

THE RELATIONSHIP BETWEEN READINESS TEST RESULTS OBTAINED  
BY CHILDREN IN AN OPTIONAL KINDERGARTEN AND A REGULAR  
KINDERGARTEN PROGRAM AS MEASURED BY THE  
METROPOLITAN READINESS TEST

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A Dissertation  
Presented to  
The School of Graduate Studies  
Drake University

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In Partial Fulfillment  
of the Requirements for the Degree  
Doctor of Education

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by  
John M. Christiansen

October 1984

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An abstract of a Dissertation by  
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October 1984  
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The problem. The major question that provided the basis for this study is "Do children in an optional kindergarten program designed specifically for risk children produce readiness test scores at a statistical difference of .05 when compared with children's readiness test scores in the regular kindergarten program as measured by the Metropolitan Readiness Test?"

Procedure. This study was conducted in an independent suburban school district of approximately 3,200 students K-12 near a midwestern metropolitan area. The population for the study consisted of thirty-two children enrolled in the district's optional kindergarten program and thirty-two children randomly selected from the regular kindergarten population of the district's six elementary schools.

The research design consisted of a fall and spring readiness testing of the total optional and regular kindergarten population during the 1983-84 school year.

A stratified random sample was identified from the regular kindergarten population and the total population of the optional kindergarten was used. Analysis of variance statistical procedures were chosen to test the study hypotheses. Hypothesis One and Two were tested with a 2 X 2 X 2 ANOVA, Hypothesis Three and Four a 2 X 2 ANOVA and a one-way ANOVA was used for Hypothesis Five. Descriptive statistics reported are age and sex.

Findings. In testing the research hypotheses at .05 level, significant differences were found for Hypothesis One, Three, Four, and Five. The results of this study found a significant difference beyond the .001 level for these hypotheses.

Conclusions. The general conclusion that can be drawn from this study is that this group of Optional Kindergarten children scored at a statistically significant lower level on a fall and spring readiness measure than regular kindergarten children. The data also shows that as a group the optional children are less ready for first grade in the spring than they were for kindergarten in the fall. The overall conclusion drawn from the data is that a significant difference does exist between the Optional Kindergarten children and Regular Kindergarten children as measured by the Metropolitan Readiness Test.

## Table of Contents

	Page
List of Tables . . . . .	v
Chapter	
1. Introduction . . . . .	1
To Whom Will the Study Have Meaning? . . . . .	2
Statement of the Problem Question . . . . .	3
Statement of Hypotheses . . . . .	4
Statement of Assumption . . . . .	5
Limitations . . . . .	7
Definition of Terms . . . . .	7
Importance of the Study . . . . .	8
Methodology . . . . .	9
2. Review of the Related Literature of Research. . . . .	11
Introduction . . . . .	11
Pre-School Screening Elements . . . . .	11
Early Intervention Programs . . . . .	23
3. Methods and Procedures . . . . .	28
Scope . . . . .	28
Instrument . . . . .	28
Sample Selection . . . . .	30
Data Analysis Procedures . . . . .	31
4. Analysis of Data . . . . .	36
Descriptive Statistics for Each Group . . . . .	36

Chapter	Page
Presentation of Data for the Research Hypotheses . . . . .	38
5. Summary, Conclusions, and Recommendations . . . . .	45
Summary and Interpretation of Findings . . . . .	46
Conclusion . . . . .	48
Recommendations for Future Research . . . . .	49
Bibliography . . . . .	51

## Tables

Table	Page
1. Numerical Values of Stratified Random Sample . . . . .	31
2. Optional Kindergarten, Metropolitan Readiness Test . . . . .	37
3. Regular Kindergarten Random Sample, Metropolitan Readiness Test . . . . .	38
4. Table of F Values, Probability, Mean Scores, and Standard Deviations for Optional Kindergarten Programs . . . . .	39
5. Table of F Values, Probability, Mean Scores, and Standard Deviations for Regular Kindergarten Program . . . . .	40
6. Table Showing Diagram of Two-Way Analysis of Variance . . . . .	41
7. Table of F Values and Probability for Fall and Spring Testing . . . . .	42
8. Table of F Value and Probability for Spring Optional Program Testing and Regular Program Fall Testing . . . . .	43
9. Summary Table of Research Hypotheses . . . . .	44

## CHAPTER ONE

### Introduction

The concept of school readiness has been researched and debated for many years. J. T. Fisher and L. S. Howley in their book, A Few Buttons Missing, published in 1951, discuss the need for delaying formal instruction until readiness is achieved. This concept of school readiness and the need to withhold formal instruction until readiness is evident was based on their clinical experiences with young children. Authors and researchers such as Raymond Moore, Dorothy Moore, Lilian Katz, and others have reviewed the literature and completed research looking for information to help educators do what is best for children in their early years.

At this time, there is no universally accepted or recommended entrance age for children to begin formal schooling. In reviewing state entrance ages, one finds some states allowing entrance to kindergarten as early as three or as late as nine. Since it is generally agreed that children develop at different rates, including sex-related differences, researchers have not been able to pinpoint an optimal age at which to begin formal schooling.



The literature does indicate, however, that there is general acceptance of the concept that many aspects of readiness must be considered other than age if successful school achievement is to be realized. These aspects include social maturity, emotional stability, self-reliance, physical health, and intelligence.

Since the concept of school readiness suggests far-reaching effects on the successful managing of the school experience, a close examination of how students actually perform in the school setting is essential to those applying these theories to their educational programming. In those settings where readiness is assessed, recommendations made, and specific educational interventions implemented, it is necessary to study carefully the effects of these interventions. The success of these interventions can be measured by studying the students themselves and evaluating their readiness for formal instruction.

#### To Whom Will the Study Have Meaning?

Information was obtained from this study that should be relevant to individuals in many different educational settings and to those individuals interested in approaching school problems from a preventive philosophy as opposed to a remedial philosophy.

The people most directly interested in this area are early childhood educators, parents of young children,

elementary school administrators, curriculum and instructional personnel, boards of education, the education community, and university personnel in the area of child development, early childhood education, elementary education, and other education-related fields of study.

#### Statement of the Problem Question

The major question that lies at the base of this study is "Do children in an optional kindergarten program designed specifically for risk children produce readiness test scores at a statistical difference of .05 when compared with children's readiness test scores in the regular kindergarten program as measured by the Metropolitan Readiness Test?"

The subquestions answered in order to answer the major question are:

1. What relationship exists between the results obtained by children in the optional kindergarten program on the Metropolitan Readiness Test given at the beginning and at the end of the school year?

