THE VALIDITY OF THE METROPOLITAN READINESS TESTS SCORES IN PREDICTING SCORES ON THE OTIS-LENNON MENTAL ABILITY TESTS

BY

GLORIA JONES MATTA

THE VALIDITY OF THE METROPOLITAN READINESS TESTS SCORES IN PREDICTING SCORES ON THE OTIS-LENNON MENTAL ABILITY TESTS

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Master of Arts

in Psychology

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by

Gloria Jones Matta

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To the Graduate Council:

I am submitting herewith a Research Paper written by Gloria Jones Matta entitled "The Validity of the Metropolitan Readiness Tests Scores in Predicting Scores on the Otis-Lennon Ability Tests." I recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts in Psychology.

Elizabeth H. Stokes
Major Professor

Accepted for the Council:

Wayne E. Stamps
Dean of the Graduate School

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CHAPTER I

INTRODUCTION

The progress children make after they enter school depends to a large extent upon their readiness for learning and upon the provisions the school makes for variations in readiness. There would be many limitations placed on providing each child the opportunity for maximum social and intellectual growth without assessment of a child's ability, whether it be an assessment of his readiness for beginning school, or an assessment of his abilities at various times throughout his school years. Barsch (1971) emphasizes this point in stating that "ability assessment, in one form or another, is no longer a laboratory luxury, but has become a necessity in a chaotic educational world."

Metropolitan Readiness Tests, hereafter referred to as MRT, were devised to measure the extent to which school beginners have developed in the social skills and abilities that contribute to readiness for first-grade instruction (Hildreth, 1969). A review of the literature reveals a number of studies employing the MRT in relation to its usefulness as an instrument capable of predicting individual success or failure in the first grade. Most of these studies used academic achievement scores (group tests, teacher ratings) as the criteria for predictive validity of the MRT. Few studies with MRT have dealt specifically with

the development of a design for predicting intelligence beyond the primary grades of school. One of the objectives of this study was to develop predictive information on the MRT in regard to intelligence as measured by the Otis-Lennon Mental Ability Test, hereafter referred to as OL-MAT, in the third grade and the seventh grade.

It is often stated that there is no definition of intelligence; however, the notion of intelligence has been gradually constructed through all of the various attempts to study intelligence. Sattler (1974) sees the definition of intelligence as a continuing problem but believes theories of intelligence are beginning to show a coalescing of views. He cites Vernon's view on intelligence here. Vernon (1969) describes three different meanings associated with the term "intelligence." Intelligence A refers to the genotype form; it can never be directly measured. Intelligence B refers to the phenotype form (observed behavior); it represents the mental ability that develops as a result of genetic factors in interaction with the environment. Intelligence C refers to the results that are obtained by an individual on an intelligence test: verbal, mechanical, or nonverbal ones, sampling many different types of abilities. It is this meaning of intelligence that is of interest for this study.

Concerning intelligence C, Vernon points out some extrinsic handicaps that may affect scores obtained on

intelligence tests. These include the examinee's unfamiliarity with the test situation and his possible lack of motivation, difficulties associated with the item format and testing conditions, mistrust of the examiner and anxiety, and difficulties in understanding the instructions or in communicating the response. These extrinsic handicaps should be considered when analyzing any set of data concerning intelligence test scores, for they may possibly serve as variables to be considered when discrepancies between test scores of the same individual occur.

The value of intelligence tests in the assessment process as cited by Jastak (1967) is their provision of a record which can be used to check predictions made by the examiner and to compare present with past scores obtained by the individual. If such a comparison is to be made between test scores, it is important that the validity of the tests used in the comparison be established. An objective of this study was to determine the correlation coefficient between the MRT, the OL-MAT (Elementary I Level), and the OL-MAT (Intermediate Level). But relating a correlation coefficient to teachers, parents, or any other interested individual will usually be of little value in their understanding of the meaning of the results. Therefore, another objective of this investigation was to interpret the results of this study into meaningful information so that it could be beneficial to its users through the use of expectancy tables.

Statement of the Problem

The purpose of this study was to test the validity of the two variables available in the school cumulative record for predicting intelligence as measured by the Otis-Lennon Mental Ability Test (Intermediate Level) in the seventh grade. The two variables were the Metropolitan Readiness Tests scores and the test scores of the Otis-Lennon Mental Ability Test (Elementary I Level).

