

THE RELATIONSHIP OF ENTRANCE  
AGE TO SCHOOL SUCCESS

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JUDITH ANN LOWE



THE RELATIONSHIP OF  
ENTRANCE AGE TO  
SCHOOL SUCCESS

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An Abstract  
Presented to  
the Graduate Council

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In Partial Fulfillment  
of the Requirements for the Degree  
Master of Arts  
in Psychology

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Judith Ann Lowe  
September, 1980

## ABSTRACT

Much has been written in support of adjusting the school entrance age, and research suggests that the older a child is at entrance to school the more likely he is to succeed scholastically. Conversely, entering school before a child is ready is said to result in failure or the need for remediation. The purpose of this study was to examine this avowed relationship between school entrance age and academic success.

Subjects included all children in one elementary school whose cumulative record contained the needed data. Academic success was measured by reading readiness scores, achievement test scores, and incidence of retention, or placement in special-help programs.

Results of the study indicate that age variations within a year at the time of entry to first grade had no significant effect on readiness scores, achievement test scores, need for retention, or placement in resource, remediation, or learning disabled (LD) groups.

As a means of comparison, the independent variables of race, gender, and parent education (the number of years parents spent in school) were also correlated with academic success. Parent education was the strongest predictor of school success, followed by race. Gender was shown to be a significant predictor of achievement test scores in the third grade and of readiness test

scores in one of the first-grade groups. In addition, more boys than girls were retained or assigned to remediation, resource, and learning disabled classes.



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# LIST OF TABLES

TABLE	PAGE
1. Mean or Percent for Race, Gender, Entrance Age, Parent Education, and Scores of Achievement Test Groups . . . .	33
2. Correlation of Race, Gender, Entrance Age, and Parent Education with Achievement Test Scores . . . . .	34
3. Coefficients for Canonical Variables Showing Relative Influence of Race, Gender, Entrance Age, and Parent Education on Achievement Test Scores . . .	36
4. Mean or Percent for Race, Gender, Entrance Age, Parent Education, and Scores of Reading Readiness Test Groups .	37
5. Correlation of Race, Gender, Entrance Age, and Parent Education with Reading Readiness Test Scores . . . . .	38
6. Mean or Percent for Race, Gender, Entrance Age, and Parent Education as Noted for Special Groups . . . . .	39

To the Graduate Council:

I am submitting herewith a Thesis written by Judith Ann Lowe entitled "The Relationship of Entrance Age to School Success". I recommend that it be accepted in partial fulfillment of the requirement for the degree of Master of Arts, with a major in Psychology.

Theresa E. H. H. H.  
Major Professor

We have read this thesis and  
recommend its acceptance:

St. Louis H. H.  
Minor Professor  
or  
Second Committee Member

Linda Rudolph  
Third Committee Member

Accepted for the  
Graduate Council:

William H. Ellis  
Dean of the Graduate School



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# TABLE OF CONTENTS

	PAGE
LIST OF TABLES . . . . .	ix
CHAPTER	
I. INTRODUCTION . . . . .	1
Statement of the Problem . . . . .	1
Hypotheses . . . . .	4
Source of Data . . . . .	5
II. REVIEW OF PREVIOUS STUDIES ON ENTRANCE AGE AND ACHIEVEMENT . . . . .	6
An Overview . . . . .	6
Related Research with Tests of Significance . . . . .	8
Related Literature Favoring Early Entrance . . . . .	20
Related Literature Favoring Later Entrance . . . . .	23
Studies Relating Gender, Entrance Age, and Achievement . . . . .	27
III. PRESENTATION OF STUDY . . . . .	29
Procedure . . . . .	29
Description of Data . . . . .	29
Presentation of Data . . . . .	31
Demographic Data . . . . .	31
Relationship of Entrance Age to Achievement Test Scores . . . . .	32
Relationship of Entrance Age to Reading Readiness Scores . . . . .	36

Relationship of Entrance Age to Placement in Special-Help Groups .	38
Results . . . . .	40
Agreement with Hypothesis . . . .	40
Conclusions . . . . .	41
IV. DISCUSSION . . . . .	44
Further Conclusions . . . . .	44
Alternatives to Grade by Age . . . . .	46
Suggestions for Further Study . . . . .	49
REFERENCES . . . . .	51



# CHAPTER I

## INTRODUCTION

Although the concept of readiness is studied widely by educators and is a household word for parents, the fact remains that children are placed in school according to their chronological age (CA) at the time of enrollment. Attempts may be made to group children according to their degree of development, but it is obvious in our present system that children who are "below" or "behind" the others in their class are soon labeled, if not by their teacher or peers, by their own observation. For some, the ensuing struggle to "catch-up" or to "keep-up" begins upon school entry, and there are educators who are concerned about the effect of this striving on an individual and on the learning process itself. Therefore, it is reasonable to ask if the younger children in a class could profit from a later start, or if entrance age is related to academic success within that grade.

### Statement of the Problem

Hedges (1978) cites more than a dozen studies which indicate that mental age is a major factor in learning to read. Other studies by Devault, Edmiston, and Bigelow, as cited by Hedges, conclude that most children having a mental age of  $6\frac{1}{2}$  can learn to read. In light of such information, inferences can be made about chronological

age. For example, children with a Stanford-Binet IQ score of 85 must be slightly over 7 years and 3 months before their mental age is  $6\frac{1}{2}$ . An IQ score of 85 would place a child at the 17th percentile as compared to the national norm sample (Terman & Merrill, 1973), which indicates that approximately one child out of six has a Binet IQ of 85 or below. Such statistics suggest that four or five children out of every first-grade class do not meet the generally accepted minimum standard of having a mental age of  $6\frac{1}{2}$  at the time they enter school. Are these the students who fail or are placed in remediation? Would they profit from a later start, or a progression through learning tasks as they are able, without regard to age? Most would prefer the latter, but it is not usually an option. According to Bates, Gillespie, Haines, and Ilg (1978),

If reading is not started too early, children rarely become confused enough to need remedial help. Their pace may be slow. Some boys do not seem fully ready to read until they are eight years of age. If they are started earlier, they do indeed become confused. (p. 193)

At the same time, Laird (1975), Jester (1971), Miller (1973), and others seeking to lower the age of school entrance, claim that children exposed to the modern mass media are more sophisticated and ready to learn at

an earlier age, and that complex society and an expanding body of knowledge demand intellectual acceleration.

They would argue in favor of "speeding up the development of mental operations" (Okon, 1973, p. 9). Considering the number of working mothers, it is predictable that parents would also favor a lower school entrance age.

