

~~THE~~  
SCREENING TECHNIQUE FOR THE PREDICTION  
OF ADJUSTMENT TO THE FIRE TRADE

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## CURRICULUM STUDIORUM

Salvatore Cammarata was born March 1, 1926 in Baltimore, Maryland. He received the Bachelor of Science degree in Business Administration from Loyola College, Baltimore, Maryland, in 1949. He received the Master of Arts degree in Clinical Psychology from the Catholic University of America, Washington, D. C., in 1955. The title of his thesis was A Study of the Role of Masculine and Feminine Principles in Music.

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## INTRODUCTION

In recent years, the fields of education and psychiatry have witnessed a strong movement toward the concept of prevention as a means of coping with some of their major problems. For the administrators of public education, whose traditional concern has been the prevention of scholastic failures, there has risen increased recognition of the significance of emotional development for good intellectual performance. Accordingly, present day educational systems are placing more emphasis on programs for the promotion of healthy emotional development and the preparation of its students for adaptation to the problems of stressful life.

The field of Psychiatry, with its high incidence of mental and emotional illnesses and severe shortage of psychiatric personnel, has likewise turned to prevention. As a result, the relatively new field of Preventive Psychiatry, which has as one of its chief goals the prevention of mental and emotional illness by the use of techniques which influence large groups, has gained in stature and use.

The logical target for such preventive programs is the growing child. Because the early formative years of a child's life markedly affect ensuing social, emotional and mental adjustments, educators, child socialists, parents

and all those responsible for the training of the child have become aware of the need for early effective mental health programs. An ideal area that is available for such programs is the primary school. Most of the current work in this area has to do with methods of early detection and treatment of deviant behavior in school children. However, increasing attention has become focused on the pre-school and beginning school child. The latter represents one of the critical phases in a child's early life because of the impact of the experience of beginning school on each child's future academic and personal adjustment. In view of the key importance of the beginning school experience, the need for more preventive programs at this level is clearly indicated. The present study has attempted to provide one such type of practical program.

Consistent with the foregoing, consideration was given to a type of program that would systematically combine the preventive aims of education and psychiatry with the trend toward utilizing methods capable of reaching and influencing large groups, such as are regularly employed in the field of public health. In other words, the idea would be to adapt orthodox public health principles to the fields of education and psychiatry. Such a plan would involve a mass-screening assessment program that would

be applicable to all rather than a selected few of the incoming first grade children and designed for the purpose of preventing future academic and personal adjustment difficulties.

There exists in many of the counties in the State of Maryland an annual pre-school round-up held jointly by the Departments of Health and Education. This round-up actually amounts to a central meeting-place or clinic where all children about to enter the first grade are processed for registration and screened for any physical deficiencies by means of a gross examination by the local health physician and public health nurses. Such a set-up was felt to be made to order for exploitation by expanding it to include psychological services and mental health personnel.

The objectives of the traditional method are to prevent scholastic difficulties and the spread of disease by the early detection and correction of physical deficiencies prior to school entrance. The objectives of the revised round-up would be broadened to include prevention of personal adjustment problems by an assessment of developmental status.

In essence, then, this study has been concerned with the development of a reliable and valid psychological technique with mass-screening specifications that could be feasibly introduced into an existing public health-education

preventive program. The ultimate purpose of the technique would be to screen out for correction and better planning those beginning school children who are likely to have adjustment problems because of their developmental unpreparedness or unreadiness for a regular first grade school setting.

The study begins with a review of the related literature and formulations of the specific hypotheses. Certain central theoretical considerations are then clarified followed by the rationale and description of the screening technique. Subsequently, the design of the study is described emphasizing the traditional and revised pre-school round-up, the sample, the criterion and the statistical methods employed. The statistical results are then presented, interpreted and discussed with special reference to the technique's predictive value and limitations. Finally, the implications and conclusions emanating from the findings are presented.

Included in an appendix are copies of the individual screening tests, detailed specifications and instructions for the administration and scoring of the motor maturity test, and directions for tabulating and interpreting the predicted adjustment scores.

## CHAPTER I

### REVIEW OF THE LITERATURE

Although the literature is replete with theoretical and statistical studies of readiness of one kind or another, to the author's knowledge no systematic work has appeared dealing with the problem of general readiness for school or the mass-screening approach to its determination. Virtually all of the statistical studies reported have involved the construction, refinement and use of specialized developmental instruments designed for circumscribed, intensive appraisals of individuals or groups. Examples of such would be the Stanford-Binet Scales of General Intelligence; the Arthur Performance Scale; the Vineland Scale of Social Maturity; the Oseretsky Tests of Motor Development; and the many popular individual and group tests of aptitude, especially reading readiness. Such individual assessments are available in Child Guidance Clinics, or by school psychologists or specially trained teachers. But this specialized service is not available for the vast majority of children.

An empirical attempt to rectify this situation was made by Banham<sup>1</sup> in 1950 with the publication of the School

<sup>1</sup> L. Banham, K. W., School Readiness Inventory, Philadelphia, Educational Test Bureau, 1950, 3 p.

Readiness Inventory. This inventory, which comes closest to the heart of the present study, "does not constitute a scale of measurement. It is merely an aid for preliminary screening of children prior to, or immediately upon, entrance to first grade in school."<sup>2</sup> Banham's items were selected from well-established developmental scales with some modifications based upon observations in examining several hundred six-year old children in school and Child Guidance Clinics. It is, in reality, a check-list for use as an aid in deciding whether or not certain children are ready to enter the first grade.

Since there is no discoverable statistical evidence of reliability or validity, Banham's Inventory must be considered an unproven instrument. Although the items used in making up the inventory are of proven value in other tests, there is no evidence that the final scores, from which the determination of readiness is made, constitute reliable and valid predictive indices. Neither could this inventory be adopted for use in this study in its present form since it is by no means quick, simple and objective to administer and score. It involves a relatively large number of mental and motor tasks as well as information bearing on the emotional and social accomplishments of a given child which

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2. Ibid., p. 1.

must either be obtained from an informant or by a period of observation in the school situation. Notwithstanding, Banham's Inventory deserves further research efforts inasmuch as it appears to have much merit.

On a smaller scale, Coleman, et al,<sup>3</sup> attempted to predict school readiness and emotional and physical maturity by means of the Goodenough Draw-A-Man Test. They were chiefly concerned with showing whether this test was practical as a predictive device for success in school; and whether the test reflected medical and/or emotional involvements. These researchers had a private-practising pediatrician, who was routinely called upon for pre-school physical examinations, give the Draw-A-Man Test to the children. The test was not administered in the usual way; the child was instructed to make the drawing in another room by himself. The pediatrician scored the drawings himself and also rated the child's physical and emotional maturity. Physical maturity was based on each child's total physical condition; emotional maturity was based on the total experiences with the child and his family. Follow-up testing showed a correlation of .41 with the Metropolitan Achievement Test; .51 with the California Mental Maturity Test;

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3. Coleman, J. M., Iscoe, I., and Brodsky, M., "The Draw-A-Man Test as a Predictor of School Readiness and as an Index of Emotional and Physical Maturity," in Pediatrics, Vol. 24, No. 2, issue of October, 1959, p. 251-256.

and .52 with a reading readiness test. The drawings were evaluated by a psychologist and a graduate student for physical and emotional-social maturity. These evaluations were compared to the pediatrician's ratings with resultant low but significant correlations of the order of .35 and .40. They concluded that a substantial relationship was shown between physical development, state of health, and emotional stability and that "the Draw-A-Man Test would seem to be a useful instrument, suitable for the use in a busy office practice. The utility of this technique as a screening procedure certainly seems warranted."<sup>4</sup>

Within the past decade or so, research studies and theoretical papers began to appear dealing with the prediction of emotional adjustment to school and the early detection of emotional disturbance in children. Lindemann<sup>5</sup> spearheaded this movement which has come to be known as preventive psychiatry.

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4. Ibid., p. 281.

5. Lindemann, Erich, "The Wellesley Project for the Study of Certain Problems in Community Mental Health," in Interrrelations Between the Social Environment and Psychiatric Disorders, New York, Milbank Memorial Fund, 1953, p. 165-184.

The longitudinal study of Lindemann and Ross<sup>6</sup> epitomizes this trend with its focus upon the assessment of emotional readiness of children for kindergarten and the early school years. Theoretically, their program has much in common with the secondary epidemiological goals of the present study. As these authors state, their project "can best be understood in the light of the major emphasis of the Project; namely, to apply to the field of mental illness some of the methods in mass prevention of disease which have been so successful in the field of public health."<sup>7</sup> Their interest is not merely early case-finding; rather, they are even more concerned with discovering "what forms of behavior constitute maladaptive responses to school and what forms appear to be healthy in terms of immediate success, on the one hand, and long range development of personality on the other."<sup>8</sup> Their methods include a standardized clinical examination of the child (doll-play situation) before entering school, parent interviews, systematized observation of the child as part of the interactional constellation in the classroom, teacher ratings,

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6. Lindemann, Elizabeth S., and Ross, Ann, "A Follow-Up Study of a Predictive Test of Social Adaptation in Pre-School Children," Chap. 4, p. 79-93, in Caplan, G., Ed., Emotional Problems of Early Childhood, New York, Basic Books, 1955, xiv-544 p.

7. Ibid., p. 79.

8. Ibid., loc. cit.

teacher interviews, and sociometric data. They are continuing to follow a small, selected sample of fifty children from kindergarten through the early school grades.

A further related project reported by Streitfeld<sup>9</sup> which unfortunately began and ended as a preliminary study, captures the trend toward the integration of the fields of public health, mental health, preventive psychiatry and education. For the purpose of early detection and prevention of emotional disturbance in children, Streitfeld introduced mental health personnel into a pre-school clinic in Canton, Ohio. Procedure-wise, all of the parents of children about to enter school for the first time were notified by mail of the clinic services. For the children whose parents were financially unable to afford a private physical examination, the following free services were made available to them at this clinic; physical examination; dental examination; consultation with a speech therapist; consultation with a member of the County Guidance Center; blood and urine analyses; and immunizations. During the clinic operation, those parents who voluntarily consulted the Guidance Center's representative were interviewed and

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9. Streitfeld, H., Early Detection of Emotional Disturbances in Children Through Pre-School Health Clinics, Unpublished Manuscript read at the American Orthopsychiatric Association Convention, New York, March, 1956, 10 p.

appropriate recommendations rendered, such as advice-giving, reassurance, referral to a community agency, or referral to the Guidance Center. However, the number of such requests were so few that the study had to be considered unsuccessful. Nonetheless, Streitfeld optimistically concluded that "with a more thoroughly prepared groundwork, refinement of screening techniques and a many-faceted follow-up, a psychiatric clinic can make a considerable contribution in combatting mental illness by exploiting the summer round-up of children."<sup>10</sup>

In his paper, Streitfeld criticized his own project principally in terms of the poor response to the announced service. As related to the present study, the major criticisms would pertain to the approach used, the bias of the sample and the restricted emphasis upon emotionally disturbed children. This approach fails to reach the majority of children, healthy as well as disturbed. Moreover, as long as the stigma associated with mental illness persists, it becomes necessary to use indirect rather than direct methods of approaching the problem.

#### 1. Statement of The Problem.

These, then, are various assessment attacks upon the problem of predicting school adjustment. Most of the

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10. Ibid., p. 10.

## REVIEW OF THE LITERATURE

studies have focused upon selected samples of children or isolated aspects of readiness, such as emotional readiness or detection of emotional maladjustment. The only study, by Barham, that attempts to deal with the multiple aspects of readiness as applied to the majority of children is plainly inadequate since no supporting statistical evidence is provided.

