

The effect of extended-day kindergarten on academic achievement of at-risk students
by Teresa Anne Baldus

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Education
Montana State University
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Abstract:
The purpose of this study was to determine if there was a significant difference in academic achievement between at-risk students who attended an extended-day kindergarten program and at-risk students who attended a regular half-day kindergarten program.

The longitudinal study used data collected from August of 1996 to June of 2000. Kindergarten students who were identified as being at risk during the 1996-97, 1997-98, and 1998-99 school years in two similar elementary schools in Bozeman, Montana, comprised the population of this study. Each year there was a control group that attended the regular half-day kindergarten program. The experimental group for each year attended a full-day every-day kindergarten program. The students in the 1996-97 group were tested at the end of their first-grade and third-grade school years in the area of mathematics and reading. The students in the 1997-98 group were tested at the end of their second-grade school year in the area of mathematics and reading. The students in the 1998-99 group were tested at the end of their first-grade school year in the area of mathematics and reading. For each of the three groups, the effects of four independent variables - gender, number of parents in the home, absenteeism, and the type of kindergarten program - on the dependent variables, reading and mathematics achievement were analyzed using an analysis of covariance design, with the covariate being aptitude.

The results of the study showed there was no statistical interaction between gender, number of parents in the home, absenteeism and the type of kindergarten program on mathematics and reading achievement. In analyzing the main effects, there was not a significant difference between math achievement and reading achievement of at-risk students who attended extended-day kindergarten and at-risk students who attended regular kindergarten.

The conclusion is that in the rural community of Bozeman, Montana, the extended-day kindergarten program did not have a significant impact on the students' education compared to the students who attended a half-day program. The test results in subsequent years showed there was no difference in the achievement of students who were in either type of kindergarten program.

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APPROVAL

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Teresa Anne Baldus

This dissertation has been read by each member of the dissertation committee and has been found to be satisfactory regards content, English usage, format, citations, bibliographic style, and consistency, and is ready for submission to the College of Graduate Studies.

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ABSTRACT

The purpose of this study was to determine if there was a significant difference in academic achievement between at-risk students who attended an extended-day kindergarten program and at-risk students who attended a regular half-day kindergarten program.

The longitudinal study used data collected from August of 1996 to June of 2000. Kindergarten students who were identified as being at risk during the 1996-97, 1997-98, and 1998-99 school years in two similar elementary schools in Bozeman, Montana, comprised the population of this study. Each year there was a control group that attended the regular half-day kindergarten program. The experimental group for each year attended a full-day every-day kindergarten program. The students in the 1996-97 group were tested at the end of their first-grade and third-grade school years in the area of mathematics and reading. The students in the 1997-98 group were tested at the end of their second-grade school year in the area of mathematics and reading. The students in the 1998-99 group were tested at the end of their first-grade school year in the area of mathematics and reading. For each of the three groups, the effects of four independent variables – gender, number of parents in the home, absenteeism, and the type of kindergarten program – on the dependent variables, reading and mathematics achievement were analyzed using an analysis of covariance design, with the covariate being aptitude.

The results of the study showed there was no statistical interaction between gender, number of parents in the home, absenteeism and the type of kindergarten program on mathematics and reading achievement. In analyzing the main effects, there was not a significant difference between math achievement and reading achievement of at-risk students who attended extended-day kindergarten and at-risk students who attended regular kindergarten.

The conclusion is that in the rural community of Bozeman, Montana, the extended-day kindergarten program did not have a significant impact on the students' education compared to the students who attended a half-day program. The test results in subsequent years showed there was no difference in the achievement of students who were in either type of kindergarten program.

CHAPTER 1

INTRODUCTION

Introduction

Established in 1965 as part of President Lyndon Johnson's War on Poverty, Title I of the Elementary and Secondary Education Act (ESEA) gives federal support to schools in economically disadvantaged communities. In addition to the 1950 Impact Aid Program, which provides funds to school districts impacted by military bases or other federal installations, Title I marks the first occasion the federal government became directly involved in the elementary and secondary schools (Edwards, 1995).

During the past thirty-five years, Congress has amended and expanded the Act eight times. In 1994, Title I was reauthorized by the Improving America's Schools Act (P.L. 103-382). The 1994 amendments included some of the most radical changes since the program was first implemented in 1965. The major changes in the law included:

- integrating Title I into the overall reform framework established by the landmark 1994 Goals 2000: Educate America Act (P.L. 103-227);
- establishing the principle that Title I students will be taught to the same high standards as other children, instead of confining them to a low-expectations remedial track;

- eliminating burdensome federal testing requirements and evaluating the performance of Title I schools and students using the same state standards and assessments that apply to other children;
- providing expanded flexibility to local schools in exchange for heightened accountability for results;
- emphasizing professional development for educators to help them implement new research-based techniques for educating children; and
- changing the funding allocation's formula and school eligibility standards to focus more funds on highest-poverty schools (Edwards, 1995).

One of the requirements of the new Title I Law was to integrate the Title I program into the framework of Goals 2000. By the year 2000, the following eight goals were to be implemented:

1. All children will start school ready to learn
2. The high school graduation rate will increase to 90%
3. Students will leave grades 4, 8, and 12 with demonstrated competency in English, mathematics, science, history, geography, foreign languages, and the arts
4. Teachers will have access to training programs to improve their skills
5. United States students will be first in the world in mathematics and science

6. All adult Americans will be literate and able to compete in a global economy
7. Every school will be free of drugs and violence
8. Every school will strive to increase parental involvement and participation in their children's education (Edwards, 1995)

The intent of the first goal was to have every child entering school ready to learn. Many Title I students have several disadvantages such as lack of readiness skills, positive home environment, parental involvement, self-esteem, and others (Agee, 1988; Edwards, 1995; Riley, 1993; Slaughter & Powers, 1983) which prevent them from achieving this goal. If this goal was not achieved, it was assumed that Title I students would not be able to reach the other goals.

Problem of the Study

In 1994, a school located in Bozeman, Montana, initiated an extended-day kindergarten program for identified at-risk students. A typical student's kindergarten day usually consists of two and one-half hours in the classroom. For many at-risk students, the remainder of the day does not offer opportunities for academic, social, and emotional growth. It was believed an extended-day program for at-risk students could enhance opportunities for improved student achievement (Riley, 1993).

The extended-day kindergarten program was part of, and funded through the Title I Program in the Bozeman Public Schools. As students

entered kindergarten, each child was screened through the use of a developmental checklist. Students registered into the extended-day program were those students identified with the greatest needs. For the first two years of the program, students attended a regular kindergarten class in the morning, with the extended-day kindergarten program beginning with lunch and continuing throughout the afternoon. For the following three years a somewhat different approach was taken. Identified students were registered into a full-day, everyday Title I kindergarten class. Focus in both formats was on the individual academic and social needs as determined by the developmental levels of students within the class. The problem of this study was to determine if the extended-day kindergarten program was successful in meeting the needs of the at-risk students and whether this program was worth the financial investment.

Statement of the Purpose

The purpose of this study was to determine if there was a significant difference in academic achievement between at-risk students who attended an extended-day kindergarten program and at-risk students who attended a regular half-day kindergarten program.

Questions To Be Answered

To accomplish its purpose, this study sought answers to the following questions:

1. Was there a difference in academic achievement between at-risk students who attend a regular kindergarten program and those who attend an extended-day kindergarten program?
2. Did the number of parents in the home and type of kindergarten program interact with academic achievement?
3. Did gender and type of kindergarten program interact with academic achievement?
4. Was there a difference between the mean number of days absent of at-risk students who attended an extended-day kindergarten program and at-risk students who attended a regular kindergarten program?
5. Did attendance and type of kindergarten experience interact with academic achievement?

Significance of Study

The success or failure in educating all students encompasses all realms of society. For at-risk children, success means "the difference between finding doors open or closed to them when they are adults – doors to high-wage jobs, doors to participation in our democratic society,

doors to personal fulfillment and quality lives. For our nation, it will mean the difference between economic prosperity and world leadership, or a decline in our standard of living and influence around the globe" (Edwards, 1995, p. B-7).

Research from the *Report of the School Readiness Task Force* compiled by the California Department of Education in 1988 (Agee), showed "that chronological age does not determine success in kindergarten. Rather a child's success is a complicated issue involving such factors as individual developmental capacities; the expectation of parents; the appropriateness of the curriculum; and the link between preschool, kindergarten, and first grade. The School Readiness Task Force found that too often children age four through six are receiving inappropriate instruction. However, schools should be changed to fit the needs rather than to continue to try to fit the children to programs which are inappropriate" (p. 3). Findings from this study contribute to our understanding of whether or not programs such as extended-day kindergarten help meet the needs of at-risk students.

As a result of the work and research done by the School Readiness Task Force, twelve recommendations were made for the early primary years. They are as follows:

1. An appropriate, integrated, experiential curriculum should be provided for children ages four through six
2. Class size should be reduced

3. Programs should meet the special needs of our culturally and linguistically diverse students, as well as the needs of exceptional children
4. Classroom organization and teaching methods should reflect the heterogeneous skills and abilities of children in the early primary programs
5. The staff of the early primary programs should receive appropriate education, training, and remuneration
6. Full-day programs should be an option for children ages four through six
7. Programs should provide either before- and after-school childcare or links with child development programs for children who need this care
8. Assessment methods for children in early primary programs should be drastically altered
9. Funding and support must be made available for the early primary programs
10. Facilities should be built or remodeled to meet the needs of the early primary programs
11. Parental involvement should be encouraged
12. A public awareness campaign should be launched describing appropriate learning practices for children ages four through six (Agee, 1988)

Of the twelve recommendations made by the task force, items one, two, three, four, five, seven, eight, eleven and twelve are currently being implemented by the Bozeman Public Schools. This study addressed item six, full-day programs as an option, in order to determine if this factor had an impact on at-risk students. As districts struggle to support programs in schools, they are obligated to investigate a program's effectiveness in order to consider funding. The findings in the current study could have an impact on the future funding and support of early primary programs as identified in number nine of the School Readiness Task Force recommendations.

School takes up only a small part of a student's daily life. Opportunities for learning occur in the hours children spend outside of school, yet at-risk students often lack activities that will further their growth (U.S. Department of Education, 1995). Findings from this study contribute to our understanding of the benefits an extended-day kindergarten program has relative to whether or not additional learning opportunities for students helps them maintain the same academic level of their peers.

Very seldom are there children who are unable to learn, because they do not want to learn. At-risk students are those who for one reason or another need additional assistance or a modified environment in which to succeed. Schools need to look at alternatives and recognize that every student will not meet success in the traditional school setting. Schools need to accept students at their individual academic and social

levels and offer a program that will meet the unique needs of all students.

Retention is an option sometimes used for at-risk students. Reasons for retaining young children include "the pressures of teacher accountability, development of more homogeneous 1st-grade classes and parental emphasis on more academic skills. Other frequently cited reasons for retention include observation of certain behavior patterns and immaturity" (Bossing & Brien, 1980, p. 2). Beth Nason (1991) researched the effects of retention and found that "not only does the accumulated research fail to provide evidence that retention can be beneficial, but it suggests that retention can be harmful. Retention does not appear to produce any significant benefits related to academic achievement" (p. 300). Bossing and Brien (1980) and May and Welch (1984) agree: Students who repeat a grade will achieve at a lower level than similar students who are promoted. Shepard and Smith's (1989) findings support these researchers' conclusion. They matched retained children with promoted at-risk children to study the effects of kindergarten retention. At the end of first grade, the students in the two groups did not differ significantly on standardized math scores or teacher ratings of reading and math achievement, learner self-concept, social maturity, or attention span. It appears that, in general, retained children do not experience any noticeable improvement in their performance. In 1993, Meisels and Liaw examined the effects of retention using data from the National Longitudinal Study of 1988 and concluded that retention

does not improve student achievement. Robertson (1998) concluded that retained children do not catch up with their new grade level when they are retained. Robertson's (1998) study showed that retained children are more likely to dislike school and possibly drop out of school. Promotion with remediation has been found to produce better academic results than retention (Peterson, DeGracie, & Ayabe, 1987). The intent of this study, investigating extended-day kindergarten for at-risk students, was to examine an alternative learning environment to retention and investigate the long-term effectiveness of the program.

Several studies on the extended-day kindergarten program for at-risk students have been reviewed (Banerji, 1988; Holmes & McConnell, 1990; Karweit, 1992; Koopmans, 1991; Rothenberg, 1995; Sevigny, 1987; Slaughter & Powers, 1983; Uguroglu, 1986). All of these studies were conducted in large urban school districts and found that full-day kindergarten programs provided increased achievement for at-risk students. The current study, *The Effect of Extended-day Kindergarten on Academic Achievement of At-risk Students*, was conducted in a small, rural district. The district was Bozeman Public Schools, located in Bozeman, Montana, which had a population of 27,509 people in the city limits according to the 2000 Census. The district consisted of seven elementary schools, two middle schools, and one high school that had a separate campus for an alternative school. The enrollment of the district was approximately 5,000 students. The primary economic base of the Bozeman area was agriculture, an academic institution, and tourism.

Examining extended-day kindergarten in a rural area may help determine if similar results are found as in urban areas.

Definition of Terms

The terms listed below were used throughout the investigation and are defined as follows.

1. Kindergarten: The first year of formal education available in the public schools for children who are at least five years old on or before September 1
2. Title I: Title I of the Elementary and Secondary Education Act is the largest federal aid program for elementary and secondary schools. The purpose of the program is to provide additional academic support to students who are at risk of failing in school in the areas of math and reading. Title I has also been known as Chapter I
3. At-risk Students: Students who are identified for possible failure in school
4. Regular Kindergarten: Students attend school for two and one-half hours per day, five days a week, or attend ten full days monthly
5. Extended-day: Students attend school for six and one-half hours per day, five days a week

6. Academic Achievement: The level of achievement on a standardized test given to students in math and reading as measured by the TeraNova CTBS/5 test
7. Family Structure: The number of parents in the home, including stepparents
8. Absenteeism: The attendance record of the student during his or her kindergarten school year. In this study, the terms attendance and absenteeism are used interchangeably
9. Aptitude: The total score received on the Title I Screening Device.

Methodology

This longitudinal study used data collected from August 1996 to June 2000. Kindergarten students who were identified as being at risk during the 1996-97, 1997-98, and 1998-99 school years in two similar elementary schools comprised the population of this study. Each year there was a control group that attended the regular half-day kindergarten program. The experimental group for each year attended a full-day every day kindergarten program. For each of the three groups, the effects of four independent variables – gender, number of parents in the home, absenteeism, and the type of kindergarten program – on the dependent variables, reading and mathematics achievement were analyzed using an analysis of covariance design, with the covariant being aptitude.

Summary

The purpose of this study was to determine if there was a significant difference in academic achievement between at-risk students who attended an extended-day kindergarten program and at-risk students who attended a regular half-day kindergarten program. The study set out to determine if the extended-day kindergarten program was successful in meeting the needs of the at-risk students and whether this program was worth the financial investment.

CHAPTER 2

REVIEW OF LITERATURE

Introduction

The literature supporting this study falls into six categories: (1) History of Kindergarten, (2) Type of Kindergarten Day, (3) At-risk Students, (4) Title I Research, (5) Family Structure, and (6) Effect of Attendance on Academic Achievement.

History of Kindergarten

The concept of kindergarten was first introduced in Germany around 1837. Friedrich Froebel's ideas concerning education emerged from a conflict with the strict religious instruction given to him by his father, a Lutheran minister, and the loss of his mother at a young age (Shapiro, 1983). Froebel became an educator prophet after attending the Yverdon Institute operated by Pestalozzi. From his training he devised a theory that education consisted of developmental stages where each educational task corresponded with an observed mental, physical, or spiritual change in the child. Froebel looked at many social institutions that might meet the needs of a young child, but none of the organizations met his criteria. He then decided to create a new social institution of education which would take place between infancy and childhood, the family and school, and nature and society (Shapiro, 1983). Froebel

called this idea kindergarten or "child garden." The goal of kindergarten was to provide a place for children to meet with their peers in a safe place. "The kindergarten was designed to train children in habits of cleanliness and neatness, courtesy, punctuality, and deference toward others. It also emphasized language, numbers, forms, and eye-hand coordination. Froebel believed the child should develop impulses that came from within. The role of the teacher was to 'cooperate with nature' and guide the child as impulses developed" (Osborn, 1991, p. 44). Froebel's idea led to the kindergarten concept in America.

Carl and Margarathe Schurz who came to America from Germany in 1852 created the first U.S. kindergarten. Based on Froebel's philosophy, Margarethe created the first kindergarten in her home in 1856 for her daughter, Agathe. Elizabeth Peabody, a teacher and lecturer, met the Schurzs and became impressed with Agathe. From this meeting and other reports, she decided to focus on teaching kindergarten students. She opened the first English-speaking American kindergarten in Boston in 1860 (Osborn, 1991). During the next few years she studied in depth the Froebelian philosophy of kindergarten and visited Germany, England, and Italy to learn more about teaching children in kindergarten. Peabody spent many years lecturing, writing, and helping establish kindergarten classes from coast to coast.

