefore, be the

product of some other influence.

An evaluation of the relationship of the Analyzer scores to A.F.E. scores by means of correlation does not show any particularly significant trends or relationships. Table IX shows the coefficients of correlation scores in Categories I to IX of the Analyzer to A.F.E. scores. While there is only one zero coefficient of correlation, none of the coefficients are large enough to permit appraising the differences as significant - at least not when evaluated by this method of statistical treatment. When the data are subjected to another type of comparison several significant relationships can be observed.*

When a comparison is made between the group of students whose A.F.E. is very low and those whose A.F.E. is very high, it is possible to establish some significant relationships. Comparison is made between the means and standard deviations and the significant ratios are calculated. These data lend themselves to visual portrayal with the use of the profile chart. Figure 4 illustrates

*For the past several years this writer, in collaboration with Dr. Edwina A. Cowan, has explored the possibilities of some other method of statistical treatment which might be employed in evaluation of the Analyzer data. At the time of her death, a study of factor analysis applied to the data was under way. This study has not yet been completed and therefore cannot be referred to in this study. Factor analysis of the data in this study is beyond the scope of this particular problem.

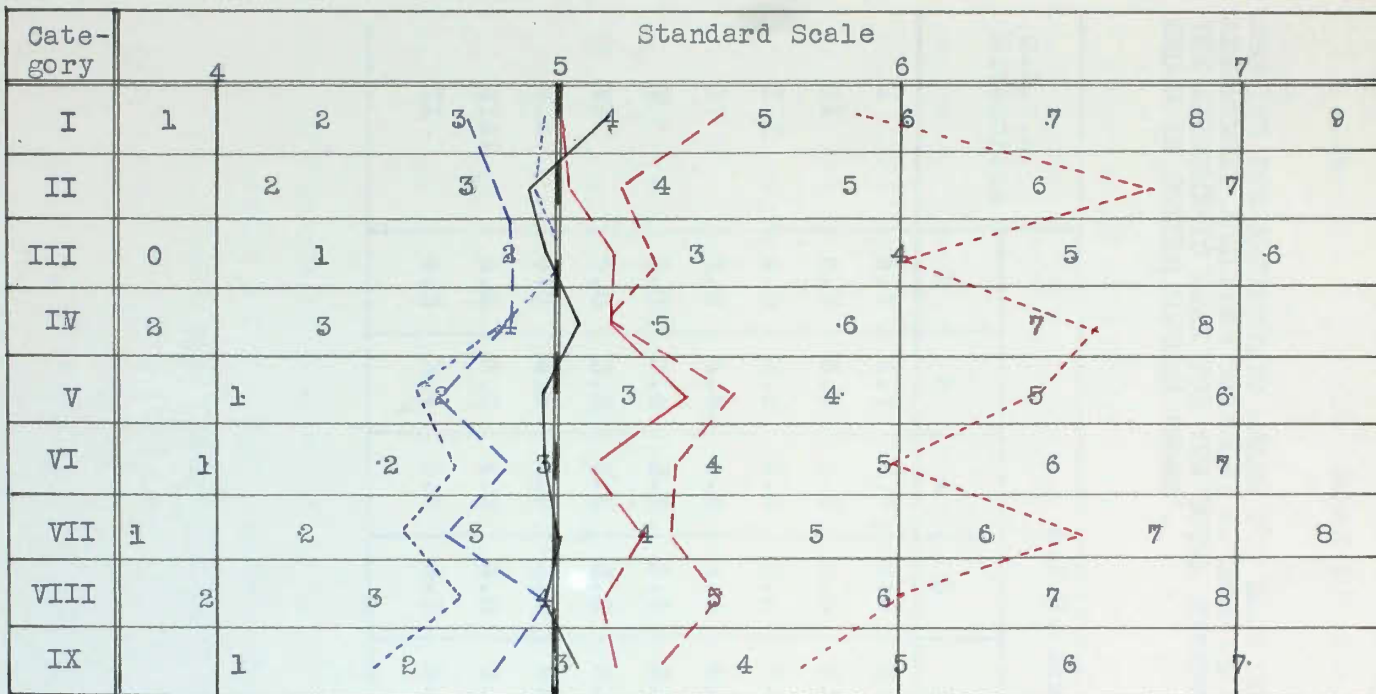
TABLE IX

SHOWING COEFFICIENTS OF CORRELATION WHEN THE COWAN ADOLESCENT ADJUSTMENT ANALYZER SCORES WERE CORRELATED BY CATEGORIES WITH A.F.E.

