THE RELATIONSHIP OF BIRTH DATE AND GENDER TO CLASS RANK, ABSENCES, AND DROPPING OUT

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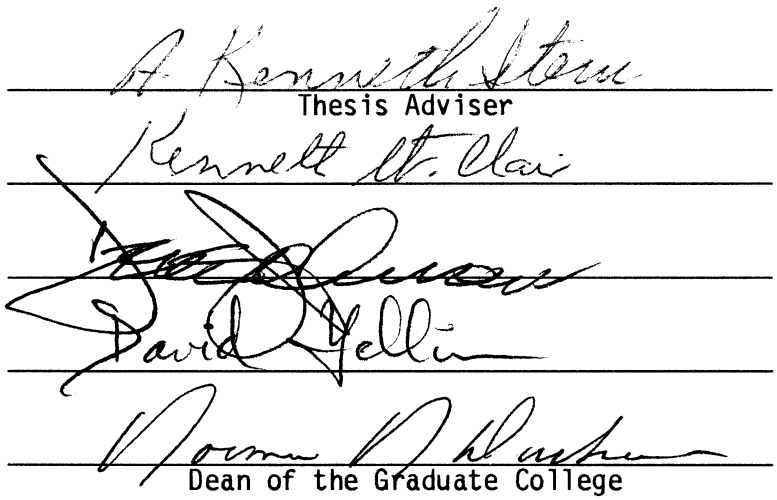

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CHAPTER I

STATEMENT OF THE PROBLEM

Introduction

Living in a world that demands efficiency, educators in the United States are carefully reviewing the best way to educate our children. Among the many questions asked in the interest of efficiency is when should children start to school (Moore and Moore, 1979). This is not a new question, for in the 1830's infant schools were developed which allowed children as young as 18 months to enter school (Spodak, 1984). In fact, this question was treated by the Jewish rabbis as far back as the 1400's, requiring that the boys start school at six or seven years of age (Montefeone and Loewe, 1974).

The word "when," as applied to when children should start school, needs to be clarified. "When" may mean when chronologically, or it may mean when developmentally. The question of whether to start children to school according to their chronological age or according to their developmental age is also an old question. In 1918, researchers were struggling with the matter of mental age and school entrance (Cole, 1918).

"When" developmentally brings to mind Piaget's stages of cognitive development (Sund, 1976). Piaget described one of those stages of cognitive development as the Preoperational Period. This period runs from two to seven years for most children, and is described as the intuitive stage, a stage in which the child is not capable of carrying on any

logical operations (Sund, 1976). Piaget's ideas about the capabilities of children from two to seven years of age have considerable bearing on when children should start to school and what they should be taught after they get there.

Contrasted with Piaget's ideas is the practice of "curricular shove down," resulting in starting academics even in kindergarten. Perhaps such a practice has contributed to recommending to some parents that their children are too immature to begin kindergarten and would do well to wait a year. The practice of starting academics early may also have created the need for a transitional first grade for some children.

So, we have two closely related questions: (1) when should children start to school? and (2) what should they be taught when they get there? When children should be enrolled in school and what they should be taught are like the confluence of two rivers muddying the water considerably.

That a free and appropriate education for all children in our nation is a given, further complicates the problem. Educators strive to give children an appropriate education. They may try to test sufficiently to discern if the child is emotionally and cognitively ready for school. At the same time, they know that five-year-old children are not reliable test takers. They also might wish for an individual education plan for every child, but they recognize what is possible for special education classes with their very small numbers may not be feasible for regular classes with their large numbers. Neither does it appear feasible to allow every child to enter school at the precise time that he/she is developmentally ready to enter school. Hence, the practice of allowing children to begin school when their birthdays fall between two certain fixed dates is adhered to by the states.

Further complications arise when many researchers reported that boys mature more slowly than girls (Baer, 1958; Jinks, 1969; Pauly, 1959; Nimnicht, Sparks, and Mortenson, 1963; Hedges, 1978; Kinard and Reinherz, 1986; Eilertson, 1986). Assuming that boys mature later, some researchers have advocated different starting times based on gender (Pauly, 1951, 1959; Ames and Chase, 1974). Consequently, researchers in the 1980's continued to have an intense interest in exploring the effects of birth date and gender, and the combination of the two on the performance of children in school (Dockery, 1985; Eilertson, 1986; Villa, 1986).

Research Question

States have two dates which mark the span of time in which a child may enter kindergarten. Oklahoma, for example, allows children who are five years old on or before September 1 to enter kindergarten. Those children who become five years old on September 2 or later during the year may not enter kindergarten that year. Therefore, September 2 of that year through September 1 of the following calendar year are the two dates that mark the span of time during which a child may meet the age requirement to enroll in kindergarten. Obviously, the older kindergartner is going to have a considerable advantage over the younger kindergartner--perhaps cognitive, perhaps physical, perhaps emotional, perhaps all three. Is the younger kindergartner faced with handicaps he/she cannot surmount? Or, is his/her task to function effectively in the classroom an achievable one? Will the younger kindergartner's handicap continue with him/her throughout the school years? Or, will it go away after a time? In addition, will gender contribute to difficulties with grades and daily attendance? Will being younger and the child's gender make him/her a greater risk for dropping out of school? Most research

treating these questions has been done with grade school students, and much of that research has been done with students in kindergarten through grade four. The research reported in this paper deals with high school students. The question to be answered is: do birth date and its attendant variable, gender, linger in their effects throughout high school?

Definition of Terms

For the purposes of this study, terms which were important for understanding are defined as follows:

Birth Date. The date of birth falling within the officially designated span of time during the year that makes the child eligible to go to school. Early birth date means the child will be an old kindergartner. Conversely, late birth date means that the child will be a young kindergartner.

Mental Age. A measure of mental development, as determined by intelligence tests.

Developmental Age. Developmental age is the mental, physical, and emotional age determined by testing that indicate a child can perform certain tasks and function at a given level in the classroom.

Cognitive Development. Cognitive development means that the child passes through identifiable stages of mental growth just as he/she passes through identifiable stages of physical growth (for example, puberty).

Assumptions of the Study

It was assumed that records were kept and files were guarded carefully and completely in the school district where the study was conducted. It was further assumed that, since the same counselor had been the guardian of these records and files, the records contained had

been recorded under the same guidelines. It was also assumed that the record of dropouts, as indicated by the dropout reports kept by the attendance secretary in the main office of the district, was a complete and accurate record. It was noted with this assumption that virtually no students drop out of schools in this district before the seventh grade. Records and testimony of elementary principals and elementary building secretaries attested to this fact.

Limitations of the Study

This correlational study was made using data from a 3A high school in a school district in northeastern Oklahoma (schools have approximately 240 to 490 in the sophomore, junior, and senior classes) which was fairly stable in population with a slowly declining enrollment but was not depressed. Ranching and some industry are two of its major sources of income. Findings could be generalized to a setting similar to the one of this investigation. This study was concerned only with the birth date and gender effects on the scholastic success of high school young people in this 3A Oklahoma district. Size of the school, community environment, home environment, and other similar variables were not considered in this study.

Significance of the Study

Birth date and its attendant variable, gender, have been a hotly debated topic in the eighties (DePasquale, Moule, and Flewelling, 1980; Gredler, 1980). Understandably, this is so because there is a growing feeling of uneasiness over the lack of efficiency of our educational system, compared with such nations as Japan, Russia, various countries in Europe, and other parts of the world. Such events as Sputnik; the

report, A Nation at Risk (1983) and other such publications; and the economic success of Japan in relation to other developed countries, have prompted a careful examination of all that is done in education.

As a nation we are committed to providing a free and appropriate education to all of our people, so it is imperative that we learn how to give more of our young people a better education. To do this, we must know why so many of them do not realize their potential as citizens. We also must understand why so many drop out of school. So, we ask and seek answers to such questions as: do birth date and gender affect academics, attendance, and dropout rates? If there are effects, do they linger through the high school years, affecting the same variables? If birth date and gender do affect adversely the education of some high school students, we may want to consider requiring time of school entrance to be based on developmental age and gender, or we may want to allow more time for developmentally younger students to adjust by offering a transitional first grade.

Theoretical Perspective

Parents, teachers, and administrators make judgments about the abilities of a child to learn based on his/her age in relation to personality and gender. These judgments lead to decisions about when the child should start to school and how he/she should proceed through school. The matter of age may be too closely calculated. The factor of gender may be overemphasized. Children may share common maturational mechanisms, physical experiences, and socially developed and organized knowledge, to the extent that they develop in similar ways. In this way, we can speak of cognitive stages of development which characterize children of certain age spans. Jacob (1984, p. 38) says of Piaget (with regard to the stages

of development): "Piaget's main concern has always been with the succession of the various stages, not when they occur exactly." From the Piagetian perspective, neither birth date nor gender are major considerations in understanding how children learn. Other factors, such as the sequence of attaining stages of thought, or biology, or nutrition, are major factors. If the above hypotheses are supported by the data, then factors that have minor significance can be laid aside and attention can be given to those factors which, indeed, have major significance in affecting school success.

Hypotheses

A statistical treatment of the following hypotheses was made:

1. No significant relationship will be shown between birth date and class ranking at the end of the seventh semester in high school.

2. No significant relationship will be shown between birth date and the total number of absences accumulated during high school.

3. No significant relationship will be shown between birth date and dropping out of school.

4. No significant relationship will be shown between gender and class ranking at the end of the seventh semester in high school.

5. No significant relationship will be shown between gender and number of absences in high school.

6. No significant relationship will be shown between gender and dropping out of high school.

7. No significant relationship will be shown between the combination of birth date and gender and class ranking at the end of the seventh semester of high school.

8. No significant relationship will be shown between the combination of birth date and gender and the total number of absences accumulated during high school.

9. No significant relationship will be shown between the combination of birth date and gender and dropping out of school.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

Through the years, many researchers have focused their studies on grade school children when treating the birth date effect. In fact, the bulk of the literature treating the effect deals with grade school children only. A relatively small amount of the literature treats the birth date effect beyond the eighth grade. The attendant variable of gender must be considered as well, for gender may complicate the birth date effect. A comprehensive study examined literature that reports a variety of approaches made, in order to understand the birth date and gender effects on school performance.

The review of literature proceeded along the following lines: pertinent literature was reviewed from each decade beginning with literature written in the second decade of this century. Then, since the birth date effect is discussed from so many different viewpoints, a brief comparative analysis of the literature was made by drawing on material from the chronological review presented in the first part of this chapter. It was noted that, while most of the literature was written in a setting in the United States, some literature was based on studies conducted in Canada and England (DiPasquale, Moule, and Flewelling, 1980; Jinks, 1964; Freyman, 1965; Simner, 1983).

Literature Reviewed Chronologically

Study in 1918

As far back as 1918, researchers were struggling with the matter of mental age and school entrance. In one study, it was concluded that mental age would be a better determiner of who should start first grade than would chronological age (Cole, 1918).

Study in 1927

Lincoln (1927) reviewed literature on the educational significance of gender differences in school children. The literature reviewed indicated a generally high performance in various subjects among the girls as compared to the boys, with the exception of history and possibly arithmetic. Many of the studies reviewed were based on pupils within a given grade without considering the ages of those pupils, making one wonder what importance gender had if the birth date factor was not considered as well. Lincoln did write that the problem of providing for gender differences becomes merged in the larger problem of making provisions in the school for greater differences in individuals represented by a wide range of physical and mental traits and acquired abilities.

