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THE DEVELOPMENT OF A GROUP PRESCHOOL SCREENING TEST
OF
EARLY SCHOOL ENTRANCE POTENTIALITY

---

by
August Edward Ahr

A Dissertation Submitted to the Faculty of the Graduate School
of Loyola University in Partial Fulfillment
of the Requirements for the Degree
of Doctor of Education

January

1966

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August Edward Ahr
1966

LIFE

August Edward Ahr was born January 27, 1936, in Albuquerque, New Mexico, where he completed his elementary and secondary education at St. Mary's Grade and High School.

He began his undergraduate course work at Spring Hill College, Mobile, Alabama, but later transferred to the University of New Mexico where he was granted the Bachelor of Science degree in June, 1957, and Master of Science degree in June, 1959.

During 1959 the author taught English and social studies at the seventh grade level at Blythe Junior High School, Blythe, California. In 1960, he served the Plattsburgh Public Schools in upper New York State as a school psychologist and spent the following two years in the same capacity with the Cayuga County Public Schools in central New York State. Since 1962, he has been employed as a school psychologist by the Niles Township Department of Special Education, Lincolnwood, Illinois. In 1964, he was appointed Supervising School Psychologist.

His Master's thesis was published under the title, "The Role of Error Density and Set in a Vigilance Task", in the Journal of Applied Psychology, XLIV (April, 1960), 205-209. The author has published two other articles: "The Psychological Referral: A Procedural Approach", Psychology in the Schools, II (July, 1965), 224-228; and coauthored "The School Psychologist as a Resource Person: Initiating and Conducting In-service Teacher Education",

Psychology in the Schools, II, (July, 1965), 220-224.

The writer holds membership in the American Psychological Association and the Illinois Psychological Association.

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TABLE OF CONTENTS

CHAPTER	PAGE
I. INTRODUCTION	1
Statement of the Problem	8
Purpose of the Study	9
Significance of the Problem	9
Scope of the Study	11
Questions to be Answered	11
Summary.	12
II. REVIEW OF THE LITERATURE	14
Present Admission Policies in the United States . .	14
Multiple Criteria for School Readiness	15
Chronological age	16
Mental age	19
Social and emotional maturity	21
Physical maturity	22
Sex	22
Practical Problems of Early Admission	24
Districts Dissatisfied with Flexible Admission Programs	27
Description and Evaluation of Early Entrance Programs	30
Evanston, Illinois	30
Brookline, Massachusetts	32
Minneapolis, Minnesota	36

Nebraska	39
Pennsylvania	42
Underage High School and College Students	44
Suggested Guidelines for Early Entrance Programs	46
Chronological age	47
Mental age	47
Parental request	49
Physical health	49
Social and emotional maturity	50
Physical size and coordination	50
Sex	50
Reporting the decision	50
Parent interview	51
Retesting	51
Standardized tests	52
Decision	52
Trial period	52
Present Tests Available at the Preschool Level	53
Testing Problems at the Preschool Level	54
Group Testing and the Preschool Level	56
III. DESIGN	59
Rationale	59
Item Selection	63
Test Materials	72

IV. METHOD	77
The Sample	77
General Procedures	80
Group Test Procedures	82
V. RESULTS	88
Group Test Normative Data	88
Rapport and Motivation	98
Suitability of Test Items	99
Reliability	105
Test-retest	105
Kuder - Richardson estimates	108
Hoyt's analysis of variance	108
Validity	108
Face validity	108
Concurrent validity	109
Efficiency and Effectiveness	110
Professional Personnel Time and Expense	116
Specialist's Time	116
Scorer reliability	116
Specialist's expense	118
Consideration of Questions	119
VI. DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS	121
Group Test Normative Data	121
Rapport and Motivation	124
Suitability of Test Items	126

Reliability	128
Validity	134
Efficiency and Effectiveness	138
Professional Personnel Time and Expense	141
Conclusions	142
Recommendations	146
VII. SUMMARY	150
BIBLIOGRAPHY	154
APPENDIX A	168
APPENDIX B	200
APPENDIX C	258

LIST OF TABLES

TABLE	PAGE
I. Achievement of Early Entrance Pupils at End of Third Grade, Predicted from Preschool Binet Mental Ages	49
II. Item Analysis Data on Stanford-Binet Comparing Preschoolers who were Admitted Early and Rejected for Kindergarten Placement	64
III. Frequency Distributions of Item Analysis Data for Discrimination and Difficulty Indexes on Fifty Try-out Items in Original Group Test with Nursery School Children	70
IV. Type and Number of Items Included in Preschool Group Test	73
V. Size of Sample by Birthdate and Sex	80
VI. Comparison of Group and Individual Test Results . .	89
VII. Frequency Distributions of Raw Scores for each Age Group in Sample	92
VIII. Difference between Means by Age	93
IX. Frequency Distributions of Raw Scores by Sex . . .	94
X. Deviation Intelligence Quotients for Group Test Normative Sample	95
XI. Constants utilized in Formule to obtain Deviation IQ's for Normative Sample	97

XII.	Item Analysis Data for Group Preschool Screening Test	100
XIII.	Frequency Distributions of Item Analysis Data for Discrimination and Difficulty Indexes	102
XIV.	Reliability Estimates for Upper and Lower Twenty-Seven Percent of Sample	103
XV.	Group Test Items Demonstrating a Bias in favor of Girls	104
XVI.	Summary of Studies on Test-Retest Reliability . .	105
XVII.	Test-Retest Raw Data for Four Week Interval in Administration of Group Test	106
XVIII.	Test-Retest Raw Data for Eight Week Interval in Administration of Group Test	107
XIX.	Frequency Distributions of Group and Individual Intelligence Scores	111
XX.	Bivariate Distribution showing Relationship between Test Scores on Group Test and Individual Test . .	113
XXI.	Expectancy Table showing Relation between Early Entrance to Kindergarten Test and Stanford-Binet .	113
XXII.	Efficiency and Effectiveness of Group Test by various Cut-off Scores in Sample	115
XXIII.	Scorer Reliability Intercorrelations	117
XXIV.	Personnel Expenditures for Early Admission Program	118

LIST OF FIGURES

FIGURE	PAGE
1. Scattergram showing Relationship between Scores on Early Entrance to Kindergarten Screening Test and Stanford-Binet	112
2. Revision of Item 16	129

LIST OF PLATES

Plate	PAGE
1. Photographs of Administration and Activity Period	87

CHAPTER I

INTRODUCTION

Allowing a child to enter school earlier than the minimum chronological age requirement on the basis of multiple criteria, is one of many types of acceleration available to the school administrator. Generally, all forms of acceleration are subsumed under two main classifications: rapid progress and double promotion. Rapid progress refers to the opportunity of pupils to accomplish their regular work at faster rates than average. Some examples would include the ungraded primary, ungraded classes, the lengthened year, or any procedure which concentrates instruction into shorter time periods. Double promotion refers to skipping a grade and may be differentiated from the former method in that verification is generally lacking as to whether the instructional material has been mastered. In fact, in the past grade skipping has been thought to be synonymous with the term acceleration since it was the most commonly used form, and received considerable criticism due to the possible resultant lack of continuity of content or gaps in instruction associated with inadequate planning. The prevailing unfavorable opinion of acceleration is most unfortunate and contrary to research evidence.

After reviewing the literature on acceleration, Gallagher made the following statement: "It is very difficult to find any

study which has reported, on balance, any negative effects of acceleration when the acceleration is done as part of a planned program and is limited to reducing the students' total educational program one or two years."¹

Terman and Oden placed some constructive limitations on the feasibility of acceleration gleaned from their longitudinal studies regarding gifted individuals. "It is our opinion that nearly all children of 135 IQ or higher should be promoted sufficiently to permit college entrance by the age of 17 at least, and that the majority of this group would be better off entering at 16. Acceleration of this extent is especially desirable for those who plan to complete two or more years of graduate study in preparation for a professional career."² A similar statement was made by Anderson concerning academically talented students. "It is probable that acceleration should not take place with youngsters whose IQ is below 130."³ This refers to approximately the top five percent of all school children in ability.

Let us explore some of the reasons pointing to the desir-

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¹James J. Gallagher, Analysis of Research on the Education of Gifted Children (Springfield, Ill.: Office of Superintendent of Instruction, 1960), p. 113.

²Louis M. Terman and Meliota H. Oden, Genetic Studies of Genius, Volume 4, "The Gifted Child Grows Up" (Palo Alto, Calif.: Stanford University Press, 1947), p. 448.

³E. E. Anderson (Ed.), Research on the Academically Talented Student (Washington, D.C.: National Education Association, 1961).

ability of acceleration. The most obvious is that at least one year of the pupil's life is saved. Regardless if no other educational provisions are made (it is hoped this would not be the case), this in itself is quite an achievement. The trend today is the extension of schooling at higher levels due to the knowledge explosion and technological advances. The need to nurture and conserve the human resources of our nation has become increasingly apparent in our post-sputnik era. The demand for high level talent in all technical and professional positions in our complex society continues at a rapid pace. Worcester calculates the values of timesaving in education in an interesting manner. "Let us assume that there are 34,000,000 school children in the United States. Ten per cent of these should, according to our evidence, be able to save a year of time. But assume that only three per cent of them could save a year each. Then our country would have gained for it use more than 1,000,000 years of its best brains in a single generation."⁴ Reducing the extended school experience in selected cases is not only of benefit to society but liberates the individual to follow his own chosen pursuits at an earlier age.

Acceleration not only gives proper recognition to our vast knowledge of individual differences but implements it in a meaningful way. Just as forcing a child who is not ready to attempt to master material which is presently beyond him quite likely

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⁴D. A. Worcester, The Education of Children of Above Average Mentality (Lincoln: University of Nebraska, 1956), p.34.

leads to failure and associated unfavorable attitudes, asking a child to wait for the masses may promote careless work habits, questionable motivation, or unfavorable attitudes toward school. If acceleration does nothing more, it places a child into a group more equal to his ability.

Lehman found that the most outstanding creative work tends to occur early in the careers of famous scientists, inventors, authors, artists, and musicians.⁵ Pressey observes that in some countries students receive their doctorate up to four years earlier than in the United States and reflects that this may have been a factor in German scientific productivity during the last war.⁶ If the greatest physical vigor, enthusiasm, and intellectual creativity come in the early adult years, it would seem most desirable to reduce the individual's education to allow maximum productivity.

Extended periods of training strongly suggest the possibility of continued dependence and delay of adult status for superior students. Yet, Terman indicates that accelerated students married and raised families at younger ages than non-accelerated

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⁵H. C. Lehman, Age and Achievement, (Princeton, N.J.: Princeton University Press, 1953), p. 358.

⁶Sidney L. Pressey, "Educational Acceleration: Occasional Procedure or Major Issue", Personnel and Guidance J., XLI (September, 1962), pp. 12-17.

pupils in his follow-up studies.⁷ Reynolds points out that personal problems and sacrifices "are deterrents and delaying factors in higher education."⁸ Acceleration allows the bright student to reduce the amount of time spent in school and to assume his independent role as an adult earlier.

As Pressey has said, "A medical advance would receive great acclaim if it added two years to one's life, yet an education procedure which accomplishes relatively the same end result is disregarded."⁹ Some form of acceleration for the mentally advanced child allows that same individual, as an adult, to enter his profession a year earlier without further delay to independent living.

Thompson and Meyer extensively reviewed many previous studies on acceleration and indicated the research evidence shows no adverse effects from acceleration, although some of the studies had certain limitations due to lack of control groups, poor presentation of data, or lack of tests of significance. Overwhelming evidence, however, remains in favor of acceleration with positive

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⁷Terman and Oden, IV, op. cit., p. 448.

⁸Maynard C. Reynolds, Early School Admission for Mentally Advanced Children, (Washington, D.C.: The Council of Exceptional Children, National Education Association, 1962), p. 4

⁹Pressey, op. cit., p. 12.

effects if it is implemented through careful study and adequate planning.¹⁰

The advantages of acceleration appear to reside in the opportunities which are offered to the individual to proceed at his own rate, to meet tasks commensurate with one's ability, to complete school earlier, to enter a career earlier, to avoid delay of adult status, and to avoid possible social and emotional maladjustments and underachievement due to nonchallenging classes or the development of unfavorable attitudes in such classes.

The following paragraph summarizes some of the disadvantages of acceleration. Reducing the time spent in school may deny bright students the opportunity to think, reflect, explore, and appreciate which in turn could curtail creativity. Equal acceleration in all areas does not take into account differences in rates of maturation. Students of like mental ages but varying chronological ages may perform qualitatively quite differently. Double promotion may result in serious instructional gaps in student learning which may affect later educational attainments.

It is apparent that not all types of acceleration can do all things for all students. To use acceleration effectively and efficiently it is probably essential to use that type of

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¹⁰J. Thompson and L. H. Meyer, "What Research Says About Acceleration," J. Sec. Educ., XXXVI (May, 1961), pp. 301-305.

acceleration which promises to meet the individual needs of each gifted student. This is, indeed, a difficult task for mass education. However, the evidence provided by research seems to overwhelmingly indicate that the principle of acceleration itself is a salutary one.

Early admission to kindergarten is a special form of acceleration for academically talented or gifted youngsters based on variable age admission standards. It combines the major ideas behind acceleration through rapid progress of subject matter and double promotion by providing continuity of education plus enabling the child to complete school, at least one year earlier. Early admission advocates the employment of multiple criteria for school entrance rather than the exclusive use of the chronological age index. This results in the establishment of flexible admission requirements that recognize the existence of individual differences and provides for them in a realistic manner in the initial and most crucial phase of formal education.

From the previous abbreviated discussion on what research has to say about acceleration, it would seem that early admission retains all of the advantages cited for other forms of acceleration yet reduces some of the disadvantages. Instructional gaps resulting from ill-planned grade skipping are eliminated. Since the time (one year) is saved prior to beginning formal education, length of schooling can remain the same, allowing for depth and

breadth of learning experiences. In addition, other curricular methods of working with mentally able pupils, such as, enrichment and special classes, could be used in an integrated approach of the total school in meeting the needs of these youngsters.

STATEMENT OF THE PROBLEM

The present study is concerned with the screening and identification of preschool youngsters for early admission to kindergarten. Typically, children enrolled in elementary school are screened in terms of their ability and performance on the basis of group standardized tests, grades, and teacher observation. On the basis of this preliminary screening, identification and selection of academically talented or gifted children is determined through subsequent evaluation, namely, individual testing and interviewing.

At the preschool level screening information in the usual form of teacher observation, grades, or group tests is unavailable. Without the benefit of such preliminary data, it is customary to notify parents of the potential early entrance to kindergarten candidate and allow the parents to function in a screening role through their decision to register their child for consideration in the program. Individual evaluations, then, must be given on a wholesale basis to every child who is referred by his parents.

Schools interested in overcoming the effects of rigid chronological age requirements to kindergarten, as one way of ad-

justing school programing to recognized individual differences at the initial and most crucial phase of formal education, are plagued by considerable expenditure. This financial outlay stems from the necessity of providing professional personnel and resources for time-consuming, individual evaluations and/or interviews for all early entrance candidates. Some means is needed that can serve as a preliminary screening device and limit individual evaluations for the most likely candidates, thereby defraying the total expense of the program yet yielding similar results.

PURPOSE OF THE STUDY

The present study is concerned with the development, construction, and standardization of a group preschool screening test for early admission to kindergarten candidates. The purpose of the instrument is to separate preschool children into two categories: (1) those who objectively appear to be probable early entrance candidates but require individual evaluations for final identification and selection; and (2) those who do not seem to demonstrate sufficient readiness for school entry and need no further evaluation. The group test will also be designed to provide an estimate of intellectual ability.

SIGNIFICANCE OF THE PROBLEM

In recent years considerable attention has been devoted

to the preschool aspects and responsibilities of education by Federal, State and local governmental bodies and educational institutions. Presently, most manpower, monies, and research centered at this level of education circumscribes the culturally deprived child. At the same time, the mentally able child continues to receive attention, but not necessarily at the preschool level.

Despite repeated research reports on the overwhelmingly favorable outcomes of early entrance to kindergarten programs, the practice is neither frequently nor widely employed in schools. Of those schools in the United States who have Early Admission to School Programs, individual evaluations requiring competent specialists are typically administered to all perspective candidates. This is necessary because no practical and reliable means for preliminary screening is currently available.

A preschool group screening device which could demonstrate sufficient efficiency and effectiveness in detecting candidates most likely to be accepted for early admission could make an important contribution to elementary education. To begin with, it could relieve the financial outlay of those schools already conducting such programs, and, perhaps, give more schools an opportunity to begin early admission programs, if financial considerations were presently the major drawback. Of more importance, such an instrument would offer schools an economically sound opportunity to identify superior students and provide a total school

program for the gifted child, beginning at the earliest level of formal education.

SCOPE OF THE STUDY

The study has potential value for all educators, particularly at the preschool and primary rung of the educational ladder. In the space age society can not afford to neglect the nurture and cultivation of its most precious natural resources at the earliest possible and feasible age. Selection and identification of our potential leaders of the next generation plus a diet of generous education opportunities is crucial in terms of our search and plans for world peace and protection through national defense.

The sample used in the study is confined to white upper-middle class children residing in a suburban community and therefore is not representative of a cross-section of the population. However, many of the early admission programs are presently located in suburban areas so the results can be generalized to such similar suburban communities.

QUESTIONS TO BE ANSWERED

The study involves the development and construction of a group screening instrument to be used with early admission to school candidates. Its usefulness will depend upon the test's characteristics in terms of standardization statistics and

technical information. The data will be analyzed to answer the following specific questions:

- (1) Can rapport be established and maintained in a group setting at the preschool level and suitable test items be devised and administered?
- (2) Does the group screening test have sufficient reliability?
- (3) Is the group screening test valid?
- (4) What percentage of children selected by the initial screening test were eventually accepted for early entrance to kindergarten on the basis of further individual evaluation?
- (5) What percentage of children eventually accepted for early entrance to kindergarten were located by the screening test?
- (6) Does the use of the screening test result in savings in terms of professional personnel's time and the outlay of funds in an early admissions program?

SUMMARY

This chapter has been concerned with a brief summary of the general methods and findings regarding acceleration, with the statement and significance of the problem, with the purpose and scope of the study, and questions to be answered. Chapter II presents a review of research and information relevant to the

problem. In Chapter III the design of the study is presented through discussions pertaining to preschool group testing rationale, item selection, and description of the group test. Chapter IV clarifies the method of the study by describing the sample and specifying the general and detailed group test procedures employed in the collection of the experimental data. Chapter V includes the major findings in terms of standardization statistics and technical information regarding the characteristics of the group preschool test. In Chapter VI is presented the discussion of the results and conclusions derived from the study with a statement of limitations, implications and recommendations for further research in the field. Chapter VII provides a summary of the overall investigation.

CHAPTER II

REVIEW OF THE LITERATURE

PRESENT ADMISSION POLICIES IN THE UNITED STATES

In most states children are admitted to kindergarten or first grade on the basis of a rigid chronological age criterion with few exceptions. For instance, in Illinois all children who will be five years of age by December 1 of a given year may enroll in kindergarten. This seems rather typical of the country as a whole according to a survey of admission policies of systems in the United States reported in 1958 by the Research Division of the National Education Association.¹ A total of 532 school districts, or 83 per cent, responded to a questionnaire originally sent to 642 districts. Of 417 systems having a kindergarten, 60 per cent reported that a chronological age of four years, eight months (4-8) or four years, nine months (4-9) was a prerequisite for admission. Likewise, a minimum age of 5-8 or 5-9 was reported necessary for entrance to first grade by 50 per cent of the schools. Entrance age for kindergarten in the remaining districts ranged from 4-0 to 5-0 with the majority falling between 4-6 and 5-0. Less than seven per cent of the districts reported having no established entrance age.

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¹National Education Association, Admission Policies for Kindergarten and First Grade (Washington, D.C.: National Education Association, 1958), Circular No. 3.

Over the years changes in minimum age requirements have tended to move upward rather than downward in direction. The research evidence now available which suggests that a mental age of about six or more is a meaningful prerequisite for beginning reading instruction only when traditional group methods are used probably lead educators to raise the chronological age requirements higher.

However, some systems are allowing exceptions to the minimum chronological age standard. The above NEA survey indicated about 20 per cent provide for some type of flexible admission procedure. The criteria typically employed to admit underaged children centered around individual psychological tests of intelligence, maturity, and social development plus parental conferences.

The Nation's Schools conducted an opinion poll in 1955 which indicated that slightly over 50 per cent of the school superintendents in the country favored early entrance to school based on mental, physical, and emotional maturity in principle. However, most of them did not operationally put this belief in action due to various practical problems involved in the administration of such a program.²

MULTIPLE CRITERIA FOR SCHOOL READINESS

Since an early school admission program does not simply

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²"Should Beginning Pupils be Admitted on Mental Age? - An Opinion Poll" Nation's Schools, LVI (August, 1955), p. 6.

advocate lowering the minimum chronological age which would merely result in all children beginning school earlier, let us consider other factors, in addition to chronological age, that might be considered. Variables related to school readiness would include mental age, physical maturity, emotional and social maturity, and sex. The emphasis might well be placed on multiple criteria since the use of any one criterion does not appear to be an adequate determinant of school entrance.

Chronological Age.

Present kindergarten programs have been constructed for four and five year old children and quite likely would be unsuitable for most younger or older children. This undoubtedly is one of the reasons why the most common and generally the only criterion for school admission is chronological age (CA). Of course, a rigid entrance range between four years, eight months and five years, eight months is administratively convenient as well as clearly and easily understood by the community.

Separate studies by Carter,³ King,⁴ and Hamalaen⁵ indicate that younger children entering kindergarten and first grade

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³L.B. Carter, "Effect of Early School Entrance on the Scholastic Achievement of Elementary School Children in the Austin Public Schools", Journal of Education Research, L (October, 1956), pp. 91-103.