C.A.A.A. Categories	Coefficients of Correlation
I	-.005
II	-.134
III	-.115
IV	-.142
V	-.272
VI	-.160
VII	-.273
VIII	-.202
IX	-.147

the movement and internal relationship of the various individual profiles of A.F.E. 2 to A.F.E. 7. The profile chart is not the same as the publisher's chart. It was felt that in the comparison of the seventh-grade data the relationships would be more meaningful if the group norms were shown by a straight line for the group median. The data for the construction of the chart for the profiles were taken from data shown in Table I. Careful study of Figure 4 reveals that there is a slight but fairly constant movement of the different profiles across the profile chart. It will be noted that those students in A.F.E. 7 have a fairly low or 'conforming' profile. A.F.E. 6 is slightly higher. A.F.E. 5, the average, or that group operating within the 'zone of prediction', adheres fairly close to the median established by the entire group. A.F.E. 4, those whose efficiency is below the level of prediction, tend to have a profile generally higher than the median of the total group. A.F.E. 3 and 4 are each respectively higher. It will be noted that A.F.E. 2 is extremely high. Table X shows the arithmetic means for all of the Analyzer categories and A.F.E. zones.

While the number of cases in each of these groups is relatively small, it appears particularly significant that the configuration of the individual profiles and their movement should follow such a uniform pattern.



A.F.E. 2, (N-4):
 A.F.E. 3, (N-16):
 A.F.E. 4, (N-43):
 A.F.E. 5, (N-165):
 A.F.E. 6, (N-46):
 A.F.E. 7, (N-14):

Figure 4. Profile of the seventh-grade A.F.E. 2 to 7, plotted on profile chart based on seventh-grade control group norms.

TABLE X

SHOWING THE ARITHMETIC MEANS FOR EACH COWAN ADOLESCENT ADJUSTMENT ANALYZER CATEGORY AT EACH OF THE A.F.E. ZONES. THE ARITHMETIC MEAN FOR THE TOTAL SEVENTH-GRADE GROUP IS SHOWN IN COLUMN MARKED 'NORM'.

C.A.A.A. Categories	A.F.E. Zones						Norm .
	2	3	4	5	6	7	
I	5.7	4.7	3.7	3.9	3.0	3.5	3.76
II	6.7	3.9	3.5	3.3	3.2	3.5	3.38
III	4.0	2.8	2.6	2.2	2.0	2.3	2.31
IV	7.2	4.6	4.6	4.3	4.0	4.0	4.35
V	5.0	3.4	3.2	2.4	2.0	1.9	2.56
VI	5.0	3.8	3.2	3.0	2.8	2.4	3.12
VII	6.7	4.1	4.0	3.5	2.8	2.6	3.51
VIII	6.2	5.0	4.3	4.0	4.0	3.5	4.06
IX	4.3	3.4	3.2	3.1	2.5	1.9	2.96

Despite the small number of cases the data were subjected to statistical comparison. In order to increase the number of cases for statistical treatment of the data A.F.E. 2 and 3 were combined. Table XI shows the A.F.E. 2 and 3 group compared with A.F.E. 7 group. It will be noted that in only one category is the mean difference less than 1 sigma. A further study of these two groups was made by comparing their average grade, A.F.E. score, I.Q. score, and the Analyzer responses. Table XII shows these various scores. Table XIII shows the same information for A.F.E. 2 and 3.

No attempt was made to evaluate the significance of individual responses to the Analyzer in these groups. It is interesting to note, however, that there is very little difference between the I.Q. scores of these two groups. While their I.Q. scores are approximately the same, they differ markedly in their average grades. A.F.E. has a numerical grade average of 6.2 - translated into letter grades this would be approximately a B+ grade whereas A.F.E. 2 and 3 had a numerical grade average of 4.2 - translated into letter grades this would be approximately a D+.

TABLE XI

SEVENTH-GRADE A.F.E. 2 & 3 COMPARED WITH A.F.E. 7 BY THE COWAN ADOLESCENT ADJUSTMENT ANALYZER CATEGORIES, SHOWING DIFFERENCES IN THE MEANS AND SIGNIFICANT RATIOS (t).

Cate- gory	A.F.E. 2&3 Means N = 20	A.F.E. 7 Means N = 14	Mean Diff.	SD _D	Sign'f ratio	Chance in 100*
I	4.9	3.5	1.4	.779	1.80	96
II	4.4	3.4	1.0	.731	1.36	91
III	3.0	2.3	0.7	.725	.97	83
IV	5.1	4.0	1.1	.631	1.74	96
V	3.8	1.9	1.9	.635	2.99	100
VI	4.0	2.4	1.6	.638	2.50	99
VII	4.7	2.6	2.1	.605	3.47	100
VIII	5.3	3.5	1.8	.576	3.12	100
IX	3.6	2.0	1.6	.710	2.25	99

*Chances in 100 that difference is significant.

