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## A Longitudinal Study of the Developmental Kindergarten Program in the Troy Schools, Troy, Michigan

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A LONGITUDINAL STUDY OF THE DEVELOPMENTAL  
KINDERGARTEN PROGRAM IN THE TROY  
SCHOOLS, TROY, MICHIGAN

by

Dennis H. Raetzke

A Dissertation  
Submitted to the  
Faculty of The Graduate College  
in partial fulfillment of the  
requirements for the  
Degree of Doctor of Education  
Department of Educational Leadership

Western Michigan University  
Kalamazoo, Michigan  
December 1992

A LONGITUDINAL STUDY OF THE DEVELOPMENTAL  
KINDERGARTEN PROGRAM IN THE TROY  
SCHOOLS, TROY, MICHIGAN

Dennis H. Raetzke, Ed.D.

Western Michigan University, 1992

This study evaluated the long-term effects of developmental kindergarten on reading achievement, grade retention, and special education services. Data were collected for 84 subjects from 12 participating elementary schools in Troy, Michigan. Forty-two subjects in the experimental group were matched with 42 subjects from the control group. Pairs were matched according to age within 6 months, gender, and total score on the Developmental Indicators for the Assessment of Learning-Revised (DIAL-R, Mardell-Czudnowski & Goldenberg, 1983) screening test.

Multivariate analysis of covariance, used to analyze the effects of developmental kindergarten participation on reading achievement over time, indicated no significant results between the groups. Analysis of covariance, used to measure achievement within grade levels, showed a significant difference in favor of the experimental group at the kindergarten level. Further analysis within Grades 1, 3, and 4 indicated that there was not a significant difference in reading achievement between groups.

Special education services and grade retention were analyzed using the chi-square test. Results indicate no significant

difference between groups for special education services and grade retention. The data suggest that the developmental kindergarten program had no long-term reading advantage to the subjects who participated in the program. This study analyzed only the academic portion of the program and did not consider the social/emotional variables.

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in the Troy schools, Troy, Michigan**

**Raetzke, Dennis Harold, Ed.D.**

**Western Michigan University, 1992**

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## DEDICATION

This dissertation is dedicated to  
Jon Haezebrouck.

Dennis H. Raetzke

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Only with help and encouragement can one succeed in an advanced degree program. No married person can embark upon a program without the help of his mate. My wife, Carolyn, has denied herself much on the behalf of my education. She has shouldered the major burden of our family by combining work and household duties to make it possible for me to have time to concentrate. To her, a very special tribute and appreciation are due.

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Dennis H. Raetzke

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## CHAPTER I

### THE PROBLEM

"You know also that the beginning is the most important part of any work, especially in the case of the young and tender thing" (Plato's The Republic, Jowett, 1941, p. 72).

#### Introduction

President Bush has outlined national educational goals, one of which states that all children should be ready for school when they enter. The law says that if a child is 5 by a certain date, he or she can go to school. The goal and the law are not necessarily consistent, since the law does not recognize the degree to which the child is ready to begin school.

In our society, there is a notion that getting a head start on your competitors gives you an advantage. In many situations it does. However, this is not necessarily appropriate when children are starting school. If children are not physically, socially, emotionally, and intellectually ready for the particular school situation in which they are placed, it is not an advantage. Instead, they could be starting at a disadvantage (Elkind, 1987).

Today's kindergarten does not resemble the kindergarten class of two decades ago (Egertson, 1987). There are both real and perceived pressures on parents today to have their children "ready" for

kindergarten and to hold them out if the appropriate stage of readiness has not been attained. The curricular expectations today are at least one year more difficult (Egertson, 1987). In Virginia, kindergarten teachers describe kindergarten as what first grade used to be and cite state mandates and pressure from first grade teachers and parents as reasons why kindergarten has become more academic (Walsh, 1989). Bennett (1986) stated that a survey conducted by Educational Research Services reports that 63% of the kindergarten programs focus on academic and social preparation for first grade and 50% of the districts list policies for teaching reading in kindergarten for those ready and able.

In response to these pressures, schools have established transitional classes for those who are young and unready to begin kindergarten. These transitional grades or intervention programs are known as developmental kindergartens, readiness kindergartens, or "young fives" classes. They are developed to provide extra time for development for the child before he or she enters kindergarten (Charlesworth, 1989).

These early education programs are intended to provide children an opportunity to develop before they begin the rigors of a formal educational classroom setting. Preventing learning problems from developing rather than attempting to remedy them after they have developed is an acceptable approach in education. Early intervention programs are a proactive approach to addressing the school readiness issue.

### Proactive Response

The Troy School District, Troy, Michigan, addressed the school readiness issue with a proactive developmental kindergarten program. The program provides extra time and an opportunity for the child to develop before being placed into a formal kindergarten classroom. The developmental kindergarten program in the Troy School District was designed to provide at-risk children an extra year to develop "readiness" before starting kindergarten. The Troy School District faced the problem of kindergarten readiness in the fall of 1986. When the demands of the parents for appropriate placement for kindergarten grew, the Troy School District adopted a kindergarten screening process to meet that demand. The research at that time was not clear as to what method was the most accurate. After careful analysis, the Troy School District selected a screening procedure that met their curricular demands.

Troy School District personnel developed a screening procedure for the developmental kindergarten program. The committee, consisting of early childhood specialists, administrators, and teachers, reviewed a variety of screening instruments and then decided on the Developmental Indicators for the Assessment of Learning-Revised (DIAL-R) instrument (Mardell-Czudnowski & Goldenberg, 1983). The DIAL-R test was selected because it was closely aligned to the established kindergarten curriculum in the Troy School District. The committee then developed a district cut-off score for entrance to the developmental kindergarten program that was appropriate for the

school district population.

Appropriate screening information allowed school district personnel to make intelligent decisions about the placement of children. The evaluation procedure helped clarify which children were at-risk and needed additional services. Troy School District administrators, teachers, and early childhood specialists adopted the position that this process was a positive intervention for those children.

This study hypothesized that the developmental kindergarten program in the Troy School District is a positive intervention in the lives of those involved in the program. It was designed to discover if children who participated in the developmental kindergarten program received a positive long-term advantage in reading achievement compared with children who did not participate in the developmental kindergarten program. Specifically, this study constituted a comparison of participants in the developmental kindergarten with nonparticipants in the areas of reading achievement, special education placement, and grade retention.

#### Definition of Terms

Developmental kindergarten: An educational program that provides additional experiences to those children who have been identified as at-risk for entering kindergarten. These programs precede a regular year of kindergarten (Meisels, 1987).

Grade retention: Spending more than one academic year in a particular grade.

Purposive sampling: A nonprobability sampling which is characterized by the use of judgment and a deliberate effort to obtain representative samples by including presumably typical areas or groups in the sample (Kerlinger, 1973).

Rate of gain: The ratio of the actual gain to the expected gain as measured by norm-referenced tests.

At-risk: Those students who are unable to graduate from high school or who are unlikely to leave school with an adequate level of basic skills because of such factors as: low achievement, retention in grade, behavior problems, poor attendance, low socioeconomic status, developmental lags, or the lack of social/emotional skills to function semi-independently in a group setting such as a kindergarten classroom (Slavin, Karweit, & Madden, 1989).

#### Background of the Problem

Kindergarten was originally a year of informal education designed to form a bridge from home to more formal schooling in the elementary grades (Hill, 1987). Until the 1960s, the education of young children was not regarded as a significant enterprise (Elkind, 1987). Elkind reported that in 1966, 60% of 5-year-olds attended kindergarten, while in 1985, 82% of 5-year-olds were attending kindergarten programs. In 1965, only 25 states provided aid for public kindergarten programs and by 1985 all 50 states were providing some form of public support for kindergarten and prekindergarten programs.

The many factors influencing a shift in kindergarten policy have arisen from social and educational movements of the last 30 years. The American family size, structure, and values have changed dramatically over the years (Gullo, 1990). The efforts of the 1960s to ensure equality of education for all groups have changed to reflect the pressure by parents and educators of the 1990s to have children become more competitive and computer literate (Golant & Golant, 1990).

The differences between today's kindergarten and that of the 1970s are the result of incremental changes in response to pressures which continue to be felt by schools and parents. The changes in kindergarten over the last 20 years have been so far reaching that one can hardly find evidence of the original purposes for its development in many schools. The curricular expectations are at least one year more difficult (Egertson, 1987).

At some time around age 5, parents and educators expect the formal education process to begin. Children generally move through the educational process with classmates who are approximately the same age. Bracey (1989), however, reported a trend among parents to postpone enrolling children in kindergarten if those children would be the youngest in the class. There was a sense that these children were not ready to start the formal educational process.

Until recently, failure prevention for potential high-risk students focused primarily on children from lower socioeconomic levels who might not have the necessary background experiences for school success and on children with special needs due to learning

disabilities, hearing or visual impairments, or other handicapping conditions that might hinder their potential for learning (Charlesworth, 1989). Charlesworth stated that during the 1980s there was a trend toward identifying high-risk children at all socioeconomic levels who may not be ready for kindergarten. Instead of serving as a readiness function in terms of socializing children for future schooling, kindergarten became an experience for which children need to be ready when they arrive at school (Smith & Shepard, 1987).

The question of when to start school is a controversial one that has existed for some time. To cope with this controversy, school districts use screening tests which determine whether a child is ready for kindergarten. Among these, according to Diamond (1990), are the Developmental Indicators for the Assessment of Learning-Revised (DIAL-R), the McCarthy Screening Test, the Early Screening Inventory, and the Revised Denver Developmental Screening Test. These screening instruments are designed to identify children who may need early intervention or who might profit from a modified classroom program (Meisels, 1987).

One test used for screening is the Metropolitan Readiness Test (Bredekamp & Shepard, 1989). Bredekamp and Shepard reported this test to be between 70% and 78% valid in predicting how a child will perform in the first year. These percentages are high when the test is used for instructional planning or program evaluation as intended by the authors, but nearly one-third of the children would be misidentified as unready when it is used for kindergarten placement.

