

THE SRA PRIMARY MENTAL ABILITIES AS A CRITERION
FOR PLACEMENT IN A CLASS FOR THE
MENTALLY RETARDED

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Indiana State Teachers College

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by
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CHAPTER I

THE PROBLEM AND DEFINITIONS OF TERMS USED

INTRODUCTION

For many years there have been attempts to determine the degree of intelligence of individuals. It was not until 1904, when at a national educators' meeting Alfred Binet was appointed to investigate mental retardation in French schools that a test was designed by Binet and Simon, which with many revisions has been widely accepted as an instrument of measurement of general intelligence. This was not the beginning of educators' interest in mental evaluation, but it did mark the first appearance of the test which has served as the pattern for all subsequent tests and scales all over the world.

I. THE PROBLEM

Statement of the problem. It was the purpose of this study (1) to show relationships between the SRA Primary Mental Abilities Tests and the Revised Stanford-Binet Scale of Intelligence, Form L; (2) to determine the suitability of the SRA Primary Mental Abilities Tests as a criterion for determining placement in a class for mentally retarded children; and (3) to present teachers' opinions in regard

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to how well the SRA Primary Mental Abilities Tests predict school success in comparison with the Revised Stanford - Binet Intelligence Scale, Form L, as revealed through a questionnaire study.

Importance of the study. Intelligence testing has been a major factor in placing a child in a class for the mentally retarded for many years. In discussing the testing program to identify slow-learners in school, Allen has recently suggested that:

Before any one school or school district can determine the special services needed, it obviously is necessary to know how many slow-learning children exist there and what seems to be the trend of the school population. This information can be arrived at most quickly through a survey with group intelligence tests.

There are several good group intelligence tests available, any of which when used as directed can help screen out slow-learning children. . . . in order to promote a higher degree of uniformity in the future among school systems throughout the state, and to partially compensate for the current lack of adequate psychological services, a test with a "performance" as well as a "verbal" measure is recommended.

Heck remarks:

Those who do poorly on the group test should be given individual examinations; the Stanford Revision of the Binet Simon is commonly administered for

¹ Amy A. Allen, Let Us Look At Slow Learning Children (State Department of Education, Ohio State University, Columbus, Ohio, 1947), pp. 10-12.

checking the child's ability to do academic school-work.²

In the State of Indiana, according to the rules and regulations governing application for the establishment and continuance of special classes, the following act was legally set forth:

Special classes to be approved under the provisions of this statute shall provide instruction for educable pupils who have a physical and/or mental disability which makes regular school room activity impractical or impossible and for whom no provision is made in any of the institutions of the state.

For mental disability, data obtained through individual intelligence tests administered and interpreted by a trained, approved examiner and substantiated by the school health officer. An examination of each child must be made at least every three years.³

Thus, we see the need for and the importance of the intelligence test in placing the child in the class for the mentally retarded. Although an individual test, usually with a performance and verbal measure, is the actual tool for placement, the group intelligence test is of no small consequence in classifying the child in need of special educational services because of a mental disability.

²Arch O. Heck, The Education of Exceptional Children (New York: McGraw-Hill Book Company, Inc., 1940), p. 360.

³Special Education Classes. Rules and Regulations Governing Application for the Establishment and Continuance of Special Classes under the Provisions of Chapter 211 of the Acts of the General Assembly of 1927 and Chapter 276 of the Acts of the General Assembly of 1947.

The Revised Stanford Binet Intelligence Scale was used in this study as it is already accepted as a basis for predicting placement of children in classes for the mentally retarded. Since there is a lack of research concerning the SRA Primary Mental Abilities Tests' value for such placement, this test was used in order to determine its usefulness as compared through the profile sheets with the Binet scores and with the teachers' ratings.

II. DEFINITIONS OF TERMS USED

Age-scale. An age-scale is a scale like the Revised Stanford-Binet Scale of Intelligence, which is constructed of subtests grouped as a series of age levels, and the scale immediately yields a mental age score.

Correlation: Fleming defined correlation as:

On many occasions it is desirable to assess the degree of correspondence between two sets of measures. This relationship is conveniently expressed by a correlation coefficient. . . . Perfect correlation is represented by the value of 1.00. This would be found between scores in spelling and reading in the case of a group of pupils in which the best speller was the most successful in reading, the child second in spelling was second in reading, and so on for the entire group.⁴

⁴C. M. Fleming, Adolescence (New York: International Universities Press, Inc., 1949), p. 246.

Group test. A group test is a type of test which can be given to many individuals simultaneously. It is generally considered only a screening device designed to sift out those who will require a more complete study.

