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A STUDY OF THE RELATIONSHIPS BETWEEN READING
AND PERSONALITY AND WAIS SCALES AT AN
OPEN DOOR COMMUNITY COLLEGE

By

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A DISSERTATION

Submitted to
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1984

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EARL L. MENARY, JR.

1984

To Walter E. Lockhart: distinguished teacher, scholar, and researcher, whose inquisitive mind explored many diverse subjects. He was a true philosopher to the end. I am fortunate indeed to have known Walter as an office partner, fellow instructor, research collaborator, and fellow Christian. Most of all, I am glad he was my friend.

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ABSTRACT

A STUDY OF THE RELATIONSHIPS BETWEEN READING AND PERSONALITY AND WAIS SCALES AT AN OPEN DOOR COMMUNITY COLLEGE

By

Earl L. Menary, Jr.

The purpose of this study was to obtain and analyze data concerning the relationship between reading and personality and intelligence scores of a group of open door community college students. The writer also explored the development of a personality and achievement profile that might help clinicians understand the strengths and weaknesses of the students with whom they work. Data were obtained on 127 open door community college students residing in the college district; they were Caucasian and predominantly middle class. The Nelson Denny Reading Test (Form C) was used to obtain students' total reading scores. The Clinical Analysis Questionnaire and the Wechsler Adult Intelligence Scale were used to measure personality and intelligence, respectively.

The subjects were arranged into comparison groups based on their total reading achievement on the Nelson-Denny. Those obtaining scores one-quarter standard deviation above the mean (approximately the top 40%) were designated the better-reading students; those scoring

one-quarter standard deviation below the mean were designated the poorer-reading students. Correlations between total reading achievement and performance on the CAQ and between total reading achievement and WAIS subscale scores were obtained using a product-moment correlation procedure. Two-way analyses of variance were used in comparing better-reading and poorer-reading students. Results were as follows: Statistically significant relationships existed between reading and personality for the total group; the relationships were enhanced by intrasexual comparisons. Statistically significant relationships between male total reading achievement and personality characteristics indicated that better-reading males were more intelligent, more imaginative, more liberal and experimental in their thinking, decisive, and resourceful. They had good vocabularies and reasoning abilities. Statistically significant relationships between female total reading achievement and personality characteristics indicated that better-reading females were more intelligent, assertive and headstrong, quick and alert, secure and self-confident, liberal and experimental in their thinking, decisive and resourceful, restless and excitement seeking, had complacent attitudes toward anti-social behavior, were not hurt by criticism, and lacked self-insight. Comparison of better and poorer readers' scores on the WAIS scales indicated that a profile analysis did not yield useful information. The only information evident was a verbal deficiency, which is assessed more easily by means other than a WAIS test.

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CHAPTER I

INTRODUCTION

Statement of the Problem and Need for the Study

The relationship that personality has to reading and to intelligence requires further exploration and extension. Previous work in this area needs to be replicated with similar instruments and design. In this way, theoretical insights can be gained, from which further studies can be generated. As a leading authority on reading wrote, "Almost everyone who has worked with or written about retarded readers has reacted to the personality problems that complicate treatment of the disability" (Spache, 1976, p. 236). Many textbooks on reading diagnosis and remediation lend truth to this statement by including at least one chapter on the relationship between reading and personality. Although the relationship of reading to personality has been discussed at length, the topic entails a number of problems.

One of the major problems is lack of replication of research studies investigating the relationship of reading to personality. Spache (1976) stated that the role of personality in the act of reading is difficult to assess "because of their bases in varying theories of personality and its measure" (p. 240). Also, each study seems to have unique characteristics, depending to some extent on the measuring devices used in the research (Ekwall, 1966, p. 240). Throughout the

literature, little commonality exists in either the measuring devices used, or in the age or grade level assessed. Of 14 studies cited by Spache, only three used the same instrument--the Rorschach--but here the similarity ended. The research design of each study differed; thus the chance of similar findings was negated.

Another problem, though of lesser degree, is that most studies investigating the relationship of reading to personality have dealt with the elementary-school population. Few such studies have been conducted at the middle school, secondary school, or college levels. Profiles of poor and good readers at all grade levels are needed if practical value is to result from the research. To study poor readers without comparing them with their good-reading counterparts will not help detect differences in the personality factors of readers. It will only measure a poor reader against the norms of the personality test used. Such information is useful in describing the poor reader, but it does not aid in identifying differences that may be involved as either incentives or deterrents in the act of reading.

In addition to the foregoing problems, determining which research instrument is most appropriate for the age and grade level of the intended population is an important consideration. The ease of instrument use and interpretation of findings for other researchers should also be considered when selecting an instrument.

In a study conducted at the community college level, Lockhart and Menary (1979) explored the use of the Cattell 16 Personality Factor Test (16 PF) in identifying differences between good and

poor readers and its ease of interpretation. The researchers were satisfied that the instrument fulfilled these requirements. However, the inability to extrapolate from the 16 PF to the Minnesota Multiphasic Personality Inventory (MMPI) led Menary and Lockhart to conduct a study with Cattell's Clinical Analysis Questionnaire, an extension of the 16 PF that measures abnormal traits, similar to the measurements obtained by the MMPI. The attempts to discover scales that can extend the knowledge of personality traits of good and poor readers at the college level is continued in the present study, in conjunction with an attempt to develop the IQ profiles of good and poor readers and to compare them.

Like the personality studies, research on the IQ profiles of poor readers has mainly compared retarded readers as a group with the scales used, rather than with a sample of good readers. This method has led to controversy over what the researchers have labeled significant differences.

Analyses of how poor readers perform on individual IQ tests such as the Wechsler Adult Intelligence Scale (WAIS) or the Wechsler Intelligence Scale Combined (WISC) do not indicate how the poor reader differs from the good reader on a given subtest, nor do they give a clear indication of whether the intragroup differences on the subtests are significant. Spache (1976) stated that

The bases of these comparisons vary from one writer to another: some comparing mean scores of matched or unmatched groups; some allowing for the probable errors of the estimate, while others ignore these; some considering almost any variation among sub-test scores with his own average as a correction.

In addition to the aforementioned difficulties in determining what scales seem to be associated with reading, or with retarded individuals' reading, to be more precise, environmental differences are also a legitimate concern. Are certain relationships attributed to reading when, in fact, they might be attributed to the persons' being from radically different environments? Thus a profile of differences between good and poor readers should be generated on homogeneous populations. Also, the population should be large enough to minimize the possibility of exaggerating differences that may be slight, at best.

Despite the numerous problems in investigating the relationship between reading and personality and intelligence, an attempt should be made to understand this relationship among well-defined, homogeneous populations. Adding to this body of knowledge will contribute to diagnostic advances in reading education. The present study is an attempt in this regard.

Purpose of the Study

The open door community college operates under the assumption that all persons, given the opportunity, have a potential for academic learning. Reading is the foundation for academic growth and development. Therefore, information that will help practitioners understand the reading characteristics and processes of open door community college students will aid in cultivating and developing their academic potential.

To this end, the investigator's main purposes in conducting the study were to examine the relationships between reading and personality and intelligence scores of open door community college students and to explore the development of a personality and achievement profile that will help practitioners assist students to realize their potential.

A third purpose in conducting this research was to study the relationship between reading and personality and intelligence within a homogeneous population. The subjects for the present study were selected from logic, psychology, and reading classes at a midwestern open door community college in a district that predominantly comprises middle-class managers and skilled workers. All subjects chosen for the study resided within the college district and were Caucasian. To this extent, environmental differences should have been minimized and a reasonable homogeneity of the group achieved.

Hypotheses

The following hypotheses, stated in the null form, were formulated to guide the collection of data in this investigation:

Hypothesis 1: There will be no statistically significant relationship between group total reading achievement and group scores on the individual scales of the Clinical Analysis Questionnaire.

Hypothesis 2: There will be no statistically significant relationship between males' total reading achievement and their scores on the individual scales of the Clinical Analysis Questionnaire.

Hypothesis 3: There will be no statistically significant relationship between females' total reading achievement and their scores on the individual scales of the Clinical Analysis Questionnaire.

Hypothesis 4: There will be no statistically significant relationship between group total reading achievement and group performance on the individual subscales of the Wechsler Adult Intelligence Scale.

Hypothesis 5: There will be no statistically significant relationship between males' reading achievement and their performance on the individual subscales of the Wechsler Adult Intelligence Scale.

Hypothesis 6: There will be no statistically significant relationship between females' reading achievement and their performance on the individual subscales of the Wechsler Adult Intelligence Scale.

Hypothesis 7: There will be no statistically significant relationship between group reading achievement and group scores on the individual scales of the Clinical Analysis Questionnaire when the effects of IQ have been controlled.

Hypothesis 8: There will be no statistically significant difference between better-reading males and poorer-reading males on the individual scales of the Clinical Analysis Questionnaire.

Hypothesis 9: There will be no statistically significant difference between better-reading females and poorer-reading females on the individual scales of the Clinical Analysis Questionnaire.

Hypothesis 10: There will be no statistically significant difference between better-reading males and poorer-reading males on the subscales of the Wechsler Adult Intelligence Scale.

Hypothesis 11: There will be no statistically significant difference between better-reading females and poorer-reading females on the subscales of the Wechsler Adult Intelligence Scale.

Hypothesis 12: There will be no statistically significant relationship between total group scores on the individual scales of the Clinical Analysis Questionnaire and total group scores on the subscales of the Wechsler Adult Intelligence Scale.

Definitions of Terms

The following terms are defined in the context in which they are used in this dissertation.

Open door community college: A two-year college that requires no entrance examinations for admission to the school.

Better readers: The group of readers who scored in the upper 40% of the distribution of scores obtained on the Nelson-Denny Reading Test.

Poor readers: The group of readers who scored in the lower 40% of the distribution of scores obtained on the Nelson-Denny Reading Test.

It should be noted that use of psychological terminology in this study reflects the language and thought of the authors of the various studies cited and the terminology and explanations contained in the Clinical Analysis Questionnaire Handbook.

Instrumentation

Because this study is a replication and extension of the research conducted by Lockhart and Menary, the same instrumentation and methodology were used. The Nelson-Denny Reading Test (Form D), the Cattell Clinical Analysis Questionnaire (CAQ), and the Wechsler Adult Intelligence Scale (WAIS) were used to obtain the scores for comparison purposes.

Data Analysis

The subjects for this study were categorized into two groups according to the scores they obtained on the Nelson-Denny Reading Test. Students with scores in the upper 40% constituted the group designated as better readers or better-reading college students. Those students

with scores in the lower 40% constituted the group designated as poorer readers or poorer-reading college students.

The Pearson product-moment correlation technique was used to test Hypotheses 1 through 6 and 12. A partial correlation was employed to test Hypothesis 7. To test Hypotheses 8 through 11, a two-way analysis of variance was used.

Organization of Subsequent Chapters

Chapter II contains a review of pertinent literature in two major areas: (1) studies comparing personality and reading achievement and (2) the relationship between individualized IQ test and reading achievement. A description of the test materials and data-collection and analysis procedures employed in the study is found in Chapter III. The research hypotheses are also presented. Chapter IV reports the results of the data analysis and hypothesis testing. A summary of the investigation, appropriate conclusions, and recommendations for further study are contained in Chapter V.

CHAPTER II

REVIEW OF RELATED LITERATURE

The review of related literature is organized under two major headings. These are: (1) studies comparing personality and reading achievement and (2) the relationship between reading achievement and Wechsler Intelligence Test subscale patterns. The review of research in these areas served as a basis for designing and conducting the present investigation.

Studies Comparing Personality and Reading Achievement

Studies at the Elementary and Secondary Levels

Although the current investigation is concerned with examining the relationship between reading and personality and intelligence in a community college population, studies conducted with elementary and secondary populations can lend insights into the relationship between reading and personality and achievement in younger students. In this section, studies done at the elementary level and the mixed elementary/secondary levels will be summarized before discussing the research conducted at the college level.

In a 1954 study, Spache investigated the relationship between reading and personality in children attending a reading clinic. Acting

on a "clinical hunch" that many of the students in the reading clinic evidenced definite negativism about and resistance to learning, Spache administered the Rosenzweig Picture Frustration Test to 50 of the clinic's clients. Children ranged from 6 to 14 years of age, with an average age of 10.96. The subjects had a mean Wechsler VIQ of 93.2.

When this group of subjects was compared with Rosenzweig's group of normal children, the clinic cases appeared significantly more aggressive and cocky, less insightful, and less apt to admit blame or fault than Rosenzweig's normative group. Also, the clinic cases showed strong tendencies toward intolerance in conflict situations.

By modifying Rosenzweig's scoring method, Spache was able to separate situations of conflict into situations of child-child conflict and adult-child conflict, thereby enabling him to study how the poor readers reacted in conflict situations with their peers and with authority figures. Spache found that the clinic population reacted differently toward adults than they did toward their peers. With an adult, the poor readers were less aggressive and more inclined to accept blame. When dealing with their peers, they were aggressive, cocky, and less apt to try to solve a problem. They aggressively resisted their peers but passively resisted adults' suggestions.

In conclusion, Spache confirmed that his clinic population manifested a resistance to learning. His findings also confirmed that simple remedial work without attention to the learner's emotional attitudes often is unsuccessful.

Three years later, Spache (1957) administered the Rosenzweig Picture Frustration Test to a group of 125 children in grades 1 through 3 who were reading one year below grade level and children in grades 3 and above who were reading two years below grade level. He found five major personality patterns that he felt were important to understanding children's failure in reading.

1. an aggressive or hostile group in conflict with authority figures.
2. an adjustive group that seeks to be inoffensive.
3. a defensive group that is sensitive and resentful.
4. a solution or peace-making type.
5. an autistic group characterized by blocking or withdrawal.

Spache's findings strengthened his belief in the need for individualized study and treatment of children with reading problems.

Chronister (1964) also conducted research on the relationship of personality to reading achievement. His study was an attempt to determine the relationship of certain measured personality variables to reading achievement. The personality variables he chose for study were self-reliance, personal worth, personal freedom, feeling of belonging, freedom from withdrawal, freedom from nervous symptoms, social standard, social skills, and freedom from anti-social tendencies.

The subjects for Chronister's study were 167 fifth-grade pupils enrolled in a central Missouri school system. He administered the Iowa Every Pupil Test of Basic Skills--Silent Reading Comprehension Test (Form A) and the California Test of Personality and Behavior Preference

Record. Chronister concluded that personality factors have a slight but positive relationship to reading comprehension. He recommended that teachers who are evaluating the work of underachievers should give considerable attention to other factors than personality.

In another study with students of similar ages and grade levels, Zimmerman and Allebrand (1965) compared poor readers with good readers in terms of their personality characteristics and attitudes toward achievement. They hypothesized that poor readers (subjects reading at least two years below grade level) would show less adequate personal adjustment toward achievement than good readers.

The study population consisted of 71 poor readers, known as the remedial group, and 82 good readers, known as the contrast group, equated as nearly as possible for age, sex, ethnic composition, and intelligence. The children were predominantly of middle to lower socioeconomic status, and roughly half were of Mexican descent. Subjects were drawn equally from the fourth and fifth grades of an urban school district. Twice as many boys as girls were represented in the remedial group, and the same proportion was maintained in the contrast group. Subjects in the remedial group were enrolled in a remedial reading program. Children in this program had been screened on the basis of having average or better-than-average intellectual ability and reading at least two years below grade level. The contrast group comprised children who were reading at grade level or above, but otherwise matched to the remedial group.

The California Test of Personality was used to measure personal and social adjustment. To measure attitudes toward learning, each child was asked to tell a story about card I of the Thematic Apperception Test.

