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THE UNIVERSITY OF OKLAHOMA

GRADUATE COLLEGE

A STUDY OF CERTAIN CHANGES WITHIN A GROUP OF THE TRAINABLE MENTALLY RETARDED

A DISSERTATION

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MARGARET JANE S. GREEN

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A STUDY OF CERTAIN CHANGES WITHIN A GROUP

OF THE TRAINABLE MENTALLY RETARDED

APPROVED BY

P. T. Teska

W. B. Ragan

William G. Monahan

A. Heilman

F. F. Gaither

DISSERTATION COMMITTEE

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A STUDY OF CERTAIN CHANGES WITHIN A GROUP OF THE TRAINABLE MENTALLY RETARDED

CHAPTER I

INTRODUCTION

For centuries society has been faced with the problem of finding the most effective method of treating and training those who are mentally defective. While this responsibility was originally delegated principally to institutions, in recent years it has been shared by the community. Parental demand has resulted in the establishment of public school facilities for the mentally retarded. This study is an attempt to evaluate the social and academic changes in a group of trainable mentally retarded children enrolled in a public school program.

Those who organized the original schools and institutions for the feebleminded held the belief that these mentally deficient individuals could be cured or that their conditions could, at least, be alleviated sufficiently to permit their return to the community to live useful, independent lives. With the realization that such an outcome was not possible and that feeblemindedness was not curable,

the institutions then made an effort to accept only high-grade mental defectives who could profit from a limited academic education.

Today the role of the institution is to serve those selected cases that particularly need institutional care. Also, since many parents of severely mentally retarded children find it emotionally impossible to accept the idea of institutional care for their children, at least in the early years of their lives, communities are developing programs to provide training and supervision for the mental defectives who remain at home.

The ideal of public education for all of the children of all of the people has led state legislatures to appropriate large sums of money for classes for the mentally retarded. Until recently these classes were limited largely to children with intelligence quotients of 50 or above. Children who functioned below this level were forced either to remain at home or to enter an institution. Since the institutions have been unable to provide space for more than twenty to thirty per cent of this group, many children of low intelligence have had to stay in their homes with no provision for training unless the family has sufficient financial means to place the child in a private day school or boarding school.

Until relatively recently even the most progressive communities have provided special public school classes

only for the high grade mental defective. The first public school for "educable" mental defectives was established in Providence, Rhode Island, in 1896. This development in the public school system spread through the larger cities of the United States. "By 1954 about four and one-half times as many children were being educated in special classes as in 1922."[1]

Parents of children who were declared ineligible for public school classes and who remained at home either because of the overcrowded conditions of the institutions or because the parents did not accept institutionalization have formed the nucleus for a group now known as the National Association for Retarded Children. This organization has been largely responsible for the pressure placed on public schools to provide programs for severely mentally retarded children.

Differences of opinion exist among American people concerning the interpretation of equal rights as guaranteed by the Federal Constitution. Some interpret this to mean, among other privileges, the right of all children to a public school education. Acceptance of such a philosophy must result in the establishment of a public school program which includes the mentally retarded child as well as the

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[1]Marvin A. Wirtz, "The Development of Current Thinking About Facilities for the Severely Mentally Retarded," American Journal of Mental Deficiency, LX (1956), p. 495.

normal child. In both instances the programs should assist the child to adjust more adequately and to develop his fullest potentialities. The severely retarded individual cannot achieve economic efficiency or assume civic responsibility. Therefore, the objectives for the severely retarded must be expressed in terms of personal adequacy and social adjustment in his limited environment.

The question is frequently asked: how can one justify the expenditure of large amounts of tax money, time, and personnel on this group of individuals who will always need supervision and who can never be economically self-supporting? What can we expect to accomplish through these classes for trainable children? What type of curriculum would foster the full development of the child's potential?

Related Literature

Much of the current literature concerning trainable mentally retarded children is descriptive in nature. In this category are the curriculum guides of state departments of education, which set forth objectives and activities for public school classes. One of the most complete guides is the Illinois Curriculum Guide.

Recommended programs for trainable children are described by McCaw;[1] Birner;[2] Tudyman;[3] and Kirk, Karnes, and Kirk.[4] Lieberman suggests that social adequacy and economic competency be the primary aims of the education of the severely retarded child. He places emphasis on the team approach of all those concerned with the child's development.[5]

Dewing reports a noticeable modification of behavior in a group of severely retarded children who were given occupational therapy sessions with play materials, group games, music, and handicrafts.[6] Cleverdon and Rosenzweig report on the use of play as a technique in curriculum development. The aim of such a program is to offer the

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[1] Ralph W. McCaw, "A Curriculum for the Severely Mentally Retarded," American Journal of Mental Deficiency, LXII (1958), pp. 616-621.

[2] Louis Birner, "An Experimental Program for Retarded Children in a Part-time Congregational Religious School," American Journal of Mental Deficiency, LX (1955), pp. 95-97.

[3] Al Tudyman, "A Realistic Total Program for the Severely Mentally Retarded," American Journal of Mental Deficiency, LIX (1955), pp. 574-582.

[4] Samuel A. Kirk, Merle B. Karnes, and Winifred D. Kirk, You and Your Retarded Child (New York: The MacMillan Co., (1957), pp. 141-156.

[5] Daniel Lieberman, "The Education of the Severely Mentally Retarded," American Journal of Mental Deficiency, LVIII (1954), pp. 397-403.

[6] Dorothy Dewing, "Use of Occupational Therapy in the Socialization of Severely Retarded Children," American Journal of Mental Deficiency, LVII (1952), pp. 43-49.

trainable child therapeutic experience through play, with a degree of social adaptability as the ultimate goal.[1]

Roewer describes an institutional curriculum for trainable children in Wisconsin. He concludes that training in self-help and social adjustment may minimize the burden of the trainable individual for society.[2]

The realistic interpretation to parents of the growth and achievement of their trainable child is considered by Ginglend. He suggests that parents need an objective understanding of their child's limitations and abilities on the basis of mental health, social development and adjustment, language development, motor and muscular development, as well as intellectual development.[3]

In the recent literature are a number of studies, largely descriptive, on the responsibility of the community to the severely retarded child. In a consideration of the education of the trainable child, Hudson states that "as long as it can be demonstrated that there are ways of

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[1] D. Cleverdon and I. Rosenzweig, "Work-Play Program for the Trainable Mental Defective," American Journal of Mental Deficiency, LX (1955), p. 57.

[2] William E. Roewer, "A Program for the Trainable Mentally Deficient Child," American Journal of Mental Deficiency, LVI (1952), pp. 551-559.

[3] David R. Ginglend, "Some Observations on Evaluating the Progress of Severely Retarded or 'Trainable' Children in a School Program," American Journal of Mental Deficiency, LXII (1957), pp. 35-38.

teaching these children, the public schools have an obligation to provide that training."[1]

An analysis of the opinions of twenty-two Wisconsin city and county superintendents where trainable classes were in operation is included in a report by Blessing. "Over one-half (59%) of the superintendents expressed the opinion that trainable children are the public school's responsibility. This attitude closely approximates the findings in the 1954 Illinois Survey (56%)."[2]

Rosenzweig states that the philosophy of education for the trainable child, the same as for any other child, "stresses our responsibility to assist each child to reach his maximum development so that his degree of dependency on others will be minimized."[3]

The responsibility of the community is pointed out in a study by Thomas. The community should consider ways to "absorb into its structure as many of those who are mentally limited as is consistent with a sound structure."[4]

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[1]Margaret Hudson, "The Severely Retarded Child: Educable vs. Trainable," American Journal of Mental Deficiency, LIX (1955), pp. 586.

[2]Kenneth R. Blessing, "A Survey of Public School Administrators' Attitudes Regarding Services for Trainable Children," American Journal of Mental Deficiency, LXIV (1959), p. 518.

[3]Louis Rosenzweig, "How Far Have We Come?" American Journal of Mental Deficiency, LXIV (1959), p. 16.

[4]D. H. H. Thomas, "Impressions of the Social Problem of Mental Retardation in the United States of America," American Journal of Mental Deficiency, LXII (1958), p. 352.

Thomas feels that the tendency of the United States to segregate the mentally deficient in large institutions is a big handicap to the integration of those persons in the community.[1]

Reports which evaluate changes in trainable children's behavior as a result of experience in a class situation are not extensive in number. Rosenzweig described changes in the growth of one group of mentally retarded children after one year in a parent-sponsored class. Cumulative records formed the basis for an index-value treatment of growth changes.[2]

Gottsegen presents the results of the use of the Vineland Social Maturity Scale with 49 non-institutional low-grade mentally defective children. He reports that positive gains in social competence were made by 84 per cent of the group. The conclusions from this study indicate that apparently the development of social competence is accelerated in low-grade mentally defective children when their inadequacies are isolated and individual teaching given.[3]

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[1] Ibid.

[2] Louis E. Rosenzweig, "Report of a School Program for Trainable Mentally Retarded Children," American Journal of Mental Deficiency, LIX (1954), pp. 181-205.

[3] M. G. Gottsegen, "The Use of the Vineland Social Maturity Scale in the Planning of an Educational Program for Non-Institutional Low-Grade Mentally Deficient Children," Genetic Psychological Monographs, LV (1957), pp. 85-137.

A study involving severely mentally retarded children in twelve public school classes in Illinois was made by Kirk. Growth was measured by a Behavior Check List and individual psychological examinations. Briefly, the findings indicated were: (1) that over a two year period there was no increase in intellectual ability or capacity as measured by a standard intelligence test; (2) that considerable progress was noted in personal routines, health, safety, play, social adjustment, and language during the first year. In the second year little progress was recorded by the teachers except in the area of personal routines.[1]

Delp and Lorenze made a follow-up study of 84 public school special class pupils with I.Q.'s below 50. Thirty per cent were later committed to institutions. Sixty-six per cent of the individuals remaining in the community were well-adjusted according to criteria set up by Delp and Lorenze. Of this group eighty per cent were categorized as economically useful either in the community or in the home. Ten per cent of the total group held jobs in the community.[2]

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[1] M. Erik Wright and Hugh Croley (Eds.), Research in the Management of the Mentally Retarded Child (Winfield, Kansas: The Winfield State Training School, 1956), pp. 145-146.

[2] Harold Delp and Marcella Lorenz, "Follow-Up of 84 Public School Special Class Pupils with I.Q.'s Below 50," American Journal of Mental Deficiency, LVIII (1953), pp. 175-182.