Study in 1934

A comparison of school children who started the first grade before they were six was made with children who started first grade between the age of six years and six years and four months (Biglow, 1934). The study indicated that a late birth date had an adverse effect upon children, compared with those children who had an early birth date. The retention rate was much higher for those with a late birth date. It was noted that

the higher the intelligence quotient (IQ), the better the chance of success for late birth date children.

Among the eight major conclusions of Biglow (1934), the following were noteworthy: (1) if a child's chronological age is between six years and six years and four months when he/she begins the first grade, and if he/she possesses an IQ of 110 or more, he/she is practically certain to succeed in school; (2) if a child's chronological age is below six years and his/her IQ is below 110, the chance of success is small; and (3) a child whose chronological age is below six years and four months, but who has a mental age of six years and four months or more, is practically certain to succeed in school.

Studies in 1937

Gates' (1937) study (entitled "The Necessary Mental Age for Beginning Reading") did not determine the optimum mental age at which reading could be introduced to young children. The study did show how a variety of factors such as materials, type of teaching, skill of the teacher, thoroughness of examination, frequency and treatment of special difficulties, and other factors might affect how rapidly and how well children learn to read at varying mental ages.

Gates (1937) illustrated how learning can vary with four different groups of teachers. The first group of teachers, the most expert group, received special instruction, used a considerable amount of supplementary materials, and was closely supervised. The 78 children taught by this group were measured near the end of the year by the "Gates Primary Silent Reading Tests." The correlation between the mental age and average reading age was .62. The correlation between chronological age and average reading age was .10. With this group of students, the teachers kept a

record of the total number of books read prior to testing. The highest correlation existed between the number of books read and the average reading age (.84).

The second group of teachers was considered above average, but was not as highly qualified as the first group. Materials used were approximately the same in quantity and quality as those of the first group. The teachers in the second group were apparently not as closely supervised as were the teachers in the first group. No mention was made of Gates' (1937) tests being given to the second group at the end of the year. It would appear that this would have had to be done; otherwise, there would have been no common basis for judging the comparative success of the pupils. With this group of 48 pupils, correlation between mental age and reading age dropped to .55.

The third group of teachers and pupils was found in a rather superior urban school setting, but with limited materials. The correlation between mental age and average reading age dropped to .44.

The fourth group was comprised of 80 pupils from two public school classes in a large metropolitan setting, with teachers judged somewhat below average of those in the system. Reading materials were inferior. Due to class size, the teachers gave little individual attention to the students. Much oral instruction was given, with little attempt to help students individually. The correlation between mental age and average reading age with this group was only .34.

The conclusions drawn from the study demonstrated that the effectiveness of the teachers and the abundance of good materials make it possible for children with mental ages of five and above to learn to read quite well. On the other hand, average teachers and limited materials

require the mental age to be higher for children to learn to read during the first year of school.

Partington (1937) conducted a study to determine the relationship, if any, between the chronological ages of pupils on entering the first grade and their later scholastic success. He investigated the records of 284 pupils who, during the 1935-36 school year, were in the second to sixth grades. His findings included: (1) apparently, a low chronological age is a handicap to many children in school; and (2) mental age is probably a better indicator than IQ for predicting success in school. While school entrance in Partington's study varied from five years to seven and one-half years, he did not discuss on what basis children should be allowed to begin school.

Study in 1938

In the 1930's, the schools of Plymouth, Massachusetts admitted students to the first grade on the basis of chronological and mental age (Handy, 1938). In September, children whose sixth birthday fell before January 1 were admitted to the first grade. Those children whose sixth birthday fell between January 1 and the following September 1 were given mental testing by a psychiatrist. If an underage child scored at least five years and eight months mental age on the test and was recommended by his/her physician as being physically fit, he/she was admitted to school.

A comparative study was made of the regular age and underage students who had completed the fourth grade in the Plymouth, Massachusetts schools (Handy, 1938). The academic records of these two groups of approximately 1,000 students were compared, showing that the underage students (younger) secured better marks than did the regular age (older) students. Another part of the study dealt with students in grades 7

through 11. Academic marks of underage students were compared with those of regular age students in three subjects. Again, the underage students were shown as doing superior work. The study seemed flawed by virtue of the selection procedures for the underage students, who appeared to be a small, selective group in comparison to the regular age group with whom they were compared.

Study in 1941

In the late 1930's and early 1940's, the Nebraska Constitution specified that school districts were required to provide free instruction for all children between the ages of 5 and 21. Since only 123 of the 644 districts provided kindergarten, 521 districts enrolled five year olds in the first grade. A limited study was made in the public schools of Saint Paul, Nebraska, to determine what reading skills five year olds were acquiring and retaining after beginning their education in the first grade (Keister, 1941). Standardized reading tests were used to test the skills of these five year olds. While results were inconclusive because of low correlations between reading tests used, it was observed that it was possible for children entering the first grade as five year olds to make normal progress in reading during their first year of school.

Study in 1955

King's (1955) study drew conclusions dealing with age of entrance in the first grade and gender. The Stanford Achievement Test was given to two groups of children with a mean age difference of nine months. All of these children started in the first grade in the same school at the same time. Intelligence quotients ranged between 90 and 110 for both age groups, with a mean difference of 1.96 higher for the younger group.

Application of that test indicated this was a significant difference at .05. The scores of children in the older group ranged from grades 11.3 to 5.4. The scores of the younger children ranged from grades 9.6 to 3.8. Applying Fisher's t-test to the differences in the scores of the two groups, it was concluded that the differences were significant at .05. Of the 104 children studied, there were 11 retentions, 8 of which were boys. King (1955) stated that retentions were not more than 2%. It seems that the proper calculation would be closer to 10%. It was also noted that kindergartens were maintained in this school system but that kindergarten attendance was not compulsory.

Study in 1958

Another study (Baer, 1958) took students as far as the 11th year in school to determine if overage students were functioning better in school than were underage students. This study matched a student on the basis of intelligence, gender, and, in most cases, school entered. Seventy-three children with November and December birth dates were matched with the same number of students with January and February birth dates of the same year. Both groups of students entered school in the fall of the same year.

The overage (older) group was significantly more successful in maintaining regular progression from grade to grade than was the underage (younger) group. At the same time, a diminished difference between the two groups existed at the completion of high school. While at the completion of high school there was still a significant difference in, among other things, marks in high school subjects and achievement test scores, it is worth remembering that the age difference between these two groups was approximately one year.

Again, in this study the variable of gender was considered. The differences between boys and girls were greater than the differences between older and younger students in three of the seven personal trait ratings of the students, which were: attitude toward school regulations, dependability, and emotional stability, with the boys demonstrating less maturity.

Study in 1959

Pauly (1959) studied the achievement test results of 29,992 second through eighth graders, comparing the ages and test results of boys versus girls. At each grade level the mean chronological age for boys was higher than for girls, ranging from .93 of a month to 1.73 months. At the same time, however, the mean achievement scores of the boys at each grade level were lower than were the scores for the girls. Since the boys' scores were compared to the girls' scores of the same age, the achievement differences between the two ranged from 4.29 months to 8.09 months.

Study in 1962

Green and Simmons (1962) pointed out that the anticipated achievement tests made it possible to compare the actual performance of children with their probable performance, had their admission to school been postponed. They concluded that if all younger pupils were required to wait a year before beginning school, the average age and the average achievement test scores in any grade would climb, but the average grade level and the average achievement test scores at any given age would drop. The gain in achievement for years of schooling would have to be weighed against the loss of achievement for years of life.

Studies in 1963

The Highline School District in the state of Washington made a study of retention in the 1959-60 school year (Hall, 1963). Data showed that 801 of approximately 12,800 elementary school children had been retained. The study was made to determine if entrance age affected retention. For this study, underage pupils were less than six years and six months of age. Older age pupils were more than six years and six months of age. The data indicated the following: (1) younger boys were much more likely to be retained than were younger girls; (2) younger girls were more likely to be retained than were older boys; and (3) older girls were less likely to be retained than were older boys. The study included children in the sixth grade.

A monograph written by Ames and Ilg (1963) of the Gezell Institute of Child Development reported on the research establishing the validity of the "Incomplete Man Test" as a means of determining the maturing of a child from 2 to 9 years of age. The incomplete man is the outline of a man in black ink having one arm, one leg and foot, one ear and no eyes, with half a bow tie at the neck. A green sheet of paper with this outline drawn on it is placed before the child. What the child adds to the man that is missing should be in keeping with the child's chronological age. How the child adds to the man determines his maturity or lack of it. For example, the addition of a belly button at any age after four years is unusual; after five years, it is interpreted as a sign of marked immaturity.

All children for the study by Dickenson and Larson (1963) were normal age children upon entering school. Four hundred eighty fourth grade students were selected by stratified random sampling from a larger

population, in order to control for such variables as kindergarten experience and other school experience. The subjects were divided into four groups by age; the youngest group was then compared to the other three groups. The research found that the youngest group scored 4.73 on the Iowa Test for Basic Skills in comparison to the three remaining groups whose mean composite score was 4.92.

The second part of the study compared each of the four groups on achievement, mental age, and IQ. Interestingly, the two younger groups had significantly higher IQs. Dickenson and Larson (1963) reported an analysis of variance revealing an F ratio of 2.45, with 3 and 475 df. An F ratio of 2.62 is significant at the .05 level. Their comment was, "Although there was no significant difference between the means of the four three-month-age range groups on achievement, their differences did approach significance" (p. 493). Comments on mental age and IQ did not seem useful for this study.

Nimnicht, Sparks, and Mortenson (1963) made a three-year study of variables that affect success in the first grade. The study involved more than 9,000 students in 84 school districts. All the first grade students in the cooperative districts took the "Lorge-Thorndike Test of Mental Maturity." Other information included birth date, father's occupation, and gender of the child. At the end of the 30 weeks, teachers reported on the success of the children by rating each as "above average," "average," or "below average" on the child's ability to read and to perform the tasks expected of him/her. As Nimnicht noted, while the teacher's judgment was based on academic achievement, it represented only one measure of success.

The results included: (1) there is a significant relationship between IQ and academic success; (2) age at entrance appears to be a factor

in success in the first grade, but not a very strong factor in most of the 84 districts included in the study; and (3) in most districts, there was a significant relationship between gender and success in the first grade. Girls tended to achieve at a higher level.

Carrol (1963) conducted a study to obtain evidence regarding possible disadvantages encountered by children who entered first grade younger than the majority of their classmates. Twenty-nine pairs of children were selected from third grades in five public schools in the state of New York. They were matched on the following variables: gender, IQ, socioeconomic status of the family, and (as far as possible) school attended. Two of the major findings of the study were: (1) overage children made consistently higher scores than did their younger classmates on achievement, and (2) boys tended to find reading more difficult than girls.

Studies in 1964

Halliwell and Stein's (1964) study was made to see how pupils admitted to the first grade at an early age would compare in the subject areas of reading vocabulary, reading comprehension, arithmetic reasoning, arithmetic fundamentals, and language and spelling, with pupils admitted to first grade at a later age at the end of the fourth and fifth grades. It was hypothesized that, since teachers gave so much attention in the early grades to reading (while arithmetic was taught at a more leisurely pace), and that since younger students were not as ready to learn to read as were the older students, the discrepancies in academic achievement would be much greater in the areas of reading than in the areas of arithmetic.