TABLE XII

SHOWING INDIVIDUAL SCORES FOR SEVENTH-GRADE A.F.E. 7
GROUP, WITH ANALYZER, GRADE, AND I.Q. SCORES. (N = 14)

Case	Analyzer Category									Av. Gr.	AFE	L.Q. Scores
	I	II	III	IV	V	VI	VII	VIII	IX			
6	1	3	2	5	0	2	1	2	2	6.8	7	122½
23	7	3	0	5	1	4	2	3	1	4.9	7	81½
31	9	5	3	7	4	5	4	4	3	6.2	7	110½
32	4	7	8	4	5	3	1	3	4	7.0	7	125½
35	4	2	0	3	0	0	5	4	0	6.0	7	101
36	6	3	2	5	1	1	2	4	0	6.3	7	113
52	1	6	4	4	3	2	4	5	3	6.2	7	107½
58	4	3	0	5	1	0	4	1	1	6.0	7	103½
67	1	1	1	4	1	1	2	4	2	6.4	7	107
100	4	1	0	2	0	0	0	2	0	6.4	7	110½
103	2	6	4	3	3	6	3	5	4	5.0	7	79
198	1	2	4	4	1	3	3	3	1	5.7	7	91
239	1	1	1	4	0	2	3	3	1	7.0	7	129½
278	4	4	3	2	3	4	4	6	7	6.5	7	112
Av.	3.5	3.4	2.3	4.0	1.9	2.4	2.6	3.5	1.9	6.2		106.7

TABLE XIII

SHOWING INDIVIDUAL SCORES FOR SEVENTH-GRADE A.F.E. 2 & 3 GROUPS WITH ANALYZER, GRADE, AND I.Q. SCORES. (N = 20).

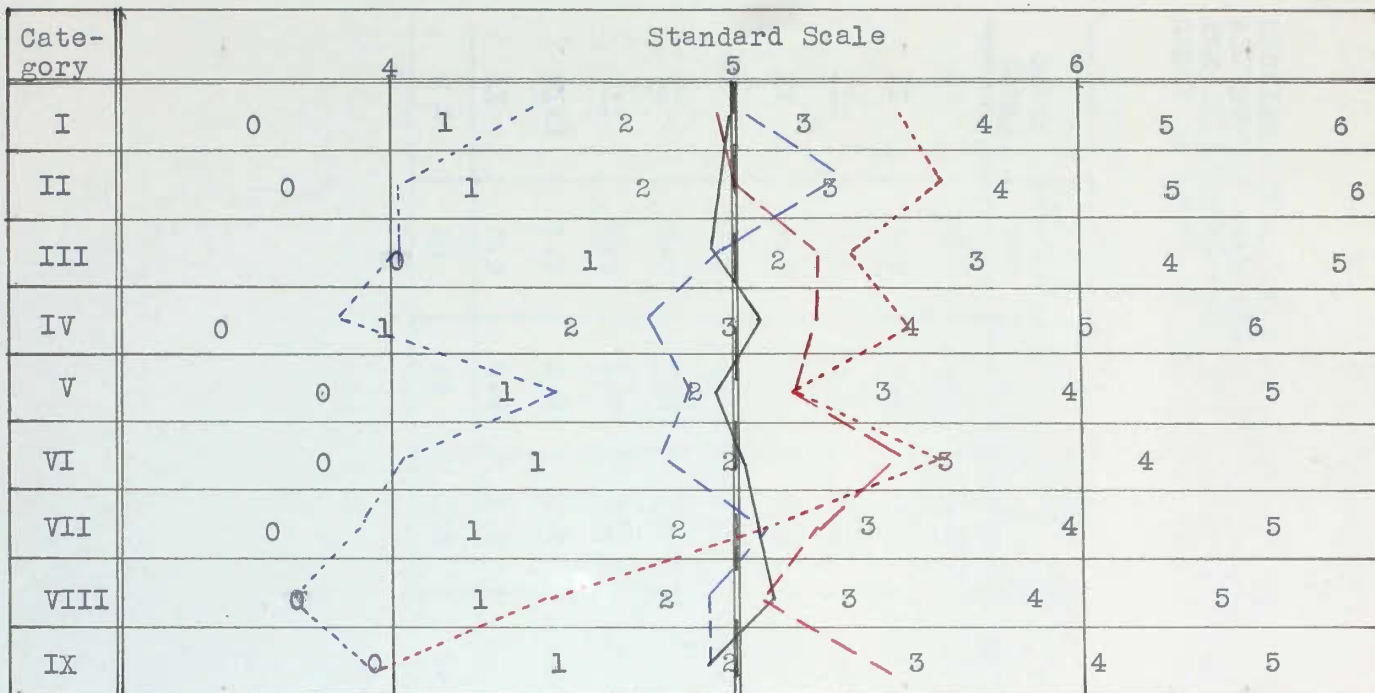
Case	Analyzer Category									Av. Gr.	AFE	I.Q. Scores
	I	II	III	IV	V	VI	VII	VIII	IX			
15	5	3	2	9	2	3	3	6	3	3.9	3	95
64	7	4	2	6	5	5	5	6	3	4.4	3	108 $\frac{1}{2}$
75	4	9	6	8	6	7	7	8	7	4.4	2	120
77	5	3	3	4	3	3	3	3	3	4.2	3	106 $\frac{1}{2}$
97	3	0	0	1	1	0	2	0	0	4.1	3	98
98	5	5	5	5	4	4	6	8	7	4.2	3	102
105	4	6	3	3	5	3	6	6	1	3.9	3	96
114	6	5	2	4	5	4	7	6	2	4.2	2	82
128	3	6	6	3	7	5	4	6	6	5.2	3	124 $\frac{1}{2}$
130	7	6	4	5	6	4	5	7	3	4.8	3	119
165	8	3	2	7	4	4	9	5	5	4.1	3	98
176	8	5	4	9	5	4	8	4	3	3.3	2	93
183	6	3	2	4	0	6	3	4	4	4.7	3	113
185	2	4	1	2	3	3	1	2	2	5.0	3	120 $\frac{1}{2}$
196	5	6	4	8	4	5	5	7	5	4.7	2	124
199	5	2	0	3	0	3	1	4	1	4.4	3	105
200	4	1	0	5	3	3	2	4	1	5.2	3	130
206	4	8	6	6	3	2	6	7	5	3.3	3	89 $\frac{1}{2}$
271	2	3	5	7	5	7	6	6	6	3.3	3	88
293	5	6	3	3	4	5	4	6	4	3.0	3	81
Av.	4.9	4.4	3.0	5.1	3.8	4.0	4.7	5.3	3.6	4.2		104.7

