DOCUMENT RESUME

ED 161 882 TM 007 150

TITLE	Technical Report of the California Assessment Program.
INSTITUTION	California State Dept. of Education, Sacramento. Office of Program Evaluation and Research.
PUB DATE	77
NOTE	218p.; For related documents, see TM 007 143, 149, 151, and 152
AVAILABLE FROM	Bureau of Publications, California State Department of Education, P.O. Box 271, Sacramento, California 95802 (no charge)
EDRS PRICE	MF-$0.83 Plus Postage. HC Not Available from EDRS.
DESCRIPTORS	Academic Achievement; Achievement Tests; Basic Skills; Elementary Secondary Education; *Norms; *Program Descriptions; Scores; *State Programs; *Statistical Analysis; Student Characteristics; Student Testing; Tables (Data); Test Construction; *Testing Programs; *Test Interpretation; Test Reliability; Test Results; Test Validity
IDENTIFIERS	California; *California Assessment Program

ABSTRACT

This technical report describes the procedures followed in developing the tests used in the California Assessment Program, the underlying principles of the program, the statistical characteristics of the tests, and the evidence that has been accumulated relating to the validity and reliability of the tests. The report also presents complete descriptions of the process of computing the scores and comparison score bands reported on the 1974-75 and 1975-76 reports for the schools and school districts in California. Background factors included: Previous test scores, socioeconomic index, percent bilingual, percent in Aid to Families with Dependent Children, parental education, and student mobility. Explanations are given for the statistical procedures that were used. The appendices contain correlation matrices and norms tables. (Author/CTM)

Technical Report

California Assessment Program

CALIFORNIA STATE DEPARTMENT OF EDUCATION / Wilson Riles, Superintendent of Public Instruction / Sacramento, 1977

Technical Report

of the California Assessment Program

Prepared under the direction of the

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This document was edited by the Bureau of Publications, California State Department of Education, and was published by the Department, 721 Capitol Mall, Sacramento, CA 95814.

Printed by the Office of State Printing and distributed under the provisions of the Library Distribution Act

1977

Preface

This technical report describes the procedures followed in developing the tests used in the California Assessment Program, the underlying principles of the program, the statistical characteristics of the tests, and the evidence that has been accumulated relating to the validity and reliability of the tests. The report also presents complete descriptions of the process of computing the scores and comparison score bands reported on the 1974-75 and 1975-76 reports for the schools and school districts in California.

We hope that this document, the fourth in a series, will be helpful to those who use the California Assessment Program reports on student achievement and school district performance. Those reports usually present only the final results of the assessment program, whereas this technical report identifies for the reader the processes and formulas used in calculating those results.

We would appreciate any comments and suggestions you may have regarding all of the publications that the Department of Education uses to report the results and the processes used in the California Assessment Program. We are especially grateful to the following persons, who reviewed this document in its draft form and made suggestions for its improvement: David R. Bayless, Educational Assessment Programs, Research Triangle Institute, Research Triangle Park, North Carolina; John Bianchini, Educational Testing

Service, Berkeley; Stephen P. Klein, Rand Corporation, Santa Monica; David Rogosa, Department of Education, University of Chicago; and Lorrie Shepard, Laboratory of Educational Research, University of Colorado.

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I. Introduction

The California Assessment Program (CAP), now in its fifth year of assessing student achievement, currently operates under the provisions of Assembly Bill 665 signed into law in 1972. CAP publishes the following reports; all but the Test Content Specifications are published annually.

1. Test Content Specifications for reading, written expression and spelling, and mathematics (published in 1975)
2. District- and school-level reports accompanied by the Interpretive Supplement
3. Profiles of School District Performance accompanied by A Guide to Interpretation
4. Student Achievement in California Schools: Annual Report
5. Technical Report

Test Content Specifications describe the skills measured by the Reading Test: Second and Third Grades, the Survey of Basic Skills: Grade 6, and the Survey of Basic Skills: Grade 12. The district- and school-level reports--Report on the Reading Test: Second and Third Grades, Report on the Survey of Basic Skills: Grade 6, and Report on the Survey of Basic Skills: Grade 12--are each two-page computer-printed reports. Each report is accompanied by an Interpretive Supplement. Profiles of School District Performance, a district-level report, is a synthesis of information about

all the tested grades in the district and includes, in addition to test scores, background information about the district. The Profile is accompanied by A Guide to Interpretation, which describes the instruments and sources used to collect the data in the district profile and an interpretation of the reported scores. Student Achievement in California Schools: Annual Report provides year-to-year comparisons of student achievement, committee judgments regarding strengths and weaknesses in basic skills programs statewide, and national comparisons of student achievement in California.

This document, the Technical Report: California Assessment Program, which is the fifth in the series, is intended to provide technical information related to the Profiles and to the school and district reports. Although the analyses in this supplement apply primarily to the 1975-76 reports, the supplement will also serve to explain analyses in the 1974-75 reports. Important differences between the 1974-75 reports and those of 1975-76 are indicated in the text.

II. Test Development

Four test instruments have been developed for use in the California Assessment Program by the Office of Program Evaluation and Research, California State Department of Education. The Entry Level Test (ELT) is administered to every first grade public school pupil in California. The ELT is not an achievement test; each school's ELT score is used as a baseline measure of the prereading skills of children starting the first grade. The other three instruments are academic skills achievement tests. The Reading Test: Second and Third Grades was designed to measure reading achievement. The Survey of Basic Skills: Grade 6 and Survey of Basic Skills: Grade 12 were designed to measure achievement in reading, written expression, spelling, and mathematics.

Development of the Entry Level Test

The reason for developing the ELT was to identify among schools initial differences that can be related to reading achievement in later grades. An advisory committee of reading experts selected the prereading skills that they believed were related to later reading performance and that could be measured through group administration of paper-and-pencil tests. The final list of skills tested by the ELT reflects a balance between the need to cover the widest possible range of relevant skills and the need to keep the test short and avoid frequent changing of the response mode.

Development of the Tests for Grades Two, Three, Six, and Twelve

The achievement tests for grades two, three, six, and twelve were developed to achieve the following goals:

- The tests would be relevant to what is being taught in California schools.
- The tests would measure the full range of instructional objectives in specified content areas.
- Each test would have a sufficient number of items for all meaningful subskills so that reliable program diagnostic information could be reported to schools and districts.
- The items in the tests would be valid, free of linguistic biases, and acceptable to California classroom teachers.
- The tests would have acceptable levels of reliability for the total scores and subscores reported at the school and district levels.
- Each test would require no more than 35 minutes for actual testing time.

As a first step, four committees of content area specialists from throughout the state were formed to delineate the objectives to be assessed in reading, written expression, spelling, and mathematics. Each committee developed a descriptive scheme which corresponded to the concepts and skills being taught in the respective content areas in California schools. The descriptive schemes, or test content specifications, served as a basis for selecting items from pools of items written and validated by test publishers. New items were written to correspond to the specifications for which suitable items were not available from test publishers; they were subsequently field-tested. Finally, the items were assigned to short test forms to conform to a matrix sampling design. (See the section on validity for a detailed description of the development of the Test Content Specifications, item selection, and item review procedures.)

In the selection of items, attention was focused on matching items with the descriptions of the domain given in the Test Content Specifications. Content validity and broad coverage of each domain were the main criteria for item selection. For this reason the statistical criterion of high point biserial correlation between item and test score was not considered important in item selection. Also, the items were not discarded solely because they were very easy or very hard. Since the difficulty level of the items depended upon the difficulty of the skill assessed and a wide variety of skills were covered in the assessment program, each test has a wide range of item difficulty values.

In general, the CAP tests are slightly easier than most standardized tests. But the easiness of the tests is certainly not a disadvantage. Because the purpose of the CAP tests is to discriminate among schools or districts--groups of students rather than individuals--items could be "easy" without compromising the purpose of the tests.

Revisions of the Tests

Pursuant to AB 665/1972, the first administrations of the new state-developed assessment instruments were conducted over a period of several years. Each instrument was revised between the first and second cycles of its administration. The revisions were made largely in response to the specific concerns of classroom teachers statewide. The revisions also reflected the fact that appropriate test questions for many skill areas were not available from test publishers or other sources at the time of publication of the first version of the tests. Working with the advisory committee and other teachers, Office of Program Evaluation and Research staff generated, field-tested, and included new questions in the second, and final, versions of the tests. Revisions related to specific tests

are described below.

Entry Level Test

The Entry Level Test was first administered in the fall of 1973. The numbers of items designed to measure various skills were: six for immediate recall, six for letter recognition, six for auditory discrimination, six for visual discrimination, and 12 for language development. The test was changed slightly for the fall, 1974, administration. One item for immediate recall was dropped, and two items for language development and two items for visual discrimination were modified.

Reading Test: Second and Third Grades

The Reading Test for grades two and three was first administered in spring, 1974. The test had 212 items divided into ten forms. Each form had 12 identical oral word-identification items and 20 unique items. The test was changed for the spring 1975 administration as follows: The oral word-identification items that were common to all forms were replaced by items that were unique to each form.[1] The number of comprehension items was increased from 80 to 110. Although the total number of items in the test was increased from 212 to 250, the elimination of common items resulted in the reduction of each from from 32 to 25 items. Table 1 shows the number of items in the 1974-75 version of the Reading Test. Pages 2 and 11 of the Interpretive Supplement for 1974-75 contain details of changes in the two versions of the test. The second, final version of the Reading Test reflected the following content changes.

- Additional emphasis was given to comprehension.
- For the items on consonants, much heavier emphasis was placed on silent letters.

[1] Although items were unique, they followed common directions for test administration purposes.