⁴I. B. King, "Effect of Age of Entrance into Grades 1 upon Achievement in Elementary School", Elementary School Journal, LV (February, 1955), pp. 331-336.

⁵R. S. Hamalaen, "Kindergarten - Primary Entrance Age in Relation to Later School Adjustment", Elementary School Journal, LII (March, 1952), pp. 406-411.

do not subsequently achieve or adjust as well as older children among unselected samples of children. Green and Simmons found a positive relation between scores on readiness tests and age.⁶ As they point out, however, in most studies the size of the initial differences between students was not known and to say that older children learned more is to assume that they did not know more initially.

Forrester compared groups formed on the basis of CA and MA. His findings indicate that old-bright pupils excel throughout their education and young-bright students have difficulty after junior high.⁷ This study is one of the very few investigations which does not lend support to early admission of academically talented children.

The above studies demonstrate that CA should definitely be considered as a variable in school admission, but not necessarily the only one. Over a wide age range CA does correlate with such variables as mental age, social and emotional maturity, and physical size and coordination. For instance, one would be safe in predicting that a fifteen year old child would have a higher mental age and show more social, emotional, and physical maturity than a five year old child. However, when age range is restricted to one

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⁶D. R. Green and S. V. Simmons, "Chronological Age and School Entrance", Elementary School Journal, LXIII (October, 1962), pp. 41-47.

⁷J. J. Forrester, "At What Age Should a Child Start School?", School Executive, LXXIV (May, 1955), pp. 80-81.

or two years, CA greatly loses its predictive power of these same variables.

In kindergarten one is likely to find children who, although their mean age may be approximately 5-0, differ in MA two to three years. This is a tremendous difference at any age. The Baldwin-Wood tables show that average five year old boys vary physically from 37 to 47 inches in height and 32 to 49 pounds in weight. If you put together all boys 42 inches tall, they would probably range in age from 4 to 8 years.⁸ These examples highlight the great variations present in all areas and soberly indicate that there is no one criterion by which all children can be grouped as alike except sex. Rigid adherence to a chronological age limit suggests that schools are not adapting to the needs of, at least, one-third of its students. It places unreasonable hardships on the slow or handicapped and ignores the needs of the bright. The current means of school admission seems ridiculously unfair and wasteful of human talent; yet most schools religiously continue and maintain it. Individual differences point to the need for differential treatment in education. By failing to provide for exceptions, schools may be doing serious personal and educational injustices to many children.

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⁸Baldwin, B. T. "The Physical Growth of Children from Birth to Maturity", University of Iowa Studies of Child Welfare, No. 1, 1921.

Terman found that highly intelligent children tend to be taller, more healthy and somewhat better adjusted socially than average.⁹ Thus, admitting younger but brighter children would mean they are more apt to be like the group chronologically one year ahead of them than their real peer age group. With this perspective one may easily argue that other factors should be considered for school admission.

Mental Age

Mental age (MA) appears to be the single best predictor of school achievement at elementary grade levels as measured by individual intelligence tests. Kazienko demonstrated that MA was very significantly more influential in determining Grade 4 achievement than CA, IQ, or a combination of both.¹⁰ Hobson has employed MA as a criterion for school admission since 1932 and found it to be a consistent and workable predictor.¹¹ Birch supported a similar finding.¹² Stake has developed tables which demonstrate

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⁹Lewis M. Terman and Melita H. Oden, Genetic Studies of Genius, Vol. 4, "The Gifted Child Grows Up" (Palo Alto, Calif.: Standard University Press, 1947), p. 448.

¹⁰L. W. Kazienko, "Beginner Grade Influence on School Progress," Educational Administration and Supervision, XL (April, 1954), pp. 219-228.

¹¹J. R. Hobson, "Mental Age as a Workable Criterion for School Admission", Elementary School Journal, XLVIII, (February, 1948), pp. 312-321.

¹²Jack W. Birch, "Early School Admissions for Mentally Advanced Children", Exceptional Children, XXI (December, 1954), pp. 84-87.

the relationships between preschool mental ages and future elementary school achievement levels.¹³ In addition, social and emotional maturity seem to be more closely related to MA than CA. Werner discovered that variation among five year olds in social age ranged from 4 years to 7 years as measured by the Vineland Social Maturity Scale but found a positive correlation between social age and MA.¹⁴

The Revised Stanford-Binet Intelligence Test, Form L-M, by Terman and Merrill is the test generally used to evaluate the intelligence of children.¹⁵ Many persons have questioned its reliability, especially at earlier age levels. This is a legitimate concern inasmuch as this test does have higher reliability at older ages, but the work of Bayley indicates its reliability at school-entering ages is adequate enough to be of considerable usefulness.¹⁶

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¹³R. E. Stake, "Predicting Success of the Early Starter", Overview, (November, 1960), pp. 32-34.

¹⁴Emmy Werner, "Social Competence of Kindergarten and Fifth Grade Children as Evaluated by the Vineland Social Maturity Scale" (unpublished Ph.D dissertation), Department of Education, University of Nebraska, 1955).

¹⁵Lewis M. Terman and Maude A. Merrill, Stanford-Binet Intelligence Scale, Form L-M, (Boston: Houghton Mifflin, 1960), p. 363.

¹⁶Nancy Bayley, "Consistency and Variability in the Growth of Intelligence from Birth to Eighteen Years", Journal of Genetic Psychology, LXXV (June, 1948), pp. 165-169.

Social and Emotional Maturity

In most of the early entrance programs ratings of social behavior and emotional maturity are typically a part of the selection criteria. Kindergarten teachers in particular, show deep concern over possible difficulties underage children may have in these areas. Sometimes the school psychologist uses tests, such as the Vineland Social Maturity Scale, besides test behavior observations in judging the maturity of youngsters.

As noted previously, social maturity correlates more highly with MA than CA. Hobson reported in a ten year follow-up study that underage children admitted by test not only exceed others scholastically but on the average were referred less often for emotional, social and other personality maladjustments.¹⁷

Mueller asked teachers to rate over 4,000 children in kindergarten through fifth grade in various schools in Nebraska on several characteristics.¹⁸ Her results indicate that early entrants admitted by testing stand better, whether in terms of number receiving high ratings or of the few receiving low ratings. The younger-bright group were significantly higher than regular classes in achievement, height, coordination, acceptance by others

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¹⁷Hobson, op. cit., pp. 312-321.

¹⁸K. Mueller, "Success of Elementary Students Admitted to Public Schools Under the Requirements of the Nebraska Program of Early Entrance", Dissertation Abstracts, XV (June, 1955).

attitude toward school and emotional adjustment as judged by teachers.

Physical Maturity

In general, gifted children tend to be taller, heavier, and to possess better physical coordination than average children of a comparable age. The research evidence of Terman and Oden,¹⁹ Olson and Hughes,²⁰ and Hollingworth²¹ is quite clear on this point. That physical maturity should be a factor to consider for early entrance to school, however, is questionable. In his review of the literature, Reynolds states ". . . there is no evidence that physical development is a relevant variable in determining whether or not children should enter school early. It is more important to ascertain that the child is in good health than to learn whether he is tall or short, stocky or thin, well-coordinated or awkward."²²

Sex

A comparison of the school adjustment and achievement of

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¹⁹Terman and Oden, Vol 4, op. cit., pp. 448.

²⁰W. C. Olson and B. O. Hughes, "Growth Patterns of Exceptional Children", Yearbook of the National Society for Studying Education, Part II (Chicago: University of Chicago Press, 1950).

²¹Leta S. Hollingworth, Gifted Children: Their Nature and Nurture (New York: Macmillan Co., 1926), pp. 374.

²²Maynard C. Reynolds (ed.), Early School Admission for Mentally Advanced Children, (Washington, D.C.: The Council for Exceptional Children, National Education Association, 1962), p.56.

boys and girls in elementary school, will no doubt result in the finding that boys tend to have more problems than girls. Based on such data, different admission standards have been proposed in terms of sex. Pauly feels boys should be admitted at an older age than girls.²³ Maxwell specifically advocates starting girls at five years of age and letting boys wait until they are six or even older.²⁴ Such a general procedure seems questionable since there is considerable overlapping, i.e., a sizable number of boys would be ready for school at ages deemed satisfactory for girls. Judging each individual on a variety of school readiness criteria seems more reasonable than using the gross index of sex. As Clark suggests, "educators need to deal with the wide range in variability in both mental ability and achievement of pupils irrespective of sex."²⁵

There is evidence to indicate that girls develop language facility earlier than boys. This is reflected in some studies which report more girls than boys tend to qualify for early admission to school. However, at later ages the language ability of boys and girls appears to be about equal. Different school admission rates solely on the basis of sex do not seem warranted.

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²³F. R. Pauly, "Should Boys Enter School Later Than Girls?" National Education Association Journal, XLI (January, 1952), pp. 29-31.

²⁴J. Maxwell, "What to Do About the Boys?", National Education Association Journal, XLIX (March, 1960), p. 26.

²⁵W. W. Clark, "Boys and Girls: Are There Significant Ability and Achievement Differences?", Phi Delta Kappan, XLI (November, 1959), pp. 73-76.

PRACTICAL PROBLEMS OF EARLY ADMISSION

It is readily apparent that the strict chronological age requirement by itself is inappropriate from a research or rational viewpoint. It does not take into account new advances in teaching nor the wide range of individual differences in children at any age. Yet, few schools have adopted a flexible school admission program.

The major barrier to adopting an early admittance procedure appears to hinge on the administrative difficulties which it may create. The identification of certain practical problems have prevented educators from translating their thoughts and ideas verified by research into practice. Thus, by their inaction they tend to perpetuate the rigid chronological entrance age and think of any other procedure as operationally infeasible without making a concentrated effort to surmount the envisioned administrative difficulties.

Reynolds has identified five practical problems involved in the establishment of a program of early admission for bright children.²⁶ The first problem involves the establishment of specific criteria for early admission. This refers to the selection of multiple criteria based on research and adapting them to

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²⁶Reynolds, op. cit., p. 5.

the peculiarities of an individual school district. A school system located in a high socio-economic community may need to set higher early admission standards than a school in a deprived area. In a previous section possible variables to be included in a selection criteria were noted and their arrangement and interaction will be further discussed in the descriptions of current programs in the latter section of the chapter.

Screening and evaluation of children poses a second problem since special personnel and resources are required. Early school admission demands extensive evaluation of children and could be a major, costly undertaking in school systems lacking psychological services. Those programs currently functioning use exclusively individual testing and interview techniques in determining eligibility. Most districts do not employ school psychologists as regular staff members. To contract a psychologist for the purpose of conducting an early admission program results in an additional outlay of funds. Even then, not all potential candidates are screened because schools rely on parental requests. To reduce costs, yet screen all candidates, this investigator advocates the development of group screening tests for all candidates followed by individual evaluation for those who appear ready for school. With such a uniform procedure no candidates would be overlooked and the program would be less costly. In addition, some states reimburse districts which provide additional services to academically talented students. For example, in Illinois under the provisions of Senate Bill 749,

Seventy-third General Assembly, the Superintendent of Public Instruction with the advice and consent of the Advisory Council on Education of Gifted Children, is authorized to enter into contract with school districts, colleges, and universities for the conduction of demonstration centers, experimental projects, and institutes in the field of education of gifted children. Reimbursement for services, material, and personnel are also provided to school districts and fellowships are available for graduate students who plan to specialize in the area of gifted children.

Provision for classroom space could conceivably be a third problem in some districts since early admission results in a temporary increase in enrollment. This can be controlled in terms of the standards regarding flexible admission. For example, if the present minimum CA in a state says a child must be 5-0 by December 1 of a given year, the early admittance program can concern itself with only December birthdays or as many months it wishes to go back depending on its resources, funds, and personnel.

Public relations presents a fourth problem. The program must be interpreted to school personnel, parents, and the community as a whole in order to gain their support. Those schools which have encountered difficulties might have had more successful programs had they concentrated on this aspect.

A fifth problem involves appropriate supervision and continuous evaluation of the program. Early entrance does not con-

cern itself merely with determining whether a child seems to be ready for school at an earlier age or not. It should be viewed as one phase of the gifted program which is, in turn, an integral part of the system's total school program. As part of an entire school program it has a higher probability of receiving adequate supervision and evaluation.

DISTRICTS DISSATISFIED WITH FLEXIBLE ADMISSION PROGRAMS

Individual psychological evaluations are conducted and several aspects of school readiness are generally employed to select early entrants. When such selective procedures are applied, early school admission seems to be a favorable form of acceleration.

However, Park Forest, Illinois, discontinued their flexible admission program in 1955 as reported in Time.²⁷ Due to overcrowded schools, parents of children who reached five between September and December were notified that their children had to take standardized tests for entrance. The evaluations were explained as an attempt to maintain high academic standards. An exam fee of \$7.00 was charged. Psychologists evaluated 203 children of which 135 were rejected. Parents of those children denied entrance became enraged and protested to the superintendent and school board. A lawyer, whose son was rejected, insisted it was illegal and took the case to court.

²⁷"Hopping like a Bunny - Kindergarten Admission Policy," Time, LXVI (September 5, 1955), p. 45.

The State Superintendent of Public Instruction declared that the tests were not in conformity with the school code. Further, he indicated that entrance to kindergarten had to be based on particular age requirements, not on maturity of the child. As a result all the children were allowed to enter kindergarten.

Most schools that develop flexible admission programs do so to allow young-bright youngsters who are ready for school to begin earlier than they would be able to under rigid CA requirements. The motivating force behind the Park Forest program, although couched in terms of academic excellence, was basically to reduce the number of kindergarten youngsters entering school who were actually eligible in terms of their age to relieve overcrowded conditions. In addition, a questionable fee was charged, undoubtedly to dissuade some parents from having their children tested. In view of the procedures used it can readily be understood why parents objected and easily gained a policy reversal.

However, there is at least one case reported by Mawhinney in the literature of a district which dropped its early entrance program after fourteen years of experience.²⁸ The reasons for discontinuing the program centered around the actual experience of children who entered early, the reaction of parents of children who were denied entry, and the expenses of the program.

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²⁸ Paul E. Mawhinney, "We Gave Up on Early Entrance", Michigan Education Journal, XLI (May, 1964), p. 25.

The records of 386 early entrants who had remained in the districts were reviewed and their teachers were asked to evaluate their social and emotional adjustment, demonstration of leadership, and academic status. The results suggested that about one-third (30.6 per cent) of the early entrants were poorly adjusted. About one in twenty was judged as an outstanding leader whereas nearly three out of four were considered lacking in leadership. Approximately one in four (24.4 per cent) was rated academically superior but the same amount (25.3 per cent) was considered either below average or had repeated a grade.

The majority of parents whose children were refused entrance reportedly reacted negatively. Most of them showed disappointment and surprise but a few were angry and bitter. Others attacked the competency of the school staff and complained to school board members. Conversely, a small number expressed confidence in the judgment of psychologists.

Ninety-eight of 197 children eligible for testing were evaluated in the summer of 1963. Of these, 55 were refused entrance and 43 were accepted but only 30 entered school. The expenditures for these 30 children (which actually included operation of total selection process involving 98 children) was calculated in terms of one month and a half secretarial service, more than a month for two psychologists, and partial teacher and classroom costs.

Having examined the difficulties that two school districts have encountered in attempting flexible admission policies, let us compare and contrast these data with the selection criteria and evaluations of early entrance programs which have proven successful.

DESCRIPTION AND EVALUATION OF EARLY ENTRANCE PROGRAMS

Evanston, Illinois

In Illinois a child may enter kindergarten if he is five by December 1 of a given year. Since 1940, in Evanston, children have routinely been admitted to kindergarten if they were five by December 31. At the same time, younger children with January, February, or March birthdays were allowed to enter if recommended on the basis of individual testing, followed by a six-week trial period. It should be noted that as early as 1926 similar services were offered on a smaller scale, if parents requested that their children be tested for school readiness.

The Evanston flexible admission program follows these procedures. Parents complete a request form for the testing in the spring. After this initial step in the screening process, they are seen by a psychologist during the summer months. The Stanford Binet Intelligence Test, Goodenough Draw-a-Man Test, and clinical observation and judgment comprise the evaluative technique utilized. Besides intellectual ability, physical, emotional, and social readiness are considered in determining acceptance or

rejection. No specific MA or IQ cut-off limits are employed, but it is uncommon for a child below an IQ of 120 to be accepted. The school's decision is given to the parent immediately following the child's individual evaluation. If the child is accepted, the parents are reminded of the trial period and told they will be asked to withdraw their youngster if the experience does not seem in the best interests of the child or his peer group. Each year, out of approximately 100 children evaluated, about 20 are accepted.

Studies of this program summarized by Miller indicate that in comparison with their classmates, early entrants rarely achieve below the average and often achieve at the upper limits of the class. As a group the young accelerants tend to increase their relative standing as they progress in school. A study involving fifth grade youngsters indicated that only six per cent of the early entrants scored below the first quartile on an achievement test as compared with 25 per cent of the older youngsters. In another study no significant differences were found between the accelerant and nonaccelerants in terms of teachers' marks, teachers' rating scales, library reading, extracurricular activities, creativity in writing, drama and music, and peer ratings. This combined data suggested that children admitted to school early by test compare favorably with their older classmates.²⁹

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²⁹Vera V. Miller, "The Early Admission Program in Evanston, Illinois", Early School Admission for Mentally Advanced Children, ed. Maynard C. Reynolds (Washington, D.C. The Council of Exceptional Children, NEA, 1962), pp. 31-34.

Brookline, Massachusetts

The Brookline School District initiated a flexible system for school admission in 1932. The major reasons for instituting the program centered around meeting individual differences, allowing bright children to complete their education a year earlier, and replacing the, then, popular method of acceleration (grade-skipping) which was receiving much justifiable criticism.

The minimum age for admission to kindergarten was and presently is 4-9 by October 1 of a given year. In 1932, children who were within three months of the deadline, were regarded as candidates to be tested. Any children in this group (4-6 to 4-8 inclusive) were accepted on a trial basis if they passed a physical and health examination and gained an MA of at least 5-0 on the Stanford-Binet Scale of 1916. In the years that followed, children with CA's between 4-0 and 4-8 were considered eligible for testing.

Research on the program indicated that the least successful group of underaged children were those who had been admitted with a MA of 5-0 (minimum requirement), and the next least successful group were those children more than six months underage chronologically. As a result of these findings in 1944, the minimum MA requirement for trial admission was raised to 5-2 on the 1937 Revision of the Stanford-Binet Scale, and the privilege of early admission was limited to children within six months of the minimum

CA requirement of all children (4-3 to 4-8 inclusive).

Only about two-thirds of approximately 250 annual possible candidates are presented for examination by their parents. Of these, about 50 per cent are admitted on a trial basis. Any child found ineligible is automatically granted one or more retests upon parental request. Social and emotional development and maturity are determined during the standardized evaluation procedure by the psychologist. Form letters are sent both to parents whose children are accepted and those who do not qualify. Results of the psychological examinations are discussed with parents by appointment or over the telephone only after receipt of the letter. Parents are rarely asked to withdraw their child after the trial period.

As one would expect, the reaction of parents whose children were admitted was satisfaction and some of the parents whose children did not qualify showed displeasure. However, the superintendent and Board of Education entertained all inquiries but vigorously opposed personal and political pressures which resulted in a smooth operating program.

In terms of school staff, the administrators accepted the program and cooperated to insure its success. However, it should be noted that the kindergarten teachers, possibly due to their birthday consciousness of kindergarten children, basically opposed the program. This was reflected in their comments to parents and

ratings on the cumulative folder.

In 1948 Hobson reported his findings concerning the first five and ten year periods of the operation of this flexible admission program. His earlier research indicated a significant high positive correlation between MA at entrance and teachers' marks and achievement through grade four. However, in kindergarten marks were lower for the underage youngsters but their average ratings on standardized reading readiness tests were higher.

The ten year follow-up study confirmed the above data. In addition to the findings which led to the changes in minimum MA requirement to 5-2 and the limiting of the program to children within six months of the minimum CA requirement, the data showed that: (1) the margin of average superiority of selected underage children increased as they progressed through eight grades of elementary school, and (2) the children entering school early exceeded others scholastically as well as being referred less often for emotional, social and other personality maladjustments on the average.³⁰

In 1963 Hobson reported the results of twenty-three years experience with this program which involved 550 graduates who had entered school early and 3,891 other graduates. One thousand one hundred sixty-five children actually were admitted to school

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³⁰Hobson, Elementary School Journal, XLVIII, pp. 312-321.

early by tests during this period of time but only 550 remained through graduation. Since more than one-half of the underage children moved away prior to graduation, the results that follow are based on the assumption that no selective factor is affecting the research. Conversely, it should be noted that by grade six an equal amount of underage children move into their district as are admitted by test, and by grade nine twice as many have entered. The lower entrance ages in adjacent cities apparently accounts for this phenomenon.

Results of the investigation indicated that:

1. The academic superiority of the underage children admitted by test witnessed in the elementary school continued and was somewhat increased in high school. There was a significant difference to which the underage group surpassed their classmates in the percentage of desirable marks, average rank in class, and in percentage graduated with honors.
2. The underage group participated in a significantly larger average number of extracurricular activities during high school. This included scholastic, athletic, and social honors plus elective positions.
3. The underage accelerates received twice as many graduation honors, awards, and distinctions than their

fellow students.

4. A significantly larger percentage of the underage graduates applied and were accepted in accredited four year colleges than their classmates.
5. The early admission of youngsters within a few months of the usual admission age by test seems to be an excellent means of providing for individual differences in the initial phase of education.
6. The administrative problems of an early school entrance program are more imaginary than real.³¹

Minneapolis, Minnesota

Children who are five on or before December 31 may enter kindergarten. Prior to 1935 early admission was determined by the principal who would interview the parent and child and administer the Detroit Kindergarten Test. The decision was based on the principal's appraisal of the child's maturity and intelligence.

