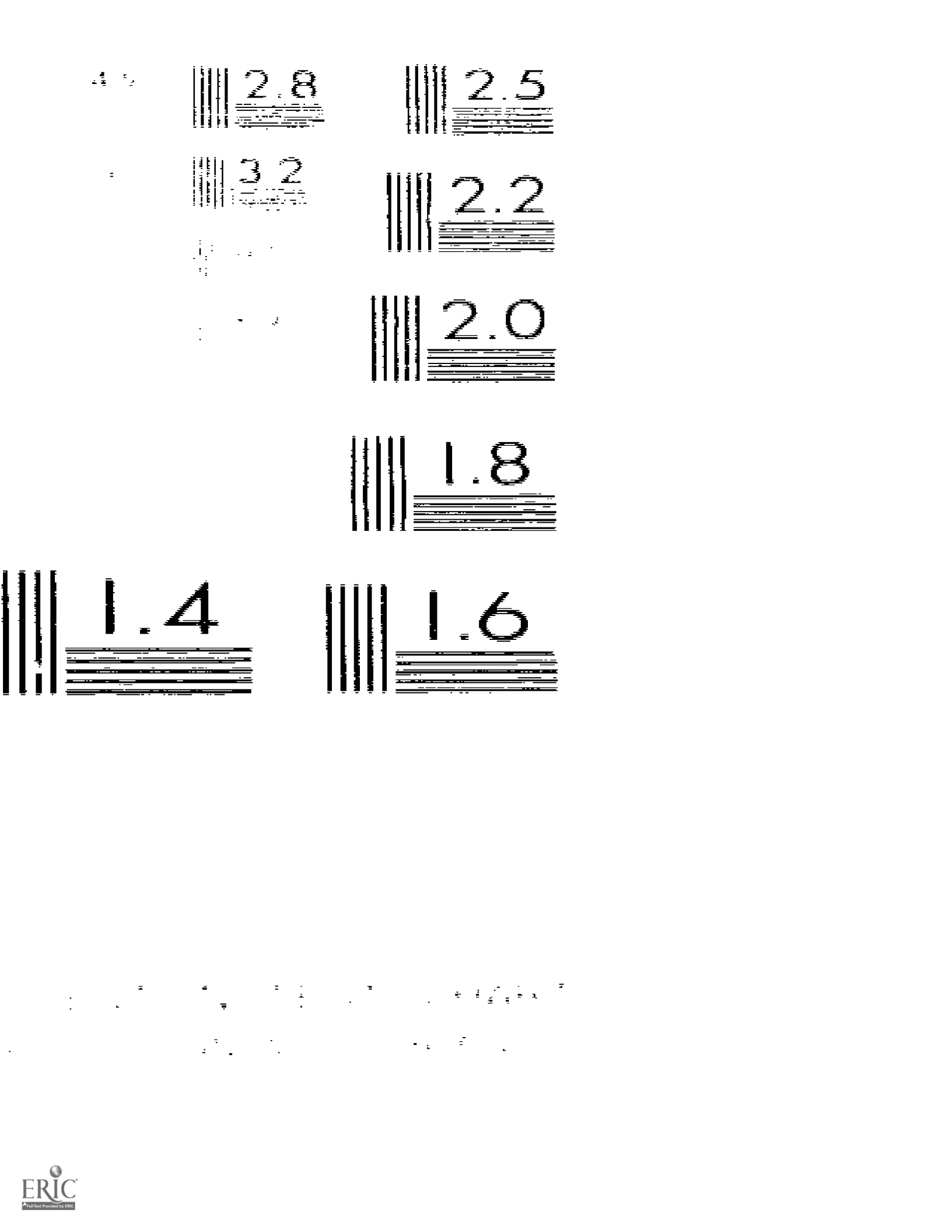
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DOCUMENT RESUME

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ABSTRACT

This study investigated changes in test performance of disadvantaged people as a result of literacy training. Differences between scores obtained before and after basic literacy training were obtained. The study also investigated predictors of achievement-test-score improvement. Standardized achievement tests of vocabulary, reading comprehension, arithmetic computation, and arithmetic reasoning were administered in 16 states. Raw scores were converted to grade score units and five derived scores were computed. The General Aptitude Test Battery (GATB) tests were also administered. Mean achievement test improvement was approximately nine grade scores or one grade equivalent for a mean of 208 hours of training. Initial reading achievement, minority group status, GATB aptitudes, and nonreading test performance predicted arithmetic improvement. In general, the same variables did not predict or were not as predictive of reading achievement improvement. (Author)

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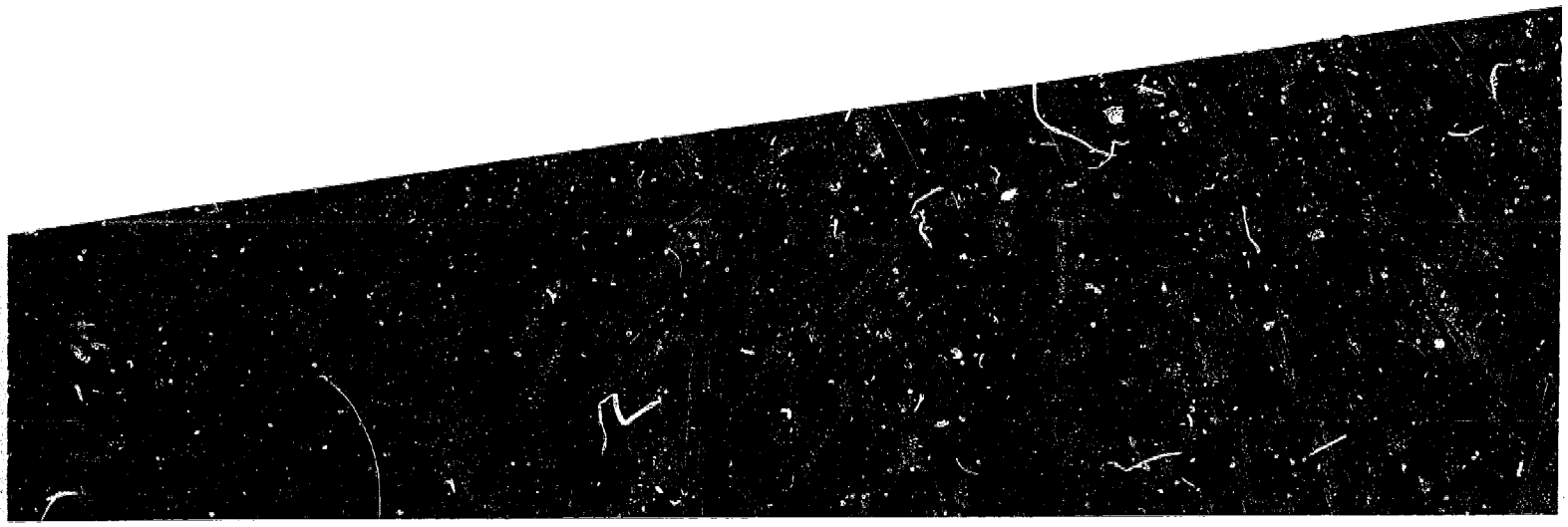
Effect of Basic Literacy Training on Test Scores



U.S. DEPARTMENT OF LABOR

MANPOWER ADMINISTRATION

USTES Test Research Report No. 26

EFFECT OF BASIC LITERACY TRAINING ON TEST SCORES

MANPOWER ADMINISTRATION

U. S. DEPARTMENT OF LABOR

SEPTEMBER 1969

FOREWORD

Extensive research conducted under the Federal-State cooperative test research program in the Training and Employment Service has led to the development of many tools useful in vocational counseling and placement. These tools include aptitude tests, proficiency tests, and non-cognitive measures based on instruments such as interest inventories and biographical information blanks.

