

THE EFFECTS OF AGE AND SEX
ON ACHIEVEMENT

APPROVED

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Today children begin school on the basis of their chronological age. Most schools require that a child be five years of age before entering kindergarten and six years of age before entering the first grade. Much doubt is being expressed each year thousands of children in America begin school before they are ready; or are they enrolled in grades too far advanced for their abilities. This overplacement may be a reason why children hate school, fail, or drop out. When boys and girls struggle to do work for which they are not developmentally ready, they frequently feel like failures. Louise Bates Ames has described their response as follows:

**CHAPTER I
THE PROBLEM AND DEFINITION OF TERMS**

No child sets out in life to be a failure, retardee, a drop-out or a juvenile delinquent. He learns to be one. He learns to be one by being literally forced to become one because of his inability to adjust to learning stimuli presented to him in school.¹

Many parents pressure their children into premature learning, starting the race to college in the early grades. Parents should not hurry the growth process but should allow the child to develop at his own pace. Francis Ilg and Louise Bates Ames have expressed it in the following manner:

Some parents have also complicated the decision of the school by not facing the reality of their children. Some have been more concerned about what they want their children to be, than what they actually are.²

¹Louise Bates Ames, Is Your Child in the Wrong Grade (New York: Harper and Row, 1967), p. 9.

²Francis L. Ilg and Louise Bates Ames, School Readiness (New York: Harper and Row, 1965), p. 58.

Journal of Child Psychology and Psychiatry, Vol. 4, April, 1963, pp. 381-396.

Today children begin school on the basis of their chronological age. Most public schools require that a child be five years of age before entering kindergarten and six years of age before entering the first grade. Much doubt is being raised about the validity of this practice.³

Many studies have been made concerning the different developmental growth rate of young children. These studies generally agree that children of the same age develop at varying rates.⁴ However this well accepted fact has not as yet become an integral part of the school curriculum and age planning. Presently California law states that a child may enter kindergarten if he will reach five years of age by December 2 of that school year.⁵

In the past there has been pressure to get our children into school as soon as possible. Research in the area of school readiness indicates that many children who begin school before they are ready have trouble the rest of their school life.⁶

³Inez B. King, "Effects of Age of Entrance into Grade upon Achievement in Elementary School," The Elementary School Journal, Vol. 55, February, 1955, p. 333.

⁴Marian E. Breckenridge and E. Lee Vincent, Ph.D., Child Development (Philadelphia, London: W. B. Saunders Company, 1965), p. 9.

⁵California Education Code, 1967, Chapter 3, Division 6, Section, 5254.

⁶R. Vance Hall, "Does Entrance Age Affect Achievement," The Elementary School Journal, Vol. 63, April, 1963, pp. 381-396.

Another factor to be considered concerning readiness for entry into school should be the sex of the child. The studies on sex differences have generally indicated that such differences do exist, with girls generally excelling over the boys.⁷

- (2) To what extent do the chronologically older eighth grade students in the Fresno City Unified School District achieve higher in reading, language and arithmetic than the younger students in the class.

Statement of the problem. The purpose of this study was to compare the achievement of eighth grade students in the Fresno City Unified School District by chronological age and sex.

Hypotheses. For this study there are three hypotheses:

hypotheses:

- (1) Students whose chronological age places them in the lower one-fourth of their class will not score significantly lower on achievement tests than the other students in the class.
- (2) Girls will not score significantly higher on reading, language and arithmetic achievement tests than boys of the same age group.
- (3) Girls whose chronological age places them in the lower one-fourth of the class will not score significantly higher than fifty per cent of the boys on these tests.

⁷The following definitions were used for the purposes of Differences in Achievement of Under-, Average-, and Over-Achieving Students Within Five IQ Groups in Grades Four Through Eight," The Journal of Educational Research, Vol. 57, 1964, p. 269; Marian Wozencraft, "Sex Comparisons of Certain Abilities," The Journal of Educational Research, Vol. 57, (September 1963), p. 26.

shows, Analysis of the problem. The following questions were considered.

1. Readiness. A child's general performance needs to be at

- (1) To what extent do eighth grade girls of the Fresno City Unified School District achieve higher than eighth grade boys in reading, language and arithmetic?

- (2) To what extent do the chronologically older eighth grade students in the Fresno City Unified School District achieve higher in reading, language and arithmetic than the younger students in the class.

The organization of the remaining chapters is presented.

Basic Assumptions. The value of this study is based on the following assumptions:

- (1) The California Test of Mental Maturity is a valid and reliable test.

- (2) The California Achievement Test is a valid and reliable test.

- (3) All of the students used for this study were tested under similar conditions.

Delimitation of the study. The study was limited to:

- (1) The records of eighth grade students of the Fresno City Unified School District.

- (2) Review of the literature in the Fresno State College Library from 1955 to 1968.

¹ Ibid., p. 3.

II. DEFINITIONS OF TERMS USED

The following definitions were used for the purpose of clarity and a better understanding of this study:

Behavior age. This level can be determined through the use of developmental behavior tests, and may be at,

above, or below the level of the child's chronological age.⁸

School Readiness. A child's general performance needs to be at the five-year-old level before he enters kindergarten.⁹

RELATED RESEARCH

Literature concerning the age of entry into school has

III. ORGANIZATION OF THE REMAINDER

been a concern of some people for many years. Rozales G.

OF THE STUDY

Weiss has defined the major issues in the following manner:

The organization of the remaining chapters is presented in the following form:

Chapter II deals with a review of the literature necessary to determine past research findings.

Chapter III presents methods used in conducting the study.

Chapter IV describes the data obtained in the study.

Chapter V consists of the conclusions, final summary, and recommendations for additional studies.

and achievement. Studies having to do with achievement based on age and sex at the different grade levels, and raising

the minimum age of entry into kindergarten are covered.

⁸Francis L. Ilg, and Louise Bates Ames, School Readiness (New York: Harper and Row, 1965), p. 3.

⁹Ibid., p. 3.

A review of the literature on entrance age indicated a trend towards raising the minimum chronological age for

¹Rozales G. Weiss, "The Validity of Early Entrance into Kindergarten," The Journal of Educational Research, Vol. 58 (September 1967), p. 34.

school entry. The trend which started in the early years of public school education has continued to the present. **CHAPTER II**

Cosinskey reported that in 1839, eighty-six of 786 children in school were under four years of age.² **RELATED RESEARCH**

Literature concerning the age of entry into school has been a concern of some people for many years. Rosalee G. Weiss has defined the major issues in the following manner:

A controversial issue in recent years has been the need for flexibility in entrance age within the school system and its relation to individual differences among children. The issue is stimulated by the increasing awareness concerning developmental differences among children, the rate at which they learn, and the degree of learning they can attain. Whereas current admission policies vary, admission by chronological age is typical. It is also known that many school districts are quite dissatisfied with their present admission policies, but are hesitant to change them due to the citizens' tendency to maintain the status quo.¹

The following review of literature begins with age and achievement. Studies having to do with achievement based on age and sex at the different grade levels, and raising the average, children younger than six and a half years are covered. the minimum age of entry into kindergarten are covered. not ready to read. Pressure experience in learning to read

I. LITERATURE ON AGE AND ACHIEVEMENT

in eyestrain and other mental and physical discomfort.⁴

A review of the literature on entrance age indicated a trend towards raising the minimum chronological age for Elementary Principal, 36 (April, 1937), pp. 24-25.