By 1935, psychologists were employed to administer individual Stanford-Binet tests to candidates after preliminary screening and referral by the principal. All aspects of the child's

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³¹James R. Hobson, "High School Performance of Underage Pupils Initially Admitted to Kindergarten on the Basis of Physical and Psychological Tests", Educational and Psychological Measurement, XXIII (Spring, 1963), pp. 159-170.

developmental level were considered, but intelligence was the major factor. The cut-off limit stated a child must have a MA one month above 5-5 for each month of chronological age below 5-0. No such MA limit is currently enforced and children born after January are also now eligible for testing.

Presently, any parent may request that his child be tested for early entrance. This is accomplished by kindergarten registration in the spring or prior to the opening of school. The principal evaluates the child's general information, vocabulary, interests, activities, physical size, muscular coordination and ease of separation from his mother. The parent is then interviewed and, if the principal feels the child is a possible candidate, he refers the youngster for a psychological study.

Psychological evaluations are scheduled for a three week period beginning two weeks prior to the opening of school. Typically, the child is administered the Stanford-Binet, Form L-M, and is asked to draw a man, do some free hand drawing, take a picture vocabulary test, or perhaps, participate in number games. The psychologist observes his behavior and responses in these activities and may further interview the child. A parental interview usually follows. The psychologist's recommendation is based on all the available data, namely, the description of the principal's interaction with the child, tests and observations of the child, developmental history, and parental interview. The final

decision rests with the principal who notifies the parent. All early admissions involve a trial period.

Due to the fact that the early entrance program has been in effect for so many years, parents and school personnel seem to accept it readily. However, kindergarten teachers may ask to have a case reviewed, if a child is having difficulty. Some of the children are informally followed-up by the psychologist.

Holbrook reported a descriptive evaluation of youngsters admitted early over a two year period.³² Questionnaires were sent to principals and teachers regarding those accelerates who were in kindergarten and first grade. The results indicated that 89 children (58 girls and 31 boys) had been admitted early during the two year period. The range in IQ was between 107 and 164. The teachers indicated that they believed 57 of the early entrants (39 girls and 18 boys) were definitely in the correct placement in school and certainly should not have waited a year. Nineteen of the children should have waited a year according to the teachers, and 13 others were questionable. The mean IQ of the children described as successful was 138 as compared with a mean IQ of 124 for the unsuccessful group. Seven children with IQ's below 120 were all found in the latter group. Teacher complaints centered around social and emotional problems. However, it is questionable

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³²Sarah F. Holbrook, "The Early Admission Program in Minneapolis, Minnesota," Early School Admission for Mentally Advanced Children, ed. Maynard C. Reynolds, 1962, pp. 35-42.

to assume that such problems would be less if the children waited an additional year. It is entirely possible that they might have been more severe.

Nebraska

In 1939 the legislature of the State of Nebraska, at the request of the State Department of Public Instruction, passed a law designating that no child may enter kindergarten unless he was five years old on or before October 15 of the current year, and no child may enter grade one unless he was six by October 15 or had completed kindergarten. Of most importance was an added provision which indicated that a school could admit to kindergarten a child who was younger than the stipulated age if he showed readiness as determined by criteria set by the State Department. Initially, children were accepted in kindergarten if they had MA's of 5-0 by September 1 on the basis of individualized, standardized tests of the Stanford-Binet type. By 1949 a State Department notice stated that the examination results were to indicate an MA of at least 5-3 as of September 1. This would be considered only one of several criteria with careful consideration being given to social, emotional, and physical maturity. The recommended minimum for these related areas was 5-0. It was further recommended that children with January or later birthdays not be examined. The MA requirement was again changed and raised to 5-6 in 1955, not on the basis of research evidence, but in an effort to insure the

success of early entering children by demanding a higher minimum level of ability. Examinations take place between June 1 and September 15 of a given year. Since the early entrance programs are governed by permissive, rather than mandatory legislation, Nebraska school systems may refuse to admit any children on the basis of tests, or demand higher standards than recommended by the State Department of Education. If a school has an early entrance program it relies on parental requests for testing of their children. Some schools have set their MA minimum as high as 6-3. This tends to more assure a child's success but it excludes many who could quite likely succeed too.

Worcester summarized several research studies on early entrance to school in the State of Nebraska in which the average early admittance age was eight months below the regular entrance age.³³ In general, the studies showed no significant difference in physical development of early entrants as compared with average children. Academically the accelerates equalled or surpassed their older classmates. Teacher ratings indicated they were well adjusted, accepted by their classmates, liked school, and had good or better coordination. No negative effects were reported. Worcester recommended admitting children who would be five by January 1 if they showed readiness on the basis of mental ability equivalent to an IQ of 110 or more as a justifiable educational

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³³D. A. Worcester, The Education of Children of Above-Average Mentality, (Lincoln: University of Nebraska Press, 1956) pp. 68.

policy.

Smith compared 175 early entrants with a random selection of 175 children whose birthdays came before October 15 of the year they entered school. She found that the younger group was just as ready as the older youngsters to read in first grade, i.e., reading readiness was more related to mental ability than CA. During elementary school the early entrants received somewhat better grades than the control group. The younger group scored higher on a sociometric instrument in which children were asked to choose their best friends. Teachers' ratings of the children indicated no difference in terms of emotional and social adjustment. Smith concluded, "If we exclude children whose fifth or sixth birthdays come after October 15 of the current year from the kindergarten or first grade, we are failing to serve some of those who could succeed in school".³⁴

Monderer compared a group of 138 early entrants with 468 children.³⁵ He employed several groupings. No sex differences were found in academic achievement or social adjustment between the accelerates and regular entrance students. In a second group he found significant differences in achievement and social adjust-

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³⁴J. Smith, "The Success of Some Young Children in the Lincoln, Nebraska Public Schools" (unpublished Master's dissertation, University of Nebraska, 1951), p. 63.

³⁵J. H. Monderer, "An Evaluation of the Nebraska Program of Early Entrance to Elementary School" XIV (Dissertation Abstracts 1954), p. 633.

ment favoring the pupils admitted early along with trends suggesting that their superiority increases as the younger children progress through school. In his third group, no significant differences in rating between the early entrants and regular students was noted in rural schools. He concluded that early accelerants are just as successful, if not more so, than regular entrants in terms of academic achievement and social adjustment.

Pennsylvania

In Pennsylvania, the minimum age for entrance to grade one is 5-7 as of September 1 of a given year. Children over 5-0 but less than 5-7 may enter on the recommendation of a psychologist. Youngsters are evaluated by test for reading readiness and superior mental ability and by interview for social, emotional and physical maturity. An IQ of 130 is typically used as a cut-off point although some have been accepted below this measure.

Birch reported that the results of a one to three year follow-up study in Pittsburgh indicated that an overwhelming majority of children admitted early to first grade were making satisfactory school adjustments in all areas, namely, academic, social, emotional, and physical.³⁶ He believes the best method of acceleration is through early entrance and advocates that every child should be evaluated before entering kindergarten.

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³⁶Birch, Exceptional Children, XXI, pp. 84-87.

In Warren, Pennsylvania a Demonstration Project regarding early entrance began preparations in 1961 supported by federal, state and local funds.³⁷ A preschool census was used by the superintendent to invite the parents of those children who would ordinarily be eligible for kindergarten in September, 1963, to have their children evaluated during 1961-62. Psychologists administered the Stanford-Binet, Goodenough Draw-a-Man Test and rated each child's behavior in terms of social and emotional maturity. Parents completed case history forms and were responsible for having their child's health checked. Of a possible 257 candidates, 229 were examined and 37 were recommended by the psychologist for early admission based on mental, social, emotional, and physical maturity. These children were then observed in neighborhood kindergartens by experienced teachers. A school committee studied the observations of the psychologists and teachers and accepted 26 of the 37 children. This represents 10 per cent of the original number and 11.6 per cent of those examined. Since the parents made the ultimate decision regarding early entrance, 19 children entered school early in September 1962.

Recent results indicate their adjustment to school was no more difficult than for regular students. On reading readiness tests at the end of kindergarten the regular pupils ranged in

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³⁷Jack W. Birch, W. David Barney, and William J. Tisdall, "Early Admission of Able Children to School: The Warren Demonstration Project", School Life, XLVI (June, 1964), pp. 7-8.

percentiles from 0 to 99 and the early entrants between 29 and 99. The mean IQ of the 19 children were found to be stable when examined by different psychologists at the end of the year. All were promoted to first grade and except for one were progressing satisfactorily. Sociometric ratings indicated they are accepted as well as regular pupils.

UNDERAGE HIGH SCHOOL AND COLLEGE STUDENTS

Early admission to kindergarten or first grade typically results in college students who would be considered underaged in comparison with their classmates. Keys carefully studied a sizable amount of research conducted prior to 1938 regarding the effects of acceleration as demonstrated in college students. Results of these studies overwhelmingly favored the underaged student on all counts. Not only was the underaged student more successful academically, but he also excelled in measures of social and emotional adjustment.

Keys also reported on research he completed which assessed the relative success of underaged high school and college students in the State of California. His findings showed the underage student to be superior to his peers on all measures of adjustment. In addition, they outperformed average-aged students of comparable intelligence. Keys concluded that ". . . the indications are strong that social age varies with mental, and that insistence on regular promotion according to chronological age for pupils with

IQ's of over 120 is not only of no benefit but an actual detriment to their social development and adjustment".³⁸

Pressey reviewed research up to 1949, and reported that in the vast majority of cases the underaged college student not only equalled, but actually surpassed his peers in all respects. The same finding held true in Pressey's research concerning underaged students at Ohio State University. He wrote, "In short, the evidence was practically unanimous that younger entrants were more likely to graduate, had the best academic records, won the most honors, and presented the fewest disciplinary problems."³⁹

Terman and Oden attempted to determine if age at graduation had any effect on a number of adjustment variables in Terman's original sample of gifted persons. The measures, taken when these people were in middle life, showed the youngest graduates to have excelled or equalled others in the sample in overall life adjustment.⁴⁰

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³⁸N. Keys, The Underage Student in High School and College (Berkeley: University of California Press, 1938).

³⁹Sidney L. Pressey, "Educational Acceleration: Appraisals and Basic Problems", Bureau of Educational Monographs (Columbus, Ohio: Ohio State University, 1949).

⁴⁰Lewis M. Terman and Melita H. Oden, Genetic Studies of Genius, Vol V: The Gifted Group at Mid-Life (Palo Alto, Calif.: Standard University Press, 1959), pp. 187.

SUGGESTED GUIDELINES FOR EARLY ENTRANCE PROGRAMS

The research seems to clearly indicate that early entrance does not result in adverse affects. In fact, accelerants tend to equal or surpass their classmates in terms of academic achievement and general adjustment.

It is hoped that the following data will be helpful to any school system contemplating an early school admission program. These suggestions concerning policies and procedures take into account descriptions, problems, and selection criteria of early entrance programs found in the literature as well as practical experience in such a program.

It seems imperative that the early admission program be an integral part of the school program. Early admission, in and of itself, does not insure that the academic needs of these students will be met. Instructional programing throughout the grades should be designed to meet the special needs of these children, as well as other gifted children who were not, because of age, eligible for early admittance. This implies that personnel are available and definitely assigned to follow through and continuously evaluate the plan. The program must be designed and individualized for each school district in terms of its personnel, resources, funds, and community setting. A modest beginning may avert problem experiences, and gradually lead to planned expansion.

Chronological Age

Children within six months of the minimum CA specified by the state may be thought of as possible candidates for early admission to kindergarten. In most states this would apply to youngsters with CA's between 4-3 to 4-8. Obviously, by manipulating the number of months beyond the minimum CA to which a district will offer the privilege of early entrance, the school can control the number of children to be tested and eventually admitted.

Mental Age

The minimum MA which schools have used in early entrance to kindergarten programs appears to range from 5-2 to 6-3. The Stanford-Binet Intelligence Test is typically employed to estimate this factor. Community socio-economic status would probably play a major role in determining a MA cut-off point, if the school decided to use one. In order to compete successfully the early entrant should at least equal the average kindergarten child in a given district in MA. Thus, the higher the intellectual norms of a given school system, the higher the minimum MA limit would be. For example, say that it were decided that the child's MA upon entering first grade should at least equal the average MA of beginning first graders for the district. If the average district IQ were assumed to be 114, and the average CA for beginning first grade is 6-2, then the average beginning first grade MA for the district would be about 7-0. Assuming, further, that mental

growth is a linear function of $IQ \times CA$, then it would be a simple matter to calculate expected first grade MA's for early admission to kindergarten applicants. Expected first grade MA would equal $IQ \times CA$ at the start of first grade, and for admittance, would need to equal or surpass the figure of 7-0.

However, if the program were designed specifically as a gifted program, then quite higher minimum standards would need to be employed depending upon the school systems unique definition of giftedness.

Stake has developed a table which predicts third grade achievement of early-entrance pupils when Stanford-Binet preschool mental ages and cut-off scores are used.⁴¹ Table I, which is a reproduction of the table presented by Stake, was designed to help school administrators more efficiently use MA measurements in selecting appropriate cut-off points. The educator can control the group of admitted pupils by adjusting the entrance requirements. Raising the requirements will result in a higher achieving group. However, since the correlation is far from perfect, no matter how high the requirement selected, some who enter early will not do superior work and some potentially high achievers will not be admitted early.

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⁴¹R. E. Stake, "Predicting Success of the Early Starter" Overview, (November, 1960), pp. 32-34.

TABLE 1

ACHIEVEMENT OF EARLY ENTRANCE PUPILS AT END OF THIRD
GRADE, PREDICTED FROM PRESCHOOL BINET MENTAL AGES

<u>Preschool MA</u>	<u>Grade Equivalent</u>	<u>Preschool MA</u>	<u>Grade Equivalent</u>
5.2	4.1	6.0	4.6
5.3	4.2	6.1	4.6
5.4	4.3	6.2	4.7
5.5	4.3	6.3	4.7
5.6	4.4	6.4	4.8
5.7	4.4	6.5	4.8
5.8	4.5	6.6	4.9
5.9	4.5	6.7	4.9

Parental Request

Most schools limit their early entrance testing programs to those children whose parents specifically request this privilege. Such a program does not consider all possible candidates and may overlook many children who could succeed and profit from this experience. Other schools charge fees for the examinations. Again, the administrator has control over the program which can range from uniform coverage of all children or reduce the number of children through such selective devices as only by parental request or charging fees.

Physical Health

Most programs require that the applicant receive a

physical examination prior to the psychological evaluation. It is usually the parents' responsibility rather than the school.

Social and Emotional Maturity

These are considered important variables in early admission programs. It is usually expected that the child would rate at least equal to young-regular kindergartners in both respects. The level of social and emotional maturity is typically judged by the psychologist during the course of his total evaluation, but some programs have the principal or an experienced kindergarten teacher interview the child and rate maturity in both these areas.

Physical Size and Coordination

These do not seem to be viewed as major factors by any of the early entrance programs in terms of selection criteria.

Sex

No differentiation is made in early admission standards on the basis of sex, nor does it appear that such a proposal warrants consideration. However, many programs report that more girls than boys are accepted for early entrance.

Reporting the Decision

The manner of reporting to parents whether a child is accepted or rejected for early attendance varies widely. Some schools communicate a verbal decision immediately after the test-

ing. Others send form letters and will discuss individual cases by appointment or over the telephone. The latter method has the advantage of avoiding quick judgments on certain borderline cases.

Parent Interview

Many programs insist on a parent interview to assess parental attitudes and obtain the child's developmental history. If the parents show an understanding and acceptance of their child, as well as a willingness to cooperate with the school in programs designed to help the child in his adjustment, then the application would show greater promise. A child would probably have a better chance to succeed with such a favorable parental attitude.

Retesting

Most early admission programs do not provide for retesting children originally deemed ineligible, although some programs allow for one or more retests at parental request. Except in cases where professional school personnel request it, no provision for retesting seems to be a defensible position. This depends largely on the convictions of the administrative staff, adequate backing by the Board of Education, and general school-community relations. However, the school does have a professional obligation to examine and consider the findings of other private, professional practitioners if the parents seek an additional evaluation from an independent source.

Standardized Tests

All current early entrance programs appear to employ psychologists to administer the 1960 Revised Stanford-Binet Intelligence Test, Form L-M, to the applicants. Clinical observation and judgment is the typical method of assessing social and emotional maturity, although in some cases the Vineland Social Maturity Scale is given. Some supplement their findings with human figure drawings, free hand drawings, reproductions of designs, number games, oral achievement tests, or some other such technique.

Decision

In most programs the psychologist recommends acceptance or rejection, but a committee or an administrator makes the final decision.

Trial Period

The majority of programs have a trial period of attendance at school following early admission. This period ranges from two weeks to three months. Parents are told that one of the conditions of early admittance is that they will be asked to withdraw their child if he does not appear to benefit from it or should he make it difficult for the group to profit from instruction. Nevertheless, the school has the obligation to follow-up and assist these children throughout the trial period by working with the

teachers and parents. Should a child have to be withdrawn from school in rare instances, the school should, through its special service personnel, maintain contact with the parents and child in an attempt to prepare the child for school the following year.

Practical experience suggests that a trial period is unnecessary. Existing early entrance programs rarely find it necessary to have parents withdraw their child. Consequently, the trial period becomes an extra burden on the child and his parents. A trial period is usually added to the program at the request of concerned kindergarten teachers. Any child can be removed from the school setting should the school experience not prove to be in the child's best interest without the designation of a trial period. In the parent conference prior to school entry this point could be emphasized in borderline cases that were accepted in the interest of protecting the child.

Research evidence suggests that the school should expect no more than average achievement and adjustment in kindergarten, although superiority in both these areas may occur at this level depending upon the selection criteria utilized for selection. If the flexible admission policies are geared to the selection of gifted youngsters, then placement in top classes throughout their schooling is most advisable.

PRESENT TESTS AVAILABLE AT THE PRESCHOOL LEVEL

All published tests which have been designed for preschool

children and are presently available to today's educator or psychologist, require individual administration. This point may be verified by checking general textbooks discussing psychological testing or referring to the latest edition of the Mental Measurements Yearbook edited by Buros.⁴²

Of the individual tests specifically designed for the preschool level, the best known are probably the Merrill-Palmer Scale and the Minnesota Preschool Scale. In addition, several other well-standardized and widely used individual tests suitable for the preschool ages but extending either downward into the infant level or upward into the school period are available. To mention a few, we might consider the Stanford-Binet, Kuhlman-Binet, Catell Infant Intelligence Scale, Leiter International Performance Scale, Gessell Developmental Schedules, Oseretsky Tests of Motor Proficiency, and Vineland Social Maturity Scale. It was noted previously that the 1960 Revision of the Stanford-Binet is most typically employed in Early School Admission Programs as part of the individual evaluation upon which identification and selection of candidates is based.

TESTING PROBLEMS AT THE PRESCHOOL LEVEL

Some of the testing problems encountered at the infant level overlap the preschool period. Such problems would involve

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⁴²Oscar K. Buros (Ed.), The Sixth Mental Measurements Yearbook, (Highland Park, N.J.: Gryphon Press, 1965), pp. 1765.

motivation and interest, short attention span, and susceptibility to fatigue. Moreover, preschool testing introduces problems specific to children under five years of age. Goodenough enumerates three chief characteristics which she feels may interfere with satisfactory individual test performance within the preschool range.⁴³ These are classified as shyness, distractability, and negativism. The strangeness of the physical environment or the examiner may frighten the shy child. Such children may cry, want to remain with their parent, object to staying in the testing room, or refuse to attempt test items. In many instances of this nature, it is necessary to allow the parent to remain in the examination room to reassure the child in order to obtain some test results. The hyperactivity and distractability of some preschoolers produces a further problem. It is extremely difficult to test a child who cannot remain seated and is moving about the room, handling materials, or asking questions about countless unrelated or irrelevant matters. The negativistic child in the test setting may refuse to respond or perform and remain silent or unresponsive, fail to follow directions, or resort to temper tantrums. The Minnesota Preschool Scale contains rating scales for recording the child's behavior during the test with reference to each of the

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⁴³Florence L. Goodenough, "The Emotional Behavior of Young Children During Mental Tests", J. Juvenile Research, XIII, (1929), pp. 204-219.

three characteristics briefly described in the section.⁴⁴ Extreme manifestations of any of the types of behavior mentioned would probably result in the postponement of an individual evaluation.

Aside from the behavioral attributes of the child which may create problems within the test setting, the development of satisfactory tests is much more difficult at the preschool level than for later years. Children's experiences preceding school admission are quite varied, thereby severely limiting the number and quality of experiences and materials from which the test constructor may derive suitable test items. Reliability and validity indexes for tests are generally higher for older rather than younger subjects.