Some statistically sound method of assessing the readiness status of the large majority of children would therefore appear to be both helpful and necessary. In order to reach such masses, some type of quick yet effective screening instrument would be required. This study represents an attempt to develop such an instrument. The study also proposes to go one step further by utilizing the public health method as the vehicle for demonstrating the mass-screening function of the technique. The public health approach is one that is singularly identified with the use of the mass-screening method in dealing with problems of early detection, prevention and control. Moreover, use of this approach was considered all the more fitting in view of the growing importance of preventive psychiatry.

### 2. Hypotheses.

Based on the foregoing, then, the following hypotheses were formulated:

1. that a mass-screening technique can be devised and applied to a large incoming population of pre-school children for the purpose of predicting adjustment to the first grade.

2. That psychological services can be adapted to the public health method and introduced into a traditional public health system of mass pre-school physical examinations.

## CHAPTER II

### THEORETICAL CONSIDERATIONS

Before describing the screening technique, certain central theoretical issues pertaining to the hypotheses and criterion will first be clarified.

In large part, this study represented an attempt to validate or repudiate Banham's<sup>1</sup> theoretical and empirical work in the area of preventing academic and personality maladjustment by means of assessing school readiness. What follows, then, is the essence of Banham's hypotheses as elucidated in the introductory explanations to her School Readiness Inventory.

The age of six or thereabouts has been found to be the most suitable for the introduction of children to formal group education. However, chronological age is not always a sufficiently exact indication of intellectual and social maturity to be adequate as a guide to a child's readiness for school. For a child to adjust successfully to school, a number of mature mental, personal, and social-emotional skills and interests are necessary. Most six year old children have reached this level of general

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1. Banham, K. M., School Readiness Inventory, Philadelphia, Educational Test Bureau, 1957, 3 p.

maturity; however, there are many who have not. Some of the latter children may have had or have physical handicaps; some may be slow learners; and some may be socially and emotionally infantile. Whatever the cause, these are the kinds of children who may not be ready for a regular first grade setting. Banham believes that such children are frequently unhappy, may fail to make academic progress because of their dislike of and discomfort in school, and may even develop neurotic and/or delinquent reactions as a result. In short, Banham contends that "maladjustments, due to school entrance before the particular children are mature enough to be ready for it, might possibly be prevented if the developmental level of the children could be ascertained beforehand."<sup>2</sup>

Secher<sup>3</sup> also agrees that setting up requirements beyond the existing developmental level only creates problems in attitudes and habits. For purposes of discussion, Secher classifies readiness into readiness for learning and readiness for reading. With respect to readiness

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2. Ibid., p. 1.

3. Secher, Elena, "Readiness and the Development of Reading Ability at all School Levels," in Education, Vol. 74, No. 9, issue of May, 1954, p. 555-560.

for learning, Socher theorizes that:

Without a state of readiness among learners, most of what may have been developed or taught in a classroom is forfeited. A state of readiness at any particular time has a highly complex nature. It is a composite of a pupil's physical, social, emotional, intellectual and language development. It reflects his past environments, his conditioning, his training, and his knowledge. Moreover, any one of these factors cannot be isolated in reality. They are all highly interrelated in any one child, and the state of relationships may vary in different situations. In any group of children, there will be ranges in differences for each of the factors. The existence of readiness for learning cannot be assumed. It must be assured, first by appraisal and, then, by development. Being fundamental to all instruction, readiness for learning is a basic concern for all teachers at all times and at all school levels.<sup>4</sup>

The concept of readiness implies the element of prediction. To say that a child is ready or not ready involves a prediction of how he or she is likely to adjust. It is, of course, the function of the criterion to indicate the effectiveness or validity of the predictions.

The type of criterion deemed appropriate to this study was that of predictive validity. According to the publication by the Committee on Test Standards of the American Psychological Association:

Predictive validity is evaluated by showing how well predictions made from the test are confirmed by evidence gathered at some subsequent time. The

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4. Ibid., p. 555.

most common means of checking predictive validity is correlating test scores with a subsequent criterion measure.<sup>5</sup>

Three separate criterion measures were obtained and combined into a single composite criterion in the present study. Individually, these measures consisted of academic achievement, sociometric choices, and teacher ratings of adjustment. Combining the criterion measures followed the approach of Smith<sup>6</sup> who combined two such measures -- sociometric nominations and teacher ratings -- in his study of the validity of six personality and adjustment tests of children since "the literature indicates that there are other than adjustment correlates of each of the criterion techniques, therefore a combination of criteria should prove more advantageous than either used separately."<sup>7</sup>

In a word, then, this study was concerned with the development of a rapid screening method that would be substantially successful in predicting the adjustment to the

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5. American Psychological Association, American Educational Research Association and National Council on Measurements Used in Education Joint Committee, "Technical Recommendations for Psychological Tests and Diagnostic Techniques," in the Psychological Bulletin, Vol. 51, No. 2, Part 2, issue of March, 1954, p. 213.

6. Smith, Louis, M., "The Concurrent Validity of Six Personality and Adjustment Tests for Children," in Psychological Monographs, Vol. 72, No. 4, Whole No. 457, 1958, p. 1-30

7. Ibid., p. 5.

first grade of large numbers of children from an appraisal of their general developmental status at the beginning of the first grade. Questions bearing an etiology and treatment are beyond the scope of this study. The screening technique is related to these questions only insofar as it proves capable of detecting those children who may not be ready and who would therefore be referred for more intensive diagnostic study and appropriate remedial action.

With this theoretical exposition as a background, the screening technique will now be described in detail.

## CHAPTER III

### THE SCREENING TECHNIQUE

The first section of this chapter presents the general aims and structure of the technique. The remaining portions deal with the rationale and description of the individual screening tests.

#### 1. General Aims and Structure.

As noted earlier, most systematic assessment programs of readiness today deal chiefly or solely with cognitive factors. Although the importance of such non-cognitive functions as emotional, social and psychomotor readiness is generally acknowledged, little or nothing of an applied nature has been done to tap these factors. The screening technique to be described represents an attempt to demonstrate a systematic and practical assessment program combining all of these variables.

A screening test, by definition, is a sorting out or classification process. Circumstances and goals dictate the desired strenuousness and fineness of discrimination. Because this study involved a mass-screening method, the discriminating power of the technique was limited to rather gross measures. Accordingly, the technique was constructed to conform to these standards. In

addition, the technique was approached as a new one so that the problems of selection, formal organization and quantification of the items and the tests were handled arbitrarily. It will become evident that the newness of the technique lies not so much in its contents as in its formal aspects.

Items were selected for the purpose of measuring success at minimum levels rather than maximum proficiency. This was in line with Banham's assumption that "children who are mentally and developmentally at or below the five year level are likely to find considerable difficulty in adjusting to regular grade school."<sup>1</sup> Thus, there is a massing of items at the lower developmental levels. Such massing, in turn, was also designed to provide ample data for later item analysis and to allow for variations in the reported discriminating values of the items.

The final items were arbitrarily selected from the following sources: established developmental instruments; the writer's own clinical experience with school children; the practical experience of elementary school teachers; and empirical studies as reported in the literature or through personal communication. In the process of selecting, structuring and organizing the tests, attention was focused throughout on the factors of speed, simplicity,

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1. K. M. Banham, School Readiness Inventory, Philadelphia, Educational Test Bureau, 1959, p. 2.

practicability, communicability, interest to the subjects, and objectivity of administration, scoring and statistical treatment.

For practical and statistical purposes, the technique was divided into four separate tests. Actually, it can just as well be viewed as a single test embodying heterogeneous items. It is composed of a variety of intellectual, emotional, social and psychomotor accomplishments of average five, six and seven year old children. For reasons already indicated, the largest proportion of items falls at or below the five year level; the next largest percentage is at the six year level; and the smallest number is at the seven year level.

A more detailed exposition of the rationale and description of the individual screening tests will now be taken up.

## 2. Assessment of Intellectual Maturity

The inclusion of a measure of intellectual development needs but little justification. Ample evidence exists regarding the significant correlation between intelligence test scores and school achievement whether the latter is measured by teachers' judgements or standardized tests. Tyler summarily states, in reference to the regular attainment of correlations from .4 to .6 between measures of

general intelligence and school grades, that "the general consistency of the correlations from first grade through graduate school constitutes impressive evidence that our tests are revealing some general intellectual factor upon which success in school depends."<sup>2</sup> Tyler adds further that higher coefficients are generally obtained when standardized achievement test scores are used instead of school grades.

Seehor contends that:

Mental capacity is significant in learning in that it helps to determine the quality and abstractness of thinking possible (L.S.) Range in intelligence has other implications for readiness. If pupils cannot grasp certain abstractions, placing them regularly in situations which demand such thinking results only in failure.<sup>3</sup>

For the present study, the Goodenough Draw-A-Man Test of Intelligence<sup>4</sup> was used. This test is considered by its author to be a measure of general intelligence based upon the demands it makes on the functions of form visualization, reproduction and abstract conceptualization. The test was also selected for its brevity, familiarity and

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2. Lorna Tyler, The Psychology of Human Differences, New York, Appleton-Century-Crofts, Inc., 1956, p. 86.

3. Elona Seehor, "Readiness and the Development of Reading Ability at All School Levels," in Education, Vol. 74, No. 9, issue of May, 1954, p. 556.

4. Florence Goodenough, Measurement of Intelligence by Drawings, New York, World Book, 1926, xi-173 p.

interest to young children and because of the psychomotor features involved. Furthermore, there is evidence that emotional factors play an important role in the process of conceptualizing and reproducing the human figure. The routine clinical use of human figure drawings supports this belief. As additional support, Machover has indicated that "in the course of administering Goodenough's Drawing-of-a-Man test for usual IQ purposes, it was discovered that careful study of the individual drawings often yielded rich clinical material not related to the intellectual level of the subject."<sup>5</sup> This study was interested in the effects of these emotional factors on the drawings only insofar as they found reflection in the obtained total scores.

In a recent study by Coleman, et al.,<sup>6</sup> the validity coefficient between the Goodenough test and the Primary California Mental Maturity Test was .51; between the Goodenough test and the Metropolitan Achievement Test, the validity coefficient was .41. Both were statistically significant. In the same study, a significant reliability coefficient of .92 was reported when the test was scored

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5. Karen Machover, Personality Projection in the Drawing of the Human Figure, Springfield, Charles C. Thomas, 1949, p. 20.

6. J. N. Coleman, et al., "The Draw-A-Man Test as a Predictor of School Readiness and as an Index of Emotional and Physical Maturity," in Pediatrics, Vol. 24, No. 2, issue of August, 1959, p. 275-281.

independently by a pediatrician and a graduate student. The authors concluded that "it would appear that the (psychometrically untrained) pediatrician can, by following the rules, score the test with a high degree of reliability."<sup>7</sup>

In the present study, the test was administered and scored according to the instructions and norms provided in Goodenough's book. Computation was based on raw scores.

### 3. Assessment of Social Maturity.

School is a social experience par excellence. Great are the social pressures on each child in this situation, especially upon children exposed to social regimentation for the first time. Thompson sums up the views of most child experts on the importance of social maturity:

In our American culture, with its extreme premium on a competitive yet socially acceptable kind of behavior, the socially immature individual has little chance of satisfying either his physical or social needs in an acceptable manner (...). Social maturity in children is sought at the expense of almost every other aspect of psychological growth.<sup>8</sup>

Thompson further underscores the fact that the child's most difficult adjustments involve the behavior of

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7. Ibid., p. 276.

