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THE PREDICTION OF JUNIOR HIGH SCHOOL READING
COMPETENCY FROM ELEMENTARY SCHOOL PERFORMANCE

A Dissertation Presented

By

GERALDINE E. FRASER

Submitted to the Graduate School of the
University of Massachusetts in partial fulfillment
of the requirements for the degree of

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Geraldine Fraser 1981

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This dissertation is dedicated to my family whose interest, support, patience and encouragement inspired me at every difficult step of this endeavor.

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ABSTRACT

The Prediction of Junior High School Reading
Competency From Elementary School Performance

(February 1981)

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Concerns regarding competency in basic skills are not unique to the late 1970s; certainly questions were being raised prior to this decade relative to the efficiency of the American public school system. However, no one could have predicted the proliferation of ideas, plans, controversies and legislation that would begin in 1972, sweep the majority of the 50 states, and engage the attention of Congress by 1978. Airasian (1979) concluded that the public's perception of the deterioration of educational standards precipitated their demand for proof, in the form of minimum competency test results, of pupil attainment of basic skills in reading, listening, writing and math.

That reading should emerge as a primary concern did not come as a surprise. Reading competency is recognized as the cornerstone of all of the academic experiences of the individual. The measurement of reading progress with

achievement tests in elementary grades has been a standard practise in education for many years. In spite of the mounting evidence that all children are not proficient readers when they reach the secondary level, formal reading instruction most often terminates at this point in time.

The purpose of this study was to examine the existing data in the cumulative school records of a certain population in search of the significant factors that contributed to, and were predictive of, reading achievement at the junior high level. These 130 beginning seventh-graders had already met the United States Census Bureau's initial criterion of literacy, namely, six years of schooling. The dependent variable in this study is the average of the reading and vocabulary subtest scores attained by the pupils in the Iowa Tests of Basic Skills early in grade seven. The independent variables investigated for their significance were: (1) reading, spelling and language subtest scores between grades three and seven; (2) intelligence test scores in grades three and six; (3) attendance; (4) age; (5) sex; (6) number of grade schools attended; (7) elementary teacher ratings of work habits and scholarship; (9) socioeconomic status; (10) grades in which some pupils received remedial reading services. Stepwise multiple regression analysis was the statistical method used to evaluate the contributions of each independent variable.

The results indicated that the reading achievement tests in grades one and two were the most significant predictors of reading competency at the seventh grade level. The Paragraph Meaning subtest of the Stanford Achievement Test in grade two was actually the most effective indicator among the primary grade (one through three) variables of later reading achievement and explained 54% of the variance. In this study, girls did not excel boys, socioeconomic status was not statistically important, and age and attendance did not add any valuable information. Some implications of this study are: (1) The majority of the children who lag behind in reading achievement in the primary grades continue to show deficiencies in subsequent school years; therefore, remedial intervention should begin early and continue until it is no longer needed. (2) Since the early indicators of reading failure can be noted by school systems already using standardized tests, the addition of competency tests will be superfluous unless the early warning indicators are being ignored. (3) Six years of basic reading instruction is not sufficient for many pupils. Formal reading instruction should continue at the secondary level (grades seven through twelve) until each student had mastered the basic decoding, comprehension and inferential skills.

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C H A P T E R I

INTRODUCTION

Thirty centuries have elapsed since man reached the developmental stage that enabled him to produce the alphabet. The transition from ideographic or picture-symbol writing to written language originated in Phoenicia (now named Lebanon) and was adopted first by the Greeks and then the Romans, who, in the course of Roman expansion, brought it to the whole Western world.

Initially conceived as a method of permanently recording trade transactions, written language became the first vehicle for recording and communicating the ideas of man; in the subsequent three thousand years of history man has not devised a superior means of recording and transmitting the philosophical subtleties of thought and creativity.

Literacy in the early centuries of written language was not widespread, nor was it expected to be. The primary goal, established and carried out by monks and other religious persons, was to enable pupils to declaim passages in biblical texts; this specific emphasis continued through the seventeenth and eighteenth centuries. The advent of secular schools transferred the subject emphasis from

religious tracts to texts that focused upon national history and simple virtues, but the emphasis upon oral reading continued.

It was not until after World War I that the United States shifted its instructional focus from the declamation of familiar material to the acquisition of skills enabling pupils to read, comprehend and answer questions about varied subject matter. The testing procedures developed for Army recruits had not only exposed serious deficiencies in the reading abilities of young Americans but also precipitated the subsequent boom in educational testing (Blumenfeld, 1973; Resnick and Resnick, 1977; Hunter and Harman, 1979).

Although expectation levels for reading achievement rose after World War I, the testing of recruits for World War II again indicated alarming reading deficits. It was not until the middle of the twentieth century, after the founding of the United Nations, that concerns about literacy became international. The accumulation of worldwide statistics was instituted; the initial attack upon illiteracy had begun. There was no greater anxiety anywhere than in the United States. Therefore, in the middle of the twentieth century, it was most disturbing to Americans to learn that the failure rate for potential Navy enlistees was nine out of ten. The primary reason was the inability of the

candidates to read and/or understand the words in the entrance test (Weintraub, 1977).

Thus literacy, or the lack of it, illiteracy, became a focal point of concern long before anyone could form a universally accepted definition. There are many who consider literacy in its most basic form, that is, the ability to read and write one's own name. The 1951 UNESCO definition was simply stated: "A person is literate who can with understanding both read and write a short, simple statement on his everyday life" (Hunter and Harman, 1977).

The United States National Reading Center offers this as a working definition of literacy:

A person is functionally literate when he has command of reading skills that permit him to go about his daily activities successfully, or to move about society normally, with comprehension of the usual printed expressions and messages he encounters (Bentovim and Stevens, 1976).

Meanwhile the United States Bureau of the Census calculates the rate of literacy in the population by counting the number of persons fourteen years or older that have completed six years of school. This definition makes two assumptions: (1) six years of schooling guarantee that persons achieve literacy; (2) those with less than six years of education do not continue to develop their reading skills. Bormuth (1975) and Copperman (1978) have completed studies indicating the inadequacy of the Census Bureau's standard

of assessment, and other researchers and educators agree that even a high school diploma does not guarantee literacy (Cramer, 1978).

In July 1973 the United States Office of Education concluded that nineteen million adult Americans were either totally or functionally illiterate, and that an additional seven million school pupils were seriously retarded in reading. It is not surprising that the American public became very alarmed about the state of public school education and demanded changes that would insure that their children attained not only literacy but a solid foundation in other academic areas (Education U.S.A. Special Report, 1978; Bentovim and Stevens, 1979).

The Minimum Competency Standards Movement

Concerns regarding minimum competency standards in basic skills are not unique to the 1970s; many questions had been raised prior to this decade relative to the efficiency of the American educational system. However, no one anticipated the mass legislative involvement that followed upon Oregon's 1972 regulations that set minimum standards for high school diplomas. By March, 1979, thirty-six states had initiated some form of minimum competency legislation and all others had begun studies relative to this issue.

The competency based education movement, or CBE, has been interpreted as "a reflection of widespread public dissatisfaction with the educational performance of American public schools" (Fiske, 1978), "a system for the reduction of learning to a pat set of objectives" (Reilly, 1978), and a means of providing to educators "an early warning system to educators that all is not well and that remedial action is necessary" (Kay, 1977).

Originally known as a competency-based high school graduation program, minimum competency assessment has become a primary tool for the identification of elementary and secondary pupils in need of remediation in basic skills. Minimum competency programs, as defined by the American Friends Service Committee (1978) are "organized efforts to make sure public school students are able to demonstrate their mastery of certain minimum skills needed to perform tasks they will routinely confront in adult life." The components of minimum programs vary, but their common intent is to determine certain levels of proficiency to be required in basic skill areas, such as reading, writing, listening and math, and to test pupils at various points in their schooling to measure their achievement in each area.

There is a unique factor to be noted in the incredible growth of the minimum competency standards movement.

The major thrust has come from citizenry outside the field of education who attracted the attention of legislators and state educational boards rather than address their concerns directly to the educators. In itself, this suggests that the public may have panicked in its assessment of educational methods, outcomes, and ultimately, its leadership. Particular groups were more alarmed than others. These included parents whose children read poorly, employers who hired high school graduates who could not perform routine tasks, and college professors whose students were not able to write effectively (Spady, 1977).

One of the main forces triggering the public's concern has been the well-publicized decline of scores in the Scholastic Aptitude Tests (SAT) which are taken annually by a million college-bound high school seniors in the United States. The SAT scores showed a steady increase during the twentieth century until the mid-1960s when scores of five hundred in the Verbal and Math sections were considered average. The downward trend was first noted in 1964; despite the efforts of educators, test specialists, and statisticians to explain, analyze, and smooth away its more serious implications, the decline has continued. In 1963 the SAT Verbal and Math averages were 478 and 502 respectively; in 1970 they fell to 460 and 488, and in 1978 plummeted to

429 and 468 (Copperman, 1979). A reversal of this trend was anticipated in 1979, but did not occur; instead, an additional three point loss was recorded in the Verbal of 427 and Math, 467 ("Scholastic Test Scores Drop," 1979).

More than three-quarter million students in the South, Midwest and Far West take part in the American College Testing Program (ACT). The decline in ACT scores, while less dramatic than that of the SAT scores, has followed a similar pattern (Copperman, 1979). Media reports of the declines in the SAT and ACT scores fueled the ire in many of the public who had passively resisted innovations in public school education under the umbrella of humanistic education. Some of the factors studied as possible influences were television, an increase in the number of students taking the tests, a larger percentage of minority persons, including females, economically disadvantaged and low-ability students, distress subsequent to Vietnam and Watergate, and differences in the size of families. A direct cause and effect relationship between any of these factors and the decline in test scores was not established.

The increasing national concern was underlined by the Gallup Polls of the Public's Attitude Toward Education in 1976 and 1977: 32% of U.S. adults supported the back-to-basics movement and 27% favored higher academic standards.

An astonishing 65% advocated a national standard examination to determine those who would qualify for a diploma, while 60% viewed the quality of education as declining. It is not surprising that by 1977 40% of the school districts with more than ten thousand students found their school board candidates campaigning on this platform (Gallup, 1978).

Chris Piphon, associate director for research and information, Education Commission of the United States, concluded that higher standards for high school graduation now rank second only to lower property taxes as an election year issue in local politics. Yet, he added, less than two years earlier, some educational leaders were able to dismiss the notion of competency-based education as just another offshoot of the "back-to-basics or knee-jerk conservative reaction" (Piphon, 1978). By late winter of 1978, Congress was asked to consider a national test of minimum competency for voluntary use in public schools. The bill, introduced by S. I. Hayakawa, was defeated, but the Senator indicated that he would return with a revision.

In March, 1978, in an unprecedented administration-sponsored summit focusing upon the government's role in school achievement testing, former Health, Education and Welfare Secretary Joseph Califano adamantly opposed a national test. He presented and supported the report of the National Academy of Education committee which concluded,

that any setting of state-wide competency standards for awarding the high school diploma--however understandable the public clamor which produced this movement and expectation--is basically unworkable, exceeds the present measurement arts of the teaching profession and will create more teaching problems than it can conceivably solve.