The research showed that the comparative achievement scores of the older fourth graders were clearly superior in every category, with the exception of arithmetic fundamentals. The same results were demonstrated with the fifth grade pupils, the older pupils being superior in every category (with the exception of arithmetic fundamentals). No nonpromoted students were used in the study. Seven of the students retained would have been in the younger fifth grade group, indicating that differences between the older and younger groups at both grade levels would have been more pronounced than they were (Halliwell and Stein, 1964).

In a British study (Jinks, 1964), it was noted that the chances for academic success increased the higher up the socioeconomic scale one was born, and that while birth date might not increase chances for success as much, it had significance. A total of 1,315 children in one borough was studied. The sexes were about evenly divided. The birth dates of the boys and girls also were evenly distributed between the first and last six months of the school year. Students were "streamed" according to a system of classification from A to E, with the brightest students in the A "stream." The next brightest group of students was in the B "stream," with the same pattern following down through the E "stream." A table was created which showed the birth dates by month of children in the A "stream," in comparison with children in the B and C "streams." In the A "stream," the table showed an obvious trend; the younger the child, the fewer the number. In contrast, the trend was exactly the opposite with the B and C "streams"; the younger the child, the higher the number. The study also contained a table showing that boys did less well than girls, and young boys did considerably less well than young girls. This study dealt with children not yet having entered upper school levels.

Study in 1965

Another British study which drew on Jink's (1964) study reached a conclusion similar to Jink's, that a child with a late birth date had less chance of becoming a member of the A "stream." This study also found that younger children in large percentages were placed in remedial reading groups and were in need of child guidance services (Freyman, 1965).

It should be pointed out that, due to the method of enrolling these children in the British infant schools, the younger children were spending up to one year less time in the infant schools before being transferred to the junior schools than were the older children who were studying with them. Another major consideration of the study was that "streaming" resulted in younger children often being placed in the lower "streams" because of a later birth date rather than the lack of ability.

Study in 1967

A Tennessee study using children in fourth and fifth grades from four predominately White grade schools placed children in three age groups in relation to birth date. Frequency data revealed that approximately 29% of the students in the late entrance age group (younger age) were held back one year in comparison to 19% for the normal entrance age group (average age) and 17% for the early entrance age group (older age). The study did not make clear whether "holding back" referred to parents enrolling their children or to retention, but stated that Chi-Square tests failed to demonstrate any significant relationship between entrance age, gender, or retention rate. The study measured students on 30 readiness, achievement, and intelligence measures. Analyses of

variance testing the significance of differences in means for the three age groups were made on all 30 measures. On only four of the measures were there significant differences. The findings of this study emphasized that it was doubtful that raising the entrance age helps anyone (Miller and Morris, 1967).

Study in 1968

Recognizing that academic deficits do exist, Weinstein (1968) assumed that if the deficits were not supported by negative definitions of self in relationship with school, the academic deficits would disappear in time. Rather than treat the relationship between school age and achievement, Weinstein's study treated the relationship between school entrance age and adjustment. Children in two schools for the emotionally disturbed were identified as having been among the youngest in their first grade classes. Children were judged the youngest if they were within four months of the cutoff date for entrance into their schools. Since the two schools, which were in two different states, had different cutoff dates, Weinstein was able to test the hypothesis that emotional disturbance is associated with the child's relative entrance age, rather than with his/her absolute entrance age. The results of the study demonstrated that the youngest children in the school with the earlier cutoff date formed a disproportionately large percentage of the total number in the school, while the children in the school with the later cutoff date whose birth dates fell into the same time span as the youngest children in the first school were not so many, proportionately. The findings that supported this hypothesis included some evidence to support the assumption that the relative age, not the absolute age, is the essential variable.

Studies in 1970

In Harrell's (1970) study (one of the few that have examined high school achievement data and subsequent enrollment in college), students were categorized as young or old if they belonged to the first or last six months of the normal first grade entrance age range (from 5 years and 10 months to 6 years and 9 months). Achievement and grade point average in grades 6 and 12 were examined for 135 males and 170 females. Achievement was measured by the composite measures of the "Stanford Achievement Test" for 6th grade and the "Iowa Test of Basic Skills" for 12th grade. The average grade point was: (1) the average grade for all elementary courses except art, music, and physical education; or (2) the average grade point for all courses 10 through 12.

The dependent measures were analyzed separately by gender, with an analysis of covariance. The covaried variables were: (1) mental age (measured by the "Kuhlman-Anderson Intelligence Test" given to all sixth grades); and (2) a social and economic measure defined as the mean dollar value of the homes in the children's neighborhoods. Among all eight comparisons, the older students were favored in grade point and achievement. Seven of these were significant; only the grade point average between old and young females in elementary school was not significant. Data that pertained to college enrollment were not considered pertinent to the purpose of this paper and were therefore not reported.

Beattie (1970) conducted a study which consisted of 387 students who attended Portage Township School Corporation from kindergarten through the third grade. The purpose of this study was to determine if there were significant differences in academic achievement from the first grade to the second grade, and also from the second grade to the third grade.

The tests were the "Stanford Achievement Test" and the "Otis-Lennon Mental Ability Tests." The students were divided into four groups according to their chronological age at the time of school entry. After analyzing the data it was found that the older school entrants were significantly superior to the younger school entrants in academic achievement at grades one, two, and three. It should be noted that a comparison of the academic achievement of the younger entrants with the older entrants was not significantly different as they progressed from first to second grade and from second to third grade.

Study in 1973

Kerr's (1973) study included children from kindergarten through grade two. The ages of these children ranged from five years and five months to nine years and four months. The hypothesis that a larger number of lower achieving children are born from May to August was not confirmed. These children were enrolled in September, and were compared with children enrolled at the same time who had a September to December birth date in the preceding calendar year, making them eligible for enrollment in school.

Study in 1978

The purpose of Hedges' (1978) research was to reduce the confusion surrounding the issue of optimum age of entry into first grade in American public schools. He proceeded by trying to locate all published references in the professional journals, from the early 1900's to 1976. These references included the following: some 200 relevant articles in the professional literature, a dozen dissertations, several master's theses, a number of ERIC documents, a few State Department of Education

monographs, several unpublished papers, and a number of books and pamphlets. The results of Hedges' research in this plethora of material appeared in the following two documents:

1. When Should Parents Delay Entry of Their Child Into the First Grade? (Research Bulletin, 1974, 38 pages.)

2. At What Age Should Children Enter First Grade: A Comprehensive Review of the Research. (Published by the UMI Int., 1977, 194 pages.)

In this microfilm, only the conclusions of this vast research project were reported. Some of the pertinent ones were: (1) by itself, chronological age is not adequate to insure the parent that his child will succeed in the first grade; (2) mental age, by itself, is not adequate to insure the parent that his child will succeed in school; (3) because of its labeling effects, IQ is not as desirable a criterion as mental age; and (4) gender differences tend to diminish over time so that somewhat after puberty they have disappeared.

Study in 1979

Moore and Moore (1979), in their book School Can Wait, wrote that children should stay at home until they are eight or nine years of age because brain development is such that perceptual abilities (seeing and hearing) are not developed at the ages of five or six to perform functions required for learning to read. The Moores reported on two studies reviewed in this paper: Keister (1941) and Freyman (1965). They pointed out that Keister reported that normal reading progress was apparently possible for underage children in school, but their reading skills were lost over the summer and were not made up later. Likewise, Freyman found that children with birthdays in the summer (making them a few months younger than their classmates) were frequently assigned to remedial

reading groups and received more than their share of low marks. These disadvantages persisted through the primary school years. Freyman concluded that starting to school, even a few months later, can result in greater reading success.

Moore and Moore (1979) emphasized that cognitive development occurs in sequential stages which never vary in their sequence. Intellectual growth is dependent on appropriate activities at each particular age. It cannot formally be accelerated through special instruction or training. For a generation, research studies have provided scientific support for Piaget's central concepts of intellectual development of the child. Despite inroads by contrasting theories of such psychologists as Jerome Bruner and Benjamin Bloom, Piaget's guidelines stand out as the practical common sense route to sound learning practice. Primarily, the potential to learn is being acquired during the early years of life more than learning itself.

Studies in 1980

A sample of children labeled "learning disabled" was studied, with the first grade entry age being the independent variable (Maddux, 1980). It was found that there were more early entering (younger) and fewer late entering (older) children in this sample than would be expected if entry age were a chance variable. The disproportionate number of early entering children among learning disabled students was found to persist through grade 9, but not to higher grade levels.

Davis, Trimble, and Vincent (1980) attempted to determine whether there was a significant difference between the achievement test scores of students who entered first grade as five year olds and those who entered as six year olds. The large samples (43,000) were taken from grades one,

four, and eight of the Kentucky Public Schools. If children were six between September 1 and December 31 of the year they entered school, they were considered five year olds. If they were six before September 1, they were considered six year olds. The "Comprehensive Tests of Basic Skills" was used to determine the progress of the students. Significant differences were noted in favor of the six year olds on the first and fourth grade levels in reading, language, and math. By the eighth grade level, significant differences were noted only in reading.

A Canadian study consisting of 552 children in kindergarten through grade 13 dealt with children who were referred for psychological assessment (DiPasquale, Moule, and Flewelling, 1980). The children referred were having difficulty, either academically or behaviorally. Charting by birth date clearly showed that the number of children increased as one went from early birth dates to late birth dates. Further charting indicated that the birth date effect was due to academic rather than behavioral referrals. Charting also showed that the birth date effect was not apparent in the later grades. Finally, charting showed no significant birth date effect on primary school aged girls in this study. The researchers stated:

> The fact that this birth date effect is not apparent in the later grades might be interpreted as evidence that younger children catch up to their peers or outgrow their difficulties. But it is not known if they do so spontaneously or because of intensive remedial assistance or grade repetition (p. 237).

Refuting the DiPasquale, Moule, and Flewelling (1980) study, Gredler (1980) noted that other pertinent variables were not considered, such as socioeconomic status, teacher expectancy for performance, and degree of nondisruptive student behavior. Gredler observed that it would seem, (according to the DiPasquale, Moule, and Flewelling study), that since the birth date effect is evident only in the male data, males should

start to school one year later, an impractical solution in light of the Civil Rights Act of 1963, which would prevent placing children in a class based on gender. The Gredler article contained a table comparing British and American children with the same socioeconomic status. The "Stanford Achievement Test" was used to compare reading age of the two groups after both groups had six months of schooling. The chronological ages of the two groups were: American, six years, six months; and British, five years, six months; making the British children's score of 7.45 with $t = 5.8$, $p < .05$ a very impressive score.

Study in 1981

The study of Kalk, Langer, and Searls (1981) involved a sample of Caucasian students in grades 4, 8, and 11. The data were collected by the "National Assessment of Educational Progress" (NAEP). The achievement data included math, science, and reading. The predictor variables were relative age, class age, gender, parental education, home environment, and type of community. Relative age described a student's age relative to other students in the classroom. Class age was a control for states with different school entrance cutoff dates. The predictor variables were entered in a stepwise multiple regression analysis, with class age and relative age entered first. The basic question that Kalk, Langer, and Searls attempted to answer was: does the achievement level of younger students ever catch up with and even possibly surpass the achievement of older students during their period of formal education?