¹"School Admission and Promotions," Research Bulletin of the National Education Association, (1962), pp. 1-10.
²Rosalee G. Weiss, "The Validity of Early Entrance into Kindergarten," The Journal of Educational Research, Vol. 56 (September 1962), p. 53.
³Harbert N. Gillies and Mariah C. Goulson, "At What Age is a Child Ready for School?," School Executive, 88 (August, 1959), pp. 29-30.

school entry. The trend which started in the early years of public school education has continued to the present. Cominskey reported that in 1839, eighty-six of 786 children in school were under four years of age.² In 1959 the National Education Association made an extensive study of the subject, and the findings showed that minimum starting ages in the United States varied from no established minimum to over six years. But the researchers reported a noticeable movement toward raising the minimum age.³ The school system may have no kindergarten. Some parents. The position of educators was summarized by Gelles and Coulson, who reported that schools of Bergen County, New Jersey, had adopted an earlier cutoff date. In reviewing the reasons for change, Gelles and Coulson stated that children of average intelligence younger than six years of age have a small chance of success in the first grade. On the average, children younger than six and a half years are not ready to read. Premature experience in learning to read may tinge the child's whole outlook with defeatism and result in eyestrain and other mental and physical discomfort.⁴

²Kathleen R. Cominskey, "Accent on Youth," National Elementary Principal, 36 (April, 1957), pp. 24-25.

³"School Admission and Promotions," Research Bulletin of the National Education Association, 37 (February, 1959), pp. 13-15.

⁴Herbert M. Gelles and Marian C. Coulson, "At What Age is a Child Ready for School?," School Executive, 88 (August, 1959), pp. 29-30.

The strong current of parental pressure is directed almost entirely at lowering the entrance age. Researchers have reported many reasons for this desire.⁵ Parents may want to get their children's formal education under way. They may believe that their child is accelerated for his age, or ambitious parents of a precocious child may want recognition for themselves. Some mothers may be working; others may wish to be free from responsibility of caring for children. Living conditions and play facilities at home may be inadequate. The school system may have no kindergarten. Some parents may want their child to have the opportunity to enter college early. Others may wish to have their child marry early. For these reasons or others, parents pursue with considerable intensity their desires for getting their children started in school early.⁶ Reported that 6.6 per cent of the Clyde Baer studied seventy-three children with birth-dates in November and December and matched them with seventy-three children who were born in January and February. Both groups had entered kindergarten in September of the same year for early admissions only.⁶ Even though mental age, rather

⁵Lowell B. Carter, "Effect of Early Entrance on the Achievement of Elementary School Children in Austin Public Schools," Journal of Educational Research, L (October, 1959), 91-103.; Jack W. Birch, "Early School Admission for Mentally Advanced Children," Exceptional Children, 21 (December, 1954), pp. 84-87.

⁶Morris Hamburg, "But My Child is Different," School Executive, 88 (September, 1958), pp. 12-23.

year and consequently were in the same grade. The groups were matched on the basis of I.Q. and sex. During the eleventh year in school, the students were given the Science Research Associates Youth Inventory and the Guilford-Zimmerman Temperament Survey. Baer studied the cumulative records for grades, teacher ratings, achievement test scores, personality traits, and number of absences and found that the older group was significantly more successful in advancing from grade to grade and had better grades in elementary school. Further, he found that the girls had better grades than the boys in elementary school. Results of the Guilford-Zimmerman Temperament Survey showed the older boys to be less suspicious or to see personal reference in words or actions of others.⁷

A national survey in 1959 reported that 6.6 per cent of the districts polled had no established minimum age for starting school. Of these, 90 per cent used individual examinations to help determine school readiness. One serious limitation of the programs was that most of them provided for early admissions only.⁸ Even though mental age, rather

⁷Clyde J. Baer, "The School Progress and Adjustment of Underage and Overage Students," Journal of Educational Psychology, 49 (November, 1958), pp. 17-19.

⁸Research Bulletin of the National Education Association, op. cit., p. 14. "Early Entrance Problems," Childhood Education, 32 (September, 1955), p. 25.

than chronological age, is used as a means of determining time of school entrance, pressures from parents still existed. Rowland and Nelson found that the biggest problem in districts that used mental age was dealing with parents of children rejected on the basis of tests. Because of this problem, some districts had dropped the program.⁹

A review of the writings of reading authorities revealed that most experts in that field think that to have a good chance to succeed in the traditional first-grade program a child must have attained a chronological age of about six years and a mental age ranging from six years and four months to six years and six months. Therefore, the type of program the pupil encounters on entering school is of real concern. Will it be a program of early formal instruction with rigid academic standards? Or will it be a program that will provide him opportunities suited to his level of readiness?¹⁰

The pressures to modify policy on school entrance age in the Highline School District of suburban Seattle have been acute. Highline pupils are not allowed to enter first

or December following his enrollment in the first grade.

⁹Thomas D. Rowland and Calvin C. Nelson, "Off to School-At What Age," Elementary School Journal, 60 (October, 1959), p. 59.

¹⁰Margaret P. Ammons and John I. Goodlad, "When to Begin: Dimensions of First Grade Entrance Problem," Childhood Education, 32 (September, 1955), p. 25.

grade unless they are six years old on or before September 15. The situation prompted an investigation by R. Vance Hall.¹¹ The children made higher scores than their younger classmates. To determine whether age at entrance made a difference in achievement Hall made a study of retentions in the Highline School District during the 1959-60 school year. Data from the pupil's records disclosed that 801 of approximately 12,000 elementary-school pupils had been retained. Of the 801 students retained, 629 were in the younger half of the class.¹² into school and achievement; of the 188 children whom Marian Carroll made an interesting study to obtain further evidence of possible disadvantages encountered by children who enter first grade chronologically behind the majority of their classmates. She studied twenty-nine pairs of children selected from the third grades of five public schools in upstate New York. The children were matched by sex, intelligence, socioeconomic status of family, and as much as possible, on school attended. One child in each pair had passed his sixth birthday before entering grade one, while the other attained the age of six in October, November, or December following his enrollment in the first grade. of these played were from the younger group. The older group

¹¹R. Vance Hall, "Does Entrance Age Affect Achievement," Elementary School Journal, 63 (April, 1963), pp. 391-96.

¹²Ibid., p. 394. Marian E. Carroll, "Academic Achievement of Under-age and Over-age Readers," The Journal of Educational Research, 56 (April, 1963), pp. 413-19.

The California Test of Mental Maturity, Primary Edition, was administered to the children. The study concluded that the overage children made higher scores than their younger classmates, and that there was significant difference in favor of the older children in the mean differences on achievement. Grade placement scores showed that more than twice as many children in the overage group made scores of above 5.0 as did the younger group.¹³

First Inez King conducted another study concerning age at entrance into school and achievement; of the 108 children whom she studied, fifty-four had entered grade one when they were chronologically between the age of five years and eight months and five years and eleven months and another group of fifty-four who had entered grade one when they were chronologically between the ages of six years and five months and six years and eight months. The achievement was based on academic or grade standard attained, average daily attendance, and social or personal adjustment reflected in the cumulative records of six years. The study showed that the older group achieved about six months ahead of the younger group.

During the six years, eleven students were retained; ten of these eleven were from the younger group. The older group

Effects of Age of Entrance into Grade One on Achievement in Elementary Schools, The Elementary School Journal, 35 (February, 1955), pp. 331-36.