In the area of personality functioning, Zimmerman and Allebrand found significant differences between the good and poor readers. Specifically, the poor readers characterized themselves as having nervous symptoms, limited personal freedom, and feelings of isolation. The good readers saw themselves as having personal worth, absence of withdrawal tendencies, and self-reliance. Major significant differences occurred in the personal rather than in the social adjustment areas.

In regard to achievement attitudes, as revealed by the Thematic Apperception Test card I, good readers embraced such middle-class goals as practice and study with a payoff of future success. Poor readers did not stress effort, and more than one-third of the poor readers' stories evidenced a negative tone. The authors concluded that the good readers appeared to reflect the concepts of adjustment and motivation prized by teachers and school psychologists, whereas the poor readers admitted feelings of inadequacy and nervousness and had short-lived goals related to immediate and social achievement.

Hake (1969) conducted research to discover and isolate personality maladjustments among poor readers. He also sought to develop a projective test to evaluate covert motivation as contrasted with overt behavior related to reading situations. Hake's study group included 80 sixth graders selected from a population of more than 600 sixth graders

in a midwestern public school. They had average intelligence, based on standardized test scores, and represented a wide socioeconomic range. The 80 children were divided into below-average and above-average reading groups, based on their scores on the California Achievement Test. The below-average group comprised those who scored one or more years below their grade level, whereas the above-average group scored one or more years above their grade level. No pupil undergoing special psychological treatment was included in the study.

Hake found significant differences ($p < .01$) between the above- and below-average readers on the following personality factors evaluated by the Reading Apperception Test, a test similar in format to the Thematic Apperception Test:

1. Poor readers more often saw their parents and homes as less warm and comforting than did the good readers.
2. Significantly more poor than good readers identified with story characters whose teachers punished them freely for their learning difficulties.

A comparison of the overt classroom behavior of the two reading groups as rated by the Pupil Behavior by the Teacher Rating Scale, a measure of overt behavior, indicated that the poor readers

1. displayed more negative classroom behavior;
2. were characterized as more shy and withdrawn;
3. were more easily led, distracted, and selfish;
4. were more happy and carefree about their work;

5. were rated more emotionally unstable, nervous, and unreliable; and
6. were rated more depressed and more easily discouraged than their better-reading counterparts.

Hake concluded:

In general the findings of the study support those of earlier studies that poor readers exhibit significantly more negative desires and wishes along with more maladaptive classroom behavior than do good readers. Also, as in previous studies, this research points up the fact that classroom teachers and reading clinicians must not only be concerned about the poor readers' word recognition problem, but must be equally sensitive to their emotional difficulties which are indeed considerable. (p. 738)

Neville, Pfost, and Dobbs (1967) studied the relationship of several personality factors to silent-reading achievement gains. The subjects were 54 boys who were enrolled in a summer reading program offered by the Child Study Center of George Peabody College for Teachers. The subjects' ages ranged from 7 through 14, with a mean age of 10.5. Grade level ranged from 3 through 9, with a mean grade level of 5.5. Before instruction the students took the Peabody Picture Vocabulary Test (Form B), the Lorge-Thorndike Group Intelligence Test (Form A), the Test Anxiety Scale for Children (TASC) by Sarason, and either the Gates Basic or Advanced Primary Reading Test.

Subjects were taught using the clinic's ordinary diagnostic teaching methods; teachers helped the children gain skills in areas of deficiency. The subjects were then tested with a parallel form of the Gates test and reading gain was calculated. Subjects were divided into three groups according to their scores on the TASC: High Anxiety (HA), Middle Anxiety (MA), and Low Anxiety (LA). The groups were not

different on several factors related to achievement, namely, IQ, age, and grade. Three simple analyses of variance comparing the three anxiety groups on each of these factors resulted in F-ratios well below that required for statistical significance. Thus it was assumed that any effect these factors might have had on reading gains could be attributed to chance.

When comparisons were completed, it was found that high test anxiety did have an inverse relationship to comprehension gain but not to vocabulary gain. However, both very high and very low test anxiety were associated with little or no gain in silent-reading comprehension, whereas a medium level of anxiety seemed to be associated with greater gain. In attempting to account for this finding, the authors stated:

It seems reasonable to assert that comprehension is a more complex task than vocabulary, and that the complexity of the task and the high anxiety resulted in inferior performances among the HA group. It is difficult to explain the LA group in this light, but it appears possible that the successful performance of a complex task requires more personal involvement than does the successful performance of a more simple task. Thus, the LA group had enough involvement to perform as well as the MA group on the Voc. task, but not enough to perform as well on the Comp. task. (p. 49)

Neville et al.'s results indicated a curvilinear relationship between anxiety and achievement gains. Moderate amounts of anxiety were associated with greater gains in reading achievement than were either high or low amounts of anxiety.

As can be noted from the studies conducted at the elementary-school level, some personality characteristics appear to be more common than others in poorer readers. Some of these characteristics are aggressiveness among boys, negative attitudes, impulsiveness rather

than goal-directed behavior, and anxiety factors. Other identified personality factors seemed to be restricted to a particular study and thus may have reflected the measuring instrument used in the investigation.

Studies at the College Level

Joseph and McDonald (1964) conducted an exploratory study at Marquette University to determine if a discernible relationship existed between personality needs, as measured by a forced-choice instrument, and reading performance, as measured by a standardized group test. The study group comprised 1,475 Marquette University freshmen. The SAT scores for the group were above the national average, and about two-thirds of the group had been in the upper one-third of their high school graduating classes.

Subjects were given the Diagnostic Reading Test and the Edwards Personal Preference Schedule. On the basis of the reading test scores, Joseph and McDonald divided the population into the following subgroups:

Group 1--High Comprehension	(N = 200)
Group 2--Low Comprehension	(N = 200)
Group 3--Top Comprehension	(N = 55)
Group 4--Bottom Comprehension	(N = 53)

Group 1 comprised the top 15% of the population in reading comprehension, and group 2 constituted the lowest 15% of the population. Groups 3 and 4 were subsamples of Groups 1 and 2 and reflected the top and bottom decile, respectively, based on local norms.

The investigators then created three additional groups based on reading rate. Membership in these groups was determined by students' scores on the Reading Versatility Test. The group designations were as follows:

Group 5--Efficient Readers	(N = 6)
Group 6--Effective Readers	(N = 19)
Group 7--Ineffective Readers	(N = 38)

No effort was made to equalize the number of males and females in each group, but the two sexes were about equally represented. Tests of significant differences in the mean were used to compare the data.

Many of the comparisons in the Joseph and McDonald study were not significant beyond the .20 level. This might have been a result of the good overall ability of the Marquette University freshman class. Because most of the students in the population had been in the upper one-third of their graduating classes, they were a fairly select group of individuals. This, in effect, would minimize the qualitative differences that may have existed within a more heterogeneous population. The lack of correlations might also have been a result of the small sample size in the final groupings.

Among the significant findings of this study, Group 1 compared with Group 2 showed a tendency toward autonomy, whereas Group 2 had a greater tendency toward deference and order. Readers in the top 15% of the group showed greater independence and flexibility than the lowest 15% of the readers, whereas the poorer readers tended to be dependent and lacked self-confidence.

Brunkan and Shen (1966) were stimulated by the results of the Joseph and McDonald study and sought to replicate it. They used the Reading Versatility Test (RVT) and substituted the Adjective Check List (ACL) for the Edwards Personal Preference Schedule (EPPS) because the ACL would provide information on a greater number of scales than the EPPS. The subjects were selected from Marquette University's 1964 incoming freshman class on the basis of their RVT scores. SAT scores were already available on these students. The selected students fit into three categories of reading performance:

1. Efficient readers, 60% comprehension and a rate/ratio of more than 1 to 1.5 between fiction and nonfiction (N = 38).
2. Effective readers, 60% comprehension and a rate/ratio of less than 1 to 1.5 between fiction and nonfiction (N = 226).
3. Ineffective readers, less than 60% comprehension and rate/ratio of less than 1 to 1.5 between fiction and nonfiction (N = 57).

Each of these qualitative categories was then subdivided into three reading-rate levels on the basis of the ratio between fiction and nonfiction. These levels represented the upper (N = 146), middle (N = 84), and lower (N = 91) one-third of the freshman class. With a high, middle, and low reading-rate category within each of the qualitative groups, a total of nine comparison groups resulted.

Brunkan and Shen found that a relationship existed between quality and rate of reading and one's self-description. Significant interactions on five of the variables indicated that both rate and

quality must be considered. Variables without interaction effects indicated twice as many significant differences due to rate than due to quality. When considering the results according to the following subgroups, certain characteristics emerged:

High-rate efficient readers were:

High on: self-confidence, dominance, exhibition, autonomy, and SAT Verbal.

Low on: succorance, abasement, deference, and counseling readiness.

High-rate effective readers were:

High on: self-confidence, autonomy, dominance, exhibition, and SAT Verbal.

Low on: heterosexuality, abasement, succorance, deference, and counseling readiness.

Ineffective low-rate readers were:

High on: heterosexuality, deference, abasement, and succorance.

Low on: self-confidence, dominance, autonomy, and SAT Verbal.

The ineffective low-rate readers portrayed the poorest personality patterns for success in school. Their scores indicated they were passive, dependent, seeking reassurance, lacking leadership, and lower in general ability as measured by the SAT. In conclusion, the authors felt their research generally supported the Joseph and McDonald study because a relationship was found between personality characteristics and reading characteristics. In addition, their study identified desirable traits in good readers as well as indicating less-desirable characteristics of poor readers. "Thus not only were the

results of previous studies reaffirmed but also a broader range of personality and reader characteristics were investigated and described" (Brunkan & Shen, 1966, p. 842).

Raygor and Wark (1964) examined poor readers' personalities and the difference between typical poor readers and typical normal students in a college sample. Their personality measure was the Minnesota Multiphasic Personality Inventory (MMPI), a test developed to aid in diagnosing psychiatric patients.

The comparison groups comprised 151 male and 67 female students who voluntarily sought aid and remained in the program at the Reading and Study Skills Center at the University of Minnesota and for whom MMPI scores were available, and a random sample of 608 males and 508 females drawn from all entering freshmen in the College of Science, Literature and Arts (SLA), to whom the MMPI was administered as a routine part of registration. The Center sample represented the poor readers, and the SLA sample represented the normal readers.

An average score on each of the scales was computed for each of the groups, and a t-test of the differences was conducted. The data were analyzed by looking at the specific scales that were significantly different across sex, and also by using the high-point code, which groups profiles according to the three highest scale scores above 55. Students having similar profiles have common adjustment problems.

The results of the Raygor and Wark study indicated that the Center-sample males had a high-point code of 7, 4, and 8. A code of this kind indicates a person lacks skill with the opposite sex, has

conflicts at home, is nonverbal, complains of insomnia, and has poor rapport with counselors. The SLA-sample males had a high-point code of 5, 8, and 9, which indicates conflicts with mother, complaints of insomnia, and poor rapport with counselors. The only apparent difference on high-point comparison was that the poor-reading males in the Center sample had fewer social skills with girls and were less verbal.

On individual scales on which the difference between the two groups of males was significant, the poor readers complained more about health and general physical condition, tended to be more immature, and had a greater need for social acceptance. They also seemed somewhat more depressed, more irresponsible, and more shy and withdrawn than the SLA sample.

Among females, there were no scores over 55 for the SLA sample and only one scale score over 55 for the Center sample; hence there was no high-point coding. When individual scales were compared, Center females and SLA females were significantly different from each other on three of them. Surprisingly, the poor-reading females tended to be emotionally healthier than the females in the normal sample. Poor-reading females were less depressed, less withdrawn and introverted, and slightly less anxious, tense, and uncomfortable.

Raygor and Wark concluded that there were small but statistically reliable differences between the students in the two samples. They pointed out, though, that the differences might be interpreted as distinctions between the personalities of volunteers and nonvolunteers rather than between good and poor readers, as the Center students were

volunteers. The investigators anticipated that the results were generalizable because other reading groups could be expected to contain students who are shy and withdrawn.

Anderson (1961) investigated the possibility of a relationship between the subscale measures of the Cooperative Reading Test (Higher Level Form Y) and the personality factors of the Cattell 16 Personality Factor Test (Form A). His sample comprised 290 males with a mean age of 18.0 years and 125 females with a mean age of 17.8 years. All subjects were freshmen admitted to the University of Western Australia. The mean intelligence of the group was 126, standard deviation 7, as measured by the ACER B-40 Intelligence Test.

In correlations obtained for the males, females, and combined group, certain factors showed a consistent relationship with reading subscales and with Total Reading Score. These factors were intelligence, conscientiousness, sensitivity, introversion, radicalism, and self-sufficiency. Anderson described those who scored high on the reading test as more intelligent, less conscientious and persevering, more sensitive, more introverted, more radical, and more self-sufficient than those who scored low on the test.

Lockhart and Menary (1978) used Cattell's 16 Personality Factor Test to study the relationship between personality traits and reading scores of a community college population. They administered the Nelson-Denny Reading Test (Form D) to 150 students in logic and psychology classes in the community college. Thirteen top readers were selected for comparison with 13 students selected from a reading and

study-skills class. Nine readers from the logic and psychology classes roughly approximated the scores of the study-skills group and were included in the low-scoring reading group, and nine more top readers were selected for the high-scoring reading group. The total size of the group was 44; coincidentally, the sample contained 22 males and 22 females.

Rank-order correlations were computed, and comparisons were carried out between sexually homogeneous groups. Good-reading males tended to be higher on B, intelligence; lower on G, less conscientious; lower on Q_1 , less insecure; higher on Q_2 , self-sufficiency; and higher on Q_4 , more tense and withdrawn, than the poorer-reading males. Significant correlations with Total Reading Score on the Nelson-Denny for the male group were with A- (.05), B+ (.01), and Q_2+ (.05).

Good-reading females tended to be lower on A, more reserved; higher on C, more stable; lower on E, more dependent; lower on F, more serious; lower on G, less conscientious; higher on L, more suspicious; lower on O, less insecure; higher on Q_1 , more experimental; higher on Q_2 , more self-sufficient; higher on Q_3 , more lax; and lower on Q_4 , more relaxed and composed, than their poorer-reading counterparts. Significant correlations with Total Reading Score on the Nelson-Denny for the female group were with M (.01), O- (.05), and Q_4- (.05).

An interesting finding of the Lockhart and Menary study was that differences in personality scores existed between poorer readers who sought help at a reading center and poorer readers of similar abilities who did not seek help at such a center. Among males, poorer

readers in the general population were more happy-go-lucky, more group dependent, less exacting, and more lax than those in the study-skills class. The poorer-reading females from the general population seemed to be more intelligent, more cheerful, less conscientious, and more socially naive than females in the study-skills class.

In this pilot study, Lockhart and Menary sought to determine whether Cattell's 16 PF could differentiate profiles of community college students. Because the number of subjects was small, direction of difference rather than magnitude or significance of difference between groups was reported.

In a second study, Menary and Lockhart (1979) increased the size of their sample, hoping to strengthen their original findings. They also included a measure of pathology by using Cattell's Clinical Analysis Questionnaire (CAQ), which retains the 16 personality factors and adds 12 pathology scales.

The sample was again obtained by administering the Nelson-Denny Reading Test (Form D) to students enrolled in logic, psychology, and reading classes at a midwestern community college. The students were grouped according to the scores they obtained on the Nelson-Denny. The personality scores for the respective groups were tabulated and averaged; no attempt was made to correlate the results. A trait was deemed significant if the between-group score was a sten or better.

Comparison of the results of this study with those of the first study indicated that the good reader had been profiled remarkably well; ten scales for the males remained the same and eight scales for the

females remained the same. In addition, scales that changed, altered in the direction of expectancy stated in the first study; only the B scale for the males shifted in the opposite direction.