Attempts at research are conflicting because (1) results could be expected to vary in different systems depending on the particular program, (2) the type of analysis may dictate the result, and (3) comparison groups vary in age, IQ, gender and socioeconomic status. In the meantime, school is still in session, legislatures and school administrators continue to make decisions as to when children should begin, and there is growing concern that increasing numbers of children are having learning difficulties.

Thus, it might be helpful to examine the correlation between chronological age of entrance and academic success within a grade. If such a correlation is significant, it might be beneficial to reconsider the entry age itself, and/or examine the timely presentation of learning tasks. It could also suggest a more critical look at remedial practices--are we creating need by presenting too much too soon? On the other hand, if no significant relationship is found, it might be concluded that age differences within a year at the time of entry are not an important consideration.



### Hypotheses

The purpose of this study is to examine the relationship of school entrance age to academic success within a grade. More specifically, do age variations within a year at the time of entry to first grade have a bearing on readiness and achievement? The following null hypotheses are proposed:

1. Chronological age at time of entry to first grade is not significantly related to achievement test scores in the third and fifth grades.
2. Chronological age at time of entry to first grade is not significantly related to reading readiness test scores.
3. Students who are retained are not significantly younger than those regularly promoted.
4. Students assigned to classes of remediation are not significantly younger than the remainder of the students.
5. Students assigned to resource or EMR classes are not significantly younger than the remainder of the students.
6. Students assigned to classes for the learning disabled are not significantly younger than the remainder of the students.

7. Boys do not show evidence of more scholastic difficulty than girls as judged by their retentions and placement in classes of remediation, resource, or learning disability.

#### Source of Data

Subjects were enrolled in East Montgomery Elementary School, Clarksville, Tennessee, grades one through six, during the 1979-80 school year. Data were gathered from cumulative records. Birthday, gender, race, and level of parent education was noted for each student. In addition, reading readiness test scores were recorded for the second, third, and fourth graders, achievement test scores given in the ninth month of the third grade (3.9) were recorded for fourth and fifth graders, and achievement test scores given at the ninth month of the fifth grade (5.9) were recorded for sixth graders. Instances of retention or enrollment in classes of remediation, resource, or learning disability were noted for all students.

CHAPTER II  
REVIEW OF PREVIOUS STUDIES  
ON ENTRANCE AGE AND ACHIEVEMENT

An Overview

The most comprehensive review of the literature from 1918 to 1977 on chronological age as it relates to school success was done by Hedges (1978) wherein he reviews over 250 articles, a number of research papers, nine dissertations, and a half-dozen previous reviews. In each instance, the author claims to have traced the reference to its original source unless otherwise noted. In summary, he states:

It is far better to err on the side of delay than to err in too early entry....If a child is about average or perhaps somewhat below average and is a male, the probability is very high that first grade is not best for him at the traditional age of 6 to 6½. He should be 7 to 7½. Take about 6 months off the above for girls....The main message of this entire document has been that earlier is not necessarily better (pp. 154-156).

Hedges is open in his comments concerning the dangers of early entrance; the last sentence quoted above is reflected throughout his book. At the same time, data as to the statistical procedures and the number of cases are not included.



An earlier review of the literature by Beattie (1970) cited 20 studies from 1930 to 1970 relating entrance age to academic success. She shows evidence for both sides as follows:

Research contrasting children matched on sex, intelligence, socioeconomic status, and schools attended, has indicated that children who entered at a later chronological age scored consistently higher on achievement ratings than their younger classmates; another study found that the difference in academic achievement between early and late school starters was not statistically significant.

(Abstract)

An evaluation of the reviews by Halliwell (1966) examining research from 1930 to 1966 is highly critical of what he calls misinterpretation, biased selection of studies, inaccurate and over-used quotes from secondary sources, and inadequate controls, particularly in studies favoring early entry. He concludes, "The advantages of postponing early entrance to first-grade programs as they are presently conducted are very real" (p. 401).

Because of the volumes of material and conflicting claims, this review of the literature will consider first the related research; that is, those studies which outline proof of relationship or difference by means of statistical significance or the lack of it. Other studies will then

be discussed under the heading of related literature.

#### Related Research with Tests of Significance

The following studies were selected for review because they were similar to each other, were typical of what has been done, and were specific as to the details of the procedure and results. Presentation is in tabular form to aid the reader.

## Summary of Literature Using Studies Which Show Statistical Tests of Significance

Author Year	Group Limits	Independent Variable	Dependent Variable	Time	Procedure	Results
King <sup>a</sup> 1955	1. 77-80 months <u>M</u> IQ = 102  2. 68-71 months <u>M</u> IQ = 100  Groups mean age difference is 6 months  IQs of 90- 110 Gender distributed equally	Age of entrance to first grade	Grade equivalent Stanford Total Achievement	Grade 6	Fisher's <u>t</u> -test	Older group significantly superior to younger at .05 level

<sup>a</sup> n = 100

## Summary of Literature Using Studies Which Show Statistical Tests of Significance (continued)

Author Year	Group Limits	Independent Variable	Dependent Variable	Time	Procedure	Results
Carter <sup>b</sup> 1956	1. 6 years by September Male and Female	Age of entrance to first grade	Grade equivalent scores of MAT: Arithmetic Spelling Reading English (Intermediate Form G)	Grade 6	<u>t</u> -test	Older males significantly superior to younger males at .05 and .01 levels of confidence
	2. 6 years after September Male and Female					Older females significantly superior to younger females at levels of .01 and .05 (Exception: Arithmetic, female groups)
	Groups match gender and IQ					

<sup>b</sup> n = 100



## Summary of Literature Using Studies Which Show Statistical Tests of Significance (continued)

Author Year	Group Limits	Independent Variable	Dependent Variable	Time	Procedure	Results
Hampleman <sup>c</sup> 1959	1. 75 months or less $\bar{M}$ IQ = 106  2. 76 months or more $\bar{M}$ IQ = 106 Unmatched gender and IQ  3. Younger half of Group 1  4. Older half of Group 2  Mean difference Groups 1 and 2 is 5 months  Mean difference Groups 3 and 4 is 9 months	Age of entrance to first grade	Grade equivalent scores of MAT, Intermediate Form B: (in months) Reading	Grade 6	<u>t</u> -test	Groups do not differ significantly