¹³Marian L. Carroll, "Academic Achievement of Underage and Overage Third-Graders," *The Journal of Educational Research*, 56 (April, 1963), pp. 415-19.

attended school a mean average of 17.6 more days during the six years than did the younger group. The younger group had more speech defects and indications of nervous disorders.¹⁴ Dickinson and Larson made a study of 480 fourth grade students attending the Souix Falls Public School System. Using the Iowa Test of Basic Skills to measure the achievement of the students, they used two approaches to determine the influences of chronological age on achievement. The first approach was to compare the younger fourth of the class to the remainder of the class. The second approach was to divide the class into four groups on the basis of age and then to compare the youngest fourth to each of the other three groups. They found that the youngest fourth had a significantly lower mean composite on the test than did the remainder of the class. I.Q. could not account for the older group's having a larger composite score, because the younger group had a higher mean I.Q. Mental age, on the other hand, was found to be significantly higher for the older group. The results suggest that mental age may be a much better predictor of achievement than I.Q. at the fourth grade level.¹⁵

¹⁴Inez B. King, "Effects of Age of Entrance into Grade One Upon Achievement In Elementary School," The Elementary School Journal, 55 (February, 1955), pp. 331-36.

¹⁵Donald J. Dickinson and J. Donald Larson, "The Effects of Chronological Age in Months on School Achievement," The Journal of Educational Research, 56 (May-June, 1963), pp. 492-93.

Dr. Hampleman made a study of age in relationship to read their children as status symbols, starting them in the reading ability along with a study of general achievement. This study involved 58 sixth grade students from the Bloomington, Indiana, Schools. All who were six years, three months of age or younger were put into Group I, those who were six years, four months or older were put in Group II. The following facts were obtained from the Bloomington Schools office: date of birth, reading achievement score on the Stanford Achievement Test, date this test was administered, and all available I.Q. scores. Mean and median reading achievement scores were figured for each group. Hampleman found that the older group had a mean reading achievement score of slightly more than four months higher than the younger children.¹⁶

The most extensive study concerning school readiness was conducted by the Gesell Institute of Child Development. Ilg and Ames made the following statement about a Child's readiness: "The earlier a child is admitted to kindergarten or first grade, ready or not, the happier some parents have been."¹⁷

grades usually become more involved in coping with disruptive behavior than in identifying misplaced students.²¹

¹⁶Richard S. Hampleman, "A Study of the Comparative Reading Achievement of Early and Late School Starters," Elementary English, 36 (April, 1959), pp. 331-34.

¹⁷Francis L. Ilg and Louise Bates Ames, School Readiness (New York: Harper and Row, 1965), p. 321.

²¹Ibid., p. 327.

The worst offenders of this speedup are those who treat their children as status symbols, starting them in the race to college in the early grades. Misled by early reading or high IQ scores, such parents strive to make educational prodigies out of their children.¹⁸

In some communities there is quite a disagreement between parents and school officials over legal age for entering school. Children usually start school on the basis of their chronological age. Some school systems require that a child be five years of age before entering kindergarten and six before the first grade. Others will allow a child to enter kindergarten before his fifth birthday or first grade before his sixth birthday if he was born in the months between September and January 1. The current practice is based largely on the belief that at a certain age all children have reached the same stage of development.¹⁹

Ilg and Ames express it in the following manner: "However not all five-year olds are mature enough for kindergarten and not all six-year olds are ready for first grade."²⁰

Kindergarten teachers can generally determine a child's readiness or unreadiness. But teachers in the higher grades usually become more involved in coping with disruptive behavior than in identifying misplaced students.²¹

¹⁸Ibid., p. 322.

¹⁹Ibid., p. 16.

²⁰Ibid., p. 27.

²¹Ibid., p. 327.

A teacher can spend as much as 25 per cent of this time dealing with just one disruptive child. Ilg and Ames have this to say about the subject; "We have barely tapped the creative potential of many teachers because their and to energies are being dissipated in dealing with disruptive or unready children."²² have decided when a child should enter school. In order to learn whether overplacement is a problem for public school children generally and not merely for those sufficiently troubled to be referred to a clinic, the Gesell researchers conducted an intensive three-year study of selected kindergartners and first and second graders in a Weston, Connecticut, public school. Evidence from this study²⁵ confirmed the clinical findings that if children enter school on the basis of chronological age or IQ score alone, more than half will be overplaced, not only at the start of school, but also in succeeding years.²³ differences in school achieve. In all of the Gesell studies, the researchers have given the children a series of school readiness tests which they believe all children should take before starting school. The series consists of the well-known Gesell Incomplete Man²⁶

²²Ibid., p. 329.

²³Louise Bates Ames and Francis L. Ilg, "Sex Differences in Test Performances of Matched Boy-Girl Pairs in the Five-to-Nine-Year-Old-Range," The Journal of Genetic Psychology, 104 (September, 1964), p. 34.

Hall, op. cit., p. 392.

Test; a developmental interview; copy form tests, Monroe's
 Visual I and II; right and left tests; and the Lowenfeld
 Mosaic Test. The children are also asked to write their
 name, address, letters, and numbers; to name animals; and to
 give home and school preferences.²⁴ are as follows: 1) Girls
 achieve Ilg and Ames have decided when a child should enter
 school: "The right time to enter school should be when a
 child is truly ready and not merely some time arbitrarily
 decided upon by custom or by law. . . . Parents, teachers,
 and school administrators should keep reminding themselves,
 that growth cannot be hurried, cultivating speed for its own
 sake has the inherent danger of producing a crash later on."²⁵

standard of achievement for boys or girls.²⁸

II. LITERATURE ON SEX AND SCHOOL

Barley and White undertook a study concerning sex
 ACHIEVEMENT

and achievement in schools. They studied seventy-five boys
 and girls. Authorities in the field of sex differences in school

achievement generally agree that girls achieve at a higher
 level than boys. Some feel that this finding is due to

innate sex differences. Most, led by Pauley, feel that the
 differences are due to the slower maturation rate of boys.²⁶

to psych. R. Vance Hall made a study to determine whether age,
considered of normal intelligence, presently considered not

²⁴Ilg and Ames, op. cit., p. 21.

²⁵Ibid., p. 14.

²⁶Hall, op. cit., p. 392.

at entrance makes any difference in achievement, and whether age at entrance is more critical for boys or girls. To determine this, Highline School District made a study of retentions during the 1959-60 school year.²⁷

The most pertinent findings are as follows: (1) Girls achieve at a higher level than boys, particular in reading and language; (2) both overage boys and girls achieve at a higher level than the underage of the same sex; (3) the under-age boys achieve at a lower level than any other group, and in some areas they were two years behind the overage girls; (4) the difference in achievement increased from the third to sixth grade; and (5) the national norm is not a realistic standard of achievement for boys or girls.²⁸

Darley and Winitz undertook a study concerning sex and achievement in school. They studied seventy-five boys and seventy-five girls selected at random from a list of students entering the Iowa City Schools. Their study was to determine if there were any differences between the sexes, based on WISC IQ scales and subtest scores and correlations between any two WISC measures. The subjects were restricted to physically normal, white children from monolingual homes, considered of normal intelligence, presently considered not

of Male and Female Kindergarten Children on the WISC, The Journal of Abnormal Psychology, 104 (1964), pp. 25-34.

²⁷Ibid., p. 393.