Table 1

Number of Items and Skills Assessed in Each Test of the California Assessment Program

Name of test and content area	Grade(s) tested	Number of items in the first version	Number of items in the second, final version	Number of common items	Skill area results reported in the district- and school-level reports and the number of items in the second, final versions of the tests
ENTRY LEVEL TEST	1	36	35	30	A total score, which is a composite of the following is reported: Immediate recall (5), Letter recognition (6), Auditory discrimination (6), Visual discrimination (6), and Language development (12).
READING TEST	2 and 3	212	250	150	Word identification (60): Sight words (5), Phonetic analysis (45)--Consonants (15), Vowels (20), Spelling patterns (10), Structural analysis (10); Vocabulary (60): Denotation (22), Relational (38)--Synonyms (24), Antonyms (10), Homonyms (4); Comprehension (110): Literal (77), Interpretive (33); Study-locational (20): Alphabetizing (10), Table of Contents (10).
SURVEY OF BASIC SKILLS: GRADE 6	6	434	480	195	
Reading		98	128	53	Word identification (18); Vocabulary (25); Comprehension (69)--Literal (39), Interpretive/Critical (30); Study-locational (16).
Written Expression		112	128	30	Sentence recognition (22), Sentence manipulation (16), Capitalization (14), Punctuation (18), Word forms (16), Language choices (26), Standard usage (16).
Spelling		56	64	32	Relationships (35) and Word forming (29).
Mathematics		168	160	80	Arithmetic (96)--Number concepts (28), Whole numbers (28), Fractions (20), Decimals (20); Geometry (20); Measurement and graphs (32); Probability and statistics (12).
SURVEY OF BASIC SKILLS: GRADE 12	12	478	558	351	
Reading		144	144	71	Vocabulary (31); Comprehension (97)--Literal (47), Interpretive/Critical (50); Study-locational (13). (Three items not scored.)
Written Expression		82	144	70	Sentence recognition (20), Sentence manipulation (12), Capitalization and punctuation (28), Paragraphs (26), Word forms (24), Language choices (32). (Two items not scored.)
Spelling		54	72	54	(No breakdown into skill areas).
Mathematics		198	198	156	Arithmetic (98)--Number concepts (28), Whole numbers (22), Fractions (26), Decimals (22); Algebra (32); Geometry (24); Measurement (30); Probability and statistics (14).

- Many more questions on vowels were included in the test.
- Study-locational skills in the first version included only alphabetizing items; the second version included items on table of contents as well.

Survey of Basic Skills: Grade 6 and Grade 12.

The Surveys for the sixth and twelfth grades were first administered in spring, 1975, and were subsequently revised for administration in spring, 1976. Table 1 shows the numbers of items in the 1974-75 and 1975-76 versions of the tests and the numbers of items that were common across the two versions.

For the most part, the changes in the 1975-76 version were made as a direct consequence of concerns expressed by classroom teachers in the teacher's questionnaire located at the end of each examiner's manual. Changes in the tests were also made to reflect a more comprehensive coverage of the skills in the Test Content Specifications because appropriate test items were not available from test publishers or other sources when the first versions of the Surveys were developed. All changes were made with the advice and consent of the advisory committees for the various content areas. The specific changes in the content areas of reading, written expression, and mathematics from the 1974-75 version to the 1975-76 version of the tests were as follows.

Reading: Grade Six. The reading section for grade six was expanded from 98 to 128 items. Almost all of the original reading passages were retained. Most of the new items in the revised version--whether they are word identification, vocabulary, or comprehension items--are based upon these passages.

Written Expression: Grade Six. The written expression section for grade six was expanded slightly from 112 to 128 items. Whereas over half,

of the items in the original version were punctuation and capitalization items, this proportion was reduced to nearly 25 percent in the revised version. The revised version also provides a much more balanced coverage of skills than the original version did.

Mathematics: Grade Six. The mathematics section for grade six was slightly reduced from 168 items to 160. The emphasis in assessing the various skill domains remains the same in the two versions except that the emphasis on geometry is less in the new version. Also, the 1975-76 version of the test has a few more test items on the metric system of measurement than the original version had.

Reading: Grade Twelve. The reading section of the revised test for grade twelve strongly emphasizes comprehension skills. Almost half of the items are new; many of the original version's vocabulary items were replaced by comprehension items. While a little over half of the first year's test was devoted to comprehension, 98 of 144 items in the revised version are comprehension items. A major effort was made to select reading passages which would be of interest to high school seniors. The new passages are more contemporary; many have a school orientation or a youth theme.

Written Expression: Grade Twelve. The written expression section for grade twelve was increased from 82 items in the original version to 144 items in the revised version. All areas contain additional items, but the test is more evenly balanced across the various skills than it was before.

Mathematics: Grade Twelve. The mathematics section for grade twelve contains 198 items in both the versions of the test. The relative emphasis in assessing various skills also remains unchanged in the new

version. Eighty percent of the items are exactly the same. Most of the items that were changed in the new version reflect a change of a technical, rather than a substantive, nature. For example, one-fourth of the changed items in the revised version are the same as in the first version except that one of the item distractors was modified from "I don't know" to "none of these."

Test Characteristics

The characteristics of the CAP tests are described in the following sections.

Entry Level Test

The 1974-75 version of the Entry Level Test consisted of 36 items in all; five items designed to measure immediate recall; six letter recognition items; six auditory discrimination items; six visual discrimination items; and 12 language development items. The distribution of the item p-values (percent correct) based on a 2 percent systematic sample from the 1975-76 administration is shown in Table 2.[2] The overall difficulty value of the items, the statewide mean at the pupil level in percent correct units, was 77.5. In number correct units, the statewide mean at the pupil level for the 35-item test was 27.1. The statewide means, medians, and standard deviations at the school and district levels are given in Table 6.

[2] The data for every 50th pupil were selected from the statewide data file. The sample size was 6,278.

Table 2

Distribution of the Item Difficulty Values for the Entry Level Test (1974-75 Version)

Item P-Value (Percent)	Number of Items	Item P-Value (Percent)	Number of Items
46-50	2	71-75	1
51-55	0	76-80	2
56-60	3	81-85	6
61-65	2	86-90	6
66-70	5	91-95	8

Reading Test: Second and Third Grades

Table 1 gives the number of items in the Reading Test. Table 3 gives the distribution of the item p-values, in percent correct units, for the second and third grades. These item p-values were based on a 2 percent systematic sample of data from the 1975-76 administration of the Reading Test.

The overall difficulty value of the test--the statewide mean at the pupil level in percent units--was 67.7 for the second grade and 81.4 for the third grade. The statewide means, medians, aand standard deviations at the school and district levels for both grades are given in Table 6.

Survey of Basic Skills: Grade 6

Table 1 shows the number of items in each of the four content areas of the Survey for grade six. Table 4 shows the distribution of the item p-values in the areas of reading, written expression, spelling, and mathematics. These p-values were based on a 10 percent systematic sample of data from the 1975-76 administration of the test. The overall difficulty

Table 3

Distribution of the Item Difficulty Values for the Reading Test for Grades Two and Three (1974-75 Version)

P-Value (Percent)	Number of Items	
	Grade 2	Grade 3
31-35	1	--
36-40	1	--
41-45	9	1
46-50	12	--
51-55	20	2
56-60	30	8
61-65	38	7
66-70	40	16
71-75	32	28
76-80	24	42
81-85	16	44
86-90	19	59
91-95	[illegible]	33
96-100	[illegible]	10
Total	250	250

values--statewide pupil means in percent correct units--were 66.1, 62.5, 63.6, and 57.4 for the reading, written expression, spelling, and mathematics sections, respectively. The distributional characteristics of the sixth grade Survey scores at the school and district levels are given in Table 5.

Survey of Basic Skills: Grade 12

Table 1 shows the number of items in each of the four content areas of the Survey for the twelfth grade. Table 6 shows the distribution of the item p-values in the areas of reading, written expression, spelling, and mathematics. These p-values are based on a 10 percent systematic sample of data from the 1975-76 administration of the Survey. The statewide student means were 64.1, 62.3, 68.0, and 67.0 for reading, written expression, spelling, and mathematics, respectively. The distributional

characteristics of the grade twelve Survey for the scores at the school and district levels are shown in Table 5.

Table 4

Distribution of the Item Difficulty Values for the Survey of Basic Skills: Grade 6 (1975-76 Version)

P-Value (Percent)	Number of Items in the Test			
	Reading	Written Expression	Spelling	Mathematics
1-10	--	--	--	2
11-20	1	1	--	5
21-30	1	2	3	11
31-35	2	7	3	7
36-40	7	6	2	19
41-45	5	9	4	12
46-50	5	10	7	12
51-55	8	12	4	13
56-60	6	16	5	12
61-65	21	7	5	9
66-70	15	13	5	3
71-80	34	15	8	23
81-90	22	21	16	20
91-100	1	9	2	12
Total	128	128	64	160

Table 5

Distribution Characteristics of the Tests at the Second-, Third-, Sixth-, and Twelfth-Grade Levels, 1975-76

Variables	For School Distribution				For District Distribution			
	N	Mean	Median	Standard Deviation	N	Mean	Median	Standard Deviation
Grade 2 Reading	4,686	68.7	70.2	11.9	927	68.2	69.1	10.9
Grade 3 Reading	4,690	82.1	84.4	9.5	929	82.3	84.1	8.8
Grade 6 Reading	4,348	66.2	67.5	9.8	914	66.9	67.3	9.2
Grade 6 Written Expression	4,348	62.8	63.8	9.6	914	63.2	63.5	9.1
Grade 6 Spelling	4,348	63.7	64.0	7.4	914	63.4	63.6	7.7
Grade 6 Mathematics	4,348	57.4	57.3	8.8	914	57.6	57.4	8.6
Grade 12 Reading	785	63.3	64.2	5.6	366	63.6	64.0	4.4
Grade 12 Written Expression	785	61.4	61.9	5.6	366	61.8	61.8	4.5
Grade 12 Spelling	785	67.5	67.6	4.1	366	67.6	67.6	3.4
Grade 12 Mathematics	785	65.6	66.3	6.6	366	65.9	66.3	5.3

Table 6

Distribution of the Item Difficulty Values for the Survey of Basic Skills: Grade 12 (1975-76 Version)

P-Value (Percent)	Number of Items in the Test			
	Reading	Written Expression	Spelling	Mathematics
1-10	--	1	--	--
11-20	2	4	--	2
21-30	6	7	3	5
31-35	8	6	--	11
36-40	6	6	--	10
41-45	6	9	8	8
46-50	8	11	3	12
51-55	5	5	4	10
56-60	5	9	4	12
61-65	18	15	8	9
66-70	15	13	7	23
71-80	35	27	11	36
81-90	20	18	17	30
91-100	7	11	7	30
Total	141*	142*	72	198

* Three items in reading and two in written expression were not scored.