In order to accommodate children identified as not ready for kindergarten, school districts have established intervention programs to make the transition to formal schooling smoother. These transition classes have many names, such as prekindergarten, developmental kindergarten, young fives, and prefirst grade. The intent is to hold these children back in order to give them time to prepare and mature before they began the rigors of kindergarten or first grade (Bredekamp & Shepard, 1989).

McDermott (1984) reported that children be assessed prior to school entry with the focus on observable learning-related behaviors that are immediately translatable into educational skills training or instructional intervention. Rather than relying on intelligence tests and personality traits, early educational assessment and remedial programs should be based upon skills that actually define success in the learning process. Developmental screening of children's learning patterns provides an opportunity to view and assess young children's abilities, problem solving competencies, and social-emotional sets (Mardell-Czudnowski & Goldenberg, 1983).

The results of the long-term studies of children who attended Head Start (Schweinhart & Weikart, 1986) and other experimental early childhood education programs (Lazar & Darlington, 1982; Schweinhart & Weikart, 1985) show academic and personal success and cost effectiveness and support increasing the numbers of programs for prekindergartens. State funded programs for prekindergartens have been in place in New York, California, Pennsylvania, and New Jersey for more than 10 years (Charlesworth, 1989). A cost



effective system that could inform educators about the range of children's development so that appropriate programs could be planned and implemented is needed (Judy, 1986).

### Need for the Study

During the past decade, there has been a movement to change the structure of kindergarten readiness (Elkind, 1986; Gullo, 1990; Steinberg, 1990). Policy decisions about whether to have full-day or half-day kindergartens, developmental kindergartens, early five program, transition classes, to start school before age 5, or even to use screening tests were made with limited field research data. The issues of whether to utilize screening tests and if extra-year programs have a positive long-term effect are not well defined in the literature (Charlesworth, 1989). The controversies of the debate over how to determine who is ready for school are not clearly resolved as will be further illustrated in the review of the literature to follow.

According to Elkind (1986), schools miseducate children when they place them at-risk before they are ready for formal education. The risks of starting school before children are ready poses short- and long-term risks for them. The short-term risks are derived from the stress that formal education places on children. The long-term risks are: (a) motivational, (b) intellectual, and (c) social (Elkind, 1986). Elkind stated that, in each case, the potential psychological risks of early intervention far outweigh any potential educational gain that children might receive by starting school

before they are ready.

High quality early educational programs are likely to benefit both low-income children and the larger society. Some of the benefits are: (a) reducing the number of children in later costly special education programs in schools, (b) helping children avoid grade failure, (c) increasing children's mathematics achievement scores at fourth grade, and (d) improving IQ scores at least up to age 13 (Lazar & Darlington, 1978).

Research conducted in relation to actual problems and under the conditions in which they are found in practice is done through applied research (Ary, Jacobs, & Razavieh, 1985). Ary et al. stated that educators depend upon basic research for the discovery of the more general laws of learning, but applied research must be conducted in the classroom. This approach is essential if scientific changes in educational practices are to be effective.

Most educational research is applied research because it attempts to develop generalizations about the teaching-learning process and instructional materials (Best, 1977). Since the late 1930s, there has been great interest in education in what is called action research. Best stated that action research is focused on the immediate application and its emphasis is on a problem in a local setting. This type of research is considered when researching educational problems in actual educational settings (Sowell & Casey, 1982).

Using a local setting, the Troy School District, Troy, Michigan, this research investigated whether the developmental

kindergarten program in the Troy School District had an impact on the learning process for those children involved in the program. The pretest-posttest control group design was used because of the strong internal validity, the limited interaction of testing effect, and the limited interaction of selection effect (Campbell & Stanley, 1963). Campbell and Stanley stated that for research on teaching this design can be used.

The Troy School District screened (pretest) approximately 1,400 entering kindergarten students before the start of the 1986-1987 and 1987-1988 school years. These students represented all 12 elementary schools in the district. Students who scored below the cut-off score were recommended to enroll in the developmental kindergarten program (experimental group). Students not in the program (control group) were matched with the experimental group according to age within 6 months, DIAL-R score, sex, and school for comparison. Standardized tests (Iowa Test of Basic Skills, 1982, and Michigan Educational Assessment Program-Reading, 1990) were used as the post-test.

The Troy School District developmental kindergarten program was designed to serve students before they enter kindergarten. The student teacher ratio is 15:1 and the curriculum is developmentally appropriate according to the early childhood specialists involved with the program. The teachers are all qualified in early childhood development and have experience with this age group. Students progress to kindergarten after experiencing the developmental kindergarten program.

Since one researcher with limited time and resources cannot study the entire target population, appropriate research conducted in one district is acceptable (Borg & Gall, 1989; Bracht & Glass, 1968). Kempthorne (1961) recommended that it is better to have reliable knowledge about restricted sets of circumstances (i.e., what happens in a school district) and to have the uncertainty of extending this knowledge to the target population than to define the experimentally accessible population so broadly as to be uncertain about the inferring from the sample to the accessible population. Bracht and Glass (1968) stated that the degree of confidence with which a researcher can generalize to the target population is never known because the researcher is never able to sample randomly from the true target population. Therefore, the Troy School District was selected for study because of the limited time and resources and the reasonably reliable knowledge about the school district by the researcher.

Much of the research in the literature focused on age, retention, lower income groups, and poor screening instruments. Studies to date were not of multimethod multimeasure longitudinal design as is the case in the Troy study. The Troy School District study is different from the other studies in that the study investigated a suburban school district which used a screening test prior to entering kindergarten. In addition, it is a longitudinal field research study.

The importance of identifying at-risk children before they enter school is now based on solid evidence showing early

identification coupled with remedial assistance at the preschool level can help reduce the risk of subsequent grade retention (Becker & Gersten, 1982; Darlington, 1981; Lazar & Darlington, 1982). Distinguishing at-risk children from their more successful peers is a concern that educators have when placing students into appropriate programs (Simner, 1983). Specifically, this study is important to education and educators for the following reasons:

First, there are a number of national panels, work groups, and task forces exploring ways to meet the President's Goal 1 by the year 2000, that all children will enter school ready to learn. The National Educational Goals Panel is focussing attention on how to measure children's readiness for school and assess progress toward improving it (Cohen, 1992).

The Troy School District study results will provide information for this issue. Identification of a useful active program could be beneficial for other school districts seeking ways to meet the national goal of school readiness. The results of the Troy School District's developmental kindergarten program will lend itself to this identification process for a model readiness program.

Second, the Troy School District developmental kindergarten program is unique because it is a proactive attempt to deal with at-risk children before they experience failure and retention. The design of a proactive program according to Uphoff (1990a) should meet six established criteria. The six criteria are:

1. The extra-year program comes before personal failure is experienced by the individual child.

2. Parents participate fully in supporting and gathering data, and act as the final decision makers regarding enrollment.

3. Nontracking, flexible exit and progression policies are available and in use, again with parents actively involved in these major decisions.

4. Small class size (usually 12-15) is maintained.

5. A developmentally appropriate curriculum is the basis for learning experiences in the program. This means limited whole-group paper-pencil sit-still type of work, maximum choice, movement, manipulatives, and active opportunities to learn.

6. Parents and professionals have data from multifactored assessments. (pp. 19-20)

The Troy School District developmental kindergarten program meets the six standards established by Uphoff (1990).

If preschool children who are at-risk are identified and placed in appropriate compensatory education programs before starting school, the chances of these children failing can be reduced. However, because of budget constraints many school districts do not do an adequate job in this area. Consequently, some children are misplaced (Simner, 1988).

A third reason this study is important to education and educators is that a review of the literature shows a limited number of longitudinal studies using screening tests to determine school readiness. The Troy School District study is unique because a screening method to determine school readiness for kindergarten was developed and utilized while this was not done in other studies. This screening process occurs before entering kindergarten.

Fourth, much of the review of the research describes studies that dealt with low income or minority populations. The problem of low achievement is by no means restricted to low income or minority students. More than 10% of economically advantaged students lack the ability to read popular magazines, and only half have the reading skills necessary to read most newspaper stories or popular novels (Slavin et al., 1989). Since there are at-risk students in middle and upper income populations, the Troy School District study will add evidence on extra-year programs for this group.

Fifth, the screening process used for Troy schools may help identify at-risk preschoolers at an acceptable rate and, therefore, provide supporting evidence about whether the program should be continued. This is important information for local administrators to have when considering the status of extra-year programs and is an appropriate application of field based action research and evaluation.

#### Purpose of the Study

The purpose of this study was to evaluate the long-term effects on at-risk students who participated in a developmental kindergarten program on reading achievement in kindergarten, Grade 1, Grade 3, and Grade 4 in the Troy School District.

#### Assumptions of the Study

Transitional programs are designed to provide another year of school for children who are predicted not to do well (Brewer, 1990).

These transitional programs view learning activities as appropriate for children when they match the child's cognitive developmental level and when the curriculum is child-centered (Bredekamp, 1987). This study used a representative design that reflects a real life environment in which learning occurs and the natural characteristics of the learner increases the generalizability of the findings (Borg & Gall, 1989).

### Limitations of the Study

There are certain limitations that must be taken into account when considering the results of this study. They are:

1. This study was limited to the Troy School District, Troy, Michigan, and the results are limited to this district. The results of this study should not necessarily be expected to provide specific answers, but to provide direction for further inquiry.

2. The research in this study was limited to the academic portion of the developmental kindergarten program. Behavior and attitudes of the subjects were not considered.

3. The results of this study are limited to suburban school districts that do not have a large minority population.

4. The subjects were matched on developmental age and not on chronological age. This does not allow for perfectly matched pairs.

5. The developmental kindergarten program in the Troy schools is a voluntary program. The parents of those students who score below the cut-off score can choose to place their child into the developmental kindergarten program. Some parents who had a child



scoring below the cut-off score chose not to participate in the program. This should be considered when interpreting the results.

### Summary

Children start school at different stages of developmental readiness. Most children start school around age 5, but this does not mean they are necessarily ready to start school. The National Educational Goals 2000 (U.S. Department of Education, 1992) state that all children should be ready for school when they enter. School professionals are trying to develop methods to determine school readiness.