The kindergarten movement grew and developed in the decades following the Civil War, primarily in the large cities on the eastern seaboard and in the far west. In the rural areas of the South, Midwest,

and West, little was known of the kindergarten movement and the changes in education. In 1870 there was only one English-speaking kindergarten in the United States, but by 1880 there were over 400 kindergartens in thirty states. The first public school kindergarten was opened by Dr. William Harris, Superintendent of the St. Louis Public Schools, and directed by Susan Blow. The teacher trainees, under Susan Blow, would teach kindergarten in the morning and would study theory in the afternoon. "Both programs were closely coordinated between theory and practice. Under Blow's influence many new and innovative ideas were initiated through the kindergarten in America. She shared Froebel's deep feelings for the importance of motherhood, and the far-reaching effects that the mother-child relationship could have" (Osborn, 1991, p. 66).

Around the turn of the century a major growth in kindergarten was seen in public schools. By 1900 there were nearly 400 public school kindergartens, and public funds for kindergarten were available in 23 states (Osborn, 1991). As kindergarten programs proliferated in public schools, a shift in philosophy about kindergarten emerged. A statement by a kindergarten teacher identifies both views:

> The change from the Froebelian and formal teacher-directed type of kindergartens to the informal type with more childlike opportunities for growth commenced about 1900. The influence of Miss Patty Hill, Dr. William Kilpatrick and other exponents of John Dewey's philosophy strongly

> affected the kindergarten practices. Gradually the teacher-centered kindergartens become child-centered. Large blocks replaced the tiny gift blocks. Toys, large crayons, paintbrushes, hammers, and saws took the place of sewing cards, paper folding, and weaving mats. Creative expression replaced dictation. But the great Froebelian principles of experience, activity, learning by doing, interdependence, and the brotherhood of man still stand as the great foundation stones of kindergarten education (Osborn, 1991, p. 104).

In Osborn's book on the historical perspective of early childhood education, he identifies significant events that have led to the current trends in kindergarten:

> Freud prepared the way by citing the importance of the early years; Eliot in bringing the nursery school to this country and making it an effective educational experience; Piaget in his studies on intelligence; Wellman in pointing out that I.Q. was not fixed; the WPA and War Nurseries in showing that the nursery school experience could be profitable for all children; the professional organizations NAEYC and ACEI, in keeping the idea of preschool education before the profession and the public (Osborn, 1991, p. 150).

These events led to the creation of such educational programs as Project Head Start, the Right to Read Project, and the Elementary and Secondary Education Act.

Between 1965 and 1970 there was a debate between enrichment and instruction in kindergarten classrooms. Many educators supported the Freudian social-emotional approach and utilized play, movements, and the dramatic and creative arts as a major part of the curriculum while others supported a structured systematic program, which emphasized cognitive skills. By the early 1970s both groups were using the other's ideas in working with children (Osborn, 1991).

Beginning with just one student, kindergarten grew to accommodate 94% of all five-year olds in some type of kindergarten program by 1990. The focus of kindergarten has also changed. In a report compiled in 1986, the Educational Research Service found that kindergarten education has moved from primarily a developmental/socializing type of experience for young children to a more preparatory/academic type of experience. Kindergarten classes have largely evolved from an unstructured routine designed for school adjustment to a more structured environment of skills development, subject content, and instructional grouping focused on preparation for formal schooling. This study reported that in 1986 62.6% of all responding principals indicated that the primary focus of their kindergarten program was on preparation defined in the survey instrument as focus on academic readiness and social preparation for later schooling. Twenty-two percent (22%) reported that academic achievement, which was defined as focus on academic skills and achievement was the primary focus of the kindergarten program in their

schools. Eight and one-tenth percent (8.1%) reported that the primary focus of their program was developmental, defined as focus on child development with academic achievement not stressed. Finally, .5% reported compensatory, defined as focus on compensation and enrichment for socially and economically disadvantaged pupils.

Type of Kindergarten Day

According to many educators and others outside of the profession, the majority of five-year olds in the United States are accustomed to being away from home for a majority of the day, which has created a demand in many communities for full-day kindergarten (Bauch, 1988). There are many advantages and disadvantages of full-day programs. Some of the advantages include:

1. a relaxed, unhurried school day
2. greater opportunity for screening and assessment
3. serving children with special needs
4. pacing instruction to help students acquire new skills and concepts with ample time to practice, apply, and consolidate new learning
5. no need for midday transportation
6. having the opportunity to become part of the school since they can more frequently use facilities such as the gymnasium, cafeteria, auditorium, and library
7. fulfilling parents' preference for full-day kindergarten

8. providing more effectively for the individual needs of children who have different home and preschool experience

Despite fears that full-day kindergarten students will experience fatigue and stress, it has been found that school districts have planned programs that meet the needs of the students, resulting in few problems relating to these fears (Evansville-Vanderburgh School Corporation, 1988; Rothenberg in Bauch, 1988).

The disadvantages of full-day kindergarten include the expense of offering a full-day program. It requires additional teaching staff and aides to maintain the appropriate child-adult ratio. In many states, school districts are not given state aid for full-day kindergarten programs. Other problems include the lack of space and in some cases, the concern that kindergarten will become too academic for children who are not developmentally ready (Rothenberg in Bauch, 1988).

According to Gardner's report, *Education Research Service Report: Kindergarten Program and Practices* (1986), 55% of the principals indicated their schools had a half-day schedule with both morning and afternoon classes and 11% reported they had half-day with one session per day. Twenty-seven percent (27%) reported a full-day, everyday schedule, while 8% reported a full-day, alternate-day schedule. Schools with full-day, everyday schedules were more prevalent in urban than rural communities. In identifying the number of hours kindergarten students spend in school, 63% of principals indicated their pupils were

in school less than three and one-half hours per day, 7% between three and one-half and five hours per day, and 30% five hours or more per day.

In a study conducted by the Evansville-Vanderburgh School Corporation in 1988, the long-term effect of students who attended half-day and full-day kindergarten programs was examined. The following are highlights of this study:

1. The majority of full-day kindergarten teachers and primary teachers of children who attend full-day kindergarten are in favor of full-day kindergarten
2. Most of the parents of children in full-day kindergarten are positive about the program at the end of kindergarten and continue to have a favorable attitude in later years
3. There is no significant difference in the attendance of the full- and half-day kindergarten students
4. There is no difference in the school attitudes or self-concept of children who attend full- or half-day kindergarten
5. Full-day kindergarten has no significant impact on promotion or non-promotion of children
6. Children who attend full-day kindergarten have higher conduct marks on report cards in the primary grades than do children who attend for a half-day
7. Children who attend full-day kindergarten when compared to children who attend half-day kindergarten consistently have higher achievement test scores in all areas tested except

handwriting. The children who attend half-day kindergarten have significantly higher handwriting test scores. All other areas have significantly higher total test scores in favor of full-day kindergarten, including readiness tests at the end of kindergarten; reading tests in grades one, two, and three; and a battery of standardized tests in grades three, five, and seven

8. There is no significant difference in participation in middle school extracurricular activities between children who attend full- or half-day kindergarten
9. Children who attend full-day kindergarten have higher report card academic marks in both the primary and middle school years

Another study, compiled by Holmes and McConnell (1990), focused on six measures of academic achievement obtained from a spring administration of the California Achievement Tests given to students who attended a full-day kindergarten program and students who attended a half-day kindergarten program. The results of the six achievement comparisons showed there were no significant differences between the groups on four of the measures. Significant differences were found, however, on two measures: (a) Comprehension and (b) Mathematics Concepts and Applications. Further investigation determined that the difference in Comprehension subtest scores was due to girls in the half-day program scoring higher than boys in the full-day program and could

not be attributed to differences in the programs. The only remaining difference resulted from the males in the full-day program significantly outscoring males in the half-day program on the Mathematics Concepts and Applications subtest (Holmes & McConnel, 1990).

A study conducted in Wilmette, Illinois, also collected data on half-day and full-day kindergarten programs (Uguroglu &, 1986). The programs differed mainly in length of school day and number of extra activities, and not in the amount of academic learning time. The findings of this study indicated only very small differences between half-day and full-day programs. The authors pointed out that it is important to remember that the two kindergarten programs basically differed in day length and number of extra activities, not the academic learning time. It is possible, therefore, that if the full-day program had differed academically from the half-day program, and if more time had passed between the test administrations, an academic difference might have been found between the two programs (Uguroglu & Nieminen, 1986).

Matthijs Koopmans (1991) conducted a study of the longitudinal effects of all-day kindergarten programs in the Newark School System located in New Jersey. The purpose of the study was to evaluate the long-term effectiveness of an all-day kindergarten program on achievement during the elementary school years. The study found that "the difference between all-day and half-day groups loses statistical significance after the first year of elementary" (Koopmans, 1991, p. 35). Koopmans (1991) stated that the "results of the present study do not rule

out the possibility that in a school where achievement scores tend to go up, all-day kindergarten gives children a lasting advantage over their half-day peers. It is quite conceivable that all-day kindergarten achievement only has a lasting effect if elementary schools provide the opportunities for children to build on their acquired strengths" (p. 36).

In 1995, Dianne Rothenberg reviewed the research on full-day kindergarten programs. Rothenberg (1995) found that research studies confirm that attendance in full-day kindergarten resulted in academic and social benefits for students in the primary grades. "In comparing similiar half-day and full-day programs, it was found that full-day kindergarteners exhibited more independent learning, classroom involvement, productivity in work with peers, and reflectiveness than half-day kindergartners. Students were more likely to approach the teacher and they expressed less withdrawal, anger, shyness, and blaming behavior than half-day kindergartners. In general, children in full-day programs exhibited more positive behaviors than did pupils in half-day or alternative-day programs" (Rothenberg, 1995, p. 1).

At-risk Students

Throughout the literature, there is not a generally accepted definition of an at-risk student. In the early days of our nation there were non-English speaking children of very poor immigrants. During the depression days another large group of at-risk students appeared due to the failing economy. Educators did little for these high-risk students, so

why is the issue of at-risk students such a concern in the 1990s? One reason for this change of attitude is that in the near future there will be only three people in the work force for each retired person on Social Security. An economic situation such as this demands a highly productive work force. Thus, for simple economic reasons, it is important that at-risk students be educated to make a positive contribution to the work force rather than a drain on it. It must become a significant priority in our schools to find ways and means to improve the educational attainment of at-risk students.

From an analysis of all the research available concerning at-risk students, ten descriptors stand out. Students at risk are those who are:

- one or two years behind grade level in reading and mathematics skills
- three or more credits behind age/grade level in credits toward graduation
- chronic truants
- the offspring of school-age parents
- adjudicated delinquents
- victims of personal and/or family, alcohol, or drug abuse
- victims of family trauma such as death, divorce, violence, separation, or unemployment
- victims of physical, sexual, or emotional abuse
- students with limited English proficiency
- victims of ethnic, economic or cultural disadvantages

It is often easy to identify characteristics of at-risk students. Deciding what can be done to help these students or how to prevent them from becoming at risk is more difficult. Throughout the nation programs exist that are attempting to solve or prevent at-risk students from dropping out of school.

It first becomes apparent that students are at risk when their classroom performance is low. When this occurs, it is important to look at the classroom environment and discover what might be interfering with the child's learning. Schwartz (1987) identifies eight ways to promote achievement in the classroom:

1. High quality and long term programs using such strategies as hands-on and enrichment activities with application to real world situations
2. High quality and diverse staff who believe in the students
3. Reconceptualization that accounts for the student
4. Cultural and language sensitivity recognizing cognitive differences
5. Anxiety-reducing strategies such as the Northeast EQUALS program
6. Improved programming that allows for smaller class size and more time on task
7. Cooperative student groupings
8. Parent involvement

Schartz contends that changing the learning environment in classrooms in one or more of these ways may lead to a reduction in the number of high-risk students who are not functioning in the regular classroom.

Many programs have attempted to help at-risk students; some have been successful and others have not. Characteristics of an effective program were described by Slavin and Madden (1989). They looked at what type of classroom programs or strategies were effective in increasing student achievement for at-risk students. The most effective programs fell into three broad categories: (1) prevention, (2) classroom change, and (3) remediation.

It was found that "learning deficits easiest to remediate are those that never occur in the first place" (Slavin & Madden, 1989, p. 4). Prevention programs used in preschool, kindergarten, and first grade identify and solve the learning difficulties early, rather than waiting for the learning deficit to be solved at the middle or high school level where it is much more difficult to correct.

One of the most effective ways to prevent remediation is to provide the best possible classroom instruction in the first place. Salvin and Madden (1989) found that in their search for programs with evidence of effectiveness, two major categories of programs emerged: progress models and cooperative learning. In continuous progress models, students proceed at their own pace through a sequence of well-defined instructional objectives. This is accomplished through small groups composed of students at their own developmental level. In cooperative

learning, students work in small groups to master the material required. Students learn decision-making skills, group skills, and problem solving skills.

A change in classroom instruction does not guarantee success, however; sometimes remediation is still required. Two types of remedial programs have been found to be effective. One program is remedial tutoring, which uses peers as tutors instead of teachers for at-risk students. Secondly, there are computer-assisted instruction programs that are motivational and have been found to have positive effects on students. Remedial programs should always be used as a last resort, not as a first line of defense.

In an article by Eschenmann (1988), five environmental factors were identified to make a classroom more successful for at-risk students:

1. Teacher Style – The teacher's style has a strong effect on a student's motivation. In student-centered classrooms students take an active part in learning. Teachers have to be positive role models and present themselves as confident and competent in order to win respect and trust from their students. Teachers having these characteristics are found to have students with high levels of achievement
2. Curriculum – Students respond positively in the classroom when the curriculum is explained to them at a level they understand. The curriculum should challenge the students by using a variety of techniques

3. Learning Style – There is no single correct teaching style, nor is there only one student learning style. Educational objectives should accommodate a variety of student learning styles.

4. Classroom Organization and Management – The way classrooms are organized and managed has a strong effect on students' performances. Good classroom management motivates students by keeping them involved in activities that are relevant to their needs and tied to clearly stated objectives.

5. Evaluation and Assessment – Every teacher needs to have a comprehensive evaluation and assessment program that will minimize the effects of negative perceptions high-risk students have toward failing. A variety of assessment formats should be used in order to gain the most comprehensive picture possible of student achievement.

By creating a non-threatening classroom environment, the teacher can begin to address the motivational problems of at-risk students (Eschenmann, 1988). The extended-day program in this study used many of these characteristics in developing its classroom environment in order to determine the effectiveness of the program.

Title I Program for Extended-day Kindergarten

In July of 1987, Karen Sevigny conducted a longitudinal study on the Extended-day Kindergarten Program (EDK) in the Detroit Public School system. EDK operated in 25 Chapter I schools during the 1983-84 school year. The purpose of the kindergarten program was to assist the children least ready for kindergarten, as determined by the results of the Kindergarten Inventory of Developmental Skills. These students attended kindergarten for a full school day, four days a week. The fifth day was used to train teachers, aides, and parents. The program increased to over 2,700 students in the 1985-86 school year from the 750 students served in 1983-84.

The main purpose of the 1987 study was to follow the progress of a random sample of groups of students from the EDK Program. Comparison groups selected from the traditional Chapter I kindergarten population were also included in the study. The study included comparison of experimental (EDK) and control (traditional kindergarten) group reading and mathematics test results, final report card marks in language arts and mathematics, attendance, compensatory education service, and retention. The study included five phases beginning with the 1983-84 groups.

The findings from Phase A of the study included tracking during the 1985-86 school year the performance of two groups of at-risk students who had attended kindergarten in 1983-84. The findings are as follows:

1. The experimental group scored significantly higher on reading and mathematics assessments than the control group
2. The experimental group also received significantly higher report card marks in language and mathematics than the control group
3. There was no difference between the groups related to attendance
4. More experimental than control students were retained in Primary I (1984-85) for the 1985-86 school year. There were seven students retained from the experimental group while only three of the control students were retained in Primary I. The average number of days absent for all students who were retained, from experimental and control, was over thirty
5. Compensatory education services were provided to more control students than to experimental students. It is also interesting to note that while experimental students received less compensatory education services during the year, they achieved at a higher level as measured by their standardized test scores and as measured by report card marks
6. When looking at the Phase A groups and those students who no longer were included in the study, there were more control students who left the school system than experimental students

Phase B included tracking students who were in the kindergarten groups during the 1984-85 school year and were in Primary I during the 1985-86 school year. The findings showed no difference between the experimental and control groups of phase B as measured by test scores, report card marks, or attendance. These findings were the same as the findings for the two groups in Phase A when they were enrolled in Primary I. The researcher recommended that further testing be done as the students progress throughout the educational system.

Another evaluation was conducted with a Chapter I Extended Time Kindergarten in Tucson, Arizona (Slaughter & Powers, 1983). This study identified 96 students as academically at risk to participate in an extended-day kindergarten program featuring small class size and a whole-language approach to the curriculum and learning. The experimental group was composed of high-risk students attending regular morning kindergarten classes as well as the extended-day afternoon session. The comparison group attended morning classes only. Students in the experimental group who attended extended kindergarten programs made significant gains statistically and educationally on standardized tests and in teacher ratings of classroom performance. The achievement level of children who went to kindergarten for only the regular half-day declined, relative to the national norm group. Even though the results showed success with the experimental groups, some of the schools were considering lowering all

class sizes to see if success could be found for at-risk students in a regular day with low class size.