8. George C. Thompson, Child Psychology, Boston, Houghton Mifflin, 1952, p. 443.

other people, and that "in view of the complexity of social adjustments, it is little wonder that the majority of children's problems and maladjustments lie in the social area."<sup>9</sup> It seems reasonable to assume that the achievement of the socially immature child can suffer or be sacrificed regardless of native ability. It is also apparent that school entails far more than simply learning to read and write. Thus, some measure of social maturity was deemed necessary.

There are very few standardized tests of social maturation. The best and most popular one is the Vineland Social Maturity Scale.<sup>10</sup> This instrument is designed to assess the child's development in social responsibility for certain developmental tasks which involve others and for regulating the satisfaction of his needs in a way that is harmonious with those about him. Doll, the author of the test, defines social maturation as "the developmental evolution of behavior as revealed by the integrated expression of experience and learning for successive stages of adequacy in personal independence, interpersonal cooperation and group responsibilities."<sup>11</sup>

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9. Ibid., p. 440.

10. Edgar A. Doll, The Vineland Social Maturity Scale, Philadelphia, Educational Test Bureau, 1946.

11. Edgar A. Doll, The Measurement of Social Competence, Philadelphia, Educational Test Bureau, 1953, p. 55.

In its present form, this test was rejected for this study because of its time-consuming nature and the special training needed for its application. Instead, an adaptation was made by borrowing appropriate items from the Vineland and Benham scales, modifying some of the contents to fit the particular needs of a rural population, and changing the formal structure of the items. The approach of using the mothers of the children as informants was retained.

Adaptation involved the construction of an objective-type test in the form of a twenty-item questionnaire (Appendix 1). Special attention was paid to simplicity of structure, unambiguity of language, and speed and objectivity of administration particularly since it would be given by psychometrically untrained nurses to subjects of varying degrees of sophistication. The questionnaire was individually administered by the public health nurses and psychiatric social worker to the mothers of the incoming children.

A five-point choice followed each item based on the frequency with which that particular personal-social accomplishment or behavior was observed by the informant. This format was further based upon the following working definition of social development by Bridges: "the acquisition of an increasing number of socially acceptable

reactions with regard to others, and in the evolution of more and more adequate or suitable adjustments to social situations."<sup>12</sup>

Twenty items, the number finally used, were decided upon arbitrarily, but influenced by the need to get as generous a sampling as possible within the limited time available. Table I shows the age norms for each item as reported by the Vineland Scale and the Banham School Inventory. It will be recalled that Banham also drew some of her items from the Vineland Scale.

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12. K. M. B. Bridges, The Social and Emotional Development of the Pre-School Child, London, K. Paul, Trench, Trubner and Co., 1931, p. 3.

Table I. Sources and Approximate Age Norms of Social Maturity Questionnaire Items.

ITEM	AGE NORMS	
	Vineland <sup>c</sup>	Benbow <sup>b</sup>
1	5	6
2	5	6
3	5	6
4	5	6
5	5	6
6	5	6
7	5	6
8	5	6
9	5	6
10	5	6
11	5	6
12	5	6
13	5	6
14	5	6
15	5 6 6	6
16	5 6 6	6
17	5 6 6	6
18	6 6 7	6
19	6 6 7	6
20	6 6 7	6

a. Vineland Social Maturity Scale, Philadelphia, Educational Test Bureau, 1946.

b. School Readiness Inventory, Philadelphia, Educational Test Bureau, 1950.

Each item received a score from one to five. The sum of all of the twenty items was the total score for each child. Total scores ranged from twenty to one hundred. Lower scores corresponded to social immaturity; higher scores to higher levels of maturity.

The same administrative procedure was followed by the nurses and social worker. Each mother was handed a copy of the questionnaire and asked to follow along silently as the examiner read aloud both the instructions and every question. After each question, the subject expressed her choice orally and the examiner made the appropriate check. This procedure was followed for three reasons: to speed up the process; to facilitate quick rather than studied responses; and to accommodate less sophisticated subjects. The examiners were instructed to refrain from discussing or explaining items but to sympathetically encourage a choice as quickly as possible. As an explanatory introduction and to combat the natural resistance inherent in all such tasks, the following standardized instructions were employed:

The following questions are being asked in order to give the school a better understanding of each child so that individual attention can be given where and if needed.

These questions are being tried out for the first time so we know they have many weaknesses. It is not expected that your child will have reached the highest level on all of the items.

Each question is followed by five possible answers. Choose the one which you think best fits your child and please try to make your choice as quickly as you can.

#### 4. Assessment of Emotional Maturity

Unresolved emotional problems constitute a barrier between the individual and productivity irrespective of age or pursuit. With regard to young children just entering school, such difficulties include retarded emotional development as well as emotional disturbance. Both can result in maladaptive reactions to the academic and non-academic demands of the school situation.

In this study, a rating scale of overt behavior was used as the instrument of measurement. The scale consisted of four traits (arbitrarily entitled Willingness, Self-Confidence, Adaptability and Emotional Control) designed to represent varying manifestations of emotional maturity or integration (Appendix I). The traits themselves and the frames of reference adopted by the writer who did the ratings were derived from the following theoretical and research sources.

Bridges adopted the following working hypotheses:

Emotional development consists in the decreasing frequency of intense emotional responses, in the progressive transfer of responses to a series of stimuli determined by experience and social approval, and in the gradual change in the nature of the

overt responses in accordance with social dictates (...). Emotional development is taken to mean increase in ability to adjust to emotion producing situations in both a biologically and socially adequate way.<sup>13</sup>

This viewpoint was reflected in the traits of adaptability and emotional control.

Consideration was given to the concepts of ego-strength and emotional maturity as described by Fenichel<sup>14</sup> and Saul.<sup>15</sup> These authors point out that with walking, talking, improved coordination, a grasp of reality, and development of thought comes increasing independence from the parents. They also refer to such characteristics as self-control, ability to tolerate tension, lack of irrational inhibitions and fears, flexibility and adaptability, and minimal hostility. These concepts were represented in the traits of emotional control, self confidence and adaptability.

Lindemann and Ross maintained that "the emotional readiness of a child for kindergarten could be measured in terms of ability to control affect sufficiently to work

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13. Ibid., p. 4.

14. Otto Fenichel, The Collected Papers of Otto Fenichel, Second Series, New York, Norton, 1954, p. 25-48.

15. Leon J. Saul, Emotional Maturity, Philadelphia, Lippincott, 1947, p. 3-22.

freely on the task at hand.<sup>16</sup> In proof of this contention they used a doll-house situation with play as the task. Each child was rated by a trained observer on the basis of four variables: the ease with which the child separated from the mother; the extent to which the child controlled his emotions (positive and negative); the amount of unusual behavior (tics, gestures, demanding, etc.); and the number of special demands made on the experimenter. They hypothesized that the well-adjusted child would be able to relate in a positive way to the doll-house and its residents and give evidence of finding the play a satisfying experience; while the child who had unresolved conflicts in his family setting would be unable to play freely, or would find it necessary to express an undue amount of affect in his play. Gruber provided a working baseline for this procedure by

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16. Elizabeth B. Lindemann and Ann Ross, "A Follow-Up Study of a Predictive Test of Social Adaptation in Pre-School Children," Chapter IV, p. 82, in G. Caplan, Ed., Emotional Problems of Early Childhood, New York, Basic Books, 1955, xiv-304 p.

positing that the well-adjusted child

is expected to have some reservation in leaving the mother, but to be able to overcome it. His attitude towards the stranger who invites him to the playroom is again reserved, but not unduly hostile or excessively friendly. Once in the playroom, where he becomes aware of what the situation is, he becomes engrossed in the play. He expresses his feelings through the dramatic situation he is creating, he verbalizes his play, and smiles occasionally. His body movements are free and fluid rather than stilted and awkward. The poorly adjusted child may present the reverse of any or all of the above features; the tendency seems to be toward showing clusters or patterns of this kind of behavior.<sup>17</sup>

The traits of emotional control and willingness embody this orientation.

The traits of adaptability and willingness also evolved from the inherent requirements of the school situation itself. Thus, the child will be expected to sit still for periods of time, conform to rules and routine, have some degree of sustained attention, work through tasks to completion, and sacrifice his own needs in the interest of group harmony. Similarly, willingness included the elements of interest and motivation which play an important part in the whole learning process.

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17. Sigmund Gruber, "The Concept of Task-Oriented Behavior in the Analysis of Play Behavior of Children Entering Kindergarten," unpublished manuscript, Wellesley Hills, December, 1952, quoted in G. Kaplan, Ed., Emotional Problems of Early Childhood, New York, Basic Books, 1975, p. 84.

In the study by Coleman, et al.,<sup>18</sup> the traits of willingness and self-confidence were approximated. It will be recalled that they had a pediatrician rate the emotional maturity of a number of children. Ratings were based upon the total experiences with the child and his family in the course of the child's physical examination and elicitation of the health history. Thus, "a child who was alert, responsive and showed no fears might be given a rating of one. A child who was fearful, cried at the examination, clung to the parents, and showed poor responses might be rated four or five, depending on severity."<sup>19</sup>

There is, of course, much that is distinctive yet overlapping among these viewpoints and methods. The present rating scale represented an attempt synthesis of the above approaches into four hypothetically different traits.

In the present study, the ratings were based entirely on the child's behavior during the psychological screening examination and his interaction with the experimenter. No systematic effort was made to assess parent-child interactions. At times, such observations were unavoidable as in the case of a recalcitrant child and/or an over-involved mother. Such impressions naturally crept into the final ratings.

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18. J. M. Coleman, et al., op. cit.

19. Ibid., p. 277.

The rating procedure for each trait consisted of checking a point along a horizontal line ranging from good to poor. All four traits were rated at the same time; immediately after the last item of the motor examination and before the next subject was seen. Each horizontal line was later divided into four equal intervals for scoring purposes. An ordinary ruler was used to determine in which of the intervals the check-mark had been placed. Each trait was scored from one to four. Total scores ranged from the lowest possible score of four to the highest possible score of sixteen. Lower scores corresponded to emotional immaturity; higher scores to higher levels of maturity.

#### 5. Assessment of Motor Maturity

Inclusion of an assessment of psychomotor functioning was deemed essential because of its important relationship to social, scholastic and personality development. In this regard, Hurlock states that "delayed motor development is serious, not only because it keeps the child from reaching the stage of independent action when he normally should, but primarily because it interferes with the social development of the child."<sup>20</sup> Child experts are agreed that the earlier the better for a child to be able to control his

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20. Elizabeth Hurlock, Child Development, New York, McGraw-Hill, 1956, p. 167.

body as well as, if not better than, peers. Some of the often-cited reasons behind this belief are summarized by Hurlock<sup>21</sup> as follows: first of all, motor activities are a source of self-amusement and self-entertainment; secondly, through motor development children go from helplessness to a life of independence and self-reliance which enhances self-confidence and happiness; thirdly, motor development is important in a child's school adjustment since motor abilities play a crucial role in many of the intellectual pursuits of childhood; fourthly, the majority of social contacts are made through play which is most often in the form of motor activities; and, finally, motor development is important to a child's self-regard and self-concept.

The motor items used in this study were selected from and fashioned after the theory and test of motor development of Oseretsky<sup>22</sup>, the later American adaptation of this test by Cassel<sup>23</sup>, and the normative study on American

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21. Ibid., p. 138-141.

22. H. Oseretsky, Oseretsky Tests of Motor Proficiency, translated by E. J. Posa, edited by E. A. Doll, Minneapolis, Educational Test Bureau, 1946.