GROUP TESTING AND THE PRESCHOOL LEVEL

In discussing group tests in her book entitled Psychological Testing, Anastasi states:

The youngest age at which it has proven feasible to employ group tests is the kindergarten and first grade level. At the preschool ages, individual testing is required in order to establish and maintain rapport, as well as to administer the oral and performance type of items suitable for such children. By the age of 5 or 6, however, it is possible to administer printed tests to small groups of no more than 10 or 15 children. In such testing, the examiner must still give considerable individual attention to the subjects to make sure that

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⁴⁴Florence L. Goodenough, Katherine M. Maurer, and M. J. Van Wagenen, Minnesota Preschool Scales: Revised Manual (Minneapolis: Educational Test Bureau, 1940), pp. 127.

directions are followed, see that pages are turned properly in the test booklets, and supervise other procedural details. With one or two assistant examiners, somewhat larger groups may be tested if necessary.⁴⁵

Acknowledging the problems posed at the preschool level both in terms of the behavioral attributes of the children and test construction, it is not surprising to find that there is no preschool group test on the market today. This does not preclude the possibility of developing a preschool group test, it merely assesses the most striking pitfalls. Like most things, when a pressing practical need is delineated, the obstacles may be overcome to meet the crisis. That a need exists for a group screening device in the area of early admission to school seems evident. As noted previously, over half the school systems in the country show interest or favor early entrance to school in principle but relatively few put it into practice. Although many factors can be cited for the state of affairs, the expenditure for professional personnel to administer individual tests to all preschool candidates is not a minor one. Even though school administration courses state theoretically that instructional needs and programming should override financial considerations, the reverse appears strikingly apparent in most instances. A preschool group screening instrument would provide any school the means to screen all of its preschoolers at a minimum of cost and reserve individual evaluations for the final identification and selection of

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⁴⁵Anne Anastasi, Psychological Testing, (New York: Macmillan Co., 1954), p. 206.

the limited number tentatively picked on the basis of group test. The following chapters deal with the construction and evaluation of a preschool group screening test designed to fill the void noted in the review of the literature regarding early school admission programs and preschool testing.

CHAPTER III

DESIGN

RATIONALE

Recognizing the host of problems involved in the development of a group test for the preschool level, procedures were systematically devised to counteract certain factors. The reader will readily detect various techniques atypical in present day test construction. These breaks with traditional test development appeared necessary in the formulation of a group test at the preschool level.

A crucial element in any test setting is the establishment and maintenance of rapport. Several measures were taken to meet this need. Upon arrival at the test session, the examiner or test monitor briefly chatted with each child individually to set him at ease. Next, a colorful number tag was pinned on the child, since children like to be given things at this age level. Prior to the formal testing period the children were lead in group play activities which involved singing, body movements, finger play, and other suitable games for this age level to relax them and satisfy their need for motor activity. The test was divided into two parts of twenty-five items each to provide another forced rest and activity period in the middle of the test session, since

preschoolers are unaccustomed to an extended period of formal structure and are easily susceptible to fatigue.

To motivate and maintain the childrens' interest in the test, the test items were not presented in order of their difficulty or discriminating power. It was felt that preschoolers would find new momentum and renewed motivation by progressing through a test alternating between a sequence of easy and more difficult items. At this age level the manner of presentation and attitude of the examiner plays an important role in keeping youngsters encouraged and reassured. To this end several statements were included in the administration directions which were intended to encourage and reinforce the test behavior of children.

When more than fifteen children were tested a monitor was present with the examiner for further management and control purposes as well as to assist with administrative procedural details, such as, checking individual performance on sample items or assisting some children in turning pages. However, the major role of such an assistant was the recording of the test behavior of individual children to supplement the objective test results. In this manner the test results can be interpreted in a more intelligible and meaningful fashion.

In an attempt to reduce hyperactivity or distractability on the part of children in the classroom testing setting, instructional materials and toys were placed in cabinets or covered with

drapes to eliminate stimulating or distracting items from the physical environment. Conversely, to stimulate and focus the attention of the children on the test, only one test item was presented per page. Equally important, each test item was printed on a different colored page contrasting it from adjacent pages. Each item was timed but the timing was liberal enough to permit most youngsters to complete the item.

The different colored pages likewise facilitated administration by acting as a check that all children were on the correct page. Those children having difficulty turning pages or following directions could be easily located and assisted by surveying the group before the directions for the next item were given. Following each item the children were reminded to turn the page to form a habit by routine. Care was taken to speak slowly and distinctly in a clear, natural, pleasant voice with ample repetition. Sample items were provided prior to various sequences of test items to offer specific help in following directions.

The children were directed to respond to the multiple choice items by marking an X on the correct picture. However, any type of mark produced by the children was accepted and scored as correct provided the marked picture was the correct choice. This was done due to the wide variance in motor coordination at this level.

Imitative behavior or copying is typical at the preschool

level since it is a major avenue to learning. In the test setting measures had to be taken to preclude this behavior. This was accomplished by both or either providing adequate spacing or placing cardboard dividers between children.

Prior to the group testing, parents were reminded to attend to their child's lavatory needs. It was understood that no parents would be allowed in the group testing room under any circumstances. This was done to prevent future coaching by parents with younger siblings or other youngsters through parent-parent sharing information get-togethers.

The ease with which the child could be separated from his parent in order to enter the group testing room was taken as one indication of his emotional maturity. If initial attempts by parent and examiner to have the child enter the testing room were unsuccessful, and if the child continued to cause a disturbance through his crying or temper tantrum, the parent was expected to withdraw the child from that scheduled session. This was done to avoid causing other children to feel uneasy and lead to a possible mass reaction of insecurity. The children who had separation anxiety problems were later seen in smaller group session.

Test sheets measured in size 5 1/2 inches by 8 inches. They were fastened together at the top (narrow width) rather than on the side so children could place their booklet in a comfortable position without their handedness becoming a problem.

ITEM SELECTION

Prior to the beginning of the 1964-65 school year, eighty candidates for early admission to school ranging in age from four years-six months to four years-eight months were evaluated individually. Each child was administered the 1960 Revision of the Stanford-Binet Intelligence Test. In addition, depending on the preference of the examining psychologist, the youngsters were asked to draw a man, finish an incomplete picture of a man, print their name, and recognize letters and numbers on the Wide Range Achievement Test. Evidence of social, emotional and physical maturity was noted through observation prior to and during the evaluation.

After the individual identification and selection of those to be admitted early to kindergarten on the basis of pre-determined criteria was completed, each sub-test item on the aforementioned individual test procedures was analyzed to determine its ability to discriminate between those youngsters accepted for early entrance and those rejected. Since no child under a minimum mental age of five years-ten months was accepted, the subsequent discrimination indexes may be thought of as separating youngsters (CA 4-6 to 4-8) above and below MA 5-10 (IQ 126 and above).

On the Stanford-Binet, Form L-M, all subtest items between Level IV-6 and Level VII were analyzed to determine their

discriminating power. The upper and lower twenty-seven percent of the eighty youngster total provided a comparison between the top twenty-one children (MA 5-10 to 7-1) and the lower twenty-one children (MA 3-7 to 4-11). Table II provides a listing of the subtests on the Stanford-Binet which appeared most useful in the development of the group test in terms of their level of difficulty and discrimination value.

TABLE II

ITEM ANALYSIS DATA ON STANFORD-BINET
COMPARING PRESCHOOLERS WHO WERE ADMITTED
EARLY AND REJECTED FOR KINDERGARTEN PLACEMENT

Level	Item	Description	<u>Upper 27%</u>		<u>Lower 27%</u>		r	Diff.
			N	%	N	%		
V	4	Copying square	15	71	3	14	.58	43
VI	1	Vocabulary	20	95	2	10	.85	52
VI	2	Difference	15	71	1	5	.68	38
VI	3	Mutilated pictures	15	71	3	14	.58	43
VI	4	Number concepts	15	71	1	5	.68	38
VI	5	Opposite analogies	16	76	2	10	.67	43
VI	6	Mazes	19	90	6	29	.63	60
VII	5	Opposite analogies	14	67	0	0	.79	33

From these nine subtests yielding sufficient discriminating

power and average difficulty between early entrants and those not accepted, thirty-four items were adapted for the initial development of the group test.

Sixty-seven percent of the upper group were able to print three or more letters of their first name as opposed to only fourteen percent of the lower group. The table of Flanagan r's yielded a correlation of .53 between the upper 27 percent and lower 27 percent of the group in their ability to print three or more letters. On the basis of the information, printing skill provided another test item for the preschool screening test.

Due to the difference in the type of individual tests administered by the psychologists, only nine of the top twenty-one children were asked to draw a person. For comparison purposes, nine of the lower twenty-one youngsters were chosen at random. The drawings were scored on the basis of the Goodenough Draw-A-Man Test. All of the nine children in the upper group achieved a raw score of five or more, whereas only fifty-six percent of the lower nine youngsters made a similar score. On the basis of the data, drawing a man was utilized as one item on the group test.

Six of the top twenty-one children had received an abbreviated form of the Wide Range Achievement Test. For comparison purposes data regarding six of the lower twenty-one children was randomly selected. All six in the high group recognized letters (A-B-O-S-E-R-T-H) and numbers (3-5-6) but none in the low group.

Recognition of numbers and letters provided an additional six try-out items for the group test.

During the first week of school in September, 1964, a kindergarten class was administered the Metropolitan Readiness Test, Form S. Five of the pupils tested were early entrants. The remaining twenty-five students were ranked in terms of their percentile scores and the lower five were compared with the early entrants on one hundred subtest items. Only five of the items (Test 1, Word Meaning, Items 7 and 12; Test 3, Information, Item 14; Test 4, Matching, Item 16; and Test 5, Numbers, Item 16) demonstrated a sufficient degree of discrimination for inclusion in the group test on a trial basis. It should be noted that the data on the test were comparing early entrants and regularly admitted, older children, whereas previous comparisons were between high and low rankings of early entrance candidates.

The foregoing techniques yielded forty-seven test items derived on an empirical basis from several individual and one group test. These items were then adapted for group presentation. An additional twenty-two items developed by the investigator were prepared yielding a total of sixty-nine test items for initial inclusion in the experimental form of the preschool group screening test.

In an effort to explain how the discriminating subtest items on individual tests were transformed for presentation in the

group test, the following examples are offered.

Sample 1. Vocabulary items on the Stanford-Binet (Level VI, Item 1) require verbal presentation and an oral response. Each vocabulary item or word was reproduced in pictorial form and three distracting outline drawings added. The reader will recognize this format as similar to many picture vocabulary tests used for individual administration. For group testing purposes the testee was asked to mark the picture of the word presented orally while looking at a set of four pictures.

Sample 2. On the subtest involving multilated pictures on the Stanford-Binet (Level VI, Item 3) the child is asked to verbally indicate what is gone in the picture. On the group test a multilated picture was depicted at the top of the page and beneath it were four possible choices of the missing part. The child was instructed to mark the picture of the part that was not in the large (multilated) picture at the top of the page.

Sample 3. Number concepts on the Stanford-Binet (Level VI, Item 4) require the subject to place a certain number of blocks on a sheet of paper. On the group test the child viewed a page with twelve squares on it and was asked to mark a prescribed number of squares.

In this manner items were derived on an empirical basis from several individual tests and transformed for inclusion in the group test. It was then necessary to determine if these trans-

formed items sufficiently retained their discriminating power via group presentation.

The initial group instrument of sixty-nine items was administered to two groups of children. The first group included seventy-two kindergarten youngsters from an all white, upper-middle-class suburban school. Their ages ranged from five years-three months to six years-two months. The second group consisted primarily of a white, upper-middle class sample of eighteen preschoolers enrolled in a private nursery school. Their chronological ages ranged from four years-no months to five years-no months. On the basis of the preliminary testing in these two groups, especially at the nursery school level, the initial form of the Preschool Group Screening Test of Early Entrance to Kindergarten Potentiality was revised to the present fifty item test currently being used in this research paper.

Item analysis of the kindergarten data indicated that more than half of the tryout items were too easy and lacked discriminating power at the five year level. Tetrachoric correlations with the criterion dichotomized at the median were utilized to determine discriminating indexes. Some items were too difficult even at the kindergarten level, indicating that they would be of no value at the preschool level.

Table III shows the summary of the item analysis data for the nursery school children in the pilot study in terms of the

fifty items chosen for the present form of the test. The upper and lower fifty percent of children were compared to obtain item discrimination and item difficulty values. The resulting group test contains twenty-six items with a discriminating power varying between .20 and .80, eight items between .10 and .19, and sixteen items with no observable discrimination value. The items with a discriminating index between .10 and .19 were included on the theory that with a larger and broader sample their discriminating ability may increase. The sixteen non-discriminating items were included for the above reason but also for motivational purposes. One of the reasons cited in the literature to explain why no group preschool test had been developed was the difficulty in establishing and maintaining rapport as well as devising suitable items for administration at this level. Thus, it seemed reasonable to sprinkle easy, although non-discriminating items throughout the test to ease the testing situation for the children.

TABLE III

FREQUENCY DISTRIBUTIONS OF ITEM ANALYSIS
 DATA FOR DISCRIMINATION AND DIFFICULTY
 INDEXES ON FIFTY TRY-OUT ITEMS IN ORIGINAL
 GROUP TEST WITH NURSERY SCHOOL CHILDREN

Values	Discrimination Index	Difficulty Index
.90 - .99	0	13
.80 - .89	3	5
.70 - .79	6	5
.60 - .69	1	11
.50 - .59	7	5
.40 - .49	2	1
.30 - .39	3	3
.20 - .29	4	2
.10 - .19	8	4
0 - .09	16	1
Total	50	50

Three observers (a researcher and two kindergarten teachers) were present during the pilot testing to subjectively evaluate the test administration. On the basis of their suggestions the

following modifications are present in the group test or manual.

1. More adequate spacing of children or further utilization of dividers between children was recommended to counteract imitative behavior (copying).
2. More sample items were employed prior to various item sequences in the test.
3. The test was divided into two booklets rather than one to provide a natural break in the testing session because pre-school children find it difficult to remain attentive for a sustained period of time. Likewise, two booklets seemed to be more advantageous than three booklets since the latter approach tends to make the test session too lengthy even though more breaks are provided.
4. Easy and more difficult items sequences have been alternated throughout the test for motivational and reinforcement purposes.
5. All items previously given fifteen seconds for completion were reduced to ten seconds since the latter time interval seemed sufficient for all children to complete the items.

Two other areas in which the investigator anticipated possible problems did not eventuate. The observers indicated unanimously that the large size of the groups and the turning of pages did not appear to be problems.

TEST MATERIALS

The Preschool Group Screening Test of Early Entrance to Kindergarten Potentiality was designed for group administration by school personnel other than trained psychometricians or psychologists. An attempt was made to develop a test that would be useful in detecting those children who were likely candidates for early admission to kindergarten. In addition, it provides an estimate of intelligence for children ranging in chronological age from four years-six months to four years-eight months. The group test is not intended to take the place of a more comprehensive individual assessment, rather to reserve individual, time-consuming, evaluations for the limited number of most likely candidates for early school admission. In this manner the group test supplements individual testing by providing a screening device prior to the indiscriminate use of individual tests and professional time.

The materials required for administration of the group test consist of the following:

1. An examiner's manual (Appendix A);
2. A set of two record booklets per testee (Appendix B);
3. A record form for scoring a subject's responses (Appendix C).

The fifty item group test is divided into two separate booklets of twenty-five items each plus demonstration or sample

items. Part I involves the exclusive use of multiple choice items, wherein the child merely marks his choice with a pencil to indicate his answer. Part II includes copying, drawing and printing items as well as the multiple choice type.

Table IV lists the major categories of items in the group test in its present form and indicates the raw score points that it is possible to achieve in the test.

TABLE IV
TYPE AND NUMBER OF ITEMS INCLUDED IN
PRESCHOOL GROUP TEST

Category	Number of Test Items	Possible Points
Draw-a-man	1	16
Numbers (recognition, concepts, printing)	11	15
Picture vocabulary	11	13
Letters (recognition and printing)	5	10
Picture description	7	9
Relationships (size, space, direction, position)	7	8
Multilined pictures	5	6
Copying designs	3	4
Total	50	81

Directions and instructions are given orally by the examiner while subjects scan a single page on which are represented four or more possible choices or answers. The subject responds to the examiner's instructions by marking one of the line drawings on the page. In some instances the children are asked to respond by copying a design, printing their name, or drawing a picture.

Each page of the booklet measures 5 1/2 inches by 8 inches and contains only one test item. Each booklet is stapled at the top (the smallest width) so the subject can position the booklet according to his handedness. The pages of the booklet alternate with four different colors. This format was followed to help stimulate the subject and assist the examiner in determining that the subjects were on the correct page.

All items have specific time limits but the time interval is sufficient for the majority of subjects to complete the assigned tasks. Total administration time is approximately one hour which includes an activity period prior to and in the middle of the test. Scoring of the group test averages about six minutes per test.

Intermittent motivational statements and verbal reinforcement of the subjects' behavior are built into the test directions. Moreover, test items are not presented in order of difficulty, rather they are arranged in a pattern of alternating easy and harder sequences to motivate and reinforce a subject's performance.

The Preschool Group Screening Test of Early Entrance to Kindergarten Potentiality has the following features:

1. It is a useful screening device specifically developed for preschool programs.
2. Preschool groups of thirty or more children can easily be accomodated in one testing session.
3. The test saves time as compared with individually administered tests, yet offers a valid and reliable test at the preschool level.
4. It is suitable for average, above average and superior levels of intellect.
5. Preschoolers most likely to be accepted for early admission to school are easily detected.
6. Norms are presented in terms of standard score deviation IQ's.
7. Cut-off points for early entrance to kindergarten are suggested but users are encouraged to supplement this data with community and school data.
8. Manual contains clear, concise directions for administration and scoring and does not require a trained specialist.

9. Items are meaningful to children four years-six months to four years-eight months of age.
10. Responses are completely non-verbal.
11. Scoring is simple and primarily objective.
12. Each test item is printed on a separate and different colored page.
13. Clear, bold line drawings are presented devoid of fine detail to reduce figure ground problems of perception.
14. Illustrations are appropriate to age level of subjects
15. Items are arranged in alternating sequences of discrimination and difficulty to provide continued interest, motivation and reinforcement.

CHAPTER IV

METHOD

THE SAMPLE

The sample employed in the standardization of the Preschool Group Screening Test of Early School Entrance Potentiality consisted of preschool children within School District 68, Skokie, Illinois. This school district was selected for several reasons:

- (1) District 68 had had experience in conducting and maintaining an early entrance program over a five year period;
- (2) The administration of the district not only expressed a willingness to participate in the study but offered encouragement and assistance in terms of personnel, resources, and facilities; and
- (3) The district was conveniently located and easily accessible to the investigator.

Skokie, as a village, is the largest in the United States. Politically, it is part of the 13th Congressional District of Illinois. According to the 1960 census, this Congressional District ranked first in the nation in terms of family income (median \$9,389), highest education (median 12.6 years), and least unemployment (1.6 percent).

Socially, it appears to be inhabited mainly by white,

upper-middle class families consisting primarily of professionals, managerial and executive persons, and skilled workers with relatively high income. Approximately sixty percent of the families are Jewish. The majority of the adults in the community are college graduates. However, there are fringe areas wherein some families would be classified socio-economically as lower-middle class or middle class, but these families are usually striving to compete with or become upper-middle class.

Skokie is part of Niles Township which is located directly northwest of Chicago. School District 68, Old Orchard, is one of five elementary school districts serving the village of Skokie which has a population of about 68,000. School District 68 serves the northern section of the village of Skokie. This northern suburb of Chicago is surrounded by Evanston to the East, Lincolnwood to the South, Niles and Morton Grove to the West, and Wilmette and Golf to the North.

School District 68 has adhered to the kindergarten through eighth grade plan of elementary school organization with an enrollment of about 4200 pupils. Repetition of grade is rather uncommon. The average IQ of the pupils, based upon the Lorge-Thorndike Group Intelligence Test is approximately 115.

Pre-school children between the ages of four years-six months and four years-eight months who would miss the rigid chronological cut-off point set by the State by from one to ninety

days served as the sample. It was estimated on the basis of informal census data that approximately 100 preschoolers would fall in this category, that is, their fifth birthday would be on or between December 2, 1965 and February 28, 1966. Although special efforts were made in the form of newspaper releases, Parent Teacher Association bulletins, and notices sent home with pupils, all potential candidates for early entrance to kindergarten were not involved in the study. A variety of reasons accounted for this: (1) conflict between the testing schedule and parent vacation plans; (2) unaware of the early entrance program; (3) informed but not interested.

One hundred and two children were registered for consideration in the Early Admission to School Program. Of these, twelve were unable to keep their appointments for both the group and individual evaluations. Thus, the sample included ninety children for the purposes of the present investigation. Table V shows the distribution of the sample by birthdate and by sex. The sample seems to be balanced about evenly between boys and girls with more cases representing December-born children than January or February birthdates. Since parents of older children or those closer to the arbitrary cut-off date for regular entrance set by the State are more anxious to have their children attend school and the test will probably be used more widely with such children, this is considered to be satisfactory.

TABLE V

SIZE OF SAMPLE BY BIRTHDATE AND SEX

Birthdate	Male	Female	Total
December	18	22	40
January	12	14	26
February	12	12	24
Total	42	48	90

GENERAL PROCEDURES

Beginning in the spring of 1965 several newspaper releases regarding the Early Entrance to Kindergarten Program were printed in the local community papers. This was followed by a Parent Teacher Association Bulletin and notices sent home with children who had younger preschool siblings to encourage parents to register their children in advance for the program. At a group meeting in July 1965, preceded by a letter, parents were given both group and individual evaluation appointments for their children.

The Preschool Screening Group Test of Early Entrance to Kindergarten Potentiality was administered to all registered preschool candidates in separate groups of 15 to 30 youngsters on July 29 and 30, 1965. A group test make-up examination was held on August 16, 1965 for 14 youngsters. Individual evaluations of

all youngsters, involving ratings of behavior and emotional maturity and the administration of the Stanford-Binet, Form L-M, Wide Range Achievement Test, and Draw-A-Man Test, were scheduled during the first two weeks of August, 1965. In the group setting youngsters were given a test number while their names were utilized in the individual testing. This was necessary because the present investigator administered and scored all the group tests and examined about half of the candidates on an individual basis. A second psychologist was employed to assist with the individual evaluations of the remaining youngsters.

Prior to the procedures discussed above the group test was administered to sixty-seven youngsters on May 31, and June 3, 1965. Twenty of these youngsters were later involved in the July testing which provided the first test-retest reliability index for an eight week interval.