On the other hand, the profile of poorer readers did not fare as well. The profile of the poorer male reader exhibited shifts opposite to expectations on Scales H, O, and Q_4 ; eight scales remained the same and five changed in the direction of expectancy. Among the female poorer readers, five scales shifted in the opposite direction (A, C, F, Q_3 , and Q_4), whereas seven remained the same and three changed in direction of expectancy.

The investigators found the better male readers were lower on A, reserved versus warm; higher on B, intelligence; higher on E, assertive versus dependent; lower on F, introspective versus happy-go-lucky; lower on G, self-indulgent versus conscientious; higher on Q_1 , experimental versus conservative; higher on Q_2 , self-sufficient versus group dependent; higher on D_3 , excitement seeking; higher on D_2 , avoids involvement with people; and higher on Pd, had complacent attitude toward self or others' anti-social behavior, than were the poorer male readers. Significant differences (by the authors' definition of a sten score or better) between the better and poorer male readers were as follows: Better readers scored significantly higher on B, Q_1 , Q_2 , D_3 , and Pd. Poorer male readers scored significantly higher on F, happy-go-lucky versus serious; D_4 , tense and easily upset; D_6 , feelings of guilt; and As, repetitive ideas and impulse to do certain acts.

Good female readers had a personality profile that was higher on B, intelligence; E, assertive versus dependent; F, happy-go-lucky versus introspective; H, adventurous versus shy; I, imaginative versus practical; L, suspicious versus trusting; M, unconventional versus conventional; Q₁, experimental versus conservative; and B₂, self-sufficient versus group dependent, than that of the poor-reading female. The good-reading females were profiled lower on N, socially climbing versus socially aware; O, secure versus insecure; and Pd, has complacent attitudes toward one another' anti-social behavior, than were the poor-reading females in the study.

Significant differences between the good-reading female and her poorer-reading counterpart were as follows: Better readers scored significantly higher on B, F, I, M, Q₁, Q₂, and Pd, whereas poorer female readers scored significantly higher on O, insecure and worrying; D₄, tense and easily upset; D₆, feelings of guilt; Pa, persecution; and As, repetitive ideas and impulses.

The authors concluded that the CAQ did distinguish between the better and poorer readers of the study and that extending the scales of a previous study resulted in a strong set of discriminating scales.

The studies conducted at the college level reflected some of the effects of replication of design or device. Brunkan and Shen, for example, extended Joseph and McDonald's findings. The results of the studies using Cattell's 16 PF were almost identical, even though one of the studies was conducted in Australia at an earlier time. According to these studies, the good reader is more intelligent, autonomous,

self-confident, and free thinking than his poorer-reading counterpart. The poor reader is more passive, abased and deferential, has fewer verbal skills, and is depressed and withdrawn.

The negativism and impulsiveness that were evident among the poorer readers at the elementary-school level seem also to be present among the older poorer readers. The aggressiveness may simply be of a different nature, disguised in the measured passivity of the poorer reader who disregards the advice of others and has poor rapport with counselors.

The Relationship Between Reading Achievement and Wechsler Intelligence Test Subscale Patterns

The subtest patterns of the Wechsler Intelligence Test have been used for diagnostic purposes almost as long as the scales themselves have been in existence. Zimmerman and Woo-Sam (1973) stated,

Wechsler himself (1958) while warning of the unreliability of the individual subtests (a point basic to profile analysis), notes that the qualitative data to be obtained, even though largely inferential, is actually the essence of a good test. (p. 16)

In the area of reading, many individuals have attempted to use the "essence of a good test" to develop profiles for predicting reading ability or for identifying retarded readers based on pattern analysis. Ekwall (1966) reported that in the 20 years preceding his study more than 19 statistical studies "reported on the relation of distinctive subtest patterns to reading retardation" (p. 2).

Spache (1976) provided a table summarizing the patterns of WISC subtest scores of poor readers, as found in 26 research studies. (See Table 1.) He pointed out that although the methods various researchers

Table 1.--Patterns of WISC subtest scores among poor readers.

Study	Info.	Comp.	Arith.	Simil.	Digit Span	Vocab.	Picture Compl.	Block Design	Picture Arr.	Object Assembly	Coding
Graham	L ^a	H ^b	L	H	L	L	H	L		H	L
Burks & Bruce	L	H	L					H	H		L
Altus ^c	L		L							H	L
Richardson ^c	L		L			L	H		H	H	L
Spache		H	L	H			H		H	H	L
Hirst			L		L		H		H		L
Neville	L		L		L			H	H		L
Kallos	L		L					H			L
Dockrell	L		L				H	H	H		L
Patterac			L	H			H				L
McDonald ^d	L	H	L		L	L	H	H	H	H	L
Robeck	L	H	L	H	L	H	H	H			L
Coleman & Rasof		H						H			L
McLean ^d	L		L		L		H				L
McLeod	L		L		L	L	H				L
Muir ^d	L	H	L			L	H	H		H	L
Reid & Schoer			L	L	L		H				L
Richardson ^d	L		L		L		H		H	H	L
Sheldond	L		L				H			H	L
De Bruler			L					H			L
Dudek & Lester	L		L		L						L
Huelsman	L		L								L
Lewis	L	L	L	L	L	L					L
Beck		H	L	H	L	H	H				L
Corwin	L		L		L						L
Schiffman	L		L		L						L

Source: George Spache, Investigating the Issues of Reading Disabilities (Boston: Allyn and Bacon, 1976).^aPoor readers significantly lower than good readers.^bPoor readers significantly higher than good readers.^cAs cited by Neville.^dAs cited by Farr.

used to identify patterns of poor readers differed greatly, there was considerable agreement in the patterns themselves.

Of the 26 studies summarized in the table, 19 found poor readers scored low on the Information subtests of the WISC. Nine studies reported poor readers scored high on the Comprehension subtest, whereas one reported they scored low. Twenty-five studies reported poor readers scored low on the Arithmetic subtest, and only one found no difference. Few and mixed results were reported for the Similarities subtest; only seven studies reported significant differences, with five showing the good reader doing well and two reporting the poor readers scoring high on the subtest. Fourteen studies reported low scores on Digit Span. Only eight studies reported differences on the Vocabulary subtest; surprisingly, two of those reported the poor readers did better than good readers on this subtest.

Fifteen studies reported the poor reader scored high on the Picture Completion subtest. Nine studies indicated higher scores on Block Design, whereas one study reported low performance on this subtest. Poor readers did well on Picture Arrangement in nine studies. On Object Assembly, seven studies reported that poor readers scored high. Finally, 20 studies reported that poor readers did poorly on Coding.

Converting the foregoing information into simple percentages and arranging the results according to the percentage of studies indicating scale differences, it was found that poor readers scored higher than good readers on Picture Completion in 57% of the studies,

on Comprehension in 34%, on Block Design in 34%, on Picture Arrangement in 34%, on Object Assembly in 26%, on Similarities in 19%, and on Vocabulary in 7% of the studies. The poor readers scored lower than good readers on Arithmetic in 96% of the studies, on Coding in 76%, on Information in 73%, on Digit Span in 53%, on Vocabulary in 23%, on Similarities in 7%, and on Comprehension and Block Design in 3% of the studies.

Viewed in this light, 50% or more agreement among investigators occurred on only five scales. These scales, in order of magnitude of agreement, were Arithmetic (96%), Coding (76%), Information (73%), Picture Completion (57%), and Digit Span (53%). The low scores came on the verbal portion of the test: Arithmetic, Information, and Digit Span. The high scores on the performance portion of the test were in Picture Completion, the low in Coding. Seemingly better scores by poorer readers on the performance section of the test have led some researchers to believe that higher performance scores are indicative of the poorer reader. According to Newland and Smith (1967), for a difference to be significant at the .05 level between Verbal and Performance IQs, a 15-point difference must occur, and to reach the .01 level of confidence there must be a 20-point gap in obtained scores.

On the whole, the methodologies that have been used to compare WISC IQs and subtest patterns to reading level have varied considerably from one study to another. Spache (1976) pointed out that

bases of these comparisons vary from one writer to another: some comparing mean scores of matched or unmatched groups; some allowing for the probable error of the estimate, while others ignore these; some considering almost any variation among subtest scores as

significant, while others compared each pupil's subtest score with his own average as a correction. (p. 140)

Differences occur regardless of methodology. But what is a significant difference, and if a significant difference occurs what does it mean?

Newland and Smith (1967) attempted to answer the question concerning significant differences between subtest scores on the Wechsler tests. Using the properties of a normal distribution curve and the basic reliability data from the Wechsler manuals, the authors computed the magnitudes of the differences between subtest scores needed for the .05 and .01 levels of significance. They presented tables for test-score differences necessary for significance at the .05 and .01 levels for the WISC and the WAIS. Newland and Smith also presented in tabular form median differences within six age groups, and within and between the verbal and performance subdivisions of the WISC and WAIS. The authors indicated that larger differences on the WISC were necessary at younger age levels because of the problem of reliability in testing younger children. One can only wonder what results would have been reported among the WISC studies had similar methodologies and statistical-significance tables have been used.

Now that the magnitude needed for significance is known, the question of the meaning of the difference must be addressed. Cohen (1957) conducted a factor-analytic study of the WAIS on a normal population over a wide age range. The groups studied were ages 18-19 (N = 200), 25-34 (N = 300), 45-54 (N = 300), and 60-75+ (N = 352). Cohen found that the same factors operated over the entire age range

and were the ones identified for clinical populations on the Wechsler-Bellavue.

The major factors were A. Verbal Comprehension, B. Perceptual Organization, and C. Memory. Two minor factors were also found: Factor D, a Picture Completion specific found in all four age groups, and Factor E, a Digit Symbol specific absent only in the oldest group.

The subtests that measure Factor A. Verbal Comprehension are Information, Comprehension, Similarities, and Vocabulary. The subtests that constitute Factor B. Perceptual Organization are Block Design, Object Assembly, and Picture Arrangement. Factor C. Memory includes Arithmetic and Digit Span. Factor D is unequally Picture Completion, and Factor E. is unequally Digit Symbol.

A result of Cohen's study is that the meaning of what the same T-scales measure is imparted to the user. This gives some rationale upon which clinical decisions and interpretation can be based.

McDonald (1964) incorporated both the magnitude for statistical significance and a meaning of the results based on factorial studies in his investigation of intellectual characteristics of older disabled readers. He studied disabled readers at the high school and college levels because virtually all previous studies had involved the WISC and younger readers. He randomly selected a group of 60 disabled readers from files on adolescents referred to the Marquette University Reading Clinic. The age range was 16.1 to 19.4 years. All subjects were male; therefore, sex was eliminated as a variable. Reading was assessed by various instruments; most commonly used were the Durrell Analysis of

Reading Difficulties, the Oral Word Attack section of the DRT, and the Gates Analysis of Reading Difficulty. McDonald wrote,

To minimize flaws arising from varying intercorrelations and reliabilities among the subtests of the WAIS, each subtest score was compared only with the mean subtest score within the same scale and by employing a value to be considered indicative of a significant deviation which was greater than the standard deviations of the subtests. (p. 98)

The findings indicated that the study group had verbal IQs of 95.8, Performance IQs of 105.3, and Full Scale IQs of 99.8. The 9.5-point difference between Verbal and Performance IQ was statistically significant, according to McDonald. The significant differences in subtest scores showed plus deviations for disabled readers on the Comprehension, Picture Completion, Picture Assembly, Block Design, and Object Assembly subtests. Minus deviations occurred on the Information, Arithmetic, Digit Span, and Digit Symbol subtests.

McDonald compared these findings to similar findings from other WISC studies and analyzed the results in light of Cohen's factor analysis. He stated, "The disabled readers in this group performed most poorly on subtests reflecting concentration and attention" (p. 100). Cohen had suggested that these subtests are a measure of the person's "freedom from distractibility." By relating his significant factors to suggestions of what the scale measures, McDonald indicated that results of WAIS patterns could be useful to the reading instructor if he uses patterning as "suggestive" only and weighs it against all the available evidence.

Spache (1975) reported that Belmont and Birch criticized pattern analysis because it is

based on clinical populations rather than on a true sample of the entire population, for use of groups not homogeneous in age or sex; and in the comparison of good and poor readers, for selection of cases from different schools, different social classes and different ages. . . . [Bijou] considers pattern analysis useful only in the comparison of equated groups. (p. 143)

Nevertheless, pattern analysis can aid the clinician or reading instructor in weighing the strengths and weaknesses of a student and in deciding upon a course of remediation. But as the preceding discussion has shown, many factors need to be explored before the WISC or WAIS can or should be used independently in determining types of reading disabilities or remedial treatments.

Summary

This chapter contained a review of related literature on the relationship between reading and personality and between reading and subscale patterns on the WISC and WAIS scales. The methodology of the study, including sample selection, instrumentation, the design, and hypotheses tested, is discussed in Chapter III.

CHAPTER III

METHODOLOGY OF THE STUDY

Introduction

This chapter describes the methodology employed in conducting the study, which replicates and extends the procedures used in the Lockhart and Menary (1979, 1980) studies on personality and reading achievement at the community college level. The current study extends their work by including individualized intelligence measures and a more sophisticated statistical design.

Population

The community college district from which the sample was drawn consists mainly of white middle- and working-class families. Many heads of households are managers or skilled workers whose income places them economically in the middle class. The sample reflects the nature of the college district. The sample was totally Caucasian; 44% came from homes of professionals, i.e., engineers, pharmacists, teachers, bank managers, and funeral directors; 10% from homes of professional sales people; and 34% from homes of highly skilled workers, i.e., aircraft mechanics, foremen, and office managers. Only 8% came from homes of unskilled workers, whereas 3% did not indicate any parental occupation.

The subjects for the study were drawn from introductory psychology, human relations, introductory and advanced logic, and reading and study skills classes. Although a cross-section of the student population was desired, it might not have been obtained voluntarily. Sample selection relied on both the willingness of the instructor to allow his classes to participate in the study and the issuance of extra credit to students who would take part in the study. An effort was made to include night-class students in the study so that the large night-school enrollment of the community college would be represented. That this effort was successful is reflected in the average age of the sample: 24.56 years. Males in the sample averaged 23.67 years, whereas females averaged 25.12 years of age.

One way the investigator had hoped to control the distribution of the population was to select classes that had high enrollments year after year, and were applicable to the requirements for all degrees offered by the college. Psychology and logic classes met both of these criteria. On the other hand, the reading classes were selected so as to tap those students who felt they needed help with reading and study habits. Their representation contributed to the inclusion of a cross-section of reading levels appropriate to an open door community college. Thus, although the writer believes the sample reflects the population from which it was drawn, there were definite deficiencies in the manner of sample selection, on which the study can be criticized. The final configuration of the sample was 127 subjects, 49 males and 78 females.

Instrumentation

The tests used in this study were selected because of their applicability to the research conducted by Lockhart and Menary using the Nelson-Denny Reading Test, Cattell's 16 Personality Factor Test, and Cattell's Clinical Analysis Questionnaire (CAQ). The Wechsler Adult Intelligence Scale (WAIS) was included to control for intelligence and to examine the WAIS subscales among and between groups of college students with differing reading achievement.

The reliability coefficients of the instruments as reported are more than adequate for an exploratory study. The Examiner's Manual for the Nelson-Denny Reading Test contains tables of reliabilities for individual grade levels 9 through 16. (See Appendix for a copy of the table.)

The reliabilities were derived by the split-halves technique, and the authors of the manual related that the technique is more suitable for power tests than for the Nelson-Denny, on which speed plays an important role. They went on to state that the approach tends to err on the high side, resulting in a substantial overestimate of reliability. But on the Comprehension Tests, because of the smaller number of items, some believe that the split-halves approach tends to underestimate reliability. In any event, the reliabilities seem more than adequate for the purpose as stated (p. 29).