Individual test. An individual test is a type of test which is administered to only one individual at a time. Such tests provide for verbal and/or performance responses.

Intelligence. Stoddard defined intelligence as:

Intelligence is the ability to undertake activities that are characterized by (1) difficulty (2) complexity (3) abstractness (4) economy (5) adaptiveness to a goal (6) social value, and (7) the emergence of originals and to maintain such activities under conditions that demand a concentration of energy and a resistance to emotional forces.⁵

Intelligence quotient. The term "intelligence quotient" or I.Q. is widely accepted as a representation of the rate of an individual's mental development. An I.Q. is calculated by dividing the individual's mental age by his chronological age.

⁵George D. Stoddard, The Meaning of Intelligence (New York: The Macmillan Company, 1948), p. 4.

Mean. The mean is the computed average representing the point on the scale where the scores tend to group themselves. It is commonly called "the average".

Mental Age. Mental age is a term used to represent the individual's performance on an intelligence test of a given standardized group.

Mental Retardation. This is rather an elusive term; however, Martens defined it as:

. . . at 75 or 80 I.Q. we have reached the borderline of serious intellectual retardation. About 5 out of every 100 school children have I.Q.'s of 78 or below; 2 in 100 have I.Q.'s of 73 or below. . . . It would not be doing violence to the definition of mental retardation if we included in this group those who reach an intelligence quotient of 75 or 80.⁶

Percentile. Fleming described percentile as:

The word percentile may be understood in terms of the division of a group of pupils arranged in order of merit into one hundred numerically equal acts. Each such set of pupils can then be said to have a "percentile" rank. A percentile score of 75 is then the average score of the set of pupils holding the 75th "percentile" rank.⁷

⁶Elise H. Martens, Teachers' Problems With Exceptional Children, Pamphlet Number 49, Mentally Retarded Children (Washington: U.S. Government Printing Office, 1934), p. 7.

⁷Fleming, op. cit., pp. 245-246.

Standard deviation. Ross defined this as:

. . . the square root of the mean of the square of the deviations of the scores from their mean. It may also be defined as that distance above and below the mean that in a normal distribution includes 68.25 per cent of the scores, or approximately two-thirds.⁸

SRA Primary Mental Abilities Tests. This test will be referred to in this study as the PMA.

The Revised Stanford-Binet Intelligence Scale. This test will be referred to in this study as the Binet Scale.

Validity. Validity, perhaps the most important characteristic of a measuring instrument, refers to the degree to which the test measures what it claims to measure.

Usability. By usability is meant the degree to which the test can be successfully employed by classroom teachers and school administrators without an undue expenditure of time and energy.

III. ORGANIZATION OF REMAINDER OF THE THESIS

The remainder of this paper presents the formats, standardizations, and criticisms of the measures, the questionnaire used, the groups studied, and the technique and the results of the study. Following the data of the study, the summary and conclusions of the study will be presented.

⁸C. C. Ross, Measurements in Today's Schools (New York: Prentice-Hall, Inc., 1947), p. 234.

CHAPTER II

THE MEASURES USED AND THE GROUPS STUDIED

Almost every aspect of the Binet Scale has received a great deal of scrutiny in attempts to prove or disprove its qualities as a measuring instrument. However, there has been a very limited amount of concrete data collected concerning the Thurstones' SRA Primary Mental Abilities Test. This chapter is largely devoted to a critical description of these two tests, the questionnaire which was used in this study, and a description of the group studied.

I. TEST MATERIALS AND METHODS USED

The Binet Scale, Form L.

Format. This measure is the 1937 revision of the 1916 Stanford Revision of the Binet Scale for the Measurement of Intelligence. It is an instrument designed to measure intelligence, and is for individual administration. It consists of 122 items plus 7 alternate items in both Form L and M arranged in 20 groups; 6 items each half year for years II to IV; 6 items for each year V to XIV; 8 items at average adult; and 6 items in superior adult groups I to III. These items range from simple tasks such as identifying parts of the body of the doll in year II-6, to solving complex mental problems

in the superior adult groups. The scale yields two types of scores: the mental age, expressed in years and months, and the intelligence quotient.

Standardization. The Binet Scale was standardized on a group of 3184 subjects from one and one-half to eighteen years of age for whom complete tests of both Form L and M were made. Tests were administered in seventeen communities, to subjects located in eleven states, representing the East, the South, the Midwest, and the West, and both rural and urban groups were among the subjects. The subjects were all American-born white children.⁹

Criticisms. When a scale becomes "the standard¹⁰ clinical method for evaluating intellectual status", it is only to be expected that it will receive considerable criticism, constructive or otherwise, from professional people all over the world. Only a few of the criticisms are given here.