## Summary of Literature Using Studies Which Show Statistical Tests of Significance (continued)

Author Year	Group Limits	Independent Variable	Dependent Variable	Time	Procedure	Results
Carroll <sup>d</sup> 1963	1. 72 months or more  2. Less than 72 months  Groups matched by IQ, sex and socioeconomic status <u>M</u> IQ = 115	Age of entrance to first grade	Raw scores  California Achievement Elementary Form CC: Vocabulary Comprehension Arithmetic Fundamentals Arithmetic Reasoning	Grade 3	Analysis of variance	Older group statistically superior in Vocabulary, Comprehension, and Arithmetic Fundamentals at .01 level of confidence, and in Arithmetic Reasoning at the .05 level

<sup>d</sup> n = 58

## Summary of Literature Using Studies Which Show Statistical Tests of Significance (continued)

Author Year	Group Limits	Independent Variable	Dependent Variable	Time	Procedure	Results
Dickinson <sup>e</sup> and Larson 1963	1. 107-109 months (younger $\frac{1}{4}$ )	Age of entrance to fourth grade	Iowa Test of Basic Skills composite score	Grade 4	Analysis of variance	Younger fourth significantly lower than remainder of class
	2. 110-118 months (remainder of class)					No significant difference in achievement of groups A-D
	No repeaters All had kindergarten IQ not significantly different					
	A. 107-109 months*					
	B. 110-112 months*					
	C. 113-115 months					
	D. 116-118 months					
	*IQ significantly higher than Group D					

<sup>e</sup> n = 489

## Summary of Literature Using Studies Which Show Statistical Tests of Significance (continued)

Author Year	Group Limits	Independent Variable	Dependent Variable	Time	Procedure	Results
Halliwell <sup>f</sup> and Stein 1964	Fourth grade: 1. 70-75 months 2. 76-81 months 3. 70-73 months 4. 78-81 months Fifth grade: same as above	Age of entrance to first grade	Adjusted raw scores for IQ of California Achievement: Vocabulary Comprehension Arithmetic Reasoning Arithmetic Fundamentals Language Spelling	Grade 4 Grade 5	Analysis of variance	Older groups were significantly superior (comparing modal halves and upper and lower thirds) in fourth and fifth grades in all areas except Arithmetic Fundamentals which was not significantly different in modal halves of fifth grade

<sup>f</sup> n = 102



## Summary of Literature Using Studies Which Show Statistical Tests of Significance (continued)

Author Year	Group Limits	Independent Variable	Dependent Variable	Time	Procedure	Results
Hirst <sup>g</sup> 1970	Kindergarten: 60-70 months old at entrance. Groups had equitable distribution of sexes and low, medium and high socioeconomic status	Age of entrance to kindergarten	WISC (7 scales) Torrence Creativity Kindergarten teacher rating of pupils MRRT Sociometric Gesell Developmental Education of Mother Physical Skills Socioeconomic Status	Grade 2	Regression	Age showed no significant correlation to reading or arithmetic achievement for total groups of first and second grade, nor for males or female groups or for lower, middle, and upper socioeconomic groups. (Sex was a predictor variable at the first-grade level, and socioeconomic status at the second-grade level.) Low relationship between age and all other predictor variables. (The highest correlation which was a portion of the Physical Skills Test indicates that age accounts for only 6% of the variation in that subtest.)

## Summary of Literature Using Studies Which Show Statistical Tests of Significance (continued)

Author Year	Group Limits	Independent Variable	Dependent Variable	Time	Procedure	Results
McCleod, <sup>h</sup> Markowsky and Leong 1972	1. Early Entrants: Age 6 in mid-school year accepted by exam  2. Rejectees: Age 6 in mid-school year but rejected by exam  3. Controls: Normal entrance age span of 1 year  Matched groups in high and low socioeconomic status	Age of entrance to first grade	Raw score MAT Primary II Form A: Arithmetic Comprehension Spelling Word Discrimination	Grade 2	Analysis of variance <u>t</u> -test	No significant difference in achievement of early and normal entrants, rejectees and normal entrants, or "old," "intermediate," and "young," normal age entrants.  Upper socioeconomic groups: No significant difference between early entrants and controls  Lower socioeconomic groups: Early entrants significantly superior to controls at .01 level

<sup>h</sup> n = 186

## Summary of Literature Using Studies Which Show Statistical Tests of Significance (continued)

Author Year	Group Limits	Independent Variable	Dependent Variable	Time	Procedure	Results
Broward <sup>i</sup> County School Board 1974	1. First Grade Early Entrants: Mid-year birthdays, accepted by exam	Age of entrance to first grade	Raw score total battery Comprehensive Test of Basic Skills	Grade 1	Analysis of variance	No significant difference in achievement between early entrants and first grade normal age entrants in the top 20%
	2. Kindergarten Same age as above, qualified for first grade but remained in kindergarten					Early entrants significantly superior to kindergarten group who refused early entrance
	3. First Grade Normal Age Entrants: Those scoring in top 20% on readiness test					

<sup>i</sup> n = 148

Several other studies which use statistical analysis but do not fit the above table, will be discussed here.

Green and Simmons (1962) used data on 23 white boys and 36 white girls who had entered school before their sixth birthday, calling them "younger," and an equal number of "older" boys and girls whose birthdays were later--the mean difference in age being just under 6 months. Distributions of parental occupations and IQ scores were "very similar" in both groups. The authors compared the actual performance of subjects with their probable performance had they postponed school admission. Results showed that if all children waited a year before beginning school, the average achievement test scores in any grade would climb, but the average scores of any given age would drop. Green and Simmons conclude that any manipulations of entrance age will help some children at the expense of others.

Mortensen, Nimicht, and Sparks (1963) studied more than 9,000 students in 84 Colorado districts. At the end of the fifth six-week period, teachers reported on the success of the children by rating each as "above average," "average," or "below average." The criteria included the children's ability to read and to perform other tasks expected of them, as well as their appearance, their social adjustment, and the relative abilities of other children in the class. Results of the study are



as follows:

Age at entrance proved to be a related factor in no more than one-third of the districts.

The results appear to show that the variable most commonly used--age--is the least reliable, and that IQ scores, the father's occupation, and sex could be used to predict success in the first grade.

(p. 35)

A more recent study comparing three types of programming for 5 year olds with birthdays between June 15 and October 15, was done by Gershman and Kulberg (1973). These children who were chronologically eligible for admission but would be youngest in the entering class, were given a battery of tests resulting in a Cognitive Index, a Psychomotor Index, and an Affective Index, and judged to be not ready, borderline, or ready for kindergarten. Children with similar scores on the three indexes were paired, resulting in 190 matched triads. Of three similarly rated children in each triad, one was assigned to the regular kindergarten, one to a readiness class, and one was asked to postpone kindergarten for a year. After determining homogeneity of the groups, analysis of variance showed the groups did not differ significantly on the Metropolitan Readiness Test. The wait group was measured a year after the other two. Gershman and Kulberg conclude that in spite of current popular appeal of postponed

admission to kindergarten for immature children, their findings suggest there is little or no advantage to waiting. On the other hand, the authors point to the wait group's higher mean score on the copying subtest, suggesting that psychomotor factors are dependent upon maturation processes and thereby improve simply with age.