The purpose of this series of reports is to provide results of significant test research projects as they are completed. These reports will be of interest to users of the tests and to test research personnel in other organizations.

This report was prepared in the Division of Counseling and Testing Services of the United States Training and Employment Service by Eileen D. Haggerty and Marlin L. Ferral under the general direction of Anthony J. Fantaci, Chief of the Division, and Beatrice J. Dvorak, Assistant Chief of the Division. Statistical services were provided by John A. Hawk of the Division of Counseling and Testing Services.

U.S. Training and Employment Service

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The research described in this report was carried out by the U. S. Training and Employment Service in cooperation with the following 16 State agencies: Alabama, California, Florida, Iowa, Louisiana, Mississippi, Nebraska, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia, and Wisconsin.

EFFECT OF BASIC LITERACY TRAINING ON TEST SCORES

CONTENTS

Summary

This study investigated changes in test performance of disadvantaged persons resulting from literacy training. Differences between scores obtained before basic literacy training and scores obtained from re-testing after basic literacy training were obtained.

The study also investigated predictors of achievement test score improvement. Standardized achievement tests of vocabulary, reading comprehension, arithmetic computation, and arithmetic reasoning were administered in 16 States. Raw scores were converted to grade score units and five derived scores were computed. The GATB and nonreading tests were also administered. Mean achievement test improvement was approximately nine grade scores or one grade equivalent for a mean of 208 hours of training. Initial reading achievement, minority group status, GATB aptitudes, and nonreading test performance predicted arithmetic achievement improvement. In general, the same variables did not predict or were not as predictive of reading achievement improvement.

Background

The first phase of this study was reported in USES Test Research Report No. 24, "Relationship between Education and Achievement for Disadvantaged Individuals in Literacy Training" (U. S. Department of Labor, December, 1968). The correlation between total achievement scores and years of education for the total sample was .34. Correlations between total achievement score for subsamples defined with reference to demographic variables ranged from .08 to .57. Variables that affected the relationship of education and achievement were age, level of education, sex, minority group status, and geographical region.

Purposes

1. To determine the amount of improvement in tested achievement in basic reading and arithmetic skills resulting from literacy training.

2. To investigate variables related to the magnitude of improvement in basic reading and arithmetic skills resulting from literacy training.

Procedure

Sample. Disadvantaged individuals in training projects scheduled to start in July and August of 1967 were selected for the study. Four types of MDTA projects (Multi-occupational, Regular, Youth, and Youth Multi-occupational) plus one OEO project and one OJT project were selected to be typical of literacy training projects for disadvantaged persons throughout the United

States at that time. Most of the individuals in the sample meet the common criteria of disadvantaged, but they are not necessarily representative of all disadvantaged persons.

The research design is attached as Appendix A.

Test Administration. Before training or within the first week of training, subjects were tested with standardized tests of reading and arithmetic achievement. The four basic skills of vocabulary, reading comprehension, arithmetic computation, and arithmetic reasoning were tested by administering one of the following tests:

1. Stanford Achievement Test (Primary II, Intermediate II, and Advanced levels)

2. Metropolitan Achievement Tests (Elementary and Intermediate levels)

Different levels of achievement tests were used both before and after training. In the South most subjects took Stanford Primary II before training and Stanford Intermediate II after training. This procedure assumes that the grade scores are a common scale for both test levels.

Raw scores were converted to grade score units using the publishers' conversions. Publishers' grade norms permit comparison of a test score with scores made by pupils with specific grade status. Ten grade score units equal one grade quivalent. The grade score may be translated into a grade equivalent by placing a decimal point before the last digit. The grade equivalent indicates the median score made by pupils at a specified grade placement. Derived scores included the following:

1. Reading score - an average of the vocabulary and reading comprehension grade scores.

2. Arithmetic score - an average of arithmetic computation and arithmetic reasoning grade scores.

3. Total achievement score - an average of reading and arithmetic scores.

4. Discrepancy score - derived by subtracting total achievement score from reported years of education and adding a constant of 100 to eliminate negative scores.

5. Reading minus arithmetic score - computed by subtracting arithmetic from reading and adding a constant of 100 to eliminate negative scores.

Following the administration of achievement tests but not later than the first week of training, ten of the 16 participating States also administered the GATB, Form B-1002A, and the nonreading tests. Scores on the nonreading tests which were considered invalid were dropped. GATB subjects were selected according to passing performance on the GATB Screening Exercises which were administered first.

At the time of initial testing, data for all subjects were collected for age, education, sex, minority group status, and geographical region.

At the conclusion of literacy training, the duration of which varied for different projects and different individuals, subjects who were still available were retested with standardized achievement tests in 16 States and with the GATB, Form B-1002B in ten of these States.

The following achievement improvement scores were computed:

1. Reading improvement score - the retest reading score minus the initial reading score plus a constant of 100

2. Arithmetic improvement score - the retest arithmetic score minus the initial arithmetic score plus a constant of 100

3. Total improvement score - the retest total score minus the initial total score plus a constant of 100.

The following additional information was recorded for each individual at the time of retesting:

1. Number of hours of literacy training

2. Duration of literacy training in weeks

3. Intensity of literacy training; average number of hours of literacy training per week

4. Relationship of literacy training to vocational training:
   (1) concurrent with vocational training
   (2) preceding vocational training
   (3) no vocational training

5. Completion of literacy training:
   (1) completed planned literacy training
   (2) dropped out of literacy training for non-training related reasons
   (3) dropped out of literacy training for academic reasons

It is important to note that retesting was not done in all projects or for every subject who entered training. Therefore the number of subjects retested is smaller than the number tested initially. However, only one

subject was dropped from training for academic reasons.

The number of subjects taking each kind of test varied. Initial achievement tests were administered to 578 subjects and achievement retests were administered to 377 subjects. Fewer than 200 subjects were tested with the initial GATB, the retest GATB, and the nonreading tests. Approximatley 40 subjects participated in all phases of testing. However, the majority of subjects participated in one, two, or three phases of testing. In order to use all available data, individuals who were tested on one or more tests were retained in the sample.

Statistical Treatment. Residual gain scores were computed for each individual. Residual gain is the difference between retest performance predicted from initial test performance (based on a test-retest correlation) and the observed or actual retest score. The general formula for residual gain is

$$RG = G - \hat{G}$$

RG = residual gain
G = actual or observed gain
$\hat{G}$ = predicted gain

The predicted gain was computed from the formula:

$$\hat{G} = r\left(\frac{Si}{Sr}\right)(Xi - Mi) + Mr$$

r = correlation between initial test and retest
Si = standard deviation of initial test
Sr = standard deviation of retest
Xi = initial test score
Mi = initial test mean
Mr = retest mean

Residual gain is a measure of how much each individual differs, in terms of the amount of his change score, from the group mean. Residual gain was computed for reading, arithmetic, and total achievement scores.