One of the limitations of the study was that the NAEP did not provide information about the same student at two points in time. For the creation of samples used by this study, only those students who were progressing through school at the normal rate for their school district

were selected for the "National Assessment" samples. The minimum sample sizes used for this study were 6,849 for age 9; 11,032 for age 13; and 10,472 for age 17. The quality and amount of analytic data were two of the most important aspects of this study, providing a much broader base than any previous research. A larger proportion of males (.1844), compared to females (.1083) had been retained one grade by the age of nine. By age 17 of a student's formal school experience, neither the relative nor class age variables were statistically significant in the presence of other predictor variables.

Based on Kalk, Langer, and Searls' (1981) analyses of the data and previous research, several reasons were offered for the decreasing importance of these variables. The reasons were: teacher intervention, remedial instruction, successful student adaptation to the school environment, and student retention (unsuccessful adaptation). Examination of the combined 9-, 13-, and 17-year-old Caucasian sample indicated that the significant advantages found for the oldest students at age nine decreased but remained significant at age 13, then disappeared by age 17.

Studies in 1983

A study involving 154,203 Hawaiian public school students (5 to 20 years old) found a significant correlation between age and learning classification for children born in each successive month (months were numbered January and onward), who were classified as learning disabled. Findings suggested that late born children had more specific disabilities than did the early born children (Diamond, 1983).

Simner's Study

The outcome of Simner's (1983) investigation questioned the merit of

raising school admission age from 57 to 60 months in order to help reduce school failure. The 114 nonrepeating kindergarten children who were the subjects for Simner's study had a mean entrance age in September of 62.7 months for the 62 males and 63.2 months for the 52 females. In brief, results indicated that, of the 21 failure-prone children in Simner's sample, only 6 were under 60 months of age at the time they entered kindergarten. On the other hand, 17 (81%) of these same 21 children obtained scores on the "Printing Performance School Readiness Test" (PPSRT) that did not meet the school readiness cutoff point, while 14 (67%) did not meet the "Draw-a-Man Test" (DAMT) cutoff point. Hence, the number of truly at-risk children who were correctly identified using this proposed increase in chronological age was far less than the number correctly identified when the cutoff point on both of these school readiness tests were employed. Interestingly, the results also showed that seven of the children in this sample who were under 60 months old at the time of kindergarten were performing at the top of the class at the end of the school year, and so were prompted to senior or advanced sections of the next grade. One year later, a similar study was made with results that closely paralleled the results of the preceding year. The subjects for this study were from the lower socioeconomic area of a medium-sized urban center.

In this study, Simner (1983) compared the effectiveness of PPSRT and DAMT with the DiHirsch Predictor's Index of Reading Failure, the McCarthy Scales of Children's Abilities, the Metropolitan Readiness Tests, and the Wexler Preschool and Primary Scale of Intelligence. He concluded that the PPRST and the DAMT, both highly cost effective and time saving, showed greater accuracy in identifying failure-prone kindergarten children than did the more sophiticated test.

Studies in 1984

Depending heavily on developmental concepts, Frieson (1984), an Oklahoma school principal, advocated allowing children to learn when they are ready to learn. He made a distinction between chronological age and developmental age, stressing the value of holding immature children back a year and advocating transitional first grade classes.

Comparisons of the academic children entering school at the opposite ends of the normal 12 month entrance age period have demonstrated that the younger students received lower school grades and scored lower on achievement tests (Langer, Kalk, and Searls, 1984). The sample size being large (97,000 Caucasians and 17,000 Black students) and the groups selected (9-, 13-, and 17-year-old children in the fourth, eighth, and eleventh grades) permitted a trend analysis from elementary to high school. The study treated only students who had a normal first grade entrance and normal progression through their school. Two age variables were considered: (1) the relative age variables (chronological age of each student), and (2) the class age variable (average chronological age of the students in the classroom), thus controlling confusion by multiple birth date cutoffs in the various states represented by the sample. Also, the gender variable was considered.

Young male students were shown more likely to be retained than were young female students or older students. Langer, Kalk, and Searls (1984) concluded their discussion of the combined 17-year-old sample by stating that apparently the age phenomenon was no longer present, speculating that this was possibly due to retention and dropping out of school.

Intricate and sound research procedures were followed. The data were collected by the NAEP. A series of stepwise multiple regressions

provided the data analyses for the study. The analyses were adjusted because the NAEP sample design employed stratifications and clusterings not satisfying standard assumptions of regression analyses.

Langer, Kalk, and Searls (1984) made comparisons of the academic achievement of children entering school at the opposite ends of the normal 12-month entrance age period. These comparisons demonstrated that the younger students received lower school grades and scored lower on achievement tests. The findings were supported by Biglow (1934), King (1955), Green and Simmons (1962), Carrol (1963), and Hall (1963).

In the nine-year-old samples for Caucasians and Blacks, the relative age and class age variables were statistically significant, demonstrating an academic advantage for older students. The study also showed that the proportion of retained White males increased significantly faster than females as the students' relative age became younger. While Black males were retained at higher percentages, the findings showed no interaction effect for Blacks between gender and relative age.

The 13-year-old sample for Caucasians yielded findings that showed there was a diminishing effect with relative age and class age. The 13-year-old Black sample, in contrast, continued to yield statistically significant results. The retention rates for 13-year-old Caucasians replicated the pattern seen with 9-year-old Caucasians. For Black 13-year-old students, there was a dramatic increase in the percentage of those retained.

The combined 17-year-old sample yielded no significant findings with regard to relative age and class age, nor did analyses of retention rates show significant changes. Langer, Kalk, and Searls (1984) stated:

> It does appear . . . that the age phenomenon was no longer present, possibly due to retention and dropping out of school . . . with much greater cost to Black students. Successful

> student adaptation to the school environment and student retention are two of the possible reasons for the decreasing importance of relative age (p. 78).

Studies in 1985

A recent dissertation treated the effects of IQ, gender, and school entrance age on the achievement and self-esteem of 202 students in the 10- to 11-year-old category (Dockery, 1985). The subjects for this study were in the school entrance age group comprised of students who were born between September 1 of 1972 and August 31 of 1973.

The following four hypotheses were the most important for this study: Hypothesis 3--boys will do less well than girls on all achievement measures; Hypothesis 4--boys will do less well than girls on all self-esteem measures; Hypothesis 5--younger students will do less well than mid-age students, and mid-age students will do less well than older students on all achievement measures; Hypothesis 6--younger students will do less well than older students on all self-esteem measures.

On Hypothesis 3 (boys will do less well than girls on all achievement measures), the results were not significant for composite achievement on math but were significant for reading, with boys doing less well than girls. On Hypothesis 4 (boys will do less well than girls on all self-esteem measures, which included total self-esteem, self-esteem/peers, self-esteem/academic, and self-esteem/teachers), the results were significant for only self-esteem teachers, with boys doing less well than girls. On Hypothesis 5 (younger students will do less well than mid-age students and mid-age students will do less well than older students on all achievement measures), the results were not significant. Neither were the results significant on Hypothesis 6 (younger students will do

less well than mid-age students and mid-age students will do less well than older students on all self-esteem measures).

Hypothesis 7 was worthy of special mention. This hypothesis stated that interactions between the variables IQ, gender, and school entrance age will create high risk groups not as likely to do as well as other groups of students on the achievement measures. Dockery (1985) noted that younger girls did less well than did younger boys on composite achievement, contradicting the thesis that boys do less well than girls.

Montz (1985) made a study of Anchorage, Alaska fourth through sixth grade students from which she concluded that there was a statistically significant difference between the "early entry" (younger) students and the "late entry" (older) students, and their academic achievement, with the "late entry" students scoring significantly higher. This study did not find a statistically significant difference between the gender of students and their academic achievement. Montz observed that, possibly, gender differences were not significant at third grade and above.

Studies in 1986

In Uphoff and Gilmore's (1986) study, the expression "summer children" was introduced. The expression referred to children whose birthdays fall between June and September. They were considered more at risk than older kindergartners and first graders, and were more likely to not be developmentally ready for school. This study, done on 178 Hebron, Nebraska pupils, showed that the bulk of failures were "summer children." Another finding was that, while older students' IQs were not quite as high as the "summer children," their average cumulative scores on the "Iowa Test of Basic Skills" were the same for boys or higher for girls than were the scores of the "summer children."

A reference in Uphoff and Gilmore's (1986) article was made to a study they made of 34 10th grade honor students in support of age and maturity combining to give a better chance at success. These students' nine-week term papers were evaluated following a detailed analysis plan. Uphoff and Gilmore noted that 71% of the oldest seven students in this class earned an "A," while only 14% of the youngest seven received the same grade.

Presenting research findings not based on their own study, Uphoff and Gilmore (1986) summarized the research findings of others as follows: (1) chronologically older children in a grade are more likely to score higher on both teacher-made and standardized achievement tests, (2) chronologically younger children are more likely to fail a grade and more likely to be referred for learning disability testing, and (3) the academic problems of young children often last throughout their school years.

A study by Kinard and Reinherz (1986), billed a "longitudinal study," spanned from kindergarten through grade four. An ambitious study, it involved parents in the collection of data. Data sought included sociodemographic characteristics, school performance at school entry, school performance at grade three, school performance at grade four, school adjustment at grade three, and school services (kindergarten through grade four). The original study was not designed to examine birth date effects on school performance and adjustments; it was designed to identify children at risk for mental health problems.

The age criterion for school entry required that children reach their fifth birthday during the calendar year in which they entered kindergarten. The children studied had birth dates ranging from January 1 to December 31 of the year in which they entered kindergarten. The

variable of birth date was accompanied by the variable of gender as the two independent variables. The dependent variables fell under two major headings: school performance and school adjustment. School performance was considered at grade three and again at grade four. School adjustment was considered at school entry, the end of the kindergarten year, grade three and grade four, and in relation to school services.

Information processing described as the child's body awareness and control, visual-perceptual motor skills, and language skills was significantly correlated with all the measures of school performance, with nearly all the measures of school adjustment and with receipt of guidance. When information processing was controlled, no age differences at school entry were found on measures of school performance or adjustment at kindergarten, third grade, or fourth grade.

The absence of significant age differences on later school performance and adjustment suggested that any apparent later age differences were due to early differences on information processing skills. The results of this study suggested that the use of chronological age as the only eligibility criterion for school entry may result in some children entering school who are neither cognitively nor emotionally ready.

Villa (1986) treated the relationship between birth date and number of academic/psychological referrals of children progressing through the categorically funded elementary schools of the Hayward Unified School District of Alameda County, California. Villa asked the following questions:

1. Is there a difference in the number of referrals (academic/psychological) to the psychologist among students who differ with respect to the month in which they were born?

2. Is there a relationship between the number of referrals and birth month for each grade level (i.e., kindergarten through grade school)?

3. Is there a relationship between the number of referrals by gender?

Villa (1986) claimed to have replicated the study of DiPasquale, Moule, and Flewelling (1980) in part, but to have departed from it. She said that the DiPasquale, Moule, and Flewelling data were analyzed as though age were the only variable that could influence frequency of referrals. Villa's study used age in determining the effect on referrals, but it also included grade level and gender of the students. Her main finding was that male students at the fourth grade level who were born in the latter third of the school year were more likely to be referred to the school psychologist because of some adjustment problems.