23. Robert H. Cassell, "The Vineland Adaptation of the Oseretsky Tests," in the Training School Bulletin, Monograph Supplement, Volume 46, Nos. 3-4, 1949, p. 1-32.

children by Holbrook<sup>24</sup>. There are a number of standardized performance tests available from which items could have been drawn. However, these were bypassed because of their high correlation with intelligence and their narrow academic focus. Contrariwise, the Oseretsky tests are based on a theory of motor maturation comparable, it is surmised, with the Binet-type tests in the intellectual sphere. Thus, the Oseretsky tests, inasmuch as they represent a developmental theory of motor functioning, seemed well-suited to the need of the present study.

There is reported evidence that the Oseretsky tests show a low correlation with intelligence. One of the chief purposes of Cassel's<sup>25</sup> adaptation was to eliminate the intelligence factor. Likewise, Holbrook<sup>26</sup> found no significant correlation with intelligence in her developmental study of children between the ages of four and twelve.

Oseretsky<sup>27</sup> postulates six types of motor functioning. They are presented in Table II.

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24. S. F. Holbrook, A Study of the Development of Motor Abilities Between the Ages of Four and Twelve, Using a Modification of the Oseretsky Scale, Microfilm, Publication No. 5537, Ann Arbor, Michigan, 1953, 195 p.

25. Robert H. Cassel, op. cit.

26. S. F. Holbrook, op. cit.

27. N. Oseretsky, op. cit.

Table II. Types and Definitions of Motor Functioning, according to Oseretsky<sup>a</sup>

Functions	Definitions
Simultaneous Voluntary Movements	ability to do a task with two different sets of muscles
General Static Coordination	body balance
Dynamic Manual Coordination	manual ability
General Dynamic Coordination	agility and strength of the whole body movements
Speed	manual speed
Synknesia	ability to perform a task with one set of muscles without superfluous movements of other muscle groups

a. N. Oseretsky, Oseretsky Tests of Motor Proficiency, edited by E. A. Dell, Minneapolis, Educational Test Bureau, 1946.

Holbrook's normative study, which eventually incorporated a large number of the Oseretsky tests, led to the conclusion that "the Oseretsky items proved to be considerably better than most of those which had been added as alternate tasks. As work went on with the scale, the writer's respect for the quality of the test items used by Oseretsky increased both from the standpoint of administration and their discriminating value.<sup>28</sup>

For the present study, sixteen items were assembled to make up the test of motor maturity (Appendix I). The following table shows the functions, sources of each item, and their variously reported discriminating values.

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28. S. F. Holbrook, op. cit., p. 31.

Table III. The Functions, Sources and Discriminating Age Values of the Test of Motor Maturity.

Item	Function	Scale	Discriminating Value
1	Simultaneous Voluntary Movements	Oseretsky	5
		Holbrook	6
2	Simultaneous Voluntary Movements	Oseretsky	5
		Cassel	7
3	Dynamic Manual Coordination	Holbrook	5.4
		Oseretsky	8
4	Dynamic Manual Coordination	Holbrook	6-7
		Oseretsky	5
5	Synknesia	Oseretsky	5
6	Similtaneous Voluntary Movements	Holbrook	5.2
		Oseretsky	8
7	Dynamic Manual Coordination	Banham	6
		Oseretsky	6
8	Dynamic Manual Coordination	Holbrook	6
9	General Dynamic Coordination	Holbrook	5-6
10	General Dynamic Coordination	Holbrook	5
11	General Dynamic Coordination	Holbrook	6
12	General Static Coordination	Holbrook	5.3
		Oseretsky	5
13	General Static Coordination	Holbrook	5.2
		Oseretsky	6
14	General Static Coordination	Holbrook	5-6
15	General Static Coordination	Holbrook	5.4
		Oseretsky	5
16	General Dynamic Coordination	Holbrook	5.6
		Oseretsky	5

Items were selected on the basis of their discriminating values and the factors of brevity, simplicity of instructions, safety, practicability, interest value and objectivity of administration and scoring. The functions included and the incidence of each were made roughly proportionate to their representation on the other scales. Thus, for example, the functions of speed and synaesthesia appear very infrequently in the other scales at these early age levels.

The items were administered in the sequence shown on the test blank. They were arranged in this order for reasons of speed and efficiency, and with the aim of gaining the child's immediate interest and attention.

With the exception of items seven and nine, no major changes were made in the administration and scoring procedure as formulated by the authors of the other scales. Item seven, tossing a ball into a hat from a distance of nine feet, seemed from just a glance to be exceptionally difficult. Item nine, jumping with feet together over a rope held at heights of eight and sixteen inches appeared, respectively, to be too easy and too difficult. Moreover, the latter height seemed somewhat hazardous. These suspicions were confirmed by a number of pilot trials before the study began. As a result, the distance in item seven was reduced to three feet; and the height of the rope was

changed to twelve inches.

Instructions were standardized. Each item constituted an all-or-none task so that an item was either passed or failed. Success on an item received a score of one; failure yielded a zero. Total scores ranged from zero to sixteen. As with the other tests, ascending scores corresponded to increasing levels of maturity. The instructions, description of items and equipment, and the scoring criteria for each item may be found in Appendix 2.

In the next chapter, the overall design of the study is described.

## CHAPTER IV

### DESIGN OF THE STUDY

This chapter presents the general plan of the study followed in order by descriptions of the traditional and revised pre-school round-ups, the sample, the criterion and the statistical methods employed.

#### 1. Organization of the Study.

The study was divided into two major parts: the pre-school assessment and the follow-up evaluation.

The pre-school assessment consisted of individual examination of a large number of children about to enter the first grade and their mothers.<sup>1</sup> The four predictor tests were administered on a mass-screening basis by a team composed of a psychiatric social worker, three public health nurses and a psychologist (the writer). To demonstrate the feasibility of such a system, the assessment was actually incorporated into and carried out in a traditional public health operation; namely, an annual, county-wide, pre-school clinic.

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1. There were only two exceptions. Both were grandmothers but longtime residents in the home for at least three years.

The follow-up evaluation involved the gathering of the criterion or validating data of the overall adjustment of the same children at the end of the first grade.

Before detailing the revised procedure, a brief description of the orthodox round-up will first be presented.

## 2. The Annual Pre-School Round-Up.

The pre-school round-up is an annual, large scale public health service conducted jointly by the County Health Department and the Department of Education for the purpose of school registration and provision of services for free physical examinations. Held at the end of the preceding academic year, the Health Department team of physician and public health nurses travels to each of the county schools. A make-up or over-flow clinic is held at the Health Center during the summer months for those families failing to attend the original clinic.

The parents of the children are notified in advance by mail of the date, time and place of the round-up. To reduce congestion and unnecessary waiting, staggered appointments are given at the time of notification. Although attendance is not compulsory, between eighty-five and ninety per cent response has been consistently achieved over the years. Whether this service is utilized by the families or not, each child must be registered and have a physical.

examination before being accepted into the first grade.

The health physician, with assistance in the larger schools from local medical practitioners, perform the routine physical examinations on the children. The nurses secure each child's health history from the mother and obtain measures of height, weight and vision. Lay women volunteers from the community are usually on hand to aid the nurses in their duties while also serving as traffic expeditors.

Representatives of the school include the principal and the first grade teacher(s). The principal serves as coordinator and receptionist while the teacher interviews each mother for purposes of registration and obtaining certifying data of eligibility for school.

This, briefly, is a description of the basic structure of the round-up into which the new service and team members were to be incorporated. To do so involved the following changes.

### 3. The Annual Pre-School Round-Up: Revised System

Advance notification proceeded as before. On the assumption of a high rate of attendance, no forecast of the study was given. Adherence to staggered appointment times, however, was underscored and encouraged.

The functions of the health physician and school personnel remained unchanged. The first departure from the customary routine involved the services of the nurses and psychiatric social worker. In addition to their regular functions, the nurse's interview with the mothers was extended to include the administration of the social maturity questionnaire. In both of these tasks, the health interview and questionnaire, the nurses were joined by the social worker.

By far, the most radical departure involved the individual administration by the writer of the remaining three screening tests. This required extra space, additional planning and the cooperation of the other team members in terms of timing and maintaining the steady flow and direction of the children. By means of prior planning, it was possible to test each child in an atmosphere of complete privacy. In order to obtain this privacy and still be near the center of operations, such adjoining places as unoccupied classrooms, principal's offices and health rooms were used. In one small school, testing was done on an outside covered porch; at another, an oversized coat-room was used. An area of at least six feet by sixteen feet was required.

In essence, the revised program of the Round-Up was as follows. All of the activity took place in adjoining, easily reached rooms so that a reasonably high degree of control and communication could be maintained. As the mother and child entered the school, they were greeted by the principal who directed the mother to the teacher for registration and the child either to the physician or nurse. After registering, the mother was sent for the health interview to whomever was free at the moment. As soon as the physician and nurses completed their services on a child, the child was sent for psychological testing. The latter was planned as the final step of the whole operation and while the mothers were busy being interviewed.

This was the master plan and the procedure most generally followed. However, in dealing with such large numbers of subjects and daily changes in physical surroundings, flexibility was a necessity. Consequently, it was not unusual for some children to reach the psychological testing room before the start or completion of the other services.

Play materials were available to help keep idled children occupied and accountable. In addition, the experienced nurses and principals did a masterful job of monitoring the flow of the mothers and children to the various stations.

During the round-up, each child was ushered individually into the testing room by one of the nurses or volunteer workers. Mothers were excluded from the testing room. An attempt was made to create the impression of a play situation. Since time was a factor and because adaptation to the new situation and the examiner was being rated, no explanation was given to the child as to the nature or purpose of the study. Each child was greeted in a quiet but friendly manner and instructed to sit at a flat-topped, primary school desk. Reassurance was given when necessary but excessive encouragement and coercion were avoided. Once seated, the child was first asked to "Draw-A-Man." This was immediately followed by the sixteen-item motor test the items of which were ordered in such a way that the first six tasks were performed by the child in the seated position while the final ten were executed in the standing position away from the desk. Once finished at the desk, therefore, the child never again returned to it. Upon completion of the motor items, the child was dismissed and the behavior rating scale was scored by the examiner before the entrance of the next child. This entire procedure took an average of about five minutes.

The screening data was collected on three separate occasions: at the round-up; the summer make-up clinic; and during the first two weeks of school. All of the mothers

were evaluated at the round-up and make-up clinic with the greater percentage (90%) obtained at the round-up. The children were all tested in their respective school settings. Roughly two-thirds of the children were tested at the round-up; the remaining one-third were examined during the first weeks of school. Thus, for this one-third of the sample an error was introduced in terms of a gap of one to three months between the time the mothers of these children were examined and the testing of their children. This discrepancy was caused by the fact that in the larger schools the relatively longer time needed for the psychological screening as compared to the other examinations gradually accumulated into a build-up of children waiting to be tested. Such was not the case in the smaller schools. Rather than cause undue inconvenience to the other personnel and the waiting parents, or shorten the technique on the spot, it was decided to test every other child in the large schools and defer the remainder until the opening of school. This situation could have easily been corrected by using two examiners for the psychological testing since there were two or more examiners sharing in each of the other services.

Evaluation of the mothers was unquestionably the critical issue at this point since they would never again be so accessible. Fortunately, no problems arose here and every mother in attendance was handled with comparative

case.

#### 4. The Sample.

The sample comprised the total incoming school population of white boys and girls and their mothers in a rural Maryland county. The children ranged in age from five years and seven months to six years and six months with a mean age of 6.07 years. According to the law of this county, every child who has reached or will reach the chronological age of six years by December 31 of a given year must begin school that same fall. The subjects were obtained from all of the eight white elementary schools in the county. In all, the final sample consisted of 176 children and their mothers; or roughly eighty-five per cent of the total first grade enrollment at the opening of the 1957-58 school year.