Statistical computations include intercorrelations, analysis of variance, means and standard deviations.

Results and Discussion

Descriptive data are shown in Tables 1, 2, and 3. Means for age and education were 24.2 and 9.6 years, respectively. These figures are very similar to those reported for 578 cases in the first phase of

the study on disadvantaged persons in literacy training. Subjects received an average of 208 hours training in approximately 11 weeks. The average intensity of training was 20 hours per week.

Table 1

Means and Standard Deviations for Demographic and Literacy Training Variables

(N=377)

Variable	M	S.D.
Demographic		
Age (years)	24.2	9.0
Education (years)	9.6	2.0
Literacy Training		
Number of hours	208.0	100.6
Number of weeks	10.9	2.8
Number of hours per week	20.2	10.7

Data in Table 2 shows that mean retest scores are approximately 9 grade scores (about one grade equivalent) above mean initial test scores. The initial test mean scores for 377 cases in Table 2 are not significantly different from comparable mean scores for 578 cases shown in the USES Test Research Report No. 24.

Table 2

Means and Standard Deviations for Initial Achievement Test Scores and Retest Achievement Scores in Grade Score Units
(N=377)

Achievement Score	Subscores					
	Reading		Arithmetic		Total	
	M	S.D.	M	S.D.	M	S.D.
Initial Test	63.3	23.4	59.5	19.1	61.5	19.7
Retest	71.3	23.2	68.8	20.6	70.1	20.4
Difference between Initial and Retest Means	8.0		9.3		8.6	

Means and standard deviations for Improvement and Residual Gain are shown in Table 3. The standard deviations for these two highly correlated variables are almost identical. Comparison of standard deviations in Tables 2 and 3 shows that subjects' test performance varies most on reading but improvement varies most on arithmetic.

Table 3

Means and Standard Deviations for Achievement Improvement and Residual Gain Scores Computed from Initial and Retest Achievement Scores in Grade Score Units

(N=377)

Computed Score	Subscores					
	Reading		Arithmetic		Total	
	M	S.D.	M	S.D.	M	S.D.
Achievement	108.0	10.9	109.3	12.1	108.8	9.0
Improvement	- .8	10.7	-1.2	12.0	-1.0	9.0
Residual Gain						

Intercorrelations of subscores for each achievement score variable are shown in Table 4. Subscore intercorrelations are higher for Initial and Retest Achievement Scores than for Achievement Improvement and Residual Gain Scores.

Table 4

Intercorrelations for Achievement Score Variables

Achievement Score	Subscores		
	Variables	Arithmetic	Total
Initial	Reading	.71	.94
	Arithmetic		.91
Retest	Reading	.73	.94
	Arithmetic		.92
Improvement	Reading	.21	.75
	Arithmetic		.79
Residual Gain	Reading	.26	.77
	Arithmetic		.81

(N=376 or 377. All r's shown are significant at the .01 level.)

Correlations between comparable subscores are shown in Table 5. Test-retest correlations are high, the correlations between Initial Achievement Scores and Improvement are low and negative; the correlations between Retest Scores and Improvement are low and positive. Initial Scores do not predict Residual Gain. Retest Scores have moderate correlations with Residual Gain. The highest correlations between Retest Scores and Improvement and between Retest Scores and Residual Gain are for Arithmetic subscores. The highest correlations shown in Table 5 are between Achievement Improvement and Residual Gain Scores indicating a very dependable relationship between these two variables.

Table 5

Correlations between Comparable Subscores for Achievement Score Variables

(N=376 or 377)

Achievement Score	Subscore	Achievement Score								
		Retest			Improvement			Residual Gain		
		Reading	Arithmetic	Total	Reading	Arithmetic	Total	Reading	Arithmetic	Total
Initial	Reading	.89			-.25			-.03+		
	Arithmetic		.81			-.18			-.03+	
	Total			.90			-.11			-.02+
Retest	Reading				.21			.43		
	Arithmetic					.38			.56	
	Total						.29			.42
Improvement	Reading							.94		
	Arithmetic								.91	
	Total									.94

+Correlations are not significant at the .05 level or above. All unmarked correlations are significant at the .01 level.

All variables were studied in relationship to Improvement and Residual Gain. Data in Table 6 shows no significant correlations between continuous demographic variables or literacy training variables and Improvement or Residual Gain Scores.

Table 6

Correlation Coefficients between Improvement and Residual Gain Scores and Demographic and Literacy Training Variables

Achievement Score	Subscore	Demographic			Literacy Training		
		Age	Education	Sex	Number of hours	Number of weeks	Number of hours per week
Improvement	Reading	.03	.03	.07	-.08	.05	-.08
	Arithmetic	-.03	.07	.03	-.01	.09	-.05
	Total	.00	.07	.07	-.04	.08	-.08
Residual Gain	Reading	-.03	.07	.05	-.03	.06	-.04
	Arithmetic	-.06	.08	.00	-.02	.08	-.02
	Total	-.03	.07	.04	-.02	.09	-.05

(N=376 or 377. None of the r's shown are significant at the .05 level.)

Data in Table 7 show that Arithmetic Residual Gain is predicted by Initial Reading Test Score and the computed score Reading minus Arithmetic.

Table 7

Correlation Coefficients between Improvement and Residual Gain Scores and Initial Achievement Test and Retest Variables

(N=376 or 377)

Achievement Score	Subscore	Initial Test Score					Retest Score		
		Reading	Arithmetic	Total	Discrepancy	Reading minus Arithmetic	Reading	Arithmetic	Total
Improvement	Reading	** -.25	* -.11	** -.20	** .20	** -.23	** .21	.01	* .12
	Arithmetic	.08	** -.18	-.04	.09	** .32	** .18	** .38	** .29
	Total	-.08	** -.18	** -.14	** .17	.09	** .27	** .27	** .29
Residual Gain	Reading	-.03	.05	.00	.06	* -.11	** .43	** .19	** .34
	Arithmetic	** .22	-.03	* .12	-.03	** .34	** .32	** .56	** .46
	Total	.03	-.08	-.02	.08	* .14	** .39	** .40	** .42

*Significant at the .05 level **Significant at the .01 level

Table 8

Group Means and Standard Deviations with F Ratios for Improvement and Residual Gain Score Variances for Subjects Classified According to Minority Group Status

Group	N	Improvement Scores						Residual Gain Scores					
		Reading		Arithmetic		Total		Reading		Arithmetic		Total	
		M	S.D.	M	S.D.	M	S.D.	M	S.D.	M	S.D.	M	S.D.
Negro	267	107.8	11.0	108.2	12.2	108.1	9.0	-1.0	10.9	-2.4	12.0	-1.7	9.1
Spanish American	17	104.0	4.7	111.0	13.3	107.8	7.0	-4.3	5.5	.7	12.6	-1.7	6.8
Non-minority Subjects	89	108.9	9.8	112.3	11.2	110.8	8.3	.1	9.4	2.3	11.4	1.2	8.2
F Ratio		1.55		4.00		3.17		1.35		5.29		3.62	
Level of Significance		.21		.02		.04		.26		.01		.03	

Table 9

Correlation Coefficients between GATB Aptitudes and Achievement Improvement and Residual Gain Scores
(N's vary from 108 to 141 and are shown on Table II in Appendix B)