A second group test-retest measure involved fourteen other preschoolers of the ninety candidates for early entrance. The test was administered on August 28, 1965 allowing a time lapse of four weeks. Since none of these preschoolers were accepted for early entrance to kindergarten, the participants were composed largely of volunteers.

Although the majority of items on the group test are objective, five items (copying, printing and drawing) involve subjectivity in scoring. One of the purposes for the development

of the group test was to allow non-specialists to administer and score it to reduce costs involved in early admission programs. Thus, scorer reliability was checked between psychologist, teacher, clerk, and housewife on 38 cases of the sample.

The majority of Early Admission Programs reported in the literature indicate that the 1960 Revision of the Stanford-Binet Individual Intelligence Test is employed as the primary instrument to assess intellectual ability. Acknowledging this, the Stanford-Binet was used as a model in terms of the group test construction and as one major criterion to demonstrate content validity and concurrent validity respectively.

GROUP TEST PROCEDURES

Parents of preschool children residing within the district were invited to have their child attend a group testing session at the elementary school nearest their residence if their child's fifth birthday was on or between December 2, 1965 and February 28, 1966. At the group session parents were asked to complete a brief information sheet and an identification number tag was pinned on their child. The group of children were then separated from their parents and taken to a first grade room by a kindergarten teacher to establish rapport, play games, and have an activity period prior to the formal and structured testing session. After making a few brief comments to the parents the examiner entered the testing room and distributed primary pencils

and booklets, numbering them to correspond with each child's identification tag.

Part I of the test was then administered by the examiner but the kindergarten teacher remained in the room for management and control purposes, but, most important, to observe and keep written records regarding the behavior of individual children. When Part I was completed the teacher held another activity session while the examiner collected the completed booklets and distributed and numbered Part II. Upon the completion of the group testing the children were returned to their parents who were waiting in another wing of the school building.

Regardless of the size of the groups the total testing time including the two activity periods was approximately one hour. The initial greeting of parents and children averaged an additional fifteen minutes.

Fifteen or less children could easily be handled adequately by one person. An additional person was required as the number of subjects increased mainly for purposes of recording the behavior of various children and assisting children farthest from the examiner in terms of administrative procedural details.

The activity periods are felt to be highly desirable and necessary at this age level. Although many of the children may have experienced a nursery school setting, it is not easy for preschoolers to enter a strange physical and social environment.

For this reason a description of the activity periods seems warranted.

When first seated in the room prior to the group test, the teacher would sing familiar songs with the children to put them at ease. Mary Had A Little Lamb and Jingle Bells seemed to be the most popular with the children. While singing the teacher would encourage movement on the part of the children. For instance, the children were asked to pretend their hands were bells and to shake them while singing Jingle Bells.

Following this the children were asked to stand behind their desks and were taught the song, Head, Shoulders, Knees and Toes, starting slowly and progressively becoming faster. The children join in quickly and learn to point while singing or say the words. The words are:

"Head, shoulders, knees and toes, knees and toes
Head, shoulders, knees and toes, knees and toes and
Eyes and ears and mouth and nose,
Head, shoulders, knees and toes, knees and toes."

The children also appeared to enjoy finger play:

"I have ten little fingers and they all belong to me.
I can make them do things
Would you like to see?
I can shut them together or make them all hide
I can make them jump high

I can make them jump low.

I can fold them up quickly and hold them just so."

During the break after Part I testing some of the aforementioned activities could be repeated. Other ideas would be for the children to pretend they were a rocket ship. The children crouch and count backwards from ten and after zero say, "Blast Off", and all jump up. Or, they might hop in place like a bunny, run in place, or clap their hands fast and loud, soft and slow or variations of these. Another activity might be the "Hokey Pokey" but instead of using left and right, have the children put both hands in, both feet in, head in, and whole body in the circle of children.

Lastly, an activity which is excellent directly before the testing begins is to have all the children make a big happy smile through the recitation of the following poem:

"I have something in my pocket

It belongs across my face

I keep it very close to me

In a very special place.

I know you'll never guess it

If you guess a long, long while.

So I'll take it out and put it on

It's a great big happy smile."

Plate 1 illustrates the testing setting through the presentation of two photographs. The first picture depicts a kindergarten teacher leading the group activity period while the second photo shows the actual test administration.

Undoubtedly an imaginative teacher could think of several other activities that would be suitable at this age level. The content or type of activity is not so important as long as it fits the age range. The establishment of rapport and security that results from such activities is of primary concern.

Plate 1: Photographs of Test Administration and Activity Period

CHAPTER V

RESULTS

GROUP TEST NORMATIVE DATA

The sample used for establishing the norms was highly specific and restricted to children residing in a white, upper-middle class community. Ninety children between the ages of four years-six months and four years-eight months who missed the rigid chronological age date set by the State for automatic school admission by from one to ninety days were administered the Group Preschool Screening Test for Early Entrance to Kindergarten Potentiality and the 1960 Revised Edition of the Stanford-Binet Intelligence Test.

Table VI presents the basic results of the study in terms of each child's score on the group and individual test. The data are presented in descending order on the basis of group test scores. Means and standard deviations are reported for the intelligence quotients on the individual test and for raw scores and deviation IQ's on the group test.

The distribution of raw scores within the three month test range of the group test are given in Table VII for one month intervals. A series of t-tests for the difference between means

TABLE VI

COMPARISON OF GROUP AND INDIVIDUAL TEST RESULTS

PRESCHOOL GROUP SCREENING TEST

Child's Number	Raw Score	Deviation IQ	Stanford-Binet, Form L-M, IQ
43*	67	155	147
25*	63	150	124
73*	61	148	135
42*	59	145	126
7*	57	143	132
4*	54	140	139
87*	50	135	132
79	49	134	118
8*	49	134	139
74	48	133	111
96*	46	130	126
9	46	130	122
20	45	129	116
35*	45	129	138
95	43	127	116
1*	42	126	144
99	42	126	116
63*	40	123	132
22*	40	123	153
16	40	123	114
93	40	123	113
86	39	122	130
21*	38	121	134
109	37	120	94
3	37	120	107
39	37	120	116
85	37	120	122
62	37	120	114
78	36	119	130
26	35	117	114
110	35	117	107
105	35	117	111
101*	35	117	128
10	34	116	109
45	34	116	101
49	34	116	103
67	34	116	122
102*	34	116	131
89	34	116	99

23	33	115	107
46	33	115	113
6	33	115	111
75	32	114	124
17	31	113	114
19	31	113	107
47	31	113	99
27	31	113	113
5*	30	112	133
38	29	111	107
29	28	109	126
72	28	109	126
76	28	109	107
97	28	109	114
33	27	108	111
48	27	108	124
104	27	108	116
108	27	108	111
15	27	108	118
98	26	107	109
103	26	107	111
34	25	106	99
90	25	106	105
83	25	106	94
84	24	105	109
100	23	104	101
51	23	104	103
92	23	104	107
80	20	100	114
31	20	100	109
69	19	99	118
14	19	99	99
11	19	99	99
60	19	99	94
64	18	98	86
106	18	98	88
37	17	97	99
40	17	97	103
88	17	97	120
41	16	95	105
68	16	95	92
94	16	95	99
32	15	94	96
107	15	94	95
50	14	93	113
65	13	92	96
30	12	91	99
28	10	88	94
2	10	88	75
12	8	86	86
71	6	84	90

Mean	31.14	113.00	112.81
S.D.	12.89	15.00	14.96

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* - asterisk denotes those children who were accepted in early entrance program.

TABLE VII
FREQUENCY DISTRIBUTIONS OF RAW SCORES
FOR EACH AGE GROUP IN SAMPLE

Raw Score	Age			Total
	December 4-8	January 4-7	February 4-6	
75-79				0
70-74				0
65-69	1			1
60-64	2			2
55-59	1		1	2
50-54	1		1	2
45-49	2	4	1	7
40-44	4	2	1	7
35-39	5	2	5	12
30-34	9	4	2	15
25-29	5	6	4	15
20-24	0	4	2	6
15-19	6	3	5	14
10-14	3	1	1	5
5-9	1		1	2
0-4				0
Total	40	26	24	90
Mean	32.83	29.96	29.58	31.24
S. D.	15.55	9.76	12.59	12.89

was applied to discover if differences existed between the means for one month intervals. The results of successive t-tests performed and reported in Table VIII revealed no significant difference between the raw score means on the group test by age in months over the three month test range of four years-six months to four years-eight months.

TABLE VIII

DIFFERENCE BETWEEN MEANS BY AGE

Age (Birthdate)	df	t	p
December - January	64	.872	NS
December - February	62	.897	NS
January - February	48	.117	NS

The distribution of raw scores by sex are itemized in Table IX. The sample is balanced about evenly between boys and girls, with the latter accounting for fifty-three percent of the cases. A t-test for the difference between means by sex was applied. For 88 degrees of freedom a t-value of 1.988 or 2.633 would be significant at the 5% or 1% level of significance respectively. The t-value obtained for the difference between raw score means (6.06) by sex was 2.306. This difference is significant at the 5% level.

TABLE IX

FREQUENCY DISTRIBUTIONS OF RAW SCORES BY SEX

Raw Score	Sex		Total
	Male	Female	
75-79			
70-74			
65-69		1	1
60-64	1	1	2
55-59	1	1	2
50-54	1	1	2
45-49	2	5	7
40-44	3	4	7
35-39	4	8	12
30-34	4	11	15
25-29	9	6	15
20-24	3	3	6
15-19	8	6	14
10-14	4	1	5
5-9	2		2
0-4			
Total	42	48	90
Mean	27.90	33.96	31.14
S.D.	13.33	11.79	12.89

TABLE X
DEVIATION INTELLIGENCE QUOTIENTS
FOR GROUP TEST NORMATIVE SAMPLE

Raw Score	Boys	Total Sample	Girls	Raw Score
1	82	78	71	1
2	83	79	72	2
3	84	80	74	3
4	85	81	75	4
5	86	83	76	5
6	87	84	77	6
7	88	85	79	7
8	90	86	80	8
9	91	87	81	9
10	92	88	83	10
11	93	90	84	11
12	94	91	85	12
13	95	92	86	13
14	96	93	88	14
15	97	94	89	15
16	99	95	90	16
17	100	97	91	17
18	101	98	93	18
19	102	99	94	19
20	103	100	95	20
21	104	101	97	21
22	105	102	98	22
23	106	104	99	23
24	108	105	100	24
25	109	106	102	25
26	110	107	103	26
27	111	108	104	27
28	112	109	105	28
29	113	111	107	29
30	114	112	108	30
31	115	113	109	31
32	117	114	111	32
33	118	115	112	33
34	119	116	113	34
35	120	117	114	35
36	121	119	116	36
37	122	120	117	37
38	123	121	118	38
39	124	122	119	39
40	126	123	121	40

Raw Score	Boys	Total Sample	Girls	Raw Score
41	127	124	122	41
42	128	126	123	42
43	129	127	124	43
44	130	128	126	44
45	131	129	127	45
46	132	130	128	46
47	133	131	130	47
48	135	133	131	48
49	136	134	132	49
50	137	135	133	50
51	138	136	135	51
52	139	137	136	52
53	140	138	137	53
54	141	140	138	54
55	142	141	140	55
56	144	142	141	56
57	145	143	142	57
58	146	144	144	58
59	147	145	145	59
60	148	147	146	60
61	149	148	147	61
62	150	149	149	62
63	151	150	150	63
64	153	151	151	64
65	154	152	152	65
66	155	154	154	66
67	156	155	155	67
68	157	156	156	68
69	158	157	158	69
70	159	158	159	70
71	160	159	160	71
72	162	161	161	72
73	163	162	163	73
74	164	163	164	74
75	165	164	165	75
76	166	165	166	76
77	167	166	168	77
78	168	168	169	78
79	169	169	170	79
80	171	170	172	80
81	172	171	173	81

In Table X deviation intelligence quotients are reported by sex and total sample for the Group Preschool Screening Test of Early Entrance to Kindergarten Potentiality. The following formula was utilized to adapt group test raw scores by sex and total sample into deviation intelligence quotients to approximate the familiar Stanford-Binet IQ distribution:

$$\text{Deviation IQ} = M + (\sigma) \left[\frac{X_1 - \bar{X}}{\text{S.D.}} \right]$$

where M = mean of Stanford-Binet IQ's for normative sample;

σ = standard deviation arbitrarily selected;

X_1 = an original raw score measurement on group test;

$\bar{X}$ = mean of normative sample for group test;

SD = standard deviation of normative sample for group test.

In Table XI are found the constants that were placed in the formula except for the varying raw scores to obtain the deviation IQ's by sex and total sample reported in Table X.

TABLE XI
CONSTANTS UTILIZED IN FORMULA TO OBTAIN
DEVIATION IQ'S FOR NORMATIVE SAMPLE

	M	σ	$\bar{X}$	S.D.
Boys	112	15	27.90	13.33
Girls	113	15	33.96	11.79
Total	113	15	31.14	12.89

RAPPORT AND MOTIVATION

The first section of Chapter III described the measures taken to establish rapport and maintain the subject's motivation. Of 94 children, 86 took the group test on the first attempt to administer it to them. Out of the remaining 8 children 4 responded to the second administration. None of the children who initially experienced difficulty in taking the group screening test were accepted for early entrance on the basis of individual evaluation follow-ups.

A room monitor was present during the group testing to assist with various administrative details, but primarily to make comments on the behavior of individual children. Anecdotes were written about 32 of the 90 children in the sample. Only 3 of the 17 children eventually accepted for early entrance received comments regarding their group test behavior. As it turned out, one girl had poor motor coordination due to a congenital defect, and medical reports were unfavorable that maturation or treatment would result in striking further development. Therefore, another year of added growth would probably not have resulted in improved coordination. The girl was accepted, since she met the three major criteria for early entrance centering around superior intellectual ability and, at least, average social and emotional maturity. One boy exhibited some emotional problems due to disturbed family relationships and further investigation indicated a

wait to enter school would not likely alleviate the problem. Family therapy was stipulated as a condition for early entrance in this case. The third child's comments referred only to his talking aloud occasionally while the group test was in progress.

Using test item omissions as a measure of lack of motivation resulted in the following findings. Of 4,500 possible test responses (90 children X 50 items on group test) 306 omissions of various items were located. This represents seven percent of the total items or 3.5 items per group test of 50 items. All the children were given ample opportunity to respond to all items since each item was timed separately.

SUITABILITY OF TEST ITEMS

Table XII presents the item analysis data for the group preschool test by comparing the upper and lower twenty-seven percent of the sample to obtain the discriminative power and difficulty value of each item. Discriminative indexes were based on values found in the table of Flanagan correlations.¹ Difficulty indexes are presented in terms of percentage of the sample passing an item. A higher percentage indicates a relatively easier item.

Frequency distributions of the item analysis data appear in Table XIII. This breakdown summarizes the information for the

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¹John C. Flanagan, "General Considerations in the Selection of Test Items...", J. of Educational Psychology, XXX (December, 1939), pp. 674-680.

fifty item test. The item discrimination indexes ranged from correlation coefficients of 0 to .82. Forty-seven or 94 percent of the 50 items on the test received a correlation coefficient of .20 or above. Forty-three items have a discriminating power of .40 or above. The difficulty of the items ranged from 11 to 90 with a mean percentage difficulty of 46.

TABLE XII

ITEM ANALYSIS DATA FOR GROUP PRESCHOOL SCREENING TEST

Item Number	Upper 27%		Lower 27%		Discrimination Index (r^*)	Difficulty Index (%)
	Correct	%	Correct	%		
1	20	83	18	75	.14	79
2	23	96	12	50	.64	73
3	24	100	15	63	.69	82
4	16	67	9	38	.28	53
5	17	71	5	21	.51	46
6	21	88	7	29	.59	59
7	24	100	19	79	.62	90
8	21	88	13	54	.41	71
9	19	79	13	54	.28	67
10	7	29	4	17	.16	23
11	6	25	1	4	.42	15
12	24	100	15	63	.69	82
13	17	71	2	8	.65	40
14	15	63	4	17	.47	40
15	22	92	6	25	.72	59
16	4	17	4	17	0	17
17	20	83	4	17	.65	50
18	22	92	4	17	.75	55
19	18	75	4	17	.57	46
20	24	100	9	38	.79	69
21	13	58	8	33	.25	46
22	20	83	9	38	.48	61
23	6	25	1	4	.42	15
24	14	58	3	13	.50	36
25	11	46	2	8	.45	27
26	18	75	5	21	.54	48
27	5	21	2	8	.21	15
28	10	42	2	8	.43	25
29	15	63	6	25	.41	40

Item Number	Upper 27%		Lower 27%		Discrimination Index (r^*)	Difficulty Index (%)
	Correct	%	Correct	%		
30	24	100	7	29	.82	65
31	8	31	1	4	.50	19
32	19	79	6	25	.54	52
33	12	50	0	0	.74	25
34	16	67	1	4	.70	36
35	10	42	1	4	.57	23
36	13	58	0	0	.76	29
37	5	21	0	0	.58	11
38	5	21	0	0	.58	11
39	7	29	0	0	.63	15
40	19	79	2	8	.69	44
41	12	50	2	8	.50	29
42	22	92	5	21	.73	57
43	23	96	15	63	.55	80
44	23	96	9	38	.70	67
45	24	100	18	75	.63	88
46	21	88	4	17	.68	53
47	18	75	2	8	.67	42
48	13	54	1	4	.64	29
49	16	67	2	8	.60	38
50	15	63	3	13	.54	38

* Discrimination index based on table of Flanagan r 's.

TABLE XIII

FREQUENCY DISTRIBUTIONS OF ITEM ANALYSIS DATA
FOR DISCRIMINATION AND DIFFICULTY INDEXES

Values	Discrimination (r)	Difficulty (%)
.90 - .99	0	1
.80 - .89	1	4
.70 - .79	8	3
.60 - .69	13	5
.50 - .59	13	8
.40 - .49	8	9
.30 - .39	0	4
.20 - .29	4	8
.10 - .19	2	8
.0 - .10	1	0
Total	50	50

Kuder-Richardson Formula 20 was employed to obtain reliability indexes for the upper and lower 27 percent of the sample. Table XIV reports the results in terms of coefficients of correlation along with an estimate of the standard errors of measurement. A correlation of .73 and a standard error of measurement of 4.33 was obtained for the top 27 percent of the sample. For

the bottom 27 percent the data yielded a correlation of .23 with a standard error of measurement of 3.55.

TABLE XIV
RELIABILITY ESTIMATES FOR UPPER AND
LOWER TWENTY-SEVEN PERCENT OF SAMPLE
(Kuder-Richardson No. 20)

Data	r	SEm	N
Upper 27 percent	.73	4.33	24
Lower 27 percent	.23	3.55	24

Five test items in the group test demonstrate a difference between the proportions of girls and boys responding correctly in the sample. Table XV describes these five items and indicates the level of significance favoring girls.

TABLE XV
GROUP TEST ITEMS DEMONSTRATING
A BIAS IN FAVOR OF GIRLS

Item Number	Description of Item	Difference in Response by Sex (z-score)	Probability
6	Picture Vocabulary (gown)	2.472	.025**
14	Number Recognition (six)	2.026	.05*
29	Draw-A-Person (based on score of six and below versus seven and above)	2.177	.05*
31	Number Concept (ten)	2.670	.01***
49	Mutilated picture (shoe)	2.502	.025**

* Significant at 5% level

** Significant at 2.5% level

*** Significant at 1% level

RELIABILITY

Test-Retest

Two reliability studies involving test-retest with time lapses of four and eight weeks were conducted. Table XVI summarizes the test-retest data on preschoolers ranging in age from four years-four months to four years-nine months which yielded correlations of .91 and .87.

TABLE XVI

SUMMARY OF STUDIES ON
TEST-RETEST RELIABILITY

Age First Testing	Time Lapse	Age Second Testing	r	N
4 yrs.; 4 mos. - 4 yrs., 6 mos.	8 weeks	4 yrs., 6 mos. - 4 yrs., 8 mos.	.91	20
4 yrs., 6 mos. - 4 yrs., 8 mos.	4 weeks	4 yrs., 7 mos. - 4 yrs., 9 mos.	.87	14

The raw score data on which the test-retest reliability studies were based are presented in Tables XVII and XVIII.

TABLE XVII

TEST-RETEST RAW DATA FOR FOUR WEEK INTERVAL
IN ADMINISTRATION OF GROUP TEST (N = 14)

Test Number	Sex	First Testing	Second Testing
99	Girl	42	49
16	Girl	40	51
39	Girl	37	47
85	Girl	37	35
105	Girl	35	43
49	Girl	34	26
33	Girl	27	37
100	Boy	23	23
80	Boy	20	34
31	Girl	20	22
14	Girl	19	27
64	Girl	18	18
107	Boy	15	22
12	Boy	8	14
Mean	--	26.79	32.00
S.D.	--	10.25	11.64

TABLE XVIII

TEST-RETEST RAW DATA FOR EIGHT WEEK INTERVAL
IN ADMINISTRATION OF GROUP TEST (N = 20)

Test Number	Sex	First Testing	Second Testing
43	Girl	56	67
79	Girl	43	49
8	Girl	43	49
9	Girl	39	46
35	Boy	36	45
1	Boy	35	42
3	Boy	34	37
7	Boy	33	57
47	Boy	27	31
101	Girl	26	35
69	Boy	25	19
29	Boy	24	28
45	Girl	24	34
46	Boy	24	33
5	Girl	22	30
103	Boy	21	26
38	Boy	19	29
68	Girl	7	17
90	Boy	7	25
28	Boy	6	10
Mean	--	27.55	35.40
S.D.	--	12.49	13.65

Kuder-Richardson Estimates

Reliability of the Preschool Group Screening Test of Early Entrance to Kindergarten Potentiality was estimated by Kuder-Richardson formula 20 for the entire sample of ninety children. A correlation of .88 and a standard error of measurement of 4.38 was obtained for raw scores.