CHAPTER VIII

COMPARISONS AT THE ELEVENTH-GRADE LEVEL

A part of this study included the accumulation of academic grades on all of the seventh-grade group who remained in the public school system in the community until the close of this study. As stated in the introduction, it was not possible to obtain Analyzer records on all of the remaining students. We felt, however, that the 124 which were secured would be a sufficient number to make the study worthwhile.

If the Analyzer is sensitive to personality factors, which relate to academic functional efficiency at the seventh-grade level, is it likewise sensitive at the eleventh-grade level? The data for the eleventh-grade experimental group were treated in the same manner accorded the seventh-grade experimental group data. Figure 5 shows a profile chart upon which have been plotted the individual profiles of the different A.F.E. groups. In this instance and for the same reasons applied to the seventh-grade norms, the profile chart was drawn to the specifications established by the eleventh-grade experimental group norms. Table XIV shows the means of different A.F.E. groups. Table XV shows the statistical treatment accorded the two extreme groups, i.e., A.F.E. 2 and 3 and A.F.E. 7.



A.F.E. 2&3, (N-4):
 A.F.E. 4, (N-21): - - - -
 A.F.E. 5, (N-77): _____
 A.F.E. 6, (N-19): - - - -
 A.F.E. 7, (N-3):

Figure 5, Profiles of the eleventh-grade A.F.E. 2 to 7, plotted on profile chart based on eleventh-grade control group norms.

TABLE XIV

SHOWING THE ARITHMETIC MEANS FOR EACH COWAN ADOLESCENT ADJUSTMENT ANALYZER CATEGORY AT EACH OF THE A.F.E. ZONES. THE ARITHMETIC MEAN FOR THE ELEVENTH-GRADE EXPERIMENTAL GROUP IS SHOWN IN THE COLUMN HEADED 'NORM'.

Cowan Categ.	A.F.E. Zones					Norm .
	2-3	4	5	6	7	
I	3.5	2.5	2.6	2.7	1.3	2.68
II	3.8	2.4	2.3	3.1	0.7	2.48
III	2.3	2.2	1.6	1.7	0.0	1.70
IV	4.0	3.4	3.1	2.3	0.7	3.00
V	2.5	2.5	2.1	2.0	1.3	2.20
VI	3.0	2.9	2.0	1.6	0.3	2.00
VII	2.4	2.7	2.4	2.4	0.3	2.35
VIII	1.3	2.5	2.6	2.2	0.0	2.38
IX	0.0	2.9	1.9	1.9	0.0	2.00
N =	20	43	165	46	14	

TABLE XV

SHOWING ELEVENTH-GRADE A.F.E. 2 & 3 COMPARED WITH A.F.E. 7
 BY THE CONAN ADOLESCENT ADJUSTMENT ANALYZER CATEGORIES
 WITH DIFFERENCES IN THE MEANS AND SIGNIFICANT RATIOS. (t).