In researching the kindergarten experience, Nancy Karweit (1992) reviewed a number of quality research studies, which were conducted in large urban communities. These studies examined the effects of full-day and half-day programs. "Four studies using random assignment or equivalent matched group design found modest and sometimes inconsistent short-term effects for full-day programs. Twelve other studies that employed a matched control-group design found modest positive effects for full-day attendance. These effects were most consistent in studies that focused on disadvantaged students" (Karweit, 1992, p. 83).

Family Structure

During the past three decades the definition of a family has changed. In today's society children may live in a variety of family structures. According to the National Center for Education Statistics, a 1995 study showed that 25% of children ages six to eight lived with a single parent, 3% lived with other relatives, and 64% lived with two biological or adoptive parents. "Different family structures are associated with different educational outcomes, even though the effects of family structure are likely to be confounded by family income, parents' education level, race/ethnicity, and the amount of time that parents

participate in their children's education" (National Center for Education Statistics, 1997, p. 9).

A large body of research finds that children who grow up with only one parent in the home are disadvantaged as compared with children who grow up with both parents. "Research consistently shows the importance of the family environment in shaping children's early development. Family circumstances at the time of a child's birth and during the first few years of life can have long-lasting effects on children's adjustment to school in particular" (Emig, 2000, p 5). Research suggests that students who are raised by both biological parents in low-conflict families will have more success in the early years of their education. Children who live with only one parent will also benefit from the active involvement of their other parent as long as the environment is positive (Emig, 2000).

Research has established a link between family structure and various measures of child development and well-being. Children in a home with two parents fare better than single-parent children, with children of divorce having the most problems (McLanahan & Sandefur 1994). "Indicators of child well-being associated with divorce or single parent status include low measures of academic achievement, increased likelihood of dropping out of high school or early childbearing, and increased levels of depression, stress, anxiety, and aggression. Social capital upon which a child can draw diminishes in the absence of one

parent because one-parent families have less time and energy available to invest in parent-child interactions" (Fields & Smith, 1998, p. 5).

The family structure may be a proxy for other problematic issues within the family. Stress in the family is often associated with marital conflict and divorce, which can negatively impact a child's development process (Amato, Loomis, & Booth, 1995; Morrison & Cherlin, 1995). The loss of contact with a parent not in the home can result in the loss of emotional support and supervision received from adults (Astone & McLanahan, 1991). "Children of single parents may experience inconsistent parenting styles, decreased time spent with a parent, and less social control than children of two parent families. In addition, children of single parents generally have a lower standard of living, are more likely to be in poverty and more frequently participate in government assistance programs than do children from two parent families" (Fields & Smith, 1998, p. 5).

Effect of Attendance on Academic Achievement

Attendance is a crucial factor in the education of children. It seems a simple concept that the more often students attend school, the more they will be taught and the more they will learn. Learning is a continuous process. Learning is built on previous information received. Students need to have good attendance in order to reach their full potential. "Research studies examining the significance of school attendance as it related to school success have been funded by national,

state, and local agencies. Published reports indicate that there is a high correlation between excellent school attendance and academic success" (Carruthers, 1993, p. xiii). In a study done in the Wake County Public School System in North Carolina, William Carruthers (1993) found that poor attendance and poor achievement were associated.

Another study done by Kube and Ratigan (1992) showed that there was a link between attendance and achievement. That link was also evident in good attendance and school readiness. They found "that by improving attendance the school also improves student and teacher attitudes, student achievement, and teacher productivity and creates an environment more conducive to learning" (Kube and Ratigan, 1992, p. 2). A key element of this study showed that every day a student is absent is the equivalent of two days missed. Students not only miss the concepts taught on the day they were absent, but also will have difficulty understanding the extension of the concepts introduced the next day.

In 1996, Douglas Lamdin researched the impact of student attendance on academic achievement. In his research he found very few research projects that examined the effects of attendance on academic achievement. This led Lamdin to study the attendance-performance relationship in the public elementary schools of Baltimore, Maryland. The results presented in his study concluded the average level of attendance at a school does have a positive influence on student performance (Lamdin, 1996).

A study done in the Chicago Public Schools examined the attendance record of students in kindergarten classrooms. The results showed that students with consistent, good attendance tend to achieve at high levels in school readiness (Whitker, 1996). The importance of school attendance and how it relates to student success cannot be underestimated.

This literature review has described the current research and information pertaining to serving at-risk kindergarten students in an extended-day kindergarten program. The intent of this study was to further support these and future findings regarding service of at-risk students.

CHAPTER 3

METHODOLOGY

The purpose of the study was to determine if there was a significant difference in academic achievement between at-risk students who attended an extended-day kindergarten program and at-risk students who attended a regular half-day kindergarten program. The procedures that were used to collect, organize, and analyze the data are described in this chapter. The procedures of the study are presented in the following order:

1. Conceptual framework
2. Population description and sampling procedures
3. Research hypotheses
4. Explanation of investigative categories
5. Method of data collection
6. Analysis of data
7. Limitations and delimitations

Conceptual Framework

The intent of this study was to contribute to the theory that high quality extended-time programs integrate the added time with regular school experiences so that all students learn and succeed academically (Nason, 1991). In 1992, Nancy Karweit studied numerous full-day

kindergarten programs and found that the effects were most consistent in studies that focused on at-risk students. The current study focused on an early intervention kindergarten model whose goal was to meet the academic needs of at-risk students as they begin their formal schooling. Previous research suggests that at-risk children benefit academically and socially from attending full-day programs compared to half-day programs (Rothenberg, 1995). In all cases, the research focused on school districts found in large urban communities. The findings of this study would determine if the same results occur in a rural community as in urban communities. An extended-day kindergarten program gives additional learning opportunities to at-risk students to help attain the same academic level as their peers. This study contributes to the theory that high quality extended-time programs integrate the added time with regular school experiences so that students learn and succeed academically, regardless of the demographics of the community (Nason, 1991).

Population Description and Sampling Procedures

In identifying the population for this study, students were chosen from two similar schools that were part of Bozeman Public Schools in Bozeman, Montana. Each of these schools was in neighborhoods with a similar socioeconomic base, student enrollment, and academic achievement. These schools qualified for Title I services based on the number of students receiving free and reduced lunch. School A had an

average of 100 students per year receiving free and reduced lunch from 1996 to 1999 and School B had an average of 94 students receiving free and reduced lunch during the same time period. The average total student enrollment at School A between 1996 and 1999 was 250 students, while the average total student enrollment at School B between these same years was 280 students. Table 1 identifies the percentage of students in each school who were functioning below their ability level, within their ability level, and above their ability on the CTBS standardized test at the fourth-grade level. This information indicates that the academic level of the students attending School A and School B were similar.

Table 1. Fourth Grade CTBS Scores

	Reading			Math		
	Below Ability	Within Ability	Above Ability	Below Ability	Within Ability	Above Ability
School A 1997	26%	54%	20%	20%	60%	20%
School B 1997	30%	46%	24%	24%	30%	46%
School A 1998	4%	80%	16%	4%	92%	4%
School B 1998	4%	91%	5%	0%	67%	33%
School A 1999	8%	79%	13%	2%	79%	19%
School B 1999	9%	76%	15%	6%	54%	40%

Students who were identified as being at risk during the years of 1996-97, 1997-98, and 1998-99 were selected at each school. The experimental group was located at School B and the control group was located at School A. The experimental group consisted of at-risk students identified each school year during the 1996-97, 1997-98, and

1998-99 school years at School B. These students attended an extended-day kindergarten in a class of approximately ten students who were together for the entire day. The control group was a group of at-risk students identified at each school year during the same school years at School A who attended a regular half-day kindergarten program either in the morning or afternoon session.

The process used to identify at-risk students was the same at both schools for each year of the study. The regular kindergarten teachers screened all of the entering kindergarten students during the first month of school. Each of these kindergarten teachers had more than fifteen years of experience teaching kindergarten. The screening device used to screen the students was an assessment of a child's level of preparedness for entering kindergarten. This tool focused on measuring speech and language development, gross motor skills, work habits and social skills, fine motor skills, and cognitive knowledge. The screening device, *Title I Kindergarten Early Childhood Needs Assessment* (Appendix A), was created by the Bozeman Title I teaching staff in order to identify students for the Title I program. The screening device evaluated the following areas:

1. Speech/Language – This section of the screening device was administered by the Speech Clinician. The ratings were based on results of the DIAL-R Screening Test. This test looked at articulation, giving personal data, remembering, naming nouns, naming verbs, classifying foods, problem

solving, and sentence length. Students received points ranging from 0 points to 4 points. Students receiving 4 points were classified as having passed, which indicated performance standard deviations at, slightly above or slightly below age norms. Students receiving 2 points were considered at risk, which indicated performance that was 1 to 2 standard deviations below age norms. Students receiving 0 points were classified as having failed, which indicated performance that was 2 or more standard deviations below age norms.

2. Gross Motor – The Health Enhancement teacher in each school administered this section of the screening device. Ratings were based on observations of students attempting a variety of activities. These activities included stair climbing, throwing, catching, kicking, jumping, and hopping. Students received points based on their ability to complete the activity. The point scale was 0 points for "not yet able" to do the activity, 1 point for "sometimes able" to do the activity, and 2 points for "most of the time able" to do the activity.

3. Work Habits and Social Skills - The regular kindergarten teacher administered this area of the screening device. Teachers observed eleven work habits/social skills:

- takes care of own needs, responsibilities, shows independence
- willing to try new things
- productive and involved during work time
- displays interest in activities
- plays and interacts with others appropriately
- follows directions
- asks questions where appropriate
- attention span persistence and/or appropriate time on task
- appropriate level of understanding oral directions
- adequate language skills
- follows classroom routine without re-direction

The rating scale used for each item was 0 points for "not yet," 1 point for "sometimes," and 2 points for "most of the time."

4. Fine Motor – The regular kindergarten teacher administered this section of the screening device. In the Fine Motor section the students were asked to do five tasks. The first was cutting a circle out of paper. Students received 0 points for cutting considerably inside or outside of the line, 1 point for cutting with some difficulty, and 2 points for cutting correctly. The second task was writing their first name. Students received 0 points for not being able to write their

name correctly and completely, 1 point for partially writing their name, and 2 points for writing their name correctly and completely. The third task was copying a square shape. Students received 0 points if the shape was unclear, 1 point for copying with some difficulty, and 2 points for copying the shape correctly. The fourth task was copying the word "dog". Students received 0 points if the word was unclear, 1 point for writing the word with some difficulty, and 2 points for writing the word "dog" correctly and completely. The final task was drawing a picture of a person. Students received 1 point for a stick feature and 2 points for full arms, legs, and body. In addition, they received 1 point each for eyes, lashes, brows, mouth, nose, ears, hair, hands, and feet.

5. Cognitive Skills – The regular kindergarten teacher administered this area of the screening device. This area measured general knowledge of cognitive skills in seven categories. The first category was color recognition (red, blue, green, yellow, black, brown, orange, purple). Students received 0 points for recognizing 1-3 colors, 1 point for recognizing 4-6 colors and 2 points for recognizing 7 or more colors. The second category was recognizing words that rhymed with "ball", "cat", and "run". Students received 0 points for not identifying any rhyming words, 1 point for identifying one to two rhyming word and 2 points for

identifying all three rhyming words. The third area was rote counting. Students received 0 points for not being able to count or only counting up to 3, 1 point for counting to between 4 and 9, and 2 points for counting to 10 or above. The fourth category was one-to-one correspondence of five objects, such as blocks. Students received 0 points if they were unable to perform the task and 2 points if they were able to perform the task by mentally or physically counting the five objects. The fifth category was numeral recognition. Students received 0 points for identifying 0 to 2 numbers, 1 point for 3 to 5 numbers, and 2 points for 6 or more numbers. The sixth category was letter recognition. Students received 0 points for identifying 0 to 5 letters, 1 point for 5 to 10 letters, and 2 points for eleven or more letters. The final category was recall of story details. The students were read the *Three Little Pigs* story the day before. They were asked to recall details from the story. They received 0 points for recalling 0 to 1 details, 1 point for recalling 2 to 3 details and 2 points for recalling 3 or more details.

Each student received a total score for all of the areas on the *Title I Kindergarten Early Childhood Needs Assessment.* This score is referred to as aptitude in this study. Each school then ranked its students, with those receiving the lowest scores indicating the most need and the ten

students with the lowest aptitude scores were identified. These students at School B were the experimental group and attended the extended-day kindergarten program. The ten students at School A were in the control group and attended a regular half-day kindergarten program. Each year of the three-year study had an experimental group at School B and a control group at School A.

Research Hypotheses

To answer the questions posed in this study, the following research hypotheses were tested:

Hypothesis One	There was not a difference in the mean number of days absent of at-risk students who attended extended-day kindergarten and at-risk students who attended regular kindergarten.
Hypothesis Two	For students who attended kindergarten during the 1996-1997 school year, there was not a statistical interaction between the number of parents in the home and the type of kindergarten program on math achievement and reading achievement in first and third grades.
Hypothesis Three	For students who attended kindergarten during the 1997-1998 school year, there was not a statistical interaction between the number of parents in the home and the type of

kindergarten program on math achievement and reading achievement in second grade.

Hypothesis Four — For students who attended kindergarten during the 1998-1999 school year, there was not a statistical interaction between the number of parents in the home and the type of kindergarten program on math achievement and reading achievement in first grade.

Hypothesis Five — For students who attended kindergarten during the 1996-1997 school year, there was not a statistical interaction between gender and the type of kindergarten program on math achievement and reading achievement in first and third grades.

Hypothesis Six — For students who attended kindergarten during the 1997-1998 school year, there was not a statistical interaction between gender and the type of kindergarten program on math achievement and reading achievement in second grade.

Hypothesis Seven — For students who attended kindergarten during the 1998-1999 school year, there was not a statistical interaction between gender and the type of kindergarten program on math

achievement and reading achievement in first grade.

Hypothesis Eight — For students who attended kindergarten during the 1996-1997 school year, there was not a statistical interaction between absenteeism and the type of kindergarten program on math achievement and reading achievement in first and third grades.

Hypothesis Nine — For students who attended kindergarten during the 1997-1998 school year, there was not a statistical interaction between absenteeism and the type of kindergarten program on math achievement and reading achievement in second grade.

Hypothesis Ten — For students who attended kindergarten during the 1998-1999 school year, there was not a statistical interaction between absenteeism and the type of kindergarten program on math achievement and reading achievement in first grade.

Hypothesis Eleven — For students who attended kindergarten during the 1996-97 school year, there was not a significant difference between math achievement and reading achievement in first and third

grades of at-risk students who attended extended-day kindergarten and at-risk students who attended regular kindergarten.

Hypothesis Twelve — For students who attended kindergarten during the 1997-98 school year, there was not a significant difference between math achievement and reading achievement in second grade of at-risk students who attended extended-day kindergarten and at-risk students who attended regular kindergarten.

Hypothesis Thirteen — For students who attended kindergarten during the 1998-99 school year, there was not a significant difference between math achievement and reading achievement in first grade of at-risk students who attended extended-day kindergarten and at-risk students who attended regular kindergarten.

Explanation of Investigative Categories

The control group was the ten identified at-risk students attending School A during the 1996-97, 1997-98, and 1998-99 school years. These students attended either the morning or afternoon session. Each session was two and one-half hours long. The at-risk students were placed in a session using the adopted school district policy for

kindergarten registration. These students were placed in a session based on a first-come, first-served policy. Each session was taught by the same classroom teacher and used the same curriculum.

The experimental group was the ten identified at-risk students at School B during the 1996-97, 1997-98, and 1998-99 school years. Each year the identified group of students attended an extended-day kindergarten in a class of ten students who were together for the entire day. This session was six hours long with a fifty-minute lunch period. The students were placed in this class based on the results of the screening device. The teacher of the experimental group used the same curriculum (Appendix B) as the teacher of the control group in addition to focusing on the individual developmental needs of the students. Since the teachers used the same curriculum, the only difference between the control group and the experimental group was extended learning opportunities for the students in the experimental group each day. The goal of the extended day was to assist the students in reaching the academic level of their peers.

Methods of Data Collection

Since this was a longitudinal study comparing two types of programs, it was important to use previous data collected from standardized tests that students had taken in school. The previous data collected supported the long-term effect of the two types of programs. The method of data collection included reviewing scores from the

TerraNova Comprehensive Tests of Basic Skills, Version 5 (CTBS/5) standardized test. The scores for the students from the 1996-97 school year included the results from the Spring 1998 and Spring 2000. Test scores for the students from the 1997-98 and 1998-99 school years included the results from the Spring 2000 CTBS.

The tests were administered during the last two weeks of April each year. The test given to the students in the 1997-98 group and 1998-99 group was administered in a small group situation. The tests given to the students in the 1996-97 group were administered in the regular classroom situation.

Collection of data on the number of parents in the home was based on the information in the school's student record files. This information was verified by the Parent Liaison in each school. The Parent Liaison was familiar with the families in both schools and her job was to be the link between the school and the home. The Parent Liaison was the same person in both schools. She spent fifty percent of her time in each school. Parent Liaisons in the Bozeman Public School system were trained to work with parents and develop a strong relationship between the parents and the school.