In addition, the NAE committee labelled any federally sponsored competency testing as "risky. The power to approve tests is ultimately the power to approve the curriculum" (Foltz, 1978).

The specter of a national competency test for high school graduation has faded, at least for the present. The major thrust now is toward the implementation of competency testing by state departments of education and local school districts. Fortunately, there has been growing recognition that the evaluation of competencies must begin in elementary grades, and continue through the secondary years with remedial services available to all those in need.

Reading competency as the cornerstone of all of the academic, if not the total life, experiences of the individual will be the focus of this research.

Statement of the Problem

For several decades, it has been very reassuring in the United States to note that the percentage of high school graduates among the 17-year-old population increased from 2% in 1870, to 51% in 1940, and to 75% in 1975

(Bormuth, 1975). The Bureau of the Census, using its criterion of six years of school, reported that literacy in this country rose from 80% in 1870, to 97.8 in 1959, and to 99% in 1969 (Census, 1971). However, for those concerned with literacy these statistics are meaningless since they do not include any measurement of reading ability. Several researchers have completed studies that note the lack of a strong, consistent relationship between literacy and the number of years of schooling (Bormuth, 1975; Weber, 1975; Thorndike, 1976; Kirsch and Guthrie, 1977-78).

Yet, until recently, most of the population were willing to believe that the receipt of a high school diploma implied a respectable amount of learning had been gained and that the recipient was academically prepared for his next career or college plans. Currently, the strident voices of parents, employers and college professors are challenging this assumption on the bases of their experiences with low-functioning, non-reading high school graduates. Meanwhile, secondary school administrators and teachers have tried to separate themselves from this problem by clinging to their traditional view of themselves as teachers of subject matter, rather than basics.

Historically, emphasis upon basic skills has been the province of the elementary school, grades one through six, even though evidence has accumulated to suggest that pupils

below grade level at grade six continue to lag behind throughout their secondary school years (Ramsay, 1962; Cooper, 1964).

Research suggests that very little reading instruction is offered in most secondary schools (grades seven through twelve), and that the teachers' training has not prepared them to provide it. Austin and Morrison (1961) surveyed 74 schools and universities and found that very few offered courses in teaching of reading at the secondary level. In their follow-up study, they discovered that less than 25% of the teacher training institutions had followed their recommendation to require a reading course for prospective secondary school teachers (Austin and Morrison, 1975).

The expectation that minimum competency testing programs would cause dramatic revisions in the curricula in teacher education colleges and universities has not been realized. A recently completed survey of 549 institutions approved by the National Council for Accreditation of Teacher Education revealed that emphasis upon teacher training in basic skill areas has increased, but not as extensively as predicted in 1978 (Riggs and Lewis, 1979).

If indeed basic reading instruction cannot be guaranteed at the junior and senior high school levels, it is imperative that elementary school pupils master basic decoding and comprehension skills in their first six years of school.

Purpose of this Study

Competency-based evaluations were originally intended for the assessment of high school seniors just before their expected graduation and acquired the label, "exit testing." It was soon evident that the preparation for the successful completion of "exit tests" had to begin long before the senior year, and that some means had to be found to identify the pupils in need of remediation at the earliest point in time possible. Minimum competency testing was hastily implemented in some areas in the elementary grades, even though ample assessment information was already available in the pupils' cumulative records.

The purpose of this study is to examine the existing data in the cumulative school records of a certain population in a search for the significant factors that contribute to, and are predictive of, reading achievement at the junior high level. All of the pertinent cumulative record data gathered between grades one and seven will be analyzed. These beginning seventh graders have already met the United States Census Bureau's initial criterion of literacy, namely, six years of schooling (actually seven years if kindergarten is counted), although some will be slightly older, or younger than fourteen.

The dependent variable in this study is the average of the reading and vocabulary subtest scores attained by these pupils in the Iowa Achievement Tests early in grade seven. The independent variables investigated for their significance include: (1) reading, spelling and language subtest scores between grades one and seven; (2) intelligence test scores in grades three and six; (3) attendance; (4) age; (5) sex; (6) number of grade schools attended; (7) elementary teacher ratings of scholarship and work habits; (8) junior high teacher ratings of work habits and scholarship; (9) parental occupations, that is, socio-economic status; (10) grades in which some pupils received remedial reading services.

The assumption of this study is that statistically relevant predictors of reading achievement at the junior high level may be found among the test scores and other data gathered in the elementary grades.

Several pertinent questions will be asked of the data. These will include:

(1) At which grade level is the available information most closely related to success in reading in grade seven?

(2) Which of the several independent variables is the best predictor of reading achievement?

(3) Are some subtests, or certain combinations of subtests, more reliable predictors?

(4) Does the analysis of the variables in the primary grades (one through three) indicate any significant correlations with reading in grade seven?

(5) What is the level of reading competency/literacy of this population that has completed seven years of public school education?

The variables, dependent as well as independent, are those most commonly recorded in school files and hence are available for longitudinal studies in many communities. This investigator is mindful of the fact that other variables, such as hours spent watching television, the number of books in the home, size of families, etc., may be very relevant. However, such data is not routinely included in school records at this time.

Significant of this Study

The Right to Read movement was launched by the late Commissioner of Education James E. Allen in 1970 with a stated goal: to overcome illiteracy in this country within a single decade. Although many heralded this federally funded program and its intent, others were less optimistic of its attainment, because of the numerous adult illiterates who had not only failed to learn to read in school but also

confronted such serious problems as occupational failures, poverty and unemployment. While they did not oppose the extension of Right to Read grants to educate adult illiterates, they cautioned that the long-term eradication of illiteracy had to begin in the public schools.

It has long been recognized that the average taxpayer is more deeply concerned with the reading problems in his local high school than he is with the global problem of illiteracy. In common with the educators and the researchers, the taxpayers want to know why there are so many failures, and, more importantly, the kind of strategies that can be developed to anticipate, and ultimately, prevent them (Weber, 1975; Mizel, 1978; Gallup, 1978).

This investigation is significant for these reasons:

(1) The analyses will define the critical independent variables that influenced, if they did not actually determine, the reading achievement of a certain population of public school children between grades one and seven.

(2) The early warning signals of potential failure will be identified.

(3) The results will provide evidence of the predictive value of reading achievement and intelligence tests at different grade levels.

(4) The total reading achievement scores at grade seven will clarify the need for the integration of

specialized reading skills instruction in such content areas as science, social studies and math during the secondary school years. Recently, researchers have begun to stress the need for reading instruction at the junior and senior high levels for two reasons: (1) their inability to read subject area texts decreases the ability of students to profit from instruction; (2) success in college programs and the reward of social mobility is denied to those with poor reading skills (Chall, 1978; Cramer, 1978).

Limitations

The results of this study can only be applied to similar populations, that is, young people attending public school in small communities (15,000 to 20,000 population). One must also be mindful of the number of students who were not included because of the insufficiency of cumulative record data.

Outline of the Remaining Chapters

This first chapter has reviewed the growing national concern about illiteracy, the public's agitated response to the declines in SAT, ACT, and other achievement test scores, and the parallel rise of the competency-based education movement. The author stated the purpose of her research, its educational significance, and its limitations.

Chapter II will review the significant literature in reading research during the past several decades.

Chapter III will provide a detailed description of the measurements, population sample, and statistical methods employed in this study.

Chapter IV will detail the evaluative data, report the results of each analysis and present the answers to the questions posed by this investigator.

Chapter V will summarize the data and discuss its implications. Suggestions for further research will be included.

C H A P T E R I I
REVIEW OF THE LITERATURE

The investigation of reading and reading processes is nearly a century old, and can be traced to Wundt's laboratory in Leipzig in the late 1870s. It was there that the late James M. Cattell experimented with the recognition of letters and words, individual differences, and the speed of mental events; his studies, and those of E. L. Thorndike, R. S. Woodworth, W. F. Dearborn, Gates and others, provided the foundation for the next thirty years of reading research (Venezky, 1977).

By 1920, however, these experimental psychologists became involved with the study of behaviorism and temporarily deserted the field of basic reading research. During the next several decades the educational psychologists dominated the field of reading research; their emphasis shifted away from basic studies and focused instead upon the analysis of reading skills, the organization of reading abilities, the design and uses of tests, and the evaluation of reading methods and teaching strategies. In 1962 Lennon estimated that more than one hundred research studies had been published annually for several decades, and concluded that even the most dedicated scholar would not be able to thoroughly

examine them and draw conclusions that would give him a complete understanding of the reading process. Lennon pointed out that the components of various reading tests include nearly eighty alleged skills and abilities, such as word discrimination, word meaning, word recognition, word analysis skills, paragraph comprehension, retention of details, rate of reading, speed of comprehension, visual perception of letters and words, etc. He added that even the proven value of all of this information in an instructional program could not guarantee that these abilities and/or skills are characteristics that can be distinguished from a general reading ability.

However, many researchers note that children acquire perceptual skills at differing rates, and that emphasis in the beginning stages of teaching and measurement in reading must be upon the perceptual and mechanical processes that diagnostic tests are designed to measure (Smith and Keogh, 1962; Scott, 1968; Koppitz, Mardis, and Stephens, 1962; Koppitz, 1963). These studies, and numerous others designed to predict either reading success or failure, have not provided definitive answers. Robinson (1968), in discussing this body of research, suggests that quality, rather than quantity of studies is needed in this area.

Despite the lack of agreement regarding the number and definition of reading sub-skills, it has been

successfully argued that their inclusion in tests may be useful to teachers in their formulation of objectives for individual children. As Thorndike (1973) points out, no harm will be done if the child does not need the additional remediation in an area, and will not pay any penalty if the teacher, recognizing the student's efficiency, withdraws the remediation.

The search for the specific components of reading ability continues to inspire the proliferation of studies. The next section of this paper will discuss some of this research.

Measurement of Reading Sub-skills

A primary goal in this area has been the reduction of the number of "abilities" measured by standardized reading tests. While most agree that several dozen separate skills must be an excessive number, not many can accept that a single global factor is involved. Indeed, while a concurrence with the latter might simplify the study of reading, there is as yet no empirical evidence to support this position.

However, during the past few decades a number of studies indicate that the original number of seventy to eighty sub-skills may be reduced to six or less. Table I presents the data obtained in many of these studies (see pp. 21-24).