Achievement Score	Subscore	Initial GATB--B1002A+									Retest GATB--B1002B+								
		G	V	N	S	P	Q	K	F	M	G	V	N	S	P	Q	K	F	M
Improvement	Reading	.05	.03	.07	-.01	.09	.23*	.13	-.13	.04	.10	.11	.14	.04	.21*	.23**	.12	.04	.11
	Arithmetic	.33**	.28**	.38**	.19*	.30**	.40**	.26**	.08	.15	.44**	.25**	.47**	.31**	.33**	.29**	.22**	.09	.25**
	Total	.22*	.20*	.27**	.12	.23**	.40**	.21*	-.03	.10	.33**	.24**	.35**	.21*	.33**	.31**	.18*	.06	.19*
Residual Gain	Reading	.22*	.22*	.23*	.08	.18	.31**	.20*	.05	.11	.27**	.32**	.27**	.12	.34**	.34**	.23*	.11	.16
	Arithmetic	.47**	.39**	.50**	.29**	.36**	.43**	.28**	.12	.18	.53**	.34**	.58**	.40**	.43**	.40**	.27**	.09	.31**
	Total	.34**	.30**	.37**	.18	.29**	.44**	.26**	.01	.15	.42**	.34**	.46**	.27**	.44**	.42**	.29**	.11	.27**

+GATB Aptitudes:
G--Intelligence
V--Verbal
N--Numerical
S--Spatial
P--Form Perception
Q--Clerical
K--Motor Coordination
F--Finger Dexterity
M--Manual Dexterity

*Significant at the .05 level
**Significant at the .01 level

Table 10

Correlation Coefficients between Nonreading Tests and Improvement and Residual Gain Scores
(N's vary from 102 to 114 and are shown on Table III in Appendix B)

Achievement Score	Subscore	X-O Matching	Picture Memory (Part 2)	Form Matching	Letter Cancellation	Substitution (Part 1)	Substitution (Part 2)	Substitution (Part 3)	Coin Matching	Matrices	Symbol Series	Tool Matching	Picture Word Matching	Oral Vocabulary	Three Dimensional Space	Coin Series (Part 1)	Coin Series (Part 2)	Coin Series (Part 3)	Patterns (Part 1)	Patterns (Part 2)
Improvement	Reading	.00	.09	-.14	-.01	-.08	-.11	-.13	-.07	-.05	-.19 *	.01	.06	-.12	-.17	-.13 **	-.10 **	-.11 **	-.19 *	-.11
	Arithmetic	.20	.19	.27	.31	.28	.24	.14	.36	.30	.22	.33 *	.31 *	.11	.13	.36	.36	.35	.09	.07
	Total	.11	.19	.09	.18	.13	.10	.01	.16	.15	.03	.23	.22	.00	-.02	.12	.14	.13	-.05	.00
Residual Gain	Reading	.14	.18	.03	.06	.05	.03	.03	.06	.16	-.01	.20 *	.21 *	.08	-.02	.09	.11	.12	-.03	.04
	Arithmetic	.27 *	.24 *	.39 *	.32 *	.37 *	.34 *	.26	.39 *	.44 **	.35	.41 **	.34 **	.18	.23	.47 **	.40 **	.40 **	.11	.14
	Total	.22	.22	.23	.22	.23	.20	.13	.23	.31	.17	.34	.29	.10	.09	.30	.26	.26	.01	.07

*Significant at the .05 level
**Significant at the .01 level

There were systematic differences in Improvement and Residual Gain for individuals classified according to minority group status. Data are shown in Table 8. Group differences on Arithmetic Improvement Scores and Arithmetic Residual Gain Scores were most significant. Significant differences for Total Scores apparently reflect group differences on Arithmetic. Group differences on Reading were not significant.

Correlations between GATB Aptitudes and Achievement Improvement and Residual Gain are shown in Table 9. Correlations range from insignificant to moderately high. The GATB Aptitudes have the best prediction for Arithmetic Improvement and Arithmetic Residual Gain Scores.

Nonreading test scores shown in Table 10 predict Arithmetic Improvement and Arithmetic Residual Gain. In general, performance on nonreading tests does not predict Reading Improvement or Reading Residual Gain Scores.

Conclusions

The results of this study should be considered suggestive rather than conclusive because of the number of uncontrolled variables which may have influenced the data. A total of five different test forms, each with different original norm samples, were used to determine before and after achievement level. There were differences between geographic regions in the test levels used, both before and after testing, which introduced the additional possibility of complex interaction effects. In addition, some States reported a preponderance of males or of females because of differences in the programs for which trainees were being prepared. Wide differences in duration and intensity of training were reported and differences in the level and content of training undoubtedly also existed.

With all the confounded variation known to be present in the data, caution in the interpretation of the results is particularly important in this study. Observed mean differences in initial and retest scores and differences in subgroup performance may be due partly or entirely to uncontrolled variations in background, treatment or measurement conditions.

However, since such conditions tend to reduce the size of correlation coefficients, reported relationships expressed as correlations should be lower than the true relationships. Thus a repetition of the study should produce correlations as high or higher than those reported here.

Recommendations

This study should be repeated under more controlled conditions to produce data more capable of interpretation. Standard conditions of initial testing, training and retesting should be maintained either through experimental

or statistical control. If conditions cannot be made standard, large enough samples should be collected to make possible separate analyses for each combination of initial test, training and retest. Control groups would also be desirable to determine whether factors not related to basic literacy training contribute to improvement.

Because reading improvement was not predicted as well as arithmetic improvement, it is recommended that additional potential predictors of reading improvement be added to the initial test battery.

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APPENDIX A

Experimental Design for Test
Research on MDTA Trainees in Basic Skills Training

Introductory Note

The basic purposes of this study are shown in statements (1) and (2) below. However, if sufficient testing time can be arranged for, State agencies are also urged to undertake the additional work involved in purpose (3). Information in the design relative to optional purpose (3) is indicated by a double asterisk (**); information so indicated may be disregarded by States carrying out only purposes (1) and (2).

Purposes

(1) To determine the discrepancy between years of education claimed and tested achievement in basic reading and arithmetic skills for disadvantaged individuals receiving literacy training under the MDTA, and to investigate variables related to the magnitude of this discrepancy.

(2) To determine the amount of improvement in tested achievement in basic reading and arithmetic skills resulting from MDTA literacy training and to investigate variables related to the magnitude of the improvement.

**(3) To accomplish one or more of the research purposes specified in Experimental Design No. 7 (April 1965) for USES Test Research on MDTA Trainees. These purposes are: (a) to develop a Literacy Aptitude Pattern for the prediction of improvement in literacy training; (b) to determine the relationships between scores on tests administered before and after literacy training, and (c) to determine the validity of aptitude measures administered before literacy training for predicting GATB Aptitude scores after literacy training. Copies of Experimental Design No. 7 are available upon request from the national office (attention EMTT).

Sample

The sample is to consist of individuals enrolled in MDTA projects and/or project sections in selected States which are scheduled to start in July 1967. These projects, providing basic education or literacy training to those needing it,

have been chosen by the Branch of Training Operations Reports Analysis (see listing in Appendix A). The selected projects comprise a national sample which will be typical of disadvantaged trainees receiving literacy training under the MDTA program throughout the United States. The total sample will be obtained from projects in 20 States. The potential sample totals about 870 cases. Except for individuals eliminated for reasons specified later in this design, all individuals receiving literacy training in the selected project and/or project sections should be included in the final sample.