Category	AFE 2&3 Means N = 4	AFE 7 Means N = 3	Mean Diff.	SD _D	Sign'f ratio	Chance in 100*
I	3.5	1.3	2.2	2.02	1.08	86
II	3.8	0.7	3.1	.981	3.16	100
III	2.3	0.0	2.3	.255	9.0	100
IV	4.0	0.7	3.3	.582	5.67	100
V	2.5	1.3	1.2	.728	1.64	94
VI	3.0	0.3	2.7	1.37	1.97	98
VII	2.3	0.3	2.0	.416	4.80	100
VIII	1.3	0.0	1.3	.255	5.70	100
IX	0.0	0.0	0.0	0.0	0.0	0

*Chances in 100 that difference is significant.

The profiles differ significantly in several categories - more in some than in others. This seems to be in line with the findings at the seventh-grade level. The Analyzer seems, therefore, also to be sensitive to personality factors which relate to academic functional efficiency at the eleventh-grade level.

While the significance of the configuration of the individual profile for A.F.E. 2 and 3 cannot be evaluated from significant ratio nor from mean differences, this observation warranted insertion in this study. For the past several years different clinicians, using the Analyzer, have observed that in the case of some delinquent children this characteristic configuration of the individual profile was observed. That is to say, the individual had a relatively high profile or large number of maladjusted responses in Categories I to VI with few or no responses in Category IX. Categories VII and VIII did not seem to follow any characteristic pattern, i.e., sometimes they were high and sometimes low. To our knowledge this characteristic has not as yet been given any special study and an explanation is beyond the scope of this study.

CHAPTER IX

OBSERVATIONS AND SUMMARY

A great deal of research needs yet to be done before the problem of achievement in school is understood. While a number of significant facts were discovered in this study, yet in the final analysis these are but a small contribution toward the total body of knowledge needed to understand properly this problem in human efficiency.

It would have been interesting and valuable to have known how many of the underachieving students fell into that category because of physical limitations or serious academic disabilities. This might have shed some light on the question: Does the failure to achieve produce a personality maladjustment or does a maladjustment produce retarded or accelerated achievement? Additional study might throw light upon this problem.

It is most regrettable that Dr. Edwina Cowan's untimely death came just at a time when this study was being completed. Her rich background of experience with the Analyzer would, no doubt, have offered numerous interpretations of the clinical significance of the findings. It is hoped that the findings will prove helpful to Clinical Psychologists who have found the Instru-

ment valuable.

In summarizing the study the following facts seem most noteworthy:

1. There is ^a significant difference between the Analyzer profile of the seventh-grade group of adolescents and the profile of the eleventh-grade group of adolescents.
2. The correlation between the Analyzer Category VI, Immaturity, and I.Q. scores was $-.347$.
3. The correlation between grade scores and I.Q. scores was $.7615$.
4. The correlation between I.Q. scores and A.F.E. scores was $.0577$.
5. The correlation coefficients between the Analyzer categories and A.F.E. were all small - ranging from $-.005$ to $-.273$.
6. The Analyzer shows a significantly different profile for the overachievers from the underachievers. The greater the deviation in achievement the greater the deviation in the Analyzer profiles.
7. A movement, very similar to that which characterized the seventh-grade deviate profiles, also characterizes the Analyzer profiles of the eleventh-grade overachievers and underachievers.