The Nelson-Denny provides a measure of reading ability on three individual scales and on one combined scale; a separate score is available for vocabulary, comprehension, and rate. The total reading score

is a derived score of vocabulary plus a double comprehension score. The total score is the best indicator of reading ability when using the Nelson-Denny and was the principal measure used in the present study.

The vocabulary section contains 100 multiple-choice items. An example of one of the items contained in the practice exercises is "A chef makes (a) bricks, (b) dishes, (c) clothes, (d) food, (e) statues." Students have ten minutes to work on the vocabulary section of the test.

The comprehension portion of the test contains 36 questions, based on eight reading selections. The first selection is a long passage and is the one on which the reading rate is measured. The reading rate makes up the first minute of the second part of the test; then the student has 19 minutes to complete the comprehension section.

Total administration time of the Nelson-Denny Test is 30 minutes. A group can easily be tested in one 50-minute class period. The test is widely used for screening purposes.

The Clinical Analysis Questionnaire (CAQ) was used to obtain the personality profiles of the readers in the study. According to the CAQ manual, the reliabilities were calculated as test-retest coefficients. The median test-retest coefficient on all 28 scales was reported as .73, the lowest coefficient being the N scale at .51 and the highest the 5c scale at .90. The clinical scales are somewhat more reliable (test-retest .80) than the normal personality scales (p. 27).

The CAQ measures 28 primary traits on two scales, the normal personality scale and the clinical scale. The normal personality scale consists of 16 factors with high score meaning as follows:

Factor

A. Warmth	L. Suspiciousness
B. Intelligence	M. Imagination
C. Emotional Stability	N. Shrewdness
E. Dominance	O. Insecurity
F. Impulsivity	Q ₁ . Radicalism
G. Conformity	Q ₂ . Self-sufficiency
H. Boldness	Q ₃ . Self-discipline
I. Sensitivity	Q ₄ . Tension

The clinical scale consists of 12 factors with high score meanings as follows:

Factor

D ₁ . Hypochondriasis	D ₇ . Boredom and withdrawal
D ₂ . Suicidal Depression	Pa. Paranoia
D ₃ . Agitation	Pp. Psychopathic Deviation
D ₄ . Anxious Depression	Sc. Schizophrenia
D ₅ . Low Energy Depression	As. Psychosthenia
D ₆ . Guilt and Resentment	Ps. Psychological Inadequacy

Second-order factors can also be calculated by combining certain primary scales if it is desirable to do so.

The CAQ contains 272 items; 128 items measure the normal personality traits, and 144 items measure the clinical traits. It is easily administered in a group setting and requires only about two hours to administer. Parts I and II can be administered in different sittings. The manual reports that the test requires only a reading level of grade 6-7, which means remedial secondary and college populations can take the test without special accommodation. The test is not

a forced-choice instrument; rather, each of the CAQ items has three choices with an uncertain or in-between category that the examinee can select.

The Wechsler Adult Intelligence Scale (WAIS) was employed to measure and control for IQ. It is widely used in clinical settings and in psychological research. The test was designed specifically for administration to individuals 16 years of age and above. It must be administered by an examiner trained in the administration and interpretation of the test. The reliability as reported in the WAIS Manual (1957) was based on the split-half technique for three age groups: 18-19, 25-34, and 45-54 years of age. Reliability coefficients were computed for Full Scale IQ (FIQ), Verbal IQ (VIQ), and Performance IQ (PIQ) for each age group. The reliability coefficient for the FIQ was .97 for each age group; for the VIQ a reliability of .96 for each age group was obtained; and for the PIQ a reliability of .93 was obtained for the 18-19 and 25-34 age groups, and a reliability of .94 was computed for the 45-54 age category. Individual subtest reliabilities ranged from .65 on Object Assembly to .94 on Vocabulary. Thus caution must be employed when making judgments concerning scores on a subscale or differences between subscale scores. Newland and Smith's (1967) tables of significant differences among subscale scores should be considered when interpreting differences.

Administration of the WAIS generally takes between one and one and a half hours, depending on the skill of the examiner and the examinee. Testing with the WAIS requires a well-lighted room free from

intrusions and noise, with enough space for the tester to be comfortable when manipulating the materials.

The WAIS contains a Verbal scale with six subtests and a Performance scale with five subtests. Separate IQs can be computed for each scale. The Full Scale IQ is the sum of the Verbal and Performance scores. The Verbal scale consists of the following subtests:

Information: This subtest contains 29 items and is designed to measure general information the subject has accumulated. Possibly long-term memory, reading habits, awareness about or interest in events, and interest areas are being measured. Performance on the scale is greatly affected by the subject's age. High scores are characteristic of college-level or gifted high school students. Low scores can result from cultural bias and anxiety, as well as a nonachievement orientation (Zimmerman & Woo-Sam, 1973).

Comprehension: This subtest contains 14 items and is designed to measure how well the subject can grasp past experiences and apply them to social situations. Many of the questions deal with moral or ethical judgments the subject is asked to make. Formal learning is not as important in this subtest as in the Information subtest. High scores suggest a socially aware individual who can apply reasoning ability and common sense to social situations. Low scores can reflect a lack of verbal ability by those subjects who are concrete in their judgments or have anti-social thought patterns.

Arithmetic: The Arithmetic subtest contains 14 timed items. The subject is not permitted to use pencil and paper but must solve the

problems in his head. Computational level does not exceed the seventh grade. The test measures the cognitive skills involved in solving word problems, as well as memory and concentration. Success indicates a task orientation as well as school learning. Low scores could indicate situational anxiety, carelessness in computation, or simple inability to concentrate on word problems.

Similarities: The Similarities subtest contains 13 items designed to tap a person's ability to classify and abstract. An example of one of the easier questions is "In what way are an orange and a banana alike?" The relationships grow more difficult from the concrete to the more abstract. A high score on the Similarities subtest indicates good abstracting and conceptualizing ability. A low score indicates poor skills in these areas.

Digit Span: This subtest contains 14 items; seven are Digits Forward and seven are Digits Backward. The test measures immediate recall, attention to detail, and freedom from distractibility. The subtest requires that the subject listen to a series of numbers and then repeat them. The items increase from a series of three digits to a series of nine digits in Digits Forward. In Digits Backward the items increase from two to eight digits. High scores indicate good immediate recall of a nonassociative task. Low scores can indicate boredom, distractibility, and poor concentration. On the whole, Digit Span is the poorest measure of intelligence in the WAIS.

Vocabulary: The Vocabulary subtest contains 40 items and is generally accepted as the best single indicator of intelligence. The

test measures a person's ability to use words; therefore, school learning and life experience are both tapped by this subtest. The test is oral, so reading ability may be tapped only by the more difficult items that come later in the test. High scores reflect good verbal comprehension, sophistication, and general intelligence. Low scores indicate low intelligence, cultural deprivation, and/or psychological problems.

The Performance section of the WAIS comprises the following subtests:

Digit Symbol: The Digit Symbol subtest contains 90 items. Subjects must substitute a symbol for a number in the 90 spaces provided. They have 90 seconds to work on this task. Digit Symbol is a measure of hand-eye coordination; another aspect of intelligence that could be measured is memorization under pressure. High scores indicate speed of operation, accuracy, and freedom from distractibility. Low scores could result from poor hand-eye coordination, physical problems, compulsiveness, and left-handedness.

Picture Completion: The Picture Completion subtest contains 21 items designed to test the subject's awareness of common things in the environment. The subject is shown pictures with some significant element missing and is asked to identify that element. Picture Completion is the best measure of intelligence in the Performance section of the WAIS. High scores on Picture Completion indicate an awareness of environmental surroundings, good perception, and a broad base of general information, which knowledge of the surroundings would indicate.

Low scores could indicate poor attention to details, lack of interest in surroundings, and a suspicious nature that insists nothing is missing.

Block Design: The Block Design subtest contains ten items that are designed to measure reasoning ability and hand-eye coordination under time constraints. The subjects are required to look at a design pattern presented in a booklet and to reproduce the design with red and white blocks. Time bonuses are awarded for designs 7 through 10. High scores indicate good analytical reasoning ability of a nonverbal nature. Low scores may reflect a speedy, careless approach, anxiety, and compulsiveness.

Picture Arrangement: The Picture Arrangement subtest contains eight items that are designed to measure a subject's ability to comprehend a story or situation from a group of scrambled clues and to arrange the clues into a whole. Sequential thinking, visual organization, and social knowledge are involved in this subtest. Subjects are presented with cartoon cards in a prescribed scrambled arrangement. The subjects are then asked to put the pictures into a sequence that tells a story. The test is timed, and bonus points are awarded. The subject who is successful on Picture Arrangement pays attention to small details and is logical with good sequencing abilities. Low scores may indicate a lack of attention to details, impulsiveness, and poor social awareness.

Object Assembly: The Object Assembly subtest contains four items and appears to measure visual organization and synthesis of parts

into familiar wholes. Object Assembly is a timed test with bonuses for speedy work; partial points are awarded if time runs out before the subject completes an item. The subject must put together jigsaw puzzles of four cut-up figures presented in a prescribed placement. This subtest can be compared to Block Design as both include perceptual organization and speed as components of the measurement, but the Object Assembly tasks may measure a social-memory component or mental alertness. Object Assembly is the least reliable and poorest measure of intelligence in the WAIS. Success on this subtest calls for perceptual organization and integration of parts into wholes. Low scores may reflect anxiety or poor perceptual skills.

Data Collection

The subjects were tested both in groups and individually. The reading and personality tests were administered in group settings. The WAIS was administered to students individually by one of the two testers trained in administering the WAIS.

To facilitate data collection, cooperating professors assigned the testing sessions as a project for which the students earned a grade. Students received a general explanation of the nature of the study before the testing project. In addition, students received a copy of their scores on each test, and a class session was set aside for an explanation of what the test scores measured. If students had further questions, special office hours were set aside for private consultation.

Each student had to take all three tests to receive credit for the class project. If students objected to taking part in the class endeavor, a related project was provided.

The tests were administered to all students in the cooperating classes, but only Caucasians born in the United States and residing in the district were included in the study sample. Students who did not complete all of the tests or whose WAIS protocols were invalid were not included in the study.

Administration of the WAIS proved the most difficult aspect of the study. Only two examiners were used, to insure tester consistency. Appropriate testing rooms had to be secured for the duration of the data gathering and a flexible schedule worked out to permit adequate blocks of time for testing. Appointments for testing were made at the students' convenience. At the end of a testing day, the examiners consulted one another on scoring-protocol decisions on the Comprehension, Similarities, and Vocabulary subtests to insure consistency in scoring.

Complete test files were obtained on 140 students. One hundred twenty-seven students met the criteria for inclusion in the sample, 49 males and 78 females.

Comparison Groups

Based on the total reading score obtained on the Nelson-Denny Reading Test (Form D), the subjects were divided into a better-reading group (upper 40%) and a poorer-reading group (lower 40%) for comparison of scores obtained on the CAQ and on the WAIS. Two additional

subdivisions were made for intrasexual comparisons. The females were divided into better-reading females and poorer-reading females. Males were divided into better-reading males and poorer-reading males. Total reading score obtained on the Nelson-Denny was compared with scores obtained on the CAQ and the WAIS according to the following groupings:

Total study population (N = 127) total reading x CAQ total reading x WAIS

Female study population (N = 78) total reading x CAQ total reading x WAIS

Male study population (N = 49) total reading x CAQ total reading x WAIS

Better-reading females (N = 32) versus poorer-reading females (N = 32): difference in scores obtained on CAQ and WAIS

Better-reading males (N = 19) versus poorer-reading males (N = 22): difference in scores obtained on CAQ and WAIS

The means and standard deviations for the upper and lower groups of college readers on the Nelson-Denny and the WAIS-FIQ are presented in Table 2 for the combined group, for the males, and for the females.

Table 2.--Means and standard deviations for upper and lower college readers on the Nelson-Denny and the WAIS-FIQ.

	Total Reading Score				WAIS-FIQ			
	Upper		Lower		Upper		Lower	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Combined group	106.60	12.75	48.00	15.47	119.60	7.49	105.26	7.33
Males	109.52	13.82	45.47	16.56	122.42	6.64	106.85	6.53
Females	104.21	11.85	50.87	14.56	117.93	7.55	104.19	7.73

Hypotheses

The following research hypotheses, stated in the null form, were formulated to guide the collection of data in this research:

Hypothesis 1: There will be no statistically significant relationship between group total reading achievement and group achievement on the individual scales of the Clinical Analysis Questionnaire.

Hypothesis 2: There will be no statistically significant relationship between males' total reading achievement and their achievement on the individual scales of the Clinical Analysis Questionnaire.

Hypothesis 3: There will be no statistically significant relationship between females' total reading achievement and their achievement on the individual scales of the Clinical Analysis Questionnaire.

Hypothesis 4: There will be no statistically significant relationship between group total reading achievement and group achievement on the individual subscales of the Wechsler Adult Intelligence Scale.

Hypothesis 5: There will be no statistically significant relationship between males' reading achievement and their achievement on the individual subscales of the Wechsler Adult Intelligence Scale.

Hypothesis 6: There will be no statistically significant relationship between females' reading achievement and their achievement on the individual subscales of the Wechsler Adult Intelligence Scale.

Hypothesis 7: There will be no statistically significant relationship between group reading achievement and group achievement on the individual scales of the Clinical Analysis Questionnaire when the effects of IQ have been controlled.

Hypothesis 8: There will be no statistically significant difference between better-reading males and poorer-reading males on the individual scales of the Clinical Analysis Questionnaire.

Hypothesis 9: There will be no statistically significant difference between better-reading females and poorer-reading females on the individual scales of the Clinical Analysis Questionnaire.

Hypothesis 10: There will be no statistically significant difference between better-reading males and poorer-reading males on the subscales of the Wechsler Adult Intelligence Scale.

Hypothesis 11: There will be no statistically significant difference between better-reading females and poorer-reading females on the subscales of the Wechsler Adult Intelligence Scale.

Hypothesis 12: There will be no statistically significant relationship between the individual scales of the Clinical Analysis Questionnaire and the subscales of the Wechsler Adult Intelligence Scale.

Data Analysis

The Pearson product-moment correlation technique was used to compare total reading scores with measures of personality and intelligence (Hypotheses 1-6 and 12). To compare reading with personality, controlling the effects of intelligence (Hypothesis 7), a partial correlation was employed. Hypotheses 8-11, the intrasexual comparisons, were tested with a two-way analysis of variance.

Summary

The methodology used in the study was described in this chapter. The population comprised students attending a midwestern open door community college. They were predominantly from middle-class homes, were Caucasian, and were Americans by birth.

The instruments used for measuring reading ability, personality traits, and intelligence were described individually. The reliability coefficients of the instruments and their derivation, as well as a description of the individual subscales and what they purport to measure, were included. A description of how the study population was

grouped for comparison and the statistical procedures used to test the hypotheses was also included. Chapter IV contains a presentation and analysis of the data gathered in this study.

CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

The purpose of this study was to analyze the relationships between reading and personality and intelligence scores of selected open door community college students and to explore the development of a personality and achievement profile that will help practitioners assist students in realizing their potential.

The methodology used in collecting and analyzing the data was described in Chapter III. This chapter contains the findings of the statistical analyses of the data as they relate to the hypotheses formulated for the study.

Results of Hypothesis Testing

The data concerning the relationship between total reading achievement and measures of personality and achievement were statistically compared using two-tailed Pearson correlation coefficients. Hypotheses 1 through 6 were tested with this procedures.