²⁸Ibid., p. 394.

to stutter, and found to have normal hearing. The study revealed that there was a statistically significant difference favoring the girls.²⁹

Ames and Ilg made a study comparing sex differences in test performances from 1957 through 1960. They studied 81 kindergarten, 26 first grade, and 29 second graders in the Hurlbutt School in Weston, Connecticut. On nearly every test at every age when responses were compared, the researchers found that regardless of the test used and regardless of the age of the subjects, the score of the girl was superior.³⁰

One of the most recent studies on sex grouping was conducted by Herman and Criscuolo. They studied eighty-two children enrolled in four first-grade class rooms at the Lincoln-Bassett Community School, located in a large inter-city neighborhood. Two of the four classrooms comprised the control group, and the other two served as the experimental group. In the control group each class was made up of approximately the same number of boys and girls. One of the experimental groups consisted of all girls and the other all boys. Findings of this study revealed that grouping by sex

²⁹Frederic L. Darley and Harris Winitz, "Comparison of Male and Female Kindergarten Children on the WISC," The Journal of Genetic Psychology, 104 (1964), pp. 25-34.

³⁰Ames and Ilg, op. cit., pp. 25-35.

³¹Darley and Winitz, op. cit., p. 48.

did not prove significantly better than the heterogeneous method. Rather, heterogeneous grouping proved more effective for girls, but no differences between the two grouping procedures was found for boys. Pretest scores showed that the girls were significantly ahead of the boys in the control group.³¹

Girls excell over boys in the area of reading achievement.³² They also have better grades in elementary school than boys.³³

There is a definite gap in the abilities of boys and girls at the kindergarten level. Girls are superior in achievement and should be given more advanced work, for which they are ready.

III. SUMMARY

The age of entry into school has been a concern of some people for a number of years. A review of the literature

³¹Barry E. Herman and Nicholas P. Crisculo, "Sex Grouping," The Instructor, 77 (March, 1968), p. 98.

³²Kenneth M. Parsley Jr., "Further Investigation of Sex Differences in Achievement of Under-, Average-, and Over-Achieving Students Within Five IQ Groups in Grades Four Through Eight," Journal of Educational Research, 57 (January, 1964), p. 269.

³³Baer, op. cit., p. 18.

³⁴Darley and Winitz, op. cit., p. 48.

indicates growing support for raising the minimum chronological age for school entry, readiness or unreadiness.³¹ They Gelles and Coulson stated that children of average intelligence younger than six years of age have a small chance of success in the first grade.³⁵ Despite the evidence, over the years there has been much parental pressure, for a variety of reasons, to lower the entrance age in some areas.³⁶ Authorities in the field of reading indicate that to have a good chance to succeed in the traditional first grade program, a child must have attained a chronological age of about six years and a mental age ranging from six years and four months to six years and six months.³⁷

A study by Carroll showed that the older children in a class scored higher on the California Test of Mental Maturity than did the younger children of the class.³⁸ Another study by King showed that the younger children of a class are absent more often.³⁹ Most studies indicate that mental age may be a better predictor of achievement than IQ.⁴⁰

³⁵Gelles and Coulson, op. cit., p. 31.

³⁶Hamburg, op. cit., p. 13.

³⁷Ammons and Goodlad, op. cit., p. 25.

³⁸Carroll, op. cit., p. 418.

³⁹King, loc. cit., p. 335.

⁴⁰Dickinson and Larson, op. cit., p. 493.

Ilg and Ames indicate that a kindergarten teacher can generally determine a child's readiness or unreadiness.⁴¹ They go on to say that if children enter school on the basis of chronological age or IQ alone, more than half will be over placed, not only at the start of school, but also in succeeding years.⁴²

The subjects for this study were limited to the eighth grade classes of the Fresno City Unified School District. Authorities in the field of sex differences in school achievement generally agree that girls achieve at a higher level than boys. Darley and Winitz found a statistically significant difference favoring girls in school achievement.⁴³ Girls excel over boys in the area of reading achievement, and have better grades in elementary school.⁴⁴

⁴¹Ilg and Ames, op. cit., p. 329.

⁴²Ames and Ilg, loc. cit., p. 25.

⁴³Darley and Winitz, loc. cit., p. 126.

⁴⁴Ames and Ilg, op. cit., p. 34.

1. low ability level, 78-90 IQ.
2. middle ability level, 94-106 IQ.
3. high ability level, 110-122 IQ.

IQ ranges were selected so that students of different ability levels could be studied. This also allowed students to be compared only to students in their own ability level.

Within each IQ level, the subjects were broken down into four groups based on their chronological age by date of birth, in the following manner:

1. Group I, December 3, 1952, to March 2, 1953.
2. Group II, March 3, 1953, to June 2, 1953.
3. Group III, June 3, 1953, to September 2, 1953.
4. Group IV, September 3, 1953, to December 2, 1953.

CHAPTER III

The subject DESIGN AND PROCEDURES was chosen so there were an equal number of boys and girls in each group.

I. THE POPULATION

II. COLLECTION OF DATA

The subjects for this study were limited to the eighth grade classes of the Fresno City Unified School District.

This sample was chosen because of two reasons:

1. Most of the previous studies concerning achievement based on chronological age or sex have been conducted at the lower elementary level.
2. This class was tested on the California Test of Mental Maturity and the California Achievement Test during the 1967-1968 school year. The California Test of Mental Maturity was used to determine the students IQ and the California Achievement Test to measure his achievement.

The study includes only those students who were born between December 3, 1952, and December 2, 1953, and who fall into one of the following IQ ranges:

1. Low ability level, 78-90 IQ.
2. Middle ability level, 94-106 IQ.
3. High ability level, 110-122 IQ.

IQ ranges were selected so that students of different ability levels could be studied. This also allowed students to be compared only to students in their own ability level.

The hypotheses were treated in the following manner: Within each IQ level, the subjects were broken down into four groups based on their chronological age by date of birth, in the following manner:

1. Group I, December 3, 1952, to March 2, 1953.
2. Group II, March 3, 1953, to June 2, 1953.
3. Group III, June 3, 1953, to September 2, 1953.
4. Group IV, September 3, 1953, to December 2, 1953.

The subjects were selected at random so there were an

equal number of boys and girls in each group.

II. COLLECTION OF DATA

Data for this study was obtained through the use of school records. This data was stored on IBM cards in the Fresno City Unified School District's central office. A

computer program was written to collect the following data:

1. Cards of those students born between December 3, 1952 and December 2, 1953.
2. Select from this group only those students who fall into the previously stated IQ levels.
3. Divide each of the IQ levels into the four birth groups previously stated.
4. Select at random, cards until there are an equal number of boys and girls in each birth group within each IQ level.
5. Compute the mean reading, language and arithmetic scores from the California Achievement Test. Compute t-test to see if there is a significant difference between the different groups.

III. TREATMENT OF DATA

The hypotheses were treated in the following manner:

1. Hypothesis number one, which stated that students whose chronological age places them in the lower one-fourth of their class do not achieve as well on achievement tests as the other students in the

class, was treated as follows. The mean scores in reading, language and arithmetic from the California Achievement Test were compared for each group. If there was a difference in the mean scores of the groups, it was computed to see if it was significant at the .05 level. The significance was determined by computing t-tests.

2. Hypothesis number two, which stated that girls of will score higher on reading, language and arithmetic achievement tests than boys of the same age group, was treated as follows. The mean scores in reading, language and arithmetic from the California Achievement Test were computed for each group. If there was a difference in the mean scores of the groups, it was computed to see if it was significant at the .05 level. The significance was determined by computing t-tests.

3. Hypothesis number three, which stated that girls whose chronological age placed them in the lower one-fourth of the class would score higher than fifty per cent of the boys on these tests, was treated in the following manner. The mean scores in reading, language and arithmetic from the California Achievement Test were computed for each group. If there was difference in the mean scores of the groups, it was computed to see if it was significant at the .05 level. The significance was determined by computing t-tests.

1. Group I, December 1, 1952, to March 2, 1953.
2. Group II, March 3, 1953, to June 2, 1953.
3. Group III, June 3, 1953, to September 2, 1953.
4. Group IV, September 3, 1953, to December 2, 1953.