APPENDIX

PART I

Data Used in This Study

- A Case number.
- B Average Henmon-Nelson I.Q. In all cases, unless marked by an asterisk, two test scores were available. One was given in 1944 at the sixth-grade level and one was given in 1947 at the ninth-grade level. When the I.Q. is followed by the asterisk (*) it indicates that only one score, the one given in the sixth-grade, was available for our computations.
- C The average grade made in the 'solid' subjects in the seventh-grade. (see text for method of computing and translation into numerical grade values.)
- D The academic functional efficiency (A.F.E.) evaluation for the seventh-grade marks or grades. (see text for method of translation into numerical values.)
- E Average grade made in the 'solid' subjects in the eighth, ninth, and tenth-grades. (see text for method of computing and translation into numerical values.)
- F The academic functional efficiency (A.F.E.) evaluation for the eighth, ninth, and tenth-grade marks or grades. (see text for method of translation into numerical values.)
- G to O Seventh-grade Cowan Adolescent Adjustment Analyzer scores by categories. The number represents the number of maladjusted responses recorded in each category.
- | | |
|---------------------------------------|-----------------------------|
| G Category I, Fear | L Category VI, Maturity |
| H Category II, Family Emotion | (now Immaturity) |
| I Category III, Family Authority | M Category VII, Escape |
| J Category IV, Feelings of Inadequacy | N Category VIII, Neurotic |
| K Category V, Non-family Authority | O Category IX, Compensation |
- P to X Scores from The Cowan Adolescent Adjustment Analyzer administered at the eleventh-grade level in 1949. The number represents the number of maladjusted responses recorded in each category.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
146	101*	4.8	5			3	3	2	3	1	2	0	2	2									
147	90*	5.0	6	4.6	5	5	3	4	5	2	3	2	2	2	4	2	4	4	2	2	2	3	0
148	92*	4.4	5			1	4	2	6	3	4	5	4	3									
149	105*	5.6	5			4	3	4	6	5	3	6	3	2									
150	113 $\frac{1}{2}$	5.7	5	5.8	5	4	6	4	7	6	8	3	5	7	3	2	0	4	1	0	0	2	3
151	100 $\frac{1}{2}$	5.1	5	4.9	5	1	4	4	5	4	4	2	2	3	3	1	1	2	0	1	0	0	1
152	122*	6.6	6			6	3	0	3	1	2	1	8	1									
153	101 $\frac{1}{2}$	5.2	5	5.0	5	3	6	2	2	1	2	3	4	2	3	3	1	3	4	1	5	3	3
154	101 $\frac{1}{2}$	5.1	5	5.2	5	2	3	1	4	6	6	3	1	2	3	4	0	5	0	2	1	0	0
155	111 $\frac{1}{2}$	5.6	5	5.5	5	9	6	4	7	5	2	7	4	3	7	3	0	7	1	4	7	5	1
156	121 $\frac{1}{2}$	6.3	6	6.2	5	1	3	2	1	4	1	3	4	4	2	1	0	3	2	2	2	3	1
157	124	6.8	6	6.2	5	3	1	2	5	1	2	1	3	1	1	0	1	2	1	2	1	3	0
158	109 $\frac{1}{2}$	5.3	5	5.5	5	6	7	4	8	3	5	6	6	6	6	1	2	3	1	1	2	4	0
159	107	4.8	4			1	3	1	2	6	3	3	3	4									
160	129 $\frac{1}{2}$	6.9	6	7.0	7	2	1	3	1	2	0	2	2	0	4	1	0	0	2	1	1	0	0
161	97*	4.3	4			2	2	4	3	2	1	2	2	3									
162	95 $\frac{1}{2}$	5.1	5	4.6	5	1	1	2	1	3	3	2	1	1	0	3	0	0	2	0	2	1	1
163	124 $\frac{1}{2}$	5.9	5	5.7	5	6	5	6	5	4	4	5	7	4	2	0	0	0	2	0	1	1	0
164	106 $\frac{1}{2}$	4.9	5	4.5	4	2	5	4	3	2	6	1	4	6	3	4	7	6	5	4	5	6	6
165	98*	4.1	3			8	3	2	7	4	4	9	5	5									
166	117	5.4	5			4	4	3	7	3	0	2	4	2									
167	112 $\frac{1}{2}$	5.6	5			4	5	4	6	4	6	5	6	7									
168	140	6.9	5			0	1	0	1	1	0	0	0	0									
169	100 $\frac{1}{2}$	4.8	5	4.3	4	7	5	2	5	6	4	4	7	7	3	1	1	4	3	2	5	1	4

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	
219	118*	5.7	5			6	6	7	7	3	7	5	4	5										
220	98	5.0	5	4.8	5	4	1	3	4	3	1	2	4	0	1	0	2	1	2	1	0	0	1	
221	121	6.3	6			5	3	1	4	1	1	3	4	2										
222	79*	4.2	5			3	1	2	5	5	5	5	6	5										
223	102	4.7	5	4.4	4	7	3	1	4	1	3	3	7	2	4	4	3	5	3	7	3	8	7	
224	124	5.3	4	5.3	4	8	3	4	7	7	8	6	8	7	3	4	3	4	2	3	4	3	4	
225	105 $\frac{1}{2}$	5.1	5	5.5	5	4	4	3	3	4	6	4	2	4	1	2	0	1	2	1	2	5	0	
226	109	4.9	4			5	7	4	6	5	2	6	8	3										
227	101 $\frac{1}{2}$	4.9	5			3	3	1	4	2	3	4	1	4										
228	97*	4.2	4			9	2	3	4	1	3	2	3	2										
229	127	5.6	4			1	2	0	3	1	3	4	1	1										
230	84 $\frac{1}{2}$	4.7	6	4.3	5	4	4	3	6	2	4	3	3	0	5	6	2	7	4	3	3	3	4	
231	124*	5.8	5			7	4	1	6	2	5	5	6	1										
232	95	4.6	5	4.8	5	5	2	1	5	1	3	4	5	1	3	2	2	5	1	3	4	6	0	
233	114*	5.1	4			4	3	5	5	4	3	3	3	4										
234	103*	5.1	5	5.2	5	6	6	5	6	6	5	3	6	6	0	2	0	4	1	6	1	4	2	
235	79*	4.0	5			5	3	0	7	4	4	3	3	5										
236	101*	4.6	5			5	5	1	5	0	2	6	4	4										
237	121 $\frac{1}{2}$	5.3	4	4.9	3	2	3	2	2	3	0	3	3	2	0	2	2	3	1	0	2	0	0	
238	135*	6.7	5			9	3	6	3	1	3	5	6	3										
239	129 $\frac{1}{2}$	7.0	7	6.9	6	1	1	1	4	0	2	3	3	1	2	2	2	0	1	1	2	2	2	
240	101 $\frac{1}{2}$	5.1	5	5.2	5	3	2	0	4	1	1	4	1	3	0	4	0	1	1	1	1	2	3	
241	111 $\frac{1}{2}$	5.6	5	5.2	5	1	5	1	4	2	6	3	7	8	1	3	1	2	2	1	1	2	0	