TABLE 1

Investigator(s)	Subjects		Factors Isolated	Tests Used
	Sample Size	Grade		
Traxler (1941)	116	10	General Reading Level	Van Wagenen-Dvorak Diagnostic Examination of Silent Reading Abilities
Gans (1940)	417	3-5	Reading ability Critical analysis Delayed recall	Critical analysis of reading Thorndike-McCall Gates Silent Reading Test California Test of Mental Maturity
Davis (1941)			Word knowledge Reasoning Literal meanings Inference Ability to follow organization of selection Knowledge of literary devices and techniques	Davis Reading Test (to measure 9 factors)

TABLE 1 (continued)

Investigator(s)	Subjects		Factors Isolated	Tests Used
	Sample Size	Grade		
Thurstone			General Reading Level	Reanalysis of Davis (1941) data
Langsam (1941)			Verbal (word meaning) Perceptual Word (fluency) Seeing relationships Numerical	6 Reading tests (14 subtests) 1 intelligence test (7 subtests)
Conant (1942)			General comprehension	Nelson-Denny Reading test American Council Psych. Exam. 1 Reading test
Artley (1944)	200	11	General comprehension	25 specially designed subscales of reading and non-prose material

TABLE 1 (continued)

Investigator(s)	Subjects		Factors Isolated	Tests Used
	Sample Size	Grade		
Hall and Robinson (1945)	100	College freshmen	Study attitude Inductive factor Verbal, word meaning Rote for unrelated facts Chart reading Unnamed	25 specially designed subscales (including reading and non-prose)
Harris (1948)		Adults	General reading level	Battery designed to measure 7 subskills
Maney and Sochor (1952)	500	5	Non uni-factor	Gates Survey Test Pintner General Ability Test Tests designed to measure comprehension of science and social studies material

TABLE 1 (continued)

Investigator(s)	Subjects		Factors Isolated	Tests Used
	Sample Size	Grade		
Hunt (1952)	585	College	Reasoning ability Word knowledge	Tests designed to measure Davis' 6 factors (1941)
Stoker and Knopp (1960)			General	Iowa Test of Educational Development
Schreiner, Hieronymus			Speed of reading Listening comprehension Verbal reasoning Speed of noting details	Iowa Test of Educational Development

Several reasons can be offered for their general lack of agreement with each other. The more significant factors are: (1) the researchers used different test batteries; (2) some, but not all, included such variables as social and personality factors, and science and social studies achievement; (3) populations tested ranged in age from elementary grades to adulthood; (4) the researchers based their studies upon theory rather than experience (Lennon, 1962).

Although the studies reported in Table 1 do not include all of the research completed during the past several decades, they form a representative sample of the investigations in this field. A cursory examination of this data suggests that the basic components of the reading act become less distinguishable as the individual matures and that by adulthood a global factor, such as comprehension or general verbal ability, may be the only one of significance. Berg (1973) concurs with Lennon's view that only these four factors, rather than seventy or more, are actually measureable: (1) a general verbal factor; (2) comprehension of explicitly stated material; (3) comprehension of implicit or latent meaning, and (4) appreciation.

Methods of Measuring Pupil Achievement

The accurate assessment of reading progress at regular intervals is essential for several reasons. Chief among

these is its value in measuring the pupil's growth and his ability to learn given the particular instructional materials and classroom situation. In addition, assessment is an invaluable aid to teachers and administrators in the determination of the effectiveness of their teaching methods, the appropriateness of their objectives, and any modifications of their instructional programs.

There are three popular approaches to assessment:

1) standardized achievement tests; 2) criterion-referenced measures; and 3) informal procedures.

Lindvall and Nitko (1975) define a standardized norm-referenced test as

a published test, accompanied by specific directions for administering and scoring, that has been given to a group of subjects representative of the group of students for whom the test was designed. The performance of any subsequent examinee can be compared with the performance of typical examinees through the use of derived scores and norms (p. 35).

Criterion-referenced tests measure performance in relation to specific objectives for an individual and do not relate his achievement to that of any group.

Informal procedures include teacher observations, anecdotal records, teacher-made tests, checklists and informal reading inventories. Good teachers rely on these procedures to add to their knowledge of their pupils' abilities and to plan appropriate educational strategies to maximize their learning.

The latter, informal procedures, are the oldest evaluative measures, and continue to be popular universally in the classroom whether or not other procedures are employed. The term 'criterion referenced test' has been attributed to Robert Glaser and was first used in military and industrial training in the forties. Such tests are intentionally structured to assess the specific behaviors mastered by students; this is their main advantage, that is, that they provide exact information about a student's progress toward the instructional goals set for him.

Standardized norm-referenced tests have been in use considerably longer than criterion-referenced measures, and in addition to providing information about a student's progress compared to his age and grade peers, they also aid administrators and teachers in their evaluations of instructional methods and curricula. It must be pointed out that standardized tests and criterion-referenced measures are not mutually exclusive and the use of both in educational assessment is not only valid but advantageous for learners and teachers.

Not all school systems are able to afford the time and money for both kinds of measurement. Recognizing this, and the fact that many systems opt for standardized norm-referenced tests, Cox and Sterett (1970) provided a method for teachers to obtain some specific criterion-referenced

information from norm-referenced tests to help them determine whether or not instructional goals had been reached by individual children. They suggested these steps: (1) specify objectives for the curriculum of pupils; (2) record the number of objectives for which the pupil has received instruction; (3) analyze the standardized test items and code each item to the matching objective; (4) score the standardized test in two ways: a) record the percentage of correct items that correlate with instructional objectives; b) record the percentage of correct items that were not part of the curriculum objectives. Cox and Sterrett recommended this method as a viable means for teachers to obtain more meaning, and hence, more direction for teaching, from standardized test scores.

Historically, standardized norm-referenced group tests have been the primary vehicles of research in the field of reading evaluation. Several researchers (Chall, 1958; Coleman, 1966; Madaus, et al., 1979) have questioned their accuracy and their reliability, not only in the determination of reading levels, but also as measures of educational outcomes of schools, and the learning ability of diverse populations. While few, if any, would quarrel with the recommendation for the development of totally new measurements that would match test items with specific courses and curricula and have universal application, most accept the present

reality: standardized educational tests are the most valid instruments presently available for the assessment of educational outcomes.

The caution that reading tests, like all other tests, are measurements of behavior at a single point in time is one that should not be forgotten when there is the temptation to make sweeping generalizations about test scores. Important decisions should not be made until all other data, such as teacher observations, student's opportunity to learn, et cetera, can be evaluated with the test scores.

Some Significant Studies

During the last few decades the assessment of readiness for reading in young children has occupied an important place in the research of elementary educators and psychologists. Nursery school and kindergarten teachers discovered that a tremendous variety of tests, rating scales, check lists, etc., were available and that measurement of some kind was essential. The advent of the space age and Russia's immediate claim of superiority stirred Americans to look more closely at the education of their youngsters. Headstart programs began in the mid-60s in an effort to increase the potential for success among disadvantaged children when they entered kindergarten or the primary grades.

Several studies completed during this period indicated that certain factors, such as oral language ability,

visual-motor development, verbal memory, and knowledge of letters were strong predictors of success in beginning reading (Koppitz, 1963; de Hirsch and Jansky, 1966, 1972; Chase, 1972; Cowen, et al., 1972).

During this same period, researchers also focused attention upon several other variables in an effort to determine their association, or lack of it, with reading progress. The sex of a child received much emphasis. Several researchers (Traxler and Spaulding, 1954; Hughes, 1953; Ames, 1968; Preston, 1962) reported that American girls excelled boys in early elementary grades.

A more controversial area of research has involved the study of the effects of socio-economic status on school performance. High correlations were found to exist between the more privileged socio-economic groups and reading attainment (Hill and Giametteo, 1963; Carson and Rabin, 1960; Chandler, 1966; Kay, 1977).

Among the other variables studied for their relationship to reading achievement are age, Rorshach responses, intelligence, personality factors, and parental attitudes toward school achievement.

The majority of these studies included relatively small numbers of children. However, in 1957, Arthur L. Gates, a test developer and researcher, presented findings of a much larger sample in his re-norming data for the Gates Reading

Tests. The norming sample for 1937 included 107,000 children; the 1957 sample involved 31,000 children. His findings were: (1) 1937 children in grades 2 through 6 were more advanced in reading ability than the 1957 children in these grades; (2) when the 1957 children were compared to the 1937 group by chronological age (rather than grade level) the 1957 pupils were superior. In primary grades the difference was +1 to +1½ months. From grade 4 to grade 6.5, the 1957 children scored 5.3 months ahead in reading compared to their 1937 peers. The Gates' study indicates that the 1957 children only appeared as inferior when their grades, rather than their ages, were considered.

The implications of another large study (Coleman, 1966) are quite different in that they emphasize the influence of the out-of-school environment, rather than innate abilities, age and grade levels, school resources, et cetera, upon scholastic achievement. The purpose of the Coleman study, which involved 570,000 pupils, 6,000 teachers and 4,000 schools, was singular in that it sought an answer to this question: how well do the United States schools provide for disadvantaged minority group children?

The Coleman study sought, in addition, to determine: (1) the extent of segregation within U.S. schools; (2) the extent of equality or inequality in educational opportunities in the U.S. The minority groups of concern included:

Negroes, American Indians, Oriental Americans, Puerto Ricans in the U.S., and Mexican Americans.

Subsequent studies of the Coleman report (Smith, 1972, Jencks , et al., 1972) appeared to confirm the original findings, that is, that schools did not make a difference in overall educational outcomes. Although Mayeske, et al., (1972) found more variation between schools in the achievement of pupils than Coleman, this variation could not be separated from their social backgrounds. Some regard the Coleman study as a very depressing influence upon professionals in education: if indeed schooling will not make any difference, is there a valid reason for educators to try harder?

Neither were the Coleman findings a source of optimism for those concerned with the results of the National Assessment of Educational Progress, another large scale study, conducted between 1971 and 1975. Fifteen percent of the blacks, ages nine, thirteen, seventeen and young adult, tested below the national norms in Writing, Reading and Literature. Hispanics, who comprise five percent of the U.S. population, also fell below national norms. Inasmuch as segregation, whether deliberate or accidental (that is, by neighborhood, and hence, by school,) loomed as a critical factor in the lesser achievement of blacks and Hispanics, the Coleman report conclusions were viewed as suspect by many.

Further evidence that the denial of equal educational opportunity to minority groups hampers educational achievement, was provided by the Florida Literacy Test in the fall of 1977 when 26% of the blacks failed the reading section (compared to a 3% white failure rate). Several court actions followed; recently a decision was rendered in favor of the blacks. The judge ordered a four-year delay in implementation of the consequences of failure in the FLT, namely, the loss of high school diplomas, because he determined that high school students through 1983 are suffering from segregated public school experiences in elementary grades.

Meanwhile, considerable evidence has accumulated nationally to indicate that elementary and junior high school students of the '70s lagged behind their peer groups of the '60s in reading and math achievement. According to the findings of the Stanford Research Report, 8th graders in 1973 read only as well as 7th graders in 1964. Gains of only a few months were restricted to first and second graders (Copperman, 1979).

A similar pattern emerged in the renorming data of the Iowa Tests of Basic Skills. Slight increases occurred in grades one and two, and sometimes in grades three and four. From grade four on, there were steady declines in achievement (Wiley and Harnischfeger, 1975).

A more optimistic note for educators is provided by the studies of Peaker (1975)--optimistic in the sense that education, that is, schooling, will make a difference in the amount of learning. Peaker's research included data from twenty-one countries (in Europe, New Zealand, Israel, South America, the Far East, as well as the United States). Some of the variables defined as of utmost importance to pupil achievement included: (1) amount of actual teaching; (2) amount of study and homework. Peaker added that "the pace of learning (in countries as well as in students) tends to remain constant: those who begin as fast or slow learners tend to continue as fast or slow" (p. 27).

Another study confirming the effectiveness of schools was completed recently in Ireland (Madaus, et al., 1979). The authors stressed the importance of measuring scholastic achievement in terms of the school's specific goals, rather than relying on measurements of a more general nature. Their admonition is particularly relevant in the measurement of content areas (science, history, physics, etc.) in which student achievement is largely dependent upon the courses taught. It is not as applicable to the measurement of reading programs since growth is not dependent upon factual input.