The final number of students in the study was 1,632.

There were 316 students in the lowest ability level, 27 boys and 27 girls in each of the age groups; in the middle ability level there were 764 students, 93 boys and 93 girls in each of the age groups; and 572 in the high ability level, 84 boys and 84 girls in each of the age groups.

As was stated in chapter one the hypotheses for this study were as follows:

CHAPTER IV

ANALYSIS OF RESULTS

The study began with the entire eighth grade class of the Fresno City Unified School District, which includes approximately 4,800 students. This number was reduced when the students had to meet certain criteria. The criteria were: (1) having been born between December 3, 1952, and December 2, 1953, and (2) having an IQ, as measured by the California Test of Mental Maturity, between 78-90, 94-106 and 110-122.

The number was further reduced when there had to be an equal number of boys and girls in each of the following age groups by date of birth:

1. Group I, December 3, 1952, to March 2, 1953.
2. Group II, March 3, 1953, to June 2, 1953.
3. Group III, June 3, 1953, to September 2, 1953.
4. Group IV, September 3, 1953, to December 2, 1953.

The final number of students in the study was 1,632. There were 216 students in the lowest ability level, 27 boys and 27 girls in each of the age groups; in the middle ability level there were 744 students, 93 boys and 93 girls in each of the age groups; and 672 in the high ability level, 84 boys and 84 girls in each of the age groups.

As was stated in chapter one the hypotheses for this study were as follows:

1. Students whose chronological age places them in the lower one-fourth of their class will not score significantly lower on achievement tests than the other students in the class.

COMPARISON OF THE MEAN TEST SCORES IN READING, LANGUAGE,

AND 2. Girls will not score significantly higher on reading, language and arithmetic achievement tests than boys of the same age group.

3. Girls whose chronological age places them in the lower one-fourth of their class will not score significantly higher than fifty per cent of the boys.

Significant at the .05 level

Mean Scores Within each of the hypotheses there have been three ability levels tested: (1) Low ability level (78-90 IQ), (2) Middle ability level (94-106 IQ), and (3) High ability level (110-122 IQ). The results of each of these will be presented on tables with a written analysis.

I. RESULTS OF TESTING THE HYPOTHESES

Results of the data from hypothesis number one. Table I compares Group IV of the lowest ability level (78-90 IQ), to the other students of this level in reading, language and arithmetic.

The mean reading score of Group IV was slightly higher than Groups II and III and lower than Group I. The difference between Group IV and the other three groups was not significant at the .05 level.

Language test results showed Group IV with a slightly higher mean score than each of the other three groups. None of the results was significant.

Arithmetic results followed much the same order as the reading and language. **TABLE I.** Group IV had a higher mean

COMPARISON OF THE MEAN TEST SCORES IN READING, LANGUAGE, I. AND ARITHMETIC FROM THE CALIFORNIA ACHIEVEMENT TEST OF GROUP IV TO GROUPS I, II, AND III

Table II compares Low Ability Level (78-90 IQ) with the middle ability level (94-106 IQ). No other students of this ability level in reading, language, and arithmetic.

Mean Score	Mean Score	t Score	Significant at the .05 level
READING			
Group IV 25.6	Group I 27.8	0.41	no
Group IV 25.6	Group II 23.4	0.42	no
Group IV 25.6	Group III 22.3	0.64	no
LANGUAGE			
Group IV 28.6	Group I 25.4	0.46	no
Group IV 28.6	Group II 22.0	0.86	no
Group IV 28.6	Group III 23.5	0.75	no
ARITHMETIC			
Group IV 19.3	Group I 20.4	0.23	no
Group IV 19.3	Group II 14.2	1.14	no
Group IV 19.3	Group III 18.1	0.26	no

reading, language and arithmetic.

Arithmetic results followed much the same order as the reading and language results. Group IV had a higher mean score than Groups II and III and a lower score than Group I. The differences were not significant.

Table II compares Group IV of the middle ability level (94-106 IQ), to the other students of this ability level in reading, language, and arithmetic.

Mean Scores: Reading results at this level showed a definite pattern. Each of the other three groups had a higher mean score than Group IV. The difference between Group IV and Groups I and II was significant. The difference between Group IV and Group III was not significant.

Group IV: Results in language, as did reading, had a definite pattern. Each of the other three groups had a higher mean score than Group IV. Although each of the other groups had a higher mean score than Group IV, only that of Group I was significant.

Group III: Arithmetic followed the same pattern as reading and language. Each group beginning with Group IV had a slightly higher mean score than the next youngest group. Group I had the only significantly higher score than Group IV.

Group IV: Table III compares Group IV of the highest ability level (110-122 IQ), to the other students of this level in reading, language and arithmetic.

TABLE II

COMPARISON OF THE MEAN TEST SCORES IN READING, LANGUAGE,
AND ARITHMETIC FROM THE CALIFORNIA ACHIEVEMENT TEST
OF GROUP IV TO GROUPS I, II AND III

Middle Ability Level
(94-106 IQ)

Mean Score	Mean Score	t Score	Significant at the .05 level
READING			
Group IV 45.9	Group I 58.2	3.44	yes
Group IV 45.9	Group II 55.8	2.74	yes
Group IV 45.9	Group III 51.2	1.50	no
LANGUAGE			
Group IV 48.0	Group I 57.5	2.57	yes
Group IV 48.0	Group II 54.7	1.77	no
Group IV 48.0	Group III 51.6	0.97	no
ARITHMETIC			
Group IV 36.4	Group I 47.6	3.00	yes
Group IV 36.4	Group II 43.3	1.88	no
Group IV 36.4	Group III 38.2	0.49	no

The pattern of results was very similar to that of the middle ability level. difference was that the

TABLE III

COMPARISON OF THE MEAN TEST SCORES IN READING, LANGUAGE, AND ARITHMETIC FROM THE CALIFORNIA ACHIEVEMENT TEST OF GROUP IV TO GROUPS I, II AND III

Group IV had the lowest mean score, with Group II next, then Group III and Group I with the highest mean score. Both

**High Ability Level
(110-122 IQ)**

Groups I and II had significantly higher mean scores than Group IV. The scores of Group I and II were significantly higher than Group IV. The scores of Group III were not significantly higher than Group IV.

Mean Score	Mean Score	t Score	Significant at the .05 level
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READING

Group III had a higher mean score than Group II. Group I had a significantly higher mean score than Group IV. Group II had a significantly higher mean score than Group IV. Group III had a mean score that was not significantly higher than Group IV. The scores of Group I and II were significantly higher than Group IV.

LANGUAGE

Group I did have a significantly higher mean score than Group IV. Group II had a mean score that was not significantly higher than Group IV. Group III had a mean score that was not significantly higher than Group IV. The scores of Group I and II were significantly higher than Group IV.

ARITHMETIC

The hypothesis was accepted for this comparison. Thus, the hypothesis was accepted for this comparison. The test results comparing Group IV to the other three groups produced a definite pattern in the middle (94-106 IQ) and High (110-122 IQ) ability levels. In each of the test results, except one, there was a definite rank order with the

and High (110-122 IQ) ability levels. In each of the test results, except one, there was a definite rank order with the

oldest The pattern of results was very similar to that of the middle ability level. The big difference was that the mean scores for each of the tests was much higher, these two ability. As in the reading results of the middle ability level,

Group IV had the lowest mean score, with Group II next, then Group II and Group I with the highest mean score. Both

Groups I and II had significantly higher mean scores than

Group IV. the lowest ability level (78-90 IQ), in reading,

language. In language the same pattern of results existed except that Group III had a higher mean score than Group II. Group I had the significantly higher mean score than Group IV.