Another birth date effect study by Eilertson (1986) was made of 52 children (26 boys and 26 girls) who entered kindergarten during the 1982-83 school term and attended an all-White, suburban middle class elementary school. Achievement data for each subject included raw scores on each of 10 subtests of the "Comprehensive Tests of Basic Skills," which was administered at the end of the second grade year. Intelligence data for each subject were obtained from the "Test of Cognitive Skills," which was also administered at the end of the second grade year.

No significant correlations between kindergarten entrance age and achievement at the second grade level were found to exist. The research hypotheses, which anticipated significant positive correlations, were rejected. A secondary analysis of achievement data from kindergarten and grades one and three was also performed. Chronological age did not appear to be a factor in achievement at grades one or two. At grade three,

the younger boys outperformed the older boys in several areas. However, the analysis of covariance procedure, using intelligence as the covariate, indicated that this superior performance was due mainly to the superior intelligence, not to the chronological age of those boys. Under a heading entitled "Limitations," it was acknowledged that there was a lack of information on those students who would have been included in the study but who had moved to another school.

Study in 1987

One of the most recent studies by Sweetland and DiSimone (1987) compared children in grades one through six in the areas of reading, language, math, and on total "Comprehensive Tests of Basic Skills" scores. The 152 subjects were divided into groups according to their birth dates, making four birth quartiles throughout the year.

Test scores of the "Comprehensive Tests of Basic Skills," coupled with a Binet-type IQ test given in the spring before kindergarten, further explored the relationship between chronological age, mental age, and academic achievement. The results of applying the multiple regression, utilizing chronological age and mental age as predictors, and academic achievement as the criterion variable, were finding a clear association between early age of entry into school and a lower academic performance across almost all academic areas of grades one through four. The effect of birth quartile became significantly less pronounced in grades five and six.

Literature Reviewed Analytically

This section of the chapter drew on the first section of the chapter entitled, "Literature Reviewed Chronologically." Some 40 different

studies were reviewed in the first section, including dissertations and summaries of studies. From these studies, it was seen that the birth date effect and its companion variable, gender, have stimulated a variety of approaches in an effort to see what impact they might have on a considerable list of dependent variables.

Early or Late Birth Date

What made an early or late birth date varied from study to study. The children Biglow (1934) studied were considered late birth date children if they entered school before six years of age. Partington's (1937) study dealt with children who entered school from the ages of five years, zero month to seven years, five months. Handy's (1938) study included children allowed into the first grade who had just turned five, provided mental testing showed they were ready. The children in Keister's (1941) study were allowed in the first grade as early as five years of age. These children were compared with those who entered kindergarten as early as five. Hamalainen (1952) studied children who entered kindergarten at four years, nine months as a minimally desirable age. All of the children in Binkley's (1967) study were born in the same calendar year. In Hall's (1963) study, underage children were less than six years, six months and older age children were more than six years, six months. Students in Harrell's (1970) study were considered young or old if they belonged to the first or last six months of the normal first grade entrance age from five years, 10 months to six years, nine months. In the study by Davis, Trimble, and Vincent (1980), children who were six between September 1 and December 31 were considered five year olds. If they were six before September 1, they were considered six year olds. Children studied by Dockery (1985) were born between September 1, 1972

and October 31, 1973. Early-entry students in Montz's (1985) study were those that started kindergarten at less than five years and one month, with birthdays between August 1 and November 1. The late-entry students were those who were at least five years, seven months of age when they entered kindergarten, with birthdays between November 1 and February 1. Uphoff and Gilmore (1986) used the expression "summer children" to refer to children whose birthdays fall between June and September. These children were considered more at risk than older kindergartners and first graders, who were more likely to be developmentally ready for school.

Grade School Studies

Most studies were studies of children who have not completed grade school. A few studies included children in high school or who had finished high school. In fact, only 8 of the some 50 studies that were examined dealt with children who were in high school or who had finished high school.

Biglow (1934) studied grade school children. Gates (1937) studied first graders. Partington's (1937) study included children in the second to sixth grades. Keister (1941) studied five year olds who had been allowed to enter the first grade. Pauly (1959) studied the achievement test results of second through eighth graders. Hall's (1963) study was of children in the sixth grade. Nimnicht, Sparks, and Mortenson (1963) studied only fourth graders. Carrol's (1963) study was conducted by selecting 29 pairs of third graders. Dickenson and Larson (1963) studied fourth graders. Halliwell and Stein's (1964) study dealt with fourth and fifth graders. Two British studies, Jinks (1964) and Freyman (1965), studied British infant school children. Miller and Morris (1967) studied fourth and fifth graders. Binkley (1967) explored first grade entrance

variables as they related to fourth grade achievement and personality adjustment. Beattie's (1970) study extended to the third grade. The Kentucky study by Davis, Trimble, and Vincent (1980) utilized samples of children taken from grades one, four, and eight in the Kentucky public schools. In Gredler's (1980) refutation of DiPasquale, Moule, and Flewelling (1980), a table was presented which compared the reading age of two groups of children--one group British and the other group American. Both groups had six months of schooling. The chronological ages of the two groups were: American--six years, six months; British--five years, six months. The subjects for Simner's (1983) study were nonrepeating kindergartners. Dockery's (1985) study was of 10- and 11-year-old students. Deitz and Wilson (1985) studied children through grade four. The data for Montz' (1985) study were gathered from fourth, fifth, and sixth graders. The Kinard and Reinherz (1986) study, billed as a "longitudinal study," went through grade four. Villa's (1986) dissertation was a study dealing with grade school children. Eilertson's (1986) dissertation study reached down to the third year. Sweetland and DiSimone (1987) studied children in grades one through six.

High School and Post High School Studies

The eight studies that dealt with high school or post-high school young people were listed. One part of Handy's (1938) study dealt with students in grades 7 through 11. Baer (1958) studied children through the 11th year in high school. Harrell's (1970) study was the only study reported to have examined high school achievement data and subsequent enrollment in college. Maddux's (1980) study continued with students past grade nine. DiPasquale, Moule, and Flewelling (1980) (Canadian researchers) extended their research through grade 13. Kalk, Langer, and

Searls (1981) engaged in a study of 4th, 8th, and 11th graders. Diamond's (1983) Hawaiian study involved subjects ranging from 5 to 20 years of age. Langer, Kalk, and Searls's (1984) study was similar.

Birth Date First Variable

In nearly all of the studies considered in this paper, birth date was the first variable considered. Sometimes it was referred to as a predictor variable (Partington, 1937; Handy, 1938). Different terminology was used to refer to birth date, chronological age (Keister, 1941; Binkley, 1967; Langer, Kalk, and Searls, 1984), entrance age or age at entry (Nimnicht, Sparks, and Mortenson, 1963; Harrell, 1970), and in one instance, relative age, immediately defined as the student's age relative to the ages of other students in the classroom (Kalk, Langer, and Searls, 1981).

Birth Date Accompanied by Other Variables

Quite often chronological age was accompanied by other predictor variables such as gender, IQ, mental age, physical well being, socioeconomic status of family, schools attended, parental education, home environment, and type of community. Gender, IQ, and mental age were the variables that accompanied chronological age most often. Gender probably accompanied chronological age more often than any of the other variables. Sometimes gender was treated independently of chronological age (Harrell, 1970). In most studies, interaction was shown between chronological age and gender, since boys the same age as girls were considered more immature, and thus were less able to achieve academically, especially during the earlier grades (Hall, 1963; Jinks, 1964; Diamond, 1983).

Birth date was studied in relation to the following list of dependent variables: achievement, remediation, retention, school adjustment, psychological referrals, academic referrals, personality adjustment, learning disabilities, and self-esteem.

Achievement included specific variables such as reading (sometimes broken down to reading vocabulary and reading comprehension) (Keister, 1941), arithmetic reasoning, arithmetic fundamentals, language, and spelling (Halliwell and Stein, 1964).

Three Conflicting Views

Finally, that there were three conflicting views with regard to the birth date effect was evident throughout the literature. The three views taken were described as pro, con, and con but attenuating. The hypothesis was that birth date and gender have no appreciable effect on the dependent variables listed in the literature reviewed. Research that supported this hypothesis was considered pro. Research that claimed that birth date and gender did have an effect was considered con. Some of the research that claimed that birth date did have an effect also acknowledged that the effect weakened and may have completely disappeared by the high school years. That literature would be classified as con but attenuating.

A listing of the literature in favor of the hypothesis that neither birth date nor gender had any effect on the various dependent variables follows: Gates (1937), Handy (1938), Keister (1941), Dickenson and Larson (1963), Miller and Morris (1967), Binkley (1967), Weinstein (1968), Kinard and Reinherz (1986), Eilertson (1986), Dockery (1985), and "An Investigation of Date of Birth in the Incidence of Learning Disabilities" (1986). While the list of literature in favor of the hypothesis was not

as great as the list against the hypothesis, it was sizable and its contributors were fairly well distributed down through the decades that this hypothesis has been under discussion.

A list of literature against the stated hypothesis follows: Biglow (1934); Halliwell and Stein (1964); Jinks (1964); Freyman (1965); DiPasquale, Moule, and Flewelling (1980); Diamond (1983); Uphoff and Gilmore (1986); Villa (1986); Partington (1937); Hamalainen (1952); King (1955); Hall (1963); Harrell (1970); Simner (1983); Montz (1985); Sweetland and DiSimone (1987); Beattie (1970); and Nimnicht, Sparks, and Mortenson (1963).

The final category of studies was those studies which were against the hypothesis, but which went on to report that the effects of birth date and gender attenuated. These studies, for the most part, stretched over a period of several years, making it easier to look at the long range effects of birth date. Baer (1958) acknowledged that the overage group in his study made better progress than did the underage group. He reported that a "diminished difference" between the two groups existed at the completion of high school. Davis, Trimble, and Vincent (1980) studied 43,000 children in grades one, four, and eight in the Kentucky Public Schools. Davis and his fellow researchers noted significant differences between younger and older children in the first and fourth grades in the subjects of reading, language, and math, but by the eighth grade, significant differences were noted only in reading. Kalk, Langer, and Searls (1982) attempted to answer the question: does the achievement level of younger students ever catch up with or even possibly surpass the achievement of older students during their period of formal education? Kalk, Langer, and Searls (1981) concluded that the significant advantage

found for the oldest students at age nine decreased but remained significant at age 13, then disappeared by the age of 17.

The study by Langer, Kalk, and Searls (1984) was similar to Kalk, Langer, and Searls (1981) study. Langer, Kalk, and Searls concluded their discussion of the combined 17-year-old sample by stating that apparently the age phenomenon was no longer present, speculating that this was possibly due to retention and dropping out of school.

One study by Green and Simmons (1962) seemed to be best classified as neutral. They concluded that if all younger pupils were required to wait a year before beginning school, the average age and the average achievement test scores in any grade would climb, but the average grade level and the average achievement test scores at any given age would drop.

Gender as a Variable

The factor of gender figured in several of the studies examined. Baer (1958) found that the differences between boys and girls were greater than the differences between overage and underage students. The Jinks (1964) study contained a table showing that boys did less well than girls. It combined the birth date and gender factors and showed that young boys did considerably less well than young girls.

Probably the most extensive study done on gender was done by Pauly (1959), who found that when the boys' achievement test scores were compared to the girls' achievement test scores of the same ages, the achievement differences between the two ranged from 4.29 months to 8.09 months. Among other things, the data of Hall's (1963) study indicated that younger boys were much more likely to be retained than younger girls. One of the conclusions drawn in the study by Nimnicht, Sparks,

and Mortenson (1963) was that, in most of the 84 districts studied, there was a significant relationship between gender and educational success in the first grade, with girls tending to achieve at a higher level. Girls and boys were not compared directly for potential reactions between gender and entrance age. Hedges (1978), after extensive research of the literature, concluded that gender differences tend to diminish over time so that after puberty they have disappeared.