A group of 190 children excluded from school because of low intelligence was studied by Jewell. She found that 17 per cent were placed in state institutions, 11 per cent were awaiting placement. Of the group remaining in the community, 79 per cent were considered to be well-adjusted in the home while 58 per cent were reported to have made a good adjustment in the community.[1]

In the group studied by Jewell, employment was found in only a very few cases. Because of the different criteria used, the two groups cannot be compared. However, it appears that the group studied by Delp and Lorenze increased in economic usefulness as a result of the training program.[2]

Johnson and Capobianco published a study on severely retarded children in New York. This project was to study the physical growth of 27 trainable mentally deficient children over a two-year period. The findings indicate that no statistically significant differences in degree of improvement in I.Q. existed among groups when classified as good, fair, and poor on the basis of physical condition. It

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[1]Alice Jewell, "A Follow-Up Study of 190 Mentally Deficient Children Excluded Because of Low Mentality from the Public Schools of the District of Columbia, Division I-IX, September 1929 to February 1, 1940," American Journal of Mental Deficiency, XLV (1941), pp. 413-420.

[2]Morvin A. Wirtz, "The Development of Current Thinking About Facilities for the Severely Mentally Retarded," American Journal of Mental Deficiency, LX (1956), p. 504.

appeared that "the children's general physical condition did not affect the benefit they derived from their class training to any discernible degree as measured by the instruments used in this study":[1] the Vineland Social Maturity Scale, the Fels Child Behavior Rating Scales, and the Behavior Check List.

Another study by Capobianco and Cole compared the free play behavior of educable and trainable boys and girls in institutional and non-institutional environments for the purpose of getting a better understanding of the functional social levels of mentally retarded children. The findings demonstrated that a statistically significant difference existed "in favor of Educable Children over Trainable in Total Play Behavior Scores."[2] There was a "significant difference (.01 level) in favor of female subjects over males in Total Play Behavior Scores,"[3] but "no statistically significant difference between Institutional and non-Institutional subjects on Total Scores."[4] Neither mental age nor chronological age seemed to influence significantly the social behavior patterns of educable and trainable

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[1] Orville Johnson and R. J. Capobianco, "Physical Condition and Its Effect Upon Learning in Trainable Mentally Deficient Children," Exceptional Children, XXVI (1959), p. 5.

[2] R. J. Capobianco and Dorothy A. Cole, "Social Behavior of Mentally Retarded Children," American Journal of Mental Deficiency, LXIV (1960), p. 650.

[3] Ibid. [4] Ibid.

groups. In the 8 to 12 chronological age group the Intelligence Quotient had a tendency to influence social participation.[1]

Increases in learning in subnormal individuals as a result of increased incentive or motivation have been studied by McPherson;[2] Aldrich;[3] O'Connor and Tizard;[4] and Clark and Hermelin. The latter concluded that "it seems that the limits to the trainability of imbeciles are very much higher than have been accepted traditionally either in theory or in practice."[5]

Goldstein's study of classes for trainable children in Illinois implies that those with I.Q.'s below 25 on the Kuhlman Test of Mental Development are not good risks for trainable classes. Those with I.Q.'s over 35 have a high probability of being retained in the class providing that social behavior, motor ability, sensory acuity, and perception are satisfactory. In this study the best measure for

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[1] Ibid.

[2] Seymour B. Sarason and Thomas Gladwin, "Psychological and Cultural Problems in Mental Subnormality: A Review of Research," American Journal of Mental Deficiency, LXII (1958), p. 1246.

[3] Ibid.

[4] N. O'Connor and J. Tizard, The Social Problem of Mental Deficiency, (New York: Pergamon Press, 1956), p. 102-165.

[5] Sarason, loc. cit., p. 1247.

determining eligibility for trainable classes was the Kuhlman Test of Mental Development.[1]

The findings in Kolstoe's study of the language training of low-grade Mongoloid children seem to confirm Goldstein's findings that those below I.Q.'s of 25 do not seem to profit from training. The Mongoloids with higher mental ages seemed to show more improvement than those with lower mental ages.[2]

The experimental data on the use of the Goodenough Drawing Test with mental defectives include an investigation by Israelite of the qualitative differences in the drawings of defective and normal subjects. Her findings indicate that the deficient tend to make out of proportion figures, are likely to include irrelevant detail, and are less likely to make integrated drawings.[3]

Gunzberg attempted to identify signs of maladjustment in the drawings of subnormal children. He suggests the use of this technique for screening subnormal children with emotional problems and states that human figure

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[1] Herbert Goldstein, "Lower Limits of Eligibility for Classes of Trainable Children," Exceptional Children, XXII (1956), pp. 226-227.

[2] Oliver P. Kolstoe, "Language Training of Low-Grade Mongoloid Children," American Journal of Mental Deficiency, LXIII (1958), pp. 17-30.

[3] Judith Israelite, "A Comparison of the Difficulty of Items for Intellectually Normal Children and Mental Defectives on the Goodenough Drawing Test," American Journal of Orthopsychiatry, VI (1936), pp. 494-503.

drawings are a valuable technique for the study of the emotional life of the feeble-minded.[1]

The reliability of human figure drawings was analyzed by Graham. He attempted to determine the consistency in the drawings of 23 subjects before and after instruction. His findings seem to indicate that despite attempts on the part of the subjects to disguise or conceal what they knew or imagined to be significant, their drawings "continued to reflect a consistent picture of the self-image."[2]

Yepsen investigated the reliability of the Goodenough Drawing Test with 37 feeble-minded boys. He concluded that this test seems to have a high degree of reliability with a correlation of .91 between the first and third administration of the test.[3]

In a comparison of the drawings of normal, retarded, and psychotic children, Gondor and Levbarg concluded that "the drawings of retarded children represent their mental age, their anxiety in expressing themselves, the

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[1] H. C. Gunzberg, "Projection in Drawings: A Case Study," British Journal of Medical Psychology, XXVIII (1955), pp. 72-81.

[2] Stanley R. Graham, "A Study of the Reliability in Figure Drawings," Journal of Projective Technique, XX (1956), p. 386.

[3] Lloyd N. Yepsen, "The Reliability of the Goodenough Drawing Test with Feeble-Minded Subjects," Journal of Educational Psychology, XX (1929), pp. 448-451.

primitiveness of their thinking, the lack of proper concepts, and the hesitation to make a statement by drawing."[1]

Johnson, Ellerd, and Lahey used the Goodenough Draw-A-Man Test as a projective technique to study personality traits in a group of 209 mentally retarded children at Dixon State Hospital. The average C.A. for the group was 12-11, the mean M.A. was 6-7, and the mean I.Q. was 50.9. In ratings on eleven traits there was a 54.4 per cent agreement between teacher judgment and psychologist rating. There was more agreement than disagreement on eight of the eleven traits.[2]

Birch investigated the relationship between M.A. on the Goodenough Drawing Test and on the 1937 Stanford-Binet in a group of 68 borderline and mental defectives between the chronological ages of 10-6 and 16-3. He concluded that the Goodenough Test is a valid measure of M.A. in children whose Binet scores fall at 70 or below. The test also provides the clinician with a useful projective technique for making inferences about personality.[3]

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[1] Emery I. Gondor and Morrison Levbarg, "Techniques and Expressive Therapy Integrated into the Treatment of Mentally Retarded Children," American Journal of Mental Deficiency, LXIII (1958), p. 61.

[2] A. P. Johnson, Arthur A. Ellerd, Thomas H. Lahey, "The Goodenough Test as an Aid to Interpretation of Children's School Behavior," American Journal of Mental Deficiency, LIV (1950), pp. 516-520.

[3] Jack W. Birch, "The Goodenough Drawing Test and Older Mentally Retarded Children," American Journal of Mental Deficiency, LIV (1949), pp. 218-224.

In a study of adult intelligence, Berdie concludes that in drawings dull normal, borderline, and defective adults tend to respond like children. They draw what they know rather than what they see. With these groups, but not with normal and superior adults, systematic observation of drawings offers an index to intellectual development.[1]

However, the limitation of test instruments is expressed in a statement by Sarason that with the mentally retarded "there is strong evidence that our conventional tests leave much to be desired both as evaluators or predictors. In part this is undoubtedly a function of the narrow range of functions which these tests presumably measure."[2]

In a study of classes for the mentally deficient in Ohio, Purcell observed that "growth is evident but extremely difficult to measure with existing instruments. New and greatly refined measures must be developed."[3] Rosenzweig is also concerned with the inadequacy of our present instruments of evaluation. "The information that they yield is totally inadequate to our needs."[4]

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[1] R. F. Berdie, "Measurement of Adult Intelligence by Drawings," Journal of Clinical Psychology, I (1945), pp. 288-295.

[2] Sarason, loc. cit., p. 1295.

[3] Roderick N. Purcell, "Ohio's Program for Mentally Deficient Youth in Community Classes," American Journal of Mental Deficiency, LIX (1955), p. 609.

[4] Louis Rosenzweig, "How Far Have We Come?" American Journal of Mental Deficiency, LXIV (1959), p. 18.

That psychologists, in their evaluation of subnormal persons, should pay more attention to personality patterns and resources is the concern of Garfield. "Even where the individual's over-all level of functioning is subnormal, in many cases we can note assets or areas of relative strength. These certainly can be used in efforts to help the individual become as happy and productive as possible."[1]

In the last decade the use of projective tests with mental defectives has become more prevalent. Molish points out that "the contemporary viewpoint no longer regards mental deficiency as simply a disease but more of a complex of symptoms in which personality factors exert an important influence."[2]

Molish concludes that "mental defectives are no longer viewed as a homogeneous group with defective intelligence but with little or no personality."[3] Furthermore, Rosenzweig states that since 1950 we have begun to see the trainable group as "children with serious problems arising

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[1]Sol L. Garfield, "Problems in the Psychological Evaluation of the Subnormal Individual," American Journal of Mental Deficiency, LXIV (1959), p. 471.

[2]Herman Molish, "Contributions of Projective Tests to Problems of Psychological Diagnosis in Mental Deficiency," American Journal of Mental Deficiency, LXIII (1958), p. 282.

[3]Ibid., p. 291.

from a variety of causes and yielding to a variety of approaches."[1]

The need for research in the area of the trainable mentally retarded is suggested in the report by Wirtz and Guenther of a study which they conducted in Michigan and Illinois. "It appears that for every 1000 school-age children there are from one to two trainable mentally handicapped children living in the community and one trainable child in an institution."[2]

In a consideration of methodological problems in research on mental retardation, Goldstein emphasizes that "the process of evaluating programs of treatment and habilitation is one of the most neglected and at the same time one of the most necessary areas for research."[3] Kodlin and Thompson state that the longitudinal approach "is one of the most valuable approaches for the investigation of factors which influence growth and development."[4] The need for comprehensive longitudinal studies is emphasized in the

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[1] Rosenzweig, loc. cit., p. 12.

[2] M. Wirtz and R. Guenther, "The Incidence of Trainable Mentally Handicapped Children," Exceptional Children, XXIII (1957), p. 175.

[3] Herbert Goldstein, "Methodological Problems in Research in the Educational Programs for the Treatment and Habilitation of the Mentally Retarded," American Journal of Mental Deficiency, LXIV (1959), p. 343.