2. What relationship exists between results obtained by children on the Metropolitan Readiness Test given to a random sample of children equal in number to the optional students in the regular kindergarten program at the beginning and at the end of the school year?

3. What relationship exists between the results obtained by children in the optional kindergarten program

and an equal number of randomly selected children in the regular kindergarten program on the Metropolitan Readiness Test given at the beginning of the school year?

4. What relationship exists between the results obtained by children in the optional kindergarten program and an equal number of randomly selected children in the regular kindergarten program on the Metropolitan Readiness Test given at the end of the school year?

5. What relationship exists between the results obtained by children in the optional kindergarten program on the Metropolitan Readiness Test given at the end of the school year and the results obtained by an equal number of randomly selected children in the regular kindergarten program to the Metropolitan Readiness Test given at the beginning of the school year.

#### Statement of Hypotheses

Five hypotheses were tested in the study.

1. There will be no significant difference in the results obtained by children in the optional kindergarten program on the Metropolitan Readiness Test given at the beginning and at the end of the school year.

2. There will be no significant difference in the results obtained by an equal number of randomly selected children in the regular kindergarten program on the Metropolitan Readiness Test given at the beginning and end of the school year.

3. There will be no significant difference between the results obtained by children in the optional kindergarten program and an equal number of randomly selected children in the regular kindergarten program on the Metropolitan Readiness Test given at the beginning of the school year.

4. There will be no significant difference between the results obtained by children in the optional kindergarten program and an equal number of randomly selected children in the regular kindergarten program on the Metropolitan Readiness Test given at the end of the school year.

5. There will be no significant difference between the results obtained by children in the optional kindergarten program on the Metropolitan Readiness Test given at the end of the school year and the results obtained by an equal number of randomly selected children in the regular kindergarten program on the Metropolitan Readiness Test given at the beginning of the school year.

#### Statement of Assumption

Certain basic assumptions were an integral part of the study. First, it was assumed that persons conducting the screening of children eligible for kindergarten could reliably use the screening instruments to determine if a child were considered a "risk" or "non-risk" for a successful

kindergarten experience. Identification of "risk" or "non-risk" children assessed a child's school readiness, which is defined as the ability to cope with the school environment physically, socially, emotionally, as well as academically, without undue stress and effort.

Second, it was assumed that the screening instruments used were both valid and reliable. Tests used for the evaluations were those of the Gessel Child Development Clinic in Connecticut and Language Tests of Word Definitions, Analogies and Digit Symbols. Assessments were made in the following areas, visual perception, visual retention, fine gross motor movements, language development, listening skills, body control, ego strength, integration of each area, and social behavior. If a child managed these evaluations, it was assumed that he/she was a "non-risk" child for school failure. If there were deficiencies (number or seriousness), the children were assumed to be "risk" children for school failure.

It was also assumed that the instrument used to test students' readiness at the beginning and at the end of the school year was valid and reliable. It was further assumed that the personnel involved in administering the instrument used the testing instruments reliably.

The last assumption was that all children in each group have experienced the same amount of chronological growth from the first to the last testing. Without regard to

chronological age difference, the study attempted to measure cognitive growth between groups from the first to last testing as determined by standardized instruments. The assumption was that test score differences were not determined by chronological age and the statistical analysis would control for this factor.

#### Limitations

The limitations of the study are (1) the small size (3,000 K-12 students) of the school district student population participating in the study and (2) the small number of participating students (70), teachers (6), and student assessment personnel (2).

The study's results cannot be generalized to the general public school population. Any generalization would be limited to those public schools whose student population and parental socio-economic status were similar to the population of the school district involved in the study.

#### Definition of Terms

The terms that must be defined for the study are:

1. Public School Optional Kindergarten Program is one that is available to children of legal kindergarten age but is designed to meet the needs of children functioning on a four-year-old to four and one-half-year-old level in the areas of physical, emotional, social and academic development.

This program operates on a one-half day five-day-a-week basis.

2. Regular Public School Kindergarten Program is designed for children of legal kindergarten age (five years to five and one-half years) and are functioning physically, emotionally, socially, and academically at that level. This program operates on a one-half day five-day-a-week basis.

3. Optional children refers to those children screened by public school personnel, and who are identified as probable risks for successful completion of the public school kindergarten program. This is determined by the child's physical, emotional, social, and academic development.

4. Regular kindergarten children are those screened by the public school personnel who are identified probable successful candidates for completion of the public school kindergarten program.

#### Importance of the Study

Much research has been directed to the study of assessing school readiness. This research has been directed toward determining what areas should be assessed to determine accurately if a child is ready to enter kindergarten. These assessments have included such areas as visual perception, visual retention, fine and gross motor growth, language development, auditory perception, social behavior, emotional stability and others. These studies have concerned themselves with determining the developmental growth of children

as compared to their chronological age and predicting school success.

The research has not, however, looked extensively at what types of intervention or options should be used when it is determined a student is not ready for formal instruction. The research does not indicate an abundance of studies relating to children who have not entered school when identified as "not ready" nor does the research compare these children to the children who were identified as "not ready" but entered school anyway.

The importance of this study becomes evident because of the limited work in the specific area of intervention techniques and the importance of beginning formal instruction at an optimal readiness level. The impact of not providing the best possible options during the beginning school years will directly affect a child's future success in the school setting.

#### Methodology

This study was conducted in an independent suburban school district of approximately 3,200 students K-12 near a midwestern metropolitan area. The population for the study consisted of thirty-two children enrolled in the district's optional kindergarten program and thirty-two children randomly selected from the regular kindergarten population of the district's six elementary schools.



The research design consisted of a fall and spring readiness testing of the total optional and regular kindergarten population during the 1983-84 school year. Each teacher involved in the study was in-serviced on the scope of the study and the procedures to follow. The Metropolitan Readiness Test was given as the readiness measure. The fall testing, done in October, utilized Level I Form P and the spring testing, done in April, utilized Level II Form Q. The researcher collected the results in May of 1984.

A stratified random sample was identified from the regular kindergarten population and the total population of the optional kindergarten was used. Analysis of variance statistical procedures were chosen to test the study hypothesis. Hypothesis One and Two were tested with a 2 X 2 X 2 ANOVA, Hypothesis Three and Four with a 2 X 2 ANOVA and a one-way ANOVA was used for Hypothesis Five. Descriptive statistics reported are age and sex.

## CHAPTER TWO

### Review of the Related Literature of Research

#### Introduction

This chapter presents an examination of the literature and research of importance to this study. The examination found that there were two major categories for the literature and research.

The first category the study reviewed is the literature and research examining the elements of child development that have been measured or evaluated in an attempt to produce the most reliable prediction of school readiness.