The intertwining of the birth date and gender effects were readily seen in the controversy between Gredler (1980) and DiPasquale, Moule, and Flewelling (1980), as reported in the Journal of Learning Disabilities. Gredler took issue with DiPasquale, Moule, and Flewelling by stating that it would seem, according to their study, that since the birth date effect was evident only in the male data, males should start to school one year later, an impractical solution in light of the Civil Rights Act of 1964, which would prevent placing children in a class based on gender. Among other considerations, Kinard and Reinherz (1986) considered school adjustment. They observed that the age effect on referrals for academic services for boys in the early elementary years reported by DiPasquale, Moule, and Flewelling were not confirmed in their study.

In Eilertson's (1986) dissertation, the following conclusion was reported. At grade three, the younger boys outperformed the older boys in several areas. However, the analysis of covariance procedure using intelligence as the covariate indicated that this superior performance was due mainly to the superior intelligence, not to the chronological age of these boys.

A review of the literature revealed a variety of approaches in the treatment of these two variables, birth date and gender. The studies were all ex post facto studies, some utilizing data stretching over

several years, some utilizing large numbers of subjects. While the word "effect" is used in most of these studies, the independent variables were not manipulated; consequently, the studies either showed a relationship or a lack of relationship between the independent variables and their dependent variables. In the review of the literature, no consensus emerged.

It remains, then, for a school district to make its own study designed to produce information pertinent to it and to draw its own conclusions. Certainly, other districts of similar description would be able to generalize with caution.

CHAPTER III

RESEARCH

Introduction

It would be impossible for a researcher to manipulate the variables birth date and gender to show what relationship they might have to class ranking, dropout rate, or absenteeism. In view of this impossibility, the study was designed as a descriptive research study. Data that have already been generated were examined in an effort to see what meaningful relationships, if any, existed when comparing these data.

Since the data for the study had already been recorded, another way to describe the study is to say that it was a study based on ex post facto research. Ex post facto research permits the researcher to study the possible effects of variables that are especially difficult to manipulate experimentally with human subjects (Borg and Gall, 1983).

Setting

A 3A school district located in northeastern Oklahoma provided the setting for the study. The district's schools were found in a county seat town of approximately 7,000 in population. The town had some industry. Head offices for four electrical cooperatives and a state mental hospital were located there. The town was a center for the production of beef cattle, with the surrounding country area dominated by ranching.

The county wherein the district resides was one of the most backward and poorest counties in the state during this five-year study. The 1980 Census reported that 25% of the county population 25 years and older had less than an eighth grade education. Over 43% of the adults of the county did not have high school diplomas. In October of 1989, the unemployment rate was 6.8%, considerably more than the state average of 4.8%, according to the county health department's Current Population Survey.

The district itself had a per pupil expenditure under the state average. Per pupil expenditures for the 1989-90 school year per average daily attendance were $3,031. That same year, statewide per pupil expenditures per average daily attendance were $3,195. However, the quality of education offered in the county was up to the state standards. The high school has been a member of the North Central Association for Accreditation for over 70 years. The curriculum offered educational opportunities sufficient to produce National Merit Scholars on a regular basis. Advance placement courses were offered in four disciplines in the high school. Students in the past few years have gained entrance at Stanford, Vanderbilt, the military academies, and other prestigious schools. Vocational courses included: business, home economics, marketing education, technology education, vocational education, and a wide selection of practical courses at the area vo-tech school. A qualified and concerned faculty gave every student an opportunity to learn. The faculty of approximately 30 teachers was stable during the five years of the study, averaging approximately one resignation and one retirement each year. The principal of the high school is the author of this paper.

Population

The population identified for the study were those subjects enrolled

in the seventh grade, who continued through the high school. All subjects included in the study had completed at least six years, with the exception of those who dropped out. Those who dropped out represented a group that formed another part of the study. Table I indicates gender and race by year of graduation. The Indians identified in the study were those subjects whose names appeared on the Johnson O'Mally school rolls, making them at least a quarterblood. The graduating classes from 1985 to 1989 provided the subjects for the study.

TABLE I

GENDER AND RACE OF GRADUATING SENIORS, 1985-89

	1985	1986	1987	1988	1989
Gender					
Male	28	28	29	38	29
Female	38	32	28	27	36
Race					
White	53	50	52	54	52
Black	9	6	4	7	8
Indian	2	4	1	4	5
Latin	2	0	0	0	0
Oriental	0	0	0	0	0

The total number of graduates included in the study was 313. Of these 313, 49 did not graduate with their class. All were older, which suggested two things: (1) either they were retained for failure to work at grade level, or (2) they were kept from enrolling with their class because their parents deemed it an advantage to wait a year. Only one child was two years behind his graduating class.

No evidence existed of students dropping out of school before the seventh grade. All data necessary for the study were available for all students who had dropped out from seventh grade forward in the classes studied. It was not necessary to apply sampling techniques in this study, since the classes were small.

Data Sources

The data on students who had dropped out of school were secured from the district's attendance reports made to the State Department of Education. All other data, including data on birth dates, gender, absenteeism, and retention were taken from student folders and student registers kept in the archives of the district.

Data Treatment

Any treatment of data must begin with a proper identification of the nature of the variables. The variables birth date and gender were labeled as quantitative and qualitative, respectively. The variable dropout was qualitative; either a student dropped out or he/she did not drop out. Class rank was continuous, but was measured on an ordinal level only, as class rank did not distinguish what differences existed in the rankings. On the other hand, days absent, another continuous variable, measured on an interval level.

The data were treated to see what, if any, relationship existed between birth date and dropping out of school, birth date and class rank, and birth date and days absent. Gender was also studied in relation to dropping out of school, class rank, and days absent. Even though there was not a correlation established between birth date and gender, and the other three variables individually, an analysis was made of the combined effects of birth date and gender on the other three variables, for possible combined effects, even though there were no individual effects.

An examination of the data was made, matching the statistical techniques with the combination of variables as follows. Birth date and class rank being quantitative and class rank being at least on the ordinal level of measurement, the Spearman Rho technique was used. The variables birth date and days absent were both quantitative and on the interval level of measurement, so the Pearson Product-Moment Correlation Coefficient Technique was used. Again, birth date being quantitative and dropping out of school being qualitative with just two levels, the Independent Groups T Test was used. Since gender is a qualitative variable with only two values, and since the variables class rank and days absent were treated as dependent variables to be measured on a scale that approximated interval characteristics, the Independent Groups T Test was used to analyze the relationship between gender and these dependent variables. Since gender and dropping out of school were both qualitative in nature and both were between subjects in nature, the chi-square technique was used. The effect of birth date and gender on class ranking, total number of days absent, and dropping out of school was determined by the multiple regression method. To provide a homogeneous population, dropouts were considered only in the treatments of birth date and dropout, and gender and dropout. Full rigor demanded that the distribution of the

target population be addressed before these statistical techniques could be finalized. Distribution tables (Tables XIV through XVIII) are found in the Appendix.

In conclusion, the techniques or procedures, matched with pertinent combinations of variables, generated the data necessary to draw dependable conclusions about the hypotheses set forth in this study. The alpha level was set at .05.

CHAPTER IV

RESULTS

Research Question

Many studies dealing with birth date and gender indicate that birth date and gender do affect academic performance in the first years of school. It is not difficult to see why a late birth date might affect a student's performance in those early years of school because, for example, a student at seven years of age who is 10 months younger than some of his/her peers has a major age handicap. It is conceded that ample research supports the position that boys mature more slowly than do girls. As was stated earlier, however, the question is: do birth date and its attendant variable gender linger in their effects throughout high school? If students who are younger and students who are male, and especially if younger male students catch up by the time they graduate, then why should there be so much concern about the academic performance of these students while they are in grade school? On the other hand, if younger students, and especially younger male students, drop out more readily than their classmates, attend classes less regularly, or perform less effectively academically, then there should be much concern.

Subjects

The subjects selected for this study were students enrolled in grades 7 through 12. Two hundred sixty-four students composed the heart

of this study. They were students who graduated from the high school in the year they were scheduled to graduate, calculating from the date of their original enrollment. That is, they graduated on time. These same 264 students were also characterized by having spent the last six years of their schooling in the same district. They were students who were enrolled in the district's middle school at the beginning of their seventh grade and continued until graduation. These 264 students composed approximately half of each of the graduating classes from 1985 to 1989, inclusive. Forty-nine other students were dealt with in this study because they graduated with these 264 students, but they were graduates who were not "on age"; that is, they were older students. They graduated, but they were "off age." Still another group of students forming part of this study were 65 students who would have graduated with these classes had they not dropped out of school. Therefore, a grand total of 378 students from the middle and high schools of the district were the subjects for this study.

Variables

Birth date and gender were considered the independent variables in this study. Originally, the actual date of birth of each student was utilized by giving each student a number of days, from 365 to 1, to indicate his/her relative age in relation to when he/she would start school. Then, it was deemed that determining the relative age of each student by the month in which he/she was born would be sufficient for this study. In the statistical tables included in this chapter, girls were indicated by a 1 and boys were indicated by a 0, making the tests that involve gender, tests for femaleness.

The three dependent variables were: class rank, days absent, and dropouts. Grade point average was entered as a part of the data, but class rank seemed to be as useful since the purpose of the study was to see how students performed compared to other students. Days absent was chosen because it was considered a fairly good indicator of student performance. A treatment of the data indicated that, while girls tend to rank higher than boys academically, they tend to be absent more often. Interestingly, though not directly related to this study, the data did show that there was a slight improvement in the class rankings of girls as the number of their absences dropped.

Birth Month in Place of Birth Date

Using birth month in place of birth date was an effort to simplify the handling of the data. Having the actual date of birth of each of these students allowed classifying them by month. Classifying students in this manner rather than using their actual birth dates was a simple but effective way of classification for the purpose of this study. Trends may be seen even more clearly by using birth months rather than the actual birth dates. Since those students were enrolled with birth dates from November 1 of the preceding calendar year to October 31 of the year of their enrollment, those who were enrolled with birth dates falling in November were assigned the number 12, and so on, until the students whose birth dates fell in October of the year of their enrollment were assigned the number 1.

Off-Age Students

Off-age students were defined earlier as those students who were older than the students who enrolled when they were of legal age to

enroll and who kept pace with their class until graduation. It should be remembered that students were off age for any number of reasons, a few of which included: delayed enrollment, failure due to poor academic performance, or failure due to illness. Of course, enrollment could have been delayed for any number of reasons, such as: recommendation of the school after testing, perception of the parent that the child was too immature to start school, or belief of the parent that the child would become outstanding academically or athletically, providing his/her schooling was delayed a year. None of the off-age students in this study were legally too young when they began school. All of the 49 off-age students were one year behind their graduating class, with the exception of one student who was two years behind.

In an effort to deal with the problem of these off-age students, the questions were asked: were these off-age students a year behind because of their being young in relation to their classmates who were on age? and was there a predominance of one gender or another among them? Table II indicates that there was minimal correlation between whether a student was on-age or off-age, and whether his/her birthday fell in the last months of the year that qualified him/her for enrollment in school. It also indicates that gender was not a predictor for determining whether students would remain on age in their schooling or could fall behind. In other words, given the fact of gender or actual age, it cannot be determined whether students will fall in an on-age or off-age group by graduation.