In a recently completed three-year study of 1,828 fourth grade pupils in Philadelphia, four critical factors

were identified as significant in reading achievement: (1) the use of a basal linguistic approach; (2) the input of principals trained as reading professionals; (3) the continuous presence of the regular classroom teacher during lessons; (4) a combination of small group and whole class instruction within the regular classroom (Phi Delta Kappan, September, 1979).

That national emphasis upon reading achievement can be a contributing factor in the attainment of literacy was cited by Thorndike (1976) in his survey of reading comprehension in 15 countries. Fourteen-year-olds in New Zealand scored highest among their international peers. Thorndike pointed out that the New Zealand government has placed a strong emphasis upon literacy over a long period of time. At the ten-year level, children in Sweden scored highest. The United States did not take a first place at any of the three levels (ages ten, fourteen, and seventeen). While the latter statistic is very disconcerting for a country that has had compulsory, free education for a century, there is some comfort in the knowledge that long-term national emphasis upon literacy can produce positive results.

Reading Competency

Chall (1979) warns that the literacy level needed for independent adult functioning in the "real" world is twelfth grade, and that even the prose that is simplified

for less able readers is at least of ninth grade difficulty.

Kirsch and Guthrie (1977-1978) agree with other researchers (Bormuth, 1975; Carroll and Chall, 1975; Copperman, 1978) that the definition of literacy applied by the United States Bureau of the Census is inadequate. They stress the fact that there is considerable difference in the readability of printed materials required for various army jobs. Citing Sticht (1975) they point out that the range extends from a grade equivalency of 9.0 for cooks, to 14.5 repairmen, and to 16+ for supply specialists. Kirsch and Guthrie recommend that the definition of literacy should be restricted to competency with printed materials, and that "functional literacy" would then denote the reading abilities needed to complete a certain real-life task in reading. They reserve the term "functional competence" to encompass the acquisition of a variety of communication skills including writing, listening, speaking and interpreting in addition to reading.

That functional competence as defined by Kirsch and Guthrie is not being attained by hundreds of thousands of high school students in this country is precisely why American citizens have been increasingly incensed by the outcomes of public school education.

Their distress was recently exacerbated by the publication of the 1980 average scores in the Scholastic Aptitude Test. The test score decline has continued for 18 years; in 1962 the Math and Verbal average scores were 502 and 478 respectively, and in 1980 they had dropped to 466 and 424. The continuation of the downward trend into 1980 seems even more ominous for these reasons: (1) the total drop in scores (4 points) is the largest since 1977; (2) persistent efforts were made during this decade to reverse this downward trend; (3) lower scores were also reported for the Test of Standard Written English, which was introduced in 1975 as an additional predictor of academic talent, and an indicator of the ability to effectively use college textbooks.

"The continuation of this trend has been a matter of concern to educators for some time," said Robert G. Cameron, an official of the College Board directing the test program. "It persists despite serious efforts by many schools to improve education and may not be reversible by changes in formal education alone" (Maeroff, 1980, p. 29).

That there may be diverse and inexplicable reasons for the declines in scores was the conclusion of a special panel chosen by the College Board three years ago to investigate, and if possible, to offer solutions. The panel could only advise that the issues were so complex that they

defied past remedies. Concerned educators remain perplexed about the significance of the test score decline in terms of prior, that is, elementary and secondary education.

Meanwhile, the public, that is, the parents and taxpayers, regard these educators in the kindergarten through senior high school levels as culpable. Farr and Olshavsky (1980), however, argue that it is fallacious to regard the decline in Scholastic Aptitude Test scores as evidence of the failure of public school educators to develop their students' reading abilities. Farr and Olshavsky contend that the Scholastic Aptitude Test must be viewed as a standard of high-level reading ability and describe the implementation of minimum competency tests as a "peculiar response" to the decline of the Scholastic Aptitude Test scores.

These authors further distinguish between high level reading abilities and "basic literacy." They cite the tests of the National Assessment of Educational Progress as evidence that basic literacy is actually at a high level in the United States. They report these NAEP statistics regarding their testing of 63,000 young people between 1971 and 1975: (1) nine-year-olds showed overall improvement; (2) thirteen-year-olds and seventeen-year-olds gained only slightly in literal comprehension; (3) minor losses were noted in the inferential and comprehension skills of both teen-aged groups. Yet they agree with the National

Assessment of Educational Progress report of "statistically significant" growth during this period.

Farr and Olshavsky also suggest that the tests of the National Assessment of Educational Progress are measuring the same abilities as minimum competency tests, and that both (NAEP tests and minimum competency tests) are geared to ascertain the academic progress of all students. They regard the Scholastic Aptitude Tests as a measure reserved for college-bound seniors and imply that the latter form an elite group that has mastered reading and inferential skills that are above and beyond those measured by either the tests of the National Assessment of Educational Progress or of minimum competency.

Most educators and researchers can agree with these authors that minimum competency tests and the tests of the National Assessment of Educational Progress are designed to measure the acquisition of basic literacy and survival skills, rather than to predict college achievement. However, they would not concur with the authors' conclusions that the educational systems in our country are doing exceptionally well in teaching basic reading, and that all that is needed is more emphasis upon the higher level reading/thinking skills tapped by the Scholastic Achievement Tests (Carroll and Chall, 1975; Copperman, 1978; Mizell, 1978; Venezky, 1978). Venezky (1978) called attention to

the fact that the slight "statistically significant" increases in scores in the tests of the National Assessment of Educational Progress may have little or no educational significance inasmuch as the educators do not know the composition of the tests nor the expected performance level on the various items.

The Education U.S.A. Special Report (1978) pointed out that the decline in the Scholastic Aptitude Test scores did not provide the initial impetus for the minimum competency standards movement. They traced its origin to Rudolph Flesch's book, "Why Johnny Can't Read," which became an overnight sensation in 1955 and set off years of controversy among reading experts relative to the teaching of reading by phonics, rather than the "whole word" method then in vogue.

These editors cite the Right to Read program initiated by the late United States Commissioner of Education James E. Allen, Jr., in 1969 as the second most significant event in the rise of the minimum competency standards movement. Allen's admission of the national reading problem was unprecedented in the annals of officialdom; his statement that 50% of the nation's unemployed young people between the ages of 16 and 21 were functionally illiterate alarmed the country.

The annual decline in the Scholastic Aptitude Test scores, first noted in 1963, was subsequently focused upon as another effect of the downward spiral in academic achievement. Unfortunately, the test score decline has not been arrested; the total loss in the averages in verbal and math skills through 1980 is 90 points. Although the College Board panel investigating the decline could not pinpoint exact causes, its speculation that lower scores were related to a lack of emphasis upon basics, fewer traditional courses at the secondary level, and minimal demands upon students for critical reading and writing had a strong impact upon the public that already held a jaundiced view of public school educational outcomes.

Frahm and Covington (1979), Mizell (1978), and Piphon (1978) affirm that the minimum competency programs and the resulting controversies are rooted in citizen dissatisfaction with students' limited acquisition of basic skills and their inadequate preparation for career and academic goals.

The Report of the Commission on the Humanities (1980) began its chapter, "Humanities and the Schools," with this strong statement: "A dramatic improvement in the quality of education in our elementary and secondary schools is the highest educational priority for America in the 1980s" (p. 25).

The Commission on the Humanities warns, however, that an excessive emphasis upon basics could signal a return to purely utilitarian goals for schools, and result in the sacrifice of study in the humanities:

To reject or ignore the humanities in the name of literacy would be a tragic mistake. Americans have traditionally set loftier goals for education than the acquisition of basic skills alone, and simply eliminating illiteracy will not restore public confidence in the schools. A free society depends on citizens who are broadly educated. The humanities form a bridge between functional literacy and the higher intellectual and civic purposes of learning. (p. 28).

The advocates of minimum competency standards in education have no quarrel with this admonition. They simply demand that all of our children are educated well enough to reach that bridge so that they may have the option to cross it.

Summary

This chapter has provided an outline of some of the emphases in reading theory and reading research during the past century, a discussion of the several methods employed to measure reading achievement, and an overview of some of the significant reading studies completed in recent decades.

It has been observed that the search for the most important factors in reading growth must continue with increased fervor. Some of the reasons for this urgency are related to the apparent decline of all achievement test

scores since the early sixties, the public's disenchantment with educational methods and its demand for minimum competency standards in basic skills, and the national concern with adult illiteracy.

In the opening sentence of her article, "Reading Instruction Today," Joanna Williams said, "People will always bewail the low level of reading ability of the current school population" (Williams, 1979, p. 917). There may be solace for some in the fact that similar pronouncements were made relative to their generations by Aristotle more than 2,000 years ago, and by Horace Mann in the 19th century. The majority, however, cannot take comfort from any historical continuation of reading incompetence. They firmly believe that intense and systematic efforts must be made to improve theory, instruction and measurement in order to enable most adults to reach self-fulfillment and to participate intelligently in the decision-making processes of society.

C H A P T E R I I I

METHODOLOGY

The specific definition and the accurate measurement of literacy continue to challenge researchers. Some of the difficulty may be the direct result of the numerous levels of literacy that educators and sociologists have generated: basic, functional, conventional, survival, minimal competence, career literacy, and adult performance standard. The United States Census Bureau's criterion of the number of years of schooling may be outdated, inaccurate, useless and controversial, but it eliminated the need for both assessment and categorizing.

That functional literacy is inextricably involved with time, place and social and cultural environments is unquestionably true. In the middle of the nineteenth century, one did not need to master a computer manual nor study to pass a test for a driver's license to ride a horse. The functional literacy level sufficient for survival in rural New England in 1850 would not be adequate in a metropolitan area in 1980 (McKinley, 1976).

The criteria of time and place are very relevant in this longitudinal study of reading competency for these reasons: (1) the pupils have been educated continuously in one public school system for seven years; (2) reading

instruction and goals have been similar, if not identical for all pupils: (3) standardized testing was a routine, almost annual, procedure and not something totally "foreign" to the pupils or to the teachers administering them; (4) the expectation of a year's progress in reading in each grade had been built into the instructional program for many years.

Kirsch and Guthrie's (1977-1978) definition of functional literacy (that is, the reading abilities needed to complete a certain real-life task in reading) seems most applicable in that the real life reading task of pupils is to demonstrate the ability to read effectively at the expected level for their grade.

Population

This study was completed in a small Western Massachusetts town (population: 18,000). The sample included the total population of the community's junior high school seventh-graders in September, 1977, for whom the relevant kindergarten through grade seven data were available. These young people entered a single junior high school from the nine public elementary schools in town; some of the latter were four-room "neighborhood" schools. Seventh-graders who attended a parochial school in the community were not included because they had not had the identical

test batteries. Children who attended other private schools, or moved into or away from, town during their elementary school years were excluded for the same reason.

The total of 130 pupils (59 boys and 71 girls) in this study, out of approximately 200 7th graders may represent the more stable, but not necessarily more advantaged, population in the community in that their families remained in town throughout their children's elementary school years.