#### Related Literature Favoring Early Entrance

It is apparent that discussions such as the "California Report of Early Schooling," (Moore, Moon, & Moore, 1972) and "When Should Schooling Begin?" (White, 1972) refer primarily to pre-school education. Another body of research centers on the advantages or disadvantages of acceleration or early admission of very bright children. For example, Green and Simmons (1962) showed early entrants to be one year ahead in grade and approximately three months ahead in achievement of pupils of the same age and intelligence who did not enter school early. Another study (Ahr, 1967) using above average children from an affluent suburb showed early entrants having a mean mental age of 7 surpassed their peers throughout elementary school as judged by the Iowa Test of Basic Skills. However, there are still those who maintain that acceleration of even these bright children results in their lowered class ranking as compared to what they might have achieved had they not been accelerated (Halliwell, 1966).

Other arguments that would favor early entrance center around the best time to start reading or the possibility that readiness can be abbetted by schooling or instruction (Weininger, 1972). Miller (1973) cites a research project by reading specialists Mckee and Harrison who designed instructional material for use in kindergarten. Testing their program in the Denver Public Schools, the experimental groups who received informal beginning reading instruction in kindergarten maintained their early lead in reading achievement. In a more limited sample, Durkin (Miller, 1973) states that the lead attained by early readers continued into intermediate grades and this lead was especially significant for the slow learning children in her samples.

A study by Jester (1971) tests the effect of early intervention. The subjects were infants. Those given systematic intellectual stimulation using objects and language were ahead of the controls as measured by the Stanford-Binet Intelligence Test at age 3. Jester claims that the best time to begin reading skills is on the baby's date of birth--5, 6, or 7 years of age may be too late for optimum development. In the same vein, a study by Laird (1975) espouses that because children are bombarded with words that have meaning for them on signs, posters, labels, etc. that readiness to read at age 6 must be re-examined. He believes that television, nursery school,



and better educated parents may also contribute to earlier readiness.

Knight and Annual (Halliwell, 1964) found that students who entered school at age 6 attained higher grades and had fewer failures than did the pupil who entered at age 7. Their review included no intelligence scores but the groups were considered homogenous in socioeconomic status. Hamalainen (1952) also found that the over-age pupils did not do as well as the normal-age pupils, though IQ scores were not reported and the age of the older entrants was not defined.

In summary, it can be noted that sometimes conflicting ideas as to the best time to begin school are brought about by differing notions of what school should be. Many researchers, whether in favor or opposed to early entrance, would probably agree with the following statement by Hymes (1964):

When the question of school-starting age arises, we focus our attention on the wrong side of the coin. Concern should focus on the school, its program, its equipment, its class size, its expectation, its philosophy. (p. 124)

To put it another way, others have said, the question is not when is the child ready for school, but rather, is school ready for the child?



### Related Literature Favoring Later Entrance

Researchers opposed to early entrance are numerous. Moore, Moon, and Moore (1972) cite more than a dozen often quoted studies wherein older entrants excelled as compared to younger entrants later in their school career. In addition to these, Forrester's Montclair study (1955) revealed that children in the very bright, very old category excelled generally throughout their schooling. On the other hand, the very bright and very young children met with varying difficulties from the junior high school period on. He found that 50% of the children in this category made only average grades and teachers reported that they were immature physically, or that they were emotionally unstable and cried easily. They were seldom asked to be leaders by the other children.

Johnston's findings (1964) comparing achievement of groups having fall birthdays with those of winter, confirm the above reports. He asserts that success in reading is positively associated with older entrance and students who enter first grade prior to their sixth birthday do not do as well in reading achievement in the first years of schooling as do their classmates whose sixth birthdays were in January through March of that year. Johnston states that this appears to be true regardless of ability level. He concludes that if a rigid entrance age is to be required, it should be raised so that all children

are 6 or more chronologically before entering school.

Perhaps the most eminent proponents of "late is better than early," are Arnold Gesell, Frances Ilg, Louise Bates Ames, and Clyde Gillespie. Ilg (1972) reports:

It is a good proportion if 25 percent of the children accomodate easily to their assigned grade. At least 50% of the children in some schools show signs of overplacement; that is, they may be bright and achieving well, but feel tensions from school demands. Age is very important with these children. They are often shown to have fall birthdays. The remaining 25% are in need of drastic help--perhaps one year and possibly two years of time. (p. 16)

In the same vein, Ames, Gillespie, and Streff (1973) suggest that 67 of the last 100 children seen in their clinical services in 1970 needed to be back one grade lower than their actual grade placement. Gillespie contends that as many as half the children in elementary school today are in the wrong grade (Levenson, 1977). In explaining the plight of these overplaced students, Ames (1967) points out that very few children grow more than a year in a year, as they would need to if they were going to catch up.

Many of the comments by Ames and Gillespie refer to long range maturity, but Ames and Chase (1974) note birthdays, saying the chances are very good that if children are on the older side (fully 5 for girls, and fully 5½ for boys) before entering kindergarten, they will make it in school. Ames is clear about early entrance programs, calling them harmful for taking children young in years but bright (what she calls superior-immature) and placing them in a grade for which their age and therefore, in all probability, their behavior is not ready. Her philosophy echoes that of Ames and Ilg (1963); that is, if children enter school on the basis of age alone, a very high proportion will be entered before they are ready.

Davis (1952) made a study of 235 first-grade children in school for one term, finding that 45% of the low grades in arithmetic and 38% of the low grades in reading went to the youngest fourth of the class. Johnston's study in 1964 indicated that students in the youngest third of the class were significantly more likely to be called retarded than their older classmates. Pullen (1972) suspects that some of the so-called learning disabilities found in children today are caused by starting children before they are ready.



Often times the advocate of later entrance points to physiologic development. Ogletree (1973) reports that of those children receiving their second teething about age 7 which is somewhat ahead of schedule, 96% were properly placed in the first grade, and doing very well. Of those children who were behind schedule in teething, 94% should have repeated the first grade; twenty-two percent did repeat.