Initiation of Research

Because of the short project lead time, State agencies should give prompt attention to arranging for testing time with project personnel and ensuring that testing supplies will be available. The national office can provide a limited quantity of copies of the Stanford Achievement Test, Form W, Primary II or Intermediate II levels, to States which do not have sufficient achievement test supplies on hand.

If the agency can obtain sufficient time to administer additional tests for purpose (3), the national office can provide copies of the non-reading aptitude test booklets and supplies of the GATB Screening Exercises, as needed. Appendix D lists the 14 non-reading aptitude tests and their administration times.

As soon as arrangements have been completed with project personnel for initial testing, and as far as possible before the testing takes place, the information listed below should be provided directly to the national office (attention: EMTT) with a copy to the regional office. This information is needed by the national office regardless of whether the agency is carrying out only purposes (1) and (2) or all three purposes.

(1) Number of expected trainees to receive literacy training, and their approximate average educational level and range of education.

(2) Dates on which initial testing and retesting will take place.

(3) Identification of tests that have been or will be administered for selection or counseling purposes.

(4) Number of copies needed (if any) of Stanford Achievement Test (indicate Primary II or Intermediate II level).

** (5) Amount of additional testing time (beyond that required for achievement testing, and exclusive of time required to administer tests listed in (3) above) available at the beginning and at the end of training to accomplish the purposes of Experimental Design No. 7 (purpose (3) of this design.)

** (6) Number of copies on hand of each of the 10 non-reading aptitude test booklet (NCS edition) and GATB Screening Exercises.

(7) Approximate duration of literacy training to be provided (weeks) and amount (number of hours).

(8) Any anticipated problems.

** On the basis of this information, the national office will recommend aptitude test batteries to be administered and will provide any additional copies of the non-reading aptitude test booklets or GATB Screening Exercises needed by States.

Data Collection:

Initial Testing

Prior to the start, or within the first week of literacy training, the tests listed below are to be administered to only those individuals in the project section who are expected to receive literacy training. Any individuals who are tested but are later found not to be receiving literacy training should be dropped from the sample.

(1) Four subtests of the Primary II level of the Stanford Achievement Test: Word Meaning, Paragraph Meaning, Arithmetic Computation, and Arithmetic Concepts.[1] Administration time will be approximately 2 hours; if feasible the tests should be administered in two sessions. Individuals whose scores fall outside the ranges shown in Appendix B should be retested with a more appropriate level if possible, or dropped from the sample. Raw scores should be converted to grade scores. (If an individual must be retested with different levels of one or two subtests for this reason, his retest scores may be substituted for the first scores and treated as though they were his first scores.) Grade scores on the Word Meaning and Paragraph Meaning subtests should be averaged to derive an Initial Reading score, grade scores on the Arithmetic Computation

[1] A different level of the Stanford may be used if indicated by the educational level of the examinees. Comparable subtests of the Metropolitan, California or other standardized achievement test series may be substituted. It may be possible to obtain achievement test scores from ES records rather than administer the tests specifically for this study.

and Arithmetic Concepts subtests should be averaged to derive an Initial Arithmetic score, and the Initial Reading and Initial Arithmetic scores should then be averaged to obtain an initial Total Achievement score. A "discrepancy score" should also be derived by subtracting Initial Total Achievement score from years of education (plus constant of 100).

** (2) The aptitude test battery recommended by the national office should be administered on another day(s) following the administration of the achievement tests but not later than the first week of training. Depending upon the testing time available and the trainees' level of education, the recommended battery may be either/or both of (a) and (b) below.

(a) Some or all of the non-reading aptitude tests. Total administration time for all 14 tests is about 4 hours. Individuals whose scores on one or more of the non-reading aptitude tests are judged invalid by the test administrator should be dropped from the sample for purpose (3), although they should remain in the sample for purposes (1) and (2).

(b) GATB, B-1002A, preceded by GATB Screening Exercises. Individuals who fail either part of the Screening Exercises should be dropped from the sample for purpose (3) although they should remain in the sample for purposes (1) and (2).

The following additional information for each individual should be obtained from ES records or from the individual prior to the start of the literacy training.

(1) age (years)

(2) education (years)

(3) sex

(4) minority group status (to be determined by observation or provided by individuals)

(5) had any other formal education since leaving regular school?

(6) length of time since most recent formal education, regular school or other (years)

(7) geographical region in which majority of education obtained up to age 18 (see Appendix C for U. S. Census classification

to code States into geographical regions)

Data Collection:

Retesting At the conclusion of each individual's literacy training, the tests listed below are to be administered. The duration of training need not be the same for all individuals. If possible, individuals who drop out of training should be retested before they leave. Regardless of whether retesting can be done, for each individual who drops out of literacy training planned for him, an evaluation should be obtained from the Instructor as to whether or not the dropout can be attributed to academic difficulties.

(1) Four subtests of the Intermediate II level of the Stanford Achievement Test: Word Meaning, Paragraph Meaning, Arithmetic Computation, and Arithmetic Applications.[1] If feasible, the tests should be administered in two sessions. Individuals whose scores fall outside the ranges shown in Appendix D should be retested with a more appropriate level if possible, or dropped from the sample. Retest Reading, Retest Arithmetic, and Retest Total Achievement scores should be derived.

Reading, Arithmetic, and Total Achievement Improvement scores should be derived for each individual by subtracting initial from retest grade scores (plus a constant of 100).

** (2) GATB, B-1002B, administered on another day following administration of the achievement tests.

The following additional information should be recorded for each individual at the time of retesting

(1) Total number of hours of literacy training provided.

(2) Duration of literacy training (weeks).

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[1]Comparable subtests of the Metropolitan, California, or other standardized achievement test series may be substituted, provided that the same series is used for retesting that was used for initial testing. A level other than Intermediate II may be used if training has been of short duration; an alternate form should be used for retesting if the same level of tests is used for both initial testing and retesting.

(3) Intensity of t ining: average number of hours of literacy training per week.

(4) Whether literacy training was concurrent with, or preceded, vocational training.

(5) Whether trainee completed scheduled literacy training , dropped out for reasons not related to the literacy training, or dropped out because of academic difficulties.

Report and Submission of Data

Data for each individual to be included in the analysis for purpose (1) are to be submitted in the form of a punched card (Card 1) prepared according to the instructions in Appendix E. Card 1 should be punched only for individuals for whom complete test score data are available.

Data for each individual to be included in the analysis for purpose (2) are to be submitte in the form of a punched card (Card 2) prepared according to the instructions in Appendix F. Cards 1 and 2 should be provided for the same individuals.

Additional data for each individual to be included in the analysis for purpose (3) are to be submitted in the form of two additional punched cards (Cards 3 and 4) prepared according to the instructions in Appendix G.

Decks of Cards 1 and 2 should be submitted within 6 weeks after the completion of initial testing, and decks of Cards 3 and 4 should be submitted within 6 weeks after the completion of all retesting.

All card punching should be verified.

Each deck should be accompanied by a machine listing or Work Table No. 1 showing all data contained on the cards. Each submittal should be accompanied by a brief report describing the project and sample characteristics and any limitations of the data.

Data Analysis

All data analysis will be carried out by the national office.

In connection with purpose (1), the correlations between years of education and the various measures of initial tested achievement will be obtained, and the mean discrepancy between years of education and tested achievement will be found for individuals at various levels of education. A number of biographical variables will be investigated as moderators of the relationship between years of education and tested achievement.