Instruments

The following group tests were administered to the 130 pupils in this study:

Grade One

Stanford Achievement Test-Form Y

Grade Two

Stanford Achievement Test-Form W

Grade Three

Stanford Achievement Test-Primary 2-Y
Lorge-Thorndike Group Intelligence Test

Grade Four

Gates-McGinitie-D-Form 2
Vocabulary and Reading Comprehension
Stanford Achievement Test-Intermediate- W
Language and Spelling

Grade Six

Comprehensive Tests of Basic Skills-Form S

Vocabulary
Comprehension
Spelling
Total Language

Short Form Test of Academic Aptitude (SFTAA)

Grade Seven

Iowa Tests of Basic Skills

Vocabulary
Reading
Spelling
Total Language

The pupils' cumulative records contained the data for grade-level equivalent scores received by the children in all of these achievement tests. Reading achievement in standardized tests is considered average if a child reaches the grade level norm for the point in time that the test is given. In the elementary grades, the achievement tests were given near the end of each school year. Therefore, pupils who achieved a grade level score of 1.9 in the ninth month of first grade, a grade level score of 2.9 in the ninth month of second grade, etc., were considered to be reading adequately for their school grade placement.

The grade seven reading tests were administered in the first month of seventh grade; hence, pupils earning a 7.1 grade equivalent score were reading at the average level for their grade.

Discussion of Measurements

Stanford Achievement Tests. The Stanford Achievement Tests were developed in 1923 and have since been used extensively throughout the country. The 1964 revision was administered to 850,000 pupils in 50 states; 250 school systems participated.

Reliability data, using split-half reliability coefficients, for Primary I subtests are reported as follows: Word Meaning, .85; Paragraph Meaning, .90; Vocabulary, .79; Spelling, .92; Word Study Skills, .88.

Reliability for the subtests in Grade Two falls between .84 and .93, and in Grade Three, .87 to .93.

In Grade Four, only the Stanford Spelling and Language subtests were administered; the reliability for both is .93.

The authors of the Stanford determined the skills and knowledge to be tested by their study of the courses and textbooks in use in schools. They recommend that the "content or curricular validity of the tests must be assessed through a careful analysis of the actual content of each subtest in relation to the objectives of instruction in the various fields," by the school administrators selecting tests for their schools (Kelley, T. et al., 1964).

Gates-MacGinitie Reading Test, Survey D

This is part of a new series of tests designed to replace the original sequential tests of the Gates Reading series. The standardization was done very carefully. Communities were selected for participation on the basis of size, geographic location and socio-economic status. The nation-wide sample included 40,000 pupils in 37 communities between 1964 and 1965 (Gates and MacGinitie, 1972).

Split-half reliability for the Vocabulary subtest is .88, and for the Comprehension subtest, .94.

Gates and MacGinitie suggest that the test user study reading achievement tests to determine their appropriateness in terms of the objectives of his particular reading programs. They report a study by Davis (1968) who correlated performance on the Gates-MacGinitie with four other standardized tests. The median coefficient for Vocabulary in Survey D was .78, and for Comprehension, .80 (Gates and MacGinitie, 1972).

Comprehensive Tests of Basic Skills

The CTBS, Expanded edition, Form S, was revised in 1968 and 1969. The sample population included 130,000 pupils in 50 states.

The reliability coefficients (split-half) include: Reading Vocabulary, .94; Reading Comprehension, .93; Total Reading, .96; Spelling, .90; Total Language, .95.

The authors of the CTBS also recommend that the test users should evaluate tests in terms of their own curriculum and objectives (CTBS Technical Manual, No. 1, 1974).

Iowa Tests of Basic Skills

Over 800 school systems with a population of 300,000 students cooperated in the development of the Iowa tests with the College of Education of the State University of Iowa.

Using split-half coefficients, the reliability data pertinent to this study are as follows: Vocabulary, .91; Reading, .93; Spelling, .91; Total Language, .87.

These authors, too, suggest that school administrators, teachers, and others, evaluate achievement tests to determine their relevance to the objectives of their systems (Lindquist and Hieronymus, 1964).

Lorge-Thorndike Tests of Intelligence, Primary Battery Level A (Grades 3,4,5)

This is a group intelligence test that includes a verbal and nonverbal battery and yields three I.Q. scores (Verbal, Nonverbal and Total). The two batteries are

designed to measure the same abstract ability but with different kinds of tasks. Final norms were based upon 72 sampling units yielding 19,000 students per grade, from grades three through twelve.

The authors report that the Verbal battery of the LT correlates highly with three other well-known group intelligence tests (.77, .79, and .84). Correlations for the Nonverbal battery were somewhat lower (.65, .71, and .74).

The authors also point out that the ability to interpret and use verbal, numerical and pictorial symbols is a demonstration of intelligent behavior. Correlations of the Verbal scale with the Iowa Tests of Basic Skills are from .72 to .84. The Nonverbal battery correlations are again a bit lower (.57 to .68). Similar correlations with the Tests of Academic Progress have also been reported. Studies of Lorge-Thorndike I.Q. scores and school achievement two years later range from .39 (Nonverbal) to .56 (Verbal). (Lorge and Thorndike, 1964; Mehrens and Lehmann, 1969).

The Short Form Test of Academic Aptitude

The SFTAA is a 1970 revision of the California Test of Mental Maturity and includes four subtests: Vocabulary, Analogies, Sequences and Memory. This intelligence test

can be completed in one class period and yields three scores, Verbal, Nonverbal and Total I.Q. The SFTAA has been standardized with the Comprehensive Test of Basic Skills, and the California Achievement Tests, 1970 edition. Reliability estimates for both K-R 20 and test-retest over a two-week period are reported to be high. Test-retest reliability coefficients over a 14-month period are also acceptable for the unit (Level 3) administered to pupils in this study (Buros, 1978).

Additional Independent Variables

Age:

Several researchers (Hildreth, 1950; Ames, 1972; Gates, 1957) have suggested that age upon school entry is a significant factor in the attainment of reading skills. Therefore, the pupils' date of birth has been entered as a variable in this study.

Attendance:

The continuity of learning experiences has always been regarded as an important factor in reading achievement. Attendance data were available for most pupils in their cumulative records and were entered in the analyses to determine their significance.

Elementary and Junior High Teacher Ratings:

In each school year, the teachers rated their pupils in terms of their scholarship, motivation and deportment on a scale of 1 (excellent) to 4 (unsatisfactory). The pupils' elementary teacher ratings were averaged for grades one through six and entered in the analyses. In addition, the pupils' seventh grade teacher ratings were averaged and were also included in this study.

Number of Elementary Schools Attended:

Many children in this community with its large number of elementary schools had attended as many as four or five different schools before entering a single junior high school. Although a change of elementary schools was often the result of the families' moves within the community, some transfers had to be effected to keep class sizes within acceptable limits. Parents frequently expressed their concern that changes in school environment would have negative effects upon their children's academic progress. Hence, this independent variable was introduced in the analyses.

Remedial Reading:

Remedial reading services were provided to children who were experiencing difficulty in the regular classroom reading program. The purpose of its inclusion in this study

is to determine at which grade level this assistance was most valuable in terms of later achievement.

Sex:

That girls surpass boys in reading ability in the United States during elementary grades has been reported by a number of researchers (Traxler and Spaulding, 1954; Hughes, 1953; Hill, 1970; Preston, 1962; Kay, 1977). Therefore, sex was entered as an independent variable.

Socioeconomic Status:

Several researchers report the relationship between socioeconomic background and the learning ability of children (Hill and Giametteo, 1963; Coleman, 1966; Thorndike, 1976; Russell, 1979). In this study, information available in cumulative school records was utilized. The four occupational categories are identical with those used in the standardization of the Comprehensive Tests of Basic Skills (CTBS Technical Manual, No. 1, 1974).

Statistics

The data analyses were completed by means of the stepwise multiple regression method described in the Statistical Package for the Social Sciences (SPSS. Nie, Hull, Jenkins, Steinbrenner, and Bent, 1975). In the stepwise method, the independent variable that explains the most variance is

entered first; the variable that accounts for the most variance in conjunction with the first enters second; this process continues with each step.

The initial data analysis determined the means, medians and modes for each subject at each grade level. It was noted that at each grade level, one or more random scores was missing for one or several subjects, for various reasons including: (1) absenteeism on a day a certain test was given; (2) a failure to record data by teachers; (3) unknown.

To insure the most conservative set of correlations, the data was initially analyzed with the obtained means entered for each item of missing data (Cohen and Cohen, 1975). Subsequently, the data was examined for the total number of subjects with complete data at each grade level. This second set of data is based on a different number of subjects at each grade level; the range varies from 81 at grade one, to 125 at grade seven.

The final correlation matrix was based upon the evidence of the initial data analyses, which made it apparent that the significant early predictors of reading achievement were available in the primary (one to three) grades. Therefore, the uppermost three correlations at each of these grade levels were entered in a final analysis; to obtain the most conservative estimate, the known means were entered for all missing data.

Summary

This chapter described the longitudinal research undertaken by this investigator to identify the early predictors of reading competency at the junior high level. This study was conceived upon the premise that the cumulative school records of children contain significant data, that if examined intensively, would enable school personnel to ascertain the earliest indicators of reading deficiencies, and to develop innovative programs for children before academic failure became the only expectation for these children.

A description of the study, the population sample, instrumentation, the statistical methods, and additional variables entered, have been presented.

The next chapter will describe the results of the several analyses.

C H A P T E R I V

FINDINGS

This chapter will detail the results of the step-wise multiple regression analyses of the data obtained in this longitudinal study of the reading progress made by a sample population of public school pupils. All of the children had entered junior high school after completing grades kindergarten through six in the same school system and had had similar, if not identical, instructional experiences. Although there is variation in their parents' socio-economic status, there is minimal diversity in the ethnic backgrounds of the pupils and their teachers in the small town community in which they live.

The sample population of 130 seventh graders includes 71 girls and 59 boys who had completed the same test batteries (achievement and I.Q.) during their school years, and for whom other pertinent cumulative data were available.

Results

The initial statistical analysis provided the means, standard deviations, medians, modes, and range of scores for each subtest entered as an independent variable in

this evaluation. These data are presented in Table 2. A cursory inspection of means and medians at each grade level indicates that these are at, or above, the expected score for the points in time during each school year when the tests were given.

Tables 3, 4, 5 and 6 summarize the data for the additional independent variables (age, attendance, sex, and socioeconomic status) entered in the analyses.

Table 7 presents the correlations obtained for Grade One pupils in two stepwise regression analyses. In the first matrix, labelled a, the analysis was completed with means substituted for missing data; as noted in Chapter II, this is the preferred method to insure the most conservative set of correlations. In the second matrix, labelled b, the analysis was completed with only those cases for whom all the data were available. The letters a and b will be used in this same way in the presentation of the grade level results in the analyses.

In stepwise regression analysis, one criterion of predictor effectiveness is the order of entry of each variable; another criterion is, of course, the degree of correlation.