Group Arithmetic results, as in reading and language, again showed Group IV with the lowest mean score. The scores of the Groups II and III approached being significantly higher than Group IV, but not quite. Group I did have a significantly higher mean score than Group IV. in all but one of the groups.

In this group, Group II, the mean score of the girls was higher than the boys but not significant at the .05 level. Summary of the data from hypothesis number one. Results from the lowest ability level (78-90 IQ), indicate very little significance. The arithmetic test results showed that the girls had a higher mean score in Groups I, II and III, with the mean level.

scores in Group IV being identical. None of the differences were significant. The test results comparing Group IV to the other three groups produced a definite pattern in the middle (94-106 IQ)

and high (110-122 IQ), ability levels. In each of the test results, except one, there was a definite rank order with the girls of the middle ability level (94-106 IQ), in reading, language, and arithmetic.

oldest students, Group I, having the highest mean score and Group IV the lowest mean score. Most results were not significant. Therefore, hypothesis number one for these two ability levels was accepted.

SCORES IN READING, LANGUAGE,
AND ARITHMETIC FROM THE CALIFORNIA ACHIEVEMENT TEST
OF BOYS AND GIRLS WITHIN EACH AGE GROUP

II. RESULTS OF THE DATA FROM HYPOTHESIS NUMBER TWO

Low Ability Level

(78-90 IQ)

Table IV gives the test results comparing boys and girls of the lowest ability level (78-90 IQ), in reading, language, and arithmetic.

In each of the groups the girls had a higher mean reading score than the boys. Only in one of the groups, Group III, was the score of the girls significantly higher than that of the boys. In each of the other three groups the score of the girls was only slightly higher.

Test results in language showed that the girls had a significantly higher mean score in all but one of the groups. In this group, Group II, the mean score of the girls was higher than the boys but not significant at the .05 level.

The arithmetic test results showed that the girls had a higher mean score in Groups I, II and III, with the mean scores in Group IV being identical. None of the differences were significant.

Table V gives the test results comparing boys and girls of the middle ability level (94-106 IQ), in reading, language, and arithmetic.

TABLE IV

COMPARISON OF THE MEAN TEST SCORES IN READING, LANGUAGE,
AND ARITHMETIC FROM THE CALIFORNIA ACHIEVEMENT TEST
OF BOYS AND GIRLS WITHIN EACH AGE GROUP

Low Ability Level
(78-90 IQ)

Group	Boys Mean Score	Girls Mean Score	t Score	Significant at the .05 level
READING				
I	25.1	30.6	0.89	no
II	22.9	24.0	0.16	no
III	16.7	28.0	2.03	yes
IV	24.3	26.9	0.56	no
LANGUAGE				
I	18.2	32.6	2.20	yes
II	18.1	27.8	1.63	no
III	16.7	32.4	2.97	yes
IV	17.9	39.3	3.15	yes
ARITHMETIC				
I	19.8	21.0	0.23	no
II	13.1	15.2	0.47	no
III	15.6	20.6	1.06	no
IV	19.3	19.3	0.0	no

Test results in reading showed that the girls had a higher mean score in each age group. All of the differences were significant at the .05 level.

TABLE V

COMPARISON OF THE MEAN TEST SCORES IN READING, LANGUAGE, AND ARITHMETIC FROM THE CALIFORNIA ACHIEVEMENT TEST OF BOYS AND GIRLS WITHIN EACH AGE GROUP

Higher mean scores were significant at the .05 level for all age groups. Middle Ability Level (94-106 IQ)

Group	Boys Mean Score	Girls Mean Score	t Score	Significant at the .05 level
READING				
I	53.0	63.4	2.86	yes
II	50.8	60.8	2.69	yes
III	45.2	57.2	3.45	yes
IV	40.7	51.1	3.01	yes
LANGUAGE				
I	48.0	67.0	5.58	yes
II	44.1	65.2	6.20	yes
III	41.2	62.0	6.23	yes
IV	37.6	58.5	5.99	yes
ARITHMETIC				
I	44.0	51.3	1.91	no
II	38.4	48.2	2.67	yes
III	36.4	39.9	0.94	no
IV	34.4	38.5	1.12	no

There was no significant difference in any of the groups.

Summary of the data from hypothesis number two. At all three ability levels the girls had a higher mean score

Test results in reading showed that the girls had a higher mean score in each age group. All of the differences were significant at the .05 level.

Language test results showed that the girls had a higher mean score in each of the four age groups. The girls' scores were significantly higher in all four age groups.

As in reading and language, the girls had a higher mean score in each of the age groups in arithmetic. The difference was significant only in Group II.

Table VI gives the test results comparing boys and girls of the highest ability level (110-122), in reading, language and arithmetic.

Reading results show that the girls had a higher mean score than the boys in all four groups. Only in Group III was there a significant difference.

The largest difference between the sexes appeared in the language test results. The girls had a higher mean score than the boys in each of the four age groups. Each of the differences was significant.

Arithmetic, the last of the tests comparing boys and girls, showed the girls with a higher mean score in each of the four groups. There was no significant difference in any of the groups.

Summary of the data from hypothesis number two. At all three ability levels the girls had a higher mean score

than the boys on each of the test results. Most of the results were not significant. Thus, hypothesis number two was accepted.

TABLE VI

COMPARISON OF THE MEAN TEST SCORES IN READING, LANGUAGE, AND ARITHMETIC FROM THE CALIFORNIA ACHIEVEMENT TEST OF BOYS AND GIRLS WITHIN EACH AGE GROUP

High Ability Level
(110-122 IQ)

Group	Boys Mean Score	Girls Mean Score	t Score	Significant at the .05 level
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READING

I	80.1	83.4	1.16	no
II	78.2	81.5	1.23	no
III	71.1	77.7	2.09	yes
IV	70.0	76.0	1.95	no

LANGUAGE

I	70.6	84.7	5.26	yes
II	65.5	82.4	5.59	yes
III	65.1	84.2	7.39	yes
IV	60.1	77.5	5.36	yes

ARITHMETIC

I	71.6	74.9	0.99	no
II	67.9	69.8	0.55	no
III	64.2	70.8	1.96	no
IV	59.5	74.9	1.44	no

youngest girls to each of the boy's groups in reading, language, and arithmetic of the middle ability level (94-106 IQ).

than the boys on each of the test results. Most of the results were not significant. Thus, hypothesis number two was accepted.

OF THE MEAN TEST SCORES IN READING, LANGUAGE, AND ARITHMETIC FROM THE CALIFORNIA ACHIEVEMENT TEST OF THE YOUNGEST GIRLS TO EACH OF THE FOUR

III. RESULTS OF THE DATA FROM HYPOTHESIS

NUMBER THREE

(78-90 IQ)

Table VII gives the test results comparing the youngest girls to each of the boy's groups in reading, language and arithmetic of the lowest ability level (78-90 IQ).

The reading results of this level showed that the youngest girls had a higher mean score than each of the boy's groups. Although the young girls had a higher mean score than each of the boy's groups, the difference was significant only in Group III.

The language test results showed that the youngest girls had a significantly higher mean score than each of the boy's groups.

Results of the arithmetic test showed the youngest girls with a higher mean score than each of the four boy's groups. None of the differences were significant.

Table VIII gives the test results comparing the youngest girls to each of the boy's groups in reading, language, and arithmetic of the middle ability level (94-106 IQ).