⁹Lewis M. Terman and Maud A. Merrill, Measuring Intelligence (Boston: Houghton Mifflin Company, 1937) pp. ix.

¹⁰Ibid., pp. 12-20.

Writing about the Binet Scale, Mursell says:

. . . it measures whatever the mental factors are that make people succeed in school, particularly in the academic subjects. . . . It has marked limitations as a clinical instrument and as an aid to psychiatric diagnoses and prediction. It is capable of an unequivocal demonstration of mental advance to what has been just about the school-leaving age and not beyond it.¹¹

Wells, an experienced clinical psychologist, criticizes the test as:

In general the scale ascends in merit as it approaches the earlier years. The contribution at the adult level is doubtful, at grade school level it is good of its kind; at preschool levels very good, save for the weaknesses inherent in Binet systems generally, lack of functional organization. They represent an embryonic, undifferentiated, mass reaction phase in psychometric development.¹²

In suggesting a constructive point of view, Kent may be quoted as:

Within the year-scale system, the subject matter of the Stanford-Binet scale is used with unnecessary wastefulness. When a child responds correctly to only three out of five absurdity questions, he of course fails to achieve ten-year credit for that item; but might he not be given nine-year credit for three acceptable responses, and possibly eight-year credit for two responses?¹³

¹¹James L. Mursel, *Psychological Testing* (New York: Longmans, Green and Company, 1949), pp. 116-117.

¹²F. L. Wells: "Revised Stanford-Binet Scale." *The Nineteen Thirty-Eight Mental Measurements Yearbook of the School of Education, Rutgers University*. (New Brunswick, N.J.; Rutgers University Press, 1938), pp. 113-114.

¹³Grace H. Kent, "Suggestions for the Next Revision of the Binet-Simon Scale." *Psychological Record*, 1937, I. pp. 409-433.

Summing up the practical value of the scale, Stoddard remarked:

There is probably a general agreement among technical workers that the 1937 Stanford Revision measures essentially scholastic aptitude. Some say that it measures scholastic experience, but they go too far. . . . Now, as before, in order to render its rating reasonable and practical, Binet testing needs reenforcement through measures of aptitude, experience, and achievement, together with first hand clinical observations of behavior. As a contribution to theory, the new Stanford Revision must be regarded as having negligible value.¹⁴

Regardless of how valid the criticisms of the Binet Scale may be, none of the authorities can deny that this test is probably the most important measure of intelligence used in American schools, clinics, courts, and institutions. As Mursell wrote:

The Stanford-Binet scale has such a focal position that a just appraisal of it is of great importance. It has constantly been used as a reference point in the construction and validation of other psychometric instruments. The methods used in its construction have been widely copied. And there is hardly a question connected with mental testing and its outcome upon which the results and principles of the Binet scale do not have some bearing.¹⁵

SRA Primary Mental Abilities.

Format. This is a group test designed to measure several of the mental abilities that have been found through

¹⁴Stoddard, Op. cit., pp. 113-114.

¹⁵Mursell, Op. cit., p. 108

¹⁶L.L. Thurstone and Thelma Gwinn Thurstone, SRA Primary Mental Abilities (Chicago: Science Research Associates, Inc.)

the method of factorial analysis. Thurstone has established eight of the primary mental abilities: Verbal-meaning, Space, Reasoning, Number (also called Quantitative), Word-fluency, Memory, Perceptual Speed (or Perception), and Motor. The test consists of three batteries, primary, ages 5 to 7; elementary, ages 7 to 11; and intermediate, ages 11 to 17.

Not all the abilities are tested in each battery. The abilities tested at the various age levels are shown in the diagram below:

Ages 5-7	Mo	P	Q	(N R)	V	S
Ages 7-11		P	N		R	V S
Ages 11-17			N		R	V S W

Number ability, as such, is not measured at the primary ages; quantitative ability, which seems to be the ability to work with quantitative or logical concepts, is measured instead. Motor ability is not tested at the older ages this ability matures early and it influences school performance only in the early grades. Word-fluency is not measured in the younger groups because tests of this ability usually depend too much on proficiency in writing. Memory ability is not included in the SRA Primary Mental Abilities; the tests take too long to administer to be of value in the ordinary testing situation. ¹⁷

The results of tests from each battery are plotted on a self-explanatory profile sheet, presenting a pattern of the child's relative strengths and weaknesses in mental abilities, which should be especially beneficial in adapting the curriculum to the child's special needs and capacities. The formats for each battery are presented as follows:

The SRA Primary Mental Abilities, for ages 5-7 is published in a twenty-four page booklet. The battery is

¹⁷ L. L. Thurstone and Thelma Gwinn Thurstone, Examiner Manual for the SRA Primary Mental Abilities, Intermediate - Ages 11 to 17 (Chicago: Science Research Associates, Inc., 1949), p. 2.

made up of about thirty-five test problems for each of the primary mental abilities, plus about seven practice items for each test. The problems are presented entirely by pictures which the child marks in response to oral directions given by the examiner. This method of presentation makes possible group testing of very young children by a single examiner.¹⁸

By interpretation of the score, a mental age for each ability as well as for the total score can be converted into an intelligence quotient.