It was also the purpose of this study to develop expectancy tables for better understanding and interpretation of the results for use in the counseling of students.

Hypotheses

1. There is a significant correlation between the scores earned on the MRT as compared to the scores earned on the OL-MAT (Elementary I Level).

2. There is a significant correlation between the scores earned on the MRT as compared to the scores earned on the OL-MAT (Intermediate Level).

3. There is a significant correlation between the scores earned on the OL-MAT (Elementary I Level) as compared to the scores earned on the OL-MAT (Intermediate Level).

4. There is a significant correlation between the combined scores of the MRT and the OL-MAT (Elementary I Level) as compared to the scores earned on the OL-MAT (Intermediate Level).

Limitations of the Study

1. The study was confined to students in Burt School, Clarksville, Tennessee.

2. No attempt was made to include the socio-economic level of children used in the study. It was assumed that the selection of students from random classes would be sufficient control to equalize the effects of this variable.

3. Thirteen of the students included in the study had been retained in first grade and were administered a second MRT. The scores of their first MRT were the scores included in this study.

4. No attempt was made to include the age of each student upon administration of the tests. Since 93 percent of the students fell within the "normal age" group according to MRT norms, this was not considered to be a variable of significant importance.

5. The extrinsic handicaps listed by Vernon in the introduction of the study would have some influence on the scores obtained by the students on all three tests. Since these effects cannot be assessed, it was assumed that they were no more likely to occur with one student than with another.

CHAPTER II

REVIEW OF RELATED LITERATURE

In attempting to determine the constancy of the IQ, that is, the extent to which a child's IQ remains the same from one test session to another, Anastasia (1958) reported two separate issues that should be considered. One issue involves the purely empirical, practical, actuarial question of prediction. We know, for example, that the intellectually gifted school child is likely to develop into a superior adult, and that a retarded child will most likely fall below average as an adult. Just how precisely can such forecasts be made, and how early in the individual's life? These are the practical questions of predictions, concerned only with observed trends in test scores. The other issue involves the extent to which the IQ provides an index of the regularity of intellectual development. This can be investigated through an examination of individual age curves or through an analysis of annual increments in test scores. This study was concerned with the first issue: the prediction of intelligence at a later date.

Anastasia (1958) reported that empirically, IQ's have been found to remain sufficiently constant during the elementary school years to make predictions over several years feasible. Among older subjects, intellectual level likewise shows considerable stability, especially when

individuals remain in a fairly constant environment.

Bloom (1964) reviewed longitudinal studies of intelligence from which he concluded that, in terms of intelligence measured at age 17, the individual develops 50 percent of his mature intelligence from conception to age 4, from ages 4 to 8 he develops another 30 percent, and from ages 8 to 17 he develops the remaining 20 percent. This pattern shows differentially accelerated growth, with very rapid growth of intelligence in the early years. As much development takes place during the first four years of life as in the next 13 years. This would suggest the possible great influence of the early environment on this development. We would thus expect the variations in environments to have relatively little effect on the IQ after age eight, but to have marked effect on the IQ before that age, with the greatest effect likely to take place between the ages of about one to five.

Subjects used in this study were at approximate age levels of six, eight, and twelve when administered the tests. Bloom's conclusions would indicate that the greatest effect on IQ would most likely occur between the age levels of six and eight of children used in this study.

Bloom (1964) and Anastasia (1958) also pointed out that the predictive value of the IQ is greater for shorter intervals between tests. The time intervals between tests in this study is approximately two years between the MRT and

OL-MAT (Elementary I Level), four years between the OL-MAT (Elementary Level I) and the OL-MAT (Intermediate Level), and seven years between the MRT and OL-MAT (Intermediate Level).

Olson (1959) discovered that children who were retested after a short period, or, even after a period of one, two, and three years, obtained substantially the same intelligence quotient as before. Variations were attributed more to the unreliability of the tests rather than to shifts of intelligence. Coefficients of correlation of between .80 and .90 were obtained for different intervals between tests.

Bradway (1944) reported that two- and three-year old children who were tested ten years later had intelligence quotients that correlated .66 with the initial test. Similarly, four- and five-year olds showed a correlation of .67.

Thirty-seven percent of the subjects used in this study were black children, and 63 percent were white children. Mitchell (1970), in a study concerning the Murphy-Durrell Reading Readiness Analysis and the MRT, concluded that both perform their functions as well with black pupils as with white pupils, and that the general level of predictive validity is similar for both groups.