The collection of the student's attendance record was obtained from the school's attendance records. The mean number of days absent was calculated for each group of students. The students were then identified as having an absenteeism record of either below the mean or above the mean.

Validity

Validity refers to the appropriateness of the interpretations made from test scores and other evaluation results with regard to a particular use. According to the TerraNova Technical Bulletin (CTB McGraw-Hill, 1997):

> TerraNova CTBS/5 was designed and developed to provide achievement scores that are valid for most types of educational decision-making. The primary inferences from the test results measured include measurement of achievement of individual students relative to a current nationwide normative group and relative program effectiveness based on the results of groups of students. Progress can be tracked over years and grades. The results can be used in a criterion-reference manner to analyze strengths and weaknesses of a student's achievement in each content area, to plan for further instruction, to plan for curriculum development, and to report progress to parents. (p. 29)

In selecting the TerraNova CTBS/5, a committee of teachers from Bozeman Public Schools reviewed three standardized tests – TerraNova CTBS/5, IOWA Basics, and the Stanford – under the guidance of an assessment consultant who had previous experience working for the

IOWA testing company and CTB McGraw-Hill. The criterion used to select the test was the match of the Bozeman Public School curriculum to the objectives in the test. It was found that the TerraNova CTBS/5 had the best match between the Bozeman Public School curriculum and the objectives in the test. There was an approximate 70% match between the objectives found in the TerraNova CTBS/5 and the curriculum outcomes.

Reliability

One view of reliability refers to the internal consistency of the test, that is, the homogeneity of the test items. Reliability indicates how much confidence can be placed in the test results (Kerlinger, 1986). According to the TerraNova Technical Bulletin, test development procedures utilized by CTB were designed to ensure that the TerraNova CTBS/5 maintains a high degree of reliability. CTB/McGraw-Hill used the KR20 metric to describe reliability (CTB McGraw-Hill, 1997).

The reliability coefficient for the reading portion of the first-grade test was .88 with a standard error of measurement of 2.63; the second-grade test was .93 with a standard error of measurement of 2.86; and the third-grade test was .95 with a standard error of measurement of 3.02. The reliability coefficient for the math portion of the first-grade test was .93 with a standard error of measurement of 3.2; the second-grade test was .92 with a standard error of measurement of 3.14; and the third-grade test was .94 with a standard error of measurement of 3.23.

Variance Control

According to Kerlinger (1986), in order to control variance, a researcher needs to maximize systematic variance, control extraneous systematic variance, and minimize error variance. In order to maximize the experimental variance in this study, each of the groups was clearly identified. In addition to clearly identifying the groups, the treatments of each group were clearly different in regard to the number of hours a student would be in school each day.

There are five possible approaches to controlling extraneous variance: random selection, eliminating variables by imposing constants, examining the effects of extraneous factors, matching samples, and statistical variance control. This study did not randomly assign students to groups. Students selected to participate in this study were chosen on their aptitude as measured on the screening device given at the beginning of the students' kindergarten year. Imposing constants was an approach taken into consideration when selecting schools. Both schools had experienced teachers and used identical kindergarten curriculum, with the exception of the full-day kindergarten having additional time to address the developmental needs of the students. When analyzing the results, the researcher examined the effects of extraneous factors, which included gender, absenteeism, number of parents in the home, and type of kindergarten program. Matching was not a factor in this study since students were selected based on their aptitude score received from the

screening device. Statistical control was addressed by using the two-way analysis of covariance model. The covariate was the aptitude measure.

Minimizing error variance was accomplished by using a highly reliable test to assess student achievement. The TerraNova CTBS/5 was used and was administered in small group situations. The reported internal consistency coefficient for the reading portion of the first-grade test was .88 with a standard error of measurement of 2.63; the second-grade test was .93 with a standard error of measurement of 2.86; and the third-grade test was .95 with a standard error of measurement of 3.02. The reliability coefficient for the math portion of the first-grade test was .93 with a standard error of measurement of 3.2; the second-grade test was .92 with a standard error of measurement of 3.14; and the third-grade test was .94 with a standard error of measurement of 3.23.

Internal Validity

Campbell and Stanley (1963) identify eight factors that affect internal validity. History, maturation, testing, instrumentation, and statistical regression are not factors pertinent to this study because the pre- and post-test method was not used. The three factors that were addressed in this study were selection, mortality, and interaction. In order to control the selection factor, an objective tool was used to select the participating students. All kindergarten students in each school were screened and the students with the lowest scores were identified to be in the control or experimental group depending on which school they

were enrolled in at the beginning of the school year. Mortality was expected to be a factor in this study. There was the possibility that students could have moved away during the period of the study. Attempts were made to keep track of students who had completed kindergarten but moved during the period of the study to discover if the treatment was a factor of the move. During the study, one student from the experimental group and one student from the control group in the 1996-1997 group of students moved out of the area. The same situation happened with the 1997-1998 group with one student from the experimental group and one student from the control group moving out of the area. Test results were not obtained for these four students. Finally, interaction factors that might hinder the process, such as diffusion or contemporary factors, have little chance of occurring because the groups were in separate schools with little interaction between groups.

External Validity

In order to control external validity, interactions between groups were analyzed. Regarding gender, the study determined if there were any interactions between males and females and the type of kindergarten program they attended. The study also analyzed if there was a difference in absenteeism of students in the experimental and control groups during their kindergarten year. In addition, the study determined if there were any interactions between absenteeism and the type of

kindergarten program. Finally, a determination was made if there were any interactions based on the number of parents in the home and the type of kindergarten program the students attended.

Analysis of Data

The influence of the independent variables on the dependent variables was analyzed using a two-way analysis of covariance for hypotheses two, three, four, five, six, seven, eight, nine, and ten. Hypothesis one was tested using an independent t-test. This test determined if there was a difference between absenteeism and the type of kindergarten experience. If the interaction hypotheses two, three, four, five, six, seven, eight, nine, and ten were retained, then the main effects of the study, hypotheses eleven, twelve, and thirteen, would be analyzed. If hypotheses one, two, three, four, five, six, seven, eight, nine, and ten were rejected, then the main effects would not be analyzed.

The two-way analysis of covariance was selected, because it statistically equated the groups on the covariate of aptitude.

> Analysis of covariance is a form of analysis of variance that tests the significance of the differences among means of experimental groups after taking into account initial differences among the groups and the correlation of the initial measures and the dependent variable measures. That is, analysis of covariance analyzes the differences between experimental groups on Y, the dependent variable, after

> taking into account either initial differences between the groups on Y (pretest), or differences between the groups in some pertinent independent variable or variables, X, substantially correlated with Y, the dependent variable. The measure used as a control variable is called a covariate (Kerlinger, 1986, p 339).

According to Glass and Hopkins (1996), the proper use of ANCOVA can reduce the chance of a Type II error without changing the probability of a Type I error. Since a two-way analysis of covariance was used, the means reported for the main effects were adjusted means. The adjusted mean was the expected mean if the two groups of students had entered the study with the same mean aptitude scores. Although the narrative in Chapter 4 discusses the means, in reality they are adjusted means.

The software package SPSS 10.0 was used to perform the independent t-test and the two-way analysis of covariance. All of the null hypotheses were tested at 0.01 level of significance. The decision for choosing the level of significance was determined by considering the consequence of making a Type I or II error. The consequence of rejecting a true null (Type I error) would be the possibility of concluding that there was a difference in the achievement level of the two groups when in fact there was no difference. This could mean that a school could adopt a more costly program with no benefit to the students. The consequence of a Type II error (retaining a false null hypothesis) was the possibility of failing to recognize the important link between the dependent variable of

achievement and the type of kindergarten experience, thus not providing an effective education alternative to assist at-risk students. The 0.01 level of significance was chosen by the researcher because the consequences of a Type I error were considered more severe than a Type II error.

Limitations and Delimitations

The following were limitations of this study:

1. The size of the experimental group was limited to ten students a year because of limited funding for the extended-day kindergarten program.
2. The selection of schools was limited to the identified Title I schools in the Bozeman Public Schools.
3. There was a possibility of students moving during the period of time they were in the control or experimental groups.
4. The placement of students into first-grade classrooms was determined by the building principal.

The following were delimitations of this study:

1. The study was limited to the identified at-risk students served during the 1996-97, 1997-98, and 1998-99 school years.
2. The study was limited to the identified at-risk students in School A and School B.

CHAPTER 4

ANALYSIS OF DATA

Introduction

The purpose of the study was to determine if there was a significant difference in academic achievement between at-risk students who attended an extended-day kindergarten program and at-risk students who attended a regular half-day kindergarten program.

For this study thirteen hypotheses were tested. For each of the three groups, the effects of four independent variables – gender, number of parents in the home, absenteeism, and type of kindergarten program – on the dependent variables, reading and mathematics achievement, were analyzed using an analysis of covariance design, with the covariate being aptitude. For the purpose of testing significance, all hypotheses were tested at the .01 alpha level. The order of presentation of the hypotheses in Chapter 3 is followed in the analysis and presentation of the data.

Characteristics of the Groups

The subjects of the study were students who were identified as being at-risk in kindergarten during the years of 1996-97, 1997-98, and 1998-99 at two identified schools. The data in Table 2 identifies the characteristics of the students in the experimental and control groups.

Table 2. Group Characteristics

	Family Structure		Gender		Absenteeism	
	1 Parent	2 Parents	Female	Male	Below Mean	Above Mean
Group 1 1996-97 School Year						
Control	3	6	3	6	4	5
Experimental	4	5	4	5	5	4
Group 2 1997-98 School Year						
Control	5	4	4	5	7	2
Experimental	4	5	4	5	5	4
Group 3 1998-99 School Year						
Control	3	7	6	4	5	5
Experimental	7	3	1	9	7	3

Group 1 consisted of 18 students who attended kindergarten during the 1996-1997 school year and were identified as being at risk based on their aptitude score. The group consisted of nine students who were in the control group at School A and nine students who were in the experimental group at School B. In the control group, three students lived in a home with one parent and six students lived in a home with two parents. In the experimental group, four students lived in a home with one parent and five students lived in a home with two parents. Of the nine students in the control group, three were female and six were male. Of the nine students in the experimental group, four were female and five were male. In regard to the students' absenteeism, the control group had four students whose absenteeism was below the mean and

five who were above the mean. In the experimental group five students' absenteeism was below the mean and four were above the mean.

Group 2 consisted of 18 students who attended kindergarten during the 1997-1998 school year and were identified as being at risk based on their aptitude score. The group consisted of nine students who were in the control group at School A and nine students who were in the experimental group at School B. In the control group, five students lived in a home with one parent and four students lived in a home with two parents. In the experimental group, four students lived in a home with one parent and five students lived in a home with two parents. Of the nine students in the control group, four were female and five were male. Of the nine students in the experimental group, four were female and five were male. In regard to the students' absenteeism, the control group had seven students whose absenteeism was below the mean and two who were above the mean. In the experimental group five students' absenteeism was below the mean and four were above the mean.

Group 3 consisted of 20 students who attended kindergarten during the 1998-1999 school year and were identified as being at risk based on the aptitude score. The group consisted of ten students who were in the control group at School A and ten students who were in the experimental group at School B. In the control group, three students lived in a home with one parent and seven students lived in a home with two parents. In the experimental group, seven students lived in a home with one parent and three students lived in a home with two parents. Of

the ten students in the control group, six were female and four were male. Of the ten students in the experimental group, one was female and nine were males. In regard to the students' absenteeism, the control group had five students whose absenteeism was below the mean and five who were above the mean. In the experimental group seven students' absenteeism was below the mean and three were above the mean.

Hypothesis 1

The results of the Independent t-test on absenteeism for each of the groups is found in Table 3.

Table 3. Independent t-test of kindergarten absenteeism

		t-test for Equality of Means	
		t	P-value (2 -tailed)
Group 1 (96-97) Absenteeism	Equal variances assumed	-.575	.574
	Equal variances not assumed	-.575	.575
Group 2 (97-98) Absenteeism	Equal variances assumed	1.303	.211
	Equal variances not assumed	1.303	.218
Group 3 (98-99) Absenteeism	Equal variances assumed	-.524	.606
	Equal variances not assumed	-.524	.607

Null Hypothesis 1

There was not a difference in the mean number of days absent of at-risk students who attended extended-day kindergarten and at-risk students who attended regular kindergarten.

The null hypothesis was retained at alpha = .01 level, as shown in Table 3 for the students in Group 1, Group 2, and Group 3. There was not a significant difference in the mean number of days absent of at-risk students who attended extended-day kindergarten and at-risk students who attended regular kindergarten.

Hypotheses 2 through 4

The results of the two-way analysis of covariance with the independent variables, number of parents in the home and the type of kindergarten program, and the dependent variables, math achievement and reading achievement, with the covariate aptitude are summarized in Tables 4 through 11.

Null Hypothesis 2

For students who attended kindergarten during the 1996-1997 school year, there was not a statistical interaction between the number of parents in the home and the type of kindergarten program on math achievement and reading achievement in first and third grades.

The null hypothesis was retained at alpha = .01 level, as presented in Tables 4 through 11. There was no significant interaction between the number of parents in the home and the type of kindergarten program on math achievement in first grade ($p = .831$).

Table 4 . ANCOVA of math achievement for first grade 96-97 Group

Source	Type III Sum of Squares	df	Mean Square	F-value	P-value
Aptitude	27.007	1	27.007	.953	.347
Parents	33.667	1	33.667	1.188	.296
Group	36.521	1	36.521	1.288	.277
Parents*Group	1.341	1	1.341	.047	.831
Error	368.543	13	28.349		
Corrected Total	458.444	17			

Dependent Variable: Math Achievement 1st grade

a. R Squared = .196 (Adjusted R Squared = - .051)

There was no significant interaction between the number of parents in the home and the type of kindergarten program on reading achievement in first grade (p = .800).

Table 5. ANCOVA of reading achievement for first grade 96-97 Group

Source	Type III Sum of Squares	df	Mean Square	F-value	P-value
Aptitude	6.716	1	6.716	.419	.529
Parents	.566	1	.566	.035	.854
Group	2.255E-02	1	2.255E-02	.001	.971
Parents*Group	1.068	1	1.068	.067	.800
Error	208.568	13	16.044		
Corrected Total	218.000	17			

Dependent Variable: Reading Achievement 1st grade

a. R Squared = .043 (Adjusted R Squared = -.251)

There was no significant interaction between the number of parents in the home and the type of kindergarten program on math achievement in third grade (p = .920).

Table 6. ANCOVA of math achievement for third grade 96-97 Group

Source	Type III Sum of Squares	df	Mean Square	F-value	P-value
Aptitude	79.755	1	79.755	1.977	.181
Parents	5.964	1	5.964	.149	.705
Group	7.866	1	7.866	.197	.644
Parents*Group	.418	1	.418	.010	.920
Error	519.212	13	39.939		
Corrected Total	624.000	17			

Dependent Variable: Math Achievement 3rd grade

a. R Squared = .168 (Adjusted R Squared = -.088)

There was no significant interaction between the number of parents in the home and the type of kindergarten program on reading achievement in third grade (p = .694).

Table 7. ANCOVA of reading achievement for third grade 96-97 Group

Source	Type III Sum of Squares	df	Mean Square	F-value	P-value
Aptitude	76.030	1	76.030	.905	.359
Parents	28.849	1	28.849	.343	.568
Group	96.362	1	96.362	1.147	.304
Parents*Group	13.574	1	13.574	.162	.694
Error	1092.086	13	84.007		
Corrected Total	1274.444	17			

Dependent Variable: Reading Achievement 3rd grade

a. R Squared = .143 (Adjusted R Squared = -.121)

Null Hypothesis 3

For students who attended kindergarten during the 1997-1998 school year, there was not a statistical interaction between the number of parents in the home and the type of kindergarten program on math achievement and reading achievement in second grade.

The null hypothesis was retained at alpha = .01 level, as presented in Tables 8 and 9. There was no significant interaction between the number of parents in the home and the type of kindergarten program on math achievement in second grade (p = .140).

Table 8. ANCOVA of math achievement for second grade 97-98 Group

Source	Type III Sum of Squares	df	Mean Square	F-value	P-value
Aptitude	140.829	1	140.829	15.965	.002
Parents	1.174	1	1.174	.133	.721
Group	24.081	1	24.081	2.730	.122
Parents*Group	21.845	1	21.845	2.477	.140
Error	114.671	13	8.821		
Corrected Total	318.000	17			

Dependent Variable: Math Achievement 2nd grade

a. R Squared = .639 (Adjusted R Squared = .528)

There was no significant interaction between the number of parents in the home and the type of kindergarten program on reading achievement in second grade (p = .905).

Table 9. ANCOVA of reading achievement for second grade 97-98 Group

Source	Type III Sum of Squares	df	Mean Square	F-value	P-value
Aptitude	121.490	1	121.490	30.425	.000
Parents	.376	1	.376	.094	.764
Group	20.893	1	20.893	5.232	.040
Parents*Group	5.949E-02	1	5.95E-02	.015	.905
Error	51.910	13	3.993		
Corrected Total	232.944	17			

Dependent Variable: Reading Achievement 2nd grade

a. R Squared = .777 (Adjusted R Squared = .709)

Null Hypothesis 4

For students who attended kindergarten during the 1998-1999 school year, there was not a statistical interaction between the number of parents in the home and the type of kindergarten program on math achievement and reading achievement in first grade.