Group IV 19.3

COMPARISON OF THE MEAN TEST SCORES IN READING, LANGUAGE,
AND ARITHMETIC FROM THE CALIFORNIA ACHIEVEMENT TEST
OF THE YOUNGEST GIRLS TO EACH OF THE FOUR
GROUPS OF BOYS

Low Ability Level
(78-90 IQ)

Girls Mean Score	Boys Mean Score	Score t	Significant at the .05 level
Group IV 51.1	Group I 53.0	0.51	no
Group IV 26.9	Group I 25.1	0.30	no
Group IV 26.9	Group II 22.9	0.70	no
Group IV 26.9	Group III 16.7	2.39	yes
Group IV 26.9	Group IV 24.3	0.56	no
Group IV 58.5	Group I 48.0	3.01	yes
Group IV 39.3	Group I 19.2	2.98	yes
Group IV 39.3	Group II 18.1	3.15	yes
Group IV 39.3	Group III 14.6	3.84	yes
Group IV 39.3	Group IV 17.9	3.15	yes
Group IV 38.5	Group I 44.0	1.45	no
Group IV 19.3	Group I 19.8	0.10	no
Group IV 19.3	Group II 13.1	1.46	no
Group IV 19.3	Group III 15.6	0.88	no
Group IV 19.3	Group IV 19.3	0.0	no

TABLE VIII

COMPARISON OF THE MEAN TEST SCORES IN READING, LANGUAGE,
AND ARITHMETIC FROM THE CALIFORNIA ACHIEVEMENT TEST
OF THE YOUNGEST GIRLS TO EACH OF THE FOUR
GROUPS OF BOYS

Language test results showed that there is a definite
Middle Ability Level
difference between the (94-106 IQ) age level. The youngest

Girls Mean Score	Boys Mean Score	t Score	Significant at the .05 level
READING			
Group IV 51.1	Group I 53.0	0.51	no
Group IV 51.1	Group II 50.8	0.08	no
Group IV 51.1	Group III 45.2	1.65	no
Group IV 51.1	Group IV 40.7	2.98	yes
LANGUAGE			
Group IV 58.5	Group I 48.0	3.01	yes
Group IV 58.5	Group II 44.1	3.97	yes
Group IV 58.5	Group III 41.2	5.16	yes
Group IV 58.5	Group IV 37.6	5.99	yes
ARITHMETIC			
Group IV 38.5	Group I 44.0	1.45	no
Group IV 38.5	Group II 38.4	0.03	no
Group IV 38.5	Group III 36.4	0.58	no
Group IV 38.5	Group IV 34.4	1.12	no

The girls had a higher mean score than each of the boy's groups in reading. The difference is significant only with Group IV.

Language test results showed that there is a definite difference between the sexes at this age level. The youngest girls had a significantly higher mean score than each of the boy's groups.

Test results in arithmetic showed that the youngest girls had a higher mean score than all of the boy's groups except Group I. None of the results were significant at the .05 level.

Table IX gives the test results comparing the youngest girls to each of the boy's groups in reading, language and arithmetic of the highest ability level (110-122 IQ).

In reading the youngest girls had a higher mean score than the boy's Groups III and IV. The boy's Groups I and II had a higher mean score than the youngest girls. None of the differences were significant.

The language test results showed the girls with a significantly higher mean score than each of the boy's groups. Arithmetic test results showed the youngest girls with higher mean scores than the boy's Groups III and IV and a lower mean score than Groups I and II. None of the differences were significant at the .05 level.

Summary of the data TABLE IX, hypothesis number three. At

COMPARISON OF THE MEAN TEST SCORES IN READING, LANGUAGE, AND ARITHMETIC FROM THE CALIFORNIA ACHIEVEMENT TEST OF THE YOUNGEST GIRLS TO EACH OF THE FOUR GROUPS OF BOYS. The language test results showed that the youngest girls had a higher mean (110-122 IQ) than each of the boys' groups.

Girls Mean Score	Boys Mean Score	t Score	Significant at the .05 level
READING			
Group IV 76.0	Group I 80.1	1.46	no
Group IV 76.0	Group II 78.2	0.81	no
Group IV 76.0	Group III 71.1	1.62	no
Group IV 76.0	Group IV 70.0	1.95	no
LANGUAGE			
Group IV 77.5	Group I 70.6	2.48	yes
Group IV 77.5	Group II 66.5	3.59	yes
Group IV 77.5	Group III 65.1	4.46	yes
Group IV 77.5	Group IV 60.1	5.36	yes
ARITHMETIC			
Group IV 64.9	Group I 71.6	1.95	no
Group IV 64.9	Group II 67.9	0.87	no
Group IV 64.9	Group III 64.2	0.20	no
Group IV 64.9	Group IV 59.5	1.44	no

Summary of the data from hypothesis number three. At each of the three ability levels the youngest girls did score higher than fifty per cent of the boys on the achievement test. The language test results showed that the youngest girls had a higher mean score than each of the boys' groups. Most of the results were not significant. Therefore, hypothesis number three was accepted.

The purpose of this study was to compare the achievement of eighth grade students in the Fresno City Unified School District by chronological age and sex. For this study there were three hypotheses:

1. Students whose chronological age places them in the lower one-fourth of their class do not score significantly lower on achievement tests than the other students in the class.
2. Girls do not score significantly higher on reading, language and arithmetic achievement tests than boys of the same age group.
3. Girls whose chronological age places them in the lower one-fourth of the class do not score significantly higher than fifty per cent of the boys on these tests.

The subjects were limited to the eighth grade classes of the Fresno City Unified School District. Only those students who were born between December 3, 1942, and December 1, 1953, and who had an IQ between 78-90, 94-106 and 110-122 were used in the study. Each of the IQ levels was divided into four age groups based on the students' chronological age in the following manner:

1. Group I, December 3, 1952, to March 2, 1953.
2. Group II, March 3, 1953, to June 2, 1953.
3. Group III, June 3, 1953, to September 2, 1953.
4. Group IV, September 3, 1953, to December 2, 1953.

CHAPTER V

SUMMARY, CONCLUSIONS, RECOMENDATIONS and Group IV

AND IMPLICATIONS

the youngest. The students were selected at random until there were an equal number of boys and girls in each of the

I. SUMMARY

age groups within each IQ level.

The purpose of this study was to compare the achievement of eighth grade students in the Fresno City Unified School District by chronological age and sex. For this study there were three hypotheses:

1. Students whose chronological age places them in the lower one-fourth of their class do not score significantly lower on achievement tests than the other students in the class.
2. Girls do not score significantly higher on reading, language and arithmetic achievement tests than boys of the same age group.
3. Girls whose chronological age places them in the lower one-fourth of the class do not score significantly higher than fifty per cent of the boys on these tests.

The subjects were limited to the eighth grade classes of the Fresno City Unified School District. Only those students who were born between December 3, 1952, and December 2, 1953, and who had an IQ between 78-90, 94-106 and 110-122 were used in the study. Each of the IQ levels was divided into four age groups based on the students' chronological age in the following manner:

- entrance:
1. Group I, December 3, 1952, to March 2, 1953.
 2. Group II, March 3, 1953, to June 2, 1953.
 3. Group III, June 3, 1953, to September 2, 1953.
 4. Group IV, September 3, 1953, to December 2, 1953.

Group I was the oldest group of students, and Group IV level that the students were selected at random until the youngest. The students were selected at random until there were an equal number of boys and girls in each of the age groups within each IQ level.

The data for this study was obtained through the use of school records. A computer program was written to select the subjects and compute the statistics needed for the findings for this study.