III. Validity

The validity evidences generally relate to the following two questions: (1) How faithfully do the scores represent the domain of skill, knowledge, or hypothetical construct intended to be measured by the test? (2) How useful are the scores as predictors of other behaviors or situations? Content or construct validation studies were conducted to answer the first question, and concurrent or predictive validation studies were conducted to answer the second question.

The two questions posed above are not necessarily unrelated; however, depending upon the purpose of a test, one question may be more important than the other. For example, information about the predictive validity will be more important with regard to the Entry Level Test, and information about the content validity will be more important with regard to the achievement tests for grades two, three, six, and twelve.

In the following paragraphs questions on test validity are answered by means of coefficients of correlation for test data. The reader is alerted to the fact that three types of correlations, depending upon the level of data aggregation--pupil, school, or district--are described. Correlations and other measures of association depend on the level at which they are calculated. Since this report is concerned with describing the progress of schools and districts, most statistics are reported for these levels of data. The reader should keep in mind that analyses at the pupil level can give accounts different from the ones reported for school and district levels.

Validity of the Entry Level Test

The scores from the Entry Level Test, which is given to pupils at the beginning of grade one, are used to predict pupils' reading test scores at the end of second or third grade. The validity of the test, therefore, depends on two factors. (1) How well does the test measure the constructs it was intended to measure? (2) How strong is the relationship between those constructs and later success in reading?

Predictive Validity of the Entry Level Test

Since no data were available on the ELT and Reading Test scores for the same pupils, the 1975-76 school year data were used to determine the relationship between the ELT scores and the Reading Test scores. For the school-level data, the correlation between these two scores was .73 for the second grade and .74 for the third grade. The "true" correlation between the two variables will be greater than .73 or .74 because of the attenuation of the correlation coefficient due to unreliability of the instruments and the fact that correlations were computed from scores of different groups of pupils.

Construct Validity of the Entry Level Test

In 1973 a study was conducted to determine whether the ELT measured the constructs it was designed to measure.[1] The study utilized data from the administration of the ELT in October, 1973. In addition, districts that routinely administered some other readiness tests in October of that year were asked to supply subtest scores for each pupil. The additional readiness measures were: McHugh-McParland Reading Readiness, Comprehensive Tests of Basic Skills (Form S, Level B), Clymer-Barrett Prereading Battery,

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[1] Shepard, L. "Development of the California Entry Level Test: Construct Validity of the Subtests." Paper presented at the American Educational Research Association Meeting, Chicago, 1974.

and Metropolitan Achievement Test. The pupil level correlations of these measures with ELT are shown in tables 7 through 10.

The evidence for convergent and discriminant validity of the subtests meets basic requirements for construct validity. The subtests correlate reasonably well with measures of the same kind and do not correlate highly with measures that are not of the same kind.

Content Validity of Tests for Grades Two, Three, Six, and Twelve

The tests for grades two, three, six, and twelve are designed to measure comprehensively achievement of instructional objectives of California schools in specified content areas. For these tests content validity was considered most important. The following steps were taken to ensure that test items measured the most representative samples of skills that were part of the instructional programs of California public schools and that items were free from subtle cultural biases.

Statewide Committees

Four advisory committees--one each for lower grade reading, upper grade reading, English language and spelling, and mathematics--assisted the Department of Education in developing the specifications for the test content and in selecting or writing items for the tests. The advisory committees were composed of leading educational specialists in the state; their names are listed in the Test Content Specifications for each test.

Test Content Specifications

The first task undertaken by the committees was to "frame" statewide objectives or test specifications. The committees reviewed and outlined official California Frameworks in reading, English, and mathematics; state-adopted instructional materials; and locally developed instructional

Table 7

Entry Level Test
Correlations with McHugh-McParland Reading Readiness
N = 796 pupils

	McHugh-McParland Subtests					ELT Subtests					
	R.W.	B.S.	V.D.	I.L.	T.T.	I.R.	L.R.	A.D.	V.D.	L.D.	Tota
Hugh-McParland Reading Readiness											
Rhyming Words		.40	.29	.22	.61	.06	.13	.29	.18	.26	.29
Beginning Sounds			.47	.39	.76	.07	.18	.54	.19	.32	.42
Visual Discrimination				.43	.76	.06	.11	.28	.12	.21	.25
Identifying Letters					.65	.03	.31	.34	.15	.23	.31
Total Test						.08	.23	.47	.19	.34	.42
ry Level Test											
mmediate Recall							.18	.11	.11	.10	.54
etter Recognition								.32	.39	.45	.64
ddditory Discrimination									.27	.36	.65
isual Discrimination										.36	.60
anguage Development											.73

Table 8

Entry Level Test
Correlations with Clymer-Barrett Prereading Battery
N = 574 pupils

	Clymer-Barrett Subtests											
	L.R.	W.M.	V.D.	B.S.	E.S.	A.D.	S.C.	C.S.	W.M.	Total	I.R.	L.R.
Clymer-Barrett Prereading Battery												
1. Letter Recognition		.46	.93	.50	.39	.50	.28	.34	.34	.73	.00	.64
2. Word Match			.73	.40	.36	.42	.32	.31	.38	.64	.09	.24
3. Visual Discrimination (1+2 = 3)				.53	.43	.54	.34	.38	.40	.81	.04	.57
4. Beginning Sounds					.58	.90	.35	.42	.42	.72	.08	.30
5. Ending Sounds						.86	.29	.28	.31	.62	.08	.26
6. Auditory Discrimination (4+5 = 6)							.36	.40	.41	.75	.10	.31
7. Shape Completion								.44	.90	.60	.09	.17
8. Copy-A-Sentence									.70	.57	.03	.22
9. Visual Motor (7+8 = 9)										.66	.07	.21
10. Total											.06	.44
Entry Level Test												
Immediate Recall												.01
Letter Recognition												
Auditory Discrimination												
Visual Discrimination												
Language Development												

Table 9

Entry Level Test
Correlations with CTBS (Form S, Level B)
N = 550 pupils

	CTBS Subtests											ELT Subtests					
	L.S.	W.R. I	R.C.	W.R. II	T.R.	L. I	L. II	T.L.	M.C.	M.C.	T.M.	I.R.	L.R.	A.D.	V.D.	L.D.	Total
Comprehensive Tests of Basic Skills																	
1. Letter Sounds		.67	.51	.66	.35	.46	.42	.49	.51	.33	.47	.05	.24	.47	.24	.35	.41
2. Word Recognition I			.60	.71	.87	.42	.37	.44	.49	.37	.49	.02	.15	.36	.16	.23	.28
3. Reading Comprehension				.63	.82	.33	.32	.36	.43	.43	.50	.06	.15	.24	.18	.23	.25
4. Word Recognition II					.87	.39	.37	.43	.47	.42	.52	.02	.18	.35	.17	.24	.29
5. Total Reading (1+2+3+4 = 5)						.45	.42	.51	.55	.45	.58	.03	.20	.41	.23	.30	.35
6. Language I							.58	.83	.44	.32	.41	.13	.25	.28	.18	.33	.39
7. Language II								.88	.41	.31	.40	.06	.14	.30	.15	.26	.28
8. Total Language (6+7 = 8)									.48	.35	.47	.12	.20	.38	.19	.34	.37
9. Main Concepts										.53	.83	.06	.19	.32	.16	.25	.30
10. Math Comprehension											.92	.01	.10	.13	.13	.19	.17
11. Total Math (9+10 = 11)												.03	.16	.23	.16	.24	.24
Entry Level Test																	
Immediate Recall													.15	.07	.19	.18	.53
Letter Recognition														.41	.40	.47	.67
Auditory Discrimination															.33	.41	.67
Visual Discrimination																.48	.57
Language Development																	.78

Table 10

Entry Level Test
Correlations with Metropolitan Achievement Test
N = 879 pupils

	Metro Subtests			ELT Subtests					
	Listening	Reading	Numbers	I.R.	L.R.	A.D.	V.D.	L.D.	Total
Metropolitan Achievement Test									
Listening		.82	.68	.09	.29	.45	.23	.35	.45
Reading			.70	.07	.31	.41	.23	.33	.42
Numbers				.13	.23	.35	.24	.39	.44
Entry Level Test									
Immediate Recall					.02	.04	.09	.07	.54
Letter Recognition						.37	.32	.33	.57
Auditory Discrimination							.27	.34	.65
Visual Discrimination								.32	.58
Language Development									.68

objectives from districts around the state.[2] The committees' aim was to select those objectives which appeared to be common in most instructional materials and in most of the school districts' curricula.

The objectives selected were arranged into content areas, and skills were defined for each content area. The draft objectives for each content area were reviewed for completeness and relevance to instructional programs by personnel in approximately 170 randomly selected school districts.[3] The subsequently revised objectives were published in 1975 in three documents, one each for reading, written expression and spelling, and mathematics, under the general title, Test Content Specifications.[4]

The purpose of developing these specifications was three-fold; to arrive at an objective statement of the goals of instructional programs in California schools; to translate those objectives into logical networks of finer and finer levels of specificity so as to define item domains and thus facilitate item construction; and to provide a description of the

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[2] English Language Framework for California Public Schools: Kindergarten Through Grade Twelve (Sacramento: California State Department of Education, 1976); Framework in Reading for the Elementary and Secondary Schools of California (Sacramento: California State Department of Education, 1973); and Mathematics Framework for California Public Schools: Kindergarten Through Grade Twelve (Sacramento: California State Department of Education, 1975).