Queen Anne's County<sup>2</sup> is next to the smallest of the twenty-three counties in the State of Maryland. It has a land area of 373 square miles and is located in the central part of the Eastern Shore of Maryland. The Eastern Shore, as it is popularly known, consists of nine predominantly rural counties and is separated from the main or western shore of the State by the Chesapeake Bay. As of 1957, the

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2. Maryland State Planning Commission, Economic County Data Book for Maryland, Third Revision, June, 1957, Publ. No. 66, 53 p.

official population of Maryland was 2,343,001. Queen Anne's County had a population of 14,579 and a population per square mile of 39.1. Agriculture and seafood are the county's chief sources of income. Vegetable canneries constitute the major part of the county's industrial activities. The County Seat and largest town is Centreville with a population of 1804. Approximately twenty-three per cent of the population live in seven incorporated municipalities. The proportion of county area in farms in 1954 was 82.1 per cent. The average size of farms was 200 acres.

The following table presents a breakdown of the sample distribution in the various schools:

Table IV. Breakdown of the Sample Distribution of 178 Children According to Schools.

School	N
Church Hill	19
Centreville	42
Crumpton	13
Grasonville	19
Kent Island	30
Queen Anne	6
Queenstown	12
Sudlersville	37

A number of factors prevented the attainment of a complete sample. These included later student transfers into the county; later student transfers out of the county; failure of a family to make use of the service; and untestable children, due either to uncooperativeness or gross physical or mental handicap. In the final analysis, representativeness was assumed on the basis of the size of the sample and the apparent unselectivity of the intervening sampling variables.

#### 5. The Criterion

The second and last phase of the study, follow-up testing, was carried out during the final weeks of the academic year in the respective school settings. Only the children originally screened were the subjects on this occasion. Testing by the writer took place during regular school hours. The teachers' ratings were made on their own time and the completed forms were forwarded to or picked up by the writer.

Three measures of overall adjustment were obtained; one measure of academic achievement and two measures of emotional-social adjustment.

The Metropolitan Achievement Test<sup>3</sup> was used as the measure of academic achievement. This popular, well-standardized group test was chosen after consultation with several of the first grade teachers near the end of the school year. They all agreed on the choice of this instrument on the basis of its format and closeness to local curricular standards. The Metropolitan is made up of four sub-tests: Word Pictures; Word Recognition; Word Meaning; and Numbers. Results are expressed in Grade Score Equivalents for each sub-test and Average Grade Score Equivalents for the sub-tests combined. The latter were used in the final computations.

Two separate measures of non-academic adjustment were secured. One involved teachers' ratings of the individual children; the other consisted of sociometric choices by the children.

The teachers' appraisals of adjustment involved the rating of each child on a total of six traits; namely, cooperation in the group; ability to work independently; relationship with other children; leadership; perseverance in assigned task; mood. The scale employed is one of the teacher rating forms being used in the research work of

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3. Gertrude H. Hildreth, Metropolitan Achievement Tests, Primary I Battery, Form B, New York, World Book Company, 1946.

Lindemann and Ross<sup>4</sup> at the Wellesley Human Relations Service. This scale was developed in the course of their longitudinal pre-school study for the identical purpose of determining the adjustment of children at the end of the first grade. Their battery of criterion measures also includes sociometric choices, sociograms based on observed social inter-action in the classroom, and global teacher ratings.

The use of sociometric status as a reliable and valid gauge of adjustment has gained in popularity in recent years. French<sup>5</sup> showed the existence of relationships between group acceptance of an individual, measured sociometrically, and other indications of individual

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4. Elizabeth Lindemann and Ann Ross, Teacher Rating Form, Unpublished Scale, personal communication, Wellesley Human Relations Service, April 1958.

5. Robert L. French, "Sociometric Status and Individual Adjustment among Naval Recruits," in the Journal of Abnormal and Social Psychology, Vol. 46, No. 1, issue of January, 1951, p. 64-72.

adjustment. Cox proved that:

It is now possible to measure adjustment in terms of inter- as well as intra-individual criteria. A particularly useful technique in this field is Moreno's sociometric questionnaire; not only does it yield reliable and valid results, but it also permits precise, quantitative estimates to be made of group acceptance.<sup>6</sup>

Procedure-wise, each child was asked to give the names of those children in his class whom he would most like to have join him in three different social activities. This testing was done in complete privacy later the same day of the achievement testing. The activities themselves were selected in the following way: four first grade teachers from a nearby county were each given a list of eight pertinent activities and asked to rank them on the basis of social importance to first grade children. The three activities receiving the highest rankings were used. These included invitations to one's birthday party and choices of classmates with whom to work and with whom to play.

Each child was allowed a free number of choices as recommended by French who found that "this gives a better status measure in terms of correlation with a paired

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6. F. N. Cox, "Sociometric Status and Individual Adjustment Before and After Play Therapy," in the Journal of Abnormal and Social Psychology, Vol. 46, No. 3, Issue of July, 1953, p. 354.

comparisons technique than does the more common practice of specifying a particular number of choices."<sup>7</sup>

## 6. Statistical Methods

In consonance with the predictive and mass-screening aims of the study, the statistical treatment of the data consisted of the following steps:

1. Multiple correlation between the four variable predictor battery and the composite criterion; derivation of the multiple regression equation and standard error of estimate.

2. Item analysis between each test battery item and the composite criterion.

3. Multiple correlation between the predictor battery after item-analysis and the composite criterion; derivation of the multiple regression equation and the standard error of estimate.

4. Expression of the relationship between the predicted criterion scores and obtained criterion scores in a predictive scheme suitable for easy application and interpretation.

The results and discussion of these results will now be presented.

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7. Robert L. French, op. cit., p. 64.

## CHAPTER V

### STATISTICAL RESULTS

This chapter includes the presentation and interpretation of the statistical findings and data on the reliability of the tests in the predictor battery.

#### 1. Multiple Correlation

The Deolittle<sup>1</sup> method was used in the computation of the multiple correlation. Examination indicated that all of the variables were generally normally distributed so that the Pearson product-moment formula was applied in arriving at the intercorrelations. To make all of the distributions comparable raw scores throughout were converted to T scores. The results of the intercorrelations are presented in Table V.

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1. Quinn McNemar, Psychological Statistics, New York, Wiley and Sons, 1949, p. 156-160.

**Table V. Correlation Matrix for all Predictor and Criterion Variables and Composite Criterion Before Item Analysis.**

	Social Mat'y	Motor Mat'y	Emot. Mat'y	Socio- Metric	Teach. Rat'gs	Ach't. Criter.	Comp. Criter.
Good- enough	.30	.40	.33	.39	.42	.52	.58
Social Mat'y		.24	.28	.36	.46	.27	.48
Motor Mat'y			.42	.36	.42	.38	.47
Emot. Mat'y				.25	.33	.22	.34
Socio- Metric					.49	.43	
Teacher Ratings						.66	

All of the correlations in the table were significant at the .01 level. To be significant at this level of confidence, a correlation needed to be .20 or higher. With two exceptions -- correlations of the order of .10 -- the intercorrelations of the predictor tests were all low. They were, therefore, accepted as being sufficiently low to satisfy the desired criterion of independence. At this point, of course, it was hoped that the item analysis would be instrumental in reducing the magnitudes of these intercorrelations.

The moderately high correlation of .40 between the Goodenough and Motor tests may be due to the large motor component at play in the execution of the Goodenough test. The correlation of .42 between the motor and emotional maturity tests may be attributable to the originally hypothesized relationship between motor facility and emotional development. In the final analysis, however, this latter correlation loses its practical significance since the behavior rating scale was ultimately eliminated from the screening battery, as will be clarified later.

From the correlation matrix, a multiple R of .674 and a standard error of estimate of + 7.26 resulted. This R was highly significant beyond the .01 level. The

following multiple regression equation was also derived:

$$X^* = .4752X_2 + .1348X_3 + .4016X_4 + .0431X_5 - 1.83$$

where:

- $X_2$  - Goodenough Test
- $X_3$  - Social Maturity Test
- $X_4$  - Motor Maturity Test
- $X_5$  - Emotional Maturity Test

Inspection of Table V reveals that the correlations between the predictor tests, taken individually, and the composite criterion ranged from a low of .34 to a high of .58. In optimum combination, the correlation was increased to .698.

## 2. Item Analysis of Predictor Tests.

With the mass-screening aim of the study in mind, the following steps were taken as a means of shortening and perhaps increasing the effectiveness of the technique. The first step was the decision to drop entirely the test of emotional maturity ( $X_5$ ) from the screening battery. Two factors led to this determination. First of all, a look at the regression equation revealed that the contribution of this test to the criterion variance was negligible; and, secondly, the low reliability of the rating scale added to its already limited value.

The next step consisted of an item analysis based on a total of thirty-six items: the twenty items from the

social maturity test and the sixteen items from the motor test. Each of the thirty-six items was dichotomized at the mean and correlated with the graduated criterion. With the variables in this form, the bi-serial method was applied.

In Tables VI and VII, the results of the item analysis are reported:

Table VI. Discrimination Levels and Item Analysis of the Social Maturity Test for 178 Subjects.

ITEM	%Pass	%Fail	$r_{bis}$	Confidence Levels
1	.51	.49	.21( $\pm$ .09)	S>.05; NS<.01
2	.76	.24	.01	NS
3	.35	.65	.19( $\pm$ .09)	S>.05; NS<.01
4	.61	.39	.28( $\pm$ .09)	S>.01
5	.56	.44	.20( $\pm$ .09)	S>.05; NS<.01
6	.51	.49	.18( $\pm$ .09)	S>.05; NS<.01
7	.52	.48	-.02	NS
8	.74	.26	.07	NS
9	.60	.40	.05	NS
10	.58	.42	.12	NS
11	.54	.46	.02	NS
12	.72	.28	.21( $\pm$ .09)	S>.05; NS<.01
13	.61	.39	-.05	NS
14	.70	.30	.17	NS
15	.53	.47	.23( $\pm$ .09)	S>.01
16	.60	.40	.21( $\pm$ .09)	S>.05; NS<.01
17	.67	.33	.15	NS
18	.48	.52	.07	NS
19	.51	.49	.07	NS
20	.54	.46	.04	NS

Table VII. Discrimination Levels and Item Analysis of the Motor Maturity Test for 173 Subjects.

ITEM	%Pass	%Fail	$r_{bis}$	Confidence Levels
1	.62	.35	.22( $\pm$ .09)	$S > .05$ ; $NS < .01$
2	.19	.81	.31( $\pm$ .10)	$S > .01$
3	.56	.44	.50( $\pm$ .08)	$S > .01$
4	.80	.20	-.14	NS
5	.98	.02	.01	NS
6	.77	.23	.26( $\pm$ .09)	$S > .01$
7	.40	.60	.83( $\pm$ .01)	$S > .01$
8	.30	.70	.13	NS
9	.74	.26	.62( $\pm$ .07)	$S > .01$
10	.70	.30	.23( $\pm$ .09)	$S > .05$ ; $NS < .01$
11	.25	.75	.30( $\pm$ .10)	$S > .01$
12	.56	.44	.25( $\pm$ .09)	$S > .01$
13	.76	.24	.16	NS
14	.12	.88	.08	NS
15	.67	.33	.18( $\pm$ .09)	$S > .05$ ; $NS < .01$
16	.66	.34	.06	NS

As illustrated in Tables VI and VII, eighteen of the thirty-six items were eliminated by the item analysis. Of the eighteen items retained, nine correlated significantly with the criterion beyond the .05 level but not beyond the .01 level while the remaining nine items were significant beyond the .01 level. These eighteen items were then combined with the Goodenough test to constitute the refined version of the screening technique.