National panels and study groups are looking for solutions to the school readiness issue. They search for model readiness programs, data about screening for readiness, and data on which to base their policy decisions. Longitudinal studies, such as this one, provide data about programs that have an effect on student achievement over time.

The Troy School District developmental kindergarten program is proactive, uses a screening test before entering kindergarten, and is a developmentally appropriate approach to reaching at-risk students before they enter kindergarten. This model program may provide data to national panels, which will allow them to make policy decisions about school readiness based on field research. The general focus of this study was to determine if the developmental kindergarten program in the Troy School District has any long-term positive effect on the achievement of students who participated in

the program.

The format for the study has been presented in Chapter I, which covers the rationale, purpose, need for the study, definition of terms, and limitations of the study.

## CHAPTER II

### REVIEW OF THE LITERATURE

The purpose of this study was to determine the long-term effects of participation in a developmental kindergarten program on students' reading achievement in kindergarten, Grade 1, Grade 3, and Grade 4 in the Troy School District.

#### Introduction

The national debate over how to best serve primary grade children in America's schools continues in professional journals, conferences, and the public press. This national debate centers around when and how children start school (Uphoff, 1990a). At the center of the controversy is the concept of extra-year programs such as prekindergarten or developmental kindergarten. Prekindergarten programs are typically for children from low socioeconomic households and for exceptional children; but more typical, children from higher economic levels may enroll in these types of programs than enroll in a Head Start program (Charlesworth, 1989).

In most public schools, the sole criterion for admission to school is chronological age as of a specified school calendar date. This requirement has been criticized for failing to take into account differing rates of cognitive and emotional development among children that may affect their school performance. There is no

uniform standard for the age requirement and the birth date criterion may vary from one school district to another (Reinherz & Kinard, 1986).

Fulghum (1986), in his book All I Really Need to Know I Learned in Kindergarten, praised the value of kindergarten. His focus of attention was on the importance of the traditional kindergarten. Today's kindergarten is in a state of controversy concerning such questions as: What is the optimal age for a child to enter kindergarten? What should be the kindergarten curriculum? Has kindergarten become too academic? What is the value of prekindergarten? What does it mean to be ready for kindergarten?

### Testing of Young Children

Testing for readiness is a common practice for school systems. School systems use various types of tests to assess children prior to kindergarten, during the kindergarten year, and at the end of the year. Three common tests used are developmental screening, readiness, and standard achievement (Freeman, 1990). According to the National Association for the Education of Young Children (NAEYC, 1988), these can be defined as follows:

Achievement test: a test that measures the extent to which a person has mastery over a certain skill after instruction has taken place.

Readiness test: assessment of a child's level of preparedness for a specific academic or preacademic program.

Screening test: a test used to identify children who may be in need of special services, as a first step in

identifying children in need of further diagnosis.  
(p. 45)

The testing of young children has come under attack in recent years. Professional organizations such as NAEYC (1988) and the National Council of Teachers of English (NAECTE, 1990) have issued statements against the use of standardized norm-referenced tests in kindergarten. Meisels (1987) described the dangers of labeling children and determining their placement based on test scores that have limited reliability and validity.

The use of testing has led to decisions regarding the placement of children. When testing occurs prior to the beginning of kindergarten, the results may be used to determine whether children are ready to begin kindergarten. If it is determined that they are not ready, children usually wait a year, or enter a prekindergarten program sometimes called developmental kindergarten (Freeman, 1990). Freeman stated that there appears to be widespread acceptance of this practice.

### Cognitive and Emotional Development

Children who begin school together but differ in age by several months may differ in readiness for school work. This applies especially to boys who are known to develop more slowly than girls in the early years and who tend to encounter more difficulty in the primary division in school (DiPasquale, Moule, & Flewelling, 1980). Donofrio (1977) stated that a July to December birth date, by itself or in conjunction with factors such as maleness and hyperkinesis, is

a common cause of inadequate school performance.

Reinherz and Kinard (1986) studied 488 fourth graders in a public school system of a predominantly white working class community near a major northeast city to determine birth date effects on school performance and adjustment over time. The students in the study had been in the same school system from kindergarten through fourth grade. The findings showed differences among the age groups on early cognitive ability, with the youngest age group having the lowest scores on information processing skills and the oldest age group having the highest scores.

In this study, information processing was significantly correlated with all the measures of school performance at the third grade level. The measures that were significant were: parent ratings of overall achievement at third grade ( $p < .001$ ); teacher ratings of reading ( $p < .001$ ); arithmetic ( $p < .001$ ); and overall achievement at the third grade ( $p < .001$ ). At the fourth grade level, the information processing scores were also significant for reading ( $p < .001$ ), mathematics ( $p < .001$ ), language ( $p < .001$ ), and achievement test scores ( $p < .001$ ). The results suggested that the use of chronological age as the only eligibility criterion for school entry may result in some children being admitted to school who are not cognitively or emotionally ready.

Given similar levels of intelligence, males with summer birth dates tended to be advantaged academically by postponing kindergarten entrance one year. That advantage was greatest in the area of reading. Males who entered kindergarten at age 6 scored

significantly ( $p = .01$ ) higher on reading in fifth or sixth grade than did males who entered kindergarten at age 5. Summer birth date females who postponed kindergarten entrance one year were not significantly advantaged at the .05 alpha level in reading or mathematics, but were generally at an advantage ( $p < .10$ ) compared with their 5-year-old counterparts, as indicated by composite battery scores on standardized tests (Crosser, 1991).

#### Increased Number of Kindergartens

The social explosions of the 1960s effectively changed our conception of out of home programs and of children's readiness to cope with such programs. In 1960 only 60% of 5-year-olds attended kindergarten, while in 1985, 82% of 5-year-olds attended kindergarten. Only 25 states provided aid for public kindergartens in 1965, while in 1985, all 50 states were providing some form of public support for kindergarten and prekindergarten programs (Elkind, 1987).

#### Programs for At-Risk Kindergartners

Slavin et al. (1989) stated there are three major types of programs for students at-risk: (1) compensatory or other remedial programs, (2) special education programs, and (3) general education. Compensatory education refers primarily to federal programs targeted toward low achieving, disadvantaged students. Special education programs are focused toward students who have identified handicaps. General education programs that reach at-risk students are tracking, cooperative learning programs, and class ability grouping.

Two federally funded programs targeted for at-risk students are Head Start and Chapter I (Slavin et al., 1989). The evaluations of the effectiveness over time for these programs have been mixed. A major finding with many of the Head Start and Chapter I programs has been that participating students tested in kindergarten and first grade showed few, if any, lasting academic gains. It is important, however, to note that some individual Head Start and Chapter I programs have been successful (Slavin et al., 1989).

Another approach to addressing at-risk kindergartners is the trend to full-day kindergarten classrooms. Full-day kindergarten programs seem most effective on short-term measures for disadvantaged populations. There are no long-term effects demonstrated for attendance at full-day kindergartens (Slavin et al., 1989). Only one study (Nieman & Gastright, 1981) reviewed by Slavin et al. found positive long-term effects of the full-day kindergarten classroom.

#### Older Versus Younger Children

Students who do not start school with their same age cohorts are the oldest in their kindergarten group when they do start school. Several studies concerned with younger children versus older children imply that older children have an academic advantage in school. Baer (1958) compared achievement of students representing the youngest 2 months and the oldest 2 months of an entrance class. He reported that the older group outperformed the younger group on some measures, but the younger group did make average progress.



Green and Simmons (1962) compared an older aged group to a younger aged group and found that the older aged group's achievement was higher than the younger aged group. Children who are youngest in their class are more likely to repeat a grade (Langer et al., 1984; Uphoff & Gilmore, 1985) or to be labeled as learning disabled (Diamond, 1983; Maddux, 1980). DiPasquale et al. (1980), in a study of 552 subjects in Grades kindergarten through 13, reported that younger children are significantly ( $p = .05$ ) more likely to be referred to psychological services for academic problems in the primary grades than are older children.

Davis, Trimble, and Vincent (1980) used a sample size of 17,000 first graders, 17,500 fourth graders, and 19,450 eighth graders to determine whether there was a significant difference between the achievement test scores of students who entered first grade as 5-year-olds and those who entered as 6-year-olds. Test scores for reading, language, mathematics, and total battery on the Comprehension Test of Basic Skills (CTBS) were analyzed. Raw scores were used to determine how students differ on achievement in Grades 1, 4, and 8. Several conclusions were apparent to Davis et al. They were:

1. Age of entrance into first grade is related to achievement at the first grade level as measured by the Comprehension Test of Basic Skills. Students who entered first grade at age 6 scored higher than students who entered first grade at age 5.
2. Entrance age into first grade is also related to achievement at the fourth grade level. Again, students who entered first

grade at age 6 scored higher than students who entered at age 5.

3. Age of entrance into first grade is related to eighth grade achievement in only one area--reading. The other three scores considered in this study, language, mathematics, and total achievement, resulted in differences between 5-year-old and 6-year-old entrants which were too small to conclude that they were significant to the degree of probability used in this study ( $p = .05$ ).

### Proactive Studies

#### Transition Rooms

Children who are held back before kindergarten are often placed in a transitional program. This extra year transition program before kindergarten is designed to prepare students and to lower the risk of failure in school. Transition classes have merit and well designed programs greatly reduce the suffering of misplaced children (Uphoff, 1990a). Uphoff indicated that the debate over extra-year programs has actually hindered the progress toward the goal of appropriate education for children.

#### Proactive

Solem (1981) reported that the Sioux Falls (South Dakota) School District offered a junior-first-grade program since 1970. There were 75 students enrolled in the program the first year. The results of a study of this program reported in May 1978 showed that 25% of the former junior-first-grade enrollees ranked in the top

quartile, 25% in the lowest quartile, and 50% ranked in the second and third quartile. In May 1980, 28% of the former junior-first-grade participants ranked in the top quartile, 70% ranked in the second and third quartile, and 2% ranked in the lowest quartile. This change suggests that the junior-first-grade transition room does help children to succeed in first grade. These at-risk children have had a chance to experience success within their school environment.