As a precaution, the combined effects of birth date and gender were examined (Table III). As can be seen in Table III, the multiple R indicates a weak correlation (.230), thus having no predictive value. It is

also worthy of note that the constant was a better predictor with a coefficient of .651 than either birth month or gender.

TABLE II

BIRTH MONTH AND GENDER CONSIDERED SEPARATELY, COMPARING ON-AGE AND OFF-AGE STUDENTS

	Pearson Correlation Coefficient Matrix		
	Month	Gender	On Age
Month	1.000		
Gender	0.012	1.000	
On Age	0.088	0.092	1.000

Note: The number of observations was 313.

TABLE III

BIRTH MONTH AND GENDER COMBINED, COMPARING ON-AGE AND OFF-AGE STUDENTS

	Multiple Regression Matrix					
Variable	Coefficient	Std. Error	Std. Coef.	Tolerance	T	P (2-Tail)
Constant	0.651	0.050	0.000		12.939	0.000
Month	0.022	0.006	0.212	0.992	3.823	0.000
Gender	0.080	0.040	0.111	0.992	1.992	0.047

Note: Dep. Var. = On Age; N = 313; Multiple R = .230; Squared Multiple R = .053; Adjusted Squared Multiple R = .047; Standard Error of Estimate = 0.355

Therefore, since neither birth month nor gender, nor birth month and gender combined, can be labeled as predictors for determining the likelihood of a student being behind in school, these 49 students who were classified as off-age were removed from the study without running the risk of invalidity. Except for the part of the study that treated dropouts, the 264 subjects were used who were enrolled in the district's schools from grades 7 through 12 who were on-age when they graduated.

Birth Month and Class Rank

While not all students in this study made up all the graduates during the years considered, their assignment of class rank was determined by their grade point average as it was compared with the grade point average of all the other students in their respective graduating classes. Where grade point averages were the same, students were assigned the same class rank.

As can be seen in Table IV, the Spearman Rho, or as it is sometimes called, the Spearman Rank-Order Correlation Technique, was used. The month in which each of the 264 students was born was compared to his/her rank in class to see if any significant correlation existed between the relative ages of these students and their class ranks. In other words, did the younger students rank lower on the average than their classmates? Table IV shows that a correlation of .109 was indicated between birth month and class rank, a weak correlation.

Birth Month and Days Absent

Since the variables birth month and days absent are both quantitative and on the interval level of measurement, the Pearson Product-Moment Correlation Technique was used. The correlation between birth month and

days absent, as seen in Table V, was .055, a negligible number. The correlation was so insignificant that no predictive value existed with this number.

TABLE IV

BIRTH MONTH AND CLASS RANK

	Spearman Correlation Coefficient Matrix	
	Month	Rank
Month	1.000	
Rank	0.109	1.000

Note: The number of observations was 264.

TABLE V

BIRTH MONTH AND DAYS ABSENT

	Pearson Correlation Coefficient Matrix	
	Month	Rank
Month	1.000	
Absent	0.055	1.000

Note: The number of observations was 264.

Gender and Rank

With the combination of variables, gender, and rank, the Independent Groups T Test was used. The number of girls in the study totaled 141, whereas the number of boys totaled 123, making it necessary to utilize the Separate Variances T. From the data listed in Table VI, it was noted that the girls were identified by the number 1 and the boys were identified by 0. It would seem that the mean ranking of the girls (37.773), considerably higher than the mean ranking of the boys (48.260), would indicate a strong relationship between gender and class rank. That there was a correlation was indicated by the T value of -3.102. However, when the Eta squared formula was applied to determine the strength of the T value, it was seen that the T value was weak. Any Eta squared number less than .20 reflects a weak relationship. It was seen that this Eta squared number of .037 reflected a weak relationship between a student's gender and his/her class rank.

TABLE VI

GENDER AND RANK

	Independent Samples T-Test		
Group	N	Mean	SD
1.000	141	37.773	26.199
0.000	123	48.260	28.407

Note: Separate Variances T = -3.102; DF = 250.2; Prob. = 0.002

Gender and Days Absent

Again, with gender and days absent, the Independent Groups T Test was utilized. It would appear that the mean of the girls' days absent is so much higher than the mean of the boys' days absent (62.065 and 41.813, respectively), that one would have to conclude that a strong relationship did exist between gender and days absent. But again, applying the Eta squared formula, Eta^2 equals T^2 over T^2 plus the degrees of freedom, it was seen that the strength of the relationship was minimal, for the Eta squared formula yielded only .067. The statistics can be seen in Table VII.

TABLE VII

GENDER AND DAYS ABSENT

	Independent Samples T-Test on Days Absent Grouped by Gender		
Group	N	Mean	SD
1.000	141	62.065	44.316
0.000	123	41.813	32.607

Note: Separate Variances T = 4.263; DF = 255.0; Prob. = 0.000

Combination of Birth Month and Gender, and Class Rank

While a significant relationship between birth month and class rank by themselves was not established, and while a significant relationship between gender and class rank by themselves was not established, as a precaution, the possibility that the combination of birth month and gender might produce a significant relationship was examined. Therefore, the multiple regression statistical technique was used. The statistics are reported in Table VIII.

TABLE VIII

COMBINATION OF BIRTH MONTH AND GENDER, AND CLASS RANK

	Multiple Regression Matrix					
Variable	Coefficient	Std. Error	Std. Coef.	Tolerance	T	P (2-Tail)
Constant	42.224	4.083	0.000		10.096	0.000
Month	1.005	0.468	0.129	1.000	2.149	0.033
Gender	-10.409	3.339	-0.188	1.000	-3.117	0.002

Note: Dep. Var. = Rank; N = 264; Multiple R = .229; Squared Multiple R = .053; Adjusted Squared Multiple R = .045; Standard Error of Estimate = 27.063

Combining the effects of birth month and gender upon class rank, the multiple regression formula produced a multiple R of .229. Squaring the multiple R gave a number of .053 which, in other terms, was the coefficient of determination; that is, the squared multiple R was a number that indicated that birth month and gender combined had a small predictive value in determining class rank. Translated to percentage, the predictive value of the birth month and gender combined would be successful only 5.3% of the time, not at all a dependable percentage.

It is worthy of note that the probability of the constant having no predictive value was 0.000, making the constant the best predictor of the three variables. The T value of the constant at 10.096 was significantly larger than the T values of either birth month (at 2.149) or gender (at 3.117). The coefficient of gender (-10.409) did indicate that girls tended to do better than boys, but it should be remembered that this correlation predicted well in only a little more than 5% of the cases.

Combination of Birth Month and Gender, and Absences

Being absent is commonly associated with performance. It is commonly thought that as the number of absences increases, a person's performance tends to decrease. In view of this, valid questions are: does birth month affect the number of absences? and does gender affect the number of absences? Those questions have been asked and answered separately. While the findings seemed to be conclusive, it still was necessary to examine the effects of the two variables combined. Therefore, again, the multiple regression statistical technique was utilized. The statistical results are found in Table IX.

TABLE IX

COMBINATION OF BIRTH MONTH AND GENDER, AND ABSENCES

	Multiple Regression Matrix					
Variable	Coefficient	Std. Error	Std. Coef.	Tolerance	T	P (2-Tail)
Constant	37.186	5.930	0.000		6.271	0.000
Month	0.661	0.679	0.058	1.000	0.973	0.331
Gender	20.304	4.850	0.250	1.000	4.187	0.000

Note: Dep. Var. = Absent; N = 264; Multiple R = .257; Squared Multiple R = .066; Adjusted Squared Multiple R = .059; Standard Error of Estimate = 39.304

Examining the possible effects of birth month and gender upon absences, it was seen that the multiple regression formula yielded a multiple R of .257. The squared multiple R was .066, a number indicating that birth month and gender combined had some predictive value in determining number of absences. Translating the decimal fraction of .066 to percentage, which would be 6.6%, it was easily seen that the combined effects of birth month and gender were not strong.

In accordance with the findings, there was no probability that either the constant or gender had no predictive value. In the case of birth month, a .331 number indicated that in 33% of the cases there was a probability that there was no predictive value. The T value of the constant and gender were strong, with the T value of the constant being considerably stronger. The T value of birth month was weak.

The coefficient of gender at 20.304 was a significant number, indicating that girls were absent some 20 more times than boys over a four-year span, an interesting number in view of the fact that girls tend to rank higher academically than do the boys.

Birth Month and Dropouts

For purposes of studying the effect of birth month on dropping out of school, the Independent Groups (Samples) T Test was utilized. Table X shows the results of the application of this test to the data.

TABLE X

BIRTH MONTH AND DROPOUTS

	Independent Samples T-Test on Month Grouped by Dropout		
Group	N	Mean	SD
0.000	264	7.042	3.481
1.000	65	6.492	3.514

Note: Separate Variances T = 1.131; DF = 97.3; Prob. = 0.261

The standard deviations of 3.481 for the group graduating on time and 3.514 for the group that did not graduate were remarkably similar. The means of the two groups were also similar. According to the means, the group that graduated was about two weeks older than the group that

dropped out. The level of significance for a one-tailed test at the .05 alpha level 97.3 degrees of freedom was 1.671. The T value at 1.131 was well within the bounds of 1.671, making birth month an insignificant factor in determining whether or not a student will drop out. This T value was such that there was no need to apply the Eta squared formula. Neither would it have value to comment on the nature of the relationship.

Gender and Dropouts

Table XI displays the gender by rows and the dropouts by columns. It is noted that 0.000 by rows represented boys and 1.000 by rows represented girls, that 0.000 by columns represented those who graduated, and 1.000 by columns represented those who dropped out.

TABLE XI

GENDER AND DROPOUTS (FREQUENCY TABLE)

Gender - Rows	Table of Frequencies		
	Dropout - Columns		
	0.000	1.000	Total
0.000	123	33	156
1.000	141	32	173
Total	264	65	329

About 47.5% of the total number of students in this part of the study were boys. This difference in percentages indicated that boys who made up a larger actual number dropped out more frequently than did girls, although not by a large margin.

Table XII is a Pearson Chi-Square Test Statistic. The Chi-Square statistic to be compared to the critical value is .365. With the alpha level set at .05 and one degree of freedom, the critical value was 3.841, making the Chi-Square statistic of .365 fall well below the 3.841 number, indicating that gender provided no predictive value in determining who dropped out of school.

TABLE XII

GENDER AND DROPOUTS (PEARSON CHI-SQUARE)

Pearson Chi-Square Test Statistic		
Value	DF	Prob.
0.365	1	0.546

Combination of Birth Month and Gender, and Dropouts

The combination of birth month and gender as they affect dropouts was tested by the multiple regression statistical technique. The data that this technique yielded is found in Table XIII. Keeping in mind that a multiple regression score of .25 is relatively low, and comparing that

score with the actual multiple regression score in this study (which is .073), it was seen that there was very little relationship between birth month and gender, and dropouts. The squared multiple regression further emphasized the lack of relationship. In fact, the adjusted squared multiple regression indicated that birth month and gender combined had no predictive value to determine who will drop out.