Other data concerning age and maturity are readily available. Liben (1977) reports that not until third grade do children get true meaning from oral words; until that time, they guess according to sounds or repetitions of familiar words. Hock (1978) cautions that too much emphasis on reading at an early age may suppress the creative part of the brain. He suggests that children should not be taught to read until the age of eight. Luella Cole (Moore, Moon, & Moore, 1972) and others report that not more than 10% of 5 year olds can see any difference between "d" and "b" or between "p" and "q," and not until children are 8 years old can one be sure that the eyes are mature enough to avoid such confusion. In the same reference, Hilgartner, an ophthalmologist, comments on the increase in nearsightedness. In his experience, prior to 1930, 7.7 children were farsighted to every one nearsighted. At that time, the Texas compulsory school age was lowered from 7 to 6 years. Reporting on his practice in 1972, Hilgartner notes that



five children were nearsighted for every one farsighted. Scott (1975) suggests that 7 year olds are not capable of storing or retrieving as much information in short-term memory as older subjects of equal ability, probably because they are not able to organize it.

Moore and Moore (1973) describe what they call the early stimulation theory: Teaching a child before he is ready is like forcing open a rosebud, "no matter how delicately you open it, you end up with a damaged rose" (p. 16).

Perhaps the most radical advocacy of later entrance comes from Rowher (1971) as he maintains that early childhood is an inefficient period in which to teach skills that can be relatively quickly learned in adolescence.

#### Studies Relating Gender, Entrance Age, and Achievement

Hedges (1978) cites studies by Baer, Pauley, Worcester, and others, which point to significantly different development or achievement between boys and girls of the same age; in each case, the boys being behind the girls. In all of the studies reviewed by this author only one is in disagreement with this premise, namely that of Brenner and Stott (1971). They report that on the basis of their factor analysis they would not be able to support the idea that boys should begin school 6 months or a year later than girls, as is advocated by Ames, Pullen, and others. Brenner

and Stott then quote from Oetzel's bibliography on sex differences that findings of about 196 studies show that boys and girls differ consistently from each other in relatively few areas. They do not discuss the age at which these correlations occur.

# CHAPTER III

## PRESENTATION OF STUDY

### Procedure

Permission was granted by the Clarksville-Montgomery County School System and Mr. Sam Winters, Principal, to review all of the cumulative records of children in the first through the sixth grades who were attending East Montgomery School during the 1979-80 school year. Only those children who had been in this school system continuously were included in the study. Data were recorded by number rather than name and were taken from 538 folders.

### Description of Data

The four independent variables noted for each student were race, gender, age of entrance to first grade, and education of parents. In computer terms, race was noted as 0 for black and 1 for white, and gender was noted as 0 for male, and 1 for female. Age of school entrance was determined in months by subtracting birthdate from the date of entry to school. Since the school year begins in August and a child must be six by October 31, age of entrance would normally range from 70-82 months with the mean being about 76 months. Parent education was somewhat speculative: For a single parent, when high school was given, a 12 was entered; two years of college or other training was recorded as 14; and in the case of medical

school, law school, etc., the approximate number was entered. If educational level for both parents was given, it was figured individually as described above. The total years were then added and divided by two.

The independent variables or measures of achievement taken from the cumulative folders are as follows: Metropolitan Achievement Test (MAT) Total Reading and Total Math scores at the third-grade ninth month (3.9) and fifth-grade ninth month (5.9) levels, and Metropolitan Reading Readiness Test (MRRT) scores, Form B and Level II. These test scores were given as percentiles in the cumulative records. Using the appropriate manuals, the readiness percentiles were converted to raw scores, and the achievement percentiles converted to standard scores. Instances of retention and enrollment in classes of remediation, resource or learning disability (LD) were signified by the numeral 1. The remainder of the students who received none of these services were marked by a zero in each of these categories. In cases of retention in which a child had two achievement test scores, the first or earlier score was used. There were also children who were retained previously (in years preceding the testing) who were therefore on the average, a full year older than their classmates at the time of testing. Six such cases were included in the 3.9 scores, and 10 in the 5.9 scores.



## Presentation of Data

### Demographic Data

Data were taken from 538 cumulative folders, and those students are referred to as the total group. There were 193 MRRT scores taken from the records of second and fourth graders. The third-grade MRRT scores could not be used because they had been recorded in terms of low, average, and high. The MRRT scores were not recorded or included for fifth and sixth grades. There were 193 MAT scores at the 3.9 level which were taken from the records of fourth and fifth-grade students, and 102 MAT scores at the 5.9 level taken from the records of sixth-grade students.

Incidence of retention, remediation, resource and/or learning disability were noted for all students irrespective of grade level, and some children appeared in more than one of the above categories. Of the total group, there were 53 who had been retained, 97 who attended remediation in either math or reading or both (no distinction was made between the type of remediation or number of years attended), 9 who were classified as resource students, and 8 who were called learning disabled.

Of the total group, 85% were white, and 51% were male. Their mean entrance age to first grade was 75.4 months, and their parents' mean educational level was 12½ years of schooling.



### Relationship of Age to Achievement Test Scores

Using records of the fourth and fifth graders, 193 listed MAT scores at the 3.9 level, and 102 sixth-grade records listed MAT scores at the 5.9 level. Table 1 gives the mean of the variables for each of these groups. Because data for race and gender were recorded as 0 and 1, those figures can be interpreted as percents, showing that 87% of the 3.9 scores and 81% of the 5.9 scores represent white students. In the same way, 50% of the 3.9 scores and 42% of the 5.9 scores represent girls.

TABLE 1

Mean or Percent for Race, Gender, Entrance Age,  
Parent Education, and Scores of Achievement Test Groups

Variable	Grade Level 3.9 <sup>a</sup>	Grade Level 5.9 <sup>b</sup>
Race	.87 (% white)	.81 (% white)
Gender	.50 (% female)	.42 (% female)
Entrance Age	74.8 months	76.1 months
Parent Education	12.6 years	12.4 years
Reading	66.1	77.0
Math	71.2	80.5

<sup>a</sup>  $\underline{n} = 193$

<sup>b</sup>  $\underline{n} = 102$

Table 2 lists the correlation coefficients between the 4 demographic variables and reading and math achievement test scores. At third-grade level, the variables of race, gender, and education of parents were significantly related to achievement scores in Math and Reading. That is, the more parent education, or the greater the proportion of white or female students, the higher the achievement. At third-grade level, age of entrance was significantly related to Math but not to Reading scores. Practically

speaking, the significant correlation with entrance age is negligible since entrance age accounts for less than 2% of the variance. The largest correlation with gender accounts for 7% of the variance. The fifth-grade scores show correlations to be significant for race and parent education but not for age at entrance or for gender.