Table 7a (first-grade level) indicates that the subtest Paragraph Meaning enters first in the analysis with

TABLE 2
 MEANS, MEDIANS, MODES, STANDARD DEVIATIONS, AND OTHER RELEVANT STATISTICS
 OF READING ACHIEVEMENT SUBTEST SCORES BY GRADE LEVEL

Test	Mean	Median	Mode	S. D.	Minimum	Maximum	Range	% Below Grade Level
<u>Grade One</u>								
<u>Stanford Achievement,</u>								
<u>Form V</u>								
Word Meaning	2.9	2.8	3.6	.51	1.5	3.6	2.1	6.3
Paragraph Meaning	2.4	2.5	3.1	.54	1.1	4.0	2.9	25.7
Spelling	2.5	2.5	3.0	.45	1.5	3.4	1.9	9.4
Word Study Skills	3.7	3.4	5.5	1.18	1.2	5.5	4.3	12.6
<u>Grade Two</u>								
<u>Stanford Achievement,</u>								
<u>Form W</u>								
Word Meaning	3.3	3.3	3.6	.76	1.6	5.7	4.1	30.0
Paragraph Meaning	2.4	2.5	3.1	1.03	1.3	7.5	6.2	27.7
Spelling	3.2	3.2	3.3	.86	1.3	6.3	5.0	38.5
Word Study Skills	3.9	3.6	2.5	1.4	1.4	7.2	5.8	30.3
Language	3.4	3.2	2.9	.90	1.7	7.0	5.3	29.2

TABLE 2 (continued)

Test	Mean	Median	Mode	S.D.	Minimum	Maximum	Range	% Below Grade Level
<u>Grade Three</u>								
<u>Stanford Achievement, Primary 2, Form Y</u>								
Word Meaning	4.1	3.8	3.6	1.07	1.8	7.5	5.7	52.5
Paragraph Meaning	4.2	4.0	5.3	1.0	2.0	7.5	5.5	43.4
Spelling	4.3	4.1	5.7	1.1	1.4	7.4	6.0	42.6
Word Study Skills	5.3	5.5	6.3	1.6	1.7	7.5	5.8	24.6
Language	4.4	4.2	3.9	1.2	2.2	7.5	5.3	37.0
<u>Grade Four</u>								
<u>Gates-McGinitie-D Form 2</u>								
Vocabulary	6.1	6.0	4.8	1.6	2.3	11.3	9.0	30.9
Reading Comprehension	6.0	5.5	4.7	2.1	2.2	11.9	9.7	32.2
<u>Stanford Achievement, Intermediate, Form W</u>								
Spelling	5.1	4.9	4.0	1.5	2.2	9.5	7.3	49.6
Language	5.1	4.9	4.2	1.7	1.0	9.5	8.5	48.3

TABLE 2 (continued)

Test	Mean	Median	Mode	S.D.	Minimum	Maximum	Range	% Below Grade Level
<u>Grade Six</u>								
<u>Comprehensive Tests of Basic Skills, Form S</u>								
Vocabulary	7.5	7.6	8.8	2.0	2.5	11.9	9.4	20.8
Reading Comprehension	7.9	8.0	11.8	2.7	1.5	11.9	10.4	32.0
Spelling	6.5	6.4	7.8	2.6	1.5	11.9	10.4	45.6
Language	7.2	7.0	11.9	2.4	2.7	11.9	9.2	35.2
<u>Grade Seven</u>								
<u>Iowa Tests of Basic Skills</u>								
Vocabulary	7.4	7.7	7.7	1.5	3.0	10.9	7.9	36.0
Reading	7.1	7.2	5.4	1.5	3.2	11.3	8.1	47.2
Spelling	7.3	7.5	8.0	2.0	2.3	11.5	9.2	41.1
Total Language	6.8	6.9	6.3	1.7	2.9	10.5	7.6	56.5
Vocabulary and Reading Average	7.3	7.5	7.6	1.5	4.0	11.1	7.1	41.1

TABLE 2 (continued)

Test	Mean	Median	Mode	S. D.	Minimum	Maximum	Range
<u>Grade Three</u>							
<u>Lorge-Thorndike</u>							
Verbal I. Q.	105.2	105.8	97	12.8	75	133	58
Nonverbal I. Q.	109.0	109.0	97	13.8	65	144	79
Total I. Q.	107.4	107.4	113	12.2	73	135	62
<u>Grade Six</u>							
<u>Short Form Test of Academic Aptitude</u>							
Verbal I. Q.	102.3	102.8	113	11.8	65	131	66
Nonverbal I. Q.	104.3	105.3	94	12.5	68	138	70
Total I. Q.	103.2	103.8	97	11.7	71	129	58

TABLE 3

AGES OF THE PUPILS IN THIS STUDY

Date of Birth	Frequency	%	Cumulative Frequency
1963	2	1.5	1.5
1964	52	40.0	41.5
1965	<u>76</u>	<u>58.5</u>	100.0
Totals	130	100.0	
Mean: 64.6	Median: 64.6	Mode: 65.0	Range: 2.0

TABLE 4
 MEANS, MEDIANS, MODES, STANDARD DEVIATIONS, AND OTHER RELEVANT STATISTICS
 OF DAILY SCHOOL ATTENDANCE BY GRADE LEVEL

Grade	Mean	Median	Mode	S. D.	Minimum	Maximum	Range	% Absent 10 Days or More
One	169.6	171.1	166.0	6.8	136	180	44	47.7
Two	170.5	172.1	174.0	6.3	141	180	39.0	35.2
Three	167.4	170.0	170.0	8.6	116	180	64.0	54.9
Four	170.0	171.0	175.0	5.4	145	178	33.0	45.5
Six	168.5	170.8	169.0	15.1	116	178	62.0	40.2

Average Number of School Days per Year = 180

TABLE 7
b
CORRELATIONS WITHOUT MEANS
SUBSTITUTED FOR MISSING DATA

a		b	
CORRELATIONS WITH MEANS SUBSTITUTED FOR MISSING DATA		CORRELATIONS WITHOUT MEANS SUBSTITUTED FOR MISSING DATA	
GRADE ONE		GRADE ONE	
Step	Multiple R	Multiple R	Step
	r^2	r^2	R^2
N = 130			
1. Paragraph Meaning	.593	.352	1. Paragraph Meaning .704 .496
2. Elem. Teacher Ratings	.631	.399	2. Elem. Teacher Ratings .715 .511
3. Word Study Skills	.646	.418	3. Sex .719 .518
4. Socioeconomic Status	.658	.433	4. Spelling .723 .523
5. Word Meaning	.666	.445	5. Socioeconomic Status .723 .529
6. Sex	.667	.447	6. Word Meaning .728 .530
7. Spelling	.670	.449	7. Word Study Skills .730 .533
8. Date of Birth	.671	.450	8. Remedial Reading .730 .534
9. Attendance	.671	.451	9. J.H. Teaching Ratings .731 .534
10. Remedial Reading	.671	.451	
11. J.H. Teacher Ratings	.671	.451	
N = 81			

Multiple R of .593 ($R^2 = .352$) and is hence not only the most significant of the variables entered, but also one that correlates highly with Grade Seven reading achievement. Elementary Teacher Ratings enters second (Multiple R = .631; $R^2 = .399$) and contributes 4.7% of the variance that can be accounted for in the analysis. However, since Elementary Teachers Ratings are an average of the teacher ratings from grades one through six, this variable cannot be considered as a predictor variable that is known at the Grade One level. The subtest Word Study Skills enters on the third step with a Multiple R of .646 and R^2 of .418; this variable adds 1.5% to the known variance in this analysis. The additional eight variables of this study contribute only .033 to the Multiple R, and 3% to the total variance.

Table 7b at the first grade level reveals that the same variables, Paragraph Meaning and Elementary Teacher Ratings entered respectively on the first and second steps of this analysis as in Table 7a. Based on a population of 81 cases, the correlations (.704, .715, respectively) are considerably higher than those provided by the more conservative method used to produce Table a. The R^2 's (.49 and .51) are also higher. Although seven more variables subsequently entered this analysis, they accounted for only 2.3% of the total variance of 53.4%.

Grade II

The stepwise multiple regression analyses are presented in Table 8 (a and b) for grade two. Again, Paragraph Meaning enters on the first step in both analyses; its predictive power has increased in each situation, and the gap between Table a (Multiple R = .736; $R^2 = .542$) and Table b (Multiple R = .793; $R^2 = .630$; N = 84) has decreased. The variables entering on the next two steps are the same, but their order is reversed. Table 8a notes Word Study Skills on the second step (Multiple R = .769; $R^2 = .591$) and the subtest Word Meaning on the third (Multiple R = .780; $R^2 = .608$). In Table 8b, Word Meaning is second (Multiple R = .821; $R^2 = .674$) and Word Study Skills (Multiple R = .833; $R^2 = .6930$) enters third. The additional variables make only trivial contributions to the total variance.

Grade III

Table 9 (a and b) presents the data for this grade. Once again, a particular variable enters on the first step in both analyses. In this instance, it is the Verbal I.Q. score of the Lorge-Thorndike. In Table a, the Multiple R = .733 and $R^2 = .537$, while in Table b, the Multiple R = .769 and $R^2 = .592$ (N=98).

TABLE 8
b
CORRELATIONS WITHOUT MEANS
SUBSTITUTED FOR MISSING DATA

a		b			
CORRELATIONS WITH MEANS SUBSTITUTED FOR MISSING DATA		CORRELATIONS WITHOUT MEANS SUBSTITUTED FOR MISSING DATA			
Step	Multiple R	R ²	Step	Multiple R	R ²
N = 130		N = 84			
1. Paragraph Meaning	.736	.542	1. Paragraph Meaning	.793	.630
2. Word Study Skills	.769	.591	2. Word Meaning	.821	.674
3. Word Meaning	.780	.608	3. Word Study Skills	.833	.693
4. J. H. Teacher Ratings	.788	.621	4. Date of Birth	.839	.703
5. Sex	.800	.637	5. Sex	.842	.709
6. Attendance	.802	.643	6. Attendance	.846	.716
7. Elem. Teacher Ratings	.804	.646	7. J. H. Teacher Ratings	.849	.721
8. Remedial Reading	.805	.646	8. Language	.852	.726
9. Socioeconomic Status	.805	.648	9. Elem. Teacher Ratings	.853	.728
10. Date of Birth	.805	.648	10. Socioeconomic Status	.853	.728
			11. Remedial Reading	.853	.728
			12. Spelling	.853	.728

TABLE 9

a

CORRELATIONS WITH MEANS
SUBSTITUTED FOR MISSING DATA

b

CORRELATIONS WITHOUT MEANS
SUBSTITUTED FOR MISSING DATA

GRADE THREE

Step	N = 130		N = 98	
	Multiple R	R ²	Multiple R	R ²
1. Verbal I.O.	.733	.537		.769
2. Word Meaning	.800	.635		.823
3. Paragraph Meaning	.801	.654		.841
4. Date of Birth	.814	.663		.849
5. J.H. Teacher Ratings	.821	.673		.853
6. Socioeconomic Status	.824	.680		.854
7. Sex	.828	.685		.855
8. Nonverbal I.O.	.828	.686		.856
9. Remedial Reading	.828	.686		.857
10. Spelling	.829	.687		.857
11. Word Study Skills	.830	.687		.858
			1. Verbal I.O.	.769
			2. Paragraph Meaning	.823
			3. Date of Birth	.841
			4. Word Meaning	.849
			5. Sex	.853
			6. I. T. Total I.O.	.854
			7. Elem. Teacher Ratings	.855
			8. Word Study Skills	.856
			9. Socioeconomic Status	.857
			10. Remedial Reading	.857
			11. Language	.858
			12. Spelling	.858
			13. J.H. Teacher Ratings	.858

The second and third step variables differ. In Table 9a, Word Meaning (Multiple R = .80; $R^2 = .635$) enters second, and Paragraph Meaning (Multiple R = .801; $R^2 = .654$), third. Meanwhile in Table 9b, Paragraph Meaning enters second with a Multiple R of .823 and $R^2 = .678$. Age (Multiple R = .841; $R^2 = .708$) enters third.