TABLE XIII

COMBINATION OF BIRTH MONTH AND GENDER, AND DROPOUTS

	Multiple Regression Matrix					
Variable	Coefficient	Std. Error	Std. Coef.	Tolerance	T	P (2-Tail)
Constant	0.264	0.055	0.000		4.784	0.000
Month	-0.007	0.006	-0.065	0.997	-1.170	0.243
Gender	-0.029	0.044	-0.037	0.997	-0.665	0.507

Note: Dep. Var. = Dropout; N = 329; Multiple R = .073; Squared Multiple R = .005; Adjusted Squared Multiple R = .000; Standard Error of Estimate = 0.399

Conclusion

The various treatments of the data produced results generally in agreement, providing ample material for statistically sound conclusions to be made in the final chapter. The hypotheses were examined in view of the material at hand in this chapter, making it possible to arrive at a

conclusion about the thesis of this paper which, simply stated, is that birth date and gender play insignificant roles in influencing the academic performance of high school students.

CHAPTER V

CONCLUSIONS

As a nation, we have deep concerns about the effectiveness of our schools. These concerns are translated into questions which, in turn, contain a great number of variables, some of which have received considerable attention for several decades. Birth date and gender are two such variables. The researchers have sometimes treated them separately, but usually together, to see what, if any, effect they might have on academics and behavior. The majority of these researchers have concentrated their efforts on grade school children. Even among the researchers who have concentrated their efforts to understand the effects of birth date and gender on grade school children, there is no agreement. Neither is there complete agreement among the small number of researchers who have included high school students in their studies. Hence, the need has persisted to examine the effects of birth date and gender on high school students.

Several of the studies which included high school students were studies involving thousands of students. Sound conclusions may be drawn from such studies. At the same time, the hypotheses treated in this paper, and the statistical treatments of these data, yielded conclusions for this district that cannot be obtained any other way.

This chapter will proceed utilizing the following topics: (1) Review of the Hypotheses, (2) Comparison of the Findings With the

Literature, (3) Implications for Schools of Similar Description, and (4) Suggestions for Further Study.

Review of Hypotheses

The nine hypotheses, briefly stated, were that no significant relationship will be shown between birth date and the three dependent variables, class ranking at the end of the seventh semester of high school, total number of absences accumulated during high school, and dropping out of school. No significant relationship will be shown between gender and class ranking, total number of absences and dropping out of school. Finally, no significant relationship will be shown between the combination of birth date and gender, and the three dependent variables.

All nine of these hypotheses were accepted. The statistical treatment of the data did not produce findings that would show any significant relationship between the two independent variables birth date and gender, and the three dependent variables class rank, attendance, and dropping out.

Comparison of Findings With Literature

The study's findings were compared with some of the more salient findings presented in Chapter II (Review of the Literature). Some of the studies reviewed in earlier chapters dealt with the possible psychological impact of birth date and gender upon the child. For example, Maddux (1980), studying disabled children, found that a disproportionate number of early entering children among learning disabled children was found to persist through grade nine, but not to higher grade levels. The use of the expression "learning disabled" suggests possible psychological

impact. Whatever it was, according to Maddux, recovery took place after the ninth grade, a recovery in keeping with the findings of this paper.

DiPasquale, Moule, and Flewelling (1980) studied Canadian children who had been referred for psychological assessment. These were children having difficulty academically or behaviorally. Further charting, according to DiPasquale, Moule, and Flewelling, indicated that the birth date effect was due to academic rather than behavioral referrals. Even the first charting showed a late birth date to be in effect in the early grades, but was not apparent in the later grades.

Kinard and Reinherz (1986) originally studied children from kindergarten to grade four in order to identify children at risk for mental health problems. The study was expanded to include children from kindergarten through the 12th grade, including 583 learning disabled children and 791 nonlearning disabled children. The data were considered to be in agreement with the finding of this paper, as they indicated nonsignificant differences in birth date patterns between the two populations of children studied.

While Villa (1986) treated the relationship between birth date and gender and academic/psychological referrals, her main finding was that male fourth grade students born in the later third of the school year were more likely to be referred to the school psychologist because of school adjustment problems, a finding followed by nothing about whether these adjustment problems would continue the older the child becomes.

As was stated in the analytical section in Chapter IV, an early or late birth date varies from study to study, making it difficult to reason from one study to another. Since many of the studies reviewed dealt with grade school children, and some of these studies dealt only with children in grades kindergarten through four, the percentage of difference in ages

was much greater than in the studies that dealt with high school students.

Of the approximately 40 studies reviewed in this paper, only eight dealt with high school young people. Of the eight studies, Handy's is the oldest, conducted in 1938. The design of the research was such that there seemed to be little comparative value between Handy's findings and the findings set forth in this paper.

Baer (1958) did a matching pairs study on the basis of intelligence, gender and, in most cases, school entered. While Baer found that children with January and February birth dates did better than children with November and December birth dates of the same year, he acknowledged that a diminished difference existed at the completion of high school, a finding that would tend to support the findings of this paper. However, in the conclusion of his study, Baer stated that the average performance of the underage groups was below the expectations of the group, since their average IQ was 111.

In Harrell's (1970) study, among the eight comparisons that he made, the older students were favored in grade point and achievement. Harrell's findings on grade point were directly contradictory to the findings in this paper on class rank, which is determined by grade point.

Maddux (1980) found that a disproportionate number of early-entering children among learning disabled students persisted through grade nine, but not to higher grade levels. This finding could be construed to support the findings of this paper, but it raises so many unanswered questions regarding the nature of the study that it is probably better not to use Maddux's study to corroborate the findings of this paper.

Diamond's (1983) gigantic Hawaiian study involving 154,203 public school students from ages 5 to 20, concluded that there is a significant

correlation between late-born children and learning disabilities. The data reported in this paper were not supported by Diamond's conclusion.

Kalk, Langer, and Searls (1981) and Langer, Kalk, and Searls (1984) used data on thousands of school children collected by the NAEP. The findings of these researchers were in basic agreement with the findings reported on in this paper. Langer, Kalk, and Searls concluded their discussion of the combined 17-year-old sample by stating that, apparently, the age phenomenon was no longer present, speculating that this was possibly due to retention and dropping out of school, two factors treated in this paper which were not found to be factors that would explain Langer, Kalk, and Searls' conclusion.

Kinard and Reinherz (1986) presented data indicating nonsignificant differences in birth date patterns between two populations of 583 learning disabled children and 791 nonlearning disabled children. Their study reached down through 12th grade. The data of the Kinard and Reinherz study should be considered supportive of the findings in this paper.

Implications for Schools of Similar Description

Many of the studies reviewed were studies whose data were drawn from not one, but from a few to many schools and school districts. Treatment of such large amounts of data does not allow for the uniqueness of individual schools. Given that no school is typical, perhaps that in itself is ample justification for this study. The relatively small size of Vinita High School, the stability of its faculty, the relative stability of the community and the study body, and many other factors undoubtedly had a bearing on the results of this study. Decisions can be made about such matters as the value of transitional first grade. On the basis of this study, parents can be advised that it is nearly impossible to

predict that their children will not do as well starting to school at a younger age.

Suggestions for Further Study

The combination of birth date and gender suggested studies dealing with high school student behavior and psychology as well as academics. Why do younger students finally achieve parity with older students in the same classes? If younger students have psychological and behavioral problems, are those problems worked through, or do they linger, even though academic success is achieved? Do both boys and girls dispel their behavioral and psychological difficulties at about the same age, or do these difficulties linger longer with boys than with girls? In view of the findings of this study, is transitional first grade necessary, or would a strongly developmental program, kindergarten through grade two with a nongraded program, serve just as well?

Any school of similar description which has transitional first grades or is thinking about installing them might want to weigh the financial consequences of adding a 14th year for a certain percentage of their students. Birth date and gender continue to suggest various research questions.

Value of the Research

Some conclusions can be made from the findings of this paper which certainly would have value for schools of similar description. These conclusions are listed below:

1. It cannot be predicted that students will be more likely to fall behind in their school classes because of their age, their gender, or a combination of their age and gender.

2. It cannot be concluded that there is a significant correlation between birth date and class rank or gender and class rank, or that there is a significant correlation between birth date and gender combined, and class rank.

3. It cannot be concluded that there is a significant relationship between birth date and days absent or gender and days absent, or a combination of birth date and gender combined, and days absent.

4. It cannot be concluded that birth date or gender, or both birth date and gender combined, will make it more likely that a student will drop out of school.

Small schools depend on the research of others if they depend on research at all. Many times, decision makers in small schools make their decisions based on intuition, and sometimes even on hearsay--someone in a nearby district tried it and it worked. This research was done, in part, to seek a sound basis for decisions that deal with delaying the time when children start to school, retaining children who seem to be progressing slowly, and placing large numbers of children in transitional first grades. In short, this research gives conviction to decision making in the areas just mentioned. The insignificance of the relationship between the variables of this paper means, also, that those variables can be laid aside, and others that do have significance may be explored. It would seem that knowing what is not significant will help in the search for what is significant in the education of children.

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APPENDIX

TABLE XIV

DISTRIBUTION TABLE: BIRTH MONTH AND CLASS RANK

Month	Class Rank									
	1-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-
1	3	1	4	6	2	2	1	1	1	
2	2	2	1		2	1	1	1	2	
3	2	3	6	3	2	2	2			
4	1	1	1	3	6		3	3	4	
5	4	2	3	1	5	1	5	3		1
6	5	2	3	1	1	3	1		1	1
7	5	4	5	1	2	1	3	2	2	1
8	1	2	2	2	4	3	1		3	2
9	4	3	4	2	4			1		
10		2		4		3	4			1
11	4	4	1	5	3	3	2	3	2	2
12	2	7	3	2	1	4	5	3	3	7

TABLE XV

DISTRIBUTION TABLE: BIRTH MONTH AND DAYS ABSENT

Month	Days Absent (Four Years)														
	0-9	11-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	100-109	119-119	120-129	130-139	140-
1	1	4	4	2	2	1	1	4			1			1	
2	3	1	2	1	2	1	2	1			1				
3		4	3	1	6	1	2	1		1	1				
4		1	2	2	2	2	3	1	2	2		2		1	2
5	1	7	3	2	3	3	3		1					1	1
6	1	2	2	4	2	2	2	1					2		
7	1	4	4	4	4	2	1	1	3						2
8	2	2	1	5	1	1		3		1		1		1	2
9	2	2	3	4		1	6	7		1					
10	2	3	1	3			1					1	1	1	1
11	2	3	4	4	1	4	1	2	1			1	2	1	3
12	3	6	2	6	4	6	2	1		1	1	1	2		2

TABLE XVI

DISTRIBUTION TABLE: GENDER AND CLASS RANK

Gender	Class Rank									
	1-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-
Male	11	11	20	10	9	15	18	10	8	11
Female	22	20	11	20	19	12	10	7	10	4

TABLE XVII

GENDER AND DAYS ABSENT

Gender	Days Absent														
	0-9	11-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	100-109	110-119	190-129	130-139	140-
Male	12	20	18	19	17	11	8	7	1	1		2	4	1	2
Female	6	19	13	19	10	13	13	10	6	4	4	5	3	5	11

TABLE XVIII

DISTRIBUTION TABLE: GENDER AND MONTH

	Month											
Gender	1	2	3	4	5	6	7	8	9	10	11	12
Male	12	9	10	7	9	8	11	9	7	5	14	22
Female	9	5	10	15	16	10	15	11	11	9	15	15

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