The second category reviewed the literature and research that examined the effects of early intervention programs on non-ready childrens' success early in school and in later school years.

#### Pre-School Screening Elements

Before school readiness can be measured or determined, it must be defined. A. R. Jensen refers to readiness as "the achievement of certain subskills along with the developmental maturity to integrate these subskills into a desired

skill."<sup>1</sup> If the desired skill is stated in terms of a future competence in reading or math, for example, what sub-skills are necessary and when and how are they achieved? For example, if a child has the ability to reason from cause to effect, his skill in math will be greater.

The interaction of all aspects of readiness in successful school achievement was evident in A. Brenner and L. H. Stott's fifteen-year study on childrens' readiness for school. They analyzed sixty-nine variables, including age of children at school entrance and at the time of screening from intercorrelation of these variables, they identified factors influencing school readiness. Some were biological and followed a biological timetable. Others were products of experience. Brenner and Stott generalized that "all aspects of readiness were the result, in some way, of the interaction between hereditary potential and environmental forces, a balance between maturation and environmental experiences."<sup>2</sup>

Brenner and Stott also generalized that the older a child is, the better he/she will function and structure his/her environment and the more he/she will have in

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<sup>1</sup>A. R. Jensen, Understanding Readiness: An Occasional Paper (ERIC ED 032 117), p. 23.

<sup>2</sup>A. Brenner and L. H. Stott, School Readiness Factor Analyzed (Detroit: Merrill-Palmer Institute, 1973), p. 47.

experience and understanding of this world. And the greater his/her body of knowledge before he/she goes to school, the more successful he/she will be at the beginning and in subsequent years.

Another study of pre-entrance variables necessary for school success was conducted by D. J. McCarthy. McCarthy concluded that intelligence was only one of many factors to consider. He identified such characteristics as social maturity, emotional stability, self-reliance, and physical health. He also found a definite relationship between a secure home environment and school success.<sup>1</sup> This is also stated by Gelles and Coulson. "Parental attachment is a readiness factor deserving far more attention than it typically receives. The total balance or imbalance of development must be considered in determining readiness for school."<sup>2</sup>

In the words of Willard Olson, "Children of the same age and same grade level are regularly found to differ by as much as four or five years in their maturation and their readiness to perform tasks."<sup>3</sup>

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<sup>1</sup>D. J. McCarthy, "Pre-entrance Variables and School Success of Underage Children," Howard Educational Review, 25 (1955), 266-69.

<sup>2</sup>H. M. Gelles and M. C. Coulson, "At What Age is a Child Ready for School?" School Executive, 78 (1959), 31.

<sup>3</sup>W. C. Olson, "Experience for Growing," NEA Journal, 36 (1947), 503.

Kohlberg presents a similar view in his work. His cognitive-developmental analysis defines readiness "as a function of age, IQ, and the general background of experience and stimulation."<sup>1</sup> He also notes further that the speeding up of cognitive-structural change is extremely difficult--although a structural change achieved may form a basis for future cognitive development. On the other hand, early learning of specific information (letter recognition, names of animals, number names), is easy to achieve but not likely to have long-range effects on cognitive development. His viewpoint suggests that naming and discriminating may cause a temporary rise on an IQ test for preschool children but over time the IQ gain disappears.

The analysis of Kohlberg, Brenner, and Stott suggested that readiness for formal schooling must involve general age-linked experience and knowledge contributing to certain cognitive-structural changes for conceptual learning. They also suggested that the biological timetable of normal development makes ineffective and unnecessary any attempts to speed up the learning process with specific training. On the other hand, a wide range of ordinary life experience is valuable and appears fundamental for optimum school readiness.

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<sup>1</sup>L. Kohlberg, "Early Education: A Cognitive-Developmental View," Child Development, 39 (1968), 1015.

Another element that has received much attention as an indicator of readiness is the ability to conserve. This is defined as the ability to recognize that a substance does not change simply because the shape or appearance of an object changes. Jean Piaget suggested that,

a child must be able to conserve if (they) [sic] are to be able to do abstract reasoning, cause-and-effect relationship, understand maturation, and be consistent in reasoning and judgment.<sup>1</sup>

Kohlberg concluded that, "the conservation concept is the result, not of maturation only, but also of interactional experience between the individual and the environment."<sup>2</sup>

These findings suggest that experience, supplemented by developmental maturity, produce the cognitive ability to conserve. Children's ability, along with verbal skill in the specific language used for learning should produce the readiness needed for success in formal school tasks and contribute to the economy of the learning effort.

Along with mental readiness, corresponding physical and motor readiness must also exist. B. S. Chissom's study analyzed the relationship between motor development and academic criteria for success for first and third grade boys.<sup>3</sup>

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<sup>1</sup>J. Piaget, The Origins of Intelligence in Children, trans. M. Cook (New York: International Universities Press, 1952), p. 154.

<sup>2</sup>Kohlberg, p. 1060.

<sup>3</sup>B. S. Chissom, "A Factor-Analytic Study of the Relationship of Motor Factors to Academic Criteria for First and Third Grade Boys," Child Development, 42 (1971), 1133-43.

He found that the boys unsuccessful in academics at the first grade level also had not reached standard levels of motor development. This was not found true for third grade boys. This would suggest that motor development is a more reliable measure of readiness with younger children.

Simon evaluated the physical maturity of first-grade children and found from a battery of anthropometric indexes that failing students tended to be less mature than successful students.<sup>1</sup> In this study, body maturity proved to be a sensitive indicator of school readiness.

Neurophysiological readiness or reasonable maturity of the central nervous system, including the ability to coordinate perceptual processes is another element necessary in evaluation of school readiness. Moreney and Wegman found in their study that the child who enters school perceptually unready (auditorily, visually, intersensorily, etc.) will have difficulty in school achievement.<sup>2</sup> The child is not even likely to catch up after the perceptual processing ability is finally developed.

Several studies indicated that young children learn more effectively through auditory presentation than by visual presentation. These include McGeoch and Irion, Budoff and

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<sup>1</sup>M. D. Simon, "Body Configuration and School Readiness," Child Development, 30 (1959), 493-512.

<sup>2</sup>A. Moreney and J. M. Wegman, "Early Perceptual Ability and Later School Achievement," Elementary School Journal, 73 (1973), 323-27.

Quinlan, and Rosner.<sup>1</sup> This information then emphasizes the need to indicate careful attention to auditory perception as well as visual perceptions in screening pre-school children.

Studies have also been carried out that looked specifically at screening instruments purposely developed to focus attention on the various elements that have been described above. An article by Smith and Solanto<sup>2</sup> described the elements screened in the system they developed called Preschool Readiness Estimate for Pupils About to Receive Education. Their process consists of three parts: (1) A lengthy parent questionnaire which calls for physical and health information, home-child relationships, play habits, interests and experiences, skills and attitudes, and independence; (2) Formal evaluation of the child; and (3) A discussion of the results and feedback to the parent.