[3] The review sheet required responses on the following questions for each objective: (i) Whether the objective was part of district curriculum? (ii) Should the objective be assessed in the statewide testing program?

[4] Test Content Specifications for California State Reading Tests: Grades Two, Three, Six, and Twelve (Sacramento: California State Department of Education; 1975); Test Content Specifications for the Survey of Basic Skills: Mathematics, Grades Six and Twelve (Sacramento: California State Department of Education, 1975); and Test Content Specifications for the Survey of Basic Skills: Written Expression and Spelling, Grades Six and Twelve (Sacramento: California State Department of Education, 1975).

tests to help in the interpretation of the scores for the various skill areas in the tests.

Formation of Item Pools

The content specifications were sent to major test publishers, who then supplied test questions which matched item domain specifications. Additional items were written by teachers and committee members for those item domains for which publishers did not submit any items. The teacher-written items were field-tested in selected California schools.

Review of Item Pools

Statewide teams of classroom teachers reviewed the resulting, initially large pools of items. An item was dropped from a pool if it did not appear to measure the skill specified in the item domain or if it did not meet face validity criteria (such as an item's appropriateness to the grade level to be tested).

Linguistic Review

The teacher-reviewed items were further reviewed by linguists and minority group testing experts for any subtle biases against students of different language or cultural backgrounds. Items judged to have a linguistic or cultural bias were either modified or dropped.

Validity Evidences of the Reading Test

The following paragraphs describe the relationship of the Reading Test scores with those of external criterion measures.

Teacher Validation of the Reading Test

A study was conducted to find out the degree of correlation between the score from the Reading Test: Second and Third Grades and teachers' judgments of pupils' competency in reading skills. In conjunction with the 1976 administration of the Reading Test, teachers in 19 schools in

five districts were asked to code the pupil booklets with a value from 1 to 3 in accordance with the following instructions:

Code 1: Fill in circle "1" if the pupil definitely is able to keep up with the reading requirements of the next grade.

Code 2: Fill in circle "2" if the pupil is on the borderline--that is, under the best circumstances, the pupil might be able to keep up with the reading requirements of the next grade but is likely to have a great deal of difficulty otherwise.

Code 3: Fill in Circle "3" if the pupil definitely is not reading well enough to go on to the next grade level.

The analysis of the data revealed that teacher judgments were highly correlated with test scores. The multiple correlation for coding was .72 for grade two, and .68 for grade three. Thus, approximately 50 percent of the variance in test scores at both grades could be accounted for by teacher judgment. Despite the fact that each form of the test had only 25 items and the traditional unreliability of subjective judgments, these values are quite remarkable. In grade two the differences in mean Reading Test scores between the groups coded 1, 2, and 3 were almost one full standard deviation.

Correlation of the Reading Test with Other Tests

A limited number of studies were conducted to examine the correlation between mean school scores on the Reading Test and those on other tests. The first analysis, which established relationship between the Reading Test and the previously used Cooperative Primary Reading Test (COOP), was reported in the 1973-74 Technical Supplement, Table 31, page 51. The correlation between Reading Test mean school scores for 1974 and COOP Test median school scores for 1973 was .72 for the second grade and .76 for the third grade.

More recently, sample districts have been asked to report standardized achievement test scores for each of their schools for spring, 1976. Generally, the administrations of the standardized tests and Reading Test were not more than four weeks apart. The results from the standardized tests were correlated with Reading Test scores. The school-level correlations between the Stanford Diagnostic Reading Test (Level III, Form A) and the Reading Test was .87. A similar study done with the Comprehensive Tests of Basic Skills (CTBS) (Form S, Level 1) produced a correlation of .92.

Also, the results of a study conducted by the Center for the Study of Evaluation (CSE) at the University of California, Los Angeles, indicated a high degree of correlation between the May, 1976, Reading Test scores and the scores on the reading test developed by the CSE.[5] For a sample of 70 schools in the study, the school-level correlation between the Reading Test and CSE reading test was .79 at the second grade and .73 at the third grade.

Validity Evidences of the Grade Six Survey

Table 11 shows the correlation coefficients between scores from the sixth grade Survey and those from the previously used test--Comprehensive Tests of Basic Skills (Form Q). The coefficients were computed on the basis of data from the fall, 1973, administration of the CTBS and the 1974-75 administration of the Survey. Correlations between the Survey and the CTBS were calculated for the data at the school and district levels. However, since Survey and CTBS data were not collected at the same time, a realistic appraisal of the correlations in Table 11 can be

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[5] Evaluation of the California Early Childhood Education Program, Volume I. Los Angeles: Center for the Study of Evaluation, UCLA Graduate School of Education, 1976.

made by comparing these correlations with correlations across years for the CTBS. For district-level data the correlations between the fall, 1972, administration and the fall, 1973, administrations of the CTBS are given in Appendix E-2. These correlations were .61, .52, .39, and .52 for reading, written expression, spelling, and mathematics, respectively. The results show that across years the Survey correlates with the CTBS almost as well as the CTBS does with itself.

The correlations presented in Table 11 are also the most conservative estimates of the true correlations between the scores from the Survey and CTBS. These correlations are attenuated because of the fact that the observations were made on the different pupils in different years and because the tests did not have perfect reliability coefficients.

Validity Evidences of the Grade Twelve Survey

The validity of the grade twelve Survey is discussed in the following sections.

Correlations of the Grade Twelve Survey with the Iowa Tests of Educational Development

Table 12 shows the correlation coefficients between the scores from the twelfth grade Survey and those from the previously used test--Form X-4

Table 11

Correlation Coefficients Between CTBS Scores and Grade 6 Survey Scores

Content Area	School Level N=4,360	District Level N=925
Reading	.79	.58
Written Expression	.74	.56
Spelling	.62	.39
Mathematics	.70	.47

of the Iowa Tests of Educational Development (ITED). The correlations are based on data from the fall, 1973, administration of the ITED and the spring, 1975, administration of the Survey. The correlation coefficients are presented for the data at the school and district level. However, since these correlations are not based upon the data from the same students, the correlations across years for ITED can be helpful to judge the usefulness of the correlations presented in Table 12. Appendix E-3 presents district-level correlations for ITED between fall, 1972, and fall, 1973, administrations of ITED. The correlations were .74, .77, .65, and .78 for reading, written expression, spelling, and mathematics, respectively. The correlations at the district level in Table 12 are comparable with these figures; they show a substantial correlation between the Survey and the ITED.

Table 12

Correlation Coefficients Between ITED Scores and Grade Twelve Survey Scores

Content Area	School Level N=4,360	District Level N=925
Reading	.76	.61
Written Expression	.80	.66
Spelling	.66	.52
Mathematics	.81	.69

The correlations presented in Table 12 are also the most conservative estimates of the true correlations between the scores from the Survey and the ITED. The correlations presented in Table 12 are attenuated because of the fact that observations were made on different students in

different years and because the tests did not have perfect reliability coefficients.

Correlations of Survey Scores with Expository Writing

In spring, 1975, the Office of Program Evaluation and Research conducted a special writing assessment as a means of validating and improving the objective test of written expression in the Survey of Basic Skills: Grade 12.[6] Each of 4,116 representative California high school seniors was randomly assigned one of five essay topics. The essays were then evaluated by experienced English teachers who used clearly defined holistic scoring procedures. The scores from the two measures of written expression were then correlated for the data at the school level.

Table 13 gives the school mean correlations between skill areas of the Survey and the essays. The correlation between the total essay score and total written expression score at the school level was .79. Other correlations varied with the essay topic, the scoring instructions, and the skill area of the written expression test. These correlations may well reflect the confidence with which the more assured writer manages conventions in the longer, more complex sentences he or she is capable of writing.

The correlations reported in Table 13 constitute lower limits of the true relationships. The true relationships were attenuated due to several factors. First, the correlations were limited by the unreliability of each instrument. Second, an error was associated with both sets of scores in that there was a one-month gap between the administration of the two measures. It is not likely that all of the same students were present on both testing dates.

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[6] For more detailed discussion of the sampling and instrumentation, see An Assessment of the Writing Performance of California High School Seniors. Sacramento: California State Department of Education, 1977.

Table 13

Correlation Coefficients Between School Mean Scores on the Survey of Basic Skills: Grade 12 and the School Means for Essays

ESSAY	SURVEY OF BASIC SKILLS: GRADE 12						
	Sentences			Paragraph	Word Forming	Language Choices	Tot
	Recognition and Manipulation	Capitalization and Punctuation	Total				
ay A (Object)							
omposition	.58	.77	.67	.54	.49	.66	.6
echanics	.67	.81	.71	.62	.52	.71	.7
ay B (Directions)							
omposition	.76	.81	.63	.30	.64	.38	.4
ay C (Letter)							
omposition	.47	.38	.47	.47	.48	.51	.5
ay D (Invention)							
omposition	.46	.77	.68	.64	.49	.58	.5
echanics	.43	.65	.61	.56	.39	.57	.5
ay E (Accident)							
omposition	.52	.80	.71	.72	.48	.54	.7
rage school score all essays							.7

IV. Reliability

In reliability estimation two or more sets of similar measurements are usually correlated; the squared correlation is called the reliability coefficient. The squared correlation gives the proportion of the total variation that is due to systematic sources in the measures. Depending upon the model or method used for reliability estimation, the coefficient of reliability is an index of the homogeneity of items in the test; stability of pupils' scores; or stability over time; and so forth.