Kilby (1984) conducted an evaluation of the Sioux Falls junior-first-grade program in 1982. A total of 473 students had gone through the program in the 12 years since its inception. Evaluation findings indicated that the program may have had a positive impact in three main areas: reading achievement, placement in special education for learning disabilities, and grade retention.

When fourth grade reading scores on the Iowa Test of Basic Skills (ITBS) were compared with program participants and eligible nonparticipants, those in the program exceeded their counterparts. This trend appeared again when program participants were compared with those students who were ineligible for the program. These findings suggest that reading instruction received in the junior-first-grade program may have had a positive and long lasting effect on the reading skills of those students who attended the program.

The findings also indicate fewer junior-first-grade students being placed into learning disabilities programs than their counterparts. Two years following the junior-first-grade program, only 11% of the participants, as opposed to 32% of their counterparts, had

been placed in programs for the learning disabled. This trend continued over time with 14% of former program participants compared with 42% of their counterparts being placed into special education programs.

Grade retention was also lower for junior-first-grade program participants than their counterparts. Only 0.1% of the junior-first-grade participants had to repeat a grade. This compares to an average of 27% of their counterparts who repeated one grade and an average of 13% who repeated two grades. The Sioux Falls program results suggest that the program had a positive and long lasting effect.

Mahalak and Peper (1992) conducted a longitudinal study of the early fives program in Farmington, Michigan. There were 501 subjects in the study. The results indicated that the early fives program had a positive effect on those enrolled in the program.

Ten measures were studied in the Farmington School District report. They were the Iowa Test of Basic Skills (ITBS) scores, cognitive Abilities Test (COAT) scores, Michigan Educational Assessment Program (MEAP) scores, retentions, learning center placements, special education placements, third to sixth grade report cards, seventh grade report cards, parent surveys, and staff surveys. There were significant results on the areas of ITBS scores ( $p = .05$  vocabulary and reading,  $p = .001$  total mathematics), COAT scores ( $p = .01$  verbal), retentions ( $p = .001$ ), learning center placements ( $p = .05$ ), 7th grade report cards ( $p = .01$  language arts,  $p = .05$  mathematics), parent survey (95% positive replies), and staff survey

(78% positive replies). These results implied a positive long-term effect for the students who participated in the program.

### Reactive Studies

#### Extra Year

Research also indicates that extra-year programs and the oldest versus youngest concept has no significant advantage. There is research evidence that suggests it is the relative age of a child compared to his or her classmates and not the absolute chronological age of a child that matters when standardized achievement is used as the outcome measure.

Shepard and Smith (1986) reported that raising the cut-off date for entrance to school to allow for older students is ineffective. Policy changes to require children to be older before starting school only shifts the documented disadvantage in early grades to a different set of children whose birth date falls near the new cut-off date. Raising the entrance age would provide only a temporary solution to the youngness problem. In a district with a September 1 cut-off, children with summer birthdays are deficient compared to their classmates according to Shepard and Smith. If the district responds by adopting a July 1 cut-off, in a short time normative comparisons will readjust and children with May and June birthdays will be at-risk.

In a study with a sample size of 97,000 Caucasian and Black students, the age of entrance accounted for less than 1% of the

variance in achievement at ages 9, 13, and 17 (Langer et al., 1984). When the young and old groups were compared on all achievement subtests, the older group had higher achievement on 28 of 29 tests, but only four tests were significant at the .05 level. The results for Caucasians and Blacks paralleled each other with respect to relative age and class age. Langer et al. noted that the statistically significant ( $p = .05$ ) relationship between age of entrance and achievement at age 9 disappeared when achievement at age 17 was examined.

A number of research studies indicate the disadvantage of youngness eventually disappears, usually by about third grade. Miller and Norris (1967) found that a difference between the oldest and youngest children on readiness measures was no longer apparent at the end of second, third, or fourth grades. Shepard and Smith (1986) found no difference in mathematics achievement or in reading achievement between the oldest and youngest children in either the third or fourth grade. Bickel (1991) reported that the correlation between age of entrance and achievement is modest at first grade and no longer significant ( $p = .05$ ) 4 years later. Age of entrance to first grade seemed to make no important difference with respect to school success. Studies indicate that extra-year programs at best have no lasting effect and, at worst, have many negative effects such as poor school performance and a higher incidence of school dropout (Freeman, 1990; Shepard & Smith, 1986).

### Summary

In summary, the review of the literature has demonstrated a mixed review of findings for school readiness. The national debate about when children should start school has been in the educational forum for some time. In most schools, however, the sole criterion for entering school is chronological age as of a specified school calendar date.

Testing children for school readiness is a common practice for some school systems. Three common tests are used. They are: (1) developmental screening tests, (2) readiness tests, and (3) standard achievement tests. Unless these test results are used properly, children may be misplaced or labeled incorrectly during their school years.

Children grow and develop differently. Boys tend to develop more slowly than girls, and boys tend to encounter more school problems than girls in the early grades. Children may begin school together, but the readiness gap may be several months apart. Children with summer birth dates or children who are the youngest in a group seem to encounter more educational problems than do older children.

Kindergartens are common in most states. Many states provide support for kindergarten and prekindergarten programs. There are three major types of programs for at-risk students when they enter school. They are: (1) compensatory or other remedial programs; (2) special education programs; and (3) general education programs, such

as tracking, cooperative learning, and class ability grouping (Slavin et al., 1989).

Head Start, Chapter I, and developmental kindergarten programs were developed to reach at-risk children before they start school. These programs are a proactive approach to the school readiness issue. The long-term lasting effect these programs have on student achievement is mixed in the review of the literature.

Given the mixed research findings in the literature, the uniquely different profile of the Troy School District in comparison to other populations studied, and the support the developmental kindergarten program in the Troy schools has received over the past few years, a study to evaluate the impact of the program was conducted. The research procedures that were used to study the impact the Troy School District developmental kindergarten program had on the students are explained in Chapter III. The research was intended to address the following question: Does the developmental kindergarten program have any sustained long-term effect on at-risk students' reading achievement?



## CHAPTER III

### PROCEDURES

The purpose of this study was to determine the effect that participation in a developmental kindergarten program in the Troy School District has on at-risk students over time. In particular, it was intended to address the following question: Does the developmental kindergarten program have any sustained long-term effect on at-risk students' reading achievement? This study used historical data to compare students who were in the developmental kindergarten program to students who were eligible for the program but who were not enrolled in the developmental program.

Previous research reviewed has not clearly established whether developmental kindergarten programs that provide extra time in school have a long-term effect on reading achievement for at-risk children. The debate continues as to whether extra time for cognitive development of at-risk children is working. There is no consensus about what constitutes an effective model program for school readiness.

The literature reviewed indicated that much of the research dealt with school readiness after the child entered kindergarten, focused on age, or evaluated situations after students had encountered difficulty in kindergarten. This study was different because it addressed the readiness issue before children are officially enrolled in kindergarten. The Troy School District program

attempts to identify at-risk students before kindergarten and provide a developmental kindergarten program to meet the developmental needs of those students.

Previous research reviewed in the literature dealt with programs that were reactive in response to at-risk students. Retention programs typically repeat the same experiences with little or no thought as to how it should provide different experiences (Shepard & Smith, 1990). The approach in the Troy schools is different from the reactive approach (i.e., retention studies) found in the literature because it is concerned with children before they experience formal education failure. If preschool children who are at-risk are identified and placed in appropriate compensatory education programs before starting school, the chances of these children failing can be reduced (Simner, 1988). Simner concluded that because of budget constraints many school districts do not do an adequate job in this area. Consequently, some children are misplaced.

The study addressed three questions:

1. Do developmental kindergarten program participants do better on standardized tests over time in the area of reading than similar students who were not in the program?
2. Does the developmental kindergarten program reduce the risk of failure for at-risk students after they have completed the program?
3. Does the developmental kindergarten program provide the additional support needed for at-risk students to develop before entering the regular formal schooling process?

## Hypotheses

The following null hypotheses were tested:

Ho<sub>1</sub>: There will be no difference between the reading level of the developmental kindergarten students and that of nondevelopmental kindergarten students within grade levels kindergarten, Grade 1, Grade 3, and Grade 4 on standardized tests.

Ho<sub>2</sub>: There is no difference between grade retention of developmental kindergarten students and nondevelopmental kindergarten students.

Ho<sub>3</sub>: There is no difference in the rate of placement in special education programs for developmental kindergarten students and nondevelopmental kindergarten students.

## Research Design

### Representative Design

Representative design is a process for planning experiments so that they reflect accurately: (a) real life environments in which learning occurs and (b) the natural characteristics of learners (Borg & Gall, 1989). Snow (1974) advocated the use of representative design because it combats artificial learning situations and unnatural behavior in the learner in systematic designs and the representative design will increase the generalizability of the findings. Snow stated that educational researchers should design research to reflect the environment of the learner. The study design for this research does reflect the environment of the learner.

### Field Studies

Kerlinger (1973) stated that "field studies are ex post facto scientific inquiries aimed at discovering the relationships and interactions among sociological, psychological, and educational variables in real social structures" (p. 405). Field studies are strong in realism, significance, strength of variables, and theory orientation. Weaknesses are its ex post facto characteristic; lack of precision in measurement; and potential practical problems, such as feasibility, sampling, and cost.

Field research studies are generally preferred for pragmatic problems, especially for situations where withholding services that may be helpful would be unethical. Since field studies are conducted in more realistic settings, their results are more likely to provide solutions to the actual daily problems of education (Ary et al., 1985).

### Applied Research

Research which is conducted in relation to actual problems and under the conditions in which they are found in practice is done through applied research (Ary et al., 1985). Ary et al. stated that educators depend upon basic research for the discovery of the more general laws of learning, but applied research must be conducted in the classrooms. Most educational research is applied research because it attempts to develop generalizations about the teaching-learning process and instructional materials (Best, 1977). This

research study investigated an actual problem under the conditions in which it is found in practice.