In connection with purpose (2), the average improvement in tested achievement will be determined for individuals at various levels of initial tested achievement. Correlations between initial and final achievement will be computed. The relationships between a number of biographical variables and amount of improvement will be investigated.

In connection with purpose (3), correlations between aptitude scores before and after training will be computed. The predictive validity of aptitude measures before training against improvement in achievement will be determined, and a number of biographical variables will be investigated as moderators of these relationships. Analysis will be done to determine the combination of aptitude measures (to be called Literacy Aptitude Pattern), which best predicts performance in literacy training.

APPENDIX B

Statistical Data

Table I

Intercorrelations between Improvement and Residual Gain Variables and the Following Variables: Demographic, Initial Achievement Test, Literacy Training, and Retest Achievement
(N's = 376 or 377)

		Demographic		Initial Achievement Test					Literacy Training			Retest Achievement			Improvement			Residual Gain		
		Education	Sex	Reading	Arithmetic	Total	Discrepancy	R - A	Hours	Weeks	Hours per week	Reading	Arithmetic	Total	Reading	Arithmetic	Total	Reading	Arithmetic	Total
Demographic	Age	-.29	.08	-.29	-.24	-.29	.00	-.12	-.24	-.20	-.14	-.27	-.24	-.27	.03	-.03	.00	-.03	-.06	-.03
	Education		.18	.30	.22	.29	.61	.16	.01	-.08	.01	.29	.22	.28	.03	.07	.07	.07	.08	.07
	Sex			-.10	-.15	-.13	.26	.03	-.08	-.23	-.01	-.07	-.12	-.10	.07	.03	.07	.05	.00	.04
Initial Achievement Test	Reading				.71	.94	-.52	.59	.17	.02	.17	.89	.71	.86	-.25	.08	-.08	-.03	.22	.03
	Arithmetic					.91	-.56	-.16	.18	-.01	.19	.66	.81	.78	-.10	-.18	-.18	-.08	.05	-.02
	Total						-.58	.27	.19	.00	.19	.85	.82	.90	-.20	-.04	-.14	.00	.12	.02
	Discrepancy							-.09	-.15	-.05	-.15	-.44	-.48	-.49	.20	.09	.17	.06	-.03	.08
	R - A								.03	.04	.01	.48	.07	.31	-.22	.32	.09	-.11	.34	.14
Literacy Training	Hours									-.07	.92	.14	.16	.17	-.08	-.01	-.04	-.03	.01	-.02
	Weeks										-.41	.05	.04	.04	.05	.09	.08	.06	.08	.09
	Hours per week											.23	.15	.15	-.08	-.05	-.08	-.04	-.02	-.05
Retest Achievement	Reading												.73	.94	.21	.18	.27	.43	.32	.39
	Arithmetic													.92	.01	.38	.27	.19	.56	.40
	Total														.12	.29	.29	.34	.46	.42
Improvement	Reading															.21	.75	.94	.17	.70
	Arithmetic																.79	.24	.91	.75
	Total																	.74	.72	.94
Residual Gain	Reading																		.26	.77
	Arithmetic																			.81

Table II

Intercorrelations between Improvement and Residual Gain Variables and Initial GATB Test Aptitudes and GATB Retest Aptitudes
(N's are shown in the lower left portion of the matrix)

			Improvement			Residual Gain			Initial GATB-B-1002A								Retest GATB-B-1002B								
			R	A	T	R	A	T	G	V	N	S	P	Q	K	F	M	G	V	N	S	P	Q	K	F	M
Improvement		Reading		.21	.75	.94	.17	.70	.05	.03	.07	.00	.09	.23	.13	-.13	.04	.10	.11	.14	.04	.21	.23	.12	.04	.11
		Arithmetic	377		.79	.24	.91	.75	.33	.28	.38	.19	.30	.40	.26	.08	.15	.44	.25	.47	.31	.33	.29	.22	.09	.25
		Total	377	377		.74	.73	.94	.22	.20	.27	.12	.23	.40	.21	-.03	.10	.33	.24	.35	.21	.33	.31	.18	.06	.19
Residual Gain		Reading	377	377	377		.26	.77	.22	.22	.23	.08	.18	.31	.20	-.05	.11	.27	.32	.27	.12	.34	.34	.23	.11	.16
		Arithmetic	376	376	376	376		.81	.47	.39	.50	.29	.36	.43	.28	.12	.18	.53	.34	.58	.40	.43	.40	.27	.09	.31
		Total	377	377	377	377	376		.34	.30	.37	.18	.29	.44	.26	.01	.15	.42	.34	.46	.27	.44	.42	.29	.11	.27
Initial GATB Aptitudes (B1002A)	G	Intelligence	108	108	108	108	107	108		.82	.84	.76	.67	.53	.48	.39	.43	.82	.63	.82	.62	.63	.66	.37	.29	.41
	V	Verbal	108	108	108	108	107	108	141		.65	.46	.47	.47	.46	.34	.33	.65	.74	.66	.34	.45	.56	.40	.18	.31
	N	Numerical	108	108	108	108	107	108	141	141		.52	.66	.59	.54	.37	.34	.79	.57	.89	.48	.65	.69	.43	.30	.40
	S	Spatial	108	108	108	108	107	108	141	141	141		.63	.40	.35	.41	.40	.62	.32	.49	.78	.57	.40	.22	.29	.34
	P	Form Perception	108	108	108	108	107	108	141	141	141	141		.62	.68	.52	.55	.66	.40	.64	.64	.80	.63	.48	.48	.50
	Q	Clerical Perception	108	108	108	108	107	108	141	141	141	141	141		.60	.42	.42	.45	.36	.52	.27	.58	.70	.52	.35	.45
	K	Motor Coordination	108	108	108	108	107	108	141	141	141	141	141	141		.52	.62	.39	.30	.48	.26	.58	.55	.87	.42	.51
	F	Finger Dexterity	108	108	108	108	107	108	141	141	141	141	141	141	141		.64	.29	.20	.22	.32	.37	.23	.41	.54	.56
	M	Manual Dexterity	108	108	108	108	107	108	141	141	141	141	141	141	141	141		.36	.19	.34	.36	.46	.41	.58	.53	.75
Retest GATB Aptitudes (B1002B)	G	Intelligence	122	122	122	122	121	122	116	116	116	116	116	116	116	116	116		.68	.87	.74	.67	.57	.31	.23	.39
	V	Verbal	122	122	122	122	121	122	116	116	116	116	116	116	116	116	116	131		.56	.35	.41	.50	.31	.08	.19
	N	Numerical	122	122	122	122	121	122	116	116	116	116	116	116	116	116	116	131	131		.48	.66	.67	.38	.19	.37
	S	Spatial	122	122	122	122	121	122	116	116	116	116	116	116	116	116	116	131	131	131		.65	.40	.17	.29	.40
	P	Form Perception	122	122	122	122	121	122	116	116	116	116	116	116	116	116	116	131	131	131	131		.72	.50	.41	.48
	Q	Clerical Perception	122	122	122	122	121	122	116	116	116	116	116	116	116	116	116	131	131	131	131	131		.52	.32	.52
	K	Motor Coordination	122	122	122	122	121	122	116	116	116	116	116	116	116	116	116	131	131	131	131	131	131		.41	.52
	F	Finger Dexterity	122	122	122	122	121	122	116	116	116	116	116	116	116	116	116	131	131	131	131	131	131	131		.56
	M	Manual Dexterity	122	122	122	122	121	122	116	116	116	116	116	116	116	116	116	131	131	131	131	131	131	131	131	