Although questions arise regarding the reliability of instruments, often it is not recognized that the most meaningful reliability is the one that pertains to the use of scores from that instrument. With the traditional use of standardized tests for estimating "true" scores of pupils, other true scores can be defined for schools, districts, or programs as units. In those cases the meaning or interpretation of true scores will not be the same as for measuring individual pupils.

The concept that some reliability estimates are more meaningful than others is particularly important for appraising the quality of the CAP tests. The CAP instruments are used to compare schools (or districts); therefore, the instruments' quality should be judged on the basis of the true school differences that they can account for. In comparison, the quality of test publishers' instruments designed for assessing the differences between pupils should be judged by the true individual pupil differences that they can account for. The systematic variations that are considered to result from true differences in reliability estimation of

a publisher's test must be considered as random variations (error) in reliability estimation of the CAP tests.

In this supplement several types of reliability estimates are provided for each of the CAP instruments. Traditional KR-20 estimates, which are discussed below, are among those provided. However, as explained in the text, these estimates are not the most meaningful indicators of the test quality. Other, more meaningful reliability coefficients, primarily based upon school mean correlations, are given for each of the tests. Reliability estimates based upon variance component analysis are also given for the sixth grade Survey and twelfth grade Survey.

The most meaningful reliability coefficients are given in the following paragraphs for each of the CAP tests. The reader should note, however, that the suggestion is made in Standards for Educational and Psychological Tests that reliability indices have limited value from the point of view of their real usage.[1] For practical purposes, standard error of the mean is a more useful statistic because it allows one to construct with a given probability the limits within which the true score of the school will fall. For this reason, standard error of the estimates are also given for the total test score for each test.

Reliability of the Reading Test

The following paragraphs give several different types of reliabilities of the Reading Test.

KR-20

The KR-20 of a test is a measure of internal consistency or homogeneity of items within the test. The Reading Test consists of 250 items

[1] Standards for Educational and Psychological Tests. Washington, D.C.: American Psychological Association, Inc., 1974, p.50.

divided into ten forms of 25 items each. The lowest KR-20 on any one form for grade two was .88 and the highest was .89. The figures for grade three were .87 and .90. On the basis of the Spearman-Brown formula, the estimated pupil reliability of the full 250-item test is between .98 and .99. However, since pupil-level results are not reported, these reliability coefficients are not the most appropriate reliability indices.

Internal Consistency of Group Scores

A meaningful coefficient, comparable to KR-20 was computed for the Reading Test from the school-level data. In the computation of this coefficient, the total test variance in the KR-20 formula was replaced by the variance between the school means. The coefficient computed from the spring, 1976, data was .987 for both grades two and three. Thus, the internal consistency of the Reading Test is quite high.

Stability Across Grades

Since the Reading Test is administered in both grades two and three, it was possible to compute the coefficient of stability--the school-level correlation between second and third grade scores. Figure 1 shows graphically the correlation between second and third grade school mean scores, by number of pupils tested for the Reading Test. The graph shows that the coefficient of stability rises as the number of pupils tested rises. Figure 1 also shows a similar relationship for the Cooperative Primary Reading Test, the test used in the statewide testing program prior to the Reading Test.[2] For virtually all sizes of schools, the coefficient of stability is higher for the Reading Test than for the COOP Test. The higher stability coefficient of the Reading Test can be attributed to the fact that the content of the Reading Test is much broader than that of the COOP Test.

[2] It is to be noted that different COOP Test forms were administered in grades two and three; Form 2A was administered in grade two and Form 23B in Grade three.

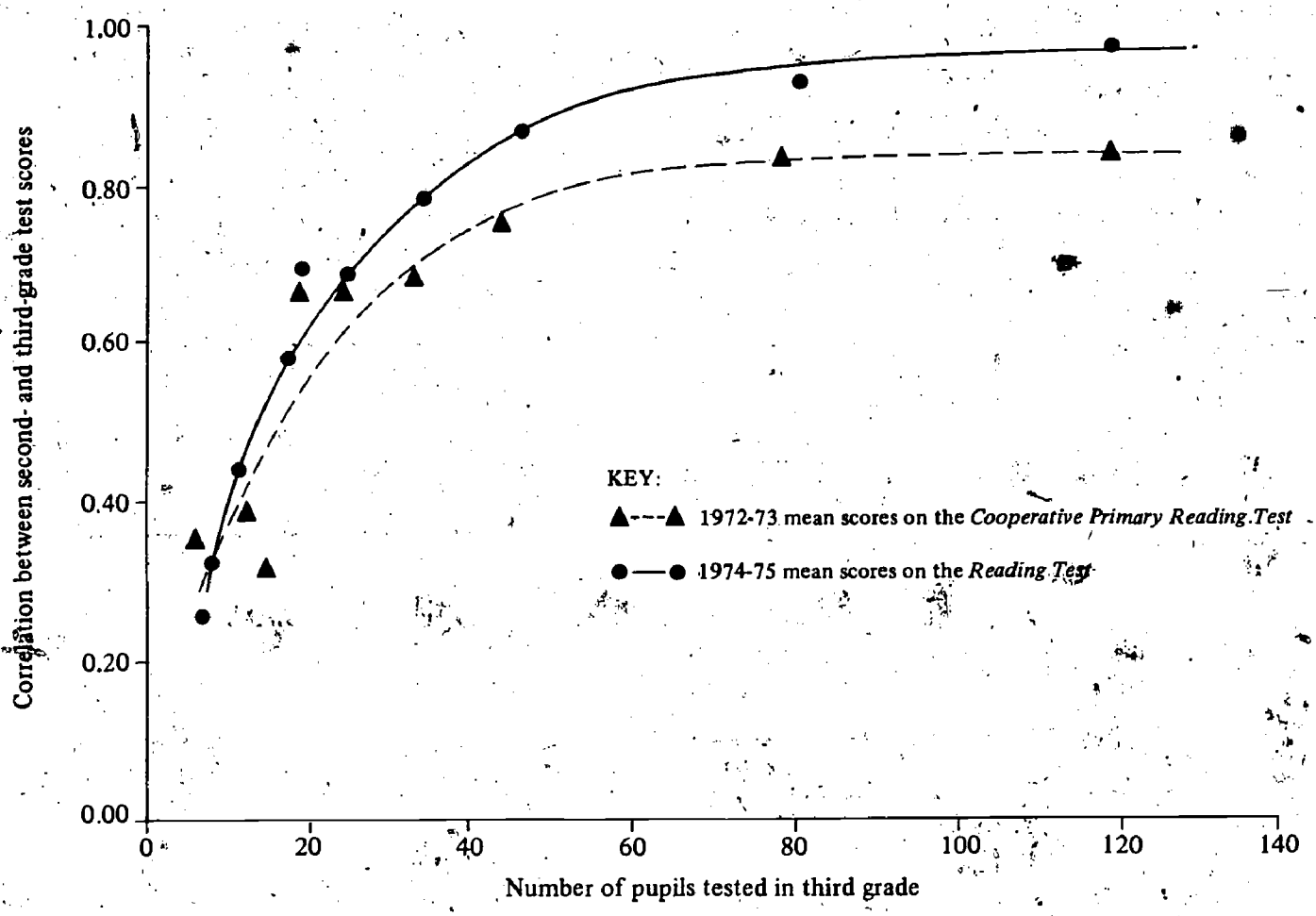

Fig. 1. School-level correlations between second- and third-grade test scores, by number of pupils tested in the third grade

Stability Over Time

The Reading Test: Second and Third Grades also has a high degree of stability over time. Appendix E-1 gives the district-level correlations of the reading tests used in the statewide testing program over a period of five years. The revised Reading Test was used in 1974-75 and 1975-76. The correlation across years, at the district level, was .68 at grade two and .70 at grade three. These correlations are much higher than those obtained from the administration of the COOP Test in 1971-72 and 1972-73; across-years correlation for the COOP Test was .58 at both grade levels.

Standard Error of the Mean

The statistic reported by the CAP to schools and districts is the mean percent correct score. The accuracy of this score is determined by the standard error of the mean. Table 14 gives the standard error of the mean for the Reading Test for various numbers of grade two and grade three pupils tested. These values make it possible to construct a confidence

Table 14

Typical Estimates of the Standard Error of the Percent Correct Score from the Reading Test for Grades Two and Three

Number Tested	Grade 2 Reading	Grade 3 Reading
10	2.3	2.0
20	1.7	1.4
30	1.3	1.2
50	1.0	0.9
80	0.8	0.7
100	0.7	0.6
150	0.6	0.5
200	0.5	0.5
300	0.4	0.4
400	0.4	0.3

interval within which the true score of the school will fall--the true score being defined as the average score obtained by administering all items many times to all pupils. For example, if the number of pupils tested in the third grade in a school were 100 and the observed score were 70.0, it could be asserted with 68 percent confidence that the true score of the school would fall between 69.4 and 70.6. Likewise it could be asserted with 95 percent confidence that the true score would fall between 68.8 and 71.2.

Reliability of the Grade Six and Grade Twelve Surveys

The reliability of the grade six and grade twelve Surveys is discussed below.

KR-20

The Survey for the sixth grade has 480 items and is divided into 16 forms, and the Survey for the twelfth grade has 558 items and is divided into 18 forms. Each form for the sixth and twelfth grade tests has eight reading items, eight written expression items, and four spelling items. For mathematics each form of the sixth grade test has ten items; the twelfth grade test has 11 items.

The KR-20 reliabilities for the areas of reading, written expression, and mathematics, computed by form, for the two grades are given in tables 15 and 16. These reliability coefficients are based upon a 10 percent statewide systematic sample over all forms for each of the tests for grades six and twelve.