Grade IV

At this level (Tables 10a and b), the first two variables are identical in both analyses and enter in the same order. In Table 10a, the Vocabulary subtest shows a Multiple R of .763 and $R^2 = .581$, while Reading Comprehension, entering second, has a Multiple R of .813 and R^2 of .661; Socio-economic status enters third (Multiple R = .824; $R^2 = .679$).

In Table 10b (N = 89), Vocabulary enters first with a Multiple R of .835 and R^2 of .697. Reading Comprehension again places second (Multiple R = .888; $R^2 = .788$) but the third place variable is now Sex (Multiple R = .891; $R^2 = .794$).

Grade VI

It is not until this grade level that different variables enter on the first steps in a and b. Vocabulary enters first in Table 11a with a Multiple R of .808 and

TABLE 10

b

CORRELATIONS WITH MEANS
SUBSTITUTED FOR MISSING DATAa
CORRELATIONS WITH MEANS
SUBSTITUTED FOR MISSING DATA

GRADE FOUR

Step	N = 130		N = 89	
	Multiple R	R ²	Multiple R	R ²
1. Vocabulary	.763	.581	.835	.697
2. Reading Comprehension	.813	.661	.888	.788
3. Socioeconomic Status	.824	.679	.891	.794
4. J.H. Teacher Ratings	.831	.690	.894	.800
5. Sex	.837	.701	.895	.802
6. Attendance	.839	.704	.896	.803
7. Remedial Reading	.841	.707	.897	.805
8. Date of Birth	.842	.708	.898	.806
9. Language	.842	.709	.898	.807
			.898	.807
			.898	.807
			.898	.807

$R^2 = .654$. The SFTAA Verbal I.Q. enters second (Multiple $R = .863$; $R^2 = .744$). The third step variable is Junior High Teacher Ratings (Multiple $R = .879$; $R^2 = .773$).

In the second analysis (Table 11b), The SFTAA Total I.Q. score entered on the first step (Multiple $R = .864$; $R^2 = .746$). Vocabulary entered second (Multiple $R = .917$; $R^2 = .842$), and Reading Comprehension, third (Multiple $R = .926$; $R^2 = .858$). The number included in this analysis is 87.

Results for Each Research Question

(1) At which grade level is the available data most closely related to success in reading in grade seven?

One would anticipate that the highest correlation with the grade seven reading test average would be the reading subtests at grade six because the behaviors being measured are not only similar but completed within the shortest period of time (Henderson, et al., 1973; Wesman, 1968).

This proved to be the case in this study when the means were substituted for missing data (Table 11a) at the sixth-grade level. The Vocabulary subtest accounted for more than 65% of the variance and was therefore the most effective predictor of success at grade seven. The Verbal I.Q. score of the SFTAA at grade six explained another 10% of the variance, and Junior High Teacher Ratings accounted

for 3%. The ten remaining variables added little to the analysis.

However, when the means were not substituted for missing data at grade six (Table 11b) the SFTAA Total I.Q. score became the most significant predictor and accounted for nearly 75% of the variance. The Vocabulary subtest explained another 9+% while Reading Comprehension added only 1.6%. The contribution of the next eleven variables entered was trivial.

(2) Which of the several independent variables is the best predictor of success in reading in grade seven?

The examination of the data relative to the initial question provided the answer to this question as well. None of the variables analyzed between grades one and four exceeded the predictive power of the Vocabulary subtest at grade six, in the correlations that substituted means for missing data.

In the Matrix (Table 11b) that excluded all subjects with missing data, the grade six SFTAA Total I.Q. score was the single best predictor (N = 87).

(3) Are some subtests, or certain combinations of subtests and other variables more reliable predictors?

It has already been noted that this study indicates a high correlation of subtest scores between grades six and seven, and that other researchers have found that similar kinds of tests given at adjacent points in time do provide significant correlations. When we look at the statistics available through this study at the next lower level, grade four, we again find high correlations of reading subtests with reading test scores at grade seven. With means substituted for missing data, the Gates Vocabulary subtest showed a correlation of .763 ($R^2 = .581$) with the Grade seven Reading-Vocabulary average in the Iowas. When the Reading Comprehension subtest is added at the second step, the correlation rises to .813 ($R^2 = .661$).

In the second analysis that includes only those cases (N =89) for whom all the data are available, the Gates Vocabulary subtest again emerges first with a correlation of .835 ($R^2 = .697$). Reading Comprehension is second, with a correlation of .888 ($R^2 = .788$). None of the other variables makes a significant contribution.

(4) Does the analysis of the variables in the primary grades (one through three) reveal any highly significant correlations with grade seven reading?

The Stanford Achievement Paragraph Meaning subtest in second grade shows the greatest predictive power of any of the variables in the first three grades, whether the analysis included means for missing data (Multiple R = .736; $R^2 = .542$), or did not (Multiple R = .793; $R^2 = .630$; $N = 84$). In the initial analysis (that is, with means substituted), Word Study Skills entered on the second step (Multiple R = .769; $R^2 = .591$), and Word Meaning placed third (Multiple R = .780; $R^2 = .608$). When means for missing data were not included, Word Meaning (Multiple R = .821; $R^2 = .674$) entered second, and Word Study Skills, third (Multiple R = .833; $R^2 = .693$).

At the third grade level, with means entered for missing data, the Lorge-Thorndike Verbal I.Q. shows a correlation (Multiple R = .733; $R^2 = .537$) that is nearly as high as that of the second grade subtest, Paragraph Meaning. The Stanford Achievement Word Meaning subtest entered second (Multiple R = .800; $R^2 = .635$), and Paragraph Meaning, third (Multiple R = .801; $R^2 = .654$).

When the means for missing data were not included, in the analysis ($N = 98$), the correlation of Verbal I.Q. rose to .769 ($R^2 = .592$). Paragraph Meaning entered on the second step with a Multiple R of .823 and R^2 of .678. Age entered on the third step; Multiple R = .841 and $R^2 = .708$.

Although the analysis of first grade variables does not yield correlations as high as those noted above, it does produce significant predictors of grade seven reading competency. With means entered for missing data, the Stanford Achievement Paragraph Meaning subtest made the largest contribution (Multiple $R = .593$; $R^2 = .352$) in the stepwise regression analysis. Elementary Teachers' Ratings entered second (Multiple $R = .631$; $R^2 = .399$), and Word Study Skills, third (Multiple $R = .646$; $R^2 = .418$). In the analysis without means entered for missing data ($N = 81$), Paragraph Meaning was again first (Multiple $R = .704$; $R^2 = .496$), and Elementary Teachers' Ratings, second (Multiple $R = .715$; $R^2 = .511$). Sex, as the third variable to enter, contributed only a trivial amount (Multiple $R = .719$; $R^2 = .518$).

(5) What is the level of reading competency/literacy of this population of seventh graders who have completed seven years (counting kindergarten) of public school education?

The mean of the Iowa Vocabulary-Reading scores of 124 students in the seventh grade sample was 7.3, with a standard deviation of 1.4; the median was 7.5. In itself, the mean indicates that the average pupil scored two months above the expected score (7.1) upon entry to junior high school. However, the scores range over 7.1 grades, from a minimum of 4.1 (frequency = one) to 11.1 (frequency = one).

The percent below the expected grade level of 7.1 is 41.1 (N = 51).

If one employs the United States Bureau of the Census's definition of literacy as the achievement of a sixth grade reading level, 82% (N = 102) have attained it as reflected in their scores of 6.0 and above.

If one selects an eighth grade level as a measure of reading competency, only 44 seventh-grade pupils have reached it. Within this latter group are three students who scored at or above the tenth grade level.

Of course, it is not the expectation that seventh-graders will read at a high school level. However, if reading instruction ends at the seventh grade level, can anyone guarantee that reading development will continue for the majority who scored at, or even below, the grade point level of 7.1?

Summary

This research study of the cumulative record data of a certain group of public school children as they progressed from grade one to grade seven reveals several predictors of their potential for success in secondary academic subjects dependent upon reading ability. Inasmuch as formal reading instruction terminates for most pupils at the end of the sixth grade, these findings will have relevance for

educators now implementing elementary and secondary programs and tests geared to the measurement and attainment of minimum competency standards.

The research results and their implications will be discussed in Chapter V.

C H A P T E R V

DISCUSSION

The results of the analyses presented in Chapter IV provide significant evidence that elementary pupil cumulative records contain a wealth of data that can be evaluated and utilized to predict success and/or failure at the junior high level.

That sixth grade variables would correlated highly with grade seven reading achievement was anticipated and subsequently verified. However, the purpose of this study was to search for the earliest predictors of reading achievement and to identify the point in time when the evidence suggested that the instructional techniques were clearly not meeting the needs of some children.

Her study of the total data led this investigator to conclude that the Paragraph Meaning subtests of the Stanford Achievement Test at grade levels one (35% of the variance accounted for) and two (54% of the variance accounted for) provide the earliest significant predictors of reading development at grade seven. It is interesting to note that the Lorge-Thorndike Verbal I.Q. score at the end of grade three, although entering first in the stepwise multiple regression analysis at this level, does not

contribute any more to the explained variance than the second grade Paragraph Meaning subtest. Inasmuch as the Paragraph Meaning data are available a full year earlier, its value as a predictor surpassed the Verbal I.Q. test.

In view of the controversy regarding the use of group intelligence tests in schools because of the concern of some (Loretan, 1965; Yourman, 1964) that the practice discriminates against the socially and economically disadvantaged, it is of special interest to note that their elimination from this study would not have decreased the ability to predict junior high performance in reading from the study of elementary school records.

A similar finding was reported by Henderson et al. (1973) in their study of the effectiveness of second-grade reading achievement, intelligence tests, and other measurements as predictors of third-grade reading. Their study of 709 pupils revealed that the second-grade reading tests were the most significant predictors of third-grade reading achievement. Some of the additional variables included in this study were the Verbal and Performance I.Q. test scores of the Wechsler Intelligence Test for Children-Revised, the Word Association subtest of the Illinois Test of Psycholinguistic Abilities, the Bender Gestalt Test of Visual Motor Development, and Draw a Man/Woman test. None of these additional variables proved to be as

significant as the third-grade reading achievement tests.

That certain tests designed to measure the various subskills (that is, visual perception, auditory efficiency, visual-motor integration, etc.) and cognitive assets considered by many as essential to the reading process, and hence predictive of reading achievement, do not in actual practice enhance the forecasting of reading success has also been noted by other researchers (Feshbach, et al. 1977; Friedman, et al. 1980).

In his study of the early predictors of reading success, Ruddell (1979) determined that reading comprehension and listening comprehension test scores in grades one, two and three were the most significant predictors of total reading achievement in grades eight, nine and ten. Their subjects' primary grade scores in word analysis and decoding skills were not important indicators of later achievement. Ruddell's findings are similar to results obtained in this study. It is the Paragraph Meaning subtest of the Standard Achievement Test, rather than Word Study Skills, (which depends upon decoding abilities), that is the most significant predictor of later reading achievement.