Goolsby and Frary (1966) studied the validity of the MRT for white and black students in a southern city. Results showed that there seemed to be no reason to question

the validity of the MRT for black students. It was therefore assumed that the selection of both black and white students as subjects for this study should not influence the results.

The usefulness of correlating a readiness test with a general mental ability or intelligence test may be questioned by some individuals: Is general mental ability a very important component of what is termed readiness? Considerable data are available on the relation between the MRT and tests measuring general intelligence. A correlation coefficient of .76 was reported (Hildreth, 1969) between total score on the MRT and raw score on the Pintner-Cunningham Primary Test, a general mental ability test for early first grade classification. This correlation is quite indicative of substantial agreement between the measures yielded by the two instruments. Additional data available on the relation between the MRT and the OL-MAT (Primary II Level) reported a correlation coefficient of .67, .72, and .70 in various school systems throughout the United States.

Two of the tests used in this study, the MRT and the OL-MAT (Elementary I Level), were of the nonverbal type in which reading knowledge is not required. The third test used was a verbal test, the OL-MAT (Intermediate Level). It is recognized that results of verbal tests are heavily influenced by the reading ability of the pupils taking the

test. Barbe and Grilk (1952) attempted to determine the correlation between various factors in reading ability and IQ. A low positive correlation was found between reading rate and the IQ (not statistically significant), which was an unexpected result. However, correlations between intelligence and reading comprehension and paragraph comprehension were + .55 and + .64 respectively. Since vocabulary is said to be the best single measure of intelligence, it was to be expected that these correlations would be high. Thus, any large discrepancy between test scores obtained on the MRT and OL-MAT (Elementary I Level) as compared to the OL-MAT (Intermediate Level) may possibly be attributed to the influence that the child's reading ability had on the score of his OL-MAT (Intermediate Level).

Since "validity" denotes the degree to which a test actually measures what it purports to measure, in the case of most intelligence tests, validity has been checked against school success as a criterion. Anastasia (1958) notes that tests of intelligence correlate nearly as high with tests of school achievement as they do with each other. Many studies investigating the validity of the MRT and the OL-MAT have been compared with achievement test scores and teacher ratings as criteria.

Chissom and Thomas (1971) investigated the validity of the OL-MAT (Elementary I Level) against a measure of academic performance in the form of teacher ratings. These

ratings (from 1 to 9) were measured in each of four academic areas: (1) Reading, (2) Quantitative, (3) Verbal, and (4) Listening. Reliability for the total scores on the teachers' rating measure were estimated to be .92. The OL-MAT reliability coefficient was equal to .91. The resulting correlation between the two sets of variables was .76, significant at the .001 level.

Mitchell (1962) investigated the predictive validity of the MRT against the Metropolitan Achievement Test (MAT). Her results for 1170 first grade pupils in a county school system showed the MRT to be good predictors of first grade learning. A considerable degree of relationship was found between the five Readiness categories and end-of-year grade equivalents. Less than ten percent of the MRT "Poor Risks" (approximate stanines 1 to 2) reached the grade norm by the end of the school year, and less than ten percent of those of "Superior" (stanines 8 to 9) readiness status failed to reach it.

The evidence of stability of intelligence is based upon measured intelligence; however, Bloom (1964) cautions that "a single early measure of general intelligence cannot be the basis for a long-term decision about an individual." Error variation is reduced when the results of several tests are combined, but the notion of an absolutely constant IQ must be questioned. Regardless of the score a child earns on the MRT, or the combined scores he earns on the

MRT and the OL-MAT, it should be remembered that this child is capable of many more functions than are represented in general intelligence scales. Although Bloom concluded that major changes in intelligence are hard to produce after reaching a high level of stability, he did stress the importance of remembering that individuals can be helped to learn better ways of using their abilities at any time. Increasing one's faith in the instruments used to assess a child's ability is one method of increasing one's assurance that he is better able to help that child to grow in the direction of optimum intellectual development.

CHAPTER III

PRESENTATION OF DATA

Subjects

The subjects for this study were 100 seventh grade students from Burt School, Clarksville, Tennessee. All subjects had been administered the Metropolitan Readiness Tests during the first month of each child's first year in school and the Otis-Lennon Mental Ability Test in the third and the seventh grades. There was a total number of 143 records studied. Those records eliminated were ones which had no record of any one of the three test scores.