It should not be expected that the total quotient of the PMA and the I.Q. of other tests will correlate highly in all cases. Most tests of "general" intelligence are heavily loaded with V, N or Q, and R, while the PMA tests yield separate scores for the component parts of intelligence and give them equal weight in determining the total quotient score. The PMA, therefore, can be expected to give a more significant estimate of the child's total mental ability.¹⁹

The PMA, Elementary, ages 7 to 11 is constructed in a similar manner, and its results are also plotted on a profile sheet. Of this battery the Thurstones' wrote:

The PMA, Elementary is published in a booklet of eighteen step-down pages. Each test booklet can be used many times. Responses to the items are marked on a separate carbonized answer pad instead of in the booklet. As the child marks the items, his answers are recorded directly on the scoring grid printed on the inside of the answer pad.

Two total scores are provided as indices of general mental ability. The Total Score includes all of the five abilities and gives them equal importance. The Total-Non-reading Score gives each of the abilities equal importance, but omits the two tests, "Words" and "Word-grouping" which are affected by reading ability. In

¹⁸L. L. Thurstone and Thelma Gwinn Thurstone, Examiner Manual for the SRA Primary Mental Abilities, Primary (Chicago: Science Research Associates, Inc., 1948), p. 5.

¹⁹Ibid., p. 7.

many instances, especially among poor readers, the teacher will find the Total Non-reading Score more valuable than the Total Score.

. . . Although the two Total Scores have some advantages as indices of general mental ability, the profile or pattern of scores on all of the tests are probably more meaningful.²⁰

Intermediate. The SRA PMA for Ages 11 to 17 is published in two forms--Form AH which is scored by hand using the automatic carbon scoring grid, and Form AM which is machine-scored.

. . . The profile sheet gives two types of norms, percentile ranks and quotient scores. The quotient score, which is somewhat similar to the I.Q. type of score, is based on the observation that one standard deviation of a normal distribution contains sixteen I.Q. points. For almost all uses, the percentile norms are recommended. In general, they are more meaningful than the quotient score, which have been included mainly because this type of score is still better known to many teachers. The quotient score is useful only for the Total Score; it does not apply to the separate abilities scores.²¹

Standardization. Since the three batteries of this test were designed separately they were standardized as follows:

Primary: the 5 to 7 battery was standardized on 1,200 children whose ages ranged from five to eight years of age.

Elementary: the 7 to 11 year battery was standardized on a sample of 4,744 children in grades two through six.

²⁰L. Thurstone and Thelma Gwinn Thurstone, Examiner Manual for the SRA Primary Mental Abilities, Elementary (Chicago: Science Research Associates, Inc., 1948), pp. 2-7.

²¹Thurstone, 1949, Op. cit., pp. 3-12.

Intermediate: the 11 to 17 year battery was standardized on over 18,000 students in junior and senior public high school.

Criticism. Little has been written about the present Primary Mental Abilities Tests since the tests are new and in a sense revolutionary to the present trends in psychometrics most authorities feel that the tests represent only an important and interesting experiment. In discussing the correlations between five of the primary mental abilities and the total scores of the American Council on Education Psychological Examination (see Table I.), Thurstone said:

These results substantiate the observations that the usual types of intelligence test measure only a few abilities, and that they measure primarily Verbal-meaning, Reasoning, and, to some extent Number and Perception.²²

Cronback stated in his chapter on "Factor Analysis"; The Sorting of Abilities," the following:

One major question relates to the validity of the primary abilities for guidance and other practical application. There is little evidence today which permits practical interpretation of a Primary Mental Abilities (PMA) test profile.²³

This critic further reminds the reader that although Thurstone declared that the profile sheet has been useful in

²²Thurstone, 1949, Ibid., p. 14.

²³Lee J. Cronback, Essentials of Psychological Testing (New York: Harper and Brothers, 1949), p. 209.