### 3. Multiple Correlation After Item Analysis.

The original test protocols were then rescored on the basis of these eighteen selected items only. After again converting all raw scores to T scores, the following results were obtained:

Table VIII. Correlation Matrix for the Predictor Variables and Composite Criterion after Item Analysis.

	Social Maturity	Motor Maturity	Composite Criterion
Goodenough	.26	.34	.58
Social Maturity		.24	.46
Motor Maturity			.45

Even though the intercorrelations of the predictor tests remained significant and positive, it can be seen from Table VIII that the item-analysis was successful in generally reducing the sizes of the intercorrelations and thereby increasing their independence.

Computation of the new multiple R, standard error of estimate and the multiple regression equation resulted as follows:

$$R_{1.234} = .70$$

$$SE_{est} = \pm 7.19$$

$$X' = .434X_2 + .294X_3 + .251X_4 + .69$$

where:

$X_2$  = Goodenough Test  
 $X_3$  = Social Maturity Test  
 $X_4$  = Motor Maturity Test

This new multiple R was also highly significant beyond the .01 level. The most obvious conclusion from these findings is that the sizeable reduction in the length of the screening battery did not alter its validity.

#### 4. Relation Between Predicted and Obtained Criterion Scores.

Each subject's predicted criterion score was computed from the multiple regression equation and expressed in T-score form. Obtained criterion scores were also in T-scores. Instead of using the customary standard error of

estimate to express the relationship between the predicted and obtained criterion scores -- which in the present case would mean that the chances are two in three that the forecast of a subject's score will not miss the actual score received by more than plus or minus seven score points -- the following percentage table (Table IX) was used as a substitute. Construction of this table was preceded by dividing the scores of both criterion distributions into thirds: lowest, middle, and highest.

Table IX. Percentage of 178 Subjects in each Obtained Criterion Score Group According to Predicted Criterion Score Group.

Percent of Subjects in Obtained Criterion Score Group				
Predicted Criterion Score Group	Lowest Third 23-43	Middle Third 45-54	Highest Third 56-78	N
Highest Third 54-72	2%	38%	60%	55
Middle Third 47-53	27	49	24	67
Lowest Third 29-46	55	41	4	56
N	50	77	51	

What are easily the most striking findings from Table IX, especially from the standpoint of practical significance, are the low percentages of false positives and false negatives: two percent of false positives and four percent of false negatives. Such evidence of the discriminating power of the screening battery lends additional support to the hypothesis of the study.

Table IX would seem to warrant the following interpretations:

1. of those subjects who scored in the highest third on the test battery, 98% of them made an average or above-average adjustment; or, the probability is extremely high that a child who scores between fifty-four and seventy-two on the screening battery will make at least an average adjustment and probably an above-average adjustment.
2. of those subjects who scored in the lowest third on the test battery, over half made a poor adjustment; or, a child who scores between twenty-nine and forty-six on the test battery has a less than fifty-fifty chance of making an average adjustment and a very small chance of making an above-average adjustment.
3. of those subjects who scored in the middle third of the test battery, slightly less than three-fourths of them made an average or better adjustment; or, a child who scores between forty-seven and fifty-three on the test

battery has a three-out-of-four chance of making an average or above-average adjustment.

A further breakdown of the relationship between the lowest third of the predicted criterion group and the total criterion distribution is presented in Table X. This represented an attempt to investigate the possibility of establishing a cut-off score which would clearly denote lack of readiness.

Table X. Percentage of 56 Subjects in the Lowest Third of the Predicted Criterion Score Group according to each Obtained Criterion Score Group.

Percent of Subjects in Obtained Criterion Score Group				
Predicted Criterion Score Group	Lowest Third	Middle Third	Highest Third	N
Lowest Third	23-43	45-54	56-78	
41-46	38%	29%	46	39
35-40	16	11		15
29-34	2	2		2
<b>N</b>	<b>11</b>	<b>23</b>	<b>2</b>	

It is evident from Table X that no cut-off score emerged which could be used to denote lack of readiness. In fact, a reverse trend is evidenced by the thirty-eight per cent of false positives.

If the issue concerned prediction of above-average adjustment, however, a cut-off score of forty could be established since no child who scored forty or below on the test battery achieved an adjustment score in the highest third of the obtained criterion group.

Table X further suggests that the score interval 41-46 represents a borderline area in view of its equivocal discriminating power. Predictions about these children would necessarily be hazardous. On the other hand, the readiness of those children who score forty or below would seem to be open to serious question and thereby deserving of more intensive scrutiny.

The procedure involved in the tabulation of the predicted adjustment scores with their suggested interpretations can be found in Appendix 3.

##### 5. Reliability of the Screening Tests.

Data on the reliability of the Goodenough test has already been reported. Reliability was not checked in this study since it has been found generally to be satisfactory.

To repeat the earlier findings of Coleman, et al.,<sup>2</sup> a significant reliability coefficient of .92 was found when the test was scored independently by a graduate student and a psychologically untrained pediatrician. As additional evidence, Goodenough<sup>3</sup> reported a retest reliability coefficient of .937 ( $\pm .006$ ) for 194 first-grade children after a one-day interval.

The reliability of the social maturity test was determined by the split-half method and the Spearman-Brown formula. This resulted in a reliability coefficient of .73 and a standard error of measurement, in T-scores, of  $\pm 5.14$ .

Split-half reliability for the motor maturity test resulted in a reliability coefficient of .71 and a standard error of measurement, in T-scores, of  $\pm 5.23$ .

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2. J. M. Coleman, et al., "The Draw-A-Man Test as a Predictor of School Readiness and as an Index of Emotional and Physical Maturity," in Pediatrics, Vol. 24, No. 2, issue of August, 1959, p. 277.

3. Florence Goodenough, Measurement of Intelligence by Drawings, New York, World Book, 1926, p. 48.

## CHAPTER VI

### DISCUSSION OF RESULTS

The statistical findings confirmed the major hypothesis regarding the basic adequacy of the screening test battery as a valid predictor of adjustment to the first grade of school. Prediction of adjustment was not errorless, however. Accordingly, this chapter presents a discussion of the theoretical and practical implications of these errors of prediction by means of a closer examination of the obtained multiple correlation, the item analysis, and the relationship between the obtained and predicted criterion scores.

#### 1. Relation Between the Predictor Variables and the Criterion.

The obtained  $R$  of .70 implies that forty-nine per cent of the criterion variance is attributable to the joint action of the three predictor variables. Further break down of this variance reveals the following independent contributions of the three predictors: twenty-five per cent of the criterion variance can be attributed to the action of the Goodenough test; thirteen per cent to the action of the social maturity test; and eleven per cent to the motor maturity test. Half of the criterion variance is

associated with intellectual factors and half to non-intellectual factors. Thus, fifty-one per cent of the criterion variance must be attributed to factors not measured by the screening tests.

Several possible explanations are offered to account for this degree of alienation. Actually, a fairly high degree of error was anticipated because of the very nature of the study; namely, dealing with a large number of subjects and variables in a limited amount of time under changing conditions with relatively few test items. Other contributing factors to be considered are: the probable weakening of the discriminating power of the test items by rigorously objectifying them; the ultimate inadequacy and elimination of the test of emotional maturity; the transitory rise in the anxiety level of the children occasioned by the new situation; the natural unreliability of the mothers' responses to the questionnaire; the fact that more and/or other correlates of adjustment could have been used; the matter of rapid and sudden developmental changes during the interval between testings; and errors of measurement.

As noted above, about half of the criterion variance was related to the action of the social and motor tests. This would seem to provide evidence, first of all, that such strictly non-intellectual functions as these are important in the process of school adjustment; and,

secondly, that it is possible to measure them quickly and validly.

## 2. Effects of the Item Analysis.

Closer examination of the retained social and motor items suggests the following observations.

In terms of administration, a much smaller room area would now be needed for the application of the screening technique as a result of the elimination of item six--test of the motor maturity test (Hopping, sixteen feet). This has distinct practical advantages. Similarly, appreciable shortening of the technique was successfully accomplished without reducing its validity and thereby making it more readily adaptable to this mass-screening type of approach.

Of the eight social maturity items retained, two (items one and five) related to habit training such as washing and dressing; the remaining six have in common the traits of social independence and responsibility. Most of the items that were rejected had to do with behavior confined to the home. Two interpretations present themselves. Some of these eliminated items were obviously too easy and therefore had weak discriminating power. The fact, however, that some good discriminating items were eliminated suggests

that less mature emotional-social behavior is observed at home. Consequently, it may be that it is the child's capacity to function at a more mature level when the need arises that is a distinguishing factor in the adjustment process.

No particular pattern emerged from the motor items that were retained or discarded. Most of the eliminated items were simply either too easy or too hard. In fact, the distribution of motor functions in the ten items that were retained turned out to be closely comparable to the distribution in the total test.

The ultimate inadequacy of the emotional maturity test, which represented an attempt to assess emotional and motivational variables via observable behavior, would seem to disprove the importance of these factors. It is the writer's belief however, that the failure to obtain positive findings here was basically the fault of the measuring instrument and not the theoretical and behavioral referents. There is the strong element of subjectivity in the rating approach as well as the elusive character of just what one should be measuring and how it should be measured. Although the results found here are in direct opposition to the rated findings of the Wellesly Pre-School

Study,<sup>1</sup> it should be noted that different methods were used. Their approach involved an unstructured doll-play situation in contrast to the present well-structured scheme that permitted little opportunity for spontaneity and interaction. Much of their criteria hinged on the child's ability to ultimately relax and the kind of interaction manifested.

### 3. Relation Between Obtained and Predicted Criterion Scores.

Table IX has shown that prediction of adjustment on an individual basis involves risk of error because of the percentage of overlap of scores throughout the distributions and the existence of false positives and false negatives, even though minute. When approached on a group basis, however, degree of predictive error is highly variable. Thus, prediction of adjustment is most hazardous for predicted scores in the middle third group of the distribution, less hazardous for predicted scores in the lowest third group, and of limited risk for scores in the highest third of the group distribution. No further breakdown of the original composite adjustment scores in order to deal with just the extreme thirds of both distributions

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1. Elisabeth Lindemann and Ann Ross, "A Follow-Up Study of a Predictive Test of Social Adaptation in Pre-School Children," Chapter 4, p. 79-93, in G. Caplan, Ed., Emotional Problems of Early Childhood, New York, Basic Books, 1955, xiv-544 p.

was felt to be necessary since inspection of Table IX indicated the reduced amount of overlapping of scores at the extremes of the distributions. In other words, it seemed reasonable to assume that the extreme thirds of the distributions were already composed of consistently high and consistently low scores while the middle third of the distributions were made up of across-the-board average scores or a combination of high, average and low scores.

Table X demonstrated the failure to establish a cut-off score which would have made possible the detection of the clearly unready child. However, a cut-off score was obtained if the issue of predicting above-average adjustment were involved. In concrete terms, no child who scored forty or below on the screening test battery made a final above-average adjustment.

In view of the gross character of the measures used and the error involved in individual prediction, the screening technique cannot be used independently. However, because of the positive results and the fact that some success was achieved in obtaining measures of non-intellectual as well as intellectual factors, the technique would appear to qualify as a meaningful and practical aid to the usual methods of determining school readiness and predicting quality of functioning.

Other uses of the technique suggest themselves in the light of the group tendencies that emerged. It is felt that the technique could provide an additional source of help in dealing with the problem of early grouping of children in the classroom. As the results indicated, the screening technique seems to have much to offer in the way of predicting average and above-average adjustment and the improbability of above-average adjustment. Furthermore, it may be of value in helping to meet the growing emphasis upon early detection of the exceptional child. Finally, the technique offers the advantage of wide applicability since it was constructed so that its administration, scoring and interpretation would be simple, objective and quick. No specialized psychological training is necessary for its valid application. As long as the rural requirements of the sample are met, it can be used in almost any setting, especially where time is an essential consideration.