Hypothesis I

There will be no statistically significant relationship between group total reading achievement and group scores on the individual scales of the Clinical Analysis Questionnaire.

Slight but statistically significant relationships ($p < .05$) were noted between the total group's reading achievement and the total group's scores on 9 of the 28 personality scales of the CAQ: Dominance, Impulsivity, Imagination, Insecurity, Radicalism, Self-Sufficiency, Intelligence, Agitation, and Psychopathic Deviation. Therefore, Hypothesis 1 was rejected. Table 3 contains the correlation coefficients and the levels of significance for the nine CAQ scales with group total reading.

Table 3.--Correlation of total reading achievement with personality: combined group.

CAQ Scale	Degree of Correlation	p =
(E) Dominance	.269	.002
(F) Impulsivity	.264	.003
(M) Imagination	.274	.002
(O) Insecurity	-.284	.001
(Q ₁) Radicalism	.375	.001
(Q ₂) Self-Sufficiency	.317	.001
(B ₁) Intelligence	.447	.001
(D ₃) Agitation	.180	.043
(P _p) Psychopathic Deviation	.250	.005

Hypothesis 2

There will be no statistically significant relationship between males' total reading achievement and their scores on the individual scales of the Clinical Analysis Questionnaire.

Statistically significant relationships ($p < .05$) were found between males' total reading achievement and their scores on 4 of the

28 CAQ personality scales: Imagination, Radicalism, Self-Sufficiency, and Intelligence. Therefore, Hypothesis 2 was rejected. Table 4 contains the correlation coefficients and levels of significance for these four CAQ scales with males' total reading achievement.

Table 4.--Correlation of total reading achievement with personality: males.

CAQ Scale	Degree of Correlation	p =
(M) Imagination	.409	.003
(Q ₁) Radicalism	.414	.003
(Q ₂) Self-Sufficiency	.409	.003
(B) Intelligence	.428	.002

Hypothesis 3

There will be no statistically significant relationship between females' total reading achievement and their scores on the individual scales of the Clinical Analysis Questionnaire.

Statistically significant relationships ($p < .05$) were found between females' total reading achievement and their scores on 9 of the 28 CAQ personality scales: Dominance, Impulsivity, Shrewdness, Insecurity, Radicalism, Self-Sufficiency, Intelligence, Agitation, and Psychopathic Deviation. Therefore, Hypothesis 3 was rejected. Table 5 contains the correlation coefficients and the level of significance for these nine CAQ scales with females' total reading achievement.

Table 5.--Correlation of total reading achievement with personality:
females.

CAQ Scale	Degree of Correlation	p =
(E) Dominance	.343	.002
(F) Impulsivity	.339	.002
(N) Shrewdness	-.366	.001
(O) Insecurity	-.420	.001
(Q ₁) Radicalism	.355	.001
(Q ₂) Self-Sufficiency	.279	.013
(B) Intelligence	.475	.001
(D ₃) Agitation	.277	.014
(P _p) Psychopathic Deviation	.338	.002

Hypothesis 4

There will be no statistically significant relationship between group total reading achievement and group performance on the individual subscales of the Wechsler Adult Intelligence Scale.

Total group performance on all scales of the WAIS except Digit Symbol correlated significantly ($p < .05$) with group total reading achievement. Therefore, Hypothesis 4 was rejected. Table 6 contains the correlation coefficients and level of significance for group performance on each of the WAIS subscales with group total reading achievement.

Hypothesis 5

There will be no statistically significant relationship between males' reading achievement and their performance on the individual subscales of the Wechsler Adult Intelligence Scale.

Statistically significant relationships ($p < .05$) were found between males' total reading achievement and their performance on 12 of

the 14 WAIS subscales. The only subscales that were not found to be significantly correlated with males' total reading achievement were Digit Symbol and Object Assembly. Therefore, Hypothesis 5 was rejected. Table 7 contains the correlation coefficients and the levels of significance for males' performance on these 12 WAIS subscales with males' total reading achievement.

Table 6.--Correlation of group total reading achievement with WAIS subscales (N = 127).

WAIS Subscale	Degree of Correlation	p =
Full Scale IQ	.724	.001
Verbal IQ	.753	.001
Performance IQ	.466	.001
Information	.653	.001
Comprehension	.498	.001
Arithmetic	.491	.001
Similarities	.481	.001
Digits Forward	.270	.002
Digits Backward	.266	.002
Combined Digits	.338	.001
Vocabulary	.763	.001
Digit Symbol	Not significant	
Picture Completion	.423	.001
Block Design	.350	.001
Picture Arrangement	.396	.001
Object Assembly	.247	.001

Table 7.--Correlation of males' total reading achievement with WAIS subscales (N = 49).

WAIS Subscale	Degree of Correlation	p =
Full Scale IQ	.765	.001
Verbal IQ	.823	.001
Performance IQ	.443	.001
Information	.737	.001
Comprehension	.582	.001
Arithmetic	.564	.001
Similarities	.564	.001
Combined Digits	.288	.045
Vocabulary	.783	.001
Picture Completion	.369	.009
Block Design	.316	.027
Picture Arrangement	.455	.001

Hypothesis 6

There will be no statistically significant relationship between females' reading achievement and their performance on the individual subscales of the Wechsler Adult Intelligence Scale.

Females' performance on all WAIS subscales except Digit Symbol correlated significantly ($p < .05$) with females' total reading achievement. Therefore, Hypothesis 6 was rejected. Table 8 contains the correlation coefficients and the levels of significance for females' performance on each of the WAIS subscales with females' total reading achievement.

Table 8.--Correlation of females' total reading achievement with WAIS subscales (N = 78).

WAIS Subscale	Degree of Correlation	p =
Full Scale IQ	.718	.001
Verbal IQ	.735	.001
Performance IQ	.488	.001
Information	.626	.001
Comprehension	.471	.001
Arithmetic	.495	.001
Similarities	.411	.001
Digits Forward	.286	.011
Digits Backward	.335	.003
Combined Digits	.380	.001
Vocabulary	.762	.001
Digit Symbol	not significant	
Picture Completion	.485	.001
Block Design	.421	.001
Picture Arrangement	.356	.001

Hypothesis 7

There will be no statistically significant relationship between group reading achievement and group scores on the individual scales of the Clinical Analysis Questionnaire when the effects of IQ have been controlled.

Hypothesis 7 was tested using zero-order partial correlations. Slight but statistically significant relationships between group total reading achievement and group scores on the CAQ were noted on 10 of the 28 personality scales before FIQ was controlled and on 8 of the 28 scales after FIQ was controlled.

When the group was divided according to sex, statistically significant relationships were found between males' reading achievement and their scores on 4 of the 28 personality scales before

controlling for FIQ. Slight but significant relationships existed between males' reading achievement and their scores on 5 of the 28 personality scales after the effect of IQ was controlled. In addition, certain CAQ scales that were significantly related to reading achievement for the males before IQ was controlled were not statistically significant after FIQ was controlled. Similar before-and-after scale shifts were noted for the female group. Before IQ was controlled, the females' reading achievement was significantly related to their scores on 12 of the 28 CAQ scales. After controlling for IQ, statistically significant relationships were noted between females reading achievement and their scores on 8 of the 28 CAQ scales. Tables 9 through 11 contain comparisons of the correlation coefficients and the levels of significance obtained for the total group, for males, and for females between total reading achievement and scores on the CAQ personality scales, before and after IQ was controlled.

As shown in Table 9, with FIQ controlled, the factors Emotional Stability and Conformity were slightly but significantly related to group total reading achievement, whereas Warmth, Dominance, Imagination, Self-Sufficiency, and Intelligence were no longer significantly related to reading achievement.

For the male group, control of IQ resulted in the factors Conformity, Shrewdness, Boredom and Withdrawal, and Psychosthenia being significantly related to total reading achievement. Imagination, Self-Sufficiency, and Intelligence were no longer significantly related to

Table 9.--Correlation of group total reading achievement and personality, before and after controlling for IQ (N = 127).

IQ Not Controlled			IQ Controlled		
CAQ Scale	Degree of Corr.	p =	CAQ Scale	Degree of Corr.	p =
(A) Warmth	.166	.032	(C) Emotional Stab.	.147	.050
(E) Dominance	.258	.001	(G) Conformity	.183	.020
(H) Boldness	.146	.001	(H) Boldness	.173	.026
(M) Imagination	.273	.001			
(O) Insecurity	.284	.001	(O) Insecurity	-.278	.035
(Q ₁) Radicalism	.375	.001	(Q ₁) Radicalism	.161	.035
(Q ₂) Self-Sufficiency	.317	.001			
(B) Intelligence	.447	.001			
(D ₃) Agitation	.130	.020	(D ₃) Agitation	.169	.029
(P _p) Psychopathic Dev.	.250	.002	(P _p) Psychopathic Dev.	.256	.002

Table 10.--Correlation of male total reading achievement and personality, before and after controlling for IQ (N = 49).

IQ Not Controlled			IQ Controlled		
CAQ Scale	Degree of Corr.	p =	CAQ Scale	Degree of Corr.	p =
(M) Imagination	.409	.002	(G) Conformity	.318	.014
(Q ₁) Radicalism	.414	.002	(N) Shrewdness	.234	.025
(Q ₂) Self-Sufficiency	.409	.002	(Q ₁) Radicalism	.290	.023
(B) Intelligence	.428	.001	(D ₇) Boredom & Withdrawal	.243	.048
			(A _s) Psychosthenia	.272	.030

Table 11.--Correlation of female total reading achievement and personality, before and after controlling for IQ (N = 78).

IQ Not Controlled			IQ Controlled		
CAQ Scale	Degree of Corr.	p =	CAQ Scale	Degree of Corr.	p =
(E) Dominance	.343	.001	(E) Dominance	.281	.007
(F) Impulsivity	.339	.001	(F) Impulsivity	.256	.012
(H) Boldness	.179	.053			
(M) Imagination	.190	.048			
(N) Shrewdness	-.366	.001	(N) Shrewdness	-.181	.057
(O) Insecurity	-.420	.001	(O) Insecurity	-.359	.001
(Q ₁) Radicalism	.355	.001	(Q ₄) Tension	-.202	.039
(Q ₂) Self-Sufficiency	.279	.007			
(B) Intelligence	.475	.001			
(D ₃) Agitation	.277	.007	(D ₃) Agitation	.203	.038
(D ₇) Boredom & Withdrawal	.207	.034	(P _a) Paranoia	.242	.010
(P _p) Psychopathic Dev.	.338	.001	(P _p) Psychopathic Dev.	.327	.002

reading achievement when IQ was controlled. Only Radicalism remained as statistically significant when IQ was controlled. (See Table 10.)

For the female group, when IQ was controlled, Tension and Paranoia were significantly related to total reading achievement, whereas Boldness, Imagination, Radicalism, Self-Sufficiency, Intelligence, and Boredom and Withdrawal no longer were significantly related to reading achievement. (See Table 11.)

Whether the study population was considered as a combined group or grouped by sex, statistically significant relationships were observed between their reading achievement and their scores on the CAQ personality scales when IQ was controlled or uncontrolled. When IQ was controlled, a slightly different relationship existed between personality and reading achievement; nevertheless, the relationship was statistically significant. Therefore, Hypothesis 7 was rejected.

Statistical comparisons for Hypotheses 8 through 11 were conducted using the analysis of variance technique. Results are reported in the following paragraphs.

Hypothesis 8

There will be no statistically significant difference between better-reading males and poorer-reading males on the individual scales of the Clinical Analysis Questionnaire.

Statistically significant differences ($p < .05$) were found between better-reading and poorer-reading males on four CAQ scales: Imagination, Radicalism, Self-Sufficiency, and Intelligence. Therefore, Hypothesis 8 was rejected. Table 12 shows the mean sten scores for the better-reading and poorer-reading males on the CAQ scales on

which there were significant differences and the levels of significance for each factor.

Table 12.--Mean sten scores and significance levels for better-reading and poorer-reading males on the CAQ.

CAQ Scale	Upper (N=19)	Lower (N=22)	Signif.
	$\bar{X}$ Sten Score	$\bar{X}$ Sten Score	
(M) Imagination	6.263	5.142	.039
(Q ₁) Radicalism	6.789	5.285	.018
(Q ₂) Self-Sufficiency	7.105	5.476	.004
(B) Intelligence	6.578	5.285	.014

Hypothesis 9

There will be no statistically significant difference between better-reading females and poorer-reading females on the individual scales of the Clinical Analysis Questionnaire.

Statistically significant differences ($p < .05$) were found between better-reading and poorer-reading females on nine CAQ scales: Dominance, Impulsivity, Shrewdness, Insecurity, Radicalism, Self-Sufficiency, Intelligence, Agitation, and Psychopathic Deviation. Therefore, Hypothesis 9 was rejected. Table 13 shows the mean sten scores for better-reading and poorer-reading females on these nine CAQ scales and the levels of significance for each factor.

Table 13.--Sten scores and significance levels for better-reading and poorer-reading females on the CAQ.

CAQ Scale	Upper (N=32)	Lower (N=32)	Signif.
	$\bar{X}$ Sten Score	$\bar{X}$ Sten Score	
(E) Dominance	6.281	5.250	.051
(F) Impulsivity	6.343	5.218	.012
(N) Shrewdness	4.375	5.593	.002
(O) Insecurity	4.375	5.593	.011
(Q ₁) Radicalism	6.250	4.687	.003
(Q ₂) Self-Sufficiency	6.281	4.937	.012
(B) Intelligence	6.312	4.812	.0001
(D ₃) Agitation	6.156	4.906	.043
(P _p) Psychopathic Deviation	6.687	5.125	.032

Hypothesis 10

There will be no statistically significant difference between better-reading males and poorer-reading males on the subscales of the Wechsler Adult Intelligence Scale.

Statistically significant differences ($p < .05$) existed between better-reading and poorer-reading males on all of the WAIS subscales except Digit Span and Object Assembly. Therefore, Hypothesis 10 was rejected. Table 14 shows a comparison of the mean scale scores for each group of male readers, the numerical differences between the mean scale scores, and the levels of significance for those differences.

Table 14.--Significant differences between better-reading and poorer-reading males on the WAIS.

WAIS Subscale	Upper (N=19)	Lower (N=22)	Diff.	Signif.
	$\bar{X}$ Scale Score	$\bar{X}$ Scale Score		
FIQ	122.42	106.86	15.56	.0001
VIQ	122.74	104.48	18.26	.0001
PIQ	118.74	108.67	10.07	.0014
Information	13.58	9.57	4.01	.0001
Comprehension	15.43	12.43	3.00	.0002
Arithmetic	13.53	10.19	3.33	.0001
Similarities	14.21	11.67	2.54	.0002
Digit Span	12.47	11.42	1.05	n.s.
Vocabulary	14.26	9.71	4.55	.0001
Digit Symbol	12.21	11.57	0.64	n.s.
Picture Completion	13.37	11.86	1.51	.0170
Block Design	13.90	12.29	1.61	.0521
Picture Arrangement	12.21	9.71	2.50	.0005
Object Assembly	12.47	11.71	0.76	n.s.

Hypothesis 11

There will be no statistically significant difference between better-reading females and poorer-reading females on the subscales of the Wechsler Adult Intelligence Scale.

Statistically significant differences ($p < .05$) were found between better-reading and poorer-reading females on all of the WAIS subscales except Digit Symbol. Therefore, Hypothesis 11 was rejected. Table 15 shows a comparison of the mean scale scores for each group of female readers, the numerical differences between the mean scale scores, and the level of significance for those differences.

Table 15.--Significant differences between better-reading and poorer-reading females on the WAIS.