### Design

The research design was a 2 x 5 factorial repeated measure. This design was chosen for its parsimony; that is, major effects and interactions can be tested with one analysis of variance procedure. Two groups were measured five times. The two groups were: (1) the experimental (developmental kindergartners) and (2) the control (nondevelopmental kindergartners). The five measures were reading results from standardized test scores. Those standardized tests were Teacher's School Readiness Inventory (TSRI, 1985) (Kindergarten); Gates-MacGinitie--Form 1, Level A (1978) (Grade 1); Iowa Test of Basic Skills (ITBS, 1982)--Form G, Level 9 (Grade 3); and Michigan Educational Assessment Program (MEAP, Michigan Department of Education, 1990)--Story and Information (Grade 4).

### Defining the Population

The population of the research study was comprised of three sections. They were: (1) the target population, (2) the experimentally accessible population, and (3) the sample (Borg & Gall, 1989). According to Borg and Gall, the advantage of drawing a small sample from a larger target population is that it saves time and expense of studying the entire target population. One can reach conclusions about an entire target population that are likely to be correct within a small margin of error by studying a relatively small

sample.

Borg and Gall (1989) stated that when the experimentally accessible population is closely comparable to the target population, then population validity is established. That is, the experimentally accessible population is reasonably representative of the target population. This means that one can generalize results from the accessible population to the target population with reasonable confidence.

### Target Population

The target population is the hypothetical set of people for which the results will be generalized (Borg & Gall, 1989). The target population for this study was kindergarten students in public schools in Oakland County, Michigan.

### Experimentally Accessible Population

The experimentally accessible population is the population from which the sample will be drawn. The experimentally accessible population for this study was kindergarten students in the Troy School District.

The community of Troy is located 15 miles north of Detroit, Michigan, in Oakland County. It is primarily an upper middle class suburban residential city with a stable school population of approximately 11,000. There are 12 elementary schools in the Troy School District. Students involved in this study were selected from all students who went through the school readiness screening process

during the academic years of 1986-1987 and 1987-1988. Over 90% of the entering kindergarten students were administered the screening process which involved the Developmental Indicators for the Assessment of Learning-Revised (DIAL-R, Mardell-Czudnowski & Goldenberg, 1983) test, observed developmental activity by professional school personnel, and a social-developmental history by the parents.

### Sample

The sample was selected from the experimentally accessible population. The sample population of this study was composed of all entering kindergarten students who were administered the screening process and were identified as at-risk to experience difficulty in kindergarten. This pool of students was composed of two groups, the experimental group and the control group. Both groups of students were still enrolled in the Troy School District and were representative of the experimentally accessible population. The experimental group was composed of those students who were identified as at-risk to experience difficulty in kindergarten in the Troy schools according to the screening results and enrolled in the developmental kindergarten program. The control group was drawn from the remaining students who were identified as at-risk for experiencing difficulty in kindergarten in the Troy schools according to the screening results, but went on to regular kindergarten instead of the developmental kindergarten program at the request of their parents. The two groups were matched according to gender, age within 6 months, school attended, and kindergarten screening results.

### Population Validity

The experimentally accessible population was reasonably representative of the target population, Oakland County, Michigan, which consisted of approximately 10% of the state school population. The areas that were representative were: (a) the age of the subjects, (b) the passing rate of the fourth grade MEAP reading test (Oakland County, Michigan--75%, and Troy School District--82%), and (c) ethnic composition (Oakland County, Michigan; White--85%, Black--10%, Asian--3%, and Hispanic--1.5% versus Troy School District; White--94%, Black--1%, Asian--4%, and Hispanic--1%). According to Borg and Gall (1989), population validity can be established.

### Variables

#### Independent Variable

The independent variable in this study was the developmental kindergarten program in the Troy School District.

#### Dependent Variables

The dependent variables in this study were the results of the standard achievement tests given to students in kindergarten and Grades 1, 3, and 4. The standard achievement tests were Teacher's School Readiness Inventory (TSRI) (kindergarten), Gates-MacGinitie Reading Test--Form 1, Level A (Grade 1), Iowa Test of Basic Skills (ITBS) Form G, Level 9 (Grade 3), and the Michigan



Educational Assessment Program (MEAP)--Essential Skills Reading--Story and Information (Grade 4).

### Data Gathering Procedures

Student records from the school in the Troy School District where the members of the experimental and control groups were currently attending were used to gather all data. With the permission and cooperation of professionals in the Troy School District, information was obtained from the child's permanent record. Scores on the DIAL-R (screening), Teacher's School Readiness Inventory (TSRI) (end of kindergarten), Gates-MacGinitie Reading Test--Form 1, Level A (Grade 1), Iowa Test of Basic Skills (ITBS) Form G, Level 9--Reading (Grade 3), and Michigan Educational Assessment Program (MEAP) Essential Skills Reading Test Grade 4--Story and Informational Reading (Grade 4) from student records were used to compare the two groups. When complete student test data were not available, that student was eliminated from consideration.

The instruments in this study were selected by a school district review committee, consisting of teachers and administrators, to be administered to all students at the designated grade levels. The tests were selected for their sound psychometric properties, including reliability, content validity, and predictive validity. Content validity was assessed by the representativeness of the content of each test's content relative to the curriculum. The committee compared course objectives with the test content to determine an appropriate match. When a testing instrument (a) measured the

objectives that had been taught, (b) reported information committee members deemed necessary about student achievement in reading comprehension, and (c) was an unbiased measure of student achievement, it was considered an appropriate match.

Developmental Indicators for the Assessment  
of Learning-Revised (DIAL-R)

The DIAL-R test was administered in May and June preceding fall enrollment. This test was selected by a committee of kindergarten teachers, school psychologists, speech pathologists, and administrators after a review of a variety of screening tests. The DIAL-R was selected for three reasons. They were: (1) The content of the test was congruent to the established curriculum in the Troy schools, (2) it was a standardized test with specific directions and procedures for scoring, and (3) it had well developed norms and established reliability.

The DIAL-R was administered by speech pathologists and licensed early childhood educational specialists who had received extensive training on the DIAL-R procedures. Local norms were developed for the purpose of establishing a cut-off score for the screening of young at-risk students. Students who were one standard deviation below the local norm (cut-off score of 70) were considered likely to be at-risk of experiencing difficulty in kindergarten in the Troy schools.

The DIAL-R test is used to evaluate motor, conceptual, and language development skills. The DIAL-R test is an individually

administered screening instrument for use with young children. The goal of the DIAL-R battery is for the examiner to be able to make one of the following statements about a child:

1. The child's development appears to be delayed when compared with those of the same age group and further assessment is recommended.

2. The child appears to be developing in a satisfactory manner and no serious difficulty is foreseen.

3. The child appears to be developing in an advanced manner when compared with those of the same age group and further assessment is recommended.

#### Teacher's School Readiness Inventory (TSRI)

The TSRI was administered at the end of the kindergarten school year. The TSRI was specifically designed to help teachers make appropriate referral decisions by including only five items that have demonstrated relationships to children's performances in school. The five items are: (1) in-class distractibility attention span and memory span, (2) verbal fluency, (3) interest and participation, (4) letter identification skills, and (5) printing skills. TSRI is an empirically derived instrument which provides information expressed in a way that reveals the urgency for obtaining assistance at a time when placement decisions are made (Simner, 1988). The scores are expressed by a rating scale.

Gates-MacGinitie Reading--Form 1, Level A

The Gates-MacGinitie Reading Test was administered to all first graders in class by the classroom teacher. The objective information obtained from the test can be used to complement teachers' evaluations and thus can contribute to making sound educational decisions. The tests can aid in determining the appropriate instructional levels for individual children, in identifying children who need additional or special instruction, in making decisions about the grouping of children, in evaluating programs, in counseling children, and in reporting to parents.

Level A consists of a vocabulary test and a comprehension test. The comprehension test involves the total reading task--understanding the relationships of words and ideas within a passage. The vocabulary test is primarily a test of decoding skills. Student results are expressed as a T score, an equal interval norm referenced score.

Iowa Test of Basic Skills (ITBS) Form G, Level 9

These tests were administered to all third grade students in class by the classroom teacher. The reading comprehension test contains passages that vary in length and represent materials used by students in everyday reading. The passages are adapted from many sources including newspapers, textbooks, magazines, and literary work.

The items on the test center on understanding and drawing inferences from the passages. These items are a reflection of the extent to which the complex process of inferences and understanding are being measured. There are three specific skill objectives measured by the test. They are: (1) facts--to recognize and understand stated factual details and relationships, (2) inferences--to infer underlying relationships, and (3) generalizations--to develop generalizations from a selection. Student results are expressed as a T score, an equal interval norm referenced score.

#### Cognitive Abilities Test (COAT) Form 4, Level A

The COAT (1979) was administered in class by the classroom teacher. The verbal subtest used in this study appraises an individual's knowledge of vocabulary and his or her flexibility in identifying specific meanings. It also appraises sentence structure and thought comprehension, verbal classification, and verbal analogies. Since most school curriculum is largely verbal, verbal abilities and school success are closely related. The verbal subtest tends to become an accurate predictor of academic success as a student progresses through different levels of schooling. Student scores are expressed as T scores, an equal interval norm referenced score.

#### Michigan Educational Assessment Program (MEAP)-- Essential Skills Reading Test Grade Four

This test was administered to students in class by classroom teachers. MEAP is a battery of tests given each fall to measure

achievement in mathematics and reading for 4th, 7th, and 10th graders. The reading test requires the child to read two selections, information and story. Four categories are tested in the reading section. They are: (1) constructing meaning (from a story and from an information passage); (2) topic familiarity; (3) knowledge about reading; and (4) student self-report of performance, effort, and interest. A score above 300 is a passing score on this reading test which is reported as a mean scale score.