Hoyt's Analysis of Variance

An analysis of variance technique developed by Hoyt was applied to the sample data yielding a reliability of .93 with a standard error of measurement of 3.40 raw score points.² This use of analysis of variance to estimate reliability is cited as algebraically equivalent to the Kuder-Richardson formula 20 although different by formulation.

VALIDITY

Face Validity

Face validity can be inferred in part from the development and construction of the Group Preschool Screening Test of Early Entrance to Kindergarten Potentiality. A description of the test items and their selection appeared in Chapter III. The test items may be inspected in Appendix B. The description and inspection of the test items will readily reveal the similarity of the group

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²B. J. Winer, Statistical Principles in Experimental Design, New York: McGraw-Hill, 1962, p. 124-132.

test to other recognized tests of intelligence since the items were empirically derived from such sources and then transformed for group presentation.

Concurrent Validity

Concurrent validity was evaluated by comparing scores on the Group Preschool Screening Test of Early Entrance to Kindergarten Potentiality with scores on a recognized and widely used individual intelligence test. Table VI, referred to previously in this chapter, reports the relationship between the group screening test and the 1960 Revised Stanford-Binet Intelligence Test, Form L-M, for a sample of ninety preschool children ranging in age from four years-six months to four years-eight months inclusive. The Stanford-Binet was selected as the prime criterion since it is employed by the majority of school districts in the literature who have early school admission programs. A correlation coefficient of .72 was obtained in comparing both the raw scores and deviation IQ scores of the group test with Stanford-Binet IQ scores in the standardization sample.

Table XIX breaks the data down in terms of frequency distributions of the group and individual intelligence test scores. Figure 1 depicts the data in the form of a scattergram showing the relationship between group test and individual intelligence test scores. Table XX presents the scattergram in tabular form. Table XXI is an expectancy table that shows the relation between

the group and individual intelligence tests. The scatter diagram in Table XX was converted into an expectancy table by expressing each cell frequency as a percentage of the corresponding raw total. For example, of the 17 subjects who scored between 90 and 99 on the group test, 11 percent (2 cases) received individual intelligence test IQ's between 90 and 89, 60 percent (10 cases) between 90 and 99, 11 percent (2 cases) between 100 and 109, 11 percent (2 cases) between 110 and 119, and 6 percent (1 case) between 120 and 129. Given a child's group test score, it is possible by means of an expectancy table to predict the chances of his falling within a certain interval on the individual test or criterion variable.

The standard error of estimate was calculated so the test validity could be viewed in terms of individual prediction. The error of estimate was found to be 11.30 points. This indicates the margin of error to be expected in an individual's predicted criterion score on the Stanford-Binet as a result of the imperfect validity of the group test.

EFFICIENCY AND EFFECTIVENESS

Although individual tests were administered to each early entrant candidate along with the group test for the primary purposes of establishing norms and concurrent validity for the group test, this data yielded additional information regarding the efficiency and effectiveness of the group test as a screening method for the detection of early entrants to kindergarten.

TABLE XIX

FREQUENCY DISTRIBUTIONS OF GROUP AND
INDIVIDUAL INTELLIGENCE TEST SCORES

IQ Intervals	Group Test Deviation IQ's	Stanford-Binet IQ's
160-169	0	0
150-159	2	1
140-149	4	2
130-139	6	12
120-129	16	12
110-119	21	24
100-109	20	18
90-99	17	17
80-89	4	3
70-79	0	1
60-69	0	0
Total	90	90

The efficiency of a screening procedure may be defined as the ratio between the total number of children it refers for individual examinations and the number of children actually selected as early entrants among those referred. In other words, the efficiency of a test compares the number of children selected by group screening with the number of children identified on individual evaluation in terms of percent. Thus, if fifty youngsters were referred as possible early entrance candidates on the basis of group testing and twenty-five were accepted in terms of individual evaluations, the efficiency of the group testing would be 50 percent.

The effectiveness of the group test refers to the percentage of early entrants the group screening procedure locates in the total number of children tested. If the screening device located all of the children eventually accepted for early entrance it would be considered 100 percent effective.

Table XXII presents data regarding the efficiency and effectiveness of the Preschool Group Screening Test of Early Entrance to Kindergarten Potentiality according to various cut-off points with five-point intervals. For example, at a cut-off score of 50 raw score points on the group screening test the efficiency is 100 percent (group test referred seven for individual testing and seven were selected for early entrance) and the effectiveness is 41 percent (seven early entrants were located by the group test

out of the seventeen who were eventually located by individual evaluations). In contrast, a cut-off score of 30 points yields an efficiency index of 35 percent (group test referred forty-eight for individual testing and seventeen were selected for early entrance) and an effectiveness index of 100 percent (seventeen early entrants were located by the group test and seventeen were identified by individual evaluations).

TABLE XXII

EFFICIENCY AND EFFECTIVENESS OF GROUP TEST
BY VARIOUS CUT-OFF SCORES IN SAMPLE

<u>Cut-Off Point</u>		Efficiency	Effectiveness
Raw Score	Deviation IQ		
60	147	100	18
55	141	100	29
50	135	100	41
45	129	71	59
40	123	62	82
35	117	45	88
30	112	35	100
25	106	27	100
20	100	25	100

PROFESSIONAL PERSONNEL TIME AND EXPENSE

Specialist's Time

Identification and selection of preschoolers for early admission to school typically involves the employment of a psychologist to administer, score, and interpret individual evaluations for all of the children. In this study all the preschoolers received both group and individual tests. The group tests were administered to all ninety youngsters and scored within a three day period. A total of nine working days for two psychologists was needed to test the ninety children individually on a schedule of five evaluations per day for each psychologist.

The lowest raw score on the group test at which a child was accepted for the early entrance to kindergarten program was 30. Using this score as a cut-off score, forty-eight children or 53 percent would have been referred for individual examinations and forty-two or 47 percent rejected at that point. On a schedule of five individual evaluations per day, a period of only nine and one-half days would have been necessary for one psychologist rather than two psychologists for nine days as was the case.

Scorer Reliability

To determine if it would be necessary for a psychologist to score the group test since an element of subjectivity is

involved in some of the test items, scorer reliability was checked. Scorer reliability was ascertained by randomly selecting thirty-eight test protocols from the total sample of ninety. Only thirty-eight of the tests were used to check scorer reliability because it was deemed convenient and practical to limit the number of tests to be scored. These records were then distributed to three separate individuals without identifying data to be scored independently by a housewife (B-Mrs. A. Edward Ahr), school clerk (C-Miss Diana Krauss), and kindergarten teacher (D-Mrs. Rochelle Fairman). As a guide, the scorers were given a copy of the directions for scoring but no further assistance was offered.

TABLE XXIII

SCORER RELIABILITY INTERCORRELATIONS

Scorers	Psychologist (A)	Housewife(B)	Clerk (C)
(A) Psychologist			
(B) Housewife	.993		
(C) Clerk	.994	.993	
(D) Teacher	.993	.988	.993

Table XXIII presents the scorer reliability findings. The reliabilities of the three scorers with the scoring by the psychologist (A) were: B, .993; C, .994; and D, .993. The correlations between non-specialists were: B+C, .993; B+D, .988; and C+D, .993.

Specialist's Expense

As stated previously, ninety children evaluated individually by two psychologists on a basis of five per day amounts to nine working days for two psychologists. Reimbursement was at a rate of \$50.00 per day resulting in an expenditure of \$900.00 for both psychologists for a nine day period.

TABLE XXIV

PERSONNEL EXPENDITURES FOR EARLY ADMISSION PROGRAM

Personnel	Duty	Rate	Expenditure
One Psychologist	Individual evaluations	\$50./day	\$475.00
Two Teachers	Group testing	\$18./day	72.00
One Clerk	Group test scoring	\$12./day	12.00
Total			\$559.00

Table XXIV summarizes the cost for personnel to conduct the program based on using a cut-off score of 30 on the group test. The psychologist's fee for services rendered is approximately cut in half. Total expense is cut by more than a third in terms of personnel costs. Secretarial services, facilities, and classroom costs for those children accepted were not considered because they would remain relatively stable whether or not a group test was used as a screening procedure.

CONSIDERATION OF QUESTIONS

Question (1). Can rapport be established and maintained in a group setting at the preschool level and suitable test items be devised and administered?

Decision. Yes. Ninety of 94 preschool children were able to separate from their parents, enter the testing room and respond to the group test stimuli. Item analysis data in Table XII and XIII indicates the test items are highly discriminating, yet maintain average difficulty.

Question (2). Does the group screening test have sufficient reliability?

Decision. Yes. Reliability of the group test calculated in three distinct manners and presented in Tables XVI and XIX indicates a band of correlations between .87 and .93 which is well within an acceptable range.

Question (3). Does the group screening test have sufficient validity?

Decision. Yes. For the purpose for which the group test was devised - as a screening instrument - the concurrent validity demonstrated with the major criterion, Stanford-Binet, Form L-M, is quite satisfactory.

Question (4). Is the group test an efficient screening instrument?

Decision. Yes. Depending on the unique characteristics of a school and community, a cut-off score can be selected to fit specific needs. As compared with the method typically utilized to refer children for individual evaluation, parental request, the screening test demonstrates considerable superiority.

Question (5). Is the group test an effective screening instrument?

Decision. Yes. The percentage of children located by the group test that are actually accepted for early entrance on the basis of individual examinations can be adjusted according to the type of school and community to the level of effectiveness most desirable in a situation.

Question (6). Does the use of the group screening test result in savings in terms of professional personnel time and the outlay of funds in an early admission program.

Decision. Yes. Timesavings and fewer expenses are attributable to the group screening test, since considerably less children are referred for timeconsuming, expensive individual evaluations.

CHAPTER VI

DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

GROUP TEST NORMATIVE DATA

Any norm is restricted to the particular normative population from which it was empirically derived. The present norms for the Group Preschool Screening Test of Early Entrance to Kindergarten Potentiality represent the test performance of ninety, white, upper-middle-class, suburban children between the ages of four years-six months and four years-eight months who constituted the standardization sample. Admittedly, the present sample is not a representative cross section of the population for which the group test could be utilized. Lack of financial backing as well as a host of additional problems did not permit a broader study in terms of a one-man investigation team. Nevertheless, a sample was chosen which corresponded with several suburban communities in the United States where early admission programs are annually conducted.

Having noted the limitations of the present sample regarding its size and representation, it should be recognized that it may ultimately be a more practicable and effective procedure to standardize a test on a narrowly defined or local population initially. Should the test prove its worth in actual practice,

as seems to be the case with the group screening test, additional samples could be employed to expand the boundaries of the normative population. Additional evidence of this type would allow the description of the present norms to be generalized accordingly.

The norms presented in this investigation for the group test should technically be thought of as local norms which are applicable only to communities similar to the sample described. Since specific norms permit more accurate prediction of an individual's performance than general norms, the present norms appear defensible as well as desirable.

Original raw scores on the group test were first transformed into standard scores. Such a linear transformation allows the relative magnitude of differences between the standard scores and raw scores to remain the same and permits evaluation of an individual's performance in reference to other persons. A further linear adaptation was performed to provide a direct comparison of an individual's performance on different tests. A standard deviation of 15 was chosen for the group test so the resulting deviation IQ's could be interpreted in the same way as Stanford-Binet IQ's even though the same methods were not employed to obtain the "IQ".

Table VIII on page 93 revealed no significant differences between the raw score means on the group test by age in months over the three month range of the group test. Consequently, it

it seemed unnecessary to develop subgroup norms on the basis of age in terms of one month intervals.

A difference between the means by sex was found to be significant at the 5% level of significance. Accordingly, separate deviation IQ's were reported on page 95 in Table X for boys, girls, and total sample to allow greater accuracy in interpreting an individual's score. Inspection of the group test norms by sex reveals a 10 point IQ difference at the bottom of the scale with no observable difference at the top. At an IQ score of 120 on the combined distribution for both sexes, the margin of difference between sexes is 5 points; IQ 130, 4 points; IQ 140, 3 points; and IQ 150, 1 point. The greatest differences in terms of sex appear within the average and below average range. Since the test was specifically designed to have a high ceiling and discriminate at the upper levels of ability, the differences at the lower levels by sex are of little consequence in terms of the primary purpose for which the group test was devised. Thus, separate norms for sex were presented mainly in the interest of presenting highly specific norms.

That subgroup norms do reveal marked discrepancies in many tests has been repeatedly demonstrated. To circumvent this happening, test constructors chose test items to minimize certain group differences which are considered irrelevant to the purposes of the test. A case in point is the Stanford-Binet in which an

attempt was made to eliminate the effects of an item which favored either sex by exclusion or balancing of sex differentiating items.

No special effort was formulated either to minimize or maximize sex differentiation on the group test. Five test items on the fifty item group test demonstrated significant differences at the 5%, 2.5%, and 1% levels of significance favoring girls. These items account for a possible 20 points out of a possible 81 points.

A plausible explanation for the sex differences on the test, other than assuming that the items reflect irrelevant differences in the experiences of the two sexes, may be to attribute the differences to the manner in which tentative group test items were initially derived. In general, more girls than boys correctly responded to subtest items on the individual tests which were eventually transformed for presentation on the group test.

RAPPORT AND MOTIVATION

In the review of the literature the pitfalls involved in the development of a preschool group test were discussed. The fact that no group test at the preschool level had been previously published supported the lack of feasibility in such an undertaking.

Eighty-six of ninety four children or 91 percent of the preschoolers took the group test on the first administration. The youngsters who did not take the test were unable to be

separated from their parents. All eighty-six children, and later four others, who actually entered the testing room responded to the test. In order for the preschoolers to take the test they had to sit quietly, listen, think, follow directions, and respond in a prescribed manner. To accomplish this task it would appear reasonable to infer that a certain degree of rapport, interest, or motivation had to be present to allow the subjects to perform the functions demanded by such an endeavor.

An examiner and monitor were present at each administration of the group test. Both kept a log of comments regarding any unusual behavior noted. Two-thirds of the youngsters did not show any outward signs of distress, nor make any observable indication that could be interpreted in a negative sense. These data suggest that the majority of the preschool subjects in the sample were sufficiently motivated and relaxed enough to not only endure but willingly participate in a meaningful, structured setting.

Further evidence of meaningful cooperation was offered in terms of the total possible responses and actual number of items not marked in the standardization sample. Ninety-three percent of all the test items were marked by the ninety children. This indicates a sustained effort on the part of the subjects which would be unlikely if they lacked rapport or interest in the test.

SUITABILITY OF TEST ITEMS

The characteristics of the items which compose a test directly affect the reliability and validity of the test. Through item analysis the test can be refined and improved by selection, substitution, or revision of items.

In reference to the group screening test it should be noted that different samples of subjects were used for item selection purposes and for standardization of the test. This satisfied the demand for cross-validation which has received increasing attention over the years in test construction. Techniques involved during the preliminary item selection phase were reported in Chapter III.

The item analysis of the group test in the standardization sample was concerned primarily with two characteristics of the test items, namely, difficulty value and discriminating power. Table XII and XIII on pages 100 and 102 presented data regarding these item characteristics for the fifty item group test.

The group test was designed to cover a wide range of difficulty but to differentiate mainly at the upper level of the range. Easy items were inserted at the beginning and intermittently throughout the test to arouse confidence and maintain the motivation of the subjects. Inspection of the item analysis data reveals that the difficulty of the group test items was indeed

widely distributed and thereby met the standard imposed by the investigator.

The measurement of item difficulty provides an index of the order of difficulty of the items and is generally utilized to rearrange the items according to difficulty level in a power test. This was not done in the group test because the investigator felt that alternating sequences of easy and hard items for motivational purposes was more important at the preschool level.

Item discriminating power was estimated in the form of correlation coefficients read directly from tables prepared by Flanagan. This method was used to reduce the amount of computational labor required. This method appeared justified on the basis that variation in item validity data from sample to sample is generally greater than that among the different methods available to compute item discriminative value.

The upper 27 percent and lower 27 percent of the standardization sample was compared to permit a clear-cut evaluation of item-criterion relationships. Considerable internal consistency was found in the correlations with total scores on the test. The fact that forty-three of the fifty items have a discriminating power of .40 or above indicates that the test items have considerably more discriminating power than anticipated on the basis of the prior data obtained on the preliminary item selection sample.

Item 16 on the preschool group test which is illustrated in Appendix B received a correlation coefficient value of zero. This item was the only one which did not yield a positive discriminating index.

A preliminary attempt to revise item 16 was tested with a sample of fourteen preschoolers which were representative of the entire standardization sample. Figure 2 depicts the suggested revised replacement for item 16. Dividing the sample at the median, a correlation coefficient of .70 was obtained. The difficulty index was 57 percent. The specific administration directions to the children are: "Mark the raindrop that is above the cloud."

RELIABILITY

The reliability of a test refers to the consistency of scores obtained by the same individuals on different occasions or with different sets of equivalent items. There are many techniques available for measuring test reliability. The most obvious method for finding the reliability of a test is by means of repetition of the identical test on a second occasion. The reliability coefficient is simply the correlation of the scores by the same subjects on the two administrations of the test and provides a measure of temporal stability. This type of measure indicates the degree to which scores on a given test are affected by random daily fluctuations in the condition of the subject or of the

Figure 2. Revision of item 16.

testing environment.

Tables XVI, XVII, and XVIII on pages 105, 106 and 107 reported raw score data and reliabilities for short-range intervals of time on two separate test-retest administrations of the group test. Considering the small size of the samples ($N=20$ and $N=14$) and the preschool age level, the resulting reliability coefficients of .91 over an eight-week time lapse and .87 for a four-week interval may be interpreted as indicating a very high positive consistency and stability rating for the group test.

The time intervals between tests was kept short for two major reasons. First, the investigation was concerned with stability of performance within a restricted three-month age range as opposed to constancy of performance over a wide age-time range. Second, the interval of time between separate administrations of the group test had to be kept as short as feasible due to the preschool age level for which the test was designed. At such early ages progressive developmental changes are noticeable over a period of a few months or less.

The test-retest technique does present some problems in evaluating a psychological test. Practice effect could have produced a degree of improvement in retest scores of different individuals. Memory or recall due to the short interval between tests may have produced the same pattern of right and wrong responses. If the effects of practice and memory cause the scores

on the two test administrations not to be independently obtained, the resulting correlation between them would be spuriously high. This is one reason why other techniques for establishing the reliability of the group test were employed.

The group test employed an individual test item time limit long enough to permit each subject to attempt each item. In this sense the group test is more like a power test than a speed test and permits the application of a single-trial method of checking reliability. The Kuder-Richardson Formula 20 measures test reliability by examining the consistency of the subjects' responses to all items on a given test. Thus, based on a single administration of the group test, a measure of its inter-item consistency was determined and offers evidence of the degree of homogeneity of the test items.

The Kuder-Richardson Formula 20 yielded a reliability coefficient of .88 indicating a very high degree of inter-item consistency or homogeneity. This finding is similar to the two previously reported reliability coefficients and suggests that the test-retest reliabilities were not spuriously high as suspected on the basis of contamination due to practice effect or memory.

A second method for establishing the reliability of the group test on the total standardization sample was employed in the form of an analysis of variance technique developed by Hoyt.

Although cited in the literature as algebraically equivalent to the Kuder-Richardson formula, it differs in formulation. The Hoyt method of analysis yielded a reliability coefficient of .93 which again indicates a very high degree of positive consistency in the group preschool screening test.

An important factor influencing the size of any reliability coefficient is the nature of the group on which reliability was measured. Not only does the reliability coefficient vary with the extent of individual differences, but it may vary between groups differing in ability level, sex, and age, as well as other factors. Thus, the standardization sample was fractionated into more homogeneous subgroups to be more applicable to a specific group.

Table XIV on page 103, reported a much higher reliability for the upper 27 percent of the standardization group ($r=.73$) than for the lower 27 percent ($r=.23$). Even though the group test as a whole enjoys a high reliability rating, the subgroup ability level data indicates that scores in the upper third of the test are considerably more dependable than in the bottom third. In explanation of this fact, it should be noted that the scores of subjects in the lower third were restricted in range to about one-half of that found in the upper third of the standardization sample. More important, the test was specifically constructed to have a high ceiling for purposes of finer discrimination at the upper levels to screen mentally able children for early

entrance to kindergarten. Consequently, this result is not surprising in view of the purpose for which the group test was designed.

Subgroup data in terms of sex, yielded a reliability coefficient of .96 for boys and .88 for girls. These findings indicate a high degree of consistency and dependability in relation to scores obtained, regardless of sex.

In terms of subgroups by age, reliability coefficients of .92, .81, and .89 were obtained for the subjects in the sample who would become five in December, January, and February, respectively. Again, it is readily apparent that the group test enjoyed a high degree of reliability when the standardization sample was fragmented into one month chronological age intervals.

The standard error of measurement provides another method of expressing the reliability of a test and is more useful in terms of interpreting the score of a given individual. The error of measurement indicates the fluctuation to be expected in a test score due to chance factors. As determined on the basis of two separate reliability measures ($r=.93$) and $r=.88$) the error of measurement for the preschool group test ranges between 3 and 4 raw score points or 4 and 5 deviation IQ points. This means that two-thirds of a group taking the preschool group test will obtain scores which would not differ from their true (unknown) scores by more than the value of the standard error of measurement. Since

the error of measurement tends to remain uniform in groups approximating the same ability level, it can be applied to new groups which may differ considerably in variability from the group on which the statistic was originally determined.

The standard error of measurement for the extremes of the standardization sample was found to be 4 raw score points in both the upper and lower 27 percent groups. In terms of subgrouping by sex, the standard error of measurement was 3 raw score points for boys and 4 points for girls. The error of measurement by age subgroups was 4 raw score points for each of the one month intervals.