[4] D. Kodlin and D. Thompson, "An Appraisal of the Longitudinal Approach to Studies in Growth and Development," Monography of the Society for Research in Child Development, Inc., Vol. XXIII, No. 1 (1958), p. 7.

extensive study of the mentally subnormal by Sarason and Gladwin. Such studies of the development of subnormal individuals continued over a period of years could yield much data that would be helpful in our understanding of the influences affecting the defective child and his family.[1]

In summary, the survey of the literature of the experimental studies on trainable mentally retarded subjects does not present many studies which evaluate changes in trainable individuals over an extended period of time. The studies carried on by Kirk; Johnson and Capobianco; and Capobianco and Cole are longitudinal studies continuing through a two-year period. None of these studies measured academic growth in the trainable mentally retarded children. None utilized the human figure drawings and the House-Tree-Person Test as measurement instruments. Many studies in the literature including those of Gunsberg, Graham, Birch, Berdie, and Gondor and Levbarg indicate that drawings appear to be a valuable technique for the study of mental defectives.

Purpose of the Study

The purpose of this study is to determine what academic and social changes occur in a group of trainable mentally retarded children whose chronological ages range from 10 to 19 years and who are enrolled in a city public school

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[1]Sarason, loc. cit., p. 1295.

setting. If changes do occur, are they statistically significant? Do they represent real gains for this group of subjects? The emphasis in this study will be on making an intensive longitudinal study of these changes. It is hoped that the study will provide objective data which will suggest directions for realistic educational planning for trainable mentally retarded boys and girls.

Statement of the Problem

The study is concerned with those changes which take place over a two-year period in trainable mentally retarded boys and girls whose chronological ages range from 10 to 19 years and who are enrolled in a public school program for trainable mentally retarded children. Classification as trainable mentally retarded applies to those children whose Intelligence Quotient is in the approximate range of 30 through 56 on tests administered by qualified psychological examiners. Over a period of two years, 1955 to 1957, the subjects were tested in the areas of academic achievement and social maturity. Tests were given at the beginning of the period and at the close of the two-year period.

The school program for these individuals was designed to concentrate on the objectives of self-care, social adjustment, and home and community usefulness. The achievement of these objectives was the major emphasis of a

curriculum designed to foster learning experiences adjusted to the individual's capabilities in the areas of language development, functional reading, writing, and number concepts. Music therapy, occupational therapy, homemaking, shop, and playground experiences were given a major emphasis in the program. The changes as a result of this instruction were measured by re-tests using the original instruments at the end of the two-year period.

CHAPTER II

PROCEDURE OF THE STUDY

The Subjects

The subjects used in this study were boys and girls enrolled in a city public school program for severely mentally retarded children. Twenty-seven subjects were in the original experimental group. They were selected on the basis of the following criteria: (1) within the chronological age range of nine through nineteen; (2) without severe physical disabilities. Because of the inevitable shift in school population, a group of twenty subjects remained in the school program for the full period of this study as shown in Appendix A. This group was composed of ten males and ten females.

The chronological age range at the beginning of the study was from nine years, ten months, to nineteen years and three months. On the basis of individual psychological examinations given by qualified public school psychologists, all subjects in this study were classified as mental defectives in the trainable retarded range of intelligence. Intelligence quotients for the twenty subjects ranged from 30 to 56.

Instruments of Measure

The purpose of this study is to make an intensive longitudinal study of the changes in individuals. Each of the twenty subjects in this study was administered a battery of tests at the beginning of the first school year and at the close of the second school year. This battery included the following tests: Metropolitan Readiness Test; Metropolitan Achievement Test, Primary Form; House-Tree-Person Test; Machover Test; and the Vineland Social Maturity Scale.

The Metropolitan Readiness Test and the Metropolitan Achievement Test, Primary Form, were selected as the instruments to measure academic changes. Both of these tests have been standardized and widely used as instruments for measuring academic achievement.

The House-Tree-Person Test and the Machover were used in this study to measure academic and social adjustment changes. Both of these instruments have been used extensively with retarded children. The type of performance called for by these tests is one in which the handicapped child is not likely to be penalized because of his lack of ability in verbal communication. Both of these tests have appeal and provide motivation for this group of retardates.

For measuring changes in social adjustment and social competence, the Vineland Social Maturity Scale was selected. This Scale is widely used both with retarded

children and with the intellectually normal. This test appeared to be well adapted to this group of subjects.

The Experimental Task

At the beginning of the school year each subject was administered the Metropolitan Readiness Test, the Primary Form of the Metropolitan Achievement Test, and House-Tree-Person Test, the Machover Test, and the Vineland Social Maturity Scale. All these tests were given individually except for the Metropolitan Readiness and Achievement Tests which were administered in groups of four subjects. The same procedure was followed in the second testing period at the end of the second school year. The procedure followed in the administration of the tests was the standardized procedure as indicated in the manual for each test. No control group was used in this intensive longitudinal study of changes taking place in individuals who were enrolled in public school classes.

All twenty subjects attended public school classes for trainable mentally retarded children for the two-year period. The school curriculum emphasized activities which were directed toward the child's improvement in self care, social adjustment, and usefulness in his home and in his community. These activities included opportunities for music and art therapy, homemaking, shop, playground, and functional reading and number experiences. The curriculum

offered a rich variety of experiences in these areas. It was the aim of these public school classes to provide the children with an atmosphere of acceptance and security throughout the school day.

The total sample was divided into low, middle, and high groups on the basis of the Vineland Social Quotients obtained at the first test. On the basis of the initially obtained social quotients, those with scores through 31 were placed in the low group; those with scores between 33 and 41 were placed in the middle group; and those with scores ranging from 43 through 54 were placed in the high group. This grouping was employed in the analysis of the data. Sometimes the analysis is in terms of the three subgroups. At other places in the analysis the subjects are regrouped as follows: the combined low and middle group is compared with the high; the combined middle and high group is compared with the low; the high group is compared with the middle; the high group is compared with the low; and the middle group is compared with the low. Since the high group tended to be near the ceiling on some of the measuring instruments, this regrouping was done in an attempt to discover where the real differences did occur.

For part of the analysis of the Goodenough Draw-A-Man Test data this same grouping on the basis of Vineland Social Quotients at the first testing was employed. However, in order to investigate the possibility of statistically

significant differences in Goodenough Intelligence Quotient gains, the subjects are divided into two groups on the basis of mental age score obtained at the first testing. Finally, the total is divided into two groups on the basis of chronological age at the time of the first testing.

These hypotheses are tested:

1. That there is no statistically significant difference among the groups in social growth as reflected in the Vineland Social Maturity Quotients.

2. That there is no statistically significant difference among the groups in academic growth as indicated by the Metropolitan Readiness Test Scores.

3. That there is no statistically significant difference among the groups in academic growth as indicated by the Metropolitan Achievement Test Scores.

4. That there is no statistically significant difference among the groups in growth in maturity as reflected in the House-Tree-Person Test and the Machover Draw-a-Person Test.

5. That there is no statistically significant difference among the groups in emotional adjustment as revealed in the House-Tree-Person Test and the Machover Draw-a-Person Test.

6. That there is no statistically significant difference among the groups in mental growth as reflected in the Goodenough Draw-a-Man Test.

Treatment of the Data

The Vineland Social Maturity Scale was used as the basis for grouping the subjects in the analysis of most of the data. The social quotients obtained by the subjects were ranked and divided into subgroups that are identified as the low, middle, and high groups. The range of social quotients was divided into three approximately equal parts. The natural breaks in these scores placed eight subjects in the low group, eight in the middle group, and four in the high group.

Appendix B presents the list of subjects along with the social quotients they obtained on the Vineland Social Maturity Scale. In column one are the subjects identified by capital letters. Throughout this study reference to the subjects will be in terms of these letters. The second column presents the Vineland Social Quotients obtained at the initial testing. In column three are the Vineland Social Quotients obtained by the subjects at the final testing period. Column four presents points of social quotient change during the two-year period.

On the basis of the initially obtained social quotients, the population was divided into the following subgroups: the low group with social quotients ranging from 23 through 31; the middle group with social quotients ranging from 33 through 41; and the high group with social quotients ranging from 43 through 54. Throughout the

treatment of the data these subgroups defined as low, middle, and high are used in the description and analysis of the subjects of this study.

Vineland Social Maturity Scale.--A sign test was employed in the analysis of the social quotients. "Z" score probabilities for the total group were obtained, and the level of confidence of the probabilities was determined.

The Exact Chi-Square technique was used to find the statistical significance of the differences in the gains made by the three groups. The increases in social quotients of the combined high and middle groups were compared with the increases in social quotients obtained by the low group.

Metropolitan Readiness and Metropolitan Achievement Tests.--For the analysis of the Metropolitan Readiness and the Metropolitan Achievement Test data, the subjects were divided into high, middle, and low groups on the basis of the Vineland Social Quotients at the first testing. A sign test was employed in the analysis of gains in standard scores on the Metropolitan Achievement Test. A sign test was applied to the gains in raw score points made on the Metropolitan Readiness Test. Probabilities were computed for the total group on both tests and the statistical significance of the group differences was tested by the Exact Chi-Square Method.

The House-Tree-Person Test, The Machover Draw-a-Person Test.--The two sets of four drawings for each of the

twenty subjects were judged by three psychology students who were completing Ph. D. degrees at the University of Oklahoma. Three separate judgments were made on these drawings. First, each judge was given the drawings in each category of house, tree, woman, and man. This first judgment was to determine which was the drawing made at the beginning of the study by each subject in each of the above categories. The second judgment was made on the basis of which set of four drawings was the set which had been drawn at the beginning of the study. The third judgment was made to determine which set of drawings for each subject indicated growth or no growth in maturity and which set of drawings indicated more, less, or no change in emotional disturbance.

To establish the reliability of the judges the probability of the agreement of the judges was derived from "Z" scores which were computed for each category of drawings in each of the three subgroups as well as for each category in the total sample. The probability and level of confidence at which the agreement of these judgments might be accepted as significant was determined.

The "Z" score treatment was also applied to the second judgment of the psychologists, namely, the judgment as to which was the set of four drawings made at the beginning of the study. The probability and confidence level at which the agreement of judgments could be accepted as

significant was determined for each of the three groups of subjects and for the total population.

To determine group differences an analysis of the drawings which showed more growth in maturity was made by the same "Z" score treatment of the data. The Exact Chi-Square Method was applied to determine the statistical significance of the group differences obtained.

An analysis of the drawings which revealed less emotional disturbance was made by "Z" score probabilities. The statistical significance of the group differences was determined by the Exact Chi-Square Method.

Goodenough Draw-A-Man Test.--Intelligence quotients were computed for each subject on the basis of his performance on the Goodenough Draw-A-Man Test. The probabilities of the increases in Goodenough Intelligence Quotients were obtained on the basis of "Z" scores for the total group. The statistical significance of differences in gains made by the high group as against the gains made by the combined middle and low groups was tested by the Exact Chi-Square Method.

Another analysis of the data from the Goodenough Draw-A-Man Test was made. The subjects were divided into two subgroups on the basis of mental age obtained at the first testing. A sign test of the gains in Goodenough Intelligence Quotients was applied. The Exact Chi-Square Method yielded probabilities and the statistical significance of the differences between these two groups.