It is important to point out that form-by-form reliability coefficients are not the most meaningful indices because pupil scores are not the unit of CAP data analysis. Longer test forms having reliabilities in the magnitude of .90s are not necessary for group assessment. As a rule of

Table 15

KR-20 Reliabilities of the Survey of Basic Skills: Grade 6, by Form

Form Number	Reading (8 items/form)	W. Expression (8 items/form)	Mathematics (10 items/form)
1	.76	.63	.65
2	.62	.66	.60
3	.67	.53	.57
4	.71	.59	.60
5	.55	.70	.59
6	.71	.62	.49
7	.73	.67	.68
8	.69	.65	.48
9	.60	.44	.67
10	.69	.61	.51
11	.74	.71	.63
12	.65	.52	.63
13	.72	.78	.60
14	.65	.55	.59
15	.65	.63	.70
16	.55	.73	.53
KR-20 of Full-Length Test	.97	.96	.96

Table 16

KR-20 Reliabilities of the Survey of Basic Skills: Grade 12, by Form

Form Number	Reading (8 items/form)	W. Expression (8 items/form)	Mathematics (11 items/form)
1	.42	.49	.66
2	.51	.50	.66
3	.55	.49	.65
4	.51	.55	.72
5	.50	.46	.63
6	.35	.48	.78
7	.24	.55	.61
8	.55	.57	.70
9	.51	.50	.76
10	.44	.40	.72
11	.57	.57	.68
12	.53	.42	.71
13	.45	.27	.67
14	.50	.61	.70
15	.57	.55	.71
16	.58	.46	.71
17	.46	.45	.78
18	.55	.55	.59
KR-20 of Full-Length Test	.95	.99	.98

thumb, Helmstadter points out that a reliability of .80 should be sufficient for tests designed to evaluate the level of group accomplishment.[3] By means of the Spearman-Brown formula, the reliability of the full length test can also be computed. These reliabilities are provided at the bottom of each table giving reliabilities of forms.

Stability Coefficients

Correlation coefficients were calculated to indicate a measure of stability of the group means. This was done by randomly dividing pupils in schools into halves and calculating mean percent correct scores for each half. The squared correlation between the two means indicates the proportion of total variance that is due to the systematic variance associated with the testing of the same pupils with the same instrument and by the same administrator at a particular time.

The stability coefficients were computed from a statewide random sample of 101 schools with sixth grade classes and 114 schools with twelfth grade classes. The stability coefficients for grade six are presented in Table 17 and those for grade twelve in Table 18.

Stability Across Years

The reliability coefficient based on a single administration of a test excludes the response variability that results from more than one administration. A determination of how much error variation is due to testing at different times can be made only by administering a test on two occasions under "identical" conditions.

The stability coefficients presented in this section are based upon the correlation of school scores across years. If the assumption is made

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[3] Helmstadter, G. C. Principles of Psychological Measurement. New York: Appleton-Century-Crofts, Inc., 1964.

Table 17

Stability Coefficients of the Content Area Scores from the Survey of Basic Skills: Grade 6

Content Area	Correlation coefficients between the means from random halves, by number of students tested		
	16-42 (N=34)	43-63 (N=42)	64-200 (N=25)
Reading	.77	.92	.94
Written Expression	.60	.87	.95
Spelling	.41	.71	.74
Mathematics	.67	.89	.98

Table 18

Stability Coefficients of the Content Area Scores from the Survey of Basic Skills: Grade 12

Content Area	Correlation coefficients between the means from random halves, by number of students tested		
	16-142 (N=38)	143-200 (N=38)	201-650 (N=38)
Reading	.91	.90	.94
Written Expression	.82	.88	.94
Spelling	.74	.64	.87
Mathematics	.93	.92	.94

that the school population remains stable from year-to-year, the correlation across years will indicate the stability of scores, and variation due to test administration and "occasions" will be treated as errors. Table 19 contains correlations for five categories of number of students tested (school size). The reader will see that the correlations for large schools are greater than those for small schools.

The correlations across years were also computed for the data at the district level. Appendix E-2 provides correlation coefficients across four years for the sixth grade tests in use in the statewide testing program. Despite the fact that 1974-75 and 1975-76 versions of the Survey were not identical, across-years correlations were comparable to those from the administration of the CTBS. The correlations for the Survey were .61, .56, .35, and .54 for reading, written expression, spelling, and mathematics, respectively. Likewise, the correlations for the CTBS were .61, .52, .39, and .52 for reading, written expression, spelling, and mathematics, respectively.

Standard Error of the Mean

As previously stated, the statistic reported by the CAP to schools and districts is the mean percent correct score. The accuracy of this score is determined by the standard error of the mean. The standard error of the mean is a function of the test design and the number of students tested. For a given test design, as the number of students tested increases, the standard error of the mean decreases.

The standard errors of the mean, by number of students tested, are given in tables 20 and 21 for the sixth and twelfth grade Surveys. These values make it possible to construct confidence intervals within which the true score of the school will fall with a given probability. (See "Standard

Table 19

Correlation Coefficients Between the 1974-75 and 1975-76 Survey Scores by Number of Students Tested/Number of Schools

Content Area	Correlation Coefficient				
Number Tested)	(1-42)	(43-61)	(62-78)	(79-100)	(101+)
Number of Schools)	(879)	(886)	(838)	(813)	(832)
rade 6 Reading	.53	.82	.87	.87	.94
rade 6 Written Expression	.48	.78	.84	.84	.92
rade 6 Spelling	.26	.60	.71	.69	.84
rade 6 Mathematics	.45	.77	.83	.84	.91
Number Tested)	(1-114)	(115-264)	(265-356)	(357-469)	(470+)
Number of Schools)	(138)	(152)	(145)	(154)	(146)
rade 12 Reading	.42	.85	.91	.92	.96
rade 12 Written Expression	.41	.87	.91	.93	.97
rade 12 Spelling	.28	.57	.72	.80	.89
rade 12 Mathematics	.50	.88	.93	.92	.96

Table 20

Typical Estimates of the Standard Error of the Percent Correct Score from the Survey of Basic Skills: Grade 6

Number Tested	Reading	Written Expression	Spelling	Mathematics
20	3.5	3.7	5.9	3.0
30	2.8	2.7	3.9	2.2
50	2.1	2.1	2.9	1.6
75	1.7	1.7	2.5	1.3
100	1.4	1.4	2.1	1.1
150	1.3	1.2	1.6	0.9
200	1.1	1.0	1.4	0.8
300	0.9	0.9	1.2	0.6
400	0.8	0.7	1.0	0.6

Table 21

Typical Estimates of the Standard Error of the Percent Correct Score from the Survey of Basic Skills: Grade 12

Number Tested	Reading	Written Expression	Spelling	Mathematics
20	3.3	3.3	4.3	2.6
30	3.1	2.9	3.9	2.2
50	2.1	2.1	3.1	1.7
75	1.7	1.8	2.4	1.4
100	1.5	1.4	1.9	1.2
150	1.2	1.2	1.6	0.9
200	1.1	1.1	1.5	0.8
300	0.9	0.9	1.2	0.7
500	0.6	0.6	0.9	0.5
1000	0.4	0.4	0.6	0.3

Error of the Mean" for information on construction of a confidence interval.).

Reliability and Precision

The relationship between the consistence and accuracy measures is determined by means of the following formula, in which SE_m is the standard error of measurement (accuracy coefficient), s is the standard deviation, and $r_{xx'}$ is the reliability (consistency) coefficient:

$$SE_m = s\sqrt{1-r_{xx'}}$$

The above formula can be used to estimate consistence of the group mean if the standard error of the mean is used for SE_m. For example, in Table 6 the standard deviation of school means for grade six reading is 9.8. In Table 20 the standard error of the mean for 100 pupils tested is 1.4. Substituting these numbers in the above equation gives a consistency coefficient of .98 for the total reading test for grade six.

The Variance Component Analysis

The reliability estimates obtained from the preceding methods were based upon the implicit assumption that a school score has a "true" score component and a random error component. The different methods of estimating reliabilities, however, did not apply to the same "true" score. The variance component analysis, also referred to in the psychometric literature as a generalizability study, allows the investigator to isolate test score variations that are due to various sources simultaneously. The ratio of the appropriate variance components yields the reliability coefficient corresponding to the true score, which is of utmost interest to the investigator.

An analysis of variance study was conducted for the sixth and twelfth grade Surveys. The study is described in detail in Appendix A. The results of the study indicate that the test scores yielded by both the sixth and twelfth grade Surveys are highly dependable measures of the "true" score.

V. Test Design, Administration, and Scoring

This section of the report describes the matrix sampling procedures of testing used in the California Assessment Program (CAP) and the rationale for using the matrix sampling design rather than the design used for conventional testing. This section also describes the sequence of events leading to preparation of the school- and district-level reports.

Matrix Sampling Test Design

An explanation and discussion of matrix sampling are included in the following sections.

Matrix Sampling

The CAP tests all students in grades two, three, six, and twelve; however, each student is administered only a portion of the total number of items in the test. This procedure of test design and data collection is called matrix sampling.

A "matrix" is a two-dimensional array--one dimension being the items and the other the students. Figure 2 shows a matrix having arrays of N students and K items. In conventional testing all students would take all items in the test; the data resulting from this type of testing are shown in Figure 3. In Figure 3, "1" represents the correct response and "0" represents the incorrect response.