The null hypothesis was retained at alpha = .01 level, as presented in Tables 10 and 11. There was no significant interaction between the number of parents in the home and the type of kindergarten program on math achievement in first grade (p = .501).

Table 10. ANCOVA of math achievement for first grade 98-99 Group

Source	Type III Sum of Squares	df	Mean Square	F-value	P-value
Aptitude	4.366	1	4.366	.076	.787
Parents	64.808	1	64.808	1.125	.306
Group	9.821	1	9.821	.171	.685
Parents*Group	27.420	1	27.420	.476	.501
Error	863.729	15	57.582		
Corrected Total	1000.800	19			

Dependent Variable: Math Achievement 1st grade

a. R Squared = .137 (Adjusted R Squared = -.093)

There was no significant interaction between the number of parents in the home and the type of kindergarten program on reading achievement in first grade (p = .162).

Table 11. ANCOVA of reading achievement for first grade 98-99 Group

Source	Type III Sum of Squares	df	Mean Square	F-value	P-value
Aptitude	9.230E-05	1	9.230E-5	.000	.997
Parents	.589	1	.589	.116	.739
Group	4.594	1	4.594	.902	.357
Parents*Group	10.996	1	10.996	2.159	.162
Error	76.381	15	5.092		
Corrected Total	95.200	19			

Dependent Variable: Reading Achievement 1st grade

a. R Squared = .198 (Adjusted R Squared = -.016)

Hypotheses 5 through 7

The results of the two-way analysis of covariance with the independent variables, gender and the type of kindergarten program, and the dependent variables, math achievement and reading achievement, with the covariate aptitude are summarized in Tables 12 through 19.

Null Hypothesis 5

For students who attended kindergarten during the 1996-1997 school year, there was not a statistical interaction between gender and the type of kindergarten program on math achievement and reading achievement in first and third grades.

The null hypothesis was retained at alpha = .01 level, as presented in Tables 12 through 15. There was no significant interaction between gender and the type of kindergarten program on math achievement in first grade (p = .851).

Table 12. ANCOVA of math achievement for first grade 96-97 Group

Source	Type III Sum of Squares	df	Mean Square	F-value	P-value
Aptitude	24.280	1	24.280	.963	.344
Gender	74.128	1	74.128	2.940	.110
Group	44.683	1	44.683	1.772	.206
Gender*Group	.928	1	.928	.037	.851
Error	327.720	13	25.209		
Corrected Total	458.444	17			

Dependent Variable: Math Achievement 1st grade

a. R Squared = .285 (Adjusted R Squared = .065

There was no significant interaction between gender and the type of kindergarten program on reading achievement in first grade (p = .345).

Table 13. ANCOVA of reading achievement for first grade 96-97 Group

Source	Type III Sum of Squares	df	Mean Square	F-value	P-value
Aptitude	.117	1	.117	.008	.931
Gender	.669	1	.669	.045	.836
Group	5.131E-04	1	5.131E-04	.000	.995
Gender*Group	14.408	1	14.408	.962	.345
Error	194.666	13	14.974		
Corrected Total	218.000	17			

Dependent Variable: Reading Achievement 1st grade

a. R Squared = .778 (Adjusted R Squared = .710)

There was no significant interaction between gender and the type of kindergarten program on math achievement in third grade (p = .199).

Table 14. ANCOVA of math achievement for third grade 96-97 Group

Source	Type III Sum of Squares	df	Mean Square	F-value	P-value
Aptitude	139.062	1	139.062	4.000	.067
Gender	6.241	1	6.241	.180	.679
Group	8.905	1	8.905	.256	.621
Gender*Group	63.805	1	63.805	1.835	.199
Error	451.971	13	34.767		
Corrected Total	624.000	17			

Dependent Variable: Math Achievement 3rd grade

a. R Squared = .276 (Adjusted R Squared = .053)

There was no significant interaction between gender and the type of kindergarten program on reading achievement in third grade (p = .650).

Table 15. ANCOVA of reading achievement for third grade 96-97 Group

Source	Type III Sum of Squares	df	Mean Square	F-value	P-value
Aptitude	87.840	1	87.840	1.023	.330
Gender	3.460	1	3.460	.040	.844
Group	82.518	1	82.518	.961	.345
Gender*Group	18.481	1	18.481	.215	.650
Error	1116.110	13	85.855		
Corrected Total	1274.444	17			

Dependent Variable: Reading Achievement 3rd grade

a. R Squared = .124 (Adjusted R Squared = -.145)

Null Hypothesis 6

For students who attended kindergarten during the 1997-1998 school year, there was not a statistical interaction between gender and the type of kindergarten program on math achievement and reading achievement in second grade.

The null hypothesis was retained at alpha = .01 level, as presented in Tables 16 and 17. There was no significant interaction between gender and the type of kindergarten program on math achievement in second grade (p = .717).

Table 16. ANCOVA of math achievement for second grade 97-98 Group

Source	Type III Sum of Squares	df	Mean Square	F-value	P-value
Aptitude	82.391	1	82.391	8.782	.011
Gender	14.656	1	14.656	1.562	.233
Group	30.652	1	30.652	3.267	.094
Gender*Group	1.290	1	1.290	.138	.717
Error	121.959	13	9.381		
Corrected Total	318.000	17			

Dependent Variable: Math Achievement 2nd grade

a. R Squared = .616 (Adjusted R Squared = .498)

There was no significant interaction between gender and the type of kindergarten program on reading achievement in second grade (p = .910).

Table 17. ANCOVA of reading achievement for second grade 97-98 Group

Source	Type III Sum of Squares	df	Mean Square	F-value	P-value
Aptitude	114.481	1	114.481	28.776	.000
Gender	.586	1	.586	.147	.707
Group	19.054	1	19.054	4.789	.047
Gender*Group	5.227E-02	1	5.227E-02	.013	.910
Error	51.719	13	3.978		
Corrected Total	232.944	17			

Dependent Variable: Reading Achievement 2nd grade

a. R Squared = .778 (Adjusted R Squared = .710)

Null Hypothesis 7

For students who attended kindergarten during the 1998-1999 school year, there was not a statistical interaction between gender and the type of kindergarten program on math achievement and reading achievement in first grade.

The null hypothesis was retained at alpha = .01 level, as presented in Tables 18 and 19. There was no significant interaction between gender and the type of kindergarten program on math achievement in first grade (p = .261).

Table 18. ANCOVA of math achievement for first grade 98-99 Group

Source	Type III Sum of Squares	df	Mean Square	F-value	P-value
Aptitude	.311	1	.311	.005	.942
Gender	50.878	1	50.878	.883	.362
Group	122.729	1	122.729	2.129	.165
Gender*Group	78.706	1	78.706	1.365	.261
Error	864.661	15	57.644		
Corrected Total	1000.800	19			

Dependent Variable: Math Achievement 1st grade

a. R Squared = .136 (Adjusted R Squared = -.094)

There was no significant interaction between gender and the type of kindergarten program on reading achievement in first grade (p = .502).

Table 19. ANCOVA of reading achievement for first grade 98-99 Group

Source	Type III Sum of Squares	df	Mean Square	F-value	P-value
Aptitude	8.884E-02	1	8.884E-02	.016	.901
Gender	.297	1	.297	.053	.820
Group	4.476	1	4.476	.807	.383
Gender*Group	2.627	1	2.627	.473	.502
Error	83.244	15	5.550		
Corrected Total	95.200	19			

Dependent Variable: Reading Achievement 1st grade
a. R Squared = .126 (Adjusted R Squared = -.108)

Hypotheses 8 through 10

The results of the two-way analysis of covariance with the independent variables, absenteeism and type of kindergarten program, and the dependent variables, math achievement and reading achievement, with the covariate aptitude are summarized in Tables 20 through 27.

Null Hypothesis 8

For students who attended kindergarten during the 1996-1997 school year, there was not a statistical interaction between absenteeism and the type of kindergarten program on math achievement and reading achievement in first and third grades.

The null hypothesis was retained at alpha = .01 level, as presented in Tables 20 through 23. There was no significant interaction between absenteeism and the type of kindergarten program on math achievement in first grade (p = .502).

Table 20. ANCOVA of math achievement for first grade 96-97 Group

Source	Type III Sum of Squares	df	Mean Square	F-value	P-value
Aptitude	22.122	1	22.122	.751	.402
Absenteeism	7.829	1	7.829	.266	.615
Group	36.190	1	36.190	1.229	.288
Absenteeism*Group	14.070	1	14.070	.478	.502
Error	382.828	13	29.448		
Corrected Total	458.444	17			

Dependent Variable: Math Achievement 1st grade

a. R Squared = .165 (Adjusted R Squared = -.092)

There was no significant interaction between absenteeism and the type of kindergarten program on reading achievement in first grade (p = .357).

Table 21. ANCOVA of reading achievement for first grade 96-97 Group

Source	Type III Sum of Squares	df	Mean Square	F-value	P-value
Aptitude	3.440	1	3.440	.233	.637
Absenteeism	5.293	1	5.293	.359	.559
Group	4.509E-02	1	4.509E-02	.003	.957
Absenteeism*Group	13.462	1	13.462	.913	.357
Error	191.760	13	14.751		
Corrected Total	218.000	17			

Dependent Variable: Reading Achievement 1st grade

a. R Squared = .120 (Adjusted R Squared = -.150)

There was no significant interaction between absenteeism and the type of kindergarten program on math achievement in third grade (p = .980).

Table 22. ANCOVA of math achievement for third grade 96-97 Group

Source	Type III Sum of Squares	df	Mean Square	F-value	P-value
Aptitude	55.377	1	55.377	1.450	.250
Absenteeism	28.957	1	28.957	.758	.400
Group	4.759	1	4.759	.125	.730
Absenteeism*Group	2.484E-02	1	2484E.02	.001	.980
Error	496.423	13	38.186		
Corrected Total	624.000	17			

Dependent Variable: Math Achievement 3rd grade

a. R Squared = .204 (Adjusted R Squared = -.040)

There was no significant interaction between absenteeism and the type of kindergarten program on reading achievement in third grade (p = .853).

Table 23. ANCOVA of reading achievement for third grade 96-97 Group

Source	Type III Sum of Squares	df	Mean Square	F-value	P-value
Aptitude	74.854	1	74.854	.859	.371
Absenteeism	.814	1	.814	.009	.924
Group	95.219	1	95.219	1.092	.315
Absenteeism*Group	3.097	1	3.097	.036	.853
Error	1133.096	13	87.161		
Corrected Total	1274.444	17			

Dependent Variable: Reading Achievement 3rd grade

a. R Squared = .111 (Adjusted R Squared = -.163)

Null Hypothesis 9

For students who attended kindergarten during the 1997-1998 school year, there was not a statistical interaction between absenteeism and the type of kindergarten program on math achievement and reading achievement in second grade.

The null hypothesis was retained at alpha = .01 level, as presented in Table 24, for math achievement in second grade. There was no significant interaction between absenteeism and the type of kindergarten program on math achievement in second grade (p = .784).

Table 24. ANCOVA of math achievement for second grade 97-98 Group

Source	Type III Sum of Squares	df	Mean Square	F-value	P-value
Aptitude	65.233	1	65.233	9.080	.010
Absenteeism	43.746	1	43.746	6.089	.028
Group	10.056	1	10.056	1.400	.258
Absenteeism*Group	.560	1	.560	.078	.784
Error	93.395	13	7.184		
Corrected Total	318.000	17			

Dependent Variable: Math Achievement 2nd grade

a. R Squared = .706 (Adjusted R Squared = .616)

The null hypothesis was rejected at alpha = .01 level, as presented in Table 25 for reading achievement in second grade. There was a significant interaction between absenteeism and the type of kindergarten program on reading achievement in second grade (p = .006).

Table 25. ANCOVA of reading achievement for second grade 97-98 Group

Source	Type III Sum of Squares	df	Mean Square	F-value	P-value
Aptitude	52.071	1	52.071	24.102	.000
Absenteeism	.505	1	.505	.234	.637
Group	36.279	1	36.279	16.792	.001
Absenteeism*Group	23.423	1	23.423	10.842	.006
Error	28.086	13	2.160		
Corrected Total	232.944	17			

Dependent Variable: Reading Achievement 2nd grade

a. R Squared = .879 (Adjusted R Squared = .842)

Null Hypothesis 10

For students who attended kindergarten during the 1998-1999 school year, there was not a statistical interaction between absenteeism and the type of kindergarten program on math achievement and reading achievement in first grade.

The null hypothesis was retained at alpha = .01 level, as presented in Tables 26 and 27. There was no significant interaction between absenteeism and the type of kindergarten program on math achievement in first grade (p = .760).

Table 26. ANCOVA of math achievement for first grade 98-99 Group

Source	Type III Sum of Squares	df	Mean Square	F-value	P-value
Aptitude	6.272	1	6.272	.109	.746
Absenteeism	87.991	1	87.991	1.524	.236
Group	79.658	1	79.658	1.380	.258
Absenteeism*Group	5.610	1	5.610	.097	.760
Error	866.109	15	57.741		
Corrected Total	1000.800	19			

Dependent Variable: Math Achievement 1st grade
a. R Squared = .135 (Adjusted R Squared = -.096)

There was no significant interaction between absenteeism and the type of kindergarten program on reading achievement in first grade (p = .361).

Table 27. ANCOVA of reading achievement for first grade 98-99 Group

Source	Type III Sum of Squares	df	Mean Square	F-value	P-value
Aptitude	.481	1	.481	.095	.762
Absenteeism	8.688	1	8.688	1.711	.210
Group	13.010	1	13.010	2.563	.130
Absenteeism*Group	4.507	1	4.507	.888	.361
Error	76.148	15	5.077		
Corrected Total	95.200	19			

Dependent Variable: Reading Achievement 1st grade
a. R Squared = .200 (Adjusted R Squared = -.013)

Hypotheses 11 through 13

The results of the two-way analysis of covariance with the independent variables, gender, number of parents in the home, absenteeism, and type of kindergarten program, and the dependent variables, math achievement and reading achievement, with the covariate aptitude are summarized in Tables 4 through 27. Since a two-way

analysis of covariance was used, the means reported for hypotheses 11 through 13 were actual means and adjusted means. The adjusted mean was the expected mean if the two groups of students had entered the study with the same mean aptitude scores. Tables 28, 30, 32, 34, 36, 38, 40, and 42 depict the actual mean achievement in mathematics and reading. The information presented in tables 29, 31, 33, 35, 37, 39, 41, and 43 identify the adjusted means when the independent variables – gender, number of parents in the home, absenteeism, and type of kindergarten program – are taken into consideration.

Null Hypothesis 11

For students who attended kindergarten during the 1996-97 school year, there was not a significant difference between math achievement and reading achievement in first and third grades of at-risk students who attended extended-day kindergarten and at-risk students who attended regular kindergarten.

The null hypothesis was retained at alpha = .01 level. The experimental group had a mean of 31.67 and the control group had a mean of 29.44 for math achievement in first grade as identified in Table 28. In the adjusted means of the control group and experimental group, there was not a significance difference found in math achievement in first grade when the independent variable of gender, parents, and absenteeism were used as the second independent variable in the two-way analysis of covariance design (Table 29). As depicted in Tables 4,

12, and 20, there was not a significant difference in the adjusted means between the experimental and control groups.

Table 28. Mean achievement first grade math 96-97 Group

Group 1 (96-97)	Mean	Std. Deviation	N
Experimental	31.67	5.52	9
Control	29.44	4.90	9
Total	30.56	5.19	18

Table 29. Adjusted means first grade math 96-97 Group

Group 1 (96-97)	Independent Variables		
	Gender	Parents	Absenteeism
Experimental	31.762	31.777	32.117
Control	28.482	28.767	29.193

*Evaluated at covariates appeared in the model: Aptitude Score = 27.72.

The experimental group had a mean of 15.22 and the control group had a mean of 14.78 for reading achievement in first grade as identified in Table 30. In the adjusted means of the control group and experimental group, there was not a significant difference found in reading achievement in first grade when the independent variable of gender, parents, and absenteeism were used as the second independent variable in the two-way analysis of covariance design (Table 31). As depicted in Tables 5, 13, and 21, there was not a significant difference in the means between the experimental and control groups.

Table 30. Mean achievement first grade reading 96-97 Group

Group 1 (96-97)	Mean	Std. Deviation	N
Experimental	15.22	5.04	9
Control	14.78	1.30	9
Total	15.00	3.58	18

Table 31. Adjusted means first grade reading 96-97 Group

Group 1 (96-97)	Independent Variables		
	Gender	Parents	Absenteeism
Experimental	15.093	15.025	14.955
Control	15.082	14.950	14.852

*Evaluated at covariates appeared in the model: Aptitude Score = 27.72.

The experimental group had a mean of 32.56 and the control group had a mean of 34.78 for math achievement in third grade as identified in Table 32. In the adjusted means of the control group and experimental group, there was not a significant difference found in math achievement in third grade when the independent variable of gender, parents, and absenteeism were used as the second independent variable in the two-way analysis of covariance design (Table 33). As depicted in Tables 6, 14, and 22, there was not a significant difference in the means between the experimental and control groups.