TABLE I

CORRELATIONS BETWEEN FIVE PRIMARY MENTAL ABILITIES
AND THE AMERICAN COUNCIL ON EDUCATION PSYCHOLOGICAL
EXAMINATION TOTAL SCORE*

Verbal-meaning	.674
Space	.322
Reasoning	.575
Number	.390
Word-fluency	.435

*L. L. Thurstone and Thelma Gwinn Thurstone, Examiner Manual for the SRA Primary Mental Abilities, Intermediate - Ages, 11 to 17. (Chicago: Science Research Associates, Inc., 1949), p. 14.

See Appendix A

in understanding children, that he (Thurstone) also said:

It requires often considerable insight on the examiner to relate the mental profile to the circumstances of each case, but there is no question but that the profile is more helpful than the IQ in the interpretation of educational and behavior problems.²⁴

Cronbach concludes:

All studies of prediction indicate that in its present stage of development the factorial approach has not produced tests which are superior to non-factorial diagnostic test for practical purposes.²⁵

Thurstone's work has not found that there are indivisible mental abilities. As Cronbach explained, "They are merely families in which many interrelated abilities can be found."²⁶ Multiple-factor analysis has not disproved the existence of a general ability, as may be seen by the intercorrelation of six of Thurstone's primary mental abilities in Table II.

Questionnaire: The questionnaire²⁷ used in this study to determine the classroom teachers' opinions was originally designed by the Special Education Clinic at Indiana State Teachers College to determine the importance of the psychological reports from the clinic to the teachers of Laboratory School. It was decided that this information and the data

²⁴Ibid., p. 209.

²⁵Ibid., p. 210.

²⁶Ibid., p. 208.

²⁷See Appendix A.

TABLE II

INTERCORRELATIONS OF SIX PRIMARY ABILITIES FOR
EIGHTH-GRADERS*

	N	W	V	S	M	R
N						
W	.47					
V	.38	.51				
S	.26	.17	.17			
M	.19	.39	.39	.15		
R	.54	.48	.55	.39	.39	

*L. L. Thurstone and Thelma Gwinn Thurstone, Factorial Studies of Intelligence (Chicago: University of Chicago Press, 1941), p. 37.

needed for this study, as well as that for another thesis being written at this time, could be obtained from the same questionnaire. Therefore, the questionnaire was written by three individuals and only the material related to their respective studies was used by each.

The raw data derived from the questionnaire was used in an attempt to answer the following statements: (1) Usefulness of the results; (2) the accuracy of the predictions; (3) teachers preference of the form for reporting results, and (4) the correlation of school achievement and test predictions.

The questionnaire for each child tested was sent to the classroom teacher with an introductory letter. In order that the teachers' responses might be their own individual opinions no explanatory conferences were held. However, the teachers had earlier been informed of the study and were heartily in sympathy with the approach so that careful cooperation was obtained.

The group studied. The subjects used in this study were selected from the first, fourth, and seventh grades of the Laboratory School, Terre Haute, Indiana, and from the special room for the mentally retarded pupils in that school. Forty-nine pupils from the total number of students enrolled during the school year of 1949-1950 were involved in the study.

The Laboratory School is operated by Indiana State Teachers College, but is also a unit of the Public School System of Terre Haute. It provides instruction for regular school age children, first through twelfth grades, plus a nursery school, a crippled children's room, and a room for the mentally retarded.

The pupils attending this school reside in the area surrounding the College, except for a small percentage of students who are enrolled for special reasons. The area is described as both residential and industrial.²⁸

Teachers employed in the school are considered to be part of the College faculty, and they have the same academic rank as the other College teachers.

A recent study at the College concluded that, "The Laboratory School appears to have a normal I.Q. distribution."²⁹

²⁸Margaret Lindsey, "A Study of the Professional Education of Teachers at Indiana State Teachers College, Terre Haute, Indiana. Progress Report, September 1948." (Mimeographed Form).

²⁹Mary Jo Riggle, "An Analysis of Mental Ability of Pupils from Grades One Through Grades Nine of Indiana State Teachers College Laboratory School," Indiana State Teachers College, 1948. (Unpublished thesis.)

CHAPTER III

TECHNIQUE AND RESULTS OF THE STUDY

I. TECHNIQUE

Since part of the problem in this study was to determine the degree of confidence one can place on the results of the PMA tests at the outer ends of the distribution, children in grades one, four, and seven, and the special room of the Laboratory School were tested. It appeared that this school population was one in which there was approximately a normal distribution of I. Q.'s and that the school and its personnel represented an average or above average school system. Following the usual plan, a representative group was tested with the PMA. Those pupils whose scores deviated one and one-fourth standard deviation above or below the mean on this test were given the individual Binet Scale. The PMA profile sheets, the examiner's reports on the pupil's performance on the Binet Scale, and the questionnaire were sent to the teachers involved in this study to determine the relative value of the two measures, as well as the actual school achievement the child had made. The procedure of the program and the results determined from it are presented here.