VALIDITY

Test validity, in general, refers to how well a test measures what it purports to measure. Before discussing objective measures of the group test validity, let us consider its face validity. This is a subjective indication of what the group test appears to measure. Inspection of the group test items in Appendix B will readily reveal the similarity of the items to items found on various individual intelligence tests at a pre-school level or group achievement or intelligence test at the primary school level. The pictorial, non-verbal nature of the items holds appeal and interest for the young child. Considering the empirical basis on which initial try-out items for the group test were obtained from various individual tests and then

transformed for group presentation in a pictorial manner, it is easily understandable why the group test could be considered as demonstrating a rather high degree of face validity. Certainly the face validity of the group test does not attest to, nor replace the need for objective validity. It can, however, be regarded as an indication of what the group test might be measuring and suggest that it is relevant for the purpose for which it was designed. Namely, the group test was intended for use with preschool children as a screening instrument to determine whether further individual evaluation would be advisable for possible selection in the early entrance program.

Concurrent validity was measured by obtaining a correlation between the preschool group test and the highly rated Stanford-Binet individual intelligence test. This latter test can properly be regarded as the primary criterion measure for several reasons. The Stanford-Binet is utilized as the main individual intelligence test in early admission to school programs in the United States. The group test is being validated against a more elaborate and time-consuming individual test whose validity has previously been established. At best the group test should be regarded as a crude approximation of the individual test. However the use of the individual test as a criterion is quite defensible since the group test represents a simpler, shorter version for group screening purposes. Furthermore, since there was previously no group test available at the preschool level, the group test

represents a new horizon in test development and construction and fills a void heretofore present for educators at the initial and crucial phase of formal education.

Table VI on pages 89, 90 and 91, reported the relationship between the preschool group screening test and the Stanford-Binet, ~~Form L-M~~, for the standardization sample of ninety preschool children between the ages of four years-six months and four years-eight months. A correlation between the two tests of .72 was computed. Since the sample was restricted to white, upper-middle class, suburban preschoolers of which a high percentage were Jewish, the effect of such preselection may have tended to lower the validity coefficient. Conversely, it should be noted that few individual or group tests on the market have validity coefficients above .70. Pictorial and tabular data showing the relationship between scores on the group and individual test were presented in Figure 1 on page 112 and Tables XIX, XX, and XXI on pages 111 and 113. Predictions of scores in the expectancy table on the criterion, Stanford-Binet, on the basis of the group test are subject to considerable sampling error, especially in view of the small number of cases. Individual percentages were based on relatively few persons falling within a single cell. For this reason chance fluctuations in the percentages from sample to sample would quite likely be large. Conversely, presentation of validity data via expectancy tables is vivid and clear, permitting examination of the predictive value of the test regarding the

criterion in different parts of the range.

The question of how high a validity coefficient should be can not be answered in a general way. An interpretation of this nature depends heavily upon how the test scores will be used.

For individual prediction, test validity can be interpreted through the standard error of estimate, which is analogous to the error of measurement discussed in the preceding section on reliability. In this case the error of estimate demonstrates the margin of error expected in the individual's predicted criterion score on the Stanford-Binet, as a result of the imperfect validity of the group test. The term $\sqrt{1-r^2_{xy}}$ in the formula for the error of estimate is called the coefficient of alienation and indicates the size of the error in relation to the error which would result from a chance guess. The coefficient of alienation corresponding to the group test validity coefficient of .72 was .69, which indicates the error is 69 percent as large as it would be by chance. Since the validity of existing published tests rarely exceeds .60 or .70, one may conclude that the prediction of any one subject's criterion score is accompanied by a wide margin of error. This is likewise readily apparent in the standard error of estimate for the group test which was calculated to be 11.30 IQ points.

The primary function of the Preschool Group Screening Test of Early Entrance to Kindergarten Potentiality is not to pre-

dict each individual's exact position in the criterion. The group test was designed to determine which individuals would exceed a certain minimum standard of performance in the criterion. The group test can effectively be employed as a screening instrument to predict that a given person has a good chance of passing the early entrance selection program of which the Stanford-Binet is a major part, even if the group test is unable to estimate with certainty whether the individual will achieve a score of IQ 130 or 140. When used for screening purposes, a test may appreciably improve predictive efficiency if it shows any significant correlation with the criterion, however low. Even tests with validities as low as .20 or .30 have been included in some selection programs. Further discussion of this topic will be found in the following section pertaining to the effectiveness and efficiency of the pre-school group test.

The time limits imposed upon this study by the investigator did not permit predictive validity in terms of correlations between the group test scores and future academic achievement of testees to be obtained and reported. Such data of a longitudinal nature is recognized and valued and will eventually be secured, but was not within the scope of the present investigation.

EFFICIENCY AND EFFECTIVENESS

Table XXII on page 115 summarized the efficiency and effectiveness of the group test at various cut-off levels. Since

early entrance programs in general have no verified method available to them as a screening procedure, children referred for individual evaluations are obtained through parental request. In terms of efficiency of a screening procedure (the ratio between the total number of children referred for individual evaluation and the number of children actually selected in percent), parental request referred 90 children of which 17 were eventually selected for early admission, yielding an efficiency rating of 19 percent. Using a cut-off score on the group test of 30 raw score points it would yield 48 referrals for individual testing of which 17 were accepted resulting in an efficiency rating of 35 percent. The difference between these efficiency indexes represents the net efficiency of the group test employing the specified cut-off point. It indicates the contribution which the group test makes in the selection of individuals who will meet the minimum standards in the criterion performance. In the case cited the group test almost doubled the efficiency rating of screening based on parent request. By raising the raw score cut-off point on the group test, efficiency can be adjusted to any level desired. For instance, the group test cut-off score of 40 would yield 62 percent efficiency, tripling the parental request efficiency index of 19, while a cut-off score of 50 would gain 100 percent efficiency for the group test, thus quadrupling the parental request efficiency rating.

Another way to demonstrate the efficiency of the group

test, as a screening device, is to consider the number of false positives included in the screening procedure. A false positive refers to an individual which the test erroneously selects as a possible early entrant who should be individually evaluated. The same data that was used in calculating efficiency ratings is used but is not converted into percentages. The use of parental request as a screening device resulted in 73 false positives (90-17). On the group test a cut-off raw score of 30 yields 31 false positives (48-17); 40 yields 8 (21-13); and a score of 50 yields no false positives (7-7).

The above data demonstrate the usefulness of the preschool group test as an efficient screening device and its superiority over mere parental request which is typically used in early admission programs as the sole initial screening technique prior to individual testing. In addition, it highlights the flexibility of the cut-off points. Cut-off points can be adjusted to the unique characteristics of differing schools and communities to meet individual local school needs.

The effectiveness of a screening device refers to the percentage of early entrants located in the total number of children. At a raw score cut-off point of 30 on the group test all 17 children eventually accepted for early entrance were located, indicating 100 percent effectiveness. Likewise, all 17 preschoolers eventually accepted for early admission were located on the basis of parental request. However, in order for the parental request

technique to yield 100 percent effectiveness 90 children had to be individually evaluated whereas the group screening test accomplished the same degree of effectiveness with only 48 individual evaluations.

PROFESSIONAL PERSONNEL TIME AND EXPENSE

The results clearly demonstrate that the use of the group test as a screening device is more economical in terms of both the outlay of funds for psychological services as well as timesaving for professional personnel. At a raw score cut-off of 30 points on the group test, all early entrants eventually selected were included in the recommendation for individual testing. Individual evaluations of 48 rather than 90 on the basis of parent referral represents a savings in time of eight and one half days for one psychologist (18-9 1/2) and a savings in expense of \$425.00 (\$900-\$475). In those cases where a school district employs its own psychologist for a twelve month period and a psychologist therefore would not be contracted specifically for the early admission program evaluation, the savings in time for such a school staff member could be devoted to an array of other professional tasks.

Examiner reliability was assumed to be sufficiently high for practical purposes due to the highly standardized procedures provided for administration of the group test. As long as the prescribed procedures are followed carefully resulting in an

empirically set of controlled conditions, there is no need for measuring this type of reliability.

Scorer reliability for the group test could have been assumed for the same reason. However, five of the items on the group test involved varying degrees of subjectivity in terms of scoring and account for a possible 24 points on the 81 raw score point test. In addition, to demonstrate that it was not necessary for a psychologist to score the group test, scorer reliability was ascertained and reported in Table XXIII on page 117. The reliability coefficients reported in terms of correlations between the four scorers leave no doubt as to the equivalence of the four scorers in view of the near perfect correlations obtained. Thus, further savings of a specialist's time and school expense can be achieved through the preschool group test administration by teachers and scoring by clerks.

CONCLUSIONS

This investigation by itself does not provide sufficient evidence to advocate the unrestricted use of the preschool group test in varying schools and communities. First, the lack of a large and representative sample precludes a broad generalization regarding the findings but permits generalizations to settings which are similar in nature to the sample utilized in the present study. Second, the results of a single investigation with a group test at the preschool level which heretofore had not been

studied, is obviously far from conclusive. A final evaluation of the attributes of the group instrument and technique within the preschool level at this stage would be highly imprudent. Third, since the investigation was conducted in but one school district, regardless of the precision and accuracy as well as the statistically satisfying results, the possibility of preselection effects and of uncontrolled variables operating to affect the data may have been present. Fourth, the findings of the study should in no way be misconstrued to suggest that the group test could be substituted for an individual evaluation for diagnostic purposes or used to make critical decisions of considerable importance which demand supporting data from a variety of tests or techniques.

With the above limitations in mind, the outstanding facts which seem to be disclosed by the findings of this investigation have been listed:

1. Preschool children between the ages of four years-six months and four years-eight months in a white, upper-middle class suburban school system were able to respond to a test designed for group administration and presentation. This would seem to strongly indicate that it is possible to test preschool children of this background in a group setting.
2. The overall results of the investigation seriously question previous literature which indicated the lack of

feasibility of group testing at the preschool level.

3. Groups of preschool children larger than fifteen in number were administered the group preschool screening test with the assistance of additional personnel. This would seem to challenge common practice and statements in the literature which indicate no more than 10 to 15 children at the kindergarten level should be tested in a group setting at one time. Perhaps, mass testing can be accomplished in school at early age levels in large groups or via closed circuit television without sacrificing any testing principles. Such a technique may even mean superior empirical control of the testing conditions since all students at a specific level would have the same examiner and test setting.

4. The results of the investigation are restricted in terms of the generalizations that can be offered. Specially, the results of the study may only be generalized to school systems and communities which are similar in make-up to the present standardization sample.

5. The majority of the preschoolers were able to separate from their parents, enter a strange physical and social environment, sit quietly, listen, think, follow directions and respond in a prescribed matter to the group test stimuli. To accomplish this task it would seem plausible

to infer that a certain amount of rapport, interest, or motivation was established or present to all the pre-schoolers to perform the functions demanded by such an endeavor.

6. The group preschool screening test was able to discriminate well between the upper and lower levels of ability. This would appear to suggest that the items selected for the group test were suitable for the use for which they were intended, namely, to screen out those youngsters who were likely candidates for early admission for the purpose of administering individual examinations for final identification.

7. The consistency of the results in terms of reliability coefficients suggests that it is possible to obtain dependable group test results at the preschool level.

8. Subgroup norms are not only desirable, but mandatory, for proper interpretation of test results when the test construction does not involve procedures to eliminate or balance the effects of certain factors, like sex.

9. The size of the correlation between the group test and the highly rated individual intelligence test suggests that it is possible to obtain sufficiently high validity for the practical use of a group screening test at the preschool level.

10. The group test demonstrated its efficiency and effectiveness as a screening procedure for a specific set of criteria in a particular setting. This suggests that it is possible to develop an efficient and effective group screening instrument at the preschool level but each varying type of school or community would have to devise its own cut-off points in regard to the nature of the local program to be meaningful.

11. The use of the preschool test as a screening instrument suggests that considerable school expense and specialist's time can be saved by reducing the number of individual evaluations needed in an early admission program.

RECOMMENDATIONS

In view of the findings of the investigation, the following recommendations have been suggested:

1. That a larger and more representative sample be employed to develop general normative data and subgroup norms to allow the use of the group test in differing schools and communities.
2. That the results of the present study be published and widely disseminated to educators and psychologists since it not only represents a technique for screening

at the preschool level but an extension of group testing to a level heretofore uninvestigated.

3. That elementary administrators, through consultants or staff personnel, make available to kindergarten and classroom teachers via in-service education programs the research literature concerning early entrance to kindergarten programs.

4. That the techniques for selection as well as the early entrance program itself be viewed as but a part of a total gifted program within any school district.

5. That workshops and conferences directed at school administrators be organized to investigate the merits of early entrance programs and its relationship with curriculum modifications.

6. That elementary principals and teachers, especially kindergarten teachers, examine, study, and acquaint themselves with the extensive field of literature on early entrance programs.

7. That elementary principals and teachers be given an opportunity to visit school systems employing an early entrance program and discuss, as well as observe, the results.

8. That the need for continued and thorough research and investigation of the potentialities of preschool group screening instruments and early entrance programs be fully realized and encouraged by administrators and school psychologists who have great responsibility for making innovations available to schools for practical use.
9. That the preschool group screening test be extended downward to the below normal ability levels to obtain more reliable results at this level of performance.
10. That the preschool group screening test normative data be extended upward chronologically to determine if the group test has merit in offering kindergarten teachers a means of grouping regular kindergarten children early in the school year for the purpose of more individualized instruction as well as identify the extremes for further individual evaluation.
11. That differences in item difficulties as well as in over-all scores be investigated in relation to socioeconomic status, cultural background, and methods of presenting the items.
12. That longitudinal studies be initiated to obtain data regarding prediction of elementary academic achievement from early childhood scores on the group preschool screening test.

13. That factor analysis at various age levels be applied to determine what the group preschool screening test appears to be measuring at different chronological ages.
14. That prediction of reading and other learning problems in the early grades on the basis of group preschool screening test scores be thoroughly investigated.
15. That early admission screening programs not only be used to help in the selection of bright children who appear ready to begin school earlier, but afford a school district the opportunity to utilize a preventive approach by identifying children with problems and seeking means of initial remediation or treatment at the earliest and most crucial phase of formal education.

CHAPTER VII

SUMMARY

This study involved the development of the Group Preschool Screening Test of Early Entrance to Kindergarten Potentiality and was designed to obtain necessary standardization statistics and technical data.

The subjects included ninety-preschool children between the ages of four years-six months and four years-eight months who would miss the rigid chronological date set by the State for automatic admission to kindergarten by from one to ninety days. The sample was derived from a suburban school district located in a white, upper-middle class community in which a significant proportion of the families were Jewish.

The items on the preschool group test were empirically derived by comparing the results of children accepted and rejected in an early school admission program on the basis of several individual tests. The individual test items which demonstrated the highest discriminating power were transformed for group presentation and included in the initial try-out form of the preschool group test.

The initial group test composed of 69 items was then administered to a different group of preschoolers to determine

which of the adapted test items maintained their discriminative power. Fifty items were retained in the group test for the present study.

Several breaks with traditional test development appeared necessary in the formulation of the first group test at the pre-school level. Brief activity periods were provided prior to and in the middle of the group test to establish and maintain rapport, reduce fatigue and restlessness in a structured setting, and satisfy the need for motor activity. The group test alternates the sequence of easy and difficult items to permit the subjects to maintain motivation throughout the testing period. To stimulate and focus attention, only one test item was presented per page and each page was a different color to facilitate administration. Provision for adequate spacing or cardboard dividers between children was necessary because imitative behavior is typical at the preschool level.

The group test is divided into two booklets of twenty-five items each plus demonstration items. Five items involve copying, drawing or printing. The remaining items are of the multiple choice variety in which the subject marks his choice of one of the outline drawings with a pencil.

The group test, the 1960 Revised Stanford-Binet, Wide Range Achievement Test, and Draw-A-Man Test were administered to the standardization sample within a two week period. Identifica-

tion of early entrants was made exclusively on the basis of the individual evaluations.

The results suggest that it is feasible to employ a group test as a screening device at the preschool level. Independent measures of reliability for the total sample ranged between .88 and .93. In terms of the standard error of measurement, two thirds of a group taking the preschool group test would obtain scores which would not be expected to differ from their true scores by more than 4 raw score points. Concurrent validity measured by comparing scores on the group test with the Stanford-Binet, Form L-M, yielded a correlation coefficient of .72, indicating ample validity for group screening test. Discriminative power of the items ranged between .00 and .82 with a mean correlation of .54; item difficulty ranged between 11 and 90 with a mean difficulty percentage of 46. The superiority of the group screening test over the typical method of referral for individual evaluations in early admission programs (parent request) in terms of efficiency and effectiveness was demonstrated by various suggested cut-off points on the group test scores. Savings of school expense and specialist's time was demonstrated through the use of the group screening instrument as opposed to wholesale individual evaluations of all candidates for early entrance to kindergarten.

The lack of a large and representative sample precludes any broad generalizations regarding the findings but permits generalizations to settings which are similar in nature to the standardization sample. The data does offer strong evidence to

challenge certain popular beliefs, such as, the infeasibility of group tests at the preschool level, the prevailing fear of testing more than fifteen subjects in a group of even kindergarten age and that sufficient rapport and suitable items cannot be established or selected at the preschool level.

Recommendations for further research were highlighted by the following suggestions: (1) Upward chronological extension of the group test range to investigate its use as a means of grouping at the beginning of kindergarten to allow for more individualized instruction; (2) Investigation of differences in item difficulties and total scores on the group test in relation to socio-economic status and cultural background; (3) Investigation of prediction of reading and other learning problems in early grades on the basis of the group preschool screening test; and (4) Use of early admission screening programs not only to select bright children who seem ready for kindergarten, but as a broad preventive approach in identifying preschool children with problems and seeking means of initial remediation or treatment prior to the child's entry into the crucial and beginning phase of formal education.

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APPENDICES

APPENDIX A

GROUP PRESCHOOL SCREENING TEST

GENERAL DIRECTIONS FOR TEST ADMINISTRATION

The test is divided into two parts. Each part contains 25 items excluding sample or demonstration items. This was done to provide a forced rest or activity period for youngsters this age since preschoolers are unaccustomed to an extended period of formal structure.

1. Prior to the actual administration of the test the examiner should familiarize himself with the directions for giving the test. A recommended practice is for the examiner to take the test in the same manner the pupils are expected to respond. The testing can proceed with confidence and precision only if the examiner is well acquainted with the test materials and directions.
2. The test has been given to groups of children varying in group size from 18 to 72 youngsters. When the size of the group exceeds 20 youngsters it is recommended to have a second or third person in the room to assist in general management and control of the group and in the distribution and collection of materials.

3. The children should be seated in such a manner as to preclude copying. This may be done through adequate spacing or provision of cardboard dividers to prevent imitative behavior.

If a school classroom is used as the testing room, instructional materials and toys should be placed in cabinets or covered to eliminate stimulating or distracting items from the physical environment.

4. The precise wording of the directions must be used to insure proper administration. All directions should be spoken slowly and distinctly in a clear, natural, pleasant voice. The examiner should stand in a central location where he can be observed by all the youngsters.
5. A few sample items precede various sections of the test to assist the children in knowing what is expected of them. Ample time should be spent on these demonstration items to insure the youngsters' understanding of what to do and how to respond to the test items. They should be shown how to mark the multiple choice items by marking a cross. A blackboard or overhead projector can be used to demonstrate this and will give the children some practice in using pencils with paper. However, no assistance can be given an

individual child once the regular part of the test is in progress.

6. Regular, colored, or primary pencils may be used by the children to record their responses. The youngsters should be told to raise their hand if their pencil breaks.
7. Lavatory needs should be attended to prior to the testing situation or during the rest or activity period. Should other emergencies arise they may be handled at the discretion of the examiner.
8. Children should be told that during the test periods no one but the examiner or monitor may do any talking. No questions pertaining to the test should be answered during the testing period. If questions arise they should be answered with the following or similar statement - "Do what you think is best".
9. The entire test is timed item by item but since a liberal time allowance has been provided, most youngsters should be able to finish each item. No items should be omitted from the test and the full time limit should be allowed for each item to insure that the discriminating power of the test is retained. The use of a stop watch is recommended.

10. Blanks for the children's names and other data may be completed prior to the distribution of the booklets. If each child is supplied with a name tag and number the booklets can be matched with each child more easily.
11. Each test item is printed on a colored page contrasting it from adjacent pages. This serves to stimulate and focus the attention of the children and to facilitate administration by acting as a check that everyone is on the right page.
12. The test is not graded in difficulty. The children will hopefully find new momentum and motivation as they progress through the test alternating between a series of easier and more difficult items.
13. It is important at this age level to keep the children encouraged and reassured through the manner of presentation and attitude of the examiner. Included in the specific directions will be found several verbal statements intended to encourage and reinforce the test behavior of the children.
14. Following each item the children must be reminded to turn to the next page by folding the completed page at the top. Some children may need special assistance.

Before giving instructions for a specific item the examiner should take time to survey the group to be sure all children are on the correct page.

SPECIFIC DIRECTIONS FOR TEST ADMINISTRATION

PART I

After the children are properly seated, say: "Boys and girls, we are going to play some games today with these booklets. (Hold up a booklet.) I am going to give each of you one of these booklets and a pencil. Sit very quietly until everyone gets one and then I will tell you how to play the games." Distribute the booklets and pencils. Fold the cover page back at the top as you give each child his booklet so the first sample item is showing.

Give the following specific instructions slowly and clearly. As much help as is needed may be given on the sample items. Repeat the samples if deemed necessary. No special help can be given on the actual test items in finding the correct answer but ample encouragement and reassurance may be offered at any time to the group.

Sample 1. "Now, boys and girls, listen very carefully as I tell you what to do. Look at the pictures on this page. I am going to tell you to mark one of the pictures by drawing a cross on it, like this. (Demonstrate on the blackboard, large chart paper, or by means of the overhead projector.) Look at each picture as I name it. (Name all the pictures beginning at the top of the page.) Airplane - wagon - car - boat. Now, mark the car. (Pause) You should have

drawn a cross on the picture of the car, like this."