Table 32. Mean achievement third grade math 96-97 Group

Group 1 (96-97)	Mean	Std. Deviation	N
Experimental	32.56	6.17	9
Control	34.78	6.10	9
Total	33.67	6.06	18

Table 33. Adjusted means third grade math 96-97 Group

Group 1 (96-97)	Independent Variables		
	Gender	Parents	Absenteeism
Experimental	33.077	33.118	33.132
Control	34.541	34.515	34.193

*Evaluated at covariates appeared in the model: Aptitude Score = 27.72.

The experimental group had a mean of 31.33 and the control group had a mean of 27.56 for reading achievement in third grade as identified in Table 34. In the adjusted means of the control group and experimental group, there was not a significant difference found in reading achievement in third grade when the independent variable of gender, parents, and absenteeism were used as the second independent variable in the two-way analysis of covariance design (Table 35). As depicted in Tables 7, 15, and 23, there was not a significant difference in the means between the experimental and control groups.

Table 34. Mean achievement third grade reading 96-97 Group

Group 1 (96-97)	Mean	Std. Deviation	N
Experimental	31.33	6.82	9
Control	27.56	10.24	9
Total	29.44	8.66	18

Table 35. Adjusted means third grade reading 96-97 Group

Group 1 (96-97)	Independent Variables		
	Gender	Parents	Absenteeism
Experimental	31.923	32.081	31.769
Control	27.466	27.192	27.026

*Evaluated at covariates appeared in the model: Aptitude Score = 27.72.

Null Hypothesis 12

For students who attended kindergarten during the 1997-98 school year, there was not a significant difference between math achievement and reading achievement in second grade of at-risk students who attended extended-day kindergarten and at-risk students who attended regular kindergarten.

The null hypothesis was retained at alpha = .01 level for math achievement in second grade. The experimental group had a mean of 31.56 and the control group had a mean of 35.11 for math achievement in second grade as identified in Table 36. In the adjusted means of the control group and experimental group, there was not a significant difference found in math achievement in second grade when the independent variables of gender, parents, and absenteeism were used as the second independent variable in the two-way analysis of covariance design (Table 37). As depicted in Tables 8, 16, and 24, there was not a significant difference in the means between the experimental and control groups.

Table 36. Mean achievement second grade math 97-98 Group

Group 2 (97-98)	Mean	Std. Deviation	N
Experimental	31.56	4.75	9
Control	35.11	3.18	9
Total	33.33	4.33	18

Table 37. Adjusted means second grade math 97-98 Group

Group 2 (97-98)	Independent Variables		
	Gender	Parents	Absenteeism
Experimental	31.875	32.016	31.818
Control	34.587	34.398	33.565

*Evaluated at covariates appeared in the model: Aptitude Score = 28.06.

The null hypothesis was retained at alpha = .01 level for reading achievement in second grade. The experimental group had a mean of 24.44 and the control group had a mean of 27.67 for reading achievement in second grade as identified in Table 38. In the adjusted means of the control group and experimental group, there was not a significant difference found in reading achievement in second grade when the independent variables of gender and parents were used as the second independent variable in the two-way analysis of covariance design (Table 39). As depicted in Tables 9 and 17, there was no significant difference in the means between the experimental and control groups.

Table 38. Mean achievement second grade reading 97-98 Group

Group 2 (97-98)	Mean	Std. Deviation	N
Experimental	24.44	4.30	9
Control	27.67	2.18	9
Total	26.06	3.70	18

Table 39. Adjusted means second grade reading 97-98 Group

Group 2 (97-98)	Independent Variables	
	Gender	Parents
Experimental	25.007	24.953
Control	27.145	27.171

*Evaluated at covariates appeared in the model: Aptitude Score = 28.06.

Null Hypothesis 13

For students who attended kindergarten during the 1998-99 school year, there was not a significant difference between math achievement and reading achievement in first grade of at-risk students who attended extended-day kindergarten and at-risk students who attended regular kindergarten.

The null hypothesis was retained at alpha = .01 level. The experimental group had a mean of 25.90 and the control group had a mean of 28.90 for math achievement in first grade as identified in Table 40. In the adjusted means of the control group and experimental group, there was not a significant difference found in math achievement in first grade when the independent variable of gender, parents, and absenteeism were used as the second independent variable in the two-way analysis of covariance design (Table 41). As depicted in Tables 10, 18, and 26, there was not a significant difference in the means between the experimental and control groups.

Table 40. Mean achievement first grade math 98-99 Group

Group 3 (98-99)	Mean	Std. Deviation	N
Experimental	25.90	9.17	10
Control	28.90	4.70	10
Total	27.40	7.26	20

Table 41. Adjusted means first grade math 98-99 Group

Group 2 (97-98)	Independent Variables		
	Gender	Parents	Absenteeism
Experimental	21.927	27.146	24.700
Control	28.809	28.677	28.978

*Evaluated at covariates appeared in the model: Aptitude Score = 30.60.

The experimental group had a mean of 13.60 and the control group had a mean of 14.80 for reading achievement in first grade as identified in Table 42. In the adjusted means of the control group and experimental group, there was not a significant difference found in reading achievement in first grade when the independent variable of gender, parents, and absenteeism were used as the second independent variable in the two-way analysis of covariance design (Table 43). As depicted in Tables 11, 19, and 27, there was not a significant difference in the means

Table 42. Mean achievement first grade reading 98-99 Group

Group 3 (98-99)	Mean	Std. Deviation	N
Experimental	13.60	2.59	10
Control	14.80	1.75	10
Total	14.20	2.24	20

between the experimental and control groups.

Table 43. Adjusted means first grade reading 98-99 Group

Group 2 (97-98)	Independent Variables		
	Gender	Parents	Absenteeism
Experimental	13.343	14.000	13.093
Control	14.657	15.047	14.822

*Evaluated at covariates appeared in the model: Aptitude Score = 30.60.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

Introduction

The purpose of the study was to determine if there was a significant difference in academic achievement between at-risk students who attended an extended-day kindergarten program and at-risk students who attended a regular half-day kindergarten program. Kindergarten students who were identified as being at risk during the 1996-1997, 1997-1998, and 1998-1999 school years in two similar elementary schools in Bozeman, Montana, comprised the population of this study. The students were selected based on a score from a screening device that assessed school readiness. The total score on the screening device was used as an aptitude score. Students with the lowest aptitude score from each school were identified as the at-risk students to be placed in the experimental and control groups.

In the 1996-1997 school year there were nine students identified as the control group in School A. These students attended a regular half-day kindergarten program either in the morning or afternoon session. During this year, the experimental group consisted of nine students in School B. These students attended an extended-day kindergarten in a classroom where the students were together for the entire day.

In the 1997-1998 school year there were nine students identified as the control group in School A. These students attended a regular half-day kindergarten program either in the morning or afternoon session. During this year, the experimental group consisted of nine students in School B. These students attended an extended-day kindergarten in a classroom where the students were together for the entire day.

In the 1998-1999 school year there were ten students identified as the control group in School A. These students attended a regular half-day kindergarten program either in the morning or afternoon session. During this year, the experimental group consisted of ten students in School B. These students attended an extended-day kindergarten in a classroom where the students were together for the entire day.

For each of the three groups, the effects of four independent variables – gender, number of parents in the home, absenteeism, and type of kindergarten – on the dependent variables, reading and mathematics achievement, were analyzed using an analysis of covariance design, with the covariate being aptitude. The reading and mathematics achievement of the 1996-1997 group was analyzed at the end of the students' first-grade and third-grade year of school. The 1997-1998 group's mathematics and reading achievement were analyzed at the end of their second-grade year. The mathematics and reading achievement of the 1998-1999 group were analyzed at the end of their first-grade year. Achievement was measured by the TeraNova/CTBS 5 test.

An independent t-test was first used to determine if there was a difference between absenteeism and type of kindergarten experience. The remaining hypotheses were analyzed using a two-way analysis of covariance to determine:

- if there was a significant interaction between the independent variables, number of parents in the home and type of kindergarten program, on the dependent variable, mathematics and reading achievement
- if there was a significant interaction between the independent variables, gender and type of kindergarten program, on the dependent variable, mathematics and reading achievement
- if there was a significant interaction between the independent variables, absenteeism and type of kindergarten program, on the dependent variable, mathematics and reading achievement

A covariate, aptitude, was used in each of the tests in order to equate statistically the groups. This was selected in order to explain as much variability as possible. Finally, the main effects were analyzed to find out if there was a significant difference between math achievement and reading achievement of at-risk students who attended extended-day kindergarten and at-risk students who attended regular kindergarten.

Conclusions

This study has provided evidence that supports the following conclusions, subject to the limitations of the study:

1. There was no significant difference in regard to the rate of absenteeism between the at-risk students who attended full-day kindergarten and at-risk students who attended half-day kindergarten. Therefore, it seems that the rate of absenteeism does not appear to be prevailing in either type of kindergarten program. Both programs had students who were absent for just a few days and students who had excessive absences.
2. The number of parents in the home did not have a significant effect on the variability of mathematics and reading achievement scores of students in each type of kindergarten program. Therefore, it appears that the number of parents in the home does not have an effect on the students who were in this study. While some students who came from one-parent homes were achieving at grade level in the area of mathematics and reading, other students in one-parent homes were not achieving at the expected grade level in these areas. The same results occurred with the students in two-parent homes. One could conclude that there are other factors at work, such as parents' view of the importance of education.
3. Gender had no significant effect on the variability of mathematics and reading achievement scores of students in either type of kindergarten program. It would appear that the

gender of the student does not affect the academic achievement of students in either type of kindergarten program. In reviewing the data in the students' subsequent years after kindergarten, there was not a significant difference between the males and females in regard to academic achievement.

4. Based on the results of the study, overall absenteeism did not have a significant effect on the variability of mathematics and reading achievement scores of students in either type of kindergarten program. In the second year of the study, there was a significant difference in the experimental group in regard to absenteeism and reading achievement. In examining the students' attendance record and their scores, it was discovered that four students that year had missed more than 35 days and these four students had very low reading raw scores. This data may have contributed to the significant difference. The data from these outlying students may have caused a Type I error to occur. In reviewing the raw scores of students who were achieving at grade level, some of the students from each type of kindergarten program had below the mean absentee rate and some had above the mean absentee rate. There was not a pattern showing that attendance had an effect on the student's academic achievement and the type of kindergarten program

in which the student was enrolled. With the limitation of a small number of students in each group, these few outlying students comprised a large percentage of N and could have inordinately influenced the results.

5. The results of this study showed that there was not a significant difference in the type of kindergarten program and the students' academic achievement. Regardless of the type of kindergarten program in which a student was enrolled, some made the growth needed to bring them to grade level while others continued to be at risk. There are many possible reasons why the results did not match previous research that has been conducted. One reason for these results may be that the students who continued to be at-risk had some type of learning disability. Many times learning disabilities cannot be detected until third grade or later. Another possible reason for the lack of significant difference was the factor of fatigue. Some students can handle a full day of school and continue to learn, while other students cannot. Another could have been that some students needed the on-going extended time in first, second or third grade. Some students received enough support in kindergarten in order to succeed in future years, while other students might need continual support in order to succeed at grade level. This study seems to support that all students

are unique and need different level of support in order to succeed in school.

6. This study showed that the results found in a rural community were slightly different from those found in large urban communities. Perhaps a full-day kindergarten program can make moderate differences in urban populations where students who otherwise go home to far worse home situations than those in Bozeman where the community does not have such extreme conditions. Bozeman is quite a homogeneous population.

Recommendations

The following recommendations are made based on the findings of this study:

The findings from this investigation indicate that "at-risk" kindergarten students who were in an extended-day kindergarten program did not score significantly higher in mathematics and reading than the students who attended a regular-day kindergarten program. A logical question to be asked is: Why did some students in each type of program succeed, while others did not? A recommendation would be to continue the research on the students who are still at risk. This research could include the administration of additional assessments to determine if the students have learning disabilities.

Another recommendation would be to research the home environment. There are factors not addressed in this study that could have had an effect on the results of this study. Examples of these home factors could be the educational level of the parents, the parents' attitude toward receiving an education, the amount of time the parents have to work with the student, or the stability in the home. It is recommended to conduct an in-depth study on home environment and its impact on the academic achievement of at-risk students.

An extension of this study could be to continue to offer extended time before and after school for the students in the years that follow kindergarten. This information would support the possibility that some students need continual extended time to succeed. This extended time supports the strong early interventions received in the full day kindergarten so that the students continue to grow.

Another extension to this study would be to analyze the social benefits and outcomes received from attending an extended-day kindergarten program. This study could focus on the long-term effects analyzing the students' social skills later in their formal education.

Studying the effects of rural life in communities such as Bozeman would support the question of why the results of this study did not match the same evidence found in large urban communities. Are there factors in rural communities that give some students the support they need in order to succeed or are the students considered at risk in a rural community not the students who would be considered at risk in an

urban community? It is recommended that additional research be done to discover if the at-risk students in Bozeman would be considered at-risk in a large urban community. Comparing screening devices used in urban school districts with the device used in Bozeman could possibly do this.

Finally, it is recommended that additional effort be put into examining the effects of other early intervention models, such as Reading Recovery, on the academic achievement of at-risk students in the school setting. Society needs to continue to search for programs that will successfully help at-risk students reaching the high academic standards set in the education of all students.

Based on the results of this study, it is recommend that further study be done to discover what methods of serving at-risk students is best in rural communities.

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APPENDICES

APPENDIX A

TITLE I KINDERGARTEN EARLY CHILDHOOD NEEDS ASSESSMENT

Title I Kindergarten
Early Childhood Needs Assessment

Student _____ School _____ Teacher _____

Birthdate _____ Parents _____ Phone _____

Work Habits/Social Skills Evaluation

Rating Scale: Not Yet = 0 Sometimes = 1 Most of the Time = 2

- •Takes care of own needs, responsibilities, shows independence. _____
- •Willing to try new things. _____
- •Productive and involved during work time. _____
- •Displays interest in activities. _____
- •Plays and interacts with others appropriately. _____
- •Follows directions. _____
- •Will ask questions where appropriate. _____
- •Attention span persistence and or time on task is appropriate. _____
- •Level of understanding of oral directions is appropriate. _____
- •Language skills are adequate. _____
- •Follows classroom routine without re-direction. _____

Total Points _____

Comments:

Speech/Language

Ratings based on results of the DIAL-R Screening Test administered by the Speech Clinician

Pass - Indicates +1 to -1 standard deviations below age norms (4 points)
At Risk - 1 to 2 standard deviations below age norms (2 points)
Failed - 2 standard deviations below age norms (0 points)

Total Points _____

Comments: (relevant information regarding previous testing, documents observations, or medical concerns)

Gross Motor Evaluation

Rating Scale: Not Yet = 0 Sometimes = 1 Most of the Time = 2

Stair Climbing	_____	Throwing	_____
Catching	_____	Kicking	_____
Jumping	_____	Hopping	_____

Total Points _____

Comments:

Fine Motor Evaluation

•Cutting Circle ——————————————————— _____
0 = way in or out of line 1 = some difficultly 2 = good

•Writes Name ——————————————————— _____
0 = no 1 = partial 2 = good

•Copies Shape (square) ——————————————— _____
0 = unclear 1 = some difficultly 2 = good

•Copies Word (dog) ——————————————————— _____
0 = unclear 1 = some difficultly 2 = good

•Person Drawing ——————————————————— _____
1 point each
eyes, pupil, lashes, brow, mouth, nose, ears, hair, hands, feet
1 point each for stick and 2 points for full
arms, legs, body

Total Points _____

Comments:

General Knowledge

•Color Recognition (red, blue, green, yellow, black, brown, orange, purple) — _____
0-3 colors = 0 points 4-6 colors = 1 point 7+ colors = 2 points

•Rhyme (Words which rhyme with ball, cat, run) ——————— _____
No = 0 points Yes (any portion) = 1 point Gave and heard rhyme = 2 points

•Rote Counting ——————————————————— _____
0-3 = 0 points 4-9 = 1 point 10+ = 2 points

•One to One correspondence (Mentally or physically counting five objects) — _____
no = 0 points yes = 2 points

•Numeral Recognition ——————————————— _____
0-2 numbers = 0 points 3-5 numbers = 1 point 6+ numbers = 2 points

•Letter Recognition ——————————————————— _____
0-5 letters = 0 points 5-10 letters = 1 point 11+ letters = 2 points

•Recall Story Details (Recall details from the Three Little Pigs Story) — — — _____
0-1 details = 0 points 2-3 details = 1 point 3+ details = 2 points

Total Points _____

Comments:

APPENDIX B

CURRICULUM GUIDES

Bozeman Public Schools
Kindergarten Curriculum

Communication Arts

I. Students will read to acquire, extend, and use information to perform meaningful tasks.
- 1.1 use prior knowledge to read words
- 1.2 use meaning and picture clues when reading
- 1.3 identify common signs and logos
- 1.4 recognize how print is organized and read
- 1.5 hold printed materials in the correct position
- 1.6 identify book parts: front and back covers, title, author, illustrator, title page
- 1.7 track words left to right, top to bottom, page to page
- 1.8 identify role of author and illustrator
- 1.9 recognize genres to include but not be limited to fiction, non-fiction, poetry
- 1.10 distinguish between letters and words
- 2.1 explain that printed materials provide information
- 2.2 read and explain own writing and drawings
- 3.1 identify upper and lower case letters of the alphabet
- 3.2 comprehend that letters represent sounds
- 3.3 identify beginning consonants in words
- 3.4 recognize rhyming words
- 4.1 read illustrations for meaning
- 4.2 identify words based on initial consonants and picture clues
- 4.3 predict to decode words
- 5.1 apply background knowledge to what is read
- 5.2 use pictures to make predictions about story content
- 5.3 retell familiar stories using beginning, middle and end
- 5.4 use story language in discussions and retellings
- 5.5 identify characters, setting and events

II. Students will write clearly for a variety of purposes and audiences.
- 1.1 generate ideas
- 1.2 print his/her name
- 1.3 draw pictures and/or use letters to write about experiences, stories, people, objects, or events
- 1.4 practice spelling phonetically to write about experiences, stories, people, objects, or events

2.1 appropriately use the following pronouns correctly: I, me, she, he, you, and it
2.2 express needs and wants
2.3 dictate a simple sentence
3.1 identify, recall and write initial consonants
3.2 identify high frequency words in modelled daily writing
3.3 use letters and phonetically spelled words to write
4.1 form upper case letters
4.2 form lower case letters
4.3 form numerals (0-9)

III. Students will listen and speak effectively for a variety of purposes and audiences.
1.1 listen and respond to a variety of media
1.2 listen and identify words in a rhyming pattern
1.3 follow one-step and two step directions
1.4 listen and speak in informal conversations with peers and adults
1.5 follow implicit rules for conversation: listen and take turns
1.6 use voice level phrasing sentence structure and intonation appropriate for language situation
1.7 begin to initiate conversations
1.8 participate in discussions
1.9 predict and substitute words in a rhyming pattern
1.10 sort words (orally) which have the same beginning, ending
1.11 blend sounds orally to make words
2.1 Use words to describe/name, people, places, and things
2.2 Use words to describe location, size, color, and shape
2.3 Use words to describe actions
2.4 Ask about words not understood
3.1 begin to recognize the difference between a question and a statement
3.2 listen and respond to a variety of literary forms, including stories and poems
3.3 participate in choral speaking and recite short poems, rhymes, songs, and stories with repeated patterns
3.4 participate in creative dramatics

IV. Students will view visual information critically to analyze and derive meaning.
1.1 complete simple directions
1.2 complete activities as directed
1.3 organize and obtain necessary materials

2.1 form a question
2.2 ask how and why questions in order to meet personal needs
2.3 ask questions for clarification of academic procedures and content
3.1 use available technology to enrich literacy
3.2 distinguish different types of technology

Mathematics

I. Students engage in the mathematical processes of problem solving and reasoning, estimation, communication, connections and applications and using appropriate technology.

1. use estimation strategies in all content areas.
2. develop and use a common mathematical language in all content areas.
3. begin to solve more complex problems using curriculum materials and manipulatives in all content areas.
4. relate math to daily life using all content areas.
5. use technological resources to extend mathematical learning in all content areas.
6. verbalize a mathematical problem (i.e. milk count) in all content areas.
7. use manipulates, oral, and pictorial language to express and explain a numerical situation in all content strands.

II. Students demonstrate understanding of and an ability to use numbers and operations.

1. write numerals one to ten.
2. identify numerals from one to twenty.
3. count to thirty.
4. show one to one correspondence up to 20.
5. show awareness of: counting by 1's, 2's, 5's, and 10's.
6. estimate the quantity of objects and assign a number.
7. show awareness of: ordering number sets to 10.
8. show awareness of: using concrete materials to recognize, represent and compare fractional parts of sets (1/2).
9. construct sets to explain addition, subtraction, more, less and the same.
10. show awareness of: addition, substraction, counting backwards and counting on.

III. Students use algebraic concepts, processes, and language to model and solve a variety of real-world and mathematical problems.

1. introduce the use of the balance scale to demon strate equal and unequal.
2. show awareness of common and comparative language (i.e. more than, less than and the same).
3. show awareness of +, -, =.
4. use balance scales to model equations.

IV. Students demonstrate understanding of shape and an ability to use geometry.

1. identify shapes (triangle, square, rectangle, and circle) in the real world.
2. describe attributes of four or more geometric shapes (i.e. triangles, circles, squares and rectangles).
3. show awareness of 3-D shapes, symmetry.

V. Students demonstrate understanding of measurable attributes and an ability to use measurement processes.

1. explore non-standard units of measure to estimate length, volume and weight.
2. show awareness of inch, foot and pound.
3. show awareness of instruments used to measure (i.e. ruler, clock, scale, calendar and thermometer), money, time to the hour using digital and analog clocks.
4. identify events as before and after (What?)

VI. Students demonstrate understanding of and an ability to use data analysis, probability and statistics.

1. collect, organize and describe data.
2. solve problems by using concrete examples from the classroom (i.e. attendance, lunch count and snack).
3. show awareness of sorting, classifying, sequencing data.
4. arrange data (peanuts, dinosaurs, seasons, etc.) in a sequential order.

5. discuss attributes of data (i.e. leaves, buttons, shapes, teddy bears).
6. explore concepts of chance.

VII. Students demonstrate understanding of and an ability to use patterns, relations, and functions.

1. recognize, create, extend and describe a wide variety of patterns using concrete materials and examples from everyday life.
2. show an awareness of constructing graphs.

APPENDIX C

ESTIMATED MARGINAL MEANS

Estimated Marginal Means
1996-97 Group
Reading 1st Grade
Parents

1. Grand Mean

Dependent Variable: Reading 1st

Mean	Std. Error	99% Confidence Interval	
		Lower Bound	Upper Bound
14.987[a]	.976	12.046	17.928

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

2. parent(s)

Dependent Variable: Reading 1st

parent(s)	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
1	14.803[a]	1.534	10.183	19.423
2	15.171[a]	1.214	11.514	18.828

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

3. GROUP

Dependent Variable: Reading 1st

GROUP	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
experimental	15.025[a]	1.363	10.917	19.132
control	14.950[a]	1.428	10.650	19.250

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

4. parent(s) * GROUP

Dependent Variable: Reading 1st

parent(s)	GROUP	Mean	Std. Error	99% Confidence Interval	
				Lower Bound	Upper Bound
1	experimental	14.588[a]	2.018	8.508	20.668
	control	15.018[a]	2.313	8.052	21.985
2	experimental	15.461[a]	1.804	10.026	20.896
	control	14.881[a]	1.669	9.855	19.907

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

Estimated Marginal Means
1996-97 Group
Reading 1st Grade
Gender

1. Grand Mean

Dependent Variable: Reading 1st

Mean	Std. Error	99% Confidence Interval	
		Lower Bound	Upper Bound
15.088[a]	.948	12.233	17.943

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

2. GENDER

Dependent Variable: Reading 1st

GENDER	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
female	14.888[a]	1.485	10.415	19.362
male	15.287[a]	1.172	11.756	18.819

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

3. GROUP

Dependent Variable: Reading 1st

GROUP	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
experimental	15.093[a]	1.314	11.135	19.052
control	15.082[a]	1.368	10.961	19.204

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

4. GENDER * GROUP

Dependent Variable: Reading 1st

GENDER	GROUP	Mean	Std. Error	99% Confidence Interval	
				Lower Bound	Upper Bound
female	experimental	13.705[a]	1.999	7.683	19.727
	control	16.071[a]	2.372	8.924	23.217
male	experimental	16.481[a]	1.957	10.585	22.377
	control	14.094[a]	1.783	8.724	19.463

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

Estimated Marginal Means
1996-97 Group
Reading 1st Grade
Attendance

1. Grand Mean

Dependent Variable: Reading 1st

Mean	Std. Error	99% Confidence Interval	
		Lower Bound	Upper Bound
14.903[a]	.911	12.159	17.647

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

2. Attendance

Dependent Variable: Reading 1st

Attendance	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
Below the Mean	15.461[a]	1.301	11.540	19.381
Above the Mean	14.346[a]	1.303	10.420	18.271

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

3. GROUP

Dependent Variable: Reading 1st

GROUP	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
experimental	14.955[a]	1.303	11.029	18.880
control	14.852[a]	1.305	10.920	18.783

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

4. Attendance * GROUP

Dependent Variable: Reading 1st

Attendance	GROUP	Mean	Std. Error	99% Confidence Interval	
				Lower Bound	Upper Bound
Below the Mean	experimental	16.384[a]	1.775	11.038	21.730
	control	14.537[a]	1.922	8.748	20.326
Above the Mean	experimental	13.525[a]	1.921	7.738	19.312
	control	15.166[a]	1.752	9.890	20.442

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

Estimated Marginal Means
1996-97 Group
Math 1st Grade
Parents

1. Grand Mean

Dependent Variable: Math 1st

Mean	Std. Error	95% Confidence Interval	
		Lower Bound	Upper Bound
30.272[a]	1.298	27.468	33.075

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

2. GROUP

Dependent Variable: Math 1st

GROUP	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
experimental	31.777[a]	1.812	27.861	35.692
control	28.767[a]	1.898	24.667	32.866

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

3. parent(s)

Dependent Variable: Math 1st

parent(s)	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	28.852[a]	2.039	24.448	33.257
2	31.691[a]	1.614	28.204	35.177

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

4. GROUP * parent(s)

Dependent Variable: Math 1st

GROUP	parent(s)	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
experimental	1	30.075[a]	2.683	24.279	35.871
	2	33.479[a]	2.398	28.298	38.660
control	1	27.630[a]	3.074	20.989	34.272
	2	29.903[a]	2.218	25.111	34.695

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

Estimated Marginal Means
1996-97 Group
Math 1st Grade
Gender

1. Grand Mean

Dependent Variable: Math 1st

Mean	Std. Error	99% Confidence Interval	
		Lower Bound	Upper Bound
30.122[a]	1.230	26.418	33.827

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

2. GENDER

Dependent Variable: Math 1st

GENDER	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
female	28.021[a]	1.927	22.217	33.825
male	32.223[a]	1.521	27.641	36.806

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

3. GROUP

Dependent Variable: Math 1st

GROUP	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
experimental	31.762[a]	1.705	26.626	36.898
control	28.482[a]	1.775	23.135	33.830

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

4. GENDER * GROUP

Dependent Variable: Math 1st

GENDER	GROUP	Mean	Std. Error	99% Confidence Interval	
				Lower Bound	Upper Bound
female	experimental	29.359[a]	2.594	21.546	37.173
	control	26.683[a]	3.078	17.410	35.955
male	experimental	34.164[a]	2.540	26.514	41.815
	control	30.282[a]	2.313	23.315	37.249

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

Estimated Marginal Means
1996-97 Group
Math 1st Grade
Attendance

1. Grand Mean

Dependent Variable: Math 1st

Mean	Std. Error	99% Confidence Interval	
		Lower Bound	Upper Bound
30.655[a]	1.287	26.778	34.532

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

2. Attendance

Dependent Variable: Math 1st

Attendance	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
Below the Mean	29.977[a]	1.839	24.437	35.516
Above the Mean	31.333[a]	1.841	25.786	36.880

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

3. GROUP

Dependent Variable: Math 1st

GROUP	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
experimental	32.117[a]	1.841	26.570	37.663
control	29.193[a]	1.844	23.637	34.748

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

4. Attendance * GROUP

Dependent Variable: Math 1st

Attendance	GROUP	Mean	Std. Error	99% Confidence Interval	
				Lower Bound	Upper Bound
Below the Mean	experimental	30.547[a]	2.508	22.993	38.101
	control	29.406[a]	2.715	21.226	37.586
Above the Mean	experimental	33.686[a]	2.714	25.510	41.862
	control	28.979[a]	2.475	21.524	36.434

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

Estimated Marginal Means
1996-97 Group
Reading 3rd Grade
Parents

1. Grand Mean

Dependent Variable: Reading 1st

Mean	Std. Error	99% Confidence Interval	
		Lower Bound	Upper Bound
14.987[a]	.976	12.046	17.928

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

2. parent(s)

Dependent Variable: Reading 1st

parent(s)	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
1	14.803[a]	1.534	10.183	19.423
2	15.171[a]	1.214	11.514	18.828

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

3. GROUP

Dependent Variable: Reading 1st

GROUP	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
experimental	15.025[a]	1.363	10.917	19.132
control	14.950[a]	1.428	10.650	19.250

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

4. parent(s) * GROUP

Dependent Variable: Reading 1st

parent(s)	GROUP	Mean	Std. Error	99% Confidence Interval	
				Lower Bound	Upper Bound
1	experimental	14.588[a]	2.018	8.508	20.668
	control	15.018[a]	2.313	8.052	21.985
2	experimental	15.461[a]	1.804	10.026	20.896
	control	14.881[a]	1.669	9.855	19.907

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

Estimated Marginal Means
1996-97 Group
Reading 3rd Grade
Gender

1. Grand Mean

Dependent Variable: Reading 3rd

Mean	Std. Error	99% Confidence Interval	
		Lower Bound	Upper Bound
29.695[a]	2.269	22.859	36.531

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

2. GENDER

Dependent Variable: Reading 3rd

GENDER	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
female	30.149[a]	3.556	19.437	40.860
male	29.241[a]	2.807	20.784	37.697

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

3. GROUP

Dependent Variable: Reading 3rd

GROUP	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
experimental	31.923[a]	3.147	22.445	41.402
control	27.466[a]	3.276	17.598	37.335

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

4. GENDER * GROUP

Dependent Variable: Reading 3rd

GENDER	GROUP	Mean	Std. Error	99% Confidence Interval	
				Lower Bound	Upper Bound
female	experimental	31.032[a]	4.787	16.612	45.451
	control	29.266[a]	5.681	12.155	46.377
male	experimental	32.815[a]	4.687	18.697	46.933
	control	25.667[a]	4.268	12.810	38.524

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

Estimated Marginal Means
1996-97 Group
Reading 3rd Grade
Attendance

1. Grand Mean

Dependent Variable: Reading 3rd

Mean	Std. Error	99% Confidence Interval	
		Lower Bound	Upper Bound
29.398[a]	2.214	22.728	36.068

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

2. Attendance

Dependent Variable: Reading 3rd

Attendance	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
Below the Mean	29.617[a]	3.164	20.087	39.146
Above the Mean	29.179[a]	3.168	19.636	38.723

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

3. GROUP

Dependent Variable: Reading 3rd

GROUP	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
experimental	31.769[a]	3.168	22.227	41.312
control	27.026[a]	3.173	17.469	36.584

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

4. Attendance * GROUP

Dependent Variable: Reading 3rd

Attendance	GROUP	Mean	Std. Error	99% Confidence Interval	
				Lower Bound	Upper Bound
Below the Mean	experimental	32.406[a]	4.314	19.411	45.402
	control	26.827[a]	4.672	12.754	40.899
Above the Mean	experimental	31.133[a]	4.670	17.066	45.199
	control	27.226[a]	4.258	14.400	40.052

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

Estimated Marginal Means
1996-97 Group
Math 3rd Grade
Parents

1. Grand Mean

Dependent Variable: Math 3rd

Mean	Std. Error	99% Confidence Interval	
		Lower Bound	Upper Bound
33.817[a]	1.540	29.177	38.457

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

2. parent(s)

Dependent Variable: Math 3rd

parent(s)	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
1	34.414[a]	2.420	27.125	41.703
2	33.220[a]	1.916	27.449	38.990

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

3. GROUP

Dependent Variable: Math 3rd

GROUP	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
experimental	33.118[a]	2.151	26.638	39.599
control	34.515[a]	2.252	27.731	41.300

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

4. parent(s) * GROUP

Dependent Variable: Math 3rd

parent(s)	GROUP	Mean	Std. Error	99% Confidence Interval	
				Lower Bound	Upper Bound
1	experimental	33.558[a]	3.184	23.965	43.150
	control	35.271[a]	3.649	24.279	46.262
2	experimental	32.679[a]	2.847	24.104	41.253
	control	33.760[a]	2.633	25.830	41.690

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

Estimated Marginal Means
1996-97 Group
Math 3rd Grade
Gender

1. Grand Mean

Dependent Variable: Math 3rd

Mean	Std. Error	99% Confidence Interval	
		Lower Bound	Upper Bound
33.809[a]	1.444	29.459	38.159

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

2. GENDER

Dependent Variable: Math 3rd

GENDER	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
female	33.199[a]	2.263	26.383	40.016
male	34.419[a]	1.786	29.037	39.800

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

3. GROUP

Dependent Variable: Math 3rd

GROUP	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
experimental	33.077[a]	2.002	27.045	39.109
control	34.541[a]	2.085	28.261	40.821

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

4. GENDER * GROUP

Dependent Variable: Math 3rd

GENDER	GROUP	Mean	Std. Error	99% Confidence Interval	
				Lower Bound	Upper Bound
female	experimental	29.967[a]	3.046	20.791	39.143
	control	36.432[a]	3.615	25.543	47.321
male	experimental	36.187[a]	2.982	27.203	45.171
	control	32.650[a]	2.716	24.469	40.832

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

Estimated Marginal Means
1996-97 Group
Math 3rd Grade
Attendance

1. Grand Mean

Dependent Variable: Math 3rd

Mean	Std. Error	99% Confidence Interval	
		Lower Bound	Upper Bound
33.663[a]	1.466	29.248	38.077

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

2. Attendance

Dependent Variable: Math 3rd

Attendance	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
Below the Mean	32.358[a]	2.094	26.051	38.666
Above the Mean	34.967[a]	2.097	28.650	41.283

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

3. GROUP

Dependent Variable: Math 3rd

GROUP	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
experimental	33.132[a]	2.097	26.816	39.449
control	34.193[a]	2.100	27.867	40.519

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

4. Attendance * GROUP

Dependent Variable: Math 3rd

Attendance	GROUP	Mean	Std. Error	99% Confidence Interval	
				Lower Bound	Upper Bound
Below the Mean	experimental	31.866[a]	2.856	23.264	40.467
	control	32.851[a]	3.092	23.536	42.166
Above the Mean	experimental	34.399[a]	3.091	25.088	43.710
	control	35.534[a]	2.818	27.045	44.024

a. Evaluated at covariates appeared in the model: Screening Score = 27.72.