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	
242	120*	5.2	4			2	2	1	4	5	3	2	4	5										
243	106 $\frac{1}{2}$	4.9	5			5	5	3	5	5	1	1	3	3										
244	95 $\frac{1}{2}$	5.3	6	5.2	6	6	0	2	7	3	4	2	4	2	5	5	0	2	4	1	4	3	3	
245	119 $\frac{1}{2}$	5.9	5	5.9	5	2	2	1	2	0	1	3	1	2	3	6	0	5	1	1	4	6	2	
246	92*	4.9	5			9	4	5	7	2	4	6	8	8										
250	112*	5.3	5	5.1	5	4	3	3	5	3	3	5	2	7	1	3	3	2	5	2	1	6	6	
251	103*	4.6	4			3	3	1	6	3	1	4	3	4										
252	133	6.4	5			1	1	1	0	0	1	0	1	1										
253	92 $\frac{1}{2}$	3.9	4			9	3	1	7	2	4	5	4	2										
254	136*	5.8	4	6.3	5	3	3	4	4	1	2	2	2	2	2	2	2	3	1	1	2	1	4	
255	113	5.3	5	5.0	4	0	2	0	4	0	0	3	0	2	2	0	1	3	2	0	0	3	0	
256	124 $\frac{1}{2}$	5.4	4	5.7	5	2	8	2	7	2	4	6	7	5	2	6	2	2	0	2	3	2	2	
257	110	5.4	5			5	3	2	5	4	3	6	5	3										
259	113	5.9	5			3	2	1	2	1	1	5	5	3										
260	121	5.6	5			0	1	1	1	0	4	3	1	0										
261	98 $\frac{1}{2}$	4.8	5	5.3	5	5	3	3	6	1	1	2	5	7	5	1	0	1	3	0	0	1	0	
262	118	5.6	5	6.1	5	0	3	1	1	3	1	3	3	2	2	6	4	4	2	0	2	3	3	
263	110 $\frac{1}{2}$	5.4	5	5.0	5	2	2	0	1	2	1	3	2	0	1	0	0	1	1	1	1	3	1	
264	105	5.0	5	5.0	5	5	4	3	3	2	1	4	6	4	1	4	3	4	1	3	5	6	5	
266	99 $\frac{1}{2}$	5.0	5	5.6	6	5	1	0	0	1	2	1	4	1	4	1	0	2	1	1	0	1	0	
266	115 $\frac{1}{2}$	5.1	4			6	4	5	4	1	1	5	4	2										
268	124*	6.6	6			1	5	4	3	3	4	4	4	2										
269	96	4.4	5	4.3	4	3	3	1	5	1	8	3	5	4	1	1	0	1	2	3	4	3	1	

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
297	114 $\frac{1}{2}$	6.1	6	6.0	5	1	2	2	2	1	2	2	2	4	3	1	4	4	0	1	2	0	4
298	104	5.0	5	5.2	5	2	3	2	2	6	2	2	4	2	0	2	2	2	1	1	2	1	2
299	124 $\frac{1}{2}$	6.3	5			2	4	5	3	3	6	5	5	7									
300	107	5.2	5	4.8	4	2	1	3	2	4	6	3	3	3	2	3	4	4	3	5	4	0	2

APPENDIX

PART II

Manual of Directions and Interpretive Guide
for
The Cowan Adolescent
Adjustment Analyzer

BIBLIOGRAPHY

Ames, Viola, "Factors Related to High School Achievement,"
The Journal of Educational Psychology, 34:229-236,
April, 1943.

A research problem dealing with factors related to high school achievement.

Assum, Arthur L. and Sidney J. Levy, "A Comparative Study of the Academic Ability and Achievement of Two Groups of College Students," The Journal of Educational Psychology, 38:307-310, August, 1947.