All subjects were sampled from six homogeneously grouped classes. The criterion used to assign pupils to class groups homogeneously was based primarily on recommendations made by each student's sixth grade teacher. Stanine scores from the sixth grade Metropolitan Achievement Test were also considered. In most cases, students who earned stanines of 1, 2, or 3 on the MAT were assigned to the "low" group; those with stanines of 4, 5, or 6 were assigned to the "average" group; and those with stanines of 7, 8, or 9 were assigned to the "high" group. Twenty-eight percent of the students used in the study were from a "low" group, twenty-eight percent from an "average" group, and forty-four percent from a "high" group. Fifty-five percent of the subjects were boys, and thirty-seven percent of the subjects were black children.

Apparatus

The Burt School cumulative record of each student provided the prediction variables of each of the following tests used in the study:

(1) Metropolitan Readiness Tests

(2) Otis-Lennon Mental Ability Test (Elementary I Level)

(3) Otis-Lennon Mental Ability Test (Intermediate Level)

The Metropolitan Readiness Tests Manual of Directions (Hildreth, 1969) described the MRT as devised to measure the extent to which school beginners have developed in the several skills and abilities that contribute to readiness for first grade instruction. The tests are designed for testing pupils at the end of the kindergarten year or the beginning of the first grade. They are said to provide a quick, convenient, and dependable basis for early classification of pupils.

Six tests are included in the MRT. These six tests are Word Meaning, Listening, Matching, Alphabet, Numbers, and Copying. Results are reported in standard scores, letter ratings, percentile ranks, and stanines. Stanines were used as the criterion for the interpretation of test scores in analysis of the data.

One purpose of the tests, according to its authors is

to determine later whether pupils have progressed in accordance with their readiness or aptitude, by comparing readiness test results with aptitude test results obtained at a later date. This was one purpose of this study.

Singer, in the Seventh Mental Measurements Yearbook (1972) says of the MRT that the assumptions underlying all of the MRT is that present level of performance, based upon interaction of maturation and past learning, is the best predictor of future achievement.

Farr (1971) says of the test that it appears to be a good predictor of readiness for kindergarten and beginning first grade youngsters. The test is probably most suited for middle class suburban children. In addition, the total test score may serve with the population as a rough screening device of intellectual functioning.

The reliability of the MRT is discussed in the MRT Manual of Directions (1969) in the form of correlations. The sample for which the reliability was computed consisted of students from three school systems. The odd-even reliability coefficient of the total score ranged from .90 to .95, which indicated very satisfactory reliability. The Manual also reported that an overall estimate would place the predictive validity at a level of at least .60. This value was considered to be very good for test results of five- and six-year old children who are in almost every instance taking their first group-administered test.

Indications of content, construct, and concurrent validity are also discussed.

The Otis-Lennon Mental Ability Test Manual for Administration (1967) describes the Otis-Lennon Mental Ability Test series as designed to provide comprehensive, carefully articulated assessment of the general mental ability, or scholastic aptitude of pupils in American schools. Emphasis is placed upon measuring the pupil's facility in reasoning and in dealing abstractly with verbal, symbolic, and figural test content, sampling a broad range of cognitive abilities.

The OL-MAT is comprised of six successive levels developed to ensure comprehensive, efficient measurement of the range of ability commonly found in grades K to 12. The Elementary I Level was used in the study for third grade assessment. The test at this level contains items of the pictorial type which sample the mental processes of classification, following of directions, quantitative reasoning, comprehension of verbal concepts, and reasoning by analogy. The manual states that the total score summarizes the performance on the 80 items comprising the test. It is a nonverbal test in which no reading is required.

The Intermediate Level was used in the study for seventh grade assessment. The test at this level is comprised of 80 items arranged in spiral omnibus form. A

single total score summarizes performance on the test. Various types of verbal and nonverbal items sample a variety of mental processes. Emphasis is placed upon the measurement of abstract reasoning ability.

Results are reported for all levels of the OL-MAT in deviation IQ's, percentile ranks, and stanines. Stanines were used as the criterion for the interpretation of test scores in analysis of the data.

Grotelueschen, in the Seventh Mental Measurements Yearbook (1972), said that the OL-MAT gives ample evidence for predicting scholastic success. However, without stronger evidence of construct validity, it may be concluded that the predictability of scholastic success is due to the fact that the OL-MAT is a direct measure of scholastic success.