II. SRA PRIMARY MENTAL ABILITIES TEST

Administration. The PMA was administered to 199 pupils in the first, fourth, and seventh grades, and the special room at Laboratory School, Terre Haute, Indiana. All tests were administered by individuals who had previous training in testing procedure with the PMA, as well as in administering other types of group tests.

The children in these grades were given a brief explanation of the tests, and the older groups were told why the tests were being given. The tests were given either in their home rooms or in a familiar class room during regular school time.

The test manuals were followed explicitly during all testing situations. The time allowed for each testing period was fifty minutes, making it impossible to complete an entire battery during one period. Consequently, each grade level was completed in two periods, one testing period each day, except for the first grade children taking the primary battery. These children were tested in three forty-minute periods. The tests were administered as follows: Verbal-meaning and Perception Tests in the first period, Quantitative and Motor Tests in the second period, and Space Test in the third period.

Selection of subjects. For further study it was deemed advisable to select fifty subjects from those children taking the PMA tests. These subjects were selected by taking all children whose I. Q. scores of the PMA were one and one-fourth standard deviation above or below the mean, which would be those with scores above an I. Q. of 119 and below an I. Q. of 81. This is based on Terman's distribution of I. Q. scores on the Revised Stanford-Binet Scale standardization group.³⁰ This distribution agrees with Merten's definition of mental retardation, which includes those pupils with an I. Q. up to 80.

During the final week of testing one child was withdrawn from school due to illness, leaving a total of forty-nine pupils in the group studied.

III. THE BINET SCALE

Administration. After the group testing had been completed and the PMA profile sheets had been sent to the teachers, the pupils who were to be given the B. scale were selected. Each subject was given the Binet Scale, Form L. The tests were administered in the Special Education Clinic, Indiana State Teachers College, Terre Haute, Indiana, by an experienced examiner. The average time for

³⁰Terman, Op. cit., p. 37.

administering this scale was approximately an hour and ten minutes.

The Binet report. Following the administration of the Binet Scale, a written report was sent to the classroom teacher. Each report was written according to the outline below.

1. Identifying information.
 - a. Name, grade, C. A., date of examination.
2. Description of the test used.
3. Test performance of the subject according to the test results.
4. Examiner's opinion of the behavior of the subject during the testing situation.
5. Summary.

It was from the information received from this report and the PMA profile sheet that the teachers were able to fill out the portion of the questionnaire pertaining to their opinion of the usefulness and value of each test.

III. RESULTS OF THE STUDY

Relationship of measures used. In order to determine the relationship between the PMA and the Binet Scale according to the grade level of the subjects, a correlation was computed using the rank-difference formula. Table III presents the results of this correlation. The lowest correlation, .34, was for the children in the seventh grade, and the highest correlation, .73, was for the children in the room for mentally retarded children.

To determine the relationship between the PMA quotients and the Binet quotients for the forty-nine children studied, the Pearson product-moment formula was used. This computation gave a correlation of .77.

In regard to this relationship, a comparison was made to discover the difference in the number of pupils each test would place in a room for the mentally retarded. The basis for this comparison was made on an I. Q. of 80 or below, according to Marten's definition.

The PMA results showed forty-two pupils eligible for a class for mentally retarded children, while the Binet Scale results, it is interesting to note, showed only twenty-two pupils with an I.Q. of 80 or below.

TABLE III

CORRELATIONS BETWEEN THE SRA PRIMARY MENTAL ABILITIES
AND THE BINET SCALE ACCORDING TO THE
GRADE LEVELS OF THE SUBJECTS

First Grade67
Fourth Grade37
Seventh Grade32
Special Room72

ANALYSIS OF CORRELATION. The correlation between the SRA Primary Mental Abilities and the Binet Intelligence Scale is presented in Table III. The correlation is .67 for the First Grade, .37 for the Fourth Grade, .32 for the Seventh Grade, and .72 for the Special Room. The correlation is highest for the Special Room and lowest for the Seventh Grade. The correlation is positive for all groups, indicating that the SRA Primary Mental Abilities are related to the Binet Intelligence Scale. The correlation is .67 for the First Grade, .37 for the Fourth Grade, .32 for the Seventh Grade, and .72 for the Special Room. The correlation is highest for the Special Room and lowest for the Seventh Grade. The correlation is positive for all groups, indicating that the SRA Primary Mental Abilities are related to the Binet Intelligence Scale.

See Appendix A.