WAIS Subscale	Upper (N=32)	Lower (N=32)	Diff.	Signif.
	$\bar{X}$ Scale Score	$\bar{X}$ Scale Score		
FIQ	117.94	104.47	13.47	.0001
VIQ	116.34	101.81	14.83	.0001
PIQ	117.31	107.41	9.90	.0001
Information	11.97	8.97	3.00	.0001
Comprehension	14.56	11.72	2.84	.0001
Arithmetic	11.72	8.97	2.75	.0001
Similarities	13.19	11.81	1.38	.0027
Digit Span	12.13	10.65	1.48	.0217
Vocabulary	13.13	9.41	3.72	.0001
Digit Symbol	14.00	13.59	0.41	n.s.
Picture Completion	12.75	10.66	2.09	.0001
Block Design	12.47	10.25	2.22	.0002
Picture Arrangement	10.88	9.72	1.16	.0235
Object Assembly	12.19	10.10	2.09	.0010

Hypothesis 12

There will be no statistically significant relationship between total group scores on the individual scales of the Clinical Analysis Questionnaire and total group scores on the subscales of the Wechsler Adult Intelligence Scale.

Statistically significant relationships ($p < .05$) were found between the total group's scores on the individual scales of the CAQ and the group's scores on the subscales of the WAIS. Tables 16, 17, and 18 contain the correlation coefficients and levels of significance between scores on the CAQ personality scales and scores on the WAIS subscales for the combined group, males, and females, respectively. Only those scales are included on which a statistically significant relationship was found.

Table 16.--Significant relationships between CAQ scales and WAIS subscales for the total group.

CAQ Scale	WAIS Subscale
(A) Warmth	FIQ: $-.191$; $p = .031$ VIQ: $-.171$; $p = .171$ Arithmetic: $-.244$; $p = .006$
(E) Dominance	FIQ: $.271$; $p = .002$ VIQ: $.242$; $p = .006$ PIQ: $.220$; $p = .013$ Information: $.218$; $p = .014$ Comprehension: $.262$; $p = .003$ Vocabulary: $.261$; $p = .003$ Digit Symbol: $.183$; $p = .038$ Picture Completion: $.251$; $p = .004$
(F) Impulsivity	FIQ: $.226$; $p = .010$ VIQ: $.235$; $p = .008$ Information: $.194$; $p = .029$ Comprehension: $.329$; $p = .001$ Vocabulary: $.211$; $p = .017$ Digit Span: $.173$; $p = .038$
(G) Conformity	Digit Symbol: $-.209$; $p = .018$ Picture Completion: $-.246$; $p = .005$ Picture Arrangement: $-.205$; $p = .02$
(H) Boldness	Comprehension: $.232$; $p = .008$
(I) Sensitivity	Digit Symbol: $-.172$; $p = .053$
(M) Imagination	FIQ: $.253$; $p = .004$ VIQ: $.308$; $p = .001$ Information: $.270$; $p = .002$ Comprehension: $.300$; $p = .001$ Arithmetic: $.175$; $p = .049$ Similarities: $.206$; $p = .020$ Vocabulary: $.336$; $p = .001$
(N) Shrewdness	FIQ: $-.218$; $p = .014$ PIQ: $-.244$; $p = .006$ Vocabulary: $-.174$; $p = .050$ Picture Completion: $-.201$; $p = .023$ Block Design: $-.180$; $p = .040$ Picture Arrangement: $-.252$; $p = .004$

Table 16

CAQ

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Table 16.--Continued.

CAQ Scale	WAIS Subscale
(0) Insecurity	Digit Symbol: $-.236$; $p = .008$
(Q ₁) Radicalism	FIQ: $.375$; $p = .001$ VIQ: $.381$; $p = .001$ PIQ: $.278$; $p = .002$ Information: $.364$; $p = .001$ Comprehension: $.254$; $p = .004$ Arithmetic: $.312$; $p = .001$ Similarities: $.229$; $p = .009$ Vocabulary: $.410$; $p = .001$ Block Design: $.257$; $p = .003$ Picture Arrangement: $.174$; $p = .050$ Object Assembly: $.287$; $p = .001$
(Q ₂) Self-Sufficiency	FIQ: $.369$; $p = .001$ VIQ: $.325$; $p = .001$ PIQ: $.301$; $p = .001$ Information: $.288$; $p = .001$ Arithmetic: $.346$; $p = .001$ Digits Forward: $.214$; $p = .015$ Vocabulary: $.383$; $p = .001$ Picture Completion: $.232$; $p = .009$ Block Design: $.280$; $p = .001$ Picture Arrangement: $.225$; $p = .011$ Object Assembly: $.265$; $p = .003$
(Q ₄) Tension	FIQ: $.216$; $p = .015$ VIQ: $.217$; $p = .014$ Information: $.200$; $p = .024$ Comprehension: $.201$; $p = .230$ Arithmetic: $.201$; $p = .024$ Similarities: $.200$; $p = .024$ Vocabulary: $.181$; $p = .041$ Block Design: $.236$; $p = .008$
(B) Intelligence	FIQ: $.570$; $p = .001$ VIQ: $.563$; $p = .001$ PIQ: $.410$; $p = .001$ Information: $.549$; $p = .001$ Comprehension: $.348$; $p = .001$ Arithmetic: $.448$; $p = .001$ Similarities: $.313$; $p = .001$

Table 16.--Continued.

CAQ Scale	WAIS Subscale
(B) Intelligence (cont'd)	Digits Forward: .218; p = .014 Digits Backward: .193; p = .029 Vocabulary: .516; p = .001 Picture Completion: .387; p = .001 Block Design: .337; p = .008 Picture Arrangement: .264; p = .008 Block Assembly: .358; p = .001
(D ₂) Suicidal Depression	Picture Completion: .175; p = .049
(D ₇) Boredom and Withdrawal	Information: .177; p = .046 Vocabulary: .177; p = .046 Block Design: .168; p = .059 Object Assembly: .175; p = .049

Table 16 shows that primarily slight correlations existed between the total group's scores on the CAQ scales and their scores on the WAIS subscales. Some CAQ scales correlated with more than half of the WAIS subscales. Cattell's Intelligence scale correlated moderately with all WAIS scales except Digit Symbol. The Intelligence scale is a power measure and requires logical-reasoning capabilities and some reading ability. Correlations between the Intelligence scale and certain WAIS subscales such as Similarities, Block Design, and Object Assembly could indicate a common factor of logical-reasoning ability. This might help explain why poor readers have mixed results on the Similarities subtest. Those poor readers who have logical-reasoning abilities and who order their thinking in this manner should do well on the subscales demanding logical relationships. It is interesting that

the Intelligence scale correlated with the Arithmetic subscale more highly than it did with PIQ. This lends some support to the suggestion that the Intelligence scale measures a logical-reasoning component of intelligence.

The CAQ scales Radicalism and Self-Sufficiency correlated with 11 WAIS measures. Radicalism correlated most highly with Vocabulary, VIQ, Information, and Arithmetic. This finding fits the description of the Radicalism scale in the Handbook for the 16 PF (1970)--that "[Radicalism +] persons are more well informed, more inclined to experiment with problem solution, less inclined to moralize, less unquestioning about views generally, etc." (p. 104).

Self-Sufficiency correlated most strongly with Vocabulary, FIQ, VIQ, Arithmetic, and PIQ. Again, these findings support the statement in the Handbook for the 16 PF--that "[Self-Sufficiency] is a constant and very significant contributor to scholastic success" (p. 105).

Dominance and Imagination correlated with eight and seven WAIS subscales, respectively. Imagination correlated more strongly with the Vocabulary, VIQ, and Comprehension subscales than did Dominance.

Negative correlations were found between five CAQ scales--Warmth, Sensitivity, Conformity, Shrewdness, and Insecurity--and subscales of the WAIS. Shrewdness was slightly negatively related to seven WAIS subscales; the strongest inverse relationship was with Picture Arrangement. Conformity was negatively related to three performance subscales. The strongest relationship was with Picture Completion.

Tension attained slight but significant relationships with eight WAIS subscales, the strongest of which was with Block Design, a speeded test. Cattell called the Tension scale the "ergic tension factor." High-scoring individuals are tense, frustrated, driven, and overwrought. The CAQ Manual (1980) suggests that higher scores on Tension can be "associated with frustrated motivation" (p. 17). In any event, the relationships were slight and could suggest a curvilinear relationship, such as was suggested for Anxiety.

Of the clinical traits, Suicidal Depression and Boredom and Withdrawal had slightly significant relationships with subscales of the WAIS. The relation of Suicidal Depression with Picture Completion and of Boredom and Withdrawal with Information, Vocabulary, Object Assembly, and Block Design can also be interpreted on an introversion-extraversion continuum. High-scoring individuals would be less apt to interact with other people (CAQ Manual, 1980).

As shown in Table 17, males' scores on the CAQ were correlated with their scores on the WAIS. Scores on 7 of the 16 normal personality scales had statistically significant relationships with scores on the various subscales of the WAIS.

Intelligence correlated with 11 subscales, followed by Self-Sufficiency with eight correlations and Imagination with six correlations. Radicalism and Dominance followed with four and three correlations, respectively, whereas Impulsivity and Boldness correlated with one subscale each.

Table 17.--Significant relationships between CAQ scales and WAIS subscales for males.

CAQ Scale	WAIS Subscale
(E) Dominance	FIQ: .313; p = .028 PIQ: .316; p = .027 Digit Symbol: .287; p = .045
(F) Impulsivity	Digit Symbol: .445; p = .001
(H) Boldness	Comprehension: .293; p = .041
(M) Imagination	FIQ: .363; p = .010 VIQ: .423; p = .002 Information: .431; p = .002 Comprehension: .303; p = .034 Arithmetic: .279; p = .052 Vocabulary: .435; p = .002
(Q ₁) Radicalism	FIQ: .308; p = .031 VIQ: .315; p = .027 Information: .337; p = .018 Vocabulary: .320; p = .025
(Q ₂) Self-Sufficiency	FIQ: .446; p = .001 VIQ: .346; p = .015 PIQ: .418; p = .003 Information: .320; p = .025 Arithmetic: .331; p = .020 Vocabulary: .508; p = .001 Picture Completion: .408; p = .004 Picture Arrangement: .424; p = .002
(B) Intelligence	FIQ: .627; p = .001 VIQ: .588; p = .001 PIQ: .489; p = .001 Information: .576; p = .001 Arithmetic: .569; p = .001 Similarities: .426; p = .002 Vocabulary: .536; p = .001 Picture Completion: .368; p = .009 Block Design: .334; p = .009 Picture Arrangement: .484; p = .002 Object Assembly: .333; p = .019
(D ₁) Hypochondriasis	FIQ: -.301; p = .035 VIQ: -.270; p = .052

Table 17.--Continued.

CAQ Scale	WAIS Subscale
(D ₃) Agitation	Digits Forward: $-.281$; $p = .050$
(D ₄) Anxious Depression	FIQ: $-.332$; $p = .020$ VIQ: $-.308$; $p = .031$ Arithmetic: $-.294$; $p = .040$
(D ₅) Low Energy Depression	Digits Backward: $-.303$; $p = .034$
(D ₇) Boredom and Withdrawal	Digits Backward: $-.380$; $p = .007$
(S _c) Schizophrenia	Digits Backward: $-.283$; $p = .048$
(A _s) Psychosthenia	Digits Backward: $-.306$; $p = .032$

On the clinical scale, males' scores on six scales had statistically significant correlations with their scores on WAIS subscales; all of the correlations were negative. Anxious Depression was negatively correlated with three subscales, whereas Hypochondriasis was correlated negatively with two subscales. The rest of the clinical scales correlated negatively with digit subtests; Low Energy Depression, Boredom and Withdrawal, Schizophrenia, and Psychosthenia correlated with Digits Backward; Agitation correlated negatively with Digits Forward.

It is interesting that Self-Sufficiency correlated more highly with PIQ than it did with VIQ even though Self-Sufficiency was more highly correlated with Vocabulary than with any other subscale. Also, Picture Arrangement correlated more highly with Self-Sufficiency than

with PIQ. When the correlation between Intelligence and Picture Arrangement was considered, the strength of the correlation was greater than that of any of the other performance subscales except PIQ. The strength of the correlation was slightly greater than for Similarities and again suggests that a common element may be present among Similarities and Picture Arrangement; it could be a verbal-reasoning or logical-reasoning element, but it is only suggestive.

Another interesting relationship was the moderate correlation between Impulsivity and the Digit Symbol subscale. The speeded nature of the Digit Symbol test requires both speed and accuracy of response. Impulsivity may include quickness but not necessarily accuracy. A seemingly better description of this scale was contained in the old 16 PF Handbook (1970), in which the general scale high score was entitled Surgency and included as a description "quick and alert" (p. 87). This makes the relationship more understandable.

Considering the CAQ scales that correlated positively or negatively with FIQ, a picture emerges of the male in the study who did well on the WAIS. He was intelligent, self-sufficient, imaginative, and radical or free thinking; exhibited dominance; viewed himself as healthy; and was relatively free of anxious depression.

As shown in Table 18, females' scores on the CAQ were correlated with their scores on the WAIS. Scores on 12 of the 16 normal personality scales had statistically significant relationships with scores on the various subscales of the WAIS.

Table 18.--Significant relationships between CAQ scales and WAIS subscales for females.

CAQ Scale	WAIS Subscale
(A) Warmth	Arithmetic: $-.273$; $p = .015$
(E) Dominance	Comprehension: $.235$; $p = .038$ Vocabulary: $.269$; $p = .017$ Digit Symbol: $.263$; $p = .020$ Picture Completion: $.248$; $p = .028$
(F) Impulsivity	FIQ: $.230$; $p = .042$ VIQ: $.274$; $p = .015$ Comprehension: $.381$; $p = .001$ Vocabulary: $.292$; $p = .009$ Picture Completion: $.263$; $p = .020$
(H) Boldness	Vocabulary: $.231$; $p = .041$
(I) Sensitivity	Arithmetic: $-.221$; $p = .051$ Digit Symbol: $.215$; $p = .058$
(L) Suspiciousness	FIQ: $.242$; $p = .033$ VIQ: $.217$; $p = .055$ Information: $.314$; $p = .005$ Comprehension: $.250$; $p = .027$
(M) Imagination	Comprehension: $.262$; $p = .020$ Vocabulary: $.251$; $p = .026$
(N) Shrewdness	FIQ: $-.345$; $p = .002$ VIQ: $-.310$; $p = .006$ PIQ: $-.283$; $p = .012$ Information: $-.277$; $p = .014$ Comprehension: $-.221$; $p = .052$ Similarities: $-.266$; $p = .018$ Vocabulary: $-.279$; $p = .013$ Picture Completion: $-.295$; $p = .009$ Block Design: $-.244$; $p = .031$ Picture Arrangement: $-.281$; $p = .012$
(O) Insecurity	FIQ: $-.248$; $p = .028$ VIQ: $-.247$; $p = .029$ Information: $-.232$; $p = .041$ Similarities: $-.228$; $p = .045$ Vocabulary: $-.301$; $p = .007$ Digit Symbol: $-.248$; $p = .028$ Picture Completion: $-.253$; $p = .025$

Table 18.--Continued.