Milholland (1972) reported an alternate forms reliability estimate given for each grade and for each age. Those for grades two and below range from .83 to .89; beyond grade four they are above .90. Below age ten the estimates range from .81 to .90; above that age they are all .90 or better. The discussion of validity is organized in accordance with the content, criterion-related, and construct categories of the 1966 Standards for Educational and Psychological Tests and Manuals. The validity research was wide-ranging, and abundant data are provided. The test correlates adequately with educational criteria and other

measures of general scholastic aptitude. The OL-MAT is considered to perform well the functions it is intended to serve.

Procedure

Data were collected from the school cumulative record of one hundred seventh-grade students who attended Burt School, Clarksville, Tennessee. The score each student earned on the MRT, the OL-MAT (Elementary I Level), and the OL-MAT (Intermediate Level) was recorded. The product-moment correlation coefficient was then performed on the data to test the validity of the MRT to predict mental ability in the third grade as measured by the OL-MAT (Elementary I Level), and in the seventh grade as measured by the OL-MAT (Intermediate Level). A correlation was also obtained to test the validity of the OL-MAT (Elementary I Level) to predict mental ability as measured by the OL-MAT (Intermediate Level). A multiple correlation coefficient was performed on the data from the three tests to determine the correlation between the OL-MAT (Intermediate Level) and the best estimate of the OL-MAT (Intermediate Level) from a knowledge of the MRT scores and the OL-MAT (Elementary I Level) scores.

Expectancy tables were prepared in order to make practical application of the collected data. Their purpose was to provide a useful medium for interpretation and communication of the meaning of the test results to school

personnel and parents. An expectancy table was prepared for (a) the MRT in predicting third-grade OL-MAT scores, (b) the MRT in predicting seventh-grade OL-MAT scores, and (c) the third-grade OL-MAT in predicting seventh-grade OL-MAT scores.

A chief limitation of the expectancy table is that it displays the predictive value of only one predictor at a time (Wesman, 1966). In order to permit simultaneous display of relationships among two predictors and a criterion, a double-expectancy table was prepared. This table revealed the predictions made for seventh-grade OL-MAT scores when the MRT score and the third-grade OL-MAT score are considered jointly, rather than singly.

CHAPTER IV

ANALYSIS AND INTERPRETATION OF DATA

The product-moment correlation coefficient was used to test the validity of the MRT to predict mental ability in the third-grade and in the seventh-grade as measured by the OL-MAT. A correlation was also obtained to test the validity of the OL-MAT (Elementary I Level) to predict mental ability in the seventh grade. Table 1 presents the data from this analysis.

Table 1

Correlation of MRT Scores, Third-Grade OL-MAT Scores, and Seventh-Grade OL-MAT Scores

	OL-MAT (Third-grade)	OL-MAT (Seventh-grade)
MRT	.75*	.76*
OL-MAT (Third-grade)		.84*

* Significant at the .01 level of significance

Table 1 indicates that the third-grade OL-MAT was a better predictor of seventh-grade mental ability than the MRT, with a correlation coefficient of .84 significant at the .01 level. The validity of the MRT in predicting third-grade and seventh-grade mental ability, with correlations

of .75 and .76 respectively, was also significant at the .01 level.

A multiple correlation coefficient was performed to test the validity of the MRT combined with the OL-MAT (Elementary I Level) to predict mental ability in the seventh grade. This correlation yielded the highest predictive validity with a correlation of .86, which was significant at the .01 level.

The criterion used in the study for the interpretation of test scores was defined in terms of stanines. The mean MRT for subjects used in the study was 4.61, and the standard deviation was 2.41. The mean OL-MAT (Elementary I Level) was 4.89, and the standard deviation was 1.89. The mean OL-MAT (Intermediate Level) was 4.84, and the standard deviation was 1.86.

In order to provide a workable means for interpreting the results of the study, expectancy tables were prepared from the data collected on each of the tests. Data obtained from these tables provide information which can be useful in the counseling of students.

Table 2 presents the percentage of students represented in the study with regards to their MRT score and their OL-MAT (Elementary I Level) score. In practical application we might wish to answer the question, "What is the probability that a student earning a given MRT score upon entering first-grade will increase his mental ability by the time he

reaches third grade?"