To complete the analysis of the data from the Goodenough Draw-a-Man Test, the subjects were again divided into two subgroups, this time on the basis of chronological age at first testing. The Exact Chi-Square Method was applied to the gains in the Goodenough Intelligence Quotients, yielding probabilities and the statistical significance of the differences between these two groups.

CHAPTER III

RESULTS

The findings in this study will be analyzed in accordance with the six hypotheses stated earlier. Since these hypotheses are stated in terms of the findings on each measuring instrument used, the analysis will be presented in this organizational pattern.

Appendix B indicates the results obtained by the subjects on the measures of social growth as reflected in gains in social quotients in the Vineland Social Maturity Scale. The subjects were grouped according to their Vineland Social Quotients obtained at the beginning of the study. Column one designates the subjects in the three subgroups, namely low, middle, and high groups. This grouping will be used in the analysis of the results of most of the measurements used in this study.

A sign test was applied to the gains made in social quotients on the Vineland Social Maturity Scale over the two-year period. Nineteen of the twenty subjects obtained increases of 4 to 27 points in social quotients. The social quotients obtained at the second testing ranged from 23 to

78. If this range were divided into three approximately equal parts, the subjects placed in the low, middle, and high groups would change only slightly from the grouping made on the basis of the first test. Two of the subjects in the low group would move up to the middle group, while two of the subjects in the middle group would move up to the high group. All four of the high group would remain in that group. The "Z" score probability for the total group of twenty subjects was .00002, which is significant at the .01 level of confidence.

The Exact Chi-Square Method was applied in order to determine the relationship between the gains in social quotient of the combined high and middle groups and the gains in social quotient made by the low group. TABLE 1 presents these results. The probability of 11 or more of the subjects in the combined high and middle groups making 10 or more points of increase in social quotient, while 2 or less of 8 subjects in the low group make 10 or more points of increase in social quotient, is .004. This is significant at the .01 level of confidence.

In the test of hypothesis one, statistically significant differences were obtained between the low group and the combined middle and high groups in Vineland Social Quotient gains during the two-year period. Those subjects ranking at the lower end of the Vineland Scale on the first test tended to be the subjects who made the least gains.

TABLE 1

EXACT CHI-SQUARE OF COMBINED MIDDLE AND HIGH GROUPS AND POINTS OF GAIN ($\geq$ 10) IN VINELAND SOCIAL QUOTIENTS AND THE LOW GROUP VINELAND SOCIAL QUOTIENT GAINS

Groups	Vineland Social Quotients	
	$\geq$ 10	$<$ 10
Middle and High.	11	1
Low.	2	6

$\underline{P}$ = .004

Thus, the hypothesis, that there would be no statistically significant differences between the groups in social growth as reflected in the Vineland Social Maturity Quotients, is rejected.

In the analysis of the Metropolitan Readiness Test data, a sign test was applied to the raw score changes made by the low, middle, and high groups during the two-year period. "Z" score probabilities were computed on the number in the total sample who made raw score gains of two or more standard errors during the two-year period. On TABLE 2 is found the summary of these probabilities. On all but one of the subtests the probability is significant at the .001 level of confidence. The probability on the copying subtest is significant at the .01 level of confidence. The "Z" score probability of the total raw scores is also significant at the .001 level of confidence.

TABLE 2

"Z" SCORE PROBABILITIES ON GAINS $\geqslant$ 2 STANDARD ERRORS OF THE MEASUREMENT FOR THE TOTAL SAMPLE IN THE METROPOLITAN READINESS TEST -- FORM R

Subtests	Probabilities	Number of Subjects
Word Meaning.	.001	20
Sentences	.001	20
Information	.001	20
Matching.	.001	20
Numbers	.001	20
Copying	.01	20
Total Tests	.001	20

The Exact Chi-Square Method was used to determine if there were real differences between the groups on gains made on the subtests of the Metropolitan Readiness Test. TABLE 3 presents the analysis of differences in gain by the middle and low groups on the word meaning subtest. Here the cut-off point is at 4 or more raw score points of gain. The P is .28, which is not significant, and suggests that no real differences exist between these two groups when four or more points of gain is the limit used.

TABLE 4 presents the Exact Chi-Square analysis of differences in gain by the middle and low group on the sentences subtest. Three or more points of raw score gain

TABLE 3

EXACT CHI-SQUARE TEST OF MIDDLE GROUP AND WORD MEANING RAW SCORE GAINS ($\geq$ 4) AND THE LOW GROUP AND WORD MEANING SCORES

Groups	Metropolitan Readiness Word Meaning Subtest	
	$\geq$ 4	< 4
Middle	3	5
Low.	1	7

P = .28

TABLE 4

EXACT CHI-SQUARE TEST OF MIDDLE GROUP AND THE SENTENCES RAW SCORE GAINS ($\geq$ 3) AND THE LOW GROUP AND SENTENCES SCORES

Groups	Metropolitan Readiness Sentences Subtest	
	$\geq$ 3	< 3
Middle	4	4
Low.	0	8

P = .31

was used as the cut-off point. The P is .31 which is not significant.

TABLE 5 presents the Exact Chi-Square analysis of the differences in raw score gain between the middle and low groups on the information subtest of the Metropolitan

TABLE 5

EXACT CHI-SQUARE TEST OF MIDDLE GROUP AND THE INFORMATION SUBTEST ($\geq$ 4) RAW SCORE GAINS, AND THE LOW GROUP AND INFORMATION SCORES

Groups	Metropolitan Readiness Information Subtest Scores	
	$\geq$ 4	< 4
Middle	3	5
Low.	1	7

$\underline{P}$ = .28

Readiness Test. The probability of three or more of the eight subjects in the middle group making four or more points of raw score gain on the information subtest, while one or less of the eight subjects in the low group make four or more points of raw score gain, is .28. This is not significant and suggests that no real differences occur between the middle and low groups on the information subtest.

The Exact Chi-Square Method is used to analyze the relationship of the middle and low groups in raw score gain on the matching subtest of the Metropolitan Readiness Test. The data are presented in TABLE 6. The probability of eight of eight subjects in the middle group making raw score gains of two or more points, while four or less of eight subjects in the low group make two or more points of score gain, is

TABLE 6

EXACT CHI-SQUARE TEST OF MIDDLE GROUP AND THE MATCHING SUBTEST ($\geq$ 2) RAW SCORE GAINS AND THE LOW GROUP AND MATCHING SCORES

Groups	Metropolitan Readiness Matching Subtest Scores	
	$\geq$ 2	$<$ 2
Middle	8	0
Low.	4	4

$\underline{P}$ = .004

.004. Since this is significant at the .01 level of confidence, it suggests that when the limit of two or more points of score gain is used, real differences do occur between the middle and low groups of subjects in the matching subtest of the Metropolitan Readiness Test.

The Exact Chi-Square Method was used to determine the relationship of the middle and low groups on the numbers subtest of the Metropolitan Readiness Test when three or more points of score gain was the limit. The data are presented in TABLE 7. A $\underline{P}$ of .004 was obtained. The probability of six or more of the eight subjects in the middle group making three or more points of score gain, while two or less of the eight subjects in the low group make three or more points of score gain on the numbers subtest, is .004. This is significant at the .01 level of confidence, which suggests that a real difference exists between the middle and low groups when the limit set is three or more points of score gain.

TABLE 7

EXACT CHI-SQUARE TEST OF MIDDLE GROUP AND THE NUMBERS SUBTEST ($\geq$ 3) RAW SCORE GAINS AND THE LOW GROUP AND NUMBERS SCORES

Groups	Metropolitan Readiness Numbers Subtest Scores	
	$\geq$ 3	$<$ 3
Middle	6	2
Low.	2	6

$\underline{P}$ = .004

The analysis of the data on the copying subtest is presented in TABLE 8. The difference between the middle and low groups was tested by the Exact Chi-Square technique. When two or more points of increase was set as the limit, the $\underline{P}$ is .14, which is not statistically significant. This indicates that there was no real difference in copying between the middle and low groups within the limit of two or more points of score gain.

Using nine or more raw score points as the cut-off point, an analysis of the relationship between the total gains made by the middle group and the low group was made by the Exact Chi-Square Method. A probability of .01 was found for that data, which are presented in TABLE 9. A $\underline{P}$ of .01 is significant and suggests that there is a real difference between the middle and low groups with nine or

TABLE 8

EXACT CHI-SQUARE TEST OF MIDDLE GROUP AND THE COPYING SUBTEST ($\geq$ 2) RAW SCORE GAINS AND THE LOW GROUP AND COPYING SCORES

Groups	Metropolitan Readiness Copying Subtest Scores	
	$\geq$ 2	$<$ 2
Middle	4	4
Low.	1	7

$P = .14$

TABLE 9

EXACT CHI-SQUARE TEST OF MIDDLE GROUP AND TOTAL METROPOLITAN READINESS TEST ($\geq$ 9) RAW SCORE GAINS AND THE LOW GROUP AND TOTAL METROPOLITAN READINESS SCORES

Groups	Metropolitan Readiness Total Scores	
	$\geq$ 9	$<$ 9
Middle	7	1
Low.	1	7

$P = .01$

more points of total test raw score gain as the cut-off point for the Metropolitan Readiness Test. The probability of seven or more of the eight subjects in the middle group making nine or more points of raw score gain, while only

one or less of seven subjects in the low group make nine or more points of raw score gain, is .01, which is significant at the .01 level of confidence.

In order to examine further the data on the Metropolitan Readiness Test the raw scores were converted to percentile rank. The Exact Chi-Square Method was employed in order to test for differences in gain between groups. The data in TABLE 10 present this treatment. The limit was set at six or more points of percentile rank gain for testing the relationship between the low group and the combined high and middle groups. The P obtained was .051, which is slightly beyond the .05 level of confidence and is not significant. The results suggest, however, that there is a tendency toward a difference between these groups although it is not enough to be regarded as statistically significant.

TABLE 10

EXACT CHI-SQUARE TEST OF COMBINED HIGH AND MIDDLE GROUPS AND PERCENTILE RANK ($\geqslant$ 6) GAINS AND THE LOW GROUP AND PERCENTILE RANK

Groups	Metropolitan Readiness Scores Percentile Rank	
	$\geqslant 6$	< 6
High and Middle.	10	2
Low.	3	5

P = .051

In summary, the "Z" score probabilities computed on the gains made by the total sample were statistically significant. The findings on the Exact Chi-Square Method indicate statistically significant differences between the middle and low groups in the numbers and matching subtests of the Metropolitan Readiness Test. Since the high group tended to be near the ceiling in points of the test, the group differences in score gain appear to be between the middle and low groups. In total Metropolitan Readiness Test scores the differences between the middle and low groups are statistically significant at the .01 level of confidence.