IV. RESULTS OF THE QUESTIONNAIRE

The questionnaire³¹ was sent to the teachers involved in this study to obtain their individual opinions of the PMA and the Binet Scale. The teachers' responses to the parts of the questionnaire which pertained to these tests are discussed below.

Usefulness of the results. This information was obtained from question one. It was not meant to be of a comparative nature, but only to determine whether or not the teachers felt the information in the test results were useful.

On the basis of the teachers' responses to this item, 86 per cent of the questionnaires showed the teachers to believe the PMA results to be useful. However, only thirty-seven of the forty-nine questionnaires were answered for the PMA, while forty-five of the forty-nine questionnaires were answered for the Binet Scale. The teachers stated that all of the forty-five Binet results were useful.

Accuracy of prediction. This information was obtained from question five, which asked whether or not the Stanford-Binet Intelligence Scale predicted school success too high, accurately, or too low. In regard to this question, the forty-eight teachers responding believed, 83 per cent to be accurate; 4 per cent to be too low; and 13 per cent to be too high.

³¹See Appendix A.

In response to question six, which was the item concerned with the accuracy of the PMA predictions, only thirty-four teachers responded. These teachers believed 70 per cent of the PMA profile sheets to be accurate; 6 per cent to be too low; 12 per cent to be too high; while 12 per cent were undecided.

Teachers' preference of the form for reporting results. Question eight was felt to be of importance due to the variety of terms used in reporting test results by present day psychometrics. The preference of the teachers for reporting results of intelligence tests was: first, the total intelligence quotient; second, the verbal quotient; third, the mental age; fourth, the performance quotient; and fifth, the percentile rank.

School achievement and test predictions. Perhaps the most accurate determinant in the relationship of these two measures would be the relationship found between the actual school achievement and the test predictions. On question nine the teachers were asked to check the child's achievement on the basis of their opinions. This relationship was computed by using the Pearson product-moment formula which gave a coefficient of correlation of .77 for the PMA predictions versus school achievement. The coefficient of correlation for the Binet Scale prediction versus school achievement was .62.

CHAPTER IV

SUMMARY AND CONCLUSIONS

Summary. On the basis of the preceding data, the relationship between the PMA test batteries and the Binet Scale was found to be .77. Since it is generally observed that correlations over .80 are uncommon and that correlations of about .60 are frequently useful for establishing³¹ that a relationship exists, it appears that the PMA, on the basis of I.Q. results, is statistically valid as compared with the Binet Scale.

The relationship between these measures on the basis of their grade levels was considerably lower. This may indicate that the batteries designed for the elementary and intermediate ages are not as accurate as the primary batteries; however, the numbers were so small on the grade level basis that the correlations are probably not a true picture of the results.

Accepting the Binet Scale as a reliable instrument for detecting the mentally retarded child, the PMA does not appear, in comparison, to be as accurate. The PMA was only able to screen the pupils, selecting forty-two subjects, and after an individual examination with the Binet Scale this

³²Terman, Op.cit., pp. 27-28.

³¹Terman, Op. cit., pp. 27-28.

number was reduced to almost one-half, twenty-two.

All of the teachers answering the forty-nine questionnaire found the Binet reports useful. In comparison 86 per cent of the questionnaires showed the teachers to believe the PMA results to be useful. These responses may have been affected by (1) the teachers being familiar with the Binet reports, (2) the teachers having a lack of understanding of the PMA profile, (3) the profile sheet not being as self-explanatory as Thurstone stated, or (4) a combination of these factors.

In determining the accuracy of prediction between these two measures, according to the teachers' opinions, 70 per cent of the thirty-four questionnaires answered showed that the teachers felt the PMA results were accurate, while 83 per cent of the forty-eight questionnaires answered showed that the teachers felt the Binet Scale was accurate. Again, this item may have been affected by the teachers' greater familiarity with the manner in which the Binet Scale results are given.

The teachers indicated that in reporting test results the total intelligence quotient was preferred to all other types of ratings of present-day measures. This appears to substantiate the general opinion, particularly Terman's³², that teachers are not familiar with statistical terms. This item also points out the importance of converting the mental

³²Terman, Op. cit., pp. 27-28.

age and percentile rank of the Binet Scale and the PMA into an I.Q. rating.

Since the Binet Scale is considered one of the best known tests to predict school success, it is worthwhile to note the relationship between it and actual school achievement as well as the PMA's relationship.

A coefficient of .62 was found in correlating the Binet Scale results with the subject's actual school achievement. The correlation of the PMA results with the subject's actual school achievement was .77. These correlations indicate that there is a definite relationship between the Binet Scale and the PMA tests results and the actual school achievement of the pupils in this study, and that the PMA test results were a better basis of prediction of school achievement than were the results of the Binet Scale.