Table 2

Expectancy Table Showing Third-Grade OL-MAT Stanine Scores Based on MRT Stanine Scores

MRT Stanines	Percent receiving 3rd Grade OL Stanine 1	2	3	4	5	6	7	8	9	Total Percent
9						30	20	40	10	100
8						14	72	14		100
7				20	20	20	20	20		100
6				22	22	22	34			100
5				23	18	41	12	6		100
4		17	17	22	17	17	10			100
3	9	9	9	36	36					99
2	8	15	31	15	31					100
1	10	40	30	20						100

As can be noted in Table 2, ten percent of students who scored in the first stanine on the MRT earned a score in the first stanine on the third-grade OL-MAT, forty percent earned a score in the second stanine, thirty percent in the third stanine, and twenty percent in the fourth stanine. No student deviated in either direction from his MRT score by more than three stanines by the time he reached third grade. Not one of the students whose score was in the eighth or ninth stanine on the MRT earned a score in third grade lower

than the sixth stanine. No one falling in the fifth, sixth or seventh stanines on the MRT fell below the fourth stanine on the third-grade OL-MAT. Those earning scores in the first, second, and third stanines on the MRT earned scores from the first to the fifth stanines in third grade.

One might predict then that a student earning a score in the third stanine of the MRT has a 72 percent chance of increasing his stanine score on the third-grade OL-MAT.

Table 3 presents the percentage of students represented in the study with regards to their MRT score and their seventh-grade OL-MAT score. From this table, we might wish to answer the question, "What is the probability that a student earning a given MRT score upon entering first grade will increase his mental ability by the time he reaches seventh grade?"

Table 3

Expectancy Table Showing Seventh Grade OL-MAT Stanine Scores Based on MRT Stanine Scores

MRT Stanines	Percent receiving 7th Grade OL-MAT Stanines 1	2	3	4	5	6	7	8	9	Total Percent
9					10	30	20	10	30	100
8					14	43	43			100
7					20	20	20	40		100
6				22	22	34	22			100
5				24	29	29	12	6		100
4		15	17	39	17		17	5		100
3		10	45	27	18					100
2		23	23	46	8					100
1	30	10	40	20						100

It is interesting to note that those students scoring in the fourth stanine on the MRT had the widest spread of stanine scores on the seventh-grade OL-MAT, ranging from the second to the eighth stanine. It was noted in Table 2 that the widest spread from the MRT to the third-grade OL-MAT was also in the fourth stanine. This would seem to suggest that, for Burt School students, MRT scores earned in the fourth stanine are not as highly predictive of mental ability in the third or seventh grades as are those in other stanines. However, it is noted that 39 percent were at the fourth stanine on both measures, with 39 percent above and 32 percent below the fourth stanine on the OL-MAT.

In both instances, students earning scores in the fourth stanine on the MRT had approximately a 33 percent chance of decreasing their score or a 42 percent chance of increasing their score.

Not one of the students whose MRT score was in the seventh, eighth, or ninth stanines earned a score on the seventh-grade OL-MAT lower than the fifth stanine. Seventy percent of the students scoring in the first stanine on the MRT increased their stanine score in the seventh grade, with 20 percent earning scores in the fourth stanine. Seventy-eight percent scoring in the second stanine on the MRT increased their score by one or two stanines in the seventh grade. One might predict then that a student earning a

score in the fifth stanine on the MRT has a 47 percent chance of increasing his stanine score on the seventh-grade OL-MAT.

Table 4 presents the percentage of students represented in the study with regards to his third-grade OL-MAT score and his seventh-grade OL-MAT score

Table 4

Expectancy Table Showing Seventh-Grade OL-MAT Stanine Scores Based on Third-Grade OL-MAT Stanine Scores

3rd Grade OL-MAT Stanines	Percent receiving Seventh-Grade OL-MAT Stanines									Total Percent
	1	2	3	4	5	6	7	8	9	
9									100	100
8					13	29		29	29	100
7					20	27	40	13		100
6				6	18	41	29	6		100
5			6	47	29	6	12			100
4			21	53	21	5				100
3	9	9	55	27						100
2	10	30	40	20						100
1	33	67								100

As can be noted in Table 4, no student deviated in either direction from his third-grade OL-MAT score by more than two stanines in the seventh-grade, with the exception

of those students earning scores in the eighth stanine; thirteen percent of those students dropped to the fifth stanine. With a correlation coefficient of .84 on the relationship between the third-grade OL-MAT and the seventh-grade OL-MAT, one would not expect a large deviation in scores. Of those students earning scores in the first stanine of the third-grade OL-MAT, 33 percent remained in the first stanine on the seventh-grade OL-MAT, and 67 percent increased their scores to the second stanine. No students earning a score in the first, second, or third stanines in third grade earned a score higher than the fourth stanine in seventh grade. Not one student whose score was in the seventh, eighth, or ninth stanine on the third-grade OL-MAT dropped below the fifth stanine on the seventh-grade OL-MAT.