In terms of limitations, no cross-validation evidence has been presented at this time. In addition to this need for replication, there is the added precaution that this study and its findings apply only to adjustment at the end of the first grade. Needless to say, it would be of considerable theoretical and practical interest to evaluate the later adjustment of these children at periodic intervals during their school career.

## SUMMARY AND CONCLUSIONS

This has been an attempt to originate a preventive program at the pre-school level by the development and application of a multiple mass-screening technique for the purpose of predicting adjustment to the first grade. The screening test battery, which consisted of a selected variety of intellectual, social, emotional and motor tasks, was administered in typical public health fashion to the total population of incoming first grade children and their mothers in one rural county. The test battery was applied in a revamped annual pre-school round-up in direct collaboration with Health Department and Department of Education personnel.

A significant multiple correlation coefficient of .70 between the screening battery scores and a composite criterion was obtained in support of the major and subsidiary hypotheses regarding the adequacy of the technique as a predictive instrument, the amenability to rapid measurement of both intellectual and non-intellectual factors important in the school adjustment process, and the feasibility of coordinating psychological, educational and public health services. An item analysis was successful in appreciably shortening the technique without reducing its validity.

Because of the gross nature of the screening measures and the fact that the final results prevent the use of the screening battery scores for individual prediction without risk of error, it was concluded that the screening battery could not therefore be used independently. Closer analysis of group tendencies, however, revealed sharp reductions in errors of prediction for the highest and lowest thirds of the battery score distribution.

The screening battery was most effective in predicting the likelihood of an average and above-average adjustment and the improbability of an above-average adjustment. Attempts to establish a cut-off score denoting lack of readiness were not realized. However, a cut-off score indicative of virtually no chance for a better than average adjustment was obtained.

Implications of the findings were discussed and reference was made to the assets, limitations and alternate uses of the technique.

It is concluded from the evidence that the screening technique has decided practical value as an aid to the conventional methods of assessing readiness and predicting adjustment. The positive results also provide demonstrable evidence that educational, mental health and public health services can be effectively combined in a coordinated preventive program.

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Lindemann, Elizabeth B., and Ross, Ann, "A Follow-Up Study of a Predictive Test of Social Adaptation in Pre-School Children," Chapter 4, p. 79-93, in G. Caplan, Ed., Emotional Problems of Early Childhood, New York, Basic Books, 1955, xiv-504 p.

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A pilot attempt at early detection of emotionally and socially disturbed children. Involved having psychiatric personnel available for consultation at an annual pre-school summer round-up. The response and end results were poor. A premature and naive project in its gross underestimation of the resistance and stigma associated with mental illness.

**APPENDIX I**  
**THE SCREENING TESTS**

## APPENDIX I

## SOCIAL MATURITY TEST

1. How much "going over" does he need in washing his face and hands satisfactorily? (except for ears and soap in eyes)
- a. \_\_\_\_\_ Always has to be gone over  
 b. \_\_\_\_\_ Frequently has to be gone over.  
 c. \_\_\_\_\_ Has to be gone over as often as not.  
 d. \_\_\_\_\_ Seldom has to be gone over.  
 e. \_\_\_\_\_ Never has to be gone over.
2. In his toilet habits, does he need help with paper or clothing?
- a. \_\_\_\_\_ Never needs help.  
 b. \_\_\_\_\_ Seldom needs help.  
 c. \_\_\_\_\_ Needs help as often as not.  
 d. \_\_\_\_\_ Frequently needs help.  
 e. \_\_\_\_\_ Always needs help.
3. When in town does he cross streets by himself, except busy or dangerous thoroughfares?
- a. \_\_\_\_\_ Never  
 b. \_\_\_\_\_ Seldom.  
 c. \_\_\_\_\_ As often as not.  
 d. \_\_\_\_\_ Frequently.  
 e. \_\_\_\_\_ Always.
4. Does he carry on a project to completion over a period of several days; for example, making a scrapbook, working on a cut-out or coloring book, collecting things?
- a. \_\_\_\_\_ Always.  
 b. \_\_\_\_\_ Frequently.  
 c. \_\_\_\_\_ As often as not.  
 d. \_\_\_\_\_ Seldom.  
 e. \_\_\_\_\_ Never.
5. Except for tying, does he need help in dressing himself?
- a. \_\_\_\_\_ Always needs help.  
 b. \_\_\_\_\_ Frequently needs help.  
 c. \_\_\_\_\_ As often as not needs help.  
 d. \_\_\_\_\_ Seldom needs help.  
 e. \_\_\_\_\_ Never needs help.
6. Does he go about the immediate neighborhood and make friendly visits by himself?
- a. \_\_\_\_\_ All the time.  
 b. \_\_\_\_\_ Frequently.  
 c. \_\_\_\_\_ As often as not.  
 d. \_\_\_\_\_ Seldom.  
 e. \_\_\_\_\_ Never.

7. At mealtime, does he dawdle? (lingering over meal; wasting time during meal)?
- a.  Always dawdles.  
 b.  Frequently dawdles.  
 c.  Dawdles as often as not.  
 d.  Seldom dawdles.  
 e.  Never dawdles.
8. Does he help in household chores such as dusting, sweeping, setting table, drying dishes, feeding pets, putting away toys?
- a.  Never  
 b.  Seldom.  
 c.  As often as not.  
 d.  Frequently.  
 e.  Always.
9. Does he join in group play with other children, such as playing tea-parties, store, hospital, school, building garages or railroads?
- a.  Never joins in.  
 b.  Seldom joins in.  
 c.  Joins in as often as not.  
 d.  Frequently joins in.  
 e.  Always joins in.
10. Does he recite verses or sing complete songs for the entertainment of others?
- a.  Very often.  
 b.  Often.  
 c.  As often as not.  
 d.  Seldom.  
 e.  Never.
11. Does he dress up in adult clothes and play act, with other children?
- a.  All the time.  
 b.  Frequently.  
 c.  As often as not.  
 d.  Seldom.  
 e.  Never.
12. Does he tell his own full name and address on request?
- a.  Always.  
 b.  Most of the time.  
 c.  As often as not.  
 d.  Seldom.  
 e.  Never.

13. Does he play competitive games with other children such as hide and seek, tag, hopscotch, or cowboys and indians?
- a. \_\_\_\_\_ Never.  
 b. \_\_\_\_\_ Seldom.  
 c. \_\_\_\_\_ As often as not.  
 d. \_\_\_\_\_ Frequently.  
 e. \_\_\_\_\_ Always.
14. Does he share turns and keep the rules in playing simple table games, such as Checkers, Dominoes, spin-the-wheel games?
- a. \_\_\_\_\_ Never.  
 b. \_\_\_\_\_ Seldom.  
 c. \_\_\_\_\_ As often as not.  
 d. \_\_\_\_\_ Most of the time.  
 e. \_\_\_\_\_ Always.
15. Does he go on errands to the store or neighbors, bring back required articles and change safely?
- a. \_\_\_\_\_ Always.  
 b. \_\_\_\_\_ Frequently.  
 c. \_\_\_\_\_ Does so as often as not.  
 d. \_\_\_\_\_ Never.  
 e. \_\_\_\_\_ Seldom.
16. In playing games with younger children, does he take the lead over them?
- a. \_\_\_\_\_ Never takes the lead.  
 b. \_\_\_\_\_ Seldom takes the lead over them.  
 c. \_\_\_\_\_ Takes lead as often as not.  
 d. \_\_\_\_\_ Frequently takes lead over them.  
 e. \_\_\_\_\_ Always takes lead over them.
17. Does he help in preparing and packing up for picnics or excursions or trips?
- a. \_\_\_\_\_ Never helps.  
 b. \_\_\_\_\_ Seldom helps.  
 c. \_\_\_\_\_ Helps as often as not.  
 d. \_\_\_\_\_ Helps most of the time.  
 e. \_\_\_\_\_ Always helps.
18. For his bath, does he need help in washing and drying himself (not including preparing the bath or cleaning up after)?
- a. \_\_\_\_\_ Never needs help.  
 b. \_\_\_\_\_ Seldom needs help.  
 c. \_\_\_\_\_ Needs help as often as not.  
 d. \_\_\_\_\_ Frequently needs help.  
 e. \_\_\_\_\_ Always needs help.

19. Is cleaning up after him necessary when he uses an ordinary table knife for spreading bread with butter, jam, and other "spread"?
- a.  Always.
  - b.  Frequently.
  - c.  As often as not.
  - d.  Seldom.
  - e.  Never.
20. Does he need help in getting ready for bed with such things as undressing, simple washing, attending to toilet, and turning out the light?
- a.  Always needs help.
  - b.  Frequently needs help.
  - c.  Needs help as often as not.
  - d.  Seldom needs help.
  - e.  Never needs help.

## MOTOR MATURITY TEST

1. <u>Matchsticks in Box (16" or less)</u> 2 trials	P	F
2. <u>Finger Circles (10")</u>	P	F
3. <u>Thumb Opposition (2 trials)</u>	P	F
4. <u>Roll Paper (2 trials)</u>	P	F
5. <u>Glench Teeth</u>	P	F
6. <u>Tapping Finger &amp; Feet (10") 2 trials</u>	P	F
7. <u>Ball in Hat (2/3) 3 yards</u>	P	F
8. <u>Bounce Ball &amp; Catch (3/4)</u>	P	F
9. <u>Race Jump (12 in.) 2 trials</u>	P	F
10. <u>Walk Straight Line (6 ft.) 2 trials</u>	P	F
11. <u>Walk Backwards (6 ft.) 2 trials</u>	P	F
12. <u>Standing, Heel to Toe, Eyes Closed (10") 2 trials</u>	P	F
13. <u>Standing, One Leg, Eyes Open (10") 2 trials</u>	P	F
14. <u>Standing, One Leg, Eyes Closed (10") 2 trials</u>	P	F
15. <u>Standing, Tiptoes, Eyes Open (10") 2 trials</u>	P	F
16. <u>Hopping, 16 feet, lands on Hips (2 trials)</u>	P	F

EMOTIONAL MATURITY RATING SCALE:

**WILLINGNESS:** amount of interest and enthusiasm; degree of enjoyment of his tasks.

Good	Rather Good	Rather Poor	Poor
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**SELF-CONFIDENCE:** degree of self-reliance; spontaneity; amount of reassurance needed; signs or remarks of uncertainty or unsureness of self.

Good	Rather Good	Rather Poor	Poor
------	-------------	-------------	------

**ADAPTABILITY:** ability to work purposefully with effort and persistence; ability to follow instructions and complete tasks.

Good	Rather Good	Rather Poor	Poor
------	-------------	-------------	------

**EMOTIONAL CONTROL:** ability to work freely on tasks at hand without interference from undue amount of positive or negative emotions; e.g., excessive friendliness, playfulness; extreme shyness, fearfulness, aggressiveness.

Good	Rather Good	Rather Poor	Poor
------	-------------	-------------	------

Positive \_\_\_\_\_  
 Negative \_\_\_\_\_

REMARKS:

**APPENDIX 2**

**ADMINISTRATION AND SCORING INSTRUCTIONS  
OF THE MOTOR MATURITY TEST**

**1. MATCHSTICKS IN BOX:**

Wooden box, 4"x 4"x 2"; 20 headless safety matches; 10 matchsticks are placed on either side of the box parallel to each other and to the box, about 1/2" apart.

**Directions:**

Watch what I do. (Demonstrate). I am going to put the matchsticks in the box, one in each hand and moving both hands at once. Do it as quickly as you can. Start with the ones nearest the box and put 2 sticks into the box at the same time, one in each hand and making both hands move at once.