The data resulting from the matrix sampling testing procedure used by the CAP are shown in Figure 4. The figure shows that responses of

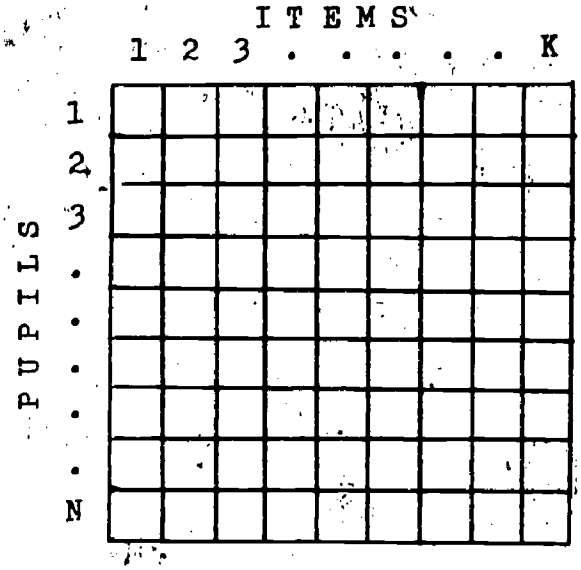

Fig. 2. A matrix showing a population of N pupils and a universe of K items

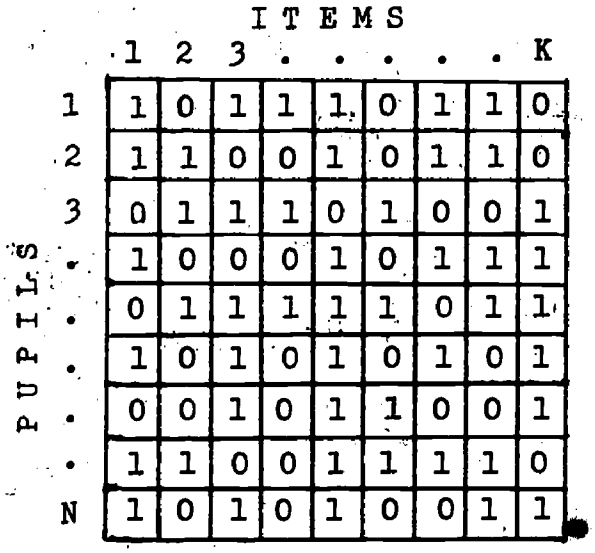

Fig. 3. A typical data matrix obtained from the administration of a K-item universe to a population of N pupils

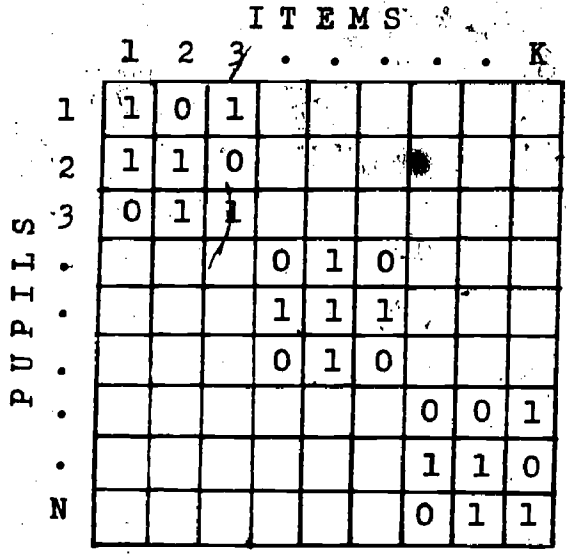

Fig. 4. A typical data matrix obtained from the administration of a test in matrix-sampling fashion—the sampling of pupils and items being exhaustive

all students are not available for all items; however, responses are available for all students and for all items. The sampling shown in Figure 4 is called "exhaustive" sampling as opposed to "inexhaustive" sampling. The exhaustive sampling procedure requires sampling of all students (from the population of students) and all items (from the domain of items) rather than a portion of these. Because the sampling was exhaustive, the data were available for all the students and all the items.

Advantages of Matrix Sampling Over Other Testing Methods

Matrix sampling has the following advantages over other testing methods.

Shorter Tests. Since in matrix sampling testing each student takes only a portion of the total items on the test, the actual testing time is short. No test developed by the CAP takes more than one class period to administer, including the time for distribution and collection of booklets. For example, the total time needed for the administration of the CAP's sixth grade test is only 40 minutes. In comparison, the time needed to administer the Comprehensive Tests of Basic Skills, (Form Q, Level 2), the test used by the CAP in years prior to 1973-74, was 3 hours and 39 minutes.

Short tests are advantageous in three ways. (1) the large amounts of time available do not require the test to be speeded; the validity of the test is usually improved as a consequence. (2) Short tests are less fatiguing for students and teachers alike; the motivation of young students is increased. (3) Short tests require less intrusion into the school's regular activities; more time is left for instructional activity.

Better Test Coverage. Matrix sampling allows testing on large pools of items. Testing on large pools of items is useful in two ways. (1) the test can be made to cover the objectives of instruction comprehensively. In fact, if the assessment is to cover the many skills taught in California schools, matrix sampling is the only feasible alternative. (2) a comprehensive item pool provides for increased program diagnostic information to be returned to schools and districts. As an example, the mathematics section of the CAP's grade six test consists of a pool of 160 items. On the basis of this large number of items, each school and district receives diagnostic information on eight skill areas, in addition to the total score. The CTBS consists of 98 items in mathematics. Only three skill areas, in addition to the total score, are reported for the CTBS.

Greater Potential for Test Sensitivity to Instruction. Since matrix sampling allows testing on a large pool of items, the procedure for selecting items in the pool need not follow the traditional constraints of item selection. The test developer has more freedom to include items that are easy or sensitive to instruction.

The traditional test development procedure leans heavily on maximizing differences between students with as few items on the test as possible. The item statistic used for selecting or rejecting an item is the point biserial correlation; quite often the items dropped in this procedure are those that measure diverse objectives--those having a high degree of content validity, or a high degree of sensitivity to instruction. The achievement tests developed by the CAP have a wide spectrum of item difficulty; item-test correlation was not a significant factor in selecting the items in the pool.

Greater Capability for Generalization. It is recognized that the test score by itself has very little meaning until one can tell from the test score about something else--the "universe score." For example, the universe score for assessing a district's sixth grade instructional program would be the score obtained by the sixth grade pupils on a large pool of items measuring all the objectives. The purpose of the measurement procedure is to collect test data that have a high degree of correlation with the universe score.

The use of a large item pool through matrix sampling allows for greater generalization of results than does a smaller item pool. Because of the fact that the CAP uses large item pools, the CAP data at the second and third grade levels have shown greater correlation between school scores across years than the data obtained by a previously used test--the Cooperative Primary Reading Test.[1]

Less Teaching to the Test. Teaching to the test is one of the abuses that leads to distortion of true test results. The large item pools for the CAP tests--250 in the second and third grades, 480 in the sixth grade, and 558 in the twelfth grade provide greater protection against teaching to the test than can be attained by tests with fewer items.

Limitations of Matrix Sampling in Comparison with Other Testing Methods

Matrix sampling has the following disadvantages in comparison with other testing methods.

No Individual Student Score. Although the total number of items in matrix sampling is very high, each student is given only a small

[1] Handbook for Reporting and Using Test Results. Sacramento: California State Department of Education, 1976, pp. IV-7 and 8.

number of items. The score obtained for a particular student is not reliable; therefore, it cannot be used for decision making at the student level.

Fewer Skill Areas Reported for Small Schools. With matrix sampling procedures, the skill area score for a school is obtained from the responses of students on items for those skill areas. In a very small school, not enough students take items in a given skill area to yield a reliable score. For this reason, if the number of students was fewer than 30 in grade two or three, 32 in grade six, and 72 in grade twelve, skill area profiles were not reported in the school or district-level reports.

Context Effect. An assumption in the measurement procedure using matrix sampling is that the student's response on an item is not affected by his or her responses on items preceding it. Studies in matrix sampling literature have yielded both positive and negative results. A study conducted by the department showed no or minimal context effect for the Reading Test in the second and third grades.[2]

Considerations in the Design of the CAP Matrix Sample Tests

Three questions were answered in designing the CAP matrix sample tests. (1) How large should the item pools be for each test? (2) Into how many forms should each item pool be divided? (3) What were the assumptions, constraints of the California Education Code, and statistical considerations involved in assigning items to forms? Decisions related to these questions were made as follows.

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[2] Carlson, D. C. "Context Effect in the Reading Test for the Lower Grades." Paper presented at the American Educational Research Association Meeting, Washington, D.C., April, 1975.

Size of Item Pools. The size of the item pools was determined on the basis of the cost associated with the development of test items, printing, and scoring as well as the precision of the obtained score. The precision of the mean score is directly related to the number of observations--number of pupils times the number of items in each form. A study conducted by the department showed that increased "payoffs" in the standard error of the mean are attained by "trading" the number of pupils for the number of items when the number of observations is held constant.[3] In other words, it is a good strategy to maximize the number of items in the pool.

The size of the item pools in the CAP instruments was kept as large as possible, within the constraints of cost and effort needed to maintain the quality of items in the pools. The number of items in the total test for each grade and content area is given in Table 1.

Number of Forms. The decision as to the appropriate number of forms was based upon the time to be allocated for testing and the precision of the score required at the lowest level of analysis. For example, the item pool for the Reading Test consisted of 250 items. Several choices were available to divide these items into forms--five forms of 50 items each, ten forms of 25 items each, or 25 forms of ten items each. The first choice, five forms of 50 items each, would have resulted in more observations for a given school and thus would have yielded more precise estimates than the other two alternatives. It would have required more testing time, however.

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[3] Pandey, T. N., and D. C. Carlson. "Assessing Payoffs in the Estimation of the Mean Using Multiple Matrix Sampling Designs," in Advances in Psychological and Educational Measurement. Edited by D. N. M. de Gruijter and L. J. T. Van der Kamp. New York: John Wiley & Sons, Inc., 1976, pp. 265-75.

The decision was made to limit the total test administration time to one class period, which allowed for 25 to 35 items in a form. Ten forms were constructed for grades two and three, 16 for grade six, and 18 for grade twelve. The number of forms allows the department to report accurate results for each school in the state, except for a few schools where the number of students tested is very small.