Table 5 presents the information obtained from a double-entry expectancy table on the relationship of the three tests used in the study. This table presents the percentage of students represented in the study with regards to their seventh-grade OL-MAT scores when the MRT and the third-grade OL-MAT scores are considered jointly as predictors.

Stanine scores were grouped into high, average, and low ratings for use in the double expectancy tables. Scores earned in the first, second, or third stanines were rated as "low," those in the fourth, fifth, or sixth

stanines were rated "average," and those in the seventh, eighth, or ninth stanines were rated "high."

Table 5

Double Expectancy Table Showing Seventh-Grade OL-MAT Scores Based on MRT and Third-Grade OL-MAT Scores

MRT Rating		Third-Grade OL-MAT Rating					
		Low		Average		High	
	**						
High	*7-OL	L	0	L	0	L	0
		A	0	A	57	A	40
		H	0	H	43	H	60
Average	7-OL	L	50	L	3	L	0
		A	50	A	80	A	50
		H	0	H	17	H	50
Low	7-OL	L	94	L	24	L	0
		A	6	A	76	A	0
		H	0	H	0	H	0

* Seventh-grade OL-MAT

** L-Low; A-Average; H-High

It can be noted in Table 5 that 94 percent of the students earning scores in the low group on the MRT and

third-grade OL-MAT earned scores in the low group on the seventh-grade OL-MAT. Only six percent of these students earned scores in the average group. One might predict then that students who have attained scores in the low group on both the MRT and OL-MAT (Elementary I Level) will have only a six percent chance of earning a rating of average on the OL-MAT (Intermediate Level).

Eighty percent of the students who earned scores in the average group on the MRT and third-grade OL-MAT earned scores in the average group on the seventh-grade OL-MAT. Seventeen percent of this group earned scores in the high group of the seventh-grade OL-MAT, and only three percent earned scores in the low group. Thus, if Mary Smith came from the average group on the MRT and third-grade OL-MAT, we would estimate her chances of earning a score on the seventh-grade OL-MAT at only three percent; however, if her score on the MRT was in the average group and her score on the third-grade OL-MAT was in the low group, we would raise the probability estimate to fifty percent.

It can be noted also that 76 percent of the students who earned scores in the low group on the MRT, and in the average group on the third-grade OL-MAT, earned scores in the average group on the seventh-grade OL-MAT. Twenty-four percent of these students earned scores in the low group on the seventh-grade OL-MAT, and none of these students earned scores in the high group in seventh grade.

Sixty percent of the students who earned scores in the high group on the MRT and the third-grade OL-MAT retained these scores on the seventh-grade OL-MAT. Forty percent of these students earned scores in the average group, and none dropped to the low group on the seventh-grade OL-MAT. However, only 43 percent of the students who earned scores in the high group on the MRT, and in the average group on the third-grade OL-MAT, earned scores in the high group on the seventh-grade OL-MAT.

It is noteworthy, too, (Table 5) that students who earned scores in the average group on the MRT and in the low group on the third-grade OL-MAT had a 50 percent chance of earning scores either in the low group or in the average group on the seventh-grade OL-MAT. Students who earned scores in the average group of the MRT and in the high group of the third-grade OL-MAT also had a 50 percent chance of earning scores in the average or in the high group on the seventh-grade OL-MAT.

Prediction is the primary purpose of expectancy tables; however, they may also show whether low standings on one predictor can be compensated for by higher standings on another. In Table 5 it was shown that higher third-grade OL-MAT did compensate for scores earned in the low or average groups of the MRT. If a student earned a score in the low group on the MRT and third-grade OL-MAT, one would estimate his chance of earning a score in the average group

on the seventh-grade OL-MAT at only six percent; if, however, his score on the third-grade OL-MAT was in the average group, one would then estimate his chance of earning a score in the average group on the seventh-grade OL-MAT at 76 percent.