In the test of hypothesis two, statistically significant differences were obtained between the middle and low groups on the total Metropolitan Readiness Test score gains during the two-year period. Thus hypothesis two, that there would be no statistically significant differences between the groups in academic growth as indicated by the Metropolitan Readiness Test, is rejected.

The test of hypothesis three is made on the findings obtained on the Metropolitan Achievement Test, Primary Battery. The division of the subjects into low, middle, and high groups is on the basis of the Vineland Social Quotients obtained at the first testing period.

A sign test was applied to the standard score gains for each of the four subtests of the Metropolitan

Achievement Test. Since there were no available standard score data on the total test scores, the analysis will be in terms of the subtest data. The sign test was in terms of gains equal to or more than two times the standard error of measurement for each of the subtests.

TABLE 11 presents the data on the "Z" score probabilities which were computed on the number in the total sample whose gains were equal to or greater than two times the standard error of the measurement. These probabilities are all less than .001 and are significant at the .01 level of confidence. This analysis suggests that some factor other than chance was operating.

TABLE 11

"Z" SCORE PROBABILITIES COMPUTED ON METROPOLITAN ACHIEVEMENT TEST STANDARD SCORE GAINS ($\geq$ 2 TIMES THE STANDARD ERROR OF THE MEASUREMENT) FOR THE TOTAL GROUP OF TWENTY SUBJECTS

Subtest	P	Level of Confidence
Word Pictures.	.001	.01
Word Recognition . . .	.001	.01
Word Meaning	.001	.01
Numbers.	.001	.01

In order to determine if group differences occur, an analysis was made of the gains in standard score points obtained by the three groups on the Metropolitan Achievement Test. In the word picture subtest the Exact Chi-Square Method was used to determine the relationship between the combined high and middle groups of twelve subjects and the low group of eight subjects obtaining a standard score gain of ten or more points. The data are presented in TABLE 12. The probability of seven or more of twelve subjects in the middle and high groups making standard score gains of ten or more points on the word picture subtest, while three or less of eight subjects in the low group make ten or more points of standard score gains, is .32. A P of .32 is not significant. It may be contended that no real difference exists between these groups on the basis of these data.

The Exact Chi-Square Method was also applied to the differences in standard score gains of the high group of four subjects on the word recognition subtest of the Metropolitan Achievement Test (TABLE 13). A P of .06 was found, which is not significant. This suggests that no real differences occur between these groups when sixteen or more points is set as the limit.

The group gains in standard score points on the word meaning subtest of the Metropolitan Achievement Test were also analyzed by the Exact Chi-Square Method. This

TABLE 12

EXACT CHI-SQUARE TEST OF COMBINED HIGH AND MIDDLE GROUP ($\geq$ 10) STANDARD SCORE GAIN ON WORD PICTURE SUBTEST OF METROPOLITAN ACHIEVEMENT TEST AND THE LOW GROUP ($\geq$ 10) STANDARD SCORE GAIN ON THE WORD PICTURE SUBTEST

Groups	Metropolitan Achievement Scores Word Picture Subtest	
	$\geq$ 10	$<$ 10
High and Middle.	7	5
Low.	3	5

P = .32

TABLE 13

EXACT CHI-SQUARE TEST OF HIGH GROUP ($\geq$16) STANDARD SCORE GAIN ON THE WORD RECOGNITION SUBTEST OF METROPOLITAN ACHIEVEMENT TEST AND THE COMBINED MIDDLE AND LOW GROUP ($\geq$ 16) STANDARD SCORE GAIN ON THE WORD RECOGNITION SUBTEST

Groups	Metropolitan Achievement Scores Word Recognition Subtest	
	$\geq$ 16	$<$ 16
High	3	1
Middle and Low	3	13

P = .06

is presented in TABLE 14. When the limit is set at fifteen or more points of standard score gain, there appears to be a very significant relationship between the gains of the

TABLE 14

EXACT CHI-SQUARE TEST OF HIGH GROUP ($\geq$ 15) STANDARD SCORE GAIN ON THE WORD MEANING SUBTEST OF METROPOLITAN ACHIEVEMENT TEST AND THE COMBINED MIDDLE AND LOW GROUP ($\geq$ 15) STANDARD SCORE GAIN ON THE WORD MEANING SUBTEST

Groups	Metropolitan Achievement Scores Word Meaning Subtest	
	$\geq$ 15	$<$15
High	4	0
Middle and Low	2	14

P = .003

high group when compared with the gains made by the combined middle and low groups. The P is .003, which is significant at the .01 level of confidence. These results suggest that a real difference exists between these groups on this measurement data.

The analysis of group differences in gains made on the numbers subtest of the Metropolitan Achievement Test is presented in the Exact Chi-Square treatment of the data in TABLE 15. Using nine or more standard score points as the limit for measuring the differences in gain, the relationship of the high group and the combined middle and low groups was tested. A P of .007 was obtained. Thus, the probability of four out of four of the subjects in the high group making nine or more points of standard score gain on

TABLE 15

EXACT CHI-SQUARE TEST OF HIGH GROUP ($\geq$ 9) STANDARD SCORE GAIN ON THE NUMBERS SUBTEST OF METROPOLITAN ACHIEVEMENT TEST AND THE COMBINED MIDDLE AND LOW GROUP ($\geq$ 9) STANDARD SCORE GAIN ON THE NUMBERS SUBTEST

Groups	Metropolitan Achievement Scores Numbers Subtest	
	$\geq$ 9	$<$ 9
High	4	0
Middle and Low	3	13

$\underline{P}$ = .007

the numbers subtest, while three or less of the sixteen subjects in the combined middle and low groups make gains of nine or more standard score points, is .007. The fact that the probability is significant at the .01 level of confidence suggests that a real difference exists between these groups when the limiting score gain is nine or more points.

An examination of the test score data seems to indicate that the high group made more consistent gains on all of the subtests. The scores for the low and middle groups suggest that the test might not go low enough to measure these subjects adequately.

In summary, the "Z" score probabilities were computed on subjects gaining standard score points equal to or greater than two standard errors of the measurement. These were all statistically significant at the .01 level of

confidence. Differences between gains made by the high, middle, and low groups were analyzed by the Exact Chi-Square Method. These differences were not statistically significant on the word recognition or word picture subtests. However, on the word meaning and numbers subtest, the difference between the gains made by the high group and the combined middle and low groups were statistically significant at the .01 level of confidence.

Thus, hypothesis three, that there would be no statistically significant differences between the groups in academic growth as indicated by the Metropolitan Achievement Scores, is rejected with the previously stated reservations.

Hypothesis four will be tested on the basis of the agreement and accuracy of judgments by three psychology students on the House-Tree-Person and Machover Drawings.

In order to determine if growth in maturity is indicated in the drawings made at the first and second testing periods, the three judges were asked to rate each pair of drawings in each category of house, tree, woman, and man. The judges were to select the drawing which had been drawn at the first testing period. It was assumed that if the drawings showed growth in maturity, the judges could choose with more accuracy the drawing made at the first testing period. The data on the agreement of the judges and the accuracy of their selections on the drawings of the house, tree, woman, and man are presented in TABLES 16, 17, 18, and 19.

TABLE 16

AGREEMENT OF JUDGES ON THE SELECTION OF THE HOUSE DRAWN AT FIRST TESTING PERIOD

Group	Number of Subjects	Number of Judges Agreement 3	2	1
Low	8	5	1	2
Middle	8	2	5	1
High	4	0	1	1

TABLE 17

AGREEMENT OF JUDGES ON THE SELECTION OF THE TREE DRAWN AT FIRST TESTING PERIOD

Group	Number of Subjects	Number of Judges Agreement 3	2	1
Low	8	4	1	2
Middle	8	4	1	2
High	4	2	2	0

The data were first analyzed to determine the reliability of the judges to make accurate judgments. Tests of statistical significance were applied to these judgments. Secondly, the differences among the three subgroups in growth in maturity as revealed in the drawings were analyzed by the Exact Chi-Square Method.

TABLE 18

AGREEMENT OF JUDGES ON THE SELECTION OF THE WOMEN DRAWN AT FIRST TESTING PERIOD

Groups	Number of Subjects	Number of Judges Agreement 3	2	1
Low	8	3	0	1
Middle.	8	4	2	1
High.	4	2	2	0

TABLE 19

AGREEMENT OF JUDGES ON THE SELECTION OF THE MAN DRAWN AT FIRST TESTING PERIOD

Groups	Number of Subjects	Number of Judges Agreement 3	2	1
Low	8	4	1	1
Middle.	8	4	1	2
High.	4	2	1	1

In order to determine if the agreement of these judgments was statistically significant "Z" score probabilities for the low, middle, and high groups were calculated on each of the four categories of drawings. TABLE 20 indicates the "Z" score probabilities of the agreement of the judges

TABLE 20

"Z" SCORE PROBABILITIES OF AGREEMENT OF JUDGES ON HOUSE DRAWN AT FIRST TESTING

Groups	P	Confidence Level of Statistical Significance
Low	.004	.01
Middle.	.04	.05
High.	.08	not significant
Total Groups. . . .	.02	.05

on the selection of the house which was drawn at the first testing period. Except for the high group, probabilities were statistically significant. The low group probability was significant at the .01 level of confidence, while the middle and total group probabilities were significant at the .05 level of confidence.

TABLE 21 presents the "Z" score probabilities of the agreement of the judges on the tree which was drawn at the first testing period. The probabilities for the low and middle groups were not significant. The high group probability was significant at the .05 level of confidence, while the probability of the judges' agreement for the total group of subjects was significant at the .01 level of confidence.

TABLE 21

"Z" SCORE PROBABILITIES OF AGREEMENT OF JUDGES ON TREE DRAWN AT FIRST TESTING

Groups	P	Confidence Level of Statistical Significance
Low	.10	not significant
Middle.	.10	not significant
High.	.02	.05
Total Groups. . . .	.002	.01

The "Z" score probabilities of the agreement of the judges on the drawing of the woman made at the first testing period are presented in TABLE 22. The probabilities of the agreement of the judges on the middle and high group drawings were significant at the .05 level of confidence.

TABLE 22

"Z" SCORE PROBABILITIES OF AGREEMENT OF JUDGES ON WOMAN DRAWN AT FIRST TESTING

Groups	P	Confidence Level of Statistical Significance
Low	.41	not significant
Middle.	.04	.05
High.	.02	.05
Total Groups. . . .	.07	not significant

TABLE 23 presents the "Z" score probabilities of the agreement of the judges on the drawing of the man made at the first testing period. The probability for the total group was significant at the .01 level of confidence. Computing the probabilities for the three separate groups yielded no significant data.

TABLE 23

"Z" SCORE PROBABILITIES ON AGREEMENT OF JUDGES ON MAN DRAWN AT FIRST TESTING

Group	P	Confidence Level of Statistical Significance
Low	.22	not significant
Middle.	.10	not significant
High.	.08	not significant
Total Groups. . . .	.009	.01

The second judgment was for the purpose of selecting the set of four drawings which was drawn by each subject at the first testing period. The data on the agreement and accuracy of these judgments are presented in TABLE 24.