The areas evaluated in the formal evaluation were

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<sup>1</sup>J. A. McGeoch and A. L. Irion, The Psychology of Human Learning, 2nd ed. (New York: Longmans, Green, 1952), p. 218; M. Budoff and D. Quinlan, "Auditory and Visual Learning in Primary Grade Children," Child Development, 35 (1964), 583-86; J. Rosner, The Development and Validation of an Individualized Perceptual Skills Curriculum (Pittsburg: Learning Research and Development Center, University of Pittsburg, 1972), p. 82; J. Rosner, "Language Arts and Arithmetic Achievement, and Specifically Related Perceptual Skills," American Educational Research Journal, 10 (1973), 59-68.

<sup>2</sup>Stanley A. Smith and J. R. Solanto, "An Approach to Preschool Evaluations," Psychology in the Schools, 2 (April 1971), 142-47.



(1) vocabulary skills; (2) numerical skills; (3) visual-motor skills; (4) new learning ability; (5) immediate recall ability; (6) intelligence level; and (7) psychological maturity.

The assessments used were: (1) Vocabulary skills--the picture vocabulary and the first eight words on the Stanford-Binet Intelligence Scale; (2) Numerical Skills--the arithmetic subtest of the WPPSI; (3) Visual motor skills and immediate recall ability, the block design and sentence subtest of the WPPSI; (4) New learning ability--the animal house on the WPPSI; (5) Intelligence level--determined by overall performance on objective measures; and (6) Psychosocial maturity was assessed on the basis of attention span, persistence at the tasks, oral-expressive behavior, and overall rapport and testing behavior. The parent questionnaire contributed further insight into the child's psychosocial maturity.

Smith and Solanto have not attempted to follow the children who completed the evaluation to determine its reliability, but the article suggested local acceptance of the process as a reliable measure.

Other studies of predictive measures, however, have addressed the reliability issue. Severson spoke to this issue in his paper, "Problems in the Practical Establishment of Predictive Measures in the School." This report discussed the practical problems encountered in a longitudinal

study that at the time of the writing was in its fourth year. The focus of the study was early identification of later learning disorders. However, a general goal was the identification of tests with the characteristics of high reliability, low cost, short time to administer, low demand on scoring sophistication, and which could be given in group form by a classroom teacher.<sup>1</sup>

A number of instruments were used which had to be administered individually. If they met some of the criteria, then consideration was given to converting them into group administered tests or using paraprofessionals to administer them successfully.

Three major sources of unreliability were found in instruments previously reported as reliable. The sources of unreliability are: examiner reliability, scorer reliability, and reliability of interpretation of differences. The vocabulary subtest of the WISC, improved by Jastah and Jastah, was found to have been the best single subtest predictor. The visual sequential memory subtest of the Illinois Test of Psycholinguistic Ability (ITPA) was found to predict first grade achievement more powerfully than the total ITPA or the Stanford-Binet IQ test.

Several other instruments studied to determine their

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<sup>1</sup>Roger A. Severson, "Problems in the Practical Establishment of Predictive Measures in the Schools: Part Two," American Educational Research Association, Minneapolis, Minnesota, March, 1970.

predictive ability are the Casey-Monahan Screening Instrument, the Maryland Systematic Teacher Observation Instrument, South Carolina's Cognitive Skills Assessment Battery, Developmental Indicators for the Assessment of Learning (DIAL), and the Gesell Developmental Test. The authors of these studies, Casey, Suhorsky and Wall, Meredith, Mardell and Goldenberg, Shatswell, and Andrews, all found indicators for the reliability and validity of the various instruments or systems.<sup>1</sup> It may also be noted that each of these instruments include a wide battery of assessments, not a single test in only one area of child development. These tests would meet the suggested criteria from a study done by Margaret Donovan in which she found that early assessments should use a battery over a single readiness test, recognize different learning modalities, and utilize a developmental sequence in the area of perception and cognition.

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<sup>1</sup>Jean Marie Casey, A Pre-Kindergarten Screening (ERIC ED 145 966); Joseph Suhorsky and Robert E. Wall, A Validation Study of the Early Identification and Intervention Program Screening Instruments: A Longitudinal Study (ERIC ED 171 777); Vano H. Meredith et al., Ready or Not: A Report of the 1979 Statewide Readiness Test Administration and Results (ERIC ED 201 380); Carol Mardell and Dorothea S. Goldenberg, The Predictive Validation of a Pre-Kindergarten Screening Test (ERIC ED 135 157); David Wayne Shatswell, "The Gesell Developmental Test as a Predictor of School Success," Diss. Lawrence Univ., 1982; Ann M. Andrews, "The Gesell Developmental Test as a Predictor of School Readiness," Diss. Univ. of Pennsylvania, 1971.

Her findings, however, suggested that specific methods and strategies for use with high-risk pupils have shown inconclusive results.<sup>1</sup>

The research of Nathlie Badian also focused on the early prediction of academic underachievement or learning difficulty.<sup>2</sup> Her research suggested that the child at highest risk for school learning difficulties is a later-born male who has a history of prior prenatal complications, and who is not of superior intelligence. Badian also concluded that group tests, and in particular, readiness tests, are superior to most individual administered tests as predictors. Single subtests such as letter naming often surpass total tests in predictive validity. She also concluded that kindergarten teachers' judgments tend to be more accurate than formal tests. The author's preliminary findings revealed that the Wechsler Preschool and Primary Scale of Intelligence information and sentence subtests, letter naming, name writing, and ability to name five basic geometric shapes are excellent predictors of early academic achievement.

The concept of school readiness has also been examined from a medical perspective. The Pediatric Examination of

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<sup>1</sup>Margaret A. Donovan, "The Relationship Between Early Assessment and Adjusted Instructional Strategies in Reading for High Risk Learners," International Reading Association, Honolulu, Hawaii, July 1976.

<sup>2</sup>Nathlie A. Badian, Early Prediction of Academic Underachievement (ERIC ED 122 500).

Educational Readiness (PEER) was designed as an integrated health and neurodevelopmental instrument to be administered by pediatricians and nurses to identify potential learning disabled children who need intervention. The neurodevelopmental portion of the test covered: (1) spatial body awareness; (2) gross and fine motor performance; (3) visual processing; (4) auditory language function; and (5) experiential knowledge.