TABLE 2

Correlation of Race, Gender, Entrance Age, and  
Parent Education With Achievement Test Scores

Group <sup>a</sup>	Race	Gender	Entrance Age	Parent Education
Reading 3.9	.37557**	.27238**	.11164	.49828**
Math 3.9	.34149**	.19018*	.14834*	.46278**
Reading 5.9	.42123**	.06598	.08443	.44696**
Math 5.9	.33897**	.13663	.02292	.31287**

<sup>a</sup>  $\underline{n}$  = 193 3.9 level

$\underline{n}$  = 102 5.9 level

\*  $\underline{p} < .05$

\*\*  $\underline{p} < .01$

The canonical correlations of the independent variables to the MAT scores are .61953 at the third-grade level,

and .52213 at the fifth-grade level. These correlations are highly significant at a level greater than .001, showing these variables, when considered together, to be important predictors of achievement test scores. They account for 38% of the variance in achievement test scores in the third grade, and 27% of the variance in fifth-grade scores.

Table 3 shows the loading of race, gender, entrance age, and parent education on the variance. The influence of entrance age is comparatively little at the third-grade level, and negligible in the fifth grade. Gender had some influence on the third-grade level.



TABLE 3  
Coefficients for Canonical Variables Showing Relative  
Influence of Race, Gender, Entrance Age, and  
Parent Education on Achievement Test Scores

Groups <sup>a</sup>	Race	Gender	Entrance Age	Parent Education
Reading, Math Third Grade	.42387	.3038	.18350	.69063
Reading, Math Fifth Grade	.55604	.04548	.01072	.64857

<sup>a</sup>  $\underline{n}$  = 193 third-grade scores

$\underline{n}$  = 102 fifth-grade scores

#### Relationship of Entrance Age to Reading Readiness Scores

Because two different forms of readiness tests had been administered, the statistical analysis was divided into 116 cases using scores from the MRRT Level II, and 77 cases using the MRRT, Form B. The mean for these raw scores and that of the independent variables is shown in Table 4.

TABLE 4  
Mean or Percent for Race, Gender, Entrance Age,  
Parent Education, and Scores of  
Reading Readiness Test Groups

	Scores, Level II <sup>a</sup>	Scores, Form B <sup>b</sup>
Race	.84 (% white)	.92 (% white)
Gender	.50 (% female)	.56 (% female)
Entrance Age	75.3 months	75.4 months
Parent Education	12.7 years	12.5 years
Metropolitan Level II	50.2	
Metropolitan Level B		65.6

<sup>a</sup>  $\underline{n} = 116$

<sup>b</sup>  $\underline{n} = 77$

Table 5 shows the relationship of each of the independent variables to the readiness test scores. The MRRT Level II scores correlated significantly with race, gender, and parent education, but not with age at entrance. The MRRT Form B scores correlated significantly with race and parent education, but not with gender or age at entrance.

In using either test, gender accounts for about 4% of the variance and entrance age accounts for less than 1.5% of the variance. Race accounts for 7-9% of the variance, and parent education accounts for 19-21% of the variance.

TABLE 5

Correlation of Race, Gender, Entrance Age, and Parent Education with Reading Readiness Test Scores

	Race	Gender	Entrance Age	Parent Education
Level II <sup>a</sup>	.29302**	.19870*	.12145	.43500**
Form B <sup>b</sup>	.26986*	.20332	.03312	.46108**

<sup>a</sup>  $\underline{n} = 116$

<sup>b</sup>  $\underline{n} = 77$

\*  $p < .05$

\*\*  $p < .01$

#### Relationship of Entrance Age to Placement in Special-Help Groups

In reviewing the 538 cumulative records, instances of retention, and attendance in remediation, resource, or learning disability classes were noted. Table 6 gives the number and the mean of each category.

TABLE 6  
Mean or Percent for Race, Gender, Entrance Age, and  
Parent Education as Noted for Special Groups

Group	n	Race (% white)	Gender (% female)	Age (months)	Parent Education (years)
Retention	53	.75	.30	74.6	10.7
Remediation	97	.73	.43	75.1	11.7
Resource	9	.44	.11	76.0	9.3
LD	8	1.0	.25	76.2	12.2
No Service	391	.89	.51	75.5	12.9
Total Groups	538 <sup>a</sup>	.85	.47	75.4	12.6

<sup>a</sup> Some students were in two groups.

Eighty-five percent of the total group was white, compared to 44% of the resource group and 100% of the learning disabled. The retention and remediation groups had a somewhat lower proportion of white than that of the total group, but the difference does not appear to be great.

The total group was 47% female, in contrast to 11% female in resource, 25% female in LD and 30% female in



the retention group. The remediation group also had a smaller proportion of females than did the total group.

Entrance age was somewhat similar for all the groups, with mean differences of less than a month.

The mean score for parent education may be high as a result of the method of computation. For example, when it was noted on the cumulative folder that the last grade attended was high school, a 12 was assumed and recorded. Nevertheless, the mean scores for parent education are relative, and were nearly 2 years less in the retention group and 1 year less in the remediation group, as compared to the total group. A larger difference was found in the resource group, with 3 years less parent education than the total group.

In summary, parent education appears to be a good predictor of membership in most of these groups, as does gender and race. Entrance age varied little between the groups. The relative strength of these variables as suggested here is not in opposition to the findings on achievement and readiness which were tested and discussed earlier, though gender looks to be more significant here.

### Results

#### Agreement with Hypothesis

Hypothesis 1 states that chronological age at time of entry to first grade is not significantly related to

achievement test scores in the third and fifth grades. This study showed one of the four correlations between entrance age and achievement to be significant, but in that case, entrance age accounted for only 2% of the variance. The null hypothesis is accepted.

Hypothesis 2 states that chronological age at time of entry to first grade is not significantly related to reading readiness test scores. This study showed no significant correlation between age of entrance and reading readiness test scores. The null hypothesis is accepted.

Hypothesis 3, 4, 5, and 6 state that students who are retained or assigned to classes of remediation, resource, or LD, are not significantly younger than the total school population. The null hypotheses are accepted.

Hypothesis 7 states that boys will not show evidence of more scholastic difficulty than girls as judged by their retentions and placement in classes of remediation, resource, or learning disability. This study showed that 89% of the resource, 75% of the LD students, and 70% of those retained were boys. These findings do not support the null hypothesis.

### Conclusions

This study seems to indicate that chronological age within a grade level is not a good predictor of academic success. Specifically, an age span of less than a year

at the time of entry to first grade had little effect on readiness scores, achievement test scores, need for retention, or placement in resource, remediation, or LD groups.