In order to determine if these judgments were statistically significant "Z" score probabilities were computed for the judgments in the low, middle, and high groups. TABLE 25 presents these probabilities. The probabilities of the judgments for the low and middle group were significant

TABLE 24

AGREEMENT OF JUDGES ON SET OF FOUR DRAWINGS MADE BY EACH SUBJECT AT FIRST TESTING PERIOD

Groups	Number of Subjects	Number of Judges			
		3	2	1	0
		Agreement			
Low	8	5	1	1	1
Middle.	8	6	0	1	1
High.	4	3	0	1	0

TABLE 25

"Z" SCORE PROBABILITIES ON AGREEMENT OF JUDGES ON SETS OF DRAWINGS MADE AT FIRST TESTING

Groups	P	Confidence Level of Statistical Significance
Low	.01	.01
Middle.	.005	.01
High.	.02	.05

at the .01 level of confidence, while the probability for the high group judgments is significant at the .05 level of confidence.

The third judgment was to determine whether the sets of drawings showed more growth in maturity or no growth in maturity. The data on these judgments are presented in TABLE 26.

TABLE 26

AGREEMENT OF JUDGES ON GROWTH IN MATURITY AS REFLECTED IN THE SETS OF FOUR DRAWINGS BY EACH SUBJECT

Groups	Number of Subjects	Number of Judges			
		3	2	1	0
		Agreement			
Low	8	5	1	1	1
Middle.	8	6	0	1	1
High.	4	3	0	1	0

"Z" score probabilities on the agreement of the judges as to which set of drawings showed more growth in maturity were computed and are presented in TABLE 27. The probabilities of the agreement of the judges were significant at the .01 level of confidence for all three of the groups of subjects. Since the agreement of the judges was statistically significant for all the subgroups we may accept these judgments as reliable for these data.

The Exact Chi-Square Method was applied to the data on the judgments as to the drawings which indicate more growth in maturity. TABLE 28 presents the analysis of the relationship of the middle group of eight subjects and the low group of eight subjects regarding the judgments on growth in maturity. The probability of .49 is not significant. This would suggest that there was no difference

TABLE 27

"Z" SCORE PROBABILITIES ON AGREEMENT OF JUDGES ON GROWTH IN MATURITY IN DRAWINGS

Groups	P	Confidence Level of Statistical Significance
Low	.000006	.01
Middle.	.0000001	.01
High.	.0002	.01

TABLE 28

EXACT CHI-SQUARE TEST OF AGREEMENT OF JUDGES ON GROWTH IN MATURITY IN SETS OF FOUR DRAWINGS BY SUBJECTS IN MIDDLE GROUP AND GROWTH IN SETS OF DRAWINGS IN LOW GROUP

Groups	House-Tree-Person, Machover Drawings Number of Judges in Agreement on Growth	
	3 Judges	2, 1, 0 Judges
Middle.	6	2
Low	5	3

$P = .49$

greater than chance in the selection of growth in maturity from the drawings of the middle group and the low group.

The Exact Chi-Square treatment of the judgments on the drawings which indicated growth in maturity in the high and middle groups is presented in TABLE 29. Again the probability is not significant.

TABLE 29

EXACT CHI-SQUARE TEST OF AGREEMENT OF JUDGES ON GROWTH IN MATURITY IN SETS OF FOUR DRAWINGS BY SUBJECTS IN HIGH GROUP AND GROWTH IN SETS OF DRAWINGS IN MIDDLE GROUP

Groups	House-Tree-Person, Machover Drawings Number of Judges in Agreement on Growth	
	3 Judges	2, 1, 0 Judges
High.	3	1
Middle.	6	2

$\underline{P} = .75$

TABLE 30 presents the Exact Chi-Square treatment of the relationship of the high and low groups on growth in maturity as revealed in the drawings. The probability is .59, which suggests that there is little difference as to the judges' selection of growth in the high or low group.

In summary, as shown in TABLE 31, the "Z" score probabilities of the agreement of the judges in the low group were statistically significant and thus reliable for the drawing of the house and sets of drawings. The judges were unable to make statistically significant agreements on the drawings of the tree, the woman, or the man.

The "Z" score probabilities for the middle group were statistically significant on agreement on growth in the sets of drawings as well as on drawings of the house and woman. The reliability of these judgments was thus established.

TABLE 30

EXACT CHI-SQUARE TEST OF AGREEMENT OF JUDGES ON GROWTH IN MATURITY IN HIGH GROUP SETS OF FOUR DRAWINGS AND GROWTH IN MATURITY IN LOW GROUP DRAWINGS

Groups	House-Tree-Person, Machover Drawings Number of Judges In Agreement on Growth	
	3 Judges	2, 1, 0 Judges
High.	3	1
Low	5	3

$\underline{P} = .59$

TABLE 31

LEVEL OF CONFIDENCE OF THE STATISTICAL SIGNIFICANCE OF THE AGREEMENT OF THE JUDGES ON GROWTH IN MATURITY AS REFLECTED IN THE DRAWINGS

Groups	Level of Confidence				Set of Four Drawings	Growth vs No Growth
	House	Tree	Woman	Man		
Low . .	.01	*	*	*	.01	.01
Middle.	.05	*	.05	*	.01	.01
High. .	*	.05	.05	*	.05	.01
Total .	.05	.01	*	.01	**	**

* Not significant.

** No judgment made.

In testing for the accuracy of the judges it was found that "Z" score probabilities on the agreement of the

judges for the high group were statistically significant on growth as revealed in the sets of four drawings, as well as for the tree and for the woman. The "Z" score probabilities on the total group drawings were statistically significant on the drawings of the house, the tree, and the man. In the subgroups there was less statistically significant agreement of the judges on the drawings of the tree and the woman. The only statistically significant agreement on the drawings of the man was for the total group of subjects.

These data suggest that judgments on growth in maturity in the low and middle groups were more consistent in the drawings of the house. Growth in the high group appeared to be more easily determined in the drawing of the tree and the woman. The agreement of the judges on growth in the total group was statistically significant in the drawings of the house, the tree, and the man. The Chi-Square treatment of the group differences in growth as revealed by the drawings did not yield any statistically significant differences.

The results apparently sustain the hypothesis that there is no statistically significant difference among the groups in growth in maturity as reflected in the House-Tree-Person Test and the Machover Draw-A-Person Test. There are, however, considerable statistically significant data on the agreement of the judges as to growth in maturity as revealed in the drawings of the majority of the subjects.

The test for sustaining or rejecting hypothesis five is to be the statistical significance of the agreement of the three judges on the selection of the set of drawings indicating more, less, or no change in emotional disturbance. To establish the reliability of the judges "Z" score probabilities were calculated on the agreement of the judges as to which drawings were selected as indicating less emotional disturbance. TABLE 32 presents a summary of the agreement of the judges on the category of less disturbance in the drawings which were made at the second testing period.

TABLE 32

AGREEMENT OF JUDGES ON LESS EMOTIONAL DISTURBANCE AS REFLECTED IN THE SETS OF FOUR DRAWINGS BY EACH SUBJECT

Groups	Number of Subjects	Number of Judges			
		3	2	1	0
		Agreement			
Low	8	2	1	5	0
Middle.	8	4	1	0	3
High.	4	3	0	1	0

A "Z" score probability was calculated on the agreement of judges as to less emotional disturbance in the second test drawings of the low group. A probability of

.02 was obtained. This is significant at the .05 level of confidence. The "Z" score probability calculated on the agreement of the judges as to less emotional disturbance in the drawings of the middle group is .006, which is significant at the .01 level of confidence.

For the high group a probability of .0002 was calculated on the agreement of the judges on less emotional disturbance as reflected in the drawings. This is significant at the .01 level of confidence. The data are presented in TABLE 33. The results of this analysis suggest that for the three groups of subjects the agreement of the judges on the indication of less emotional disturbance in the drawings was significantly greater than would be expected on the basis of chance alone, thus indicating the reliability of the judges.

TABLE 33

"Z" SCORE PROBABILITIES ON AGREEMENT OF JUDGES ON LESS EMOTIONAL DISTURBANCE ON SETS OF DRAWINGS MADE AT SECOND TESTING

Groups	P	Confidence Level of Statistical Significance
Low	.02	.05
Middle.	.006	.01
High.	.0002	.01

TABLE 34 presents the agreement of the judges on the selection of the subjects' drawings which indicated more emotional disturbance at the second test period. In both the low and the high group one judge selected one subject's drawings as indicating more emotional disturbance at the second testing.

TABLE 34

AGREEMENT OF JUDGES ON MORE EMOTIONAL DISTURBANCE AS REFLECTED IN THE SETS OF DRAWINGS BY EACH SUBJECT

Groups	Number of Subjects	Number of Judges			
		3	2	1	0
		Agreement			
Low	8	0	0	1	7
Middle.	8	0	1	2	5
High.	4	0	0	1	3

In the middle group two judges selected one subject's drawings as indicating more emotional disturbance at the second testing period. Also in the middle group one judge selected the drawings of two subjects as showing more emotional disturbance.

In TABLE 35 are presented the data on the agreement of judges as to the criterion of no change in emotional disturbance as indicated by the drawings made at the second

TABLE 35

AGREEMENT OF JUDGES ON NO CHANGE IN EMOTIONAL DISTURBANCE AS REFLECTED IN THE SETS OF DRAWINGS BY EACH SUBJECT

Groups	Number of Subjects	Number of Judges			
		3	2	1	0
		Agreement			
Low	8	0	5	0	3
Middle.	8	1	1	1	5
High.	4	0	0	1	3

testing period. There was little agreement of judges except in the low group, where the drawings of five subjects were selected as indicating no change in emotional disturbance.

In TABLE 36 the Exact Chi-Square Method was used to analyze the relationship of the judgments on less emotional disturbance in the high group of four subjects, as compared with the judgments in the combined middle and low groups. A probability of .21 was obtained, which is not significant and suggests that no differences occur between these groups on judgments of less emotional disturbance.

In summary, the agreement of the judges on less emotional disturbance was statistically significant and thus reliable for each of the three groups. The Exact Chi-Square Method did not reveal any statistically significant

TABLE 36

EXACT CHI-SQUARE TEST OF AGREEMENT OF JUDGES ON LESS EMOTIONAL DISTURBANCE IN SETS OF FOUR DRAWINGS BY SUBJECTS IN HIGH GROUP AND LESS EMOTIONAL DISTURBANCE IN THE DRAWINGS OF THE COMBINED MIDDLE AND LOW GROUPS

Groups	House-Tree-Person, Machover Drawings Number of Judges In Agreement on Less Emotional Disturbances	
	3 Judges	2, 1, 0 Judges
High.	3	1
Middle and Low. . .	6	10

$\underline{P} = .21$

differences between the groups when the judgments on less emotional disturbance were tested.