Oberklaid compared children's scores on the PEER to the children's scores on the General Cognitive Index of the McCarthy Scales of Children's Abilities and on the Kindergarten Performance Scale and found a high correlation between students identified as being at educational risk on each of these measures. He concluded that these correlations supported the concurrent and predictive validity of the PEER.<sup>1</sup>

The literature and research review indicates a wide range of screening procedures and measurement devices. The review does indicate that the most reliable and valid measures are those that assess a wide range of child development factors. Some of the subtests do possess a high degree of predictive ability for problems but do not provide a broad base of information on a child's development for education planning.

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<sup>1</sup>F. Oberklaid et al., The Pediatric Examination of Examination of Educational Readiness. An Integrated Health and Neurodevelopmental Assessment Instrument (ERIC ED 166 196).

### Early Intervention Programs

The other major category the literature review discovered was information on early intervention programs. This body of literature is not as large as the first section which dealt with screening instruments.

One of the issues raised in the literature on school readiness is best summarized in a passage from an article by Robert Wendt.

Readiness, which is a common concept for testing, also can be questioned because it raises the issue of the basic role of the school. Is it the role of the schools to determine who is ready for their program, or to take the child at his/her present level and educate him/her accordingly? An additional confounding issue is that "readiness" is often related to the cultural level of the school or community. A child may not be ready in one school, but well able to handle the program in another area of the same community. Some children, indeed, are better off in a school environment rather than remaining home an extra year, which often happens as a result of a readiness measure. A case in point is Kohlberg and Gershman's (1973) study where immature preschool children were put into three groups: a waiting at home group, a kindergarten readiness program, and a regular program. Follow-up data suggested little or no advantage to waiting. And the authors questioned the idea that readiness can be expressed as a unitary concept. Unfortunately, testing for school readiness appears to be rarely related to effective programming for the non-ready child.<sup>1</sup>

The issue identified asked if screening preschool children resulted in more appropriate programming for those

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<sup>1</sup>Robert N. Wendt, "Kindergarten Entrance Assessment, Is It Worth the Effort?" Psychology in the Schools, 15 (1978), 60.

children identified as "not ready." Another issue addressed how effective intervention programs are in helping students to make significant gains. John Keanderman studied the effects of a Kindergarten Perceptual Motor Development Program to look at the issue.<sup>1</sup> The hypotheses of his study stated that a structured sequential perceptual-motor development program would demonstrate significant gains for the experimental groups in (1) academic achievement, (2) master of basic skills, (3) gross motor skills, and (4) fine motor skills. The students were pre-tested and post-tested using the Stanford Early School Achievement Test, Boehm Test of Basic Concept, the Motor Facilitation Skills Survey, and the Metropolitan Readiness Test. The analysis of the results showed that all four of the hypotheses were unsupported.

Much of the research and literature describing and studying early intervention programs is associated with the Headstart Program. These programs organized for low socioeconomic children, and have demonstrated much success in producing gains in these young children. Robert Dwyer studied head start children who had received the Environmental Academics Program as a part of their headstart experience, and his study showed significant gains over a

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<sup>1</sup>John Watson Klanderma, "A Study of the Effects of a Kindergarten Perceptual-Motor Development Program," Diss. Michigan State Univ., 1971.

control group on IQ and achievement measures.<sup>1</sup>

The Chicago Public Schools developed an extensive program called Chicago Early Program which identified and provided remediation for prekindergarten children who were considered likely to have school learning problems. The Head Start Program and other Title I ESEA Child-Parent Centers delivered this program. A longitudinal analysis of the predictive ability of their assessments and the success in school of children who participated is being conducted. Carole Perlman reported, in a paper she presented at the American Education Research Association, that EARLY students have not been placed in special education classrooms or retained in primary classes as frequently as the students with no preschool experience.<sup>2</sup>

A report by Irving Laylor, which analyzed the findings of several longitudinal studies of low income children who participated in experimental preschool intervention programs, identified findings similar to those of the Chicago project.<sup>3</sup>

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<sup>1</sup>Robert C. Dwyer, "An Evaluation of the Effectiveness of a New Type of Preschool Compensatory Program: Environmental Academics," American Educational Research Association, April 1972.

<sup>2</sup>Carole L. Perlman, "Chicago EARLY Program Follow-up: A Longitudinal Analysis," American Education Research Association, April 1981.

<sup>3</sup>Irving Laylor et al., "Lasting Effects After Preschool," Evaluative Report for Department of Health, Education and Welfare, October 1978.



The data from these reports are organized into four categories: (1) preschool effects on target children's later school performances, including retention in grade, significant changes in achievement and intelligence test scores, and assignment to special education classes in the primary grades; (2) attitudes and values of the children and parents involved in the program related to children's achievement motivation and self-esteem and parents' aspirations for their children; (3) kind of preschool programs that were most effective in helping the target children avoid placement in special education classes; (4) determination of special education placements. As reported by Laylor, the data showed lasting effects in the following areas: reduced number of children assigned to special education classes, reduced number of children retained, higher achievement test scores for children at the fourth grade level; higher IQ scores, higher achievement oriented attitudes and values.

Other early intervention projects were studied and offered similar results. The Ypsilanti Perry Preschool Project, Primary Programs of Greater Victorial School District No. 61, Kindergarten Diagnostic Prereading Program, and the Kamehameha Early Education Project are examples of similar programs. Each of the longitudinal studies of these programs revealed long-term success for students in these projects.

Another successful program is the Toronto Early Identification and Developmental program. This program obtained similar results as described in the other projects, but its focus was not just on low income families. Landrus reported that the project had identified students from all socio-economic backgrounds and has also documented successful results.<sup>1</sup>

The review did not produce a large volume of research on early intervention programs. The focus was on the screening instruments. Because of this shortage of research on the outcome of early intervention programs, other than Head Start programs, additional research is needed.

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<sup>1</sup>B. D. Landrus et al., "The Toronto Early Identification and Developmental Program," Research Report for Toronto Board of Education, December 1974.

## CHAPTER THREE

### Methods and Procedures

The methods and procedures utilized in this study are discussed in this chapter. The following sections are included: (1) scope, (2) instrument, (3) sample selection, and (4) data analysis procedures.

#### Scope

This research study was designed to investigate the relationship of childrens' test results from an alternative or optional kindergarten program compared to children in the regular kindergarten program. The design utilized was a pre-test/post-test model. The Metropolitan Readiness Test was the instrument used. Level I, Form P, was administered in October of 1983 and Level II, Form P, was administered in May of 1984. The study analyzed the test scores obtained by children in the regular and optional kindergarten program during the 1983-84 school year.

#### Instrument

The instrument used in this study was the Metropolitan Readiness Tests by Joanne R. Nurss and Mary E. McGauvran (1974) by Harcourt Brace Jovanovich, Inc. This test was first developed in 1933 with updates in 1964, 1966, 1969,

1974, and 1976.