### Statistical Treatment

Hypotheses involving differences in incidence rates of retention or special education placement were evaluated using the chi-square technique. Chi square is a means of answering questions about data existing in the form of frequencies rather than as scores or measurements along some scale (Isaac & Michael, 1985) as is the case in this study. The chi-square test indicates whether the variables are related or are independent of each other. This technique is also used to test a null hypothesis that there is no significant difference between the proportion of the subjects falling into any number of different categories (Ary et al., 1985).

The hypothesis of significant differences in reading comprehension between groups within each grade level was evaluated by using an analysis of covariance (ANCOVA) design. The covariate was the DIAL-R score. ANCOVA was used to partially adjust for preexisting differences between groups. An advantage of this technique is that data from all subjects can be used rather than only data from

matched pairs (Ary et al., 1985). Many times there will be initial differences between groups that arise by chance or because of the inability of the educational researcher to select subjects at random (Isaac & Michael, 1985) as in the case of this study. ANCOVA adjusts for the initial differences between groups and for the correlation between means. ANCOVA is particularly appropriate when it is not possible to compare randomly selected and randomly assigned samples (Best, 1977).

To evaluate differences in reading achievement between the experimental (developmental kindergarten) and control (nondevelopmental kindergarten) groups, a multivariate analysis of covariance (MANCOVA) design was used to analyze the effects of developmental kindergarten participation over time. The total score on the DIAL-R served as the covariate for analysis.

The MANCOVA procedure of SPSS-X was applied for the analysis of the repeated measures ANCOVA design. All hypotheses were evaluated using the .05 level of significance. All analyses were completed using SPSS-X (Hedderson, 1987).

### Summary

This study used historical data to compare students who were in the developmental kindergarten program in the Troy School District to students who were eligible for the program but were not enrolled in the developmental kindergarten program. This study was developed to compare developmental kindergarten with nondevelopmental kindergarten subjects to determine if there was a long-term effect on

reading achievement for developmental kindergarten subjects. A purposive sampling was used to compare the two groups for this study. The chi-square test, ANCOVA, and the MANCOVA were used to statistically compare the difference between the experimental and control groups and all hypotheses were evaluated at the .05 level of significance. In the following chapter, the analyses of the data are detailed in presenting the study findings.



## CHAPTER IV

### ANALYSIS OF THE DATA

The purpose of this study was to evaluate the long-term effects on reading achievement of at-risk students who participated in a developmental kindergarten program. Reading achievement was analyzed in kindergarten, Grade 1, Grade 3, and Grade 4 in the Troy School District, Troy, Michigan. It was designed to discover whether the children in the developmental kindergarten program received a positive long-term advantage in reading achievement as compared to children who did not participate in the developmental kindergarten program. The control group could have participated in the developmental kindergarten based on their Developmental Indicators for the Assessment of Learning-Revised (DIAL-R, Mardell-Czudnowski & Goldenberg, 1983) scores. This study hypothesized that the developmental kindergarten program in the Troy School District was a positive intervention in the lives of those involved in the program.

#### Introduction

Analyses of the data that were collected for this study were performed through the use of the Statistical Package for the Social Sciences (SPSS-X, Hedderson, 1987). Included were chi-square tests ( $\chi^2$ ), an analysis of variance (ANOVA), an analysis of covariance (ANCOVA), and a repeated measures multivariate analysis of

covariance (MANCOVA). Analyses were carried out to investigate the impact of participation in a developmental kindergarten program on school achievement. A control group was also selected for the study to provide comparative data.

The findings are presented in the order of the hypotheses tested and tables have been constructed showing each analysis. Each dependent variable was analyzed by ANCOVA using the DIAL-R as the covariate. A brief summary of results concludes the chapter.

### Analysis of Variance

The experimental and control groups were matched by gender, age within 6 months, and DIAL-R scores. Even though the experimental and control groups were matched as closely as possible, the control group had a higher mean score on the DIAL-R test than the experimental group. The two groups were statistically different to begin with (see Table 1).

Table 1  
Analysis of Variance Comparison of the DIAL-R With  
Status Developmental Kindergarten Versus  
Regular Kindergarten

Source	<u>df</u>	Sum of sig.	Mean sq.	<u>F</u> ratio	<u>F</u> prob.
Between groups	1	372.964	372.964	7.670	.007*
Within groups	82	3987.071	48.623		
Total	83	4360.036			

\* $p < .05$ .

### Analysis of Covariance

Descriptive statistics in Tables 2 through 7 show the mean scores on each dependent variable. The dependent variables were the Teacher's School Readiness Inventory (TSRI, 1985), Gates-MacGinitie Reading Tests (Gates, 1978), Cognitive Abilities Test (COAT, 1979), Iowa Tests of Basic Skills (ITBS, 1982), Michigan Educational Assessment Program-Story (MEAP, Michigan Department of Education, 1990), and MEAP-Information tests. The means were compared by gender and status to determine if there was a difference between boys and girls. There was no statistically significant difference between the means for boys and girls. The analysis of covariance was used to determine if any significant difference existed between the experimental and control groups in reading achievement within Grades kindergarten, 1, 3, and 4. Results of the analysis of covariance tests are presented in Tables 8 through 13.

The Teacher's School Readiness Inventory (TSRI) scores were analyzed using the DIAL-R test as the covariate. Scores attained were analyzed to determine whether any significant difference existed between groups in school readiness. The TSRI showed significance in favor of those in the developmental kindergarten program. There was no significance when gender was considered. The experimental group scored significantly higher than the control group at the kindergarten level on the TSRI (see Table 8).

At the first grade level, Table 9, reading comprehension subtest scores from the Gates-MacGinitie Test were analyzed using the

Table 2  
Descriptive Statistics: Means and Standard Deviations  
for TSRI by Sex and Status

Sex and status	Mean	<u>SD</u>	<u>N</u>
Entire population	20.37	2.52	84
Male	20.20	2.61	64
Regular kindergarten	19.56	2.42	32
Developmental kindergarten	20.84	2.67	32
Female	20.90	2.17	20
Regular kindergarten	20.00	2.16	10
Developmental kindergarten	21.80	1.87	10

Table 3  
Descriptive Statistics: Means and Standard Deviations  
for Gates by Sex and Status

Sex and status	Mean	<u>SD</u>	<u>N</u>
Entire population	54.96	7.78	77
Male	55.90	7.48	58
Regular kindergarten	55.35	8.23	31
Developmental kindergarten	56.52	6.61	27
Female	52.11	8.19	19
Regular kindergarten	50.80	8.28	10
Developmental kindergarten	53.56	8.32	9

Table 4

Descriptive Statistics: Means and Standard Deviations  
for COAT by Sex and Status

Sex and status	Mean	<u>SD</u>	<u>N</u>
Entire population	54.68	8.34	84
Male	55.14	7.24	64
Regular kindergarten	54.88	8.01	32
Developmental kindergarten	55.41	6.49	32
Female	53.20	11.29	20
Regular kindergarten	54.90	11.32	10
Developmental kindergarten	51.50	11.61	10

Table 5

Descriptive Statistics: Means and Standard Deviations  
for ITBS by Sex and Status

Sex and status	Mean	<u>SD</u>	<u>N</u>
Entire population	54.60	7.53	84
Male	54.77	7.12	64
Regular kindergarten	53.13	7.05	32
Developmental kindergarten	56.41	6.90	32
Female	54.05	8.89	20
Regular kindergarten	55.50	10.31	10
Developmental kindergarten	52.60	7.49	10

Table 6

Descriptive Statistics: Means and Standard Deviations  
for MEAP-Story by Sex and Status

Sex and status	Mean	<u>SD</u>	<u>N</u>
Entire population	314.19	21.53	54
Male	312.88	18.27	41
Regular kindergarten	312.93	20.61	28
Developmental kindergarten	312.77	12.50	13
Female	318.31	30.18	13
Regular kindergarten	316.10	29.86	10
Developmental kindergarten	325.67	36.69	3

Table 7

Descriptive Statistics: Means and Standard Deviations  
for MEAP-Information by Sex and Status

Sex and status	Mean	<u>SD</u>	<u>N</u>
Entire population	301.31	12.53	54
Male	300.70	13.37	41
Regular kindergarten	299.14	13.52	28
Developmental kindergarten	304.08	12.91	13
Female	303.23	9.61	13
Regular kindergarten	304.60	10.63	10
Developmental kindergarten	298.67	2.31	3

Table 8

Analysis of Covariance: Comparison of Kindergarten Groups  
on the Teacher's School Readiness Inventory,  
Developmental Kindergarten Versus  
Regular Kindergarten

Source of variation	Sum of squares	<u>df</u>	Mean square	<u>F</u>	Sig. of <u>F</u>
Covariate					
DIAL-R	22.516	1	22.516	4.141	*
Main effect					
Group	70.220	2	35.110	6.457	*
By sex	3.257	1	3.257	0.599	NS
By status	65.692	1	65.692	12.082	*

\* $p < .05$ . NS = not significant.

Table 9

Analysis of Covariance: Comparison of First Grade Groups on  
the Reading Comprehension Subtest of the Gates-MacGinitie  
Test, Developmental Kindergarten Versus  
Regular Kindergarten

Source of variation	Sum of squares	<u>df</u>	Mean square	<u>F</u>	Sig. of <u>F</u>
Covariate					
DIAL-R	75.833	1	75.833	1.265	NS
Main effect					
Group	202.337	2	101.169	1.688	NS
By sex	185.077	1	185.077	3.088	NS
By status	23.141	1	23.141	0.386	NS

Note. NS = not significant.

Table 10

Analysis of Covariance: Comparison of Third Grade Groups on  
the Reading Comprehension Subtest of the Cognitive  
Abilities Test, Developmental Kindergarten  
Versus Regular Kindergarten

Source of variation	Sum of squares	<u>df</u>	Mean square	<u>F</u>	Sig. of <u>F</u>
Covariate					
DIAL-R	92.222	1	92.222	1.310	NS
Main effect					
Group	80.750	2	40.375	0.573	NS
By sex	79.755	1	79.755	1.132	NS
By status	1.825	1	1.825	0.026	NS

Note. NS = not significant.