**Scoring:**

2 trials. Record time in seconds. Best trial used. Rhythm of movement must be maintained. Success: 16" or less with no break in rhythm. Score one point for success.

**2. FINGER CIRCLES:**

S extends hands in front of him; close fingers except for index which is extended. Describes circles with both index fingers at once in rhythm.

**Directions:**

See if you can make circles in the air with your fingers the way I do. (Demonstrate)

**Scoring:**

Movement must be maintained for 10 seconds. Only fingers, not hands, should move in easily recognized circles of about the same size. Score 1 point for success.

**3. THUMB-FINGER OPPOSITION:**

S touches each finger of one hand with the thumb beginning with the little finger and then repeat starting with the index finger.

Directions:

Watch what I do. Start with your little finger and touch each finger with your thumb and then go back again. Now try it with your other hand.

Scoring:

2 trials each hand; best trials used. Failed if S touches a finger more than once, skips a finger or touches 2 fingers at the same time. Score 1 point for success on both hands.

4. MAKING A PAPER BALL:

Cigarette papers. S takes one paper in the fingers of one hand and rolls it into a ball with a rolling movement of fingers. One hand at a time.

Directions:

Let's see you make a paper ball with the fingers of one hand like this. (Demonstrate) Throw the ball on the table as soon as you are through.

Scoring:

2 trials with each hand; best trials used. Ball must not come undone when thrown on table but should be a fairly compact and round ball. Score 1 point for success with both hands.

5. CLENCH TEETH:

S told to watch E closely. S clenches teeth with lips separated.

Directions:

Watch and do just what I do. (Demonstrate). Go ahead.

Scoring:

2 trials. Best trial used. Upper row of teeth must be placed directly upon lower row. Teeth must be clearly visible. Lips must be held apart without movement for 5". Score 1 point for success.

6. TAPPING, FEET AND FINGERS IN UNISON:

S sits with feet flat on floor and index fingers on edge of table. S. taps feet alternately on floor at any speed and simultaneously taps with the corresponding index fingers.

Directions:

Now see if you can do these 2 things at the same time. Tap the floor with first one foot and then the other. At the same time tap the table with one finger and then the other. When you tap the floor with your right foot you should tap the table with your right hand. (Demonstrate).

Scoring:

2 trials; best trial used. S must maintain rhythm for 10 seconds without break. Score 1 point for success.

7. BALL IN HAT:

Small rubber ball, ping-pong ball size. An ordinary man's hat is placed inverted on the floor. S stands with feet together three feet from the hat.

Directions:

Watch what I do. (Demonstrate). See how many times you can throw the ball in the hat.

Scoring:

Three trials. S must remain in place with

only slight hunch allowed.  
Success: 2 out of 3 times. Score 1 point.

8. BOUNCE A BALL AND CATCH:

Tennis ball with a good bounce. S is to bounce the ball and catch it with one hand after the first bounce. Must not move about the room.

Directions:

Now bounce the ball and catch it like this. Stand in one place and don't move your feet.

Scoring: Four trials with preferred hand. S must not move out of place.  
Success is 3 out of 4 times. Score 1 point.

9. JUMPING ROPE:

One end of a rope is tied to a chair. The other end is held loosely by E so that it is 8 inches from the floor at center.

Directions:

See if you can jump over this rope with both feet together. Stand close to it like this and be sure to jump with both feet at the same time.

Scoring: 2 trials, best trial used. Feet must be held together and must not touch the rope.  
Score 1 point for success.

10. WALKING A STRAIGHT LINE:

S must walk in a straight chalked or taped line by placing heel of one foot ahead of and in contact with the toe of the other. Hands on hips. Walk a distance of 6 feet.

Directions: Let's see if you can walk a straight line over to there like this. Keep your hands on your hips and be sure to put one foot right in front of the other.

Scoring: 2 trials. Best trial used. S must not lose balance or step out of line. Score 1 point for success.

11. WALKING BACKWARDS:

S must walk in the manner described in item 10 but backwards.

Directions: Now try walking that way backwards (Demon.)

Scoring: 2 trials. Best trial used. S must walk in a straight line maintaining balance. Score 1 point for success.

12. STANDING, HEEL TO TOE, EYES CLOSED:

S stands with right foot placed before the left foot, with right heel touching the left toe, both feet being in a straight line. Eyes are closed; hands on hips.

Directions: See how long you can stand like this with your eyes closed. (Demon.)

Scoring: 2 trials. Best trial used. Maximum 10 sec. Item failed if S moves feet or body to maintain balance or opens eyes. Score 1 point for 10 seconds.

13. STANDING, ONE LEG, EYES OPEN:

S stands on one leg with the other bent to form a right angle at the knee; hands on hips.

Directions: Let's see how long you can stand on one leg like this. (Demon.). Now try standing on the other leg.

- Scoring:** 2 trials each leg. Best trials used. Maximum 10 sec. S must not move out of place, jump, stand on tiptoe or move body to maintain balance. Score 1 point for success on both legs.
14. **STANDING, ONE FOOT, EYES CLOSED:**
- Position as in item 13 but eyes closed.
- Directions:** Now try this one again only this time do it with your eyes closed. Watch how it is done again. (Demon.).
- Scoring:** 2 trials each leg. Best trials used. Maximum 10 sec. Slight swaying is permitted but no other movement. Score 1 point for success on both legs.
15. **STANDING ON TIPTOES, EYES CLOSED:**
- S stands with feet together, hands on hips, heels raised off floor, eyes closed.
- Directions:** Now I want you to stand on your tiptoes like this. (Demon.). Remember to keep your eyes closed.
- Scoring:** 2 trials. Best trial used. Maximum 10 sec. Moving body to maintain balance is permitted as long as heels do not touch floor. Score 1 point for success.
16. **HOPPING:** S hops on one leg for 16 feet with the other leg bent backwards at right angle at the knee, hands on hips.
- Directions:** See if you can hop in a straight line from here over to there. Keep your other leg bent back like this and your hands on your hips. Now try it on the other leg.
- Scoring:** 2 trials each leg. Best trials used. Item is failed if S deviates from a straight line by more than 1 1/2 feet, if he touches

the floor with the other feet or if  
he moves his arms to keep balance.  
Score 1 point for success on both  
legs.

**APPENDIX 3**

**TABULATION AND INTERPRETATION OF THE  
PREDICTED ADJUSTMENT SCORES**

Each subject's predicted adjustment score was derived in the manner described below. For future application of the screening battery, the same systematic procedure would be followed. It is necessary to emphasize that all computations were based on T-scores so that the predicted scores are in T-score form. Finally, this scoring and interpretive procedure pertains only to the Goodenough Test and the selected items from the social and motor tests; namely, Items 1, 3, 4, 5, 6, 12, 15 and 16 from the social maturity test; and items 1, 2, 3, 6, 7, 9, 10, 11, 12 and 15 from the motor maturity test.

The scoring procedure is as follows:

1. Compute the total raw score for each subject on each of the three predictor tests:
  - a. the Goodenough raw score;
  - b. the sum total of items passed on the motor test. Each passed item receives a score of 1;
  - c. the sum total of points earned on each item of the social test. Each item is scored from 1 to 5. A score of 1 corresponds to less mature performance.
2. Convert the total raw score on each of the tests to its equivalent T-score value by means of Table XII;
3. Substitute each of the T-score values for X in the following equation and solve the equation for X', where X' is the subject's predicted adjustment score; X<sub>2</sub> is the subject's Goodenough T-score; X<sub>3</sub> the subject's social maturity test T-score; and X<sub>4</sub> the subject's motor maturity test T-score:

$$X' = .434X_2 + .204X_3 + .251X_4 + .59$$

4. The resultant  $X'$  score is the subject's predicted adjustment score and may be interpreted according to the suggested schema in Table XI:

**Table XI. Suggested Interpretations of the Predicted Adjustment Scores Based on a Sample of 176 Rural First Grade Children.**

Score	Suggested Interpretation
54-72	Almost certainly ready; chances are excellent for at least average adjustment; better than 50-50 chance of above-average adjustment.
47-53	Probably ready; odds are 3 out of 4 of at least average adjustment; chances are 1 in 4 of above-average adjustment.
41-46	As many ready as not; slightly less than 50-50 chance of an average adjustment; only an outside chance of above-average adjustment; worth a second look.
29-40	May not be ready; should definitely be evaluated further; no chance of making above-average adjustment.

Table XII. T-Score Equivalents of Obtained Total Raw Scores for each of the Screening Battery Tests.

Goodenough Test		Social Maturity Test		Motor Maturity Test	
Raw Score	T	Raw Score	T	Raw Score	T
30	78	39	78	10	73
27	74	38	74	9	67
20	72	37	72	8	62
19	70	36	71	7	56
17	67	35	69	6	51
16	64	34	66	5	47
15	62	33	64	4	43
14	60	32	62	3	40
13	58	31	60	2	35
12	56	30	58	1	29
11	53	29	57	0	23
10	50	28	56		
9	47	27	54		
8	45	26	53		
7	42	25	52		
6	39	24	50		
5	35	23	48		
4	32	22	46		
3	27	21	43		
1	23	20	41		
		19	39		
		18	38		
		17	36		
		16	35		
		15	33		
		14	32		
		13	31		
		12	29		
		11	26		
		10	23		

**APPENDIX 4**

**ABSTRACT OF**

**THE DEVELOPMENT AND APPLICATION OF A  
MASS-SCREENING TECHNIQUE FOR THE  
PREDICTION OF ADJUSTMENT TO THE  
FIRST GRADE**

## APPENDIX 4

### ABSTRACT OF

#### The Development and Application of a Mass-Screening Technique for the Prediction of Adjustment to the First Grade<sup>1</sup>

The fields of education and psychiatry have been concerned with the beginning school child in regard to the prevention of academic and personal adjustment difficulties. Experts are agreed that many such problems could be prevented by the use of various types of readiness tests designed to determine if and when the child is sufficiently mature, physically, mentally, socially and emotionally, to begin the regular work of the first grade. Various research and practical programs have been attempted to meet this need. However, little or nothing of a systematic nature has been done that would be practically applicable to the large, unselected body of incoming first grade children and in an average school setting.

In this study, a mass-screening technique was devised and applied to a large number of pre-school children and their mothers in an attempt to predict the adjustment of the children to the first grade. A measure of each child's

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1. Salvatore Casmarata, doctoral thesis presented to the School of Psychology of the University of Ottawa, Ontario, May, 1962, x-106 p.

intellectual, social, emotional and motor maturity was obtained in typical public health fashion in an annual pre-school round-up. The sample included the total population of white children in a small, rural county. Follow-up evaluations of adjustments were done at the end of the first grade.

The results confirmed the major hypothesis as to the basic validity of the screening technique as an adequate predictor of adjustment to the first grade. The subsidiary hypothesis regarding the feasibility of coordinating educational, public health and mental health services into an effective large-scale preventive effort was also demonstrated and upheld.

After an item analysis, a highly significant multiple correlation between the screening test battery and the composite criterion scores was obtained. The results failed in terms of enabling prediction of adjustment on an individual basis and in arriving at a cut-off score denoting certainty of poor adjustment. However, a cut-off score indicating virtually no chance of an above-average adjustment was obtained. The screening test battery was found to be highly effective in predicting the likelihood of an average and above-average adjustment and the high improbability of

an above-average adjustment.

In view of the results, it was concluded that the screening technique cannot be used independently. However, because of the positive results and the success achieved in obtaining measures of non-intellectual as well as intellectual factors, the technique would qualify as a very useful aid to the usual methods of determining school readiness, grouping of children and predicting adjustment.