Conclusions. The following may be concluded from this study;

1. That the correlation between the PMA tests and the Binet Scale established the existence of a definite positive relationship.

2. That the PMA tests are not as accurate or efficient as the Binet Scale as criteria for placement in a mentally retarded class.

3. While the majority of the teachers believed the PMA profile sheets were useful, they were not as enthusiastic

about these results as they were about the written report on the Binet Scale.

4. The correlation between the PMA tests and actual school achievement indicated that the PMA tests may be used to predict school success. In fact, with a correlation of .77 between the PMA predictions and school achievement and a correlation of .62 between the Binet Scale predictions and school achievement it might be possible to strengthen the conclusions by saying that the PMA was found to be a better instrument than the Binet Scale for predicting school success. It is interesting to note, however, that according to the questionnaire data the teachers considered the Binet Scale more accurate in its predictions.

5. The teachers preferred a total I.Q. to all other ways of reporting tests results.

Recommendations. In view of the previous stated data, it appears that the following recommendations are in order:

1. That a correlative study between the PMA and the Binet Scale be made with a larger representative group of school children.

2. That a larger study include: (a) an intercorrelation between subtests of the PMA and I.Q.'s of the Binet Scale to determine the validity of each subtest of the PMA; (b) a correlation between the Total Non-reading Scores of the PMA and the Binet Scale I.Q.'s to evaluate these results as a better

prediction of school success than the Binet Scale I.Q.:
(c) the subtests of the PMA involving verbal factors and the Binet Scale I.Q.'s to evaluate these factors since the Binet Scale is largely a verbal test.

3. That this study be continued on a longitudinal basis to determine the prognostic value of the PMA, in relation to other prognostic tests used today.

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APPENDIX

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INDIANA STATE TEACHERS COLLEGE
Division of Special Education

Committee for Evaluation of Psychological Reports

During the present school year each of the pupils named on the enclosed questionnaires has been examined by the Special Education Clinic in regard to his or her probable academic success and achievement. The chief measures used were: The Stanford Binet Intelligence Scale; the SRA Primary Mental Abilities¹ and the Wechsler Scale for Children.

The individual reports on each child for these three tests have been sent to the principal's office with a duplicate copy for you. It is hoped that these reports have proved of value to you in meeting the individual needs of the pupils.

These questionnaires are submitted in order to evaluate the contribution of the findings of each test in terms of functional information to the teachers and to improve the Clinic's service to the Laboratory School. Your cooperation in answering the questions will greatly aid the Clinic in providing more useful information to you in the future.

Sincerely yours,

Rutherford B. Porter
Director

Enclosures

Before marking the questionnaire you should have three reports on this child: Stanford Binet Intelligence Scale; SRA Primary Mental Abilities; Wechsler Intelligence Scale for Children.

Please check the responses which appear most fitting for _____ and return this questionnaire to the Special Education Clinic by _____.

1. Was the information in this report useful to you?
 - a. Stanford Binet Report Yes () No ()
 - b. SRA Primary Mental Abilities Profile Sheet Yes () No ()
 - c. The Wechsler Scale for Children Report Yes () No ()
2. For which test was the information on this report of most value to you?
 - a. Stanford Binet Report ()
 - b. SRA Primary Mental Abilities Profile Sheet ()
 - c. The Wechsler Scale for Children Report ()
3. For which test was the information on this report of least value to you?
 - a. Stanford Binet Report ()
 - b. SRA Primary Mental Abilities Profile Sheet ()
 - c. The Wechsler Scale for Children Report ()
4. Which report, in your opinion gave the most accurate picture of the child's ability to learn?
 - a. Stanford Binet Report ()
 - b. SRA Primary Mental Abilities Profile Sheet ()
 - c. The Wechsler Scale for Children Report ()
5. Did the Stanford Binet Intelligence Scale predict school success too high () accurately () too low ()?
6. Did the SRA Primary Mental Abilities predict school success too high () accurately () too low ()?
7. Did the Wechsler Scale for Children predict school success too high () accurately () too low ()?

8. Rate your preference (1, best; 2, next best, etc.: 3: 4: 5) of the most beneficial means of reporting a child's standing on an intelligence test.

- a. Verbal intelligence quotient. ()
- b. Performance intelligence quotient. ()
- c. Total intelligence quotient. ()
- d. Mental Age. ()
- e. Percentage Rank ()

9. Please check this child's actual achievement in school work in the appropriate column.

	Very Low	Below Average	Average	Superior	Very Superior
English					
Arithmetic (Numbers)					
Science					
Social Studies					
Social Science					
Reading					
Spelling					

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