None of the several additional variables entered in the analyses established more predictive power than the second-grade Paragraph Meaning subtest. Inasmuch as

Elementary School Teacher Ratings were the average of the ratings in grades one through six, the value of this data as an early predictor was lost. This is also true of the Junior High School Teacher Ratings, accumulated at the end of grade seven. The utilization of Teacher Ratings by successive grade levels might have been valuable. Recognition of this fact came too late to be used in this study. Nevertheless, it is important to note that the data suggest that teacher ratings of scholarship and motivation do correlate with reading achievement.

The relatively insignificant contribution of remedial reading to grade seven reading achievement appears to be the result of the very small number of remedial reading pupils who remained in this public school system throughout their elementary school years. Some of these pupils attended the single parochial school in the community; others moved into, or out of, the community during the period of this study. Since the longitudinal data were not available for many of these pupils, they could not be included in the statistical analyses.

Age, when it does enter the analyses, suggests that the older pupils are not doing as well as their younger classmates. This may be due to the fact that some of these older pupils had either attended a prekindergarten when they

had reached kindergarten age (and entered kindergarten one year later), or had repeated a grade because of reading and/or other academic problems. This finding does not coincide with the reports of some researchers in regard to age and its relationship to school progress. Ilg, et al. (1978) recommend that the developmental, rather than the chronological, age should be considered a priority in determining a child's readiness to begin formal learning tasks. Austin and Postlewaite (1978) reported that an earlier age entry to school had a positive effect upon math achievement, but not upon reading progress. Meanwhile, Ingenkamp has found that the elevation of age for school entrance among European countries has not resulted in a corresponding reduction in the number of first-graders repeating their initial year of school (Gredler, 1979). At this time, there does not appear to be a definitive statement that can be made about age and its relationship to reading achievement. In this particular study, age did not prove to be a significant predictor.

Neither does socioeconomic status appear to have the significance that it has been attributed in other studies (Coleman, 1966; Goodacre, 1976; Ruddell, 1979; Thorndike, 1976).

Similarly, attendance, and the number of elementary schools attended were not noted as predictors of later reading achievement for this group of pupils.

Although there is a considerable body of research (Blom, et al., 1976; Goodacre, 1976; Hill, 1979; Johnson, 1974) which suggests that girls excell boys in reading achievement in elementary school years in the United States, the sex of the pupils in this study did not prove to be a significant variable. Varying reasons have been offered by other researchers for the superiority of girls in reading skills in early school years. Hill (1979) and Ilg (1978) view boys as less mature in perceptual and language development during these years, and therefore less ready for reading. Blom, et al., (1976) suggest that unfavorable teacher attitudes toward boys may have a negative influence upon their progress. However, the reading achievement of the 130 pupils in this study could not be differentiated on the basis of sex.

It is important to note here that this study did not include the total population of more than 200 seventh-graders in the community's single junior high school. As in nearly all longitudinal studies, the data were not complete for some subjects who therefore had to be excluded. It has already been mentioned that the children who attended parochial school between kindergarten and grade

six were not included because they did not have the identical achievement and intelligence tests at the same points in time. Other pupils were excluded because they attended other private schools after grade six. An additional loss of subjects occurred because the pupils moved into, or out of, the school district during the period of this study. In all of these cases the subjects had to be excluded because their cumulative school records did not contain the relevant data. It is not possible to predict the impact that the data for these missing subjects might have had upon the statistical results of this study. However, the 130 pupils included in the study represent more than 50% of the seventh grade population.

This particular class was selected for study because of the longitudinal data available for a period of several years. Other classes were not administered test batteries as frequently, nor at equally distant points in time. There were several years, both before and after this class, when seventh graders were not tested at all, because of a general reduction in achievement testing at all levels in this school system. In the period between 1967 and 1971, and again in 1980, the Iowa Tests of Basic Skills were given to all seventh graders in the late spring. A comparison of the averaged scores in the Reading and Vocabulary subtests in these years suggests that the

pupils' reading achievement was quite similar to that of the group in this study. From 1967 through 1971, the tests were given in May, the ninth month of the school year; in 1980 they were given in April, the eighth month. The averaged Reading and Vocabulary scores are as follows: May, 1967: 8.2; May, 1968: 8.1; May, 1969: 8.1; May, 1970: 8.0; May, 1971: 8.2; April, 1980: 8.2.

It is apparent that in each of these years the class average was a few months above the expected grade level score (7.9 or 7.8) for the point in time that the tests were given. This was also true for the seventh graders in this longitudinal study; this correspondence of average scores for several years suggests that the pupils in this study are a representative sample of the community's typical seventh grade population.

The results have some important implications for reading researchers. The significance of the Paragraph Meaning subtest in the prediction of later reading achievement supports the conclusion of many that reading development depends not only upon the mastery of such subskills as word analysis and decoding, but more importantly, upon comprehension, verbal reasoning and inferential skills (Cramer, 1978; Farr, 1980; Goodman, 1970; Melnik, 1976). Melnik cited E. L. Thorndike's 1917 study, "Reading as Reasoning: A Study of Paragraph Mistakes," as classic in

its insights into the nature of comprehension. Melnik is critical of the many researchers who take exception to Thorndike's concluding statement:

It is not a small or unworthy task to learn what the book says. In school practice, it appears likely that exercises in silent reading to find the answers to questions, or to give a summary of the matter read, or to list questions which it answers, should in large measure replace oral reading (p. 10).

She concludes that an intelligent response to Thorndike's question, "What does the book say?" is the first step in the progression to higher levels of comprehension and interpretation.

Another important finding in this study is that the average seventh grader achieved test scores that were two months above expectations upon entry to junior high school. This suggests that the traditional emphasis upon reading development in elementary grades has produced the desired educational outcome for most pupils. It does not seem unreasonable to assume that a continued emphasis upon reading achievement in secondary school years would lead to further gains in comprehension skills, the ultimate goal in reading.

That a relatively small number of seventh-grade pupils had not reached a sixth-grade reading level cannot be ignored. Their test scores indicated a need for further evaluation to determine the causative factors, and to plan

for the indicated intervention measures. Ruddell (1979) suggests that intensive research is needed before educators can meet the needs of the low-achieving reading pupils: others (Austin and Morrison, 1975; Cramer, 1978; Diederich, 1973) recommend that basic skills instruction continue throughout the secondary school years.

Additional implications of this study for educators and researchers include the following:

(1) The cumulative data, particularly standardized reading test scores, in pupils' elementary school records can be very useful in the determination of the success and/or failure of the educational methods and philosophy of a particular school system.

(2) The majority of the children who lag behind in reading achievement in the primary grades continue to show deficiencies in subsequent school years; therefore, remedial intervention should be planned and implemented in the first few grades and continue until it is no longer needed.

(3) Since the early indicators of reading failure are available in school systems already using standardized tests, the addition of mandated competency tests in elementary grades is superfluous unless the early warning indicators are being ignored.

(4) Six years of public school education does not in itself guarantee an adequate level of reading competency

and/or literacy. Reading, as a basic subject, should be retained at the secondary level (grades seven through twelve) until each pupil has mastered the basic decoding, comprehension and inferential skills.

(5) Reading development should be a primary concern of the teachers of English literature, math, science and social studies at the secondary level.

(6) Factors noted to be of significance in national and international studies cannot be universally applied. More in-depth studies of local and regional populations are needed.

Summary

In the past decade in America, the demand for minimum competency standards in education has mushroomed beyond belief. The majority of the fifty states have determined that their students must prove their competency in academic areas, that is, reading, writing, and computational skills in order to receive their high school diplomas. The abrupt implementation of "exit" tests in some areas caused not only academic turmoil, but social and legal crises as well, and led to the recognition that competency testing, if it is to be of any value in education, should begin before the final year of high school.

The ultimate goal of the minimum competency standards movement in education is generally agreed to be the prevention of school failures. However, there is little agreement as to the grade level at which it ideally should begin. The Education U.S.A. Special Report (1978) indicated the extent of the variation among the states. Some, among them, Alabama, Colorado, Connecticut, Delaware, Idaho, Maine and Wyoming, still postpone competency tests until senior high school, while others (California, Florida, Georgia, Indiana, Kansas, Kentucky, Louisiana, Maryland, Nebraska, New Jersey, Oklahoma, Rhode Island, and Tennessee), have initiated their testing programs between grades three and twelve.

It was perhaps inevitable that so many educators, pressured by their school boards, parents and legislators, succumbed to the idea that more tests, labelled "minimum competency assessments," would shed new light upon the educational insufficiencies of numerous pupils, and provide more direct avenues to solutions. The public demanded increased educational attainment; the educators responded with additional measurements of achievement. The final outcome stunned no one: intensive and long-term remediation would be essential for large numbers of pupils and would be very expensive.

Minimum competency testing in itself is extremely costly. The necessary investments of time, money and expertise were approved by the taxpayers who strongly believed that the educators had failed and that new approaches would automatically lead to higher achievement. Blau (1980) identifies the student as "the victim" in the minimum competency test movement. Meanwhile, Bardon and Robinette (1980) predict that teachers will be held accountable if the movement does not produce positive results.

Not many, in either the educational or the political community, considered that the school histories of students might provide significant clues to their subsequent academic achievement, and yield insights that would enable educators to plan educational strategies for children in need long before their competency assessments were mandated. Most school systems already administer standardized norm-referenced tests on an annual basis to determine pupils' progress toward their systems' goals for achievement, particularly in reading. The data obtained may or may not be examined with statistical techniques on a longitudinal basis and its true significance never revealed.

The intent of this study has been to gather and to analyze all of the data routinely accumulated for a certain population of pupils during their school years from grades one to seven. The investigator sought answers to several

specific questions, addressed in Chapters III and IV, and to these more general ones:

(1) Now that exit testing has been coupled in some areas with competency tests at earlier grade levels, can it be assumed that the pre-senior year level tests are planned for the earliest point in time when remedial procedures are indicated for some pupils?

(2) Is the United States Bureau of the Census standard of literacy, namely six years of schooling, an accurate index for a nation that has had compulsory, free education for more than a century?

Concluding Statement

The focus of this study has been upon the reading progress of 130 pupils between grades one and seven in a small New England community. The analyses revealed that their reading subtest scores in grades one and two were the most significant predictors of junior high reading achievement. The Paragraph Meaning subtest of the Stanford Achievement Test in grade two was actually the most effective indicator among the primary grade (one through three) variables of later reading achievement and explained 54% of the total variance.

The superiority of the early Paragraph Meaning subtest, rather than an early Word Meaning or Word Study Skills

subtest, as a predictor of grade seven reading proficiency is evidence that reading is a developmental process that requires comprehension and interpretive abilities at later grade levels (Ruddell, 1976; Stevenson, 1976), even though letter and word-matching, and other perceptual skills are of significance in the prediction from kindergarten to grades one and two (Holmes, et al., 1975; Jansky and de Hirsch, 1972).

The results of this evaluation confirm Peaker's observation in his empirical study of learning in nineteen countries. ". . . the pace of learning tends to stay constant; those who begin as fast or slow learners tend to continue as fast or slow" (Peaker, 1975, p. 27).

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