Table 11

Analysis of Covariance: Comparison of Third Grade Groups on  
the Reading Comprehension Subtest of the Iowa Test of  
Basic Skills, Developmental Kindergarten  
Versus Regular Kindergarten

Source of variation	Sum of squares	<u>df</u>	Mean square	<u>F</u>	Sig. of <u>F</u>
Covariate					
DIAL-R	17.264	1	17.264	0.307	NS
Main effect					
Group	112.932	2	56.466	1.004	NS
By sex	14.084	1	14.084	0.250	NS
By status	101.672	1	101.672	1.808	NS

Note. NS = not significant.



Table 12

Analysis of Covariance: Comparison of Fourth Grade Groups on  
the Story Reading Subtest of the Michigan Educational  
Assessment Program, Developmental Kindergarten  
Versus Regular Kindergarten

Source of variation	Sum of squares	<u>df</u>	Mean square	<u>F</u>	Sig. of <u>F</u>
Covariate					
DIAL-R	71.980	1	71.980	0.147	NS
Main effect					
Group	363.755	2	181.878	0.371	NS
By sex	362.784	1	362.784	0.741	NS
By status	0.655	1	0.655	0.001	NS

Note. NS = not significant.

Table 13

Analysis of Covariance: Comparison of Fourth Grade Groups on  
the Information Reading Subtest of the Michigan Educational  
Assessment Program, Developmental Kindergarten  
Versus Regular Kindergarten

Source of variation	Sum of squares	<u>df</u>	Mean square	<u>F</u>	Sig. of <u>F</u>
Covariate					
DIAL-R	174.246	1	174.246	1.105	NS
Main effect					
Group	119.996	2	59.998	0.381	NS
By sex	113.522	1	113.522	0.720	NS
By status	5.982	1	5.982	0.038	NS

Note. NS = not significant.

DIAL-R score as the covariate. The scores of the two groups were compared to determine if any significant differences existed as measured by these variables. No significant difference existed between the means of the test scores of the experimental and control groups.

Presented in Table 10 is the third grade analysis. I scores from the verbal subtest of the Cognitive Abilities Test (COAT) were analyzed using the DIAL-R score as the covariate. The scores of the two groups were compared to determine if any significant differences existed as measured by these variables. No significant difference existed between the means of the test scores of the experimental and control groups.

In Table 11, the third grade analysis for the Iowa Test of Basic Skills (ITBS) is presented. I scores from the reading comprehension subtest of the ITBS were analyzed using the DIAL-R as the covariate. The scores of the two groups were compared to determine if any significant differences existed. No significant differences existed between the means of the test scores of the experimental and control groups.

Table 12 represents an analysis of the fourth grade using the results of the Michigan Educational Assessment Program (MEAP) Story subtest. Raw scores from the reading Story subtest of the MEAP were analyzed using the DIAL-R as the covariate. The scores were compared to determine if any significant difference existed between groups. No significant difference existed between the means of the test scores of the experimental and control groups.

The final analysis of covariance at the fourth grade level used the results of the MEAP Information subtest (see Table 13). Raw scores from the Information reading subtest of the MEAP were analyzed using the DIAL-R as the covariate. The scores were compared to determine if any significant difference existed between groups. No significant difference existed between the means of the test scores of the experimental and control groups.

Results of the analysis of covariance tests as presented in Tables 8 through 13 show that the experimental group was statistically significant at the kindergarten level by status and as a group. The differences at the other grade levels were not statistically significant.

#### Chi Square

To establish whether the treatment, developmental kindergarten participation, resulted in a significant difference between the experimental and control group for grade retention, a chi-square test was performed. No significant relationship was found between retention and status (developmental kindergarten vs. regular kindergarten). The chi-square value was 2.04878 with one degree of freedom. No significant relationship was found between retention and gender. The chi-square value was 0.64024 with one degree of freedom. Indeed, only 2 students in the sample, both in the regular kindergarten group, were retained during the course of the study. No significant difference was found between the groups for grade retention.

To establish whether the treatment, developmental kindergarten participation, resulted in a significant difference between the experimental and control groups for special education placement, a chi-square test was performed. No significant relationship was found between special education service referral and status (developmental kindergarten vs. regular kindergarten). The chi-square value was 0.04991 with one degree of freedom. No significant relationship was found between special education service referral and gender. The chi-square value was 1.26337 with one degree of freedom. No significant difference was found between the groups for special education referral services.

#### Multivariate Analysis of Covariance

The multivariate analysis of covariance (MANCOVA) was used to analyze the effects of developmental kindergarten participation on reading achievement over time from kindergarten through fourth grade. Two measures of MANCOVA were analyzed. They were kindergarten to fourth grade with the MEAP-Story subtest and kindergarten to fourth grade with the MEAP-Information subtest.

In order to satisfy the requirement of homogeneity of variance for each of the dependent variables, the Bartlett-Box test for univariate homogeneity of variance was used. Tables 14 and 15 present the results for each measure and covariate. The failure to reject the null hypothesis in each case, with the exception of the kindergarten TSRI results, is the satisfaction of the requirement for homogeneity of variance.

Table 14

Comparison of the TSRI, Gates, ITBS, and MEAP-Story by  
Status With DIAL-R, Developmental Kindergarten  
Versus Regular Kindergarten

Variable	Square Mul. <u>R</u>	Mul. <u>R</u> Adj.	<u>R</u> Sq.	Hypoth. <u>MS</u>	Error <u>MS</u>	<u>F</u>	Sig. of <u>F</u>
TSRI	.0136	.1165	.0000	4.193	5.978	0.701	.406
Gates	.0126	.1120	.0000	44.289	68.343	0.648	.425
ITBS	.0234	.1529	.0042	69.310	56.774	1.220	.274
MEAP-S	.0020	.0452	.0000	50.109	480.259	0.104	.748

Note. Pillais = .10678. Exact F = 1.43. Hypoth. df = 4. Error df = 48. F = .237.

Table 15

Comparison of the TSRI, Gates, ITBS, and MEAP-Information  
by Status With DIAL-R, Developmental Kindergarten  
Versus Regular Kindergarten

Variable	Square Mul. <u>R</u>	Mul. <u>R</u> Adj.	<u>R</u> Sq.	Hypoth. <u>MS</u>	Error <u>MS</u>	<u>F</u>	Sig. of <u>F</u>
TSRI	.0136	.1165	.0000	4.193	5.978	0.701	.406
Gates	.0126	.1120	.0000	44.289	68.343	0.648	.425
ITBS	.0234	.1529	.0042	69.310	56.774	1.221	.274
MEAP-I	.0135	.1161	.0000	111.272	159.626	0.697	.408

Note. Pillais = .11672. Exact F = 1.586. Hypoth. df = 4. Error df = 48. Sig. of F = .193.

Table 14 presents the analysis of the effects of developmental kindergarten participation on reading achievement. A comparison of the TSRI, Gates, ITBS, and MEAP-Story with the DIAL-R test was analyzed. The results indicated that over time the growth of reading achievement was not significantly different for the experimental and control groups from kindergarten through Grade 4 with the MEAP-Story subtest.

Table 15 presents the analysis of the effects of developmental kindergarten participation on reading achievement. A comparison of the TSRI, Gates, ITBS, and MEAP-Information by status with the DIAL-R test was analyzed. The results indicated that over time the growth in reading achievement was not significantly different between the experimental and control groups from kindergarten through Grade 4 with the MEAP-Information subtest.

### Findings

The research questions that were to be answered by this study stated as null hypotheses are:

Hypothesis 1: There will be no difference between the reading level of the developmental kindergarten students and that of the nondevelopmental kindergarten students within Grade Levels of kindergarten, 1, 3, and 4 on standardized tests.

As presented in Table 8, there was a statistically significant difference between the mean scores of the experimental and control groups in favor of the experimental group when status and total group is considered in kindergarten. At Grade Levels 1, 3, and 4

there was no significant difference between groups. The null hypothesis was not rejected.

Hypothesis 2: There is no difference between grade retention of the developmental kindergarten students and nondevelopmental kindergarten students.

There was no significant difference between the rates of grade retention between developmental kindergarten students and nondevelopmental kindergarten students. The statistical evidence supported this hypothesis. The null hypothesis was not rejected.

Hypothesis 3: There is no difference in the rate of placement in special education programs for developmental kindergarten students and nondevelopmental kindergarten students.

There was no significant difference between developmental kindergarten students and nondevelopmental kindergarten students. The statistical evidence supported this hypothesis. The null hypothesis was not rejected.

### Discussion

The analyses of the data presented in this chapter, as it relates to the research questions of this study, indicated that a developmental kindergarten experience results in benefits for participants in kindergarten. When the experimental and control groups move through Grades 1, 3, and 4, the advantage gained in reading at the kindergarten level is no longer evident. There was no evidence to support any benefits in reading for participants over time.

In several studies included in the Review of the Literature, Chapter II, data indicated that initially a developmental kindergarten experience resulted in gains for the children and that over time the results would remain with developmental kindergarten students outperforming those without a developmental kindergarten experience. The results of this study indicated that for these groups the opposite was true. At kindergarten, the experimental group showed significantly higher readiness scores. After kindergarten, there was no significant difference between the groups within individual Grades 1, 3, and 4.

The research findings presented here support the results of Miller and Norris (1967). The kindergarten results indicated a significant difference between the experimental and control groups in favor of the experimental group. However, the results were no longer significant at the end of third and fourth grades.

The results of this study also are consistent with the conclusions of Shepard and Smith (1986) and Bickel (1991). The findings indicate that over time the differences between the experimental and control groups are not significant by third and fourth grades. The research findings in this study also support the conclusions drawn by Freeman (1990) that extra-year programs have no lasting effect.

The results of this study did not support findings by Mahalak and Peper (1992), Kilby (1984), and others that extra-year programs resulted in long-term advantages. The results of this study did not support the conclusions that students in extra-year programs are not referred for special education services fewer times than their



counterparts. Also, extra-year program participants are not significantly held back fewer times than non-extra-year participants.