In the Seventh Mental Measurements Yearbook edited by Oscar Bures, a review of the test was given by Dr. Robert Dyksta, Professor of Education, University of Minnesota. Dr. Dyksta stated: "The MRT is designed to measure readiness for first grade instruction and to provide teachers with information helpful in classifying pupils." The assumption underlying the MRT is that present level of performance, based upon interaction of maturation and post learning, is the best predictor of future achievement.

The manual provides a great deal of information about administering, scoring, and interpreting the tests. The manual provides a long discussion on interpreting test results which is a major strength of the MRT. Emphasis is placed on pupil performance on the total battery, and the test authors clearly caution against undue weight being attributed to subtest scores because of the lower reliabilities associated with the shorter tests. The subtests on the MRT are auditory, memory, rhyming, letter recognition, visual matching, school language and listening and quantitative language.

The alternate form reliabilities of the subtests range from .50 for Listening to .86 for Letter Recognition. The alternate form reliability of .91 for the total for tests 1-6 is considered high enough to use with individual students. These reliabilities support the authors' statements

on attaching too much significance to subtest scores of individual students. The reliability data reported were computed using both split-half and alternate form techniques.

Dr. Dyksta's closing paragraph stated,

This test ranks very high among readiness tests. It has undergone careful development, it appears to be valid and reliable, and it provides unusually specific information about the instructional significance of test results. If a school system wishes to administer a readiness test in either kindergarten or first grade, it should find the Metropolitan Readiness Tests a useful tool.

#### Sample Selection

This study was conducted in an independent suburban school district near a midwestern metropolitan area. The population study consisted of the thirty-two children enrolled in the district's optional kindergarten program and thirty-two children randomly selected from the regular kindergarten population of the district's six elementary schools.

The regular kindergarten population was 206. From that population it was determined which proportion of the entire population was represented by each of the six elementary schools. This was done to insure that the subjects included in the random sample were identified in the same proportion that existed in the total population. A number was assigned to each subject and a table of random numbers was utilized to draw the sample. Since each elementary

school represents a specific neighborhood within the district, the stratified random sample was determined to be a good method of selecting the sample. Table 1 contains the numerical distribution of the process described.

Table 1  
Numerical Values of Stratified Random Sample

School	Regular Kindergarten Enrollment	Percent of Total Population	Number of Objects in Sample
1	35 RG	17%	5
2	62 O	30%	10
3	24 V	12%	4
4	39 KA	19%	6
5	13 B	6%	2
6	33 J	16%	5
Total	206	100%	32

#### Data Analysis Procedures

Multiple analysis of variance statistical procedures were utilized to test Hypothesis One, Two, Three, and Four. A one-way analysis of variance procedure was utilized to test Hypothesis Five. The data for the study was analyzed on the computer at the University of Nebraska - Lincoln through the NEAR Computer Center. The programs used were those available through the Statistical Package for the Social

Sciences (SPSS) system.<sup>1</sup>

The multiple analysis of variance procedures were utilized in this study to test for statistical change in the pre-test/post-test model because these procedures yield a better growth index. W. J. Popham and K. A. Sirothmih pointed out in their book, Educational Statistics, Use and Interpretation,

Fortunately, the traditional "posttest minus pretest" difference score has been exposed as a simplistic, misleading, and statistically unsound design for the assessment of change. Unfortunately, there is a great deal of controversy and difficulty in determining a useful procedure to take its place. Measuring change is closely related to the concept of sensitivity; each subject being measured more than once functionally serves as his own control, which has the net effect of generally reducing appropriate error terms relative to systematic sources.

In fact, perhaps the best way of assessing change in the common pretest-posttest design is to perform an analysis of variance. The difference between posttest score and predicted posttest score is generally a better growth index<sup>2</sup> than the raw post - minus - pre score difference.

The multiple-classification analysis of variance was chosen to test Hypotheses One, Two, Three, and Four because the research was testing the relationship between one dependent variable and several independent variables. These

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<sup>1</sup>C. Hadlai Hull and Norman H. Nie, Statistical Package for the Social Sciences, 2nd ed. (New York: McGraw-Hill Book Co., 1981).

<sup>2</sup>W. Jones Popham and Kenneth A. Sirothmih, Educational Statistics, Use and Interpretation (New York: Harper and Row, 1973), p. 177.

procedures also allowed this researcher to test for relationships between the dependent variable and various interactions of the independent variables.

A one-way analysis of variance statistical procedure could have been utilized to test Hypotheses One, Two, Three, and Four to determine if there was a significant difference between the means of the MRT results and the two types of classrooms, optional and regular kindergarten. This researcher, however, felt that, in addition to this information, the relationship of age and sex should be analyzed.

The multiple analysis of variance for Hypothesis One and Two is a 2 X 2 X 2 ANOVA and a 2 X 2 ANOVA for Hypothesis Three and Four. Because of the researcher's interest in the relationship between the optional kindergarten group and the regular kindergarten group the 2 X 2 ANOVA was chosen for Hypotheses Three and Four a priori so that analysis of the difference between groups could be made. The 2 X 2 X 2 ANOVA analysis of Hypothesis One and Two will examine the difference between pre- and post-test scores but will also reveal any relationship among score, sex and age. Age has been divided into two categories: first, is children from five years zero months to five years four months; second is five years five months and above.

The one-way ANOVA was used for Hypothesis Five because of the researcher's interest in only one factor. What was



the difference between means of the optional kindergarten group at the spring testing and the regular kindergarten group at the fall testing?

In this study, the multiple-classification analysis of variance utilized the following variables in Hypotheses One, Two, Three, and Four:

<u>Hypothesis</u>	<u>Dependent Variable</u>	<u>Independent Variables</u>
1 & 2	Pre-test MRT score Post-test MRT score	Age Sex
3 & 4	Pre-test MRT score Post-test MRT score	Type of Classroom: Regular Optional

The assumptions necessary to be met for the use of the statistical analysis procedures are summarized from Popham as follows:

1. The subjects in each subgroup are random samples from their corresponding populations.
2. The measures must be normally distributed in the subgroup populations.
3. The variance within the subgroup populations must be homogeneous.

The preceding conditions were assumed to be tenable because the study utilized a predominantly middle-class suburban and homogeneous school district. The populations represent a uniform cross-section of the district.

The descriptive data that is provided with this study

included the subjects' chronological age, birth date, and redundant sex. This information is presented in Chapter Four by use of tables and narrative which explain the significance of the F values derived from the computations. Descriptive data also presented in Chapter Four are the means and standard deviations.