CAQ Scale	WAIS Subscale
(Q ₁) Radicalism	FIQ: .406; p = .001 VIQ: .414; p = .001 PIQ: .288; p = .010 Information: .370; p = .001 Comprehension: .281; p = .013 Arithmetic: .378; p = .001 Similarities: .245; p = .030 Vocabulary: .301; p = .007 Block Design: .367; p = .001 Object Assembly: .345; p = .002
(Q ₂) Self-Sufficiency	FIQ: .306; p = .006 VIQ: .282; p = .012 PIQ: .237; p = .036 Information: .233; p = .040 Arithmetic: .317; p = .005 Digits Forward: .252; p = .026 Vocabulary: .297; p = .008 Block Design: .303; p = .007 Object Assembly: .268; p = .017
(B) Intelligence	FIQ: .519; p = .001 VIQ: .530; p = .001 PIQ: .357; p = .001 Information: .513; p = .001 Comprehension: .372; p = .001 Arithmetic: .344; p = .002 Similarities: .219; p = .053 Digits Forward: .246; p = .029 Digits Backward: .216; p = .057 Vocabulary: .489; p = .001 Picture Completion: .377; p = .001 Block Design: .304; p = .007 Object Assembly: .357; p = .001
(D ₂) Suicidal Depression	Block Design: .303; p = .007
(D ₃) Agitation	Similarities: .222; p = .050 Picture Arrangement: .214; p = .059
(D ₄) Anxious Depression	Information: .248; p = .028 Object Assembly: .226; p = .046
(D ₅) Low Energy Depression	Block Design: .251; p = .02 Object Assembly: .276; p = .014

Table 18.--Continued.

CAQ Scale	WAIS Subscale
(D ₇) Boredom and Withdrawal	FIQ: .339; p = .002 VIQ: .311; p = .006 PIQ: .276; p = .014 Information: .321; p = .004 Arithmetic: .321; p = .004 Similarities: .215; p = .058 Digits Forward: .269; p = .017 Vocabulary: .246; p = .030 Block Design: .424; p = .001 Object Assembly: .396; p = .001
(P _a) Paranoia	Block Design: .299; p = .008
(P _d) Psychopathic Deviation	Vocabulary: .274; p = .015
(S _c) Schizophrenia	Block Design: .355; p = .001
(A _s) Psychosthenia	Block Design: .276; p = .014
(P _s) Psychological Inadequacy	Block Design: .220; p = .052 Object Assembly: .249; p = .028

As with the males, Intelligence correlated with the most subscales of the WAIS among the females--13, counting the Digit Span sections separately. Here the comparison of females with the males ends. The females' next four normal CAQ scales that correlated significantly with WAIS subscales were Radicalism (10 subscale correlations), Shrewdness (10 subscale correlations), Self-Sufficiency (9 subscale correlations), and Insecurity (7 subscale correlations). Most of the correlations were slight; a few were moderate. Apart from Intelligence, the strongest correlations for the normal CAQ scales were between Radicalism and the WAIS subscales.

Among the clinical CAQ scales, the females' scores on the CAQ scales were significantly correlated with their scores on 10 of the 12 WAIS subscales. Boredom and Withdrawal was correlated with 10 WAIS subscales; some of the correlations approached moderate strength. Agitation, Anxious Depression, Low Energy Depression, and Psychological Inadequacy correlated with two WAIS subscales each. Apart from Boredom and Withdrawal, most of the correlations between the clinical scales of the CAQ and the WAIS subscales were with performance subscales of the WAIS. Most of these correlations were with Block Design and Object Assembly.

It should be noted that, to be clinically significant, the scales of the CAQ require scores in the 1 to 3 range at the low end and in the 8 to 10 range at the high end (CAQ Manual, 1970, p. 11). Of the females in the study group, only a few had clinically significant scores at either end of the spectrum. In this case the correlations with Boredom and Withdrawal could more accurately mean the sample females tended to be introverted (CAQ Manual, 1970, p. 19).

The interesting aspect of the females' CAQ scores correlating with the WAIS subscales is the number of scales between which correlations existed. The two CAQ scales that were negatively related to a number of WAIS subscales indicated that insecure, socially astute women seemed to do poorly on the WAIS, whereas secure, socially unpretentious women seemed to do better. Taking this analysis a step further, by looking at the CAQ scales that correlated positively or negatively with FIQ, it might be stated that the female in this sample who did well on

the WAIS was intelligent, radical or free thinking, self-sufficient, introverted, socially unpretentious, and self-assured.

Statistically significant relationships existed between subjects' scores on the CAQ and their scores on the WAIS subscales, whether the sample was examined as a combined group or by sex. Therefore, Hypothesis 12 was rejected.

Summary

Hypotheses 1 through 6 were tested using a two-tailed Pearson correlation coefficient procedure. All six null hypotheses were rejected. Statistically significant relationships were found between subjects' total reading achievement and their performance on the CAQ personality scales, and between subjects' total reading achievement and their scores on WAIS subscales. The statistically significant relationships existed when the study population was examined as a total group and when grouped by sex. When subjects were grouped by sex, the relationships between total reading achievement and personality factors were intensified and clarified.

Hypothesis 7 was tested with a zero-order partial correlation technique. The hypothesis was rejected. Statistically significant relationships were found between subjects' total reading achievement and their performance on individual scales of the CAQ when the effects of IQ were controlled. This relationship existed when the study population was combined into a single group and when grouped by sex.

Certain scale shifts were noted in the IQ-controlled condition as compared to the IQ-uncontrolled condition. CAQ scales that were significant in the uncontrolled condition were no longer significant in the controlled situation, but other, less-significant, relationships were found. This shift occurred for the combined group and for both the male and female groups.

Hypotheses 8 through 11 were tested using an analysis of variance technique. Each of these hypotheses was rejected. Statistically significant differences existed between the better-reading and poorer-reading students in terms of their scores on the CAQ scales and their performance on the WAIS subscales. These differences were found for the combined group of better-reading versus poorer-reading subjects, as well as for intrasexual comparisons of better and poorer readers.

Hypothesis 12 was tested using a two-tailed Pearson correlation coefficient. The hypothesis was rejected. Statistically significant relationships existed between subjects' scores on the CAQ personality scales and their performance on the WAIS subtests. These relationships existed when the study population was combined into a single group and when grouped by sex. These relationships were intensified and clarified in the intrasexual comparisons.

Chapter V contains a summary of the findings and recommendations for further research. In addition, the findings of this study are compared with those of previous research.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purpose of this study was to analyze the relationships between reading and personality and intelligence scores of selected open door community college students. The writer also explored the development of a personality and achievement profile for open door community college students that could help clinicians understand the strengths and weaknesses of the students with whom they work. Such a profile would help the practitioner assist students in realizing their potential.

The review of the literature contained findings of research on the relationship between reading achievement and personality factors at the elementary-school, secondary-school, and college levels. Also included was an overview of reading achievement and individualized intelligence measures, especially focused on studies involving the Wechsler scales.

In this study, data were obtained on 127 open door community college students. These students were Caucasian, predominantly middle class, and resided in the college district. The Nelson-Denny Reading Test (Form C) was used to obtain the subjects' total reading scores; the Clinical Analysis Questionnaire (CAQ) and the Wechsler Adult

Intelligence Scale (WAIS) were used to measure personality and intelligence, respectively.

The subjects for the study were categorized into comparison groups according to their total reading achievement on the Nelson-Denny Reading Test. Those obtaining scores one-quarter standard deviation above the mean (approximately the top 40% of the sample) were designated the better-reading students, whereas those scoring one-quarter standard deviation below the mean were designated the poorer-reading students. Intrasex comparisons were made using the same criterion.

Correlations between total reading and the CAQ, and between total reading and WAIS subscale scores, were obtained using a Pearson product-moment correlation. Intragroup comparisons between the better-reading and the poorer-reading students were made using the two-way analysis of variance technique. Other statistical procedures and groupings were used for comparisons with other research.

Conclusions

The following 12 hypotheses were formulated to examine the relationships between reading and personality and reading and WAIS subscale scores:

Hypothesis 1: There will be no statistically significant relationship between group total reading achievement and group scores on the individual scales of the Clinical Analysis Questionnaire.

Hypothesis 2: There will be no statistically significant relationship between males' total reading achievement and their scores on the individual scales of the Clinical Analysis Questionnaire.

Hypothesis 3: There will be no statistically significant relationship between females' total reading achievement and their scores on the individual scales of the Clinical Analysis Questionnaire.

Hypothesis 4: There will be no statistically significant relationship between group total reading achievement and group performance on the individual subscales of the Wechsler Adult Intelligence Scale.

Hypothesis 5: There will be no statistically significant relationship between males' reading achievement and their performance on the individual subscales of the Wechsler Adult Intelligence Scale.

Hypothesis 6: There will be no statistically significant relationship between females' reading achievement and their performance on the individual subscales of the Wechsler Adult Intelligence Scale.

Hypothesis 7: There will be no statistically significant relationship between group reading achievement and group scores on the individual scales of the Clinical Analysis Questionnaire when the effects of IQ have been controlled.

Hypothesis 8: There will be no statistically significant difference between better-reading males and poorer-reading males on the individual scales of the Clinical Analysis Questionnaire.

Hypothesis 9: There will be no statistically significant difference between better-reading females and poorer-reading females on the individual scales of the Clinical Analysis Questionnaire.

Hypothesis 10: There will be no statistically significant difference between better-reading males and poorer-reading males on the subscales of the Wechsler Adult Intelligence Scale.

Hypothesis 11: There will be no statistically significant difference between better-reading females and poorer-reading females on the subscales of the Wechsler Adult Intelligence Scale.

Hypothesis 12: There will be no statistically significant relationship between total group scores on the individual scales of the Clinical Analysis Questionnaire and total group scores on the subscales of the Wechsler Adult Intelligence Scale.

All of the hypotheses were rejected. The correlational data indicated that statistically significant relationships between students' reading achievement and their scores on both the CAQ and the WAIS subscales did exist for this group of open door community college students. These relationships were clarified when the combined group was resolved into female and male groups.

The relationships that were found between total reading achievement and the personality scales of the CAQ for this group of open door community college students are presented below. The trait descriptions are a condensed version of those contained in the Handbook for the 16 PF (1970, pp. 80-109). In the following discussion, the statistically significant personality traits are listed under the better-reader and poorer-reader categories. To possess all the characteristics of a trait, students would have to have a scale score of 10; for the total group, no score of 10 was recorded. Therefore, a scale characteristic of the better or poorer reader was the tendency toward the behavior of a particular personality scale. Because the relationships of the combined group were somewhat weaker than those reported by intrasexual comparison, the characteristics are reported only for males and females.

The statistically significant relationships that existed between males' total reading achievement and personality characteristics are shown in Table 19. The personality variables shown in the table maintained a consistent relationship with total reading achievement of male college readers except when IQ was controlled. With IQ

controlled, only Radicalism remained significant, whereas a set of weaker relationships became evident. It appears the personality variables associated with the better-reading male students had a shared component with Intelligence. Table 17 indicated that the personality variables Imagination, Self-Sufficiency, and Intelligence correlated with the most WAIS subscales. Looking beyond the data, one might speculate that the common factor related to personality and IQ, as measured by these instruments, may be an organizing principle that orders perceptions and catalogues memory. In any event, at the college level, intelligence and personality variables need to be considered in tandem.

Table 19.--Statistically significant relationships between males' total reading achievement and personality characteristics.

Factor	Upper-Reading Male	vs.	Lower-Reading Male
M	Imaginative, unconventional, absent-minded		Practical, conventional, and concerned with the immediate
Q ₁	Experimental, free thinking, analytical		Conservative, respecting established ideas
Q ₂	Self-sufficient, resource-full, prefers own decisions		Group dependent, follower and joiner
B	Higher general mental capacity, fast learning and adaptable		Lower general mental capacity, less able to handle abstract problems

The statistically significant relationships between females' total reading and personality characteristics are shown in Table 20.

Table 20.--Statistically significant relationships between females' total reading achievement and personality characteristics.

Factor	Upper-Reading Female	vs.	Lower-Reading Female
E	Assertive, aggressive, competitive, stubborn		Submissive, dependent, mild, accommodating, easily led
F	Enthusiastic, talkative, quick and alert		Serious, full of cares, slow, and cautious
-N	Socially clumsy, spontaneous, simple tastes, lacks self-insight		Polished, socially aware, artful, insightful, cuts corners
-O	Placid, secure, vigorous, self-confident		Lonely, brooding, self-reproaching, insecure and worrying
Q ₁	Experimental, analytical, and free-thinking		Conservative, respecting established ideas
Q ₂	Self-sufficient, resourceful, prefers own decisions		Group dependent, a joiner and follower
B	High general mental capacity, fast learning and adaptable		Lower general mental capacity, less able to handle abstract problems
D ₃	Seeks excitement, is restless, takes risks, tries new things		
P _p	Complacency from one's or others' anti-social behavior, is not hurt by criticism, enjoys emergencies and quarrels.		

The personality variables shown in Table 20 maintained a consistent relationship with reading achievement of the females in the sample. When IQ was controlled using a zero-order partial correlation, only Radicalism, Self-Sufficiency, and Intelligence ceased being significant, as Self-Sufficiency, Imagination, and Intelligence had done for the males in the study. Again, those scales that ceased being significant had the most significant relationships with the various WAIS subscales.

Comparison of the scores obtained by better and poorer readers on the Wechsler scales in the present study indicated that a rethinking of methodology may be in order. The findings clearly showed that the better-reading college student, whether male or female, scored significantly higher on practically all the WAIS subscales but Digit Symbol. Further, among this sample at least, no useful information was gained by totaling and averaging the scale scores and comparing that mean to each scale score to see whether it was lower or higher than the total mean. The WAIS scale scores for the combined group, males, and females, are shown in Table 21. The scale scores are compared with the means of the scale scores. For the purposes of this study, a difference of one scale score indicates whether the group did better or worse on a particular scale than it did on the test. This will replicate the situation where any variation among subtest scores was considered significant.

From Table 21 it is seen that the poorer readers had some of the reported patterns of PIQ higher than VIQ; Low Information, High

Table 21.--WAIS scale scores for combined group, males, and females.

WAIS Scale	Combined		Males		Females		Poor Readers Vary From Mean On:
	Upper Readers	Lower Readers	Upper Readers	Lower Readers	Upper Readers	Lower Readers	
FIQ	119.61	105.27	122.42	106.86	117.94	104.47	
VIQ	118.73	102.63	122.74	104.48	116.34	101.81	PIQ higher than VIQ
PIQ	117.84	107.87	118.74	108.67	117.31	107.41	
Information	12.58	9.19 L	13.58 S	9.57 L	11.97 S	8.97 L	Low on Information
Comprehension	14.88 H	11.94 H	15.43 H	12.43 H	14.56 H	11.72 H	High on Comprehension
Arithmetic	12.39 S	9.40 L	13.53 S	10.19 S	11.72 S	8.97 L	Mixed 1-S, 2-L
Similarities	13.57 S	11.73 H	14.21 S	11.67 S	13.19 S	11.81 H	Mixed 1-S, 2-H
Digit Span	12.25 S	10.97 S	12.47 S	11.42 S	12.13 S	10.65 S	Same
Vocabulary	13.55 S	9.44 L	14.26 S	9.71 L	13.13 S	9.41 L	Low on Vocabulary
Digit Symbol	13.33 S	12.83 H	12.21 L	11.57 S	14.00 H	13.59 H	2 higher, 1 same
Picture Completion	12.98 S	11.10 S	13.37 S	11.86 S	12.75 S	10.66 S	Same
Block Design	13.00 S	11.10 S	13.90 S	12.29 H	12.47 S	10.25 S	2-same, 1 high
Picture Arrangement	11.37 L	9.67 L	12.21 L	9.71 L	10.88 L	9.72 S	2 low on P.A.
Object Assembly	12.29 S	10.71 S	12.47 S	11.71 S	12.19 S	10.10 S	Same
Mean	12.93	10.74	13.42	11.04	12.63	10.53	

Comprehension, Low Arithmetic (females), High Similarities (females), Low Vocabulary, High Block Design (males), and Low Picture Arrangement (males). Table 21 appears to be similar to the table provided by Spache (1976, p. 139), but it is also evident from Table 21 that better readers scored higher in Comprehension and lower in Picture Arrangement and that, apart from Information and Vocabulary, little additional information can be gained from an analysis of poorer readers' subtest patterns. Even though PIQ was higher than VIQ for the poorer readers, the better-reading females had a PIQ higher than their VIQ. In any event, the 15 points required for significance were not there any more than was the required difference between subtests according to Newland and Smith's (1967) formula.