Gender was shown to be a significant predictor of achievement test scores in the third grade and of readiness test scores in one of the first-grade groups. In addition, more boys than girls were retained or assigned to remediation, resource, and LD classes.

Finally, looking at the effect of variables on different measures of achievement, parent education was the largest predictor of success, accounting for 19-21% of the variance in reading readiness test scores. Parent education accounted for 25% of the variance of 3.9 achievement test scores in reading, and 20% of the variance of 5.9 achievement test scores in reading. The next largest variable, race, accounted for 7-8% of the variance of reading readiness test scores, and 14% and 18% of the variance for 3.9 and 5.9 reading achievement test scores. The variable of gender accounted for 4% of the variance of reading readiness test scores, 7% of the variance of 3.9 achievement test scores in reading, and less than 1% of the variance for 5.9 reading achievement scores. Age at entrance accounted for 2% or less of the variance of reading readiness and achievement test scores at the above levels.

In light of the small contribution of entrance age to the prediction of readiness and achievement test scores, the interaction of entrance age with other variables was not considered.



## CHAPTER IV

### DISCUSSION

Considering those studies with similar, more limited age spans, previous investigation of the effect of school entrance age yields inconsistent results. Most studies used analysis of variance to evaluate the data, and many investigations showed a significant difference between groups of older and younger children, with the older achieving more. However, the cause of these differences was not addressed by such research. Factors such as socioeconomic level, intelligence, education of parents, etc., could have had a greater effect on achievement than did CA.

In studies using multiple regression as a statistical procedure, or those which indicate the percent of variance accounted for, the effect of CA as a predictor of achievement is shown. Employing these same techniques, this study supports the research by Hirst (1970) who found no significant relationship between age and achievement in the time span considered.

#### Further Conclusions

This study offers no insight as to an ideal entrance age; the majority of children could be overplaced (that is, they would profit by waiting a year or more to begin school) and show no significant correlation between CA and achievement.

In the same way, the majority could have reached an optimum age to begin school and show no significant relationship between CA and achievement. Therefore, while age differences within a year did not seem important, a year or more could be very significant, and this study does not indicate whether or not children are exposed to learning tasks that would be better mastered at a later time.

This study could have meaning to classroom teachers who are evaluating similar learning problems of two children of different ages within the year. This investigator suggests that the younger might be viewed by the teacher as immature, or as a possible candidate for retention, while the older child might be thought of as slower or less bright. If, in fact, an age difference of several months does not significantly affect achievement, the older student could be experiencing the same lack of maturity indicating a need for retention, or the younger child might simply be less bright. Factors other than age would become obvious once the child is evaluated, but errors might be made in initial assumptions before referral.

As to an optimum entrance age, there is little indication in the research that formal reading should be started earlier. On the other hand, starting school at a later age would mean succumbing to what could be called a "some children" syndrome: "Some children" cannot fixate on objects at close range until age 8 or later (Moore,

Moon, & Moore, 1972); "some children" might be better to start school a year later (Pullen, 1972); "some children" will be unable to consistently retain and recall speech sounds until age 9 (Wepmann, from Moore & Moore, 1973). If age of entry were to be based on the time when the entire group is ready, there would always be "some children" who need more time.

### Alternatives to Grade by Age

In light of this study and other research, the author takes the liberty to discuss alternative plans for dealing with the problem of entrance age.

In determining the best time to begin school, some have suggested that it would be more sensible to admit children according to their mental age (Hedges, 1978), or their integrated maturity level (Moore & Moore, 1979), or even their ability to recognize letters (Di Nello & Muehl, 1976). However, in addition to being cumbersome, expensive, and subject to error, a system that admits students at various times would probably be unacceptable in today's plan ahead world.

Another alternative is one that might not be as complicated as it first appears. Consider again the ungraded classroom. For public convenience, children would begin on a specified date as is presently done, but they would be placed either in a kindergarten or at



a first-grade level according to their state of readiness. Simple screening could be used for initial placement and daily success at that level would confirm placement or suggest the need for immediate re-assignment. After a period of weeks or months during which certain competencies were passed, the groups would be reorganized. Those who had mastered the material would proceed to another competency while others might remain at that level, but perhaps with a different name, a new teacher, or another method of instruction. Such a plan recognizes the fact that readiness is a complex quality, difficult to measure outside of the learning task itself, and that entrance age needs to be somewhat uniform for the convenience of school and society alike. It allows for the idea that achievement in learning a task is equal to the amount of time allowed divided by the amount of time needed. That leaves only the curriculum to be progressively arranged and presented to groups of children as they prove able.

In the school just studied, there were 53 retentions in the five grades. In this alternative system, those 53 might have spent an extra year getting through the primary levels, but hopefully with little damage to the persons or their attitude toward learning. It is interesting to contemplate the benefits of using teachers of remediation in the regular classroom, thereby lowering the pupil teacher ratio. This was done without the loss of state funds in



California (Glasser, 1975).

Those who are unable to progress might be served by an altered curriculum with topics contributing to their life situation presented at their level of understanding. High school and even junior high students are allowed to be different in the classes they take and amount of learning expected of them. It might be possible to allow elementary children some latitude in development time and even in course offerings, so that an 11 year old who is still struggling with reading would not be called upon to recognize a dangling participle or discuss the Boston tea party.

In Tennessee and elsewhere, schools are expensive; numbers of children graduate without knowing the so-called "basics" of reading and writing; graduates are too often unskilled and unable to find jobs; and many dropouts and graduates alike are destructive and burdensome to society. What better place to look for answers than at the beginning, and what better way than reorganization of that which is already there. In the present system two things are clear:

- (1) children are admitted to school according to their chronological age and their relative performance within that age curve determines who succeeds year by year, and
- (2) children are not learning what we would like them to know academically or as productive citizens. Perhaps if we could modify the first point by teaching according to

an individual's demonstrated readiness, the second would begin to take care of itself. Such a plan could be attempted in one elementary school.

So, hopefully would end the debate on readiness, entrance age and when to teach what. A program would be there for the child as he needs it. The day might come when achievement tests could be replaced by achievement in living--learning to be successful at various levels in school and in society.

#### Suggestions for Further Study

1. Correlate entrance age, gender, and intelligence with readiness or achievement test scores, and look for interactions between matched groups such as young female entrants with average or below intelligence as compared to young male entrants with average or below intelligence. Show percent of the variance accounted for and contributing weight of each of the variables.
2. Look for other significant predictors of scholastic success by correlating birth order, teacher ratings, physiological development such as number of teeth, socioeconomic background, etc., with measures of achievement. Check for percent of variance and interaction between variables.
3. Conduct a longitudinal study using the first, third, and fifth-grade scores of a large group of sixth

graders considering the variables mentioned above.