The analysis of the data apparently indicates that there is no statistically significant difference among the groups in emotional adjustment as revealed in the House-Tree-Person Test and the Machover Draw-A-Person Test. Since statistically significant differences between the groups were not obtained, hypothesis five is sustained.

The testing of hypothesis six calls for an examination of the data on the Goodenough Draw-A-Man Test. Appendix C lists the subjects in the low, middle, and high groups. Column two indicates the chronological age of each of the subjects at the first testing period. Column three lists the mental age for each of the subjects at the first

testing period. Columns four and five present the Goodenough Intelligence Quotients at the first and second testing periods.

In the analysis of the data a sign test was applied to the gains in Goodenough Intelligence Quotients for the subjects in the low, middle, and high groups. Using two probable errors or eleven or more points of increase as the limit, "Z" score probabilities were computed for the total group on the basis of this gain. The probability was less than .001. This is significant at the .01 level of confidence, and suggests that the gains in Goodenough Intelligence Quotients beyond two probable errors may indicate a real gain in mental maturity.

The Exact Chi-Square Method was used to compare the gains in Goodenough Intelligence Quotients of the high group and the combined middle and low groups when eleven or more points was the limit. The data are presented in TABLE 37. The probability of three or more of four subjects in the high group making eleven or more points of intelligence quotient gain, while one or less in the middle and low group make eleven or more points of intelligence quotient gain, is .013. This is significant at the .05 level of confidence. This suggests a real difference between these groups of subjects when the limit of gain is set at eleven or more points.

TABLE 37

EXACT CHI-SQUARE OF POINTS OF INCREASE ($\geq$ 11) IN GOODENOUGH INTELLIGENCE QUOTIENTS FOR HIGH GROUP AND POINTS OF INCREASE ($\geq$ 11) IN GOODENOUGH INTELLIGENCE QUOTIENTS FOR COMBINED MIDDLE AND LOW GROUPS

Groups	Goodenough Draw-A-Man Test Increase in Intelligence Quotients	
	$\geq$ 11	$<$ 11
High.	3	1
Middle and Low.	1	15

$\underline{P}$ = .013

For the analysis of the Goodenough Draw-A-Man data the subjects were also divided into two groups on the basis of the mental ages obtained at the first testing period. The Exact Chi-Square Method is used to analyze the relationship between these mental age groups and the amount of gain in Goodenough Intelligence Quotient. TABLE 38 presents the analysis of these differences when the mental age groups are divided so that the twelve subjects with mental ages below five years and three months are in the lower group and the eight subjects with mental ages above this point are in the upper group. The probability of one or less of the twelve subjects in the lower mental age group making eight or more points of intelligence quotient gain, while four or more of the eight subjects in the upper mental age

TABLE 38

EXACT CHI-SQUARE TEST OF POINTS OF INCREASE ($\geq$ 8) GOODENOUGH INTELLIGENCE QUOTIENTS, M.A. GROUP (2-9 TO 5-3) AND POINTS OF INCREASE ($\geq$ 8), GOODENOUGH INTELLIGENCE QUOTIENTS M.A. GROUP (5-9 TO 8-6)

M.A. at First Test	Goodenough Draw-A Man Test Increase in Intelligence Quotients	
	$\geq$ 8	$<$ 8
2-9 yrs. to 5-3 yrs.	1	11
5-9 yrs. to 8-6 yrs.	4	4

$P = .057$

group are making eight or more points of intelligence quotient gain, is .057. This is above the limit of the five per cent level of confidence and thus does not indicate a statistically significant difference between the subjects when so grouped according to mental age at the first testing. However, the data suggest that there is a tendency here for group differences to exist.

TABLE 39 presents the Exact Chi-Square treatment of the subjects grouped according to mental age at the first testing and divided into two groups at the mental age of six years. The probability of one or less of the fifteen subjects in the lower mental age group making eight or more points of intelligence quotient gain, while four or more of five subjects in the upper mental age group make eight or more points of intelligence quotient gain, is .004. This

TABLE 39

EXACT CHI-SQUARE OF POINTS OF INCREASE ($\geq$ 8) IN GOODENOUGH INTELLIGENCE QUOTIENTS FOR SUBJECTS (MENTAL AGES FIRST TESTING, 2-9 YEARS THROUGH 6-0 YEARS) AND POINTS OF INCREASE ($\leq$ 8) IN GOODENOUGH INTELLIGENCE QUOTIENTS FOR SUBJECTS, (MENTAL AGES AT FIRST TESTING OF 6-3 YEARS THROUGH 8-6 YEARS)

M.A. at First Test	Goodenough Draw-A-Man Test Increase in Intelligence Quotients	
	$\geq$ 8	$<$ 8
2-9 to 6-0.	1	14
6-3 to 8-6.	4	1

$P = .004$

is significant at the .01 level of confidence and suggests that a real difference exists between these groups.

The subjects were again divided into two groups on the basis of the chronological age of the subjects at the first testing period. The Exact Chi-Square Method is used to analyze these data and is presented in TABLE 40. The total group is divided into two groups at the chronological age of fourteen years and nine months. The probability of four out of seven of the lower chronological age group making eleven or more points of intelligence quotient gain, while none of the nine subjects in the upper chronological age group make eleven or more points of gain, is .068. This is not significant and suggests that there is no

TABLE 40

EXACT CHI-SQUARE TEST OF POINTS OF INCREASE ($\geq$ 11), GOODENOUGH INTELLIGENCE QUOTIENTS, C.A. GROUP 9-10 TO 14-9) AND POINTS OF INCREASE ($\geq$ 11), GOODENOUGH INTELLIGENCE QUOTIENTS, C.A. GROUP (14-10 TO 19-3)

C.A. at First Test	Goodenough Draw-A-Man Test Increase in Intelligence Quotients	
	$\geq$ 11	$<$ 11
9-10 to 14-9	4	7
14-10 to 19-3	0	9

$P = .068$

significant difference between group gains when the groups are so divided into upper and lower chronological age groups.

In summary, the "Z" score probabilities of gain were significant at the .01 level of confidence, suggesting a real gain in mental growth in the total group of subjects. The Exact Chi-Square treatment suggests that a real difference exists between the high group and the combined middle and low group on the gain in Goodenough Intelligence Quotient. The gain made by the high group was significantly greater than the gain made by the middle and low groups.

Significant differences did not occur between the groups when divided according to mental age at the first testing. There was no statistically significant difference

between the groups of subjects when divided according to chronological ages. There was more of a tendency for the subjects in the lower chronological age group to gain in Goodenough Intelligence Quotient than for the upper chronological group to gain.

Hypothesis six, that there would be no statistically significant differences between the groups in mental growth as reflected in the Goodenough Draw-A-Man Test, is rejected. Significant group differences did occur between the high group and the combined middle and low groups.

Statistically significant differences occur between groups in this study. Hypotheses one, two, three, and six were rejected since statistically significant differences between groups were indicated in the analysis of the data from the Vineland, Metropolitan Readiness, Metropolitan Achievement, and the Goodenough Draw-A-Man Tests. Hypotheses four and five were sustained on the basis of the results of the analysis of the drawings of the House-Tree-Person and the Machover Draw-A-Person Test. No statistically significant group differences were apparent from the data used to test hypotheses four and five.

CHAPTER IV

DISCUSSION OF RESULTS

Within recent years there has been an increased interest in the establishment and expansion of public school classes for trainable mentally retarded children. The purpose of this study was to determine what social and academic changes occurred in a public school class for trainable children during a two-year period. Test data on twenty subjects were recorded and analyzed. The instruments used in the measurement of changes were: Metropolitan Readiness Test; Metropolitan Achievement Test, Primary Form; House-Tree-Person Test; Machover Draw-A-Person Test; and the Vineland Social Maturity Scale.

The total sample was divided into subgroups designated as low, middle, and high on the basis of the Vineland Social Maturity Quotients obtained at the first testing period. The range of these initial scores was divided into three approximately equal parts, placing eight subjects in the low group, eight in the middle group, and four in the high group. A sign test was employed and "Z" score probabilities and the level of confidence of the probabilities

was determined. The statistical significance of the differences in gains made by the three groups was determined by the Exact Chi-Square technique. In this study of changes in trainable mentally retarded children as a result of a public school program six hypotheses were formulated and tested.

The analysis of the Vineland Social Maturity Quotients indicates that those subjects with the lowest initial scores tended to make the smallest gains over the two-year period when compared with the subjects in the middle and high groups. Those who ranked in the low group originally tended to remain there. The gains made by the middle and high group over those made by the low group were significant at the .01 level of confidence as shown in TABLE 1.

It would be interesting to investigate whether or not greater gains in social growth might occur in these subjects if a more vigorous program of parent counseling were introduced. Many of the subjects are overprotected in their home environments. Opportunities to gain confidence and independence are limited by this attitude in the home.

On the basis of these data the hypothesis that there would be no significant differences between the groups in social growth as reflected on the Vineland Social Maturity Scale is rejected.

To determine whether or not significant academic changes occurred, "Z" score probabilities were computed on

the number in the total sample who made raw score point gains of two or more standard errors during the two-year period on the Metropolitan Readiness Test. The "Z" score probabilities for all the subjects, as listed in TABLE 2, are significant at the .001 level of confidence for all the subtests except the copying subtest where the probability was significant at the .01 level of confidence.

Statistically significant differences were obtained between the middle and the low groups in the numbers and matching subtests, as indicated in TABLES 6 and 7. In the analysis of the total raw score gains the middle group made a statistically significant gain over that of the low group at the .01 level of confidence. This suggests that factors other than chance were operating.

When the raw score points on the Metropolitan Readiness test were converted to percentile rank, as listed in TABLE 10, a probability of .051 was obtained when the high and middle group gains were compared with the low group gains. Although this difference is not great enough to be statistically significant, it suggests a tendency toward a difference between these groups. No significant differences were indicated in the gains of the high group. The ceiling of the test was apparently too low for this group to indicate any significant growth over the initial test scores.

On the basis of the data, hypothesis two, that there would be no statistically significant group differences

in academic growth as indicated by the Metropolitan Readiness Test scores, is rejected.

In order to further investigate the academic changes in this group of subjects, the results of the Primary Form of the Metropolitan Achievement Test were analyzed. The "Z" score probabilities for the total group on each of the subtests were significant at the .01 level of confidence, as indicated in TABLE 11. With no standard score data available on the total test scores the analysis was made on this subtest data.

Comparison of the high group gains over the combined middle and low group gains yielded statistically significant differences on two of the subtests, word meaning and numbers. On these subtests the gains of the high group were significant at the .01 level of confidence, as listed in TABLES 13 and 15. The high group made more consistent gains on the subtest scores. The low score gains for the middle and low group suggest that the test was somewhat beyond their capacity. The test didn't go low enough to adequately measure the middle and low groups.

Since there were statistically significant differences between the groups in academic growth as indicated by the Metropolitan Achievement Test Scores, hypothesis three is rejected but with the previously stated reservations.