There was a 33 percent increase in a student's chance of earning a score in the high group on the seventh-grade OL-MAT if he compensated an "average" score on the MRT with a "high" score on the third-grade OL-MAT. It is thus shown that the MRT score can be compensated for by a higher score on the third-grade OL-MAT. Earning a lower rating on the third-grade OL-MAT than on the MRT also had the effect of increasing the student's chance to remain in the lower group.

CHAPTER V

SUMMARY AND CONCLUSIONS

The primary purpose of this study was to test the validity of the MRT for predicting mental ability as measured by the OL-MAT (Elementary I Level) and the OL-MAT (Intermediate Level). A secondary purpose was to develop a workable means for better understanding of the results of the study through the use of expectancy tables. Subjects in the study were one hundred seventh-grade students from Burt School in Clarksville, Tennessee. The students were selected from six classes. Two of these classes were homogeneously group as "high" in regards to mental ability; two were grouped as "average"; and two were grouped as "low." The cumulative record of each student provided his scores for the MRT, the OL-MAT (Elementary I Level), and the OL-MAT (Intermediate Level).

The product-moment correlation coefficient was used to compute the correlation of the MRT to the OL-MAT (Elementary I Level) and to the OL-MAT (Intermediate Level). It was also used to determine the correlation of the OL-MAT (Elementary I Level) to the OL-MAT (Intermediate Level). A multiple correlation coefficient was computed on the data from the three tests to determine the correlation between the OL-MAT (Intermediate Level) and the combined use of the MRT and the OL-MAT (Elementary I Level).

A statistical analysis of the data allowed the following conclusions to be drawn:

1. There was a significant correlation between the scores on the MRT as compared to the scores earned on the OL-MAT (Elementary I Level).

2. There was a significant correlation between the scores earned on the MRT as compared to the scores earned on the OL-MAT (Intermediate Level).

3. There was a significant correlation between the scores earned on the OL-MAT (Elementary I Level) as compared to the scores earned on the OL-MAT (Intermediate Level).

4. There was a significant correlation between the combined scores of the MRT and the OL-MAT (Elementary I Level) as compared to the scores earned on the OL-MAT (Intermediate Level).

The conclusions of this study would indicate that there is a high degree of predictability of mental ability from the MRT to the OL-MAT (Elementary I Level) and to the OL-MAT (Intermediate Level). This high predictability is also indicated from the OL-MAT (Elementary I Level) to the OL-MAT (Intermediate Level). The correlation for the combined scores of the MRT and OL-MAT (Elementary I Level) in predicting mental ability as measured by the OL-MAT (Intermediate Level) was the best predictor of OL-MAT (Intermediate Level) scores.

Data from the expectancy tables would indicate that students scoring in the same range (high, average, or low) on both the MRT and the OL-MAT (Elementary I Level) had the best chance of scoring in that same range on the OL-MAT (Intermediate Level). An increase in score range from the MRT to the OL-MAT (Elementary I Level) would increase a student's chance to score in the higher of the two ranges on the OL-MAT (Intermediate Level). A decrease in score range from the MRT to the OL-MAT (Elementary I Level) would increase a student's chance to score in the lower of the two ranges on the OL-MAT (Intermediate Level).

According to this study, scores on the MRT given at the beginning of the first grade were found to be highly predictive in reference to intelligence scores obtained in the third and the seventh grades. In view of this finding, it might be emphasized that a child obtaining a score on the MRT in the first, second, or third stanines should alert school personnel to the need for corrective or developmental prescriptive measures to increase this child's chance for school success. Children receiving "low" scores on the MRT should be evaluated by other measures to determine the area or areas of difficulty. Consideration might also be given to the delaying of school entrance or placement in a kindergarten rather than first grade.

Need for Further Study

The following topics are suggested for further study:

1. The comparison of the relationship of scores obtained on the MRT to scores obtained on individualized intelligence tests, such as the Stanford Binet and WISC.

2. The comparison of the relationship of scores obtained on the MRT, OL-MAT (Elementary I Level) and OL-MAT (Intermediate Level) in relation to the child's socio-economic background.

3. The influence of school entrance age on the relationship between the MRT, the OL-MAT (Elementary I Level) and the OL-MAT (Intermediate Level).

4. The comparison of the relationship of scores obtained on the MRT to children who are placed in EMR classes.

5. The comparison of the relationship of scores obtained on the MRT, OL-MAT (Elementary I Level) and OL-MAT (Intermediate Level) in relation to the sex of the students.

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