CHAPTER FOUR  
Analysis of Data

This study investigated the relationships between readiness test results obtained by children in an optional kindergarten and a regular kindergarten program as measured by the Metropolitan Readiness Test. These relationships were examined within each group and between groups. This chapter provides an analysis of the data collected for testing the hypotheses that formed the basis of the study. It is divided into two sections: (1) descriptive statistics for each group, and (2) presentation of data for the hypotheses.

Descriptive Statistics for Each Group

The optional kindergarten group consisted of thirty-two children, twenty-one boys and eleven girls. The ages ranged from five years two months at the October 1983 testing to five years eight months. The children were divided for statistical purposes into two groups: Group 1 five years zero months to five years five months and Group 2 five years six months and above. Group 1 contained twenty-three children, twelve boys and eleven girls. Group 2 contained nine children, seven boys and two girls.

The random sample of regular kindergarten children contained thirty-two children, fourteen boys and eighteen girls. The ages ranged from five years three months to six years three months at the October 1983 testing. This group was also divided into two age groups, five years zero months to five years five months and five years six months and above. Group 1 contained seven children, five girls and two boys. Group 2 contained twenty-five children, twelve boys and thirteen girls.

The standard deviation and mean scores were computed for each group on the fall testing and the spring testing. The scores are presented in Tables 2 and 3.

Table 2

Optional Kindergarten  
Metropolitan Readiness Test

	Standard Deviation	Mean	Cases
Fall	10.03658	58.09375	32
Spring	10.25477	50.46875	32

Table 3  
 Regular Kindergarten Random Sample  
 Metropolitan Readiness Test

	Standard Deviation	Mean	Cases
Fall	5.91668	66.65625	32
Spring	4.82433	65.62500	32

The total number of children's test scores analyzed was sixty-four. This group contained thirty-five boys and twenty-nine girls. The total group divided into the two age categories included thirty children in Group 1, fourteen boys and sixteen girls and Group 2, thirty-four children, nineteen boys and fifteen girls.

Presentation of Data for the Research  
 Hypotheses

This study focused on five hypotheses. A three-way analysis of variance was utilized on hypotheses one and two. The three-way ANOVA was chosen a priori to tests for significance in relationship to the age and sex of the children along with the factor of time from the beginning to the end of the school year. Table 4 presents the data for the first hypothesis.

Hypothesis 1: There will be no significant difference in the results obtained by children in the optional kindergarten program on the Metropolitan Readiness Test given at the beginning and at the end of the school year.

Table 4

Table of F Values, Probability, Mean Scores, and Standard Deviations for Optional Kindergarten Programs

Relationship	F Value		Probability	
Sex to mean scores	0.23		0.6318	
Age to mean scores	1.72		0.2006	
Sex and age to mean scores	0.90		0.3505	
Time (Fall to Spring) to mean scores	21.06		0.0001	
Time to sex	0.02		0.8796	
Time to age	0.87		0.3582	
Time to sex and age	0.01		0.9311	

  

Age & Sex	Group 1 Males	Group 2 Males	Group 1 Females	Group 2 Females
<u>Mean Scores</u>				
Fall	56.46154	56.50000	62.55556	55.00000
Spring	49.92308	46.87500	55.77778	44.50000
<u>Standard Deviation</u>				
Fall	9.77766	7.74597	10.66667	19.79899
Spring	8.45046	12.95528	8.42201	14.84924

The analysis of the data for Hypothesis One does show a significant difference between the fall test scores and the spring test scores for the optional kindergarten at the .0001 level. Analyzing for a difference in sex and age showed no significant difference.

Table 5 presents the data for Hypothesis Two.

Hypothesis 2: There will be no significant difference in the results obtained by an equal number of randomly selected children in the regular kindergarten program on the Metropolitan Readiness Test given at the beginning and end of the school year.

Table 5

Table of F Values, Probability, Mean Scores, and Standard Deviations for Regular Kindergarten Program

Relationship	F Value		Probability	
Sex to mean score	0.23		0.6382	
Age to mean scores	0.02		0.8755	
Sex and age to mean scores	0.62		0.4381	
Time (Fall and Spring) to mean scores	1.38		0.2494	
Time to sex	0.00		0.9848	
Time to age	0.19		0.6689	
Time to age and sex	0.30		0.5894	

  

Age & Sex	Group 1 Males	Group 2 Males	Group 1 Females	Group 2 Females
<u>Mean Scores</u>				
Fall	65.5000	66.58333	67.8000	66.46154
Spring	63.0000	66.33333	66.6000	65.00000
<u>Standard Deviation</u>				
Fall	12.02082	5.51788	6.68581	5.89654
Spring	4.24264	3.42008	2.50998	6.58781

The analysis of the data for Hypothesis Two does not show any significant difference from the fall to spring test scores. Analyzing for a difference in sex and age also

showed no significant difference

A two-way analysis of variance procedure was utilized to test Hypotheses Three and Four. A diagram of the procedure is shown in Table 6.

Table 6

Table Showing Diagram of Two-Way Analysis of Variance

	Fall Testing	Spring Testing	
Regular Kindergarten	66.65	65.63	66.14
Optional Kindergarten	58.09	50.47	54.46
Overall Mean	62.37	58.04	60.21

Included in the diagram are the individual group mean scores and the overall mean scores. Table 7 presents the data for Hypotheses Three and Four.

Hypothesis 3: There will be no significant difference between the results obtained by children in the optional kindergarten program and an equal number of randomly selected children in the regular kindergarten program on the Metropolitan Readiness Test given at the beginning of the school year.

Hypothesis 4: There will be no significant difference between the results obtained by children in the optional kindergarten program and an equal number of randomly selected children in the regular kindergarten program on the Metropolitan Readiness Test given at the end of the school year.



Table 7

Table of F Values and Probability for Fall and Spring Testing

Relationship	F Value	Probability
Group to Group	40.51	0.0000
Blended Means		
Overall Means to Time	28.56	0.0000
Group to Group Over Time	16.57	0.0001

The analysis of the data for Hypotheses Three and Four does show a strong significant difference (0.0000) between the fall and spring test scores of the optional kindergarten children and the regular kindergarten children. It also shows a strong significant difference (0.0000) between the overall mean scores.

A one-way analysis of variance procedure was used to test Hypothesis Five. Table 8 presents the data for Hypothesis Five.

Hypothesis 5: There will be no significant difference between the results obtained by children in the optional kindergarten program on the Metropolitan Readiness Test given at the end of the school year and the results obtained by an equal number of randomly selected children in the regular kindergarten program on the Metropolitan Readiness Test given at the beginning of the school year.