One fact might be gleaned from this study of a community college sample: The IQ profiles of the better readers were significantly better on those subscales relating to acquired knowledge, interest in the environment, and reasoning than those of their poorer-reading counterparts. Information, Arithmetic, Vocabulary, and Similarities are all skills Cohen (1959) placed in his Verbal Comprehension I component. All are necessary for school achievement, especially at the college level.

It seems unlikely that an IQ profile can be developed for the open door community college as a result of this study. But as a result of this research it can be said that, in community colleges with similar characteristics, poorer readers will have average IQs, with deficits in the language and reasoning areas. In relation to their

better-reading counterparts, poorer readers will have less information to draw on and a poorer vocabulary with which to work. They will also need to learn to reason and calculate.

The personality profile of this population would reflect the sexual differences evident in this study. The better-reading male student would be more intelligent (IQ = 120), more imaginative, and more liberal and experimental in his thinking and would be decisive and resourceful. He would come to college equipped with a good vocabulary and reasoning abilities.

The better-reading female student would be more intelligent (IQ = 115), more assertive and headstrong, more quick and alert, lacking self-insight, secure and self-confident, more liberal and experimental in her thinking, decisive and resourceful, restless and excitement seeking, have complacent attitudes toward anti-social behavior of self or others, and not be hurt by criticism.

Comparison of the Present Study With Other Studies

The present study was not compared with research done at the elementary-school level. Maturational and developmental factors make comparisons between college and elementary-school students tenuous, at best. Therefore, this study was compared only with other research conducted at the college level.

Anderson's (1961) correlational study indicated consistent relationships between reading achievement and personality factors of Intelligence, Conformity, Sensitivity, Imagination, Radicalism, and Self-Sufficiency. Total reading scores of the males were significantly

related to the personality factors of Intelligence, Conformity, Sensitivity, Imagination, Radicalism, and Self-Sufficiency. For the females, Anderson recorded significant relationships between reading achievement and the personality factors of Intelligence and Self-Sufficiency.

In the present study, group reading achievement correlated with the personality factors of Dominance, Impulsivity, Imagination, Insecurity, Radicalism, Self-Sufficiency, Intelligence, Agitation, and Anxious Depression. Anderson did not measure the clinical factors, but among the 16 PFs measured, Intelligence, Imagination, Radicalism, and Self-Sufficiency were in agreement between the two very different populations. In the present study, males' reading achievement correlated with the personality factors of Imagination, Radicalism, Self-Sufficiency, and Intelligence. By contrast, Anderson found relationships between males' reading achievement and the personality factors of Intelligence, Conformity, Sensitivity, Imagination, Radicalism, and Self-Sufficiency. Again there was partial agreement between the two study populations. Intelligence, Imagination, Radicalism, and Self-Sufficiency had statistically significant relationships with reading achievement in both studies. The correlation of females' reading achievement with their personality factors showed little agreement between the two studies. The present study found nine correlations of females' reading achievement with personality factors. Anderson's study listed only two, Intelligence and Self-Sufficiency. Both of these factors were related to reading achievement in the present study,

but 5 of the 16 personality factors found no comparison in the Anderson study.

The Lockhart and Menary (1979) pilot study divided the study group by sex and then used Spearman correlations to detect significant differences. Among males, correlations were found between total reading achievement and the personality factors of Warmth, Intelligence, and Self-Sufficiency. The number of statistically significant relationships reported for this small sample ($N = 22$) differed from those in Anderson's research and in the present study but still included two of the descriptors, Intelligence and Self-Sufficiency. It is interesting that correlations for the better readers in the Lockhart and Menary study were reported in the direction of the correlations in the Anderson study on the factors of Conformity, Sensitivity, and Radicalism, but they never reached significance with reading achievement. In the present study, the same indication existed for the males. The small number of subjects in the pilot study might have resulted in these factors' not reaching statistical significance.

Among the female subjects in Lockhart and Menary's pilot study, statistically significant correlations existed between reading achievement and only two of the 16 PF scales, Imagination and Insecurity. Neither of these factors was found to be significant in the Anderson study, and the present study had only Insecurity in common with the pilot study.

In an unpublished study, Menary and Lockhart enlarged their sample and used the CAQ to measure the personality variables. Although

this was not a correlational study, they held the difference of a sten score to be significant with reading and between high- and low-reading-achievement groups.

Males' total reading achievement was significantly related to the personality scales Intelligence, Radicalism, Self-Sufficiency, Low Energy Depression, Boredom and Withdrawal, and Psychopathic Deviation. The Anderson (1961) study agreed with Intelligence, Radicalism, and Self-Sufficiency among the 16 PF normal scales but did not measure the clinical factors. The current study also agreed with the scales Intelligence, Radicalism, and Self-Sufficiency but did not find the clinical scales Agitation, Boredom and Withdrawal, or Psychopathic Deviation to be significant.

Among the female subjects, the Menary and Lockhart study found total reading achievement related to the personality scales Intelligence, Impulsivity, Sensitivity, Imagination, Shrewdness, Insecurity, Radicalism, Self-Sufficiency, and Psychopathic Deviation. The current study found statistically significant relationships between females' total reading achievement and the CAQ scales Dominance, Impulsivity, Shrewdness, Insecurity, Radicalism, Self-Sufficiency, Intelligence, Agitation, and Psychopathic Deviation--a remarkable fit. The Anderson (1961) study, though, indicated only Intelligence and Self-Sufficiency as significant, whereas in the Lockhart and Menary pilot study, only Imagination, Insecurity, and Tension were found to be significant.

Thus among the studies using the same basic instrument, certain personality scales seemed common. Among the males, these were Intelli-

gence, Radicalism, and Self-Sufficiency. Among the females, they were Intelligence, Self-Sufficiency, Shrewdness, Insecurity, Radicalism, and Psychopathic Deviation. There was much agreement among the samples of community college students. However, had identical statistical tests been employed, greater agreement might have resulted.

Raygor and Wark (1964) found that low-scoring males from the University of Minnesota reading center scored high on MMPI scales 4, 7, and 8. They lacked social skills, were shy and depressed, had vague goals, and were less verbal than the control males. The females in the study were higher on Scale 7 (Psychosthenia) but otherwise were above average on adjustment.

The present study supported Raygor and Wark's findings for males in the areas of being less verbal and more group dependent; otherwise, the poorer-reading male in this study did not resemble his counterpart in the Minnesota group. On the other hand, the present study echoed Raygor and Wark's findings for females; they indicated that poorer-reading females tended to be emotionally healthier than better-reading females. The current study showed the poorer-reading female to be somewhat less secure than her better-reading counterpart. Aside from that, the better-reading female had significant relationships with two clinical scales, Agitation and Psychopathic Deviation, thus resembling the Minnesota women.

Brunken and Shen (1968) found efficient and effective readers to be high on self-confidence, dominance, exhibition, autonomy, and SAT Verbal, whereas the poorer reader exhibited the opposite

characteristics. The present study agreed with the general findings concerning Dominance, Self-Sufficiency, Center of Attention (exhibition?), Autonomy, and Radicalism. This seemed to be quite a good fit. In the current study, though, clarity was added when personality factors were described according to intrasexual comparisons.

From the preceding comparison it is evident that although differences existed among the studies there was also a great deal of agreement. Much of the dissimilarity can be attributed to the differences in methodology, but more discrepancies seemed to exist because of the differing populations being described. The studies conducted on open door community college students, using similar instruments, had similar results.

Certainly, sample size and how the sample is divided both affect the results of a study. Comparing the McDonald study with the follow-up study illustrated this, as did comparing the Lockhart and Menary pilot study with the present study. In both cases, the earlier study indicated differences and direction; the follow-up study added definition.

Discussion and Recommendations

One purpose of this study was to explore the development of a personality and achievement profile for open door community college students that could help clinicians understand the strengths and weaknesses of the students with whom they work. A number of personality factors were found that had significant relationships with

reading achievement and differentiated the upper and lower reading groups. However, an achievement profile that could aid the clinician in developing remedial materials and programs was not discovered. If anything, the findings indicated that, among this group of open door community college students, the poorer-reading group did significantly more poorly on nearly all subscales of the WAIS than did the upper-reading group.

In regard to an achievement profile for the poorer-reading groups, the WAIS subscales that were higher among the poorer readers tended also to be higher among the better readers. Thus, the only thing that can be said concerning achievement on the WAIS subscales is that the poorer readers in this study scored lower than the better readers on most measures and that a deficiency in verbal skills seemed most evident. Scores on Information and Vocabulary were uniformly low among the poorer readers. This finding lends support to Ekwall (1976), whose experience led him to question the worth of IQ testing to discover the reading strengths and weaknesses of poorer readers. He wrote,

The question we must ultimately ask . . . is: Do we get enough worthwhile information to warrant giving the test? This, of course, has to be answered by each diagnostician as he works with students in various testing situations. From personal experience, after administering over 500 WAIS, WISC and S-B tests to children and adults, the author's opinion is that seldom, if ever, is enough information obtained about the way a student worked or about his subtest scores to have justified taking time to give the test. . . . There are short vocabulary tests available that will give you an estimate of the student's word knowledge. And, might it not be better to observe the way the student works and reacts in a reading task than in an intelligence testing situation? (p. 173)

Based on the results of the present study, the writer would have to agree with Ekwall. But at the same time, the open door community college clinician must be aware that the poorer reader tends to score lower on intelligence tests than his better-reading counterpart and will probably need programs that develop his reasoning capabilities and broaden the base of information on which he can draw.

At the same time, programs need to be developed that attend to the reader's personality. This can be accomplished by incorporating counseling programs into reading programs at the open door community colleges. The investigator was involved in a study (Burnside, McHolland, & Menary, 1978) that incorporated the preceding recommendation and attempted to assess the programs of students in structured reading groups with human-potential seminars and of students who worked independently. Students who attended the reading lab were randomly assigned to one of four groups, which were then equated for reading level. One group was assigned to the typical open-lab situation with the traditional material; the second group was assigned to an open lab with motivational material; the third group received motivational materials and a structured study-skills class; and the final group received a human-potential seminar along with a structured study-skills class. In all cases, gains were greater among students who were given the motivational material. The drop-out rate was lower for students in group situations than for those in the open lab situations, and the group with the human-potential seminar had the highest gains and the lowest drop-out rate.

Programs including a counseling component as a regular feature need to be developed, tested, and refined. The findings of this study justify further research into the role that personality plays in interaction with reading achievement. Particular attention should be focused on homogeneous groupings; socioeconomic and racial composition need to be controlled. This study was based on a white, middle-class population; other studies of this nature are needed for community colleges with different populations, e.g., black, Hispanic, or lower socioeconomic levels. In addition, studies attempting to assess the effects of various remedial treatments need to be undertaken so that attention is focused on outcome rather than symptoms.

Based on the findings of the present study, there are some possible implications for counselors, reading clinicians, and instructors at the open door community college.

The counselor should be aware that a low reading score suggests a range of personality factors that may have to be dealt with before reading gains may be accomplished by the student. Male students might need help in becoming more imaginative, free thinking, logical, and able to formulate their own decisions. This could most easily be accomplished if a counseling component was built into the reading center. This component, handled by a trained counselor, could use a group-dynamics or human-potential format based on the poorer reader's personality needs.

The reading clinician, being aware of the personality needs of the student, could develop strategies for using materials that present

subjects in a successful format, as well as materials that enable the student to see and then apply logical outcomes and independent decision making. Development of such materials would offer a challenge to the reading clinician, but the outcome would be worth the effort.

Instructionally, the clinician, aware that the poorer readers may be more conservative and reluctant to question established ideas, would try to develop strategies designed to aid the students in critical reading. On the other hand, the clinician could aid the better readers in test-taking and study skills by moderating or channeling their assertive and aggressive natures toward positive outcomes.

The instructor at the open door community college needs to be involved with the identification and referral of students to the reading clinician or counselor. Low grades and poor writing ability may reflect deficits that could best be corrected in a study-skills and/or clinical setting. Prompt attention might even help in retention of the marginal student.

APPENDIX

NELSON-DENNY TABLE OF RELIABILITIES
FOR GRADES 9-16

Test	WEIGHTED RAW SCORE VALUES			UNWEIGHTED RAW SCORE VALUES		
	Mean	Standard Deviation	Standard Error of Measurement	Mean	Standard Deviation	Reliability Coefficient*
(n = 12453) GRADE 9 (n = 4269)						
Vocabulary	17.04	9.88	3.14	16.86	9.52	.90
Comprehension times two	28.00	11.02	4.92	28.20	10.90	.80
Total (V + 2C)	45.03	18.86	5.85	45.07	18.38	.90
Reading Rate	220.60	107.32	—	—	—	—
(n = 12087) GRADE 10 (n = 4442)						
Vocabulary	20.17	12.47	3.27	20.10	11.70	.93
Comprehension times two	31.12	12.06	5.00	31.46	11.62	.83
Total (V + 2C)	51.30	22.60	6.03	51.56	21.23	.93
Reading Rate	224.08	95.08	—	—	—	—
(n = 10130) GRADE 11 (n = 3589)						
Vocabulary	23.51	14.51	3.29	23.83	13.71	.95
Comprehension times two	34.00	12.38	4.92	23.86	13.86	.84
Total (V + 2C)	57.50	25.03	5.94	57.51	23.81	.94
Reading Rate	234.89	96.70	—	—	—	—
(n = 9518) GRADE 12 (n = 3368)						
Vocabulary	26.61	15.07	3.15	26.57	14.60	.96
Comprehension times two	36.28	12.70	4.98	36.42	12.20	.85
Total (V + 2C)	62.89	25.93	5.84	63.00	24.90	.95
Reading Rate	240.26	94.65	—	—	—	—
(n = 1942) GRADE 13** (n = 1942)						
Vocabulary	34.63	15.92	3.10	34.63	15.92	.96
Comprehension times two	40.74	11.46	4.77	40.74	11.46	.83
Total (V + 2C)	75.38	25.09	5.70	75.38	25.09	.95
Reading Rate	275.02	105.09	—	—	—	—
(n = 687) GRADE 14** (n = 687)						
Vocabulary	41.70	17.49	3.15	41.70	17.49	.97
Comprehension times two	44.14	11.30	4.90	44.14	11.30	.81
Total (V + 2C)	85.84	26.23	5.78	85.84	26.23	.95
Reading Rate	280.61	105.93	—	—	—	—
(n = 525) GRADE 15** (n = 525)						
Vocabulary	45.91	17.10	2.91	45.91	17.10	.97
Comprehension times two	46.76	11.00	4.63	46.76	11.00	.82
Total (V + 2C)	92.67	25.42	5.52	92.67	25.42	.95
Reading Rate	283.21	95.86	—	—	—	—
(n = 397) GRADE 16** (n = 397)						
Vocabulary	50.92	17.91	2.72	50.92	17.91	.98
Comprehension times two	47.00	10.48	4.73	47.00	10.48	.80
Total (V + 2C)	97.91	25.58	5.32	97.91	25.58	.96
Reading Rate	288.79	107.72	—	—	—	—

*Corrected by the Spearman-Brown Formula

**In Grades 13-16 the statistics are the same for both sides of the table because there was no weighting; the figures are repeated for the convenience of the user.

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