Table III

Intercorrelations between Improvement and Residual Gain Variables and Nonreading Test Scores
(N's are shown in the lower left portion of the matrix)

		Improvement			Residual Gain			Nonreading Test Scores																				
		Reading	Arithmetic	Total	Reading	Arithmetic	Total	X - O Matching	Picture Memory	Form Matching	Letter Cancellation	Substitution 1	Substitution 2	Substitution 3	Coin Matching	Matrices	Symbol Series	Tool Matching	Picture Word Matching	Oral Vocabulary	3-Dimensional Space	Coin Series 1	Coin Series 2	Coin Series 3	Patterns 1	Patterns 2
Improvement	Reading		.21	.75	.94	.17	.70	.00	.09	-.14	-.01	-.08	-.11	-.13	-.07	-.05	-.19	.01	.06	-.12	-.17	-.13	-.10	-.11	-.19	-.11
	Arithmetic	377		.79	.24	.91	.75	.20	.19	.27	.31	.28	.24	.14	.36	.30	.22	.33	.31	.11	.13	.36	.36	.35	.09	.07
	Total	377	377		.74	.73	.94	.11	.19	.09	.18	.13	.10	.01	.16	.15	.03	.23	.22	.00	-.02	.12	.14	.13	-.05	.00
Residual Gain	Reading	377	377	377		.26	.77	.14	.18	.03	.06	.05	.03	.03	.06	.16	.00	.20	.21	.08	-.02	.09	.11	.12	-.03	.04
	Arithmetic	376	376	376	376		.81	.28	.24	.39	.32	.37	.34	.26	.39	.44	.35	.41	.34	.18	.23	.47	.40	.40	.11	.14
	Total	377	377	377	377	376		.22	.22	.23	.22	.23	.20	.13	.23	.31	.17	.34	.29	.10	.09	.30	.26	.26	.01	.07
Nonreading Test Scores	X - O Matching	114	114	114	114	113	114		.43	.61	.47	.62	.59	.37	.46	.49	.38	.59	.40	.21	.32	.39	.33	.36	.31	.31
	Picture Memory	103	103	103	103	102	103	162		.49	.42	.53	.54	.47	.50	.40	.33	.42	.39	.24	.43	.36	.34	.36	.35	.37
	Form Matching	114	114	114	114	113	114	172	161		.54	.72	.75	.66	.53	.63	.53	.68	.49	.25	.55	.53	.49	.51	.54	.53
	Letter Cancellation	114	114	114	114	113	114	173	162	172		.65	.63	.39	.45	.35	.33	.46	.32	.17	.33	.40	.39	.41	.34	.32
	Substitution 1	114	114	114	114	113	114	173	162	172	173		.88	.58	.55	.55	.50	.60	.46	.29	.39	.53	.52	.54	.44	.45
	Substitution 2	114	114	114	114	113	114	173	162	172	173	173		.67	.63	.59	.51	.66	.46	.28	.40	.59	.56	.59	.53	.53
	Substitution 3	114	114	114	114	113	114	172	161	171	172	172	172		.52	.62	.50	.58	.37	.29	.43	.61	.61	.62	.60	.60
	Coin Matching	114	114	114	114	113	114	173	162	172	173	173	173	172		.61	.43	.47	.38	.26	.37	.56	.56	.60	.53	.49
	Matrices	114	114	114	114	113	114	172	161	171	172	172	172	171	172		.64	.64	.47	.41	.51	.68	.65	.65	.57	.58
	Symbol Series	109	109	109	109	108	109	164	153	163	164	164	164	163	164	164		.50	.46	.39	.47	.63	.55	.58	.54	.50
	Tool Matching	114	114	114	114	113	114	173	162	172	173	173	173	172	173	172	164		.44	.19	.50	.52	.53	.54	.51	.50
	Picture Word Matching	114	114	114	114	113	114	173	162	172	173	173	173	172	173	172	164	173		.54	.38	.43	.44	.40	.30	.31
	Oral Vocabulary	114	114	114	114	113	114	173	162	172	173	173	173	172	173	172	164	173	173		.27	.44	.39	.38	.41	.42
	Three Dimensional Space	114	114	114	114	113	114	173	162	172	173	173	173	172	173	172	164	173	173	173		.41	.38	.39	.49	.44
	Coin Series 1	114	114	114	114	113	114	172	161	171	172	172	172	171	172	171	163	172	172	172	172		.91	.90	.55	.52
	Coin Series 2	114	114	114	114	113	114	173	162	172	173	173	173	172	173	172	164	173	173	173	173	172		.95	.57	.51
	Coin Series 3	113	113	113	113	112	113	171	160	170	171	171	171	170	171	170	163	171	171	171	171	171	171		.59	.53
	Patterns 1	113	113	113	113	112	113	172	161	171	172	172	172	171	172	171	163	172	172	172	172	171	172	170		.89
	Patterns 2	113	113	113	113	112	113	172	161	171	172	172	172	171	172	171	163	172	172	172	172	171	172	170	171	

Table IV

Intercorrelations between GATB Retest Aptitudes and Nonreading Test Scores
(N's are shown in the lower left portion of the matrix)