An analysis of the drawings of the house, tree, woman, and man was made in order to determine if any growth

in maturity was indicated over the two-year period. The selection of the judges as to which drawing was made at the first testing is assumed to suggest that the second drawing showed growth in maturity. TABLES 20, 21, 22, 23, 25, 27, 28, and 29 present the statistical significance of the agreement of the three judges on these drawings and indicate the reliability of the judges.

The data suggest that in the low and middle groups the judges were able to make statistically significant agreements on the drawings of the house. In the high group the agreement was significant on the tree and the woman. The agreement of the judges on growth in the total group was statistically significant in the drawings of the house, the tree, and the man. There were no statistically significant group differences in growth when the Exact Chi-Square treatment was applied to the data.

Thus, the data apparently sustain hypothesis four, that there would be no statistically significant differences in growth and maturity among the high, middle, and low groups as reflected in the drawings. However, the data also indicate that in the judgments as to growth in maturity much of the data are statistically significant and thus reliable in the agreement of the judges as to growth in maturity as revealed in the drawings of the individual subjects.

The analysis of the sets of drawings also yielded data on the agreement of the judges as to whether or not the subjects' drawings showed less emotional disturbance at the final testing. TABLE 33 presents the agreements of the judges on the drawings of each of the three groups. Less emotional disturbance in the final sets of drawings was indicated. Since the agreements were statistically significant at the .01 level of confidence for the middle and high groups and .05 for the low group the reliability of the judges was thus indicated. For all three groups the drawings made at the final testing showed less emotional disturbance.

In the comparison of the three groups no statistically significant differences were found. Thus, hypothesis five is sustained. Apparently no group differences in emotional disturbance were indicated by the drawings.

The data on the Goodenough Intelligence Quotients suggest that there was a real gain in mental growth in the total group of subjects. The high group apparently made significantly greater gains than the combined middle and low groups. No significant differences were obtained when the gains of the high mental age group were compared with the low mental age group gains. It was also found that there were no significant differences in gain in mental growth when the comparison was made between the high and low chronological age groups. There was, however, a

tendency for the younger individuals to show gain in mental growth.

Since statistically significant differences in mental growth did occur between the high group and the combined middle and low group, hypothesis six is rejected. However, the more intelligent seemed to make greater gains.

In summary, the findings in this study seem to indicate there were changes both socially and academically in this group of subjects as reflected in the test data during the two-year period of their enrollment in public school classes for trainable mentally retarded children. Statistically significant differences among the low, middle, and high groups of subjects were reflected in the Vineland Social Maturity Scale, the Metropolitan Readiness Test, the Metropolitan Achievement Test, and in mental growth as indicated by the analysis of the Goodenough Test Drawings. Although group differences in growth in maturity as reflected in the drawings were not statistically significant when divided into high and low groups on M.A. and C.A. at first testing, there was a tendency for the judges to agree that there was growth in maturity indicated in the drawings of certain individuals.

Group differences were not significant as reflected in the judgments of emotional disturbance in the drawings. However, the final drawings of all three groups apparently showed less emotional disturbance according to judgments made in this study.

The conclusions for this study were:

1. There were statistically significant differences among the groups in social growth as reflected in the Vineland Social Maturity Quotients.
2. There were statistically significant differences among the groups in academic growth as indicated by the Metropolitan Readiness Tests and the Primary Form of the Metropolitan Achievement Test.
3. The differences among the groups in growth in maturity as reflected in the House-Tree-Person Test and the Machover Draw-A-Person Test were not great enough to indicate that anything but the laws of chance were operating.
4. The differences among the groups in emotional adjustment as reflected in the drawings were not statistically significant, indicating again that probably nothing but the laws of chance were operating. All three groups seemed to show less emotional disturbance, according to the data.
5. There were statistically significant differences among the groups of subjects in mental growth as reflected in the Goodenough Draw-A-Man Test.

6. On the basis of these findings, public school classes apparently may be a contributing factor in the social and academic growth in these children.

CHAPTER VI

SUMMARY AND CONCLUSIONS

The responsibility for providing classes for trainable mentally retarded children has, in recent years, been assumed by many community public school systems with the assistance of the state departments of education. There is considerable concern among educators, parents, and the general public over what type of curriculum to offer this group of children as well as with the evaluation of such programs.

This study is an attempt to evaluate the social and academic changes which occurred in a group of trainable mentally retarded children as a result of a public school program. The subjects for this study were twenty children enrolled in a city public school program for severely mentally retarded children. Ten of these children were males and ten were females. They ranged in chronological age from 9-10 to 19 years. All had been given individual psychological examinations by qualified psychologists. The intelligence quotients for the twenty subjects ranged from 30 to 56 on one of the following: the Wechsler Intelligence

Scale for Children, the 1937 Revision of the Stanford-Binet Test, or the Merrill Palmer Test.

The social and academic changes in these individuals were measured in the fall of the first year and in the spring of the second school year by means of the Metropolitan Reading Readiness Test, the Primary Form of the Metropolitan Achievement Test, the Vineland Social Maturity Scale, the House-Tree-Person Test, the Machover Draw-A-Person Test, and the Goodenough Draw-A-Man Test. All tests were administered individually to the subjects except for the two Metropolitan Tests which were administered in groups of four.

For the analysis of the test data the total sample was divided into low, middle, and high subgroups on the basis of the Vineland Social Quotients obtained at the first test. In order to investigate for statistically significant differences in the Goodenough Intelligence Quotient gains, the subjects were divided first into two groups on the basis of mental age at the first testing, and then into two subgroups on the basis of chronological age at the time of the first testing.

The following hypotheses were tested:

1. That there would be no statistically significant differences among the groups in social growth as reflected in the Vineland Social Maturity Quotients.

2. That there would be no statistically significant differences among the groups in academic growth as indicated by the Metropolitan Readiness Test.
3. That there would be no statistically significant differences among the groups in academic growth as indicated by the Metropolitan Achievement Test scores.
4. That there would be no statistically significant differences among the groups in growth in maturity as reflected in the House-Tree-Person Test and the Machover Draw-A-Person Test.
5. That there would be no statistically significant differences among the groups in emotional adjustment as revealed in the House-Tree-Person Test and the Machover Draw-A-Person Test.
6. That there would be no statistically significant differences among the groups in mental growth as reflected in the Goodenough Draw-A-Man Test.

The results suggest that over a two-year period social and academic changes did occur in this group of trainable mentally retarded subjects as reflected in the test data. Statistically significant differences among the low, middle, and high groups of subjects were reflected by the test scores in the Vineland Social Maturity Scale, the

Metropolitan Readiness, and Metropolitan Achievement Tests, as well as in mental growth as indicated in the analysis of the Goodenough drawings. In the analysis of the Goodenough data, when the subjects were divided into high and low groups on the basis of C.A. and M.A. at first testing, statistically significant differences did not occur between the groups. However, there was a tendency for the Goodenough test data to reflect growth in maturity when individual scores were analyzed. Although the high, middle, and low group test data did not indicate statistically significant differences among the groups, all three groups showed less emotional disturbance on the second test as reflected in the drawings.

On the basis of these findings we can reject hypotheses one, two, three, and six. Hypotheses four and five are sustained.

In conclusion, according to these data, some members of this group did show significant changes in academic and social areas of development during a two-year period of experience in a public school class for trainable mentally retarded children. Additional research is needed to determine how these changes hold up over a longer period of time. Also, it would be desirable to investigate the effects of an intensive program of parent counseling on the rate of social and academic change in severely retarded children. If it were possible to set up a matched control group of

those children who have no opportunity for attending public school classes, research of this type would be desirable.

One of the limiting factors of a study using severely retarded subjects is the choice of measuring instruments. Further research is needed in order to construct new instruments which are standardized on mentally retarded children as well as to standardize existing instruments for use with mentally defective subjects. The evaluation of specific teaching techniques and types of curricula might yield data which would be helpful in developing school programs for trainable mentally retarded children.

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APPENDIX

APPENDIX A

Subjects	C.A. at Intelligence Testing*	Intelligence Quotient	C.A. at First Testing	C.A. at Second Testing
A.	16- 7	40**	17- 1	18- 7
B.	14- 9	45**	14- 3	15- 9
C.	9- 5	46**	11- 1	12- 7
D.	14- 8	43***	15- 5	16-11
E.	13-10	38****	16- 4	17-10
F.	13- 7	34***	15- 3	16- 9
G.	10- 8	36**	12- 3	13- 9
H.	13- 8	30**	15- 2	16- 8
I.	15- 1	45**	16- 9	18- 3
J.	11- 2	49**	11-10	13- 4
K.	8- 4	48***	9-10	11- 4
L.	13- 6	46**	19- 1	20- 7
M.	12- 1	45**	13-10	15- 4
N.	13- 2	48***	14- 10	16- 4
O.	9-11	35***	11- 2	12- 8
P.	10- 5	56**	12- 1	13- 7
Q.	17- 7	36**	19- 3	20- 9
R.	13-11	46**	12-11	14- 5
S.	11- 0	52**	10- 5	11-11
T.	15- 3	46**	14- 9	16- 3

* C. A. at time of psychological assessment.
** Wechsler Intelligence Scale for Children.
*** 1937 Revision, Stanford Binet, Form L.
**** Merrill Palmer Scale.

APPENDIX B

VINELAND SOCIAL MATURITY SCALE -- SOCIAL QUOTIENTS AT INITIAL AND FINAL TESTING PERIODS

Subjects	Initial Testing	Final Testing	Points of Score Change
Low Group			
L.	23	27	+ 4
Q.	23	23	+ 0
H.	24	29	+ 5
E.	25	30	+ 5
O.	25	31	+ 6
F.	26	45	+19
I.	29	38	+ 9
A.	31	51	+20
Middle Group			
G.	33	43	+10
D.	34	52	+18
K.	35	48	+13
N.	36	61	+25
C.	37	52	+15
S.	38	51	+13
P.	39	54	+15
M.	41	68	+27
High Group			
B.	45	64	+20
T.	49	64	+15
J.	53	78	+25
R.	53	61	+ 8

APPENDIX C

GOODENOUGH DRAW-A-MAN TEST

Subjects	C.A. at First Testing	M.A. at First Testing	I.Q. Test 1	I.Q. Test 2
Low Group				
L.	19- 1	4-6	35	40
Q.	19- 3	2-9	21	27
H.	15- 2	4-3	33	37
E.	16- 4	5-9	44	48
O.	11- 2	2-9	25	22
F.	15- 3	3-6	27	33
I.	16- 9	5-3	40	46
A.	17- 1	6-0	46	48
Middle Group				
G.	12- 3	4-9	39	42
D.	15- 5	8-3	63	73
K.	9-10	3-0	31	37
N.	14-10	5-9	44	33
C.	11- 1	4-0	36	36
S.	10- 5	4-3	41	42
P.	12- 1	7-9	64	65
M.	13-10	4-9	37	54
High Group				
B.	14- 3	6-3	48	83
T.	14- 9	8-0	62	75
J.	11-10	8-6	72	85
R.	12-11	5-3	41	44