A study of two groups of college students - a maladjusted group and a normal group.

Babcock, Harriet, Time and the Mind. Cambridge: Scio-Arts Publishers, 1941. 304 pp.

Techniques for evaluating mental efficiency.

Betts, Emmett A., Foundations of Reading Instruction. New York: American Book Company, 1946. 143 pp.

The psychology of learning as applied to reading.

Bingham, Walter VanDyke, Aptitudes and Aptitude Testing. New York: Harper and Brothers Publishers, [c 1937]. 390 pp.

A textbook for evaluation of aptitudes.

Briggs, Leslie J., "Intensive Classes for Superior Students,"
The Journal of Educational Psychology, 38:207-215,
April, 1947.

A study of the effects of intensified study programs with superior students.

Buros, Oscar Krisen, The Third Mental Measurements Year-book. New Brunswick: Rutgers University Press, 1949, 1047 pp.

A catalog of mental measurement instruments and devices listing authors, publishers, and critical reviews.

Cattell, Raymond B., "Personality Traits Associated with Abilities. II: With Verbal and Mathematical Abilities,"
Journal of Educational Psychology, 36:485-486, November, 1945.

One of a series of studies in factor analysis as applied to intelligence.

Cowan, Edwina A., Mernerva Church McClellan, Berth M. Pratt, and Mae Skaer, "An Adolescent Personality Schedule," Child Development, 6:77-87, March, 1935.

An adolescent personality schedule.

Cowan, Edwina A., Wilbert J. Mueller, and Edra Weathers,
A Manual of Directions and Interpretive Guide for
The Cowan Adolescent Adjustment Analyzer. Preliminary
Edition; Emporia: Bureau of Educational Measurements,
Kansas State Teachers College, 1946, 8 pp.

A manual of directions and interpretive guide for
The Cowan Adolescent Adjustment Analyzer.

Dunkel, Harold B., "The Effect of Personality on Language
Achievement," Journal of Educational Psychology, 38:
177-182, March, 1947.

A psychological study of certain personality factors
effecting language achievement.

Horney, Karen, The Neurotic Personality of Our Time.
New York: W. W. Norton and Co., Inc., [c 1937]. 299 pp.
A psychology of the neurotic personality.

Jones, Arthur J., Principles of Guidance. Second edition;
New York: McGraw-Hill Book Co., Inc., 1934. 287 pp.
A textbook of the principles of guidance.

Kilby, Richard W., "The Relation of a Remedial Reading
Program to Scholastic Success in College," Journal of
Educational Psychology, 36:513-534, December, 1945.

A study of the value and effect of remedial
reading instruction to a group of college freshmen.

Krueger, William C. F., "Rate of Progress as Related to Difficulty of Assignment," Journal of Educational Psychology, 37:247-249, April, 1946.

A psychological study of the effects of an accelerated program of study.

Lane, Howard A., and Paul A. Witty, "The Educational Attainment of Delinquent Boys," Journal of Educational Psychology, 25:695-702, December, 1934.

A study of the educational attainment of delinquent boys.

Learned, Williams S., What's in a Mark? New York: Carnegie Foundation for the Advancement of Teaching, [1940?] . 36 pp.

A critical evaluation of grading practices.

Learned, William S., Two Decades of an Educational Inquiry. New York: Carnegie Foundation for the Advancement of Teaching, [1940?] . 47 pp.

A review of research in education supported by the Carnegie Foundation for the Advancement of Teaching.

Moore, Joseph E., "A Comparative Study of the Intelligence of Delinquent and Dependent Boys," Journal of Educational Psychology, 28:355-366, May, 1937.

A comparative study of the intelligence of delinquent and dependent boys.

Mueller, Wilbert J., Guided Growth. Salina: St. John's School, Inc., 1944. 8 pp.

A technique of educational guidance.

Mueller, Wilbert J., "Group Interpretation of Test Results," Transactions Kansas Academy of Science, 49:457-459, 1947.

A study of factors relating to test interpretation to high school students.

Olson, Williard C., and Byron O. Hughes, "Concepts of Growth - Their Significance to Teachers," Childhood Education, 21:53-63, October, 1944.

A study of achievement in school and its relationship to the total personality development.

Prescott, Daniel Alfred, Emotion and the Educative Process. Washington, D.C.: American Council on Education, 1938, 323 pp.

A review of the literature bearing upon emotions and the educative process.

Pressey, S. L., Psychology and the New Education.

New York: Harper and Brothers Publishers, 1933.

594 pp.

A textbook of educational psychology.

Thorndike, Robert L., "The Prediction of Intelligence at College Entrance from Earlier Test," Journal of Educational Psychology, 38:129-148, March, 1947.

A study relating earlier mental ability scores to later college achievement.