Estimated Marginal Means
1997-98 Group
Reading 2nd Grade
Parents

1. Grand Mean

Dependent Variable: Reading 2nd

Mean	Std. Error	99% Confidence Interval	
		Lower Bound	Upper Bound
26.062[a]	.474	24.634	27.490

a. Evaluated at covariates appeared in the model: Screening Score = 28.06.

2. parent(s)

Dependent Variable: Reading 2nd

parent(s)	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
1	25.915[a]	.673	23.886	27.943
2	26.210[a]	.676	24.173	28.246

a. Evaluated at covariates appeared in the model: Screening Score = 28.06.

3. GROUP

Dependent Variable: Reading 2nd

GROUP	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
experimental	24.953[a]	.676	22.915	26.990
control	27.171[a]	.680	25.123	29.219

a. Evaluated at covariates appeared in the model: Screening Score = 28.06.

4. parent(s) * GROUP

Dependent Variable: Reading 2nd

parent(s)	GROUP	Mean	Std. Error	99% Confidence Interval	
				Lower Bound	Upper Bound
1	experimental	24.865[a]	1.001	21.848	27.881
	control	26.965[a]	.896	24.265	29.664
2	experimental	25.041[a]	.901	22.327	27.756
	control	27.378[a]	1.042	24.241	30.515

a. Evaluated at covariates appeared in the model: Screening Score = 28.06.

Estimated Marginal Means
1997-98 Group
Reading 2nd Grade
Gender

1. Grand Mean

Dependent Variable: Reading 2nd

Mean	Std. Error	99% Confidence Interval	
		Lower Bound	Upper Bound
26.076[a]	.473	24.651	27.501

a. Evaluated at covariates appeared in the model: Screening Score = 28.06.

2. GENDER

Dependent Variable: Reading 2nd

GENDER	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
female	26.261[a]	.712	24.117	28.404
male	25.892[a]	.635	23.978	27.805

a. Evaluated at covariates appeared in the model: Screening Score = 28.06.

3. GROUP

Dependent Variable: Reading 2nd

GROUP	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
experimental	25.007[a]	.682	22.953	27.061
control	27.145[a]	.678	25.102	29.189

a. Evaluated at covariates appeared in the model: Screening Score = 28.06.

4. GENDER * GROUP

Dependent Variable: Reading 2nd

GENDER	GROUP	Mean	Std. Error	99% Confidence Interval	
				Lower Bound	Upper Bound
female	experimental	25.250[a]	1.082	21.991	28.509
	control	27.271[a]	1.023	24.188	30.353
male	experimental	24.763[a]	.906	22.036	27.491
	control	27.020[a]	.892	24.333	29.707

a. Evaluated at covariates appeared in the model: Screening Score = 28.06.

Estimated Marginal Means
1997-98 Group
Reading 2nd Grade
Attendance

1. Grand Mean

Dependent Variable: Reading 2nd

Mean	Std. Error	99% Confidence Interval	
		Lower Bound	Upper Bound
26.312[a]	.384	25.153	27.470

a. Evaluated at covariates appeared in the model: Screening Score = 28.06.

2. Attendance

Dependent Variable: Reading 2nd

Attendance	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
Below the Mean	26.503[a]	.443	25.167	27.838
Above the Mean	26.121[a]	.641	24.190	28.051

a. Evaluated at covariates appeared in the model: Screening Score = 28.06.

3. GROUP

Dependent Variable: Reading 2nd

GROUP	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
experimental	24.652[a]	.506	23.129	26.175
control	27.971[a]	.607	26.144	29.798

a. Evaluated at covariates appeared in the model: Screening Score = 28.06.

4. Attendance * GROUP

Dependent Variable: Reading 2nd

Attendance	GROUP	Mean	Std. Error	99% Confidence Interval	
				Lower Bound	Upper Bound
Below the Mean	experimental	26.282[a]	.683	24.223	28.340
	control	26.723[a]	.556	25.048	28.399
Above the Mean	experimental	23.022[a]	.843	20.485	25.560
	control	29.219[a]	1.072	25.991	32.447

a. Evaluated at covariates appeared in the model: Screening Score = 28.06.

Estimated Marginal Means
1997-98 Group
Math 2nd Grade
Parents

1. Grand Mean

Dependent Variable: Math 2nd

Mean	Std. Error	99% Confidence Interval	
		Lower Bound	Upper Bound
33.207[a]	.705	31.085	35.330

a. Evaluated at covariates appeared in the model: Screening Score = 28.06.

2. parent(s)

Dependent Variable: Math 2nd

parent(s)	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
1	33.468[a]	1.001	30.452	36.483
2	32.947[a]	1.005	29.920	35.974

a. Evaluated at covariates appeared in the model: Screening Score = 28.06.

3. GROUP

Dependent Variable: Math 2nd

GROUP	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
experimental	32.016[a]	1.005	28.988	35.045
control	34.398[a]	1.010	31.354	37.442

a. Evaluated at covariates appeared in the model: Screening Score = 28.06.

4. parent(s) * GROUP

Dependent Variable: Math 2nd

parent(s)	GROUP	Mean	Std. Error	99% Confidence Interval	
				Lower Bound	Upper Bound
1	experimental	31.143[a]	1.488	26.660	35.626
	control	35.793[a]	1.332	31.781	39.805
2	experimental	32.890[a]	1.339	28.856	36.925
	control	33.004[a]	1.548	28.341	37.667

a. Evaluated at covariates appeared in the model: Screening Score = 28.06.

Estimated Marginal Means
1997-98 Group
Math 2nd Grade
Gender

1. Grand Mean

Dependent Variable: Math 2nd

Mean	Std. Error	99% Confidence Interval	
		Lower Bound	Upper Bound
33.231[a]	.727	31.042	35.419

a. Evaluated at covariates appeared in the model: Screening Score = 28.06.

2. GENDER

Dependent Variable: Math 2nd

GENDER	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
female	32.308[a]	1.093	29.017	35.600
male	34.154[a]	.976	31.215	37.092

a. Evaluated at covariates appeared in the model: Screening Score = 28.06.

3. GROUP

Dependent Variable: Math 2nd

GROUP	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
experimental	31.875[a]	1.047	28.721	35.029
control	34.587[a]	1.042	31.449	37.725

a. Evaluated at covariates appeared in the model: Screening Score = 28.06.

4. GENDER * GROUP

Dependent Variable: Math 2nd

GENDER	GROUP	Mean	Std. Error	99% Confidence Interval	
				Lower Bound	Upper Bound
female	experimental	30.659[a]	1.661	25.654	35.664
	control	33.957[a]	1.571	29.224	38.691
male	experimental	33.090[a]	1.391	28.901	37.279
	control	35.217[a]	1.370	31.091	39.343

a. Evaluated at covariates appeared in the model: Screening Score = 28.06.

Estimated Marginal Means
1997-98 Group
Math 2nd Grade
Attendance

1. Grand Mean

Dependent Variable: Math 2nd

Mean	Std. Error	99% Confidence Interval	
		Lower Bound	Upper Bound
32.692[a]	.701	30.580	34.804

a. Evaluated at covariates appeared in the model: Screening Score = 28.06.

2. Attendance

Dependent Variable: Math 2nd

Attendance	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
Below the Mean	34.468[a]	.809	32.032	36.904
Above the Mean	30.915[a]	1.169	27.394	34.435

a. Evaluated at covariates appeared in the model: Screening Score = 28.06.

3. GROUP

Dependent Variable: Math 2nd

GROUP	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
experimental	31.818[a]	.922	29.040	34.595
control	33.565[a]	1.106	30.233	36.898

a. Evaluated at covariates appeared in the model: Screening Score = 28.06.

4. Attendance * GROUP

Dependent Variable: Math 2nd

Attendance	GROUP	Mean	Std. Error	99% Confidence Interval	
				Lower Bound	Upper Bound
Below the Mean	experimental	33.372[a]	1.246	29.618	37.126
	control	35.565[a]	1.014	32.509	38.620
Above the Mean	experimental	30.264[a]	1.536	25.636	34.892
	control	31.566[a]	1.954	25.680	37.452

a. Evaluated at covariates appeared in the model: Screening Score = 28.06.

Estimated Marginal Means
1998-99 Group
Reading 1st Grade
Parents

1. Grand Mean

Dependent Variable: Reading 1st

Mean	Std. Error	99% Confidence Interval	
		Lower Bound	Upper Bound
14.524[a]	.551	12.901	16.146

a. Evaluated at covariates appeared in the model: Screening Score = 30.60.

2. parent(s)

Dependent Variable: Reading 1st

parent(s)	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
1	14.334[a]	.784	12.024	16.643
2	14.714[a]	.785	12.399	17.028

a. Evaluated at covariates appeared in the model: Screening Score = 30.60.

3. GROUP

Dependent Variable: Reading 1st

GROUP	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
experimental	14.000[a]	.779	11.705	16.295
control	15.047[a]	.779	12.751	17.344

a. Evaluated at covariates appeared in the model: Screening Score = 30.60.

4. parent(s) * GROUP

Dependent Variable: Reading 1st

parent(s)	GROUP	Mean	Std. Error	99% Confidence Interval	
				Lower Bound	Upper Bound
1	experimental	13.001[a]	.864	10.455	15.546
	control	15.667[a]	1.303	11.826	19.508
2	experimental	15.000[a]	1.306	11.151	18.848
	control	14.428[a]	.861	11.892	16.964

a. Evaluated at covariates appeared in the model: Screening Score = 30.60.

Estimated Marginal Means
1998-99 Group
Reading 1st Grade
Gender

1. Grand Mean

Dependent Variable: Reading 1st

Mean	Std. Error	99% Confidence Interval	
		Lower Bound	Upper Bound
14.000[a]	.728	11.855	16.145

a. Evaluated at covariates appeared in the model: Screening Score = 30.60.

2. GENDER

Dependent Variable: Reading 1st

GENDER	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
female	14.168[a]	1.272	10.419	17.918
male	13.832[a]	.708	11.746	15.918

a. Evaluated at covariates appeared in the model: Screening Score = 30.60.

3. GROUP

Dependent Variable: Reading 1st

GROUP	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
experimental	13.343[a]	1.244	9.678	17.008
control	14.657[a]	.764	12.406	16.908

a. Evaluated at covariates appeared in the model: Screening Score = 30.60.

4. GENDER * GROUP

Dependent Variable: Reading 1st

GENDER	GROUP	Mean	Std. Error	99% Confidence Interval	
				Lower Bound	Upper Bound
female	experimental	13.010[a]	2.357	6.064	19.956
	control	15.326[a]	.963	12.488	18.165
male	experimental	13.675[a]	.788	11.353	15.998
	control	13.988[a]	1.182	10.506	17.470

a. Evaluated at covariates appeared in the model: Screening Score = 30.60.

Estimated Marginal Means
1998-99 Group
Reading 1st Grade
Attendance

1. Grand Mean

Dependent Variable: Reading 1st

Mean	Std. Error	99% Confidence Interval	
		Lower Bound	Upper Bound
13.957[a]	.529	12.398	15.517

a. Evaluated at covariates appeared in the model: Screening Score = 30.60.

2. Attendance

Dependent Variable: Reading 1st

Attendance	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
Below the Mean	14.659[a]	.662	12.709	16.609
Above the Mean	13.256[a]	.835	10.794	15.717

a. Evaluated at covariates appeared in the model: Screening Score = 30.60.

3. GROUP

Dependent Variable: Reading 1st

GROUP	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
experimental	13.093[a]	.794	10.753	15.433
control	14.822[a]	.716	12.712	16.931

a. Evaluated at covariates appeared in the model: Screening Score = 30.60.

4. Attendance * GROUP

Dependent Variable: Reading 1st

Attendance	GROUP	Mean	Std. Error	99% Confidence Interval	
				Lower Bound	Upper Bound
Below the Mean	experimental	14.307[a]	.854	11.789	16.824
	control	15.011[a]	1.008	12.040	17.982
Above the Mean	experimental	11.879[a]	1.359	7.874	15.884
	control	14.632[a]	1.013	11.647	17.618

a. Evaluated at covariates appeared in the model: Screening Score = 30.60.

Estimated Marginal Means
1998-99 Group
Math 1st Grade
Parents

1. Grand Mean

Dependent Variable: Math 1st

Mean	Std. Error	99% Confidence Interval	
		Lower Bound	Upper Bound
27.911[a]	1.852	22.455	33.367

a. Evaluated at covariates appeared in the model: Screening Score = 30.60.

2. parent(s)

Dependent Variable: Math 1st

parent(s)	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
1	25.917[a]	2.635	18.152	33.683
2	29.905[a]	2.641	22.122	37.688

a. Evaluated at covariates appeared in the model: Screening Score = 30.60.

3. GROUP

Dependent Variable: Math 1st

GROUP	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
experimental	27.146[a]	2.619	19.427	34.864
control	28.677[a]	2.621	20.953	36.401

a. Evaluated at covariates appeared in the model: Screening Score = 30.60.

4. parent(s) * GROUP

Dependent Variable: Math 1st

parent(s)	GROUP	Mean	Std. Error	99% Confidence Interval	
				Lower Bound	Upper Bound
1	experimental	23.874[a]	2.905	15.314	32.433
	control	27.961[a]	4.383	15.045	40.878
2	experimental	30.418[a]	4.392	17.476	43.359
	control	29.393[a]	2.894	20.864	37.921

a. Evaluated at covariates appeared in the model: Screening Score = 30.60.

Estimated Marginal Means
1998-99 Group
Math 1st Grade
Gender

1. Grand Mean

Dependent Variable: Math 1st

Mean	Std. Error	99% Confidence Interval	
		Lower Bound	Upper Bound
25.368[a]	2.346	18.455	32.281

a. Evaluated at covariates appeared in the model: Screening Score = 30.60.

2. GENDER

Dependent Variable: Math 1st

GENDER	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
female	23.163[a]	4.101	11.080	35.247
male	27.572[a]	2.282	20.849	34.296

a. Evaluated at covariates appeared in the model: Screening Score = 30.60.

3. GROUP

Dependent Variable: Math 1st

GROUP	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
experimental	21.927[a]	4.009	10.114	33.740
control	28.809[a]	2.462	21.554	36.064

a. Evaluated at covariates appeared in the model: Screening Score = 30.60.

4. GENDER * GROUP

Dependent Variable: Math 1st

GENDER	GROUP	Mean	Std. Error	99% Confidence Interval	
				Lower Bound	Upper Bound
female	experimental	16.981[a]	7.597	-5.405	39.367
	control	29.346[a]	3.105	20.198	38.495
male	experimental	26.873[a]	2.541	19.386	34.359
	control	28.272[a]	3.808	17.051	39.494

a. Evaluated at covariates appeared in the model: Screening Score = 30.60.

Estimated Marginal Means
1998-99 Group
Math 1st Grade
Attendance

1. Grand Mean

Dependent Variable: Math 1st

Mean	Std. Error	99% Confidence Interval	
		Lower Bound	Upper Bound
26.839[a]	1.785	21.579	32.099

a. Evaluated at covariates appeared in the model: Screening Score = 30.60.

2. Attendance

Dependent Variable: Math 1st

Attendance	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
Below the Mean	29.072[a]	2.232	22.496	35.647
Above the Mean	24.606[a]	2.817	16.306	32.907

a. Evaluated at covariates appeared in the model: Screening Score = 30.60.

3. GROUP

Dependent Variable: Math 1st

GROUP	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
experimental	24.700[a]	2.678	16.808	32.593
control	28.978[a]	2.415	21.863	36.093

a. Evaluated at covariates appeared in the model: Screening Score = 30.60.

4. Attendance * GROUP

Dependent Variable: Math 1st

Attendance	GROUP	Mean	Std. Error	99% Confidence Interval	
				Lower Bound	Upper Bound
Below the Mean	experimental	27.505[a]	2.881	19.014	35.995
	control	30.639[a]	3.400	20.619	40.659
Above the Mean	experimental	21.896[a]	4.583	8.390	35.402
	control	27.317[a]	3.417	17.249	37.385

a. Evaluated at covariates appeared in the model: Screening Score = 30.60.

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