Table 8

Table of F Value and Probability for Spring Optional Program Testing and Regular Program Fall Testing

Relationship	F Value	Probability
Optional Kindergarten Spring Score to Regular Kindergarten Fall Score	59.82	0.0000

The analysis of the data for Hypothesis Five does show a significant difference between the spring test scores of the optional kindergarten children and the fall test scores of the regular kindergarten children. This difference is shown to be beyond the 0.001 level.

A summary of the findings is presented in Table 9. Hypothesis One explaining the difference between fall testing and spring testing of the optional kindergarten children was rejected at the 0.0001 level. Hypothesis Two examining the fall and spring testing of regular kindergarten children was retained because no significant difference was shown. Hypotheses Three, Four, and Five, which analyzed differences between the regular kindergarten children and optional kindergarten children were all rejected at the .0001 level or beyond.

Table 9  
Summary Table of Research Hypotheses

Hypotheses	P	Retained	Rejected
1	.0001		x
1a. Sex	.6318	x	
1b. Age	.2006	x	
1c. Sex & Age	.3505	x	
2	.2494	x	
2a. Sex	.6382	x	
2b. Age	.8755	x	
2c. Sex & Age	.4381	x	
3	.0001		x
4	.0000		x
5	.0000		x

## CHAPTER FIVE

### Summary, Conclusions, and Recommendations

This chapter contains a summary of the findings of this study, conclusions, and recommendations for future research.

The purpose of this study was to determine whether children who were identified through a pre-school screening process as "risk" children for kindergarten actually performed differently on a standardized readiness measure than regular kindergarten children. The study investigated differences in each group's performance from the fall of the school year to the spring. It also investigated the difference in group performance between the groups. The dependent variables were the raw scores obtained by children on the Metropolitan Readiness Test. Level I, Form P, was administered in the fall and Level II, Form P, was administered in the spring. The independent variables were type of classroom; regular or optional; age, sex, and time.

This study was conducted in an independent suburban school district near a midwestern metropolitan area. The subjects for the study were sixty-four kindergarten children from the 1983-84 school year, thirty-two children attending the optional kindergarten program and thirty-two randomly selected children from the regular kindergarten program.

The multiple-classification analysis of variance was used to test for differences between means on the Metropolitan Readiness Test. This procedure also allowed investigation of type of classroom, sex, and age differences.

#### Summary and Interpretation of Findings

The hypotheses to which this study were addressed are stated below. Each hypothesis was tested at the .05 level of significance.

Research Hypothesis 1. There will be no significant difference in the results obtained by children in the optional kindergarten program on the Metropolitan Readiness Test given at the beginning and at the end of the school year.

The hypothesis was rejected at the .05 level because the value of the computed F ratio for main effects had a probability of .0001.

Research Hypothesis 2. There will be no significant difference in the results obtained by an equal number of randomly selected children in the regular kindergarten program on the Metropolitan Readiness Test given at the beginning and end of the school year.

This hypothesis was retained at the .05 level because the value of the computed F ratio for main effects had a probability of .2494.

Research Hypothesis 3. There will be no significant difference between the results obtained by children in the

optional kindergarten program and an equal number of randomly selected children in the regular kindergarten program on the Metropolitan Readiness test given at the beginning of the school year.

This hypothesis was rejected at the .05 level because the value of the computed F ratio for main effects had a probability of .0000.

Research Hypothesis 4. There will be no significant difference between the results obtained by children in the optional kindergarten program and an equal number of randomly selected children in the regular kindergarten program on the Metropolitan Readiness Test given at the end of the school year.

This hypothesis was rejected at the .05 level because the value of the computed F ratio for main effects had a probability of .0000.

Research Hypothesis 5. There will be no significant difference between the results obtained by children in the optional kindergarten program on the Metropolitan Readiness Test given at the end of the school year and the results obtained by an equal number of randomly selected children in the regular kindergarten program on the Metropolitan Readiness Test given at the beginning of the school year.

This hypothesis was rejected at the .05 level because the value of the computed F ratio for main effects had a probability of .0000.

The findings of this study are consistent with the research results of Brenner, Stott, McCarthy and others as cited in Chapter Two. The pre-entrance screening procedures using a wide range of child development factors identified children who did not possess readiness skills. The probability factor of this study shows a very large difference in the two groups both at the beginning and at the end of the year.

#### Conclusion

The significant difference identified in the first hypothesis, which examined the Optional Kindergarten children's readiness scores at the beginning and at the end of the year, was due to the group's mean score decreasing from fall to spring. The Metropolitan Readiness Test Level I is designed to examine a child's readiness for kindergarten, and the Level II test is designed to test first grade readiness. The examination of the data indicates that the optional children's fall scores show the group does not possess appropriate skills for kindergarten and the spring scores show the same for first grade. The data also show that, as a group, the optional students are much less ready for first grade than for kindergarten.

The review of the literature did indicate that other researchers had found readiness to be related to age and sex differences. This study did not find significant differences

when analyzing these two factors. In the data for Hypothesis One, the age factor came the closest to being significant but did not reach a level that would allow any generalization to be made.

The overall conclusion that can be drawn from the data is that a significant difference does exist between the Optional Kindergarten children and Regular Kindergarten children as measured by the Metropolitan Readiness Test. The results appear to support the necessity for providing children programs designed specifically for their readiness levels.

#### Recommendations for Future Research

Based upon the results and generalizations derived from this study, future researchers might address themselves to the following suggestions and recommendations:

1. Studies are needed which replicate this research to evaluate the generalizability of the findings.
2. Studies are needed which would examine the readiness for kindergarten of those children having completed the Optional Kindergarten program. The use of the Metropolitan Readiness Test Level I, Form Q, in the spring for the Optional Children could be analyzed with the Level I, Form P, given in the fall to determine if there was any significant difference in the group's readiness.
3. Studies are needed which would examine the differences in readiness for those children in the optional program



and those risk children who chose other options. The option to examine would be risk children who remained at home, those who attended private preschools, those who were left in child care other than the home, and those that attended the regular kindergarten program.

4. Studies are needed which would further examine the sex and age differences related to readiness.

5. Studies using a longitudinal design are needed to examine the school success of risk children as they progress through the elementary school.

6. Studies using a longitudinal design are needed to examine school success of risk children in relationship to the school or non-school options chosen at the time they reached school age.

7. Studies are needed examining the growth of the students in relation to the different curriculum offerings, optional and regular, to determine the appropriateness of the experiences.

These recommendations may provide additional information for educators enabling them to better meet the needs of children as they begin their school experience. Further studies are needed to help education look to preventative models for school difficulties rather than the reliance on the remedial models that are presently more widespread.

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