(Illustrate on the examiner's test booklet, holding it slightly above the children's eye level so everyone can see it.)

After completion of each test item, say: "Now, turn to the next page, the _____ (name the color) page like this one." Check to see that each child is on the correct page. Assist any youngster having difficulty finding the correct place before beginning specific instructions.

Sample 2. "Listen carefully as I tell you what to do. Look at the pictures on this page while I name each one. (Name all the pictures beginning at the top of the page.) Trousers - hat - dress - coat. Now, mark a cross on the dress (Pause.) You should have drawn a cross on the picture of the dress, like this." (Illustrate on the examiner's test booklet.)

On items one to twenty-five the examiner should pause ten seconds after giving the directions. Then, the children are told to turn the page in the manner mentioned previously.

1. "Look at all of the pictures. Mark the orange."
2. "Look at all of the pictures. Mark the envelope."
3. "Look at all of the pictures. Mark the straw."
4. "Mark the one that makes a tapping sound."

5. "Mark the puddle." (After the ten second time limit but prior to telling the children to turn the page, make the following statement.) "I see that all of you are doing a fine job. Keep up the good work."
6. "Look at all of the pictures. Mark the gown."
7. "Mark the animal that roars."
8. "Mark the eye that has eyelashes."
9. "Look at all of the pictures. Mark the juggler."
(After the time limit expires but before turning the page, make the following statement.) "That's fine. Remember to try your best."
10. "Mark the girl who rescues the kitten."
11. "Mark the mansion."
12. "Look at all of the pictures. Mark the longest pencil."
13. "Look at all of the numbers. Mark the number six.
That's it, mark the number six."
14. "Mark the shortest candle."
15. "Mark the number five." (After the time limit expires but prior to telling the children to turn the page, make the following statement.) "I see that all of you are doing a fine job. Keep up the good work."
16. "Listen carefully. Mark the third raindrop below the cloud."
17. "Look at all of the letters. Mark a cross on the letter S. Go ahead, mark the letter S."

18. "Mark the letter R."
19. "Mark the letter A."
20. "Mark the letter Q." (After the time limit expires but prior to telling the children to turn the page, make the following statement.) "All of you seem to be doing very well. Remember to try your very best."
21. "Look at all of the pictures. Mark the ears that look like the ears of a mouse."
22. "Mark the color of coal."
23. "Mark the animal that is tame."
24. "Mark the animal that has feathers."
25. "Listen carefully to what I say. Look at the picture at the top of the page with the circle drawn around it. (Point to it.) Now, find another picture that looks just like it and mark it. Go ahead. That's it, find another picture that looks just like the one with a circle around it and mark it with your pencil."

Collect the booklets and pencils. Then, provide a short rest or activity period for the children. Give special help to any child who was having difficulty in marking the booklets. Have the children attend to bathroom needs. Answer any questions which do not pertain to questions asked on the test. Record comments on the booklet of any child exhibiting unusual behavior.

PART II

After the children are properly seated, say: "It's time to play some different games now. I am going to give each of you one of these booklets (hold up booklet) and another pencil. Sit very quietly until everyone gets one and then I will tell you how to play the games." Distribute the booklets and pencils. Fold the cover page back at the top as you give each child his booklet so the sample item is showing.

Give the specific directions slowly and distinctly. Generous assistance may be given on the sample items and they may be repeated if deemed necessary. Extra encouragement and reassurance may be offered at any time to the group but no help may be given in completing an actual test item correctly except the samples.

Sample. "Now, boys and girls, listen very carefully as I tell you what to do. Look at the line going up and down at the top of this page. (Point to vertical line.) I want you to make a line just like that one down here. (Point to lower section of page beneath the dividing line.) That's right. Go ahead and make a line down here just like the one near the top of the page. (Pause.) Now, watch me. You should have made a line just like this. (Draw a vertical line and hold examiner's booklet slightly above the children's eye level so everyone can see it.)

After the completion of each test item, say: "Now, turn to the next page, the _____ (name the color) page like this one." Check to see that each child is on the correct page. Assist any youngster having difficulty finding the correct place before beginning specific instructions.

Items twenty-six to fifty call for a variety of responses. The time limits vary on these items and are listed following the item number. Allow the precise amount of time allocated to each item.

Item   Time

26	15"	"Look at the picture of a <u>circle</u> here. (Point to the circle.) Make one just like it but do it down here. (Point to lower blank section of page.) That's right, make a <u>circle</u> on your paper."
27	20"	"Look at the picture of a <u>triangle</u> here. (Point to the triangle.) Make one just like it down here. (Point to lower blank section of page.) That's right, make a <u>triangle</u> on your paper."
28	20"	"Look at the <u>square</u> at the top of your paper. (Point to the square.) Make one just like it but do it down here. (Point to lower blank section of page.) Try the very best you can. Make a <u>square</u> on your paper."

Item Time

- 29 120" "On this sheet of paper I want you to make a picture of a man. Make the very best picture that you can. Take your time and work very carefully. I want to see if you boys and girls can do as well as other children have done. Go ahead. Try very hard and see what good pictures of a man you can make." Answer all questions by saying, "Do whatever you think is best." Walk around the room and observe the children's work without comment.

Sample. "Look at all of the small squares on your paper. (Point to the squares.) I want you to mark one of the squares with your pencil. Go ahead. Mark one of the squares with your pencil. (Pause.) All of you should have one square marked with your pencil. It does not matter which one you chose to mark. It could be any one, but only one should be marked like this. (Demonstrate by marking one of the squares. Do it quickly but not necessarily neatly.)

Item Time

- 30 20" "Look at all of the squares on your paper. Mark three of the squares with your pencil. Go ahead, mark three squares only."
- 31 40" Repeat the directions in item 30, but insert ten.
- 32 30" Repeat the directions in item 30, but insert six.

Item	Time	
33	40"	Repeat the directions in item 30, but insert <u>nine</u> .
34	30"	Repeat the directions in item 30, but insert <u>seven</u> . (After completion of the item but before turning the page, make the following statement.) "I see that all of you are doing a fine job. Keep up the good work."
35	15"	"Look at all of the different designs on this page. Mark all of the pictures of a <u>diamond</u> . That's it, mark a cross on all of the <u>diamond-shaped</u> designs."
36	90"	"Now I want you to print your <u>name</u> on this sheet of paper. Do it here. (Point to the lines in the middle of the page.) Print both your <u>first</u> and <u>last</u> name if you can. Go ahead. Do the best you can. That's it, print your <u>name</u> as best you can."
37	10"	"Look at the balls. There are three of them. (Point while counting.) One, two, three. Now, I want you to make the number <u>three</u> on your paper. Go ahead. Make the number <u>three</u> on your paper."
38	10"	"Look at the buttons. There are nine of them. (Point while counting.) One, two, . . . nine. Now, I want you to make the number <u>nine</u> on your paper. Try the best you can. Make the number <u>nine</u> ."
39	120"	"Look at all of the dots and numbers on this page. Start with number one and draw a line to number two. As you count the numbers in order draw a line to

connect the numbers. When you are finished you will have a picture of the head of an Indian Chief. Remember, as you count from one to twenty, draw a line to connect the numbers."

Sample. "This little boy lives here (pointing to the figure on the path,) and here (pointing) is his grandmother's house. The little boy wants to go to his grandmother's house the shortest way without getting off the sidewalk. Here is the sidewalk. (Point to the path where the boy stands.) Show me the shortest way for the little boy to go to his grandmother's house. Mark it with your pencil, but do not go off the sidewalk. Start where the little boy is (point) and take him to his grandmother's house (point) the shortest way. (Pause.) You should have drawn a line from the little boy to his grandmother's house, like this. This is the shortest way."

Item   Time

40	20"	"This little boy lives here (point), and here (point) is his grandmother's house. The little boy wants to go to his grandmother's house the <u>shortest</u> way without getting off the sidewalk. Here is the sidewalk. (Point to the path where the boy stands.) Show me the shortest way for the little boy to go to his grandmother's house. Mark it with your pencil, but

do not go off the sidewalk. Start where the little boy is and take him to his grandmother's house the shortest way."

- 41 20" "This little boy lives here (point). Show me the shortest way for him to go to his grandmother's house (point). Mark it with your pencil but do not go off the sidewalk."
- 42 20" Repeat the directions in item 41.
- 43 10" "Look at all of the pictures. Mark the one which is made of glass."
- 44 10" "Mark the one that swims in water."
- 45 10" "Mark the one that is sharp." (After the time limit expires but prior to telling the children to turn the page, make the following statement.) "That's fine. Remember to try your best."

Sample. "Look at the picture at the top of the page. (Point to it.) A very important part is gone in the picture. See if you can find the part that is gone but do not say anything out loud. (Pause.) Now, look at the other pictures of things that might be gone. (Name the possible missing parts beginning with the top one.) Now, mark the picture of the part that is missing from the big picture at the top. Only mark one of them. (Pause.) You should have marked the picture of the mouth, like this. (Illustrate on the examiner's test booklet.) The part that is gone

from this big picture (point to it) is the mouth, so that is why you marked the picture of the mouth down here (point to it)."

<u>Item</u>	<u>Time</u>	

46	15"	"Look at the picture at the top of the page. (Point to it.) A very important part is gone in the picture. See if you can find the part that is gone but <u>do not</u> say anything out loud. (Pause.) Now, down here (point to lower part of the page) we have pictures of things that might be gone. Look at them and mark the one that is gone from the big picture at the top of the page. Only mark one of them."
47	15"	Repeat the directions in item 46.
48	15"	Repeat the directions in item 46.
49	15"	Repeat the directions in item 46.
50	15"	Repeat the directions in item 46.

Collect the test booklets and pencils. Record comments on the booklet of any child exhibiting unusual behavior.

DIRECTIONS FOR SCORING

PART I

Each correct response on Part I of the test receives a score of one point. Additional points may be obtained. An explanation of bonus points will be found following a specific sequence of items. To score a point the correct response on each test item must be marked with a cross or in some other manner which clearly indicates the subject's choice. If another mode of response is used spontaneously in place of a cross, the failure to follow directions should be noted. If more than one response is marked for a single test item, no response is indicated, or the incorrect response is selected, no credit is given and the item receives a score of zero.

Correct Response

<u>Item</u>	<u>Position</u>	<u>Description</u>	<u>Score</u>
1	second	orange	1
2	first	envelope	1
3	second	straw	1
4	second	tapping sound (drum)	1
5	fourth	puddle	1
6	first	gown	1
7	third	roars (lion)	1

8	second	eyelashes	1
9	lower left	juggler	1
10	lower left	girl who rescues kitten	1
11	upper right	mansion	1

1-11 If nine of these items are correct, add one point to the child's score; if ten or more correct, add two points.

12	second	longest pencil	1
13	third	6	1
14	third	shortest candle	1
15	second	5	1
16	third	third raindrop	1
17	fourth	S	1
18	sixth	R	1
19	first	A	1
20	third	O	1

17-20 If three or more of these items are correct, add one point to child's score.

21	third	ears of mouse	1
22	third	color of coal (black)	1
23	third	tame (dog)	1
24	second	feathers (bird)	1

21-24 If three or more of these items are correct, add one point to child's score.

25	third	936	1

PART II

26. Copying a Circle

The reproduction should be approximately round and completely closed. An elliptical shape is acceptable if the longer diameter is less than one-and-one-half the length of the smaller diameter. Extra lines used for closure, pointedness, angulation or sketching are unacceptable. The drawing must appear on the lower portion of the page to preclude tracing. If two or more shapes are drawn, all of them must meet the given specifications. Size is not considered in the scoring. Score one point for a good approximation of a circle.

Examples of plus and minus circles are illustrated in Figure 1 to facilitate scoring. Although some of the minus examples have more than one error, any of the following defects alone would render the response unacceptable.

Example 1: Extra line used for closure.

Example 2: Extra line distorts circular shape.

Example 3: More amorphous than circular shaped.

Example 4: Elongation of proportions (longer diameter more than one and one-half times bigger than shorter diameter).

Example 5: Pointedness.

Example 6: Lack of closure.

PLUS

187

MINUS

Figure 1: Scoring samples for copying a circle

27. Copying a Triangle

The reproduction should have three well-defined angles but need not be equilateral. The lines should tend to be straight although a slight unevenness is allowed. Curved, jagged or broken lines are unacceptable. Rounded corners, elongation of both lines at a corner in excess of one-quarter of an inch, or additions of extra lines are unacceptable. The edge of the paper or dividing line on the paper may not be used as one side of the triangle. Size is not a scoring factor. If acceptable, score one point.

Figure 2 offers some samples of plus and minus scoring of the triangle.

Example 1: Rounded corner; elongation of both lines at the two bottom corners in excess of a quarter of an inch.

Example 2: Curved and broken lines.

Example 3: Broken line.

Example 4: Top angle distorted.

Example 5: Side angle missing.

Example 6: Curved and jagged line; distorted angle.

28. Copying a Square

The reproduction should approximate the proportions of a square but a rectangular drawing is acceptable if the length does not exceed twice the width. The lines should tend to be straight although a slight unevenness is allowed. Curved,

MINUS

Figure 2. Scoring samples for copying a triangle.

jagged or broken lines are unacceptable. The four angles must be present and outstanding. Rounded corners, elongations of both lines at a corner in excess of one-quarter of an inch, or additions of extra lines are unacceptable. The edge of the paper or the dividing line on the paper may not be used as one of the sides of the square. Size is not a scoring factor. In order to receive a score of one point, the drawing must have four well-defined angles, relatively straight sides, and resemble a square more so than some other type of geometric figure. If any one of the above mentioned unacceptable responses is contained in the drawing, a score of zero is indicated.

Plus and minus examples of squares are demonstrated in Figure 3.

Example 1: One angle missing; another angle distorted due to curved lines.

Example 2: Extra lines; sketched lines.

Example 3: One angle distorted; broken line.

Example 4: Extra lines distort square shape.

Example 5: Distorted angles; curved, broken, and jagged lines.

Example 6: Rounded corner; jagged line.

26-28. If two or more of these items are correctly reproduced, add one point to the child's score.

PLUS

191

MINUS

Figure 3. Scoring samples for copying a square.

29. Human Figure Drawing

Score one point for each of the following parts of a person that are present in the child's drawing.

- A. HEAD. Any clear representation is acceptable.
- B. MOUTH. Any clear representation is acceptable.
- C. NOSE. Any clear representation is acceptable.
- D. EYES. Any method of representation is acceptable and the number need not be correct.
- E. EYE DETAIL. Any clear representation in which an eyebrow or eyelashes are shown is acceptable.
- F. HAIR. Any clear representation is acceptable.
- G. EARS. Any clear representation is acceptable, but two ears must be present in a full face drawing.
- H. LEGS. Any clear representation is acceptable, but the number must be correct.
- I. ARMS. Any clear representation is acceptable, but the number must be correct.
- J. TRUNK. Any clear indication is acceptable, including a straight line.
- K. LENGTH OF TRUNK GREATER THAN BREADTH.
Measurements must be taken at points of greatest length and breadth. A single line does not receive credit.

- L. NECK. Any clear indication is acceptable.
- M. FINGERS. Any clear indication is acceptable.
Fingers must be shown on both hands if both hands are present. Credit is given for fingers on one hand if only one is shown.
- N. NUMBER OF FINGERS.
Five fingers must be present on both hands.

Figure 4 offers illustrations of figure drawings to be used for practice in scoring test item 29.

29. A-N

If a score of seven to nine is achieved on these items, add one point to the child's score. If ten or more are correct, add two points.

30-34. Number Concepts

30. Any three of the twelve squares must be marked clearly in some manner to be acceptable. If fewer or more squares are marked it is unacceptable. Score one point if it meets the standard, otherwise zero.
31. Any ten of the twelve squares must be marked clearly in some manner to be acceptable. Score one point if correct, otherwise zero.

NO CREDIT

ONE POINT

TWO POINTS

THREE POINTS

Figure 4. Sample figure drawings produced by four and one-half year old children.

FOUR POINTS

FIVE POINTS

SIX POINTS

SEVEN POINTS
PLUS ONE BONUS POINT

Figure 4. (cont'd). Sample figure drawings produced by four and one-half year old children.

EIGHT POINTS
PLUS ONE BONUS POINT

NINE POINTS
PLUS ONE BONUS POINT

TEN POINTS
PLUS TWO BONUS POINTS

ELEVEN POINTS
PLUS TWO BONUS POINTS

Figure 4 (cont'd). Sample figure drawings produced by four and one-half year old children.

32. Any six of the twelve squares must be marked to be acceptable. Score one point if correct, otherwise zero.
33. Any nine of the twelve squares must be marked to be acceptable. Score one point if correct, otherwise zero.
34. Any seven of the twelve squares must be marked to be acceptable. Score one point if correct, otherwise zero.
- 30-34. If four or more of these items receive credit, add one point to the child's score.

35. Recognizing Geometric Designs

All three diamond-shaped figures must be marked in order for the child to receive one point credit. If all three diamonds are not marked or if any other designs are marked, no credit is given.

36. Printing Name

If less than three letters are printed, no credit is given. (Exception: If two letters form a name, such as ED, credit is given for complete first name.) Three or more letters legibly printed in correct sequence receives one point credit. Reversals and transpositions of letters or rotations of letters in excess of 45 degrees may not be included when adding the number of correctly printed letters to determine the score. The complete first name or nickname legibly printed in correct sequence receives two points.

credit regardless of number of letters. Score five points for correct order and legibility of first and last name, permitting one error of any kind.

37-38. Printing Numbers

37. The number three must be legibly printed to receive a score of one point. Reversal or rotation in excess of 45 degrees is scored zero.

38. The number nine must be legibly printed to receive a score of one point. Reversal or rotation in excess of 45 degrees is scored zero.

37-38. If both items receive credit, add one point to the child's score.

39. Connecting Dots in Numerical Sequence

A drawing in which no errors are evident receives a score of three points. If no more than five errors are present and the drawing bears a resemblance to an Indian Chief, score one point. Each additional or omitted line is counted as an error, as well as each violation of sequence.

40-42. Maze Tracing

A score of one point is credited for each maze if the shortest path is selected. The line drawn by the subject should be more within the boundaries of the path than outside it. Tracing one of the boundary lines is permitted.

40-42. If two or more of the items receive credit, add one point to the child's score.

	<u>Position</u>	<u>Description</u>	<u>Score</u>
43-45. Picture Definitions			
43	first	glass (window)	1
44	first	swims (fish)	1
45	third	sharp (knife)	1

43-45. If all three of these items are correct, add one point to the child's score.

46-50. Multilaled Pictures

46	third	telephone receiver	1
47	fourth	tricycle wheel	1
48	second	person's ear	1
49	third	shoe lace	1
50	second	kitten's ear	1

46-50. If four or more of these items are correct, add one point to the child's score.

Number _____

FOR RESEARCH PURPOSES ONLY

EARLY ENTRANCE TO
KINDERGARTEN TEST
PART I

Name _____ Sex _____

School _____

Date of Testing _____
Year _____ Month _____ Day _____Date of Birth _____
Year _____ Month _____ Day _____

Child's Age Yrs. _____ Mos. _____

* * * *

Total Score _____ Cut off Point _____

Individual Evaluation Recommended _____

* * * *

Prepared by:

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School Psychologist
School District 68
Skokie, IllinoisFirst Revision
May - 1965

SAMPLE

SAMPLE

3

5

6

8

9

71

3

5

6

8

9

71

A
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936

963

369

936

693

Number _____

EARLY ENTRANCE TO
KINDERGARTEN TEST

PART II

SAMPLE

SAMPLE

241

_____

_____

_____

_____

SAMPLE

SAMPLE

APPENDIX C

PRESCHOOL GROUP SCREENING TEST RECORD FORM

Name _____

Total Score _____

Test No. _____ Sex _____

Deviation IQ _____

(Score 0 or 1 point for each item. Total Possible score = 81 points)

1. orange	21-24. (3+)	30-34. (4+)
2. envelope	25. 936	35. diamonds
3. straw	26. circle	36. 3 letters
4. drum	27. triangle	36. first name
5. puddle	28. square	36. complete name
6. gown	26-28. (2+)	36. complete name
7. lion	29. A. head	36. complete name
8. eyelashes	29. B. mouth	37. 3
9. juggler	29. C. nose	38. 9
10. rescue	29. D. eyes	37-38. (2+)
11. mansion	29. E. eye detail	39. 3 errors
1-11. (7 to 9+)	29. F. hair	39. no errors
1-11. (10+)	29. G. ears	39. no errors
12. longest	29. H. legs	40. maze
13. 6	29. I. arms	41. maze
14. shortest	29. J. trunk	42. maze
15. 5	29. K. length of trunk	40-42. (2+)
16. third	29. L. neck	43. window
17. S	29. M. finger	44. fish
18. R	29. N. number of fingers	45. knife
19. A	29. A-N. (7 to 9+)	43-45. (3+)
20. O	29. A-N. (10+)	46. receiver
17-20. (3+)	30. three	47. tricycle wheel
21. mouse	31. ten	48. person's ear
22. black	32. six	49. shoe lace
23. dog	33. nine	50. kitten's ear
24. bird	34. seven	46-50. (4+)

APPROVAL SHEET

The dissertation submitted by August Edward Ahr has been read and approved by a board of five members of the Department of Education.

The final copies have been examined by the director of the dissertation and the signature which appears below verifies the fact that any necessary changes have been incorporated, and that the dissertation is now given final approval with reference to content, form, and mechanical accuracy.

The dissertation is therefore accepted in partial fulfillment of the requirements for the Degree of Doctor of Education.

Jan 26, 1966
Date

Samuel Mayo
Signature of Advisor (PK)