### Summary

The purpose of this study was to determine if developmental kindergarten participation had a lasting effect on reading achievement, grade retention, and special education referrals. The variables of special education referrals, grade retention, TSRI, COAT, Gates-MacGinitie, ITBS, MEAP-Story, and MEAP-Information were analyzed for both the experimental and control groups. As the subjects progressed through school, the advantage gained at the kindergarten level was no longer evident in Grades 1, 3, and 4.

Descriptive statistics compared the means for the dependent variables between boys and girls. There were no significant differences on any of the dependent variables analyzed. Boys and girls were not significantly different in this study.

The rate of growth in reading achievement was not significant within Grade Levels 1, 3, and 4. Using MANCOVA, a comparison of the TSRI, Gates, ITBS, and MEAP-Story by status with the DIAL-R test was analyzed. The results indicate that over time there was no significant difference in favor of the experimental group in reading achievement. Using MANCOVA a second time, a comparison of the TSRI, Gates, ITBS, and MEAP-Information by status with the DIAL-R test was analyzed. The results indicate that over time there was no significant difference in favor of the experimental group in reading achievement. The null hypothesis that there is no lasting

difference between the experimental and control groups over time was not rejected.

Results indicated that students who had developmental kindergarten experiences were not significantly different from nonparticipants in grade retention. When the two groups were compared with regard to retention and status, results of the chi-square test showed no significant difference. When retention and gender were used in the analysis, there was no significant difference. The null hypothesis that there would be no difference was not rejected.

Results indicated that students who had developmental kindergarten experiences were not significantly different from nonparticipants in special education referrals. When the two groups were compared with regard to special education referrals and status, the results of the chi-square test showed no significant differences. When special education referrals and gender were used in the analysis, there was no significant difference. The null hypothesis that there would be no difference was not rejected.

The three null hypotheses stated were not rejected based on the findings in this study. There were no significant differences between the experimental and control groups to indicate that the developmental kindergarten experience does result in long-term benefits for the participants.

## CHAPTER V

### SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Research conducted over the past 20 years concerning school readiness and extra-year programs (i.e., developmental kindergarten) has produced conflicting results. Early studies indicated that extra-year programs resulted in no long-term advantage, or significant gains were made only for the first year following intervention. More recent research has produced studies that indicated extra-year programs have lasting educational effects.

Over the past 20 years kindergarten programs have gone through change. Kindergarten programs are no longer seen as vehicles for providing only experiences dealing with socialization skills. The kindergarten curriculum now deals with the whole child; cognitive, physical, and social/emotional. The kindergarten curriculum is more demanding.

The Troy Public School system, Troy, Michigan, has provided a developmental kindergarten program since 1986 to help prepare at-risk students for kindergarten. The at-risk students in Troy are not the stereotypical at-risk students. At-risk students in Troy are not necessarily poor or from a disadvantaged minority group. They come from middle to upper income families and they are students who have been identified as students who could experience difficulty with the formal educational routine in the Troy schools.

The purpose of this study was to determine the long-term effects of participation in a developmental kindergarten program on students' reading achievement in kindergarten, Grade 1, Grade 3, and Grade 4 in the Troy School District. Longitudinal data had not been analyzed in the Troy schools relating to this problem.

### The Problem

Though there has been extensive debate and some research in the past decade about kindergarten readiness, there is still no consensus as to the long-term results these programs have on students. The problem explored in this study was to determine if the developmental kindergarten program in the Troy School District resulted in any long-term advantage in reading over time. It was proposed that the extra-year program would result in long-term reading benefits for those students involved in the program.

### The Procedure

A pretest-posttest control group design was used to determine the long-term reading achievement effects students received from participation in a developmental kindergarten program. The dependent variables used in the analysis were the Teacher's School Readiness Inventory (TSRI, 1985), Gates-MacGinitie (Gates, 1978), Cognitive Abilities Test (COAT, 1979), Iowa Test of Basic Skills (ITBS, 1982), Michigan Educational Assessment Program-Story (MEAP-Story, Michigan Department of Education, 1990), and Michigan Educational Assessment Program-Information (MEAP-Information, 1990) tests. The

students were matched with regard to age within 6 months, gender, and Developmental Indicators for the Assessment of Learning-Revised (DIAL-R, Mardell-Czudnowski & Goldenberg, 1983) screening results.

The student population was comprised of 84 kindergartners divided into two groups. There were 42 subjects in the experimental group and 42 subjects in the control group. Data collection took place at the school where the subjects were enrolled. The data were analyzed to determine if any differences existed between the groups which could be related to the developmental kindergarten experience.

### The Findings

Presentation of data and data analysis suggested findings concerning the long-term benefits for those students in the developmental kindergarten program, special education referrals, and grade retention between the experimental and control groups. Even though the two groups were matched as closely as possible, there was a statistical difference between the groups when they started. Results of the analysis of variance indicated that a significant difference existed between the two groups with the DIAL-R test in favor of the developmental kindergarten students.

The results of the analysis of covariance for raw scores on the TSRI, using the DIAL-R as the covariate, indicated that the experimental group scored significantly higher on school readiness than the control group at the kindergarten level. At the first grade level, T scores from the Gates test were analyzed using the DIAL-R as the covariate. No significant difference existed between the means of

the test scores of the experimental and control groups. At the third grade level, T scores on the COAT and ITBS were analyzed using the DIAL-R as the covariate. No significant difference existed between the means of the test scores of the experimental and control group. The fourth grade results using the MEAP-Story subtest and the MEAP-Information subtest raw scores were analyzed using the DIAL-R as the covariate. No significant difference existed between the means of the test scores of the experimental and control groups.

The multivariate analysis of covariance, used to analyze the effects of developmental kindergarten participation on reading achievement over time, indicated no significant difference between the experimental group and the control group. The analysis compared the two groups twice, once using TSRI, COAT, ITBS, and MEAP-Story subtest and once using the TSRI, COAT, ITBS, and MEAP-Information subtest.

Results indicated that students with developmental kindergarten experience were not significantly different from nonparticipants in grade retention. When retention and status were used to compare the two groups, there was no significant difference. When retention and gender were used to compare the two groups, there was no significant difference.

Results indicated that students with developmental kindergarten experience were not significantly different from nonparticipants in special education referrals. When special education referrals and status were used to compare the two groups, there was no significant difference. When special education referrals and gender were used

to compare the two groups, there was no significant difference.

Findings indicated that a significant difference was found at the kindergarten level with regard to readiness. There was no significant difference found at Grades 1, 3, and 4 over time that was related to the developmental kindergarten experience.

### Conclusions

Results of this study support the contention that experience in extra-year programs does not produce long-term effects on reading achievement. The experimental group did not outperform the control group. This conclusion is based on the comparison of the two groups over time in Grades kindergarten, 1, 3, and 4.

This conclusion is supported by the conclusions of Miller and Norris (1967) in their research. They concluded that the early advantage students receive is no longer apparent by the end of third and fourth grades. The difference in school readiness was not sustained in third and fourth grade in this study between the experimental and control groups.

Shepard and Smith (1990) also reported that there was no difference in reading achievement over time between extra-year participants and nonparticipants by the third and fourth grades. Findings of this study's analysis of reading achievement over time indicate support of these results.

Results of this study support the contention that experience in extra-year programs do not produce long-term positive effects on reading achievement. The experimental group did not outperform the

control group. This result is opposite of the results of Solem (1981) and Kilby (1984), who found a sustained difference.

The results of this study did not provide significant results to support the position that developmental kindergarten participants were less likely to have failed a grade or to be placed into special education classes. The experimental group had fewer total numbers in grade retention than the control group. The small numbers may have reduced the likelihood of significant results. This is opposite of the results that Kilby (1984) and Solem (1981) reported.

Mahalak and Peper (1992) reported that an extra-year program did have a positive effect on those enrolled in the program. They reported significant results in the areas of ITBS scores and grade retention. Within grade effects of developmental kindergarten participation in this study were opposite to these reported results.

The findings of this research did not support the concept that early intervention into the lives of those students who were identified as likely to encounter academic difficulty through a developmental kindergarten program had any long-term effect on reading achievement.

### Recommendations

Based on the results of this study, it appears that the developmental kindergarten program in the Troy schools does not produce positive long-term effects on reading achievement over time. The Troy school system should not continue the developmental kindergarten program as it is now offered for the purpose of improving



reading achievement. Even though there were no long-term benefits in the area of reading, there may have been a positive effect for those involved with their self-esteem.

While not necessarily expected to provide specific answers, this study has supplied a number of findings and conclusions which add to the body of knowledge about extra-year programs. Further research should be conducted to substantiate these findings and conclusions.

Since the developmental kindergarten program deals with many other aspects of school readiness other than reading achievement, the areas of parental involvement, school attendance, teacher attitudes, and report card marks should be analyzed. In-depth studies should also be conducted analyzing the type of program and the amount of service from the school system that is received by these students. Student attitudes should be analyzed to determine how the students feel toward self-esteem and school based on their experience in a developmental kindergarten program over time.

The findings of this study inferred that there was no difference between developmental kindergarten and nondevelopmental kindergarten students with regard to reading achievement, grade retention, and special education referrals. Specific research could be conducted to determine students' self-esteem and their attitudes toward school. Evidence other than academic achievement could be investigated.

## **APPENDIX**

### **Approval Letter From Human Subjects Institutional Review Board**

Human Subjects Institutional Review Board



Kalamazoo, Michigan 49008-3899

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**WESTERN MICHIGAN UNIVERSITY**

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Date: June 12, 1992

To: Dennis H. Raetzke

From: Mary Anne Bunda, Chair

*Mary Anne Bunda*

Re: HSIRB Project Number: 92-05-22

This letter will serve as confirmation that your research protocol, "A Longitudinal Ex Post Facto Evaluation of the Development Kindergarten Program in the Troy Schools, Troy, Michigan" has been approved under the exempt category of review by the HSIRB. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the approval application.

You must seek reapproval for any changes in this design. You must also seek reapproval if the project extends beyond the termination date.

The Board wishes you success in the pursuit of your research goals.

xc: Cowden, Ed Leadership

Approval Termination: June 12, 1993

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