Multiple correlations showing the effect of variables as they relate to readiness and achievement could be compared for their changing effect over time.

4. Correlate readiness test scores to simple screening devices such as letter recognition.

## REFERENCES

- Ahr, A. E. Early school admission: One district's experience. The Elementary School Journal, 1967, 67, 231-236.
- Ames, L. B. Is your child in the wrong grade? New York: Harper and Row, 1967.
- Ames, L. B., & Chase, J. A. Don't push your preschooler. New York: Harper and Row, 1974.
- Ames, L. B., Gillespie, C., & Streff, J. W. Your child and school success. Today's Education, 1973, 62, 33-40.
- Ames, L. B., & Ilg, F. L. Every child in the right grade. Instructor, 1963, 73, 7, 11.
- Bates, L. A., Gillespie, C., Haines, J., & Ilg, F. L. School Readiness. New York: Harper and Row, 1978.
- Beattie, O. Entrance age to kindergarten and first grade: Its effect on cognitive and affective development of students. 1970. (ERIC Document Reproduction Service No. ED 013 371)
- Brenner, A., & Stott, L. H. School readiness factor analyzed. Detroit, Mich.: The Merrill-Palmer Institute, 1971. (ERIC Document Reproduction Service No. ED 094 862)



- Broward County School Board. A study of early entry into first grade. 1974. (ERIC Document Reproduction Service No. ED 122 929)
- Carroll, M. L. Academic achievement and adjustment of underage and overage third graders. Journal of Educational Research, 1963, 56, 415-419.
- Carter, L. B. The effect of early school entrance on the scholastic achievement of elementary school children in the Austin Public Schools. Journal of Educational Research, 1956, 50, 91-103.
- Davis, H. M. Don't push your school beginners. Parents' Magazine, 1952, 27, 140-141.
- Dickinson, D. J., & Larson, J. D. The effects of chronological age in months on school achievement. Journal of Educational Research, 1963, 56, 492-493.
- Di Nello, M. C., & Muehl, S. Early first-grade skills related to subsequent reading performance: A seven year follow-up study. Journal of Reading Behavior, 1976, 8, 67-79.
- Forrester, J. J. At what age should a child start school? The School Executive, 1955, 74, 80-81.
- Gershman, E. S., & Kulberg, J. M. School readiness: Assessment procedures and comparison of programming. Psychology in the Schools, 1973, 10, 410-419.
- Glasser, W. Schools without failure. New York: Harper and Row, 1969.

- Green, D. B., & Simmons, S. V. Chronological age and school entrance. Elementary School Journal, 1962, 63, 41-47.
- Halliwell, J. W. Reviewing the reviews of entrance age and school success. The Journal of Educational Research, 1966, 59, 395-401.
- Halliwell, J. W., & Stein, B. W. A comparison of the achievement of early and late starters in reading related and non-reading related areas in fourth and fifth grades. Elementary English, 1964, 41, 631-639.
- Hamalainen, A. E. Kindergarten-primary entrance age in relation to later school adjustment. The Elementary School Journal, 1952, 52, 406-411.
- Hampleman, R. S. A study of the comparative reading achievement of early and late school starters. Elementary English, 1959, 36, 331-334.
- Hedges, W. D. At what age should children enter first grade: A comprehensive review of the research. Ann Arbor, Mich.: University Microfilms International, 1978.
- Hirst, W. E. Entrance age: A prediction variable for academic success? Reading Teacher, 1970, 23, 547-555.
- Hock, R. Dangers of early emphasis on reading. Intellect, 1978, 106, 352.
- Hymes, J. L. The right school starting age. Grade Teacher, 1964, 81, 123-124.

- Ilg, F. L. Overplacement--The problem that doesn't have to be. Teacher, 1972, 90, 16, 29.
- Jester, R. E. Intellectual stimulation of the preschooler, or reading readiness begins at birth. 1971. (ERIC Document Reproduction Service No. ED 049 900)
- Johnston, A. M. School entrance age. Childhood Education, 1964, 40, 384-386.
- King, I. B. Effect of age of entrance into grade 1 upon achievement in elementary school. Elementary School Journal, 1955, 55, 331-336.
- Laird, A. W. When are children ready to learn to read? Reading Improvement, 1975, 12, 47-49.
- Levenson, D. Where do they belong? Teacher, 1977, 94.
- Liben, L. S., & Posnansky, C. J. Inferences on inference: The effect of age. Child Development, 1977, 48, 1490-1497.
- McLeod, J., Markowsky, M.D., & Leong, C. K. A follow-up of early entrants to elementary schools. Elementary School Journal, 1972, 73, 10-19.
- Miller, W. H. What about formal reading instruction in kindergarten? Illinois School Journal, 1973, 53, 16-20. (ERIC Document Reproduction Service No. EJ 080 294)
- Moore, R. S., Moon, R., & Moore, D. R. The California report: Early schooling for all? Phi Delta Kappan, 1972, 53, 615-621.



- Moore, D. R., & Moore, R. S. How soon should they go to school? Childhood Education, 1973, 50, 19-20.
- Moore, D. N., & Moore, R. S. School can wait. Provo, Utah: Brigham Young University Press, 1979.
- Mortensen, J., Nimnicht, G., & Sparks, J. Is there a right admission age? The Education Digest, 1963, 28, 33-36.
- Ogletree, E. J. Bioplasmic forces: A new concept in readiness. Reading Improvement, 1973, 10, 34-36.
- Okon, S., & Wilgocka-Okon, B. The school readiness project. (Institute for Education, Experiments, and Innovations in Education, No. 2) Warsaw: UNESCO, IBE, 1973.
- Pullen, J. R. Starting kindergarten too soon. School and Community, 1972, 58, 20-21.
- Rohwer, W. D. Prime time for education: Early childhood or adolescence? Harvard Educational Review, 1971, 41, 316-341.
- Scott, R. Shifts on reading readiness profiles during the last decade. Journal of Genetic Psychology, 1975, 126, 269-282.
- Terman, L. M., & Merrill, M. A. Stanford-Binet Intelligence Scales (1972 norms ed). Boston: Houghton Mifflin, 1973.
- Weininger, O. Ready or not: Some psychological aspects of readiness in relation to learning effectiveness. Education, 1972, 93, 141-145.



White, B. L. When should schooling begin? Phi Delta  
Kappan, 1972, 53, 610-612.