			Retest GATB, B1002B									Nonreading Tests																		
			G	V	N	S	P	Q	K	F	M	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Retest GATB (B-1002B) Aptitudes	G	Intelligence		.68	.87	.74	.67	.57	.31	.23	.39	.57	.53	.70	.45	.64	.66	.61	.67	.75	.57	.68	.53	.44	.62	.61	.61	.62	.53	.52
	V	Verbal	131		.56	.35	.41	.50	.31	.08	.19	.39	.36	.46	.24	.46	.45	.47	.44	.46	.31	.42	.55	.53	.31	.46	.45	.41	.31	.31
	N	Numerical	131	131		.48	.66	.67	.38	.19	.37	.56	.46	.63	.39	.63	.66	.54	.61	.68	.48	.60	.51	.34	.42	.59	.57	.56	.33	.37
	S	Spatial	131	131	131		.65	.40	.17	.29	.40	.49	.45	.71	.48	.59	.61	.59	.62	.71	.57	.65	.38	.29	.79	.49	.49	.50	.58	.58
	P	Form Perception	131	131	131	131		.72	.50	.41	.48	.63	.52	.71	.57	.74	.78	.56	.58	.65	.44	.76	.43	.22	.53	.49	.48	.49	.41	.48
	Q	Clerical Perception	131	131	131	131	131		.52	.32	.52	.60	.53	.60	.46	.70	.71	.49	.44	.57	.35	.52	.49	.23	.29	.47	.42	.40	.23	.31
	K	Motor Coordination	131	131	131	131	131	131		.41	.52	.45	.30	.35	.30	.59	.49	.29	.30	.25	.08	.40	.25	.03	.12	.32	.32	.35	.04	.14
	F	Finger Dexterity	131	131	131	131	131	131	131		.56	.48	.27	.39	.25	.40	.44	.29	.39	.26	.24	.33	.32	-.08	.17	.23	.21	.24	.31	.33
	M	Manual Dexterity	131	131	131	131	131	131	131	131		.54	.39	.40	.27	.54	.51	.34	.40	.34	.25	.37	.31	.08	.25	.40	.36	.37	.30	.32
Nonreading Test Scores	1.	X - O Matching	104	104	104	104	104	104	104	104	104		.43	.61	.47	.62	.59	.37	.46	.49	.38	.59	.40	.21	.32	.39	.33	.36	.30	.31
	2.	Picture Memory	93	93	93	93	93	93	93	93	93	162		.49	.42	.53	.54	.47	.50	.40	.33	.42	.39	.24	.43	.36	.34	.36	.35	.38
	3.	Form Matching	103	103	103	103	103	103	103	103	103	172	161		.54	.72	.75	.66	.53	.63	.53	.68	.49	.25	.55	.53	.49	.51	.54	.53
	4.	Letter Cancellation	104	104	104	104	104	104	104	104	104	173	162	172		.65	.63	.39	.45	.35	.33	.46	.32	.17	.33	.40	.39	.40	.34	.32
	5.	Substitution 1	104	104	104	104	104	104	104	104	104	173	162	172	173		.88	.58	.55	.55	.50	.60	.46	.29	.39	.53	.52	.54	.44	.45
	6.	Substitution 2	104	104	104	104	104	104	104	104	104	173	162	172	173	173		.67	.62	.59	.51	.66	.46	.28	.40	.59	.56	.59	.53	.53
	7.	Substitution 3	103	103	103	103	103	103	103	103	103	172	161	171	172	172	172		.52	.62	.50	.58	.37	.29	.43	.61	.61	.62	.60	.60
	8.	Coin Matching	104	104	104	104	104	104	104	104	104	173	162	172	173	173	173	172		.61	.43	.47	.38	.26	.37	.56	.56	.60	.53	.49
	9.	Matrices	104	104	104	104	104	104	104	104	104	172	161	171	172	172	172	171	172		.64	.64	.47	.41	.51	.68	.65	.65	.57	.58
	10.	Symbol Series	98	98	98	98	98	98	98	98	98	164	153	163	164	164	164	163	164	164		.50	.46	.39	.47	.63	.55	.58	.54	.50
	11.	Tool Matching	104	104	104	104	104	104	104	104	104	173	162	172	173	173	173	172	173	172	164		.45	.19	.50	.52	.53	.54	.51	.50
	12.	Picture Word Matching	104	104	104	104	104	104	104	104	104	173	162	172	173	173	173	172	173	172	164	173		.54	.38	.43	.44	.40	.30	.31
	13.	Oral Vocabulary	104	104	104	104	104	104	104	104	104	173	162	172	173	173	173	172	173	172	164	173	173		.27	.44	.39	.38	.41	.42
	14.	Three Dimensional Space	104	104	104	104	104	104	104	104	104	173	162	172	173	173	173	172	173	172	164	173	173	173		.41	.38	.39	.49	.44
	15.	Coin Series 1	103	103	103	103	103	103	103	103	103	172	161	171	172	172	172	171	172	171	163	172	172	172	172		.91	.90	.55	.52
	16.	Coin Series 2	104	104	104	104	104	104	104	104	104	173	162	172	173	173	173	172	173	172	164	173	173	173	173	172		.95	.57	.51
	17.	Coin Series 3	102	102	102	102	102	102	102	102	102	171	150	170	171	171	171	170	171	170	163	171	171	171	171	171	171		.59	.53
	18.	Patterns 1	103	103	103	103	103	103	103	103	103	172	151	171	172	172	172	171	172	171	163	172	172	172	172	171	172	170		.89
	19.	Patterns 2	103	103	103	103	103	103	103	103	103	172	151	171	172	172	172	171	172	171	163	172	172	172	172	171	172	170	171	

Table 7

Means and Standard Deviations for Demographic Variables, Literacy Training Variables and Achievement Test Scores in Grade Score Units

Variable	N	M	S.D.
Demographic Variables			
Age (years)	377	24.2	9.0
Education (years)	377	9.6	2.0
Sex (male-1; female-2)	377	1.6	.5
Literacy Training Variables			
Number of hours	377	208.0	100.6
Number of weeks	377	10.9	2.8
Number of hours per week	377	20.2	10.7
Initial Achievement Test Scores			
Achievement Test Sample			
Reading	377	63.3	23.4
Arithmetic	377	59.5	19.1
Total	377	61.5	19.7
Discrepancy	377	134.5	24.0
Reading minus Arithmetic	377	103.8	16.8
Initial GATB Sample			
Reading	141	55.2	21.8
Arithmetic	141	52.2	15.5
Total	141	53.6	17.8
Retest GATB Sample			
Reading	131	55.4	21.4
Arithmetic	131	52.9	15.0
Total	131	54.1	17.4
Nonreading Test Sample			
Reading	173	56.5	21.9
Arithmetic	173	52.9	15.2
Total	173	54.7	17.8
Retest Achievement Scores			
Reading	377	71.3	23.2
Arithmetic	377	68.8	20.6
Total	377	70.1	20.4
Achievement Improvement			
Reading	377	108.0	10.9
Arithmetic	377	109.3	12.1
Total	377	108.8	9.0
Residual Gain			
Reading	377	- .8	10.7
Arithmetic	376	-1.2	12.0
Total	377	-1.0	9.0

Table VI

Means and Standard Deviations for GATB Aptitude Scores and Nonreading Test Scores

Variable	N	M	S.D.
GATB-B1002A-Initial Test Aptitudes			
G-Intelligence	141	77.4	13.6
V-Verbal	141	80.2	11.6
N-Numerical	141	76.1	18.3
S-Spatial	141	85.0	16.9
P-Form Perception	141	83.8	21.6
Q-Clerical Perception	141	91.2	15.1
K-Motor Coordination	141	86.3	22.2
F-Finger Dexterity	141	82.0	25.6
M-Manual Dexterity	141	86.1	26.0
GATB-B1002B-Retest Aptitudes			
G-Intelligence	131	78.9	13.8
V-Verbal	131	81.5	9.7
N-Numerical	131	78.4	18.6
S-Spatial	131	91.0	18.6
P-Form Perception	131	92.0	22.2
Q-Clerical Perception	131	95.0	15.4
K-Motor Coordination	131	94.6	20.4
F-Finger Dexterity	131	92.8	20.4
M-Manual Dexterity	131	98.0	24.2
Nonreading Tests			
X-O Matching	173	30.5	8.4
Picture Memory (Part 2)	162	20.5	5.3
Form Matching	172	23.0	8.6
Letter Cancellation	173	54.3	18.5
Substitution (Part 1)	173	28.4	9.4
Substitution (Part 2)	173	56.1	17.7
Substitution (Part 3)	172	27.8	21.5
Coin Matching	173	18.8	6.4
Matrices	172	14.0	7.2
Symbol Series	164	6.6	4.0
Tool Matching	173	28.3	8.8
Picture Word Matching	173	26.6	5.8
Oral Vocabulary	173	23.2	6.4
Three Dimensional Space	173	13.7	5.9
Coin Series (Part 1)	172	23.9	20.8
Coin Series (Part 2)	173	16.2	13.5
Coin Series (Part 3)	171	13.6	12.2
Patterns (Part 1)	172	14.9	8.8
Patterns (Part 2)	172	13.2	8.3

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