The review of literature pointed out that the age of entry into school has been a concern of some people for a number of years. A review of the literature also indicates growing support for raising the minimum chronological age for school entry.

A study by Gelles and Coulson pointed out that children of average intelligence younger than six years of age have a small chance of success in the first grade.¹ Despite the evidence, there has been much parental pressure over the years, for a variety of reasons, to lower the

¹Herbert M. Gelles, and Marian C. Coulson, "At What Age is a Child Ready for School?," School Executive, 88 (August, 1959), pp. 29-30.

and Journal of Abnormal Psychology, 104 (1964), pp. 25-35.

entrance age in some areas.² Level (119-122 IQ), had results similar. Authorities in the field of sex differences in school achievement generally agree that girls achieve at a higher level than boys. Darley and Winitz found a statistically significant difference favoring girls in school achievement.³ The results of the data from hypothesis number one, which stated that students whose chronological age places them in the lower one-fourth of their class will not score significantly lower on achievement tests than the other students in the class, is as follows: At the lowest ability level (78-90 IQ), there is no statistical significance in favor of any group. The results vary with no set pattern. There is evidence of many low scores. Some of the results showed the standard deviation nearly as large as the mean score. Thus, the hypothesis was accepted for this ability level. The results of the middle ability level (94-106 IQ) showed a definite pattern. Each of the other three groups had a higher mean score than the younger one-fourth of the class. This was true on all three of the achievement tests.

At the highest ability level the girls had a higher

² Morris Hamburg, "But My Child is Different," School Executive, 88 (September, 1958), pp. 12-24.

³ Frederic L. Darley and Harris Winitz, "Comparison of Male and Female Kindergarten Children on The WISC," The Journal of Genetic Psychology, 104 (1964), pp. 25-35.

The highest ability level (110-122 IQ), had results similar to those shown in the middle ability level. Each of the other three groups had a higher mean score than Group IV on each of the achievement tests. The reading tests results showed the older students far advanced over the younger students of the middle and high ability levels. Most of the results were not significant. Therefore, the hypothesis was accepted for the middle and high ability levels.

Results of the data from Hypothesis number two, which stated that girls will not score significantly higher on reading, language and arithmetic achievement tests than boys of the same age group, is as follows:

Test results of the lowest ability level showed that the girls scored higher than the boys on reading, language, and arithmetic achievement tests in each of the age groups.

Results at the middle ability level showed a significant difference in favor of the girls on reading and language achievement tests. The girls had a higher mean score at each level on the arithmetic achievement, but only one was significant.

At the highest ability level the girls had a higher mean score on each of the tests. All of the t-test scores are very high, but only one is significant. The language test results showed the girls with a significantly higher mean score at each age level. Arithmetic test results showed

the girls with a higher mean score than the boys in all of the age groups. Most of the test results were not significant. Thus, the hypothesis was accepted.

II. CONCLUSIONS

The results of the data concerning hypothesis number three, which stated that girls whose chronological age places them in the lower one-fourth of their class will not score significantly higher than fifty per cent of the boys on reading, language and arithmetic achievement tests, follow.

There were consistent results at all three ability levels. The reading test results showed that the youngest girls had a higher mean score than each of the four boys' groups at the lowest ability level. Only the oldest group of boys had a higher mean score at the middle ability level. At the highest ability level the young girls had a higher mean score than the boy's Groups III and IV, but were outscored by Groups I and II.

Language test results showed very conclusively that the girls' test results were higher than the boys. At each ability level the young girls had a significantly higher mean score than the boys.

Test results in arithmetic showed the youngest group of girls had a higher mean score than most of the boy's groups. The only group of boys to have a higher mean score than the youngest girls on the achievement tests was Group I of this study.

The following recommendations are based on the findings of the middle ability level and Groups I and II of the highest

ability level. Most of the scores were not significant.

Therefore, the hypothesis was accepted.

II. CONCLUSIONS

The following conclusions were drawn from this study:

1. There was no difference on achievement test scores between the younger one-fourth and the rest of the class at the lowest ability level (78-90 IQ).
2. Students of the middle and high ability levels whose chronological age places them in the lower one-fourth of their class did not achieve as well on achievement test in reading, language, and arithmetic as the other students in their class.
3. Girls of this eighth grade class scored higher on reading, language, and arithmetic achievement tests than boys of their same age.
4. The largest difference between boys and girls on these achievement tests was in language.
5. Girls whose chronological age places them in the lower one-fourth of their class did not score significantly higher than fifty per cent of the boys on reading, language, and arithmetic achievement tests.
6. There is less difference on the achievement test scores between the different age groups and between boys and girls at the highest ability level than there is at the middle ability level. This would tend to indicate that at the higher intelligence level an individual is more likely to overcome the age or sex difference.

III. RECOMENDATIONS

The following recommendations are based on the findings

of this study.

Francis L. Ilg and Louise Ellen Ilg, School Readiness (New York: Harper and Row, 1968), p. 21.

1. That further studies be conducted at the high (110-122 IQ) school level to determine if the findings of this study would be true at this level.
2. That a study be made to determine if chronological age or sex is a determining factor in social adjustment.
3. That a study be made to determine if chronological age or sex is a determining factor in a student's dropping out of school.
4. That a study be made to determine if chronological age or sex is a determining factor in students' going on to college.
5. That a study be made to determine if chronological age or sex is a determining factor in a student's finishing high school in four years.
6. That a different method of determining school readiness, other than chronological age, be considered. The method recommended would be based on a child's behavioral age as discussed in chapter II.⁴

IV. IMPLICATIONS FOR EDUCATION

Under most circumstances the results of this study would not be apparent in the school system. This study has broken the students into groups and compared them only to students of their own mental ability. Most of the time these students are compared to the entire student body. An example of this is when a student has to fill out an application to a college. The application asks for his class rank; it does not ask with whom he is being ranked.

⁴Francis L. Ilg and Louise Bates Ames, School Readiness (New York: Harper and Row, 1965), p. 21.

The youngest students in the high ability level (110-122 IQ) do not achieve as well on achievement tests as do the older students at their ability level. They would probably still get good grades and be ranked fairly high in their class. The reason for this is that the mean achievement scores for the youngest students of the high ability level are higher than the oldest group of students at the middle ability level. The mean reading score for the youngest students of the high ability level was 73.0, and the oldest students of the middle ability level had a mean reading score of 58.2. This same difference exists between the middle and low ability levels. Other equally important areas of a school. The indication of this study is that chance plays a big role in the success that a student will have in school. If a student is in the high ability level his chance of study success is very good. If a student does not have the intelligence to be in the high ability level, the next best chance for success is to be a girl or in the oldest group of the middle ability level. Indications are that a student who is in the youngest group of the middle ability level will have very little success in school.

With these thoughts in mind some questions must be asked about our educational system. Is it fair to ask all students to enter school at a certain time because they have attained a specified chronological age? Is it fair to ask

boys in elementary school to compete with girls of the same age when studies show that the girls are more advanced at this level?⁵ Is the educational system meeting its responsibilities in planning its programs to meet the needs of all of the students?

Realizing that these and other pertinent questions on this subject are not easily answered by one limited study, it is hoped that future studies will be made in other related areas that will further clarify the problem and its answers. This study does not assume, nor should it be assumed by the reader, that sex or chronological age alone determines success or failure in school. Other equally important areas of a child's makeup such as personality, social adjustment, and home environment are naturally vital influences on the growing, changing child. The facts presented in this study are intended merely to point out how such basic factors as sex and chronological age can play a role in the achievement of a student in school.

⁵Darley and Winitz, op. cit., p. 30.

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