Allocation of Items to Forms. The California Education Code requires that each child be tested. In statistical terms it means that sampling of pupils must be exhaustive. In order to make the test forms amenable for group testing and also to keep measurement error to a minimum, the allocation of items to forms was stratified both in content and difficulty. For example, each form for grades two and three (Reading Test) consists of items from four major skill areas--word identification, vocabulary, comprehension, and study location. Similarly, each form for grades six or twelve consists of items from the content areas of reading, written expression, spelling, and mathematics; and within each content area items were allocated from every major skill area.

For the purpose of avoiding order effect, the ordering of content areas in forms for grades six and twelve was balanced. For example, in some forms mathematics items appear as the first section of the test; in others mathematics items appear as the last section of the test. The mathematics section was not placed between the reading and written expression sections to avoid change of content pattern.

Test Administration, Scoring, and Analysis

Typesetting, printing, packaging, and shipping of test booklets was done through test contractors. The contracts were awarded by grades and

required the contractors to carry out all the steps for that grade level.

The tests were shipped by the CAP contractor to each district office. The tests were packaged in class packs. Each class pack contained a Teacher's Manual and a specified number of test booklets arranged in a specified sequence.[4] The class pack for grades two and three contained 32 booklets, that for grades six and twelve 33 booklets. Since the beginning of the sequence in each class pack was also varied, there were as many unique class packs at a grade level as there were numbers of forms.

Testing Periods

For the 1974-75 school year, the Reading Test for grades two and three was administered during May 6-16, 1975; the grade six Survey during April 21-May 2, 1975; and the grade twelve Survey during January 6-17, 1975. For the 1975-76 school year, the Reading Test for grades two and three was administered during April 26-May 21, 1976; the grade six Survey during April 19-30, 1976; and the grade twelve Survey during December 1-12, 1975.

Test Administration

The Teacher's Manual for each grade contains detailed instructions for administering a test in a standardized manner. The manual also contains directions for filling out pupil-related information on the back of booklets for grades two, three, and six.

The instructions in the manual required the test administrators to pass the booklets to students as if they were distributing a single-form test booklet, without shuffling the order of the test booklets. The arrangement ensured random and equal administration of each form. For

[4] The sequence of forms was not the same for all grade levels.

testing in the lower grades, the administrators were advised to administer the tests in the pupils' own classrooms. No such constraint was imposed for testing in the twelfth grade; however, the use of an adult proctor for every 30 students was advised when the test was administered to a large group.

At each grade level students marked their answers directly on the machine scorable test booklets. The Reading Test for grades two and three was not timed. A time limit of 30 minutes was included in the directions for test administration for the sixth and twelfth grade tests. However, field-testing and teacher questionnaires indicated that the time limit was generous in most instances.

Scoring and Analysis

The test booklets were shipped from each district office directly to the contractor who was responsible for scoring the booklets and producing the school- and district-level reports. The guidelines for scoring the booklets and analyzing the results were provided to the contractor by the staff of the California Assessment Program.

VI. The Background Factors

The law related to the statewide testing program required the Department of Education to analyze the results of the achievement tests in light of those operational factors that appear to have a significant relationship to or bearing on the results. The law specifies that the analysis may include, but need not be limited to the following factors:

(a) Demographic characteristics

(b) Financial characteristics

(c) Pupil and parent characteristics

(d) Instructional and staff characteristics

(e) Specially funded programs

The statistical tool used by the Department to analyze the test results in the light of the background factors was the regression analysis. This analysis allowed the Department to derive a "comparison score band," which served as a "norm" against which the actual scores were evaluated.

Since the initial attempt to report the comparison score band to districts in 1969-70, changes have been made in refining the statistical procedure, collecting background factor data, and reporting levels of the results. This section of the supplement describes the background factors used in the 1974-75 and 1975-76 reports.

Background Factors in 1974-75 and 1975-76

The state testing legislation of 1972, requiring the Department to report test results to districts and schools, became fully operative in

1974-75. For analyzing the results at the district and school levels, the Department decided to use the same set of background factors at both the levels. This decision excluded the possibility of using the background factors used in previous years--such as Index of Family Poverty, Expenditure for Instruction, and the U.S. Census factors--because the school-level data were not available for those factors.

A summary of the background factors used to derive the comparison score bands in the 1974-75 and 1975-76 reports is given in Chart 1. The reader can note the following three points while reading Chart 1:

- The background factors are listed separately for each test because a unique set of background factors was used for each test.
- Certain factors, such as socioeconomic index, were common across tests; however, the sources of data base were not identical across tests.
- Approximately one-half the background factors were identical in 1974-75 and 1975-76.

The need to change some of the background factors from 1974-75 to 1975-76 reflects the continual attempt of the Department to provide for improved and objective reporting of school and district background characteristics. The major changes between these two years were to drop socioeconomic and parental education indices in grades six and twelve and add percent of Aid to Families with Dependent Children (AFDC) in all grades.

Scaling Procedures and Units

The statewide distributional characteristics of the background factors are given in Table 22. The procedures for data collection and data

Chart 1

Summary of Background Factors Used for Computing Comparison Score Bands for 1974-75 and 1975-76

Test	1974-75	1975-76	Source
Reading Test: Second and Third Grades	Entry Level Test Score	Entry Level Test Score	The score from the test developed by the Department.
	Socioeconomic Index	Socioeconomic Index	Teacher recorded for each child occupation of parents in one of the five categories.
	Percent Bilingual	Percent Bilingual	Teacher classified each child in one of the four bilingual categories.
	Mobility	Mobility	Teacher indicated whether the child has been continuously enrolled.
		Percent AFDC	District provided data by school's attendance area.
Survey of Basic Skills: Grade 6	Grade 3 Achievement Index	Grade 3 Achievement Index	Immediate prior year scores from the statewide testing program. Tests were not the same across two years.
	Socioeconomic Index		School principal gave percentages of students in the four occupational categories.
	Parental Education Index		School principal gave percentages of students in the four educational categories.
		Percent Bilingual	Teacher categorized each child in one of the four bilingual categories.
		Percent AFDC	District provided data by school's attendance area.
Survey of Basic Skills: Grade 12	Grade 6 Achievement Index	Grade 6 Achievement Index	Immediate prior year score from the statewide testing program. Some test items were not the same across the two years.
	Socioeconomic Index		School principal indicated percentages of students in the four occupational categories.
	Parental Education Index		School principal indicated percentages of students in the four educational categories.
		Percent AFDC	District provided data by school's attendance area.

Table 22

Distributional Characteristics of the Background Factors Used in the 1975-76 Reports

Background Factors	School Level				District Level			
	N	Mean	Median	Standard Deviation	N	Mean	Median	Standard Deviation
Reading Test: Second and Third Grades								
Entry Level Test	4,692	27.3	27.8	2.7	913	27.4	27.8	2.4
Socioeconomic Index	4,724	2.1	2.1	0.4	935	2.1	2.1	0.4
Percent AFDC	4,682	15.3	11.1	14.9	918	12.7	11.1	10.2
Percent Bilingual	4,724	17.7	10.4	19.3	935	16.6	9.2	19.2
Pupil Mobility	4,724	41.1	39.5	14.2	935	41.4	40.0	13.9
Survey: Grade 6								
Grade 3 Achievement Index	4,276	82.1	84.3	9.3	898	82.3	83.9	8.6
Percent AFDC	4,315	15.1	10.8	14.7	912	12.2	10.4	9.9
Percent Bilingual	4,348	15.3	8.0	19.4	914	13.4	5.9	18.3
Survey: Grade 12								
Grade 6 Achievement Index	760	55.6	55.1	6.4	366	54.5	54.5	5.7
Percent AFDC	756	10.1	6.8	11.5	365	9.0	6.9	4

aggregation for background factors are described below.

Reading Test: Second and Third Grades

At the second and third grade levels, four background factors were used to compute the comparison score band for the 1974-75 reports. The percent AFDC factor was used additionally in 1975-76.

Entry Level Test. The Entry Level Test (ELT) is administered to all first grade pupils during the third or fourth week of the school year. The ELT was specifically designed to measure learning readiness skills related to pupils' learning in subsequent school years.

The score for each school or district is the mean of the number of questions answered correctly by pupils. Those pupils who were in programs for the educable mentally retarded or trainable mentally retarded were not tested with the ELT. Educationally handicapped pupils were tested if they were in a regular class for more than half a day, but their scores were not used in computing the school or district scores.[1]

Socioeconomic Index. A five-level socioeconomic classification appears on the back page of each pupil's booklet. For each pupil the teacher was required to choose the occupational category--professional/executive/manager, semiprofessional/clerical/sales worker/technician, skilled/semiskilled, or unskilled (including unknown)--that corresponded most closely with the occupation of the pupil's father, mother, or guardian who was the principal source of family income. (See Teacher's Manual for Reading Test for detailed instructions to the teachers.)

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[1] The Department of Education published a separate report for the educationally handicapped pupils.

The socioeconomic index calculated for a school was the weighted average of the number of second and third grade pupils in each of the five categories. The number of pupils in the unknown and unskilled categories was given a weight of 1; the number in the skilled/semiskilled categories was given a weight of 2; and the number in the categories of semiprofessional/clerical/sales worker/technician and professional/executive/manager was given a weight of 3. (See Technical Supplement for 1973-74 for the statistical rationale of the weighting procedure.)

The socioeconomic index could have a value anywhere from 1.00 to 3.00. The value of the socioeconomic index for the median school in the state was 2.14; for the median district in the state, it was 2.07.

Percent Bilingual. A four-level degree of English fluency appears on the back page of each pupil's booklet. The teacher classified each pupil in one of four categories of English language proficiency--English only, fluent English and a second language, limited English and a second language, or non-English speaking. (See Teacher's Manual for Reading Test for detailed instructions to the teachers.)

The percent bilingual for a school was the percent of second and third grade pupils who were identified as belonging to the following categories: fluent English and a second language, limited English and a second language, or non-English speaking. The value of percent bilingual could range from 0 to 100. The value for the median school in the state was 10.4; for the median district in the state, it was 10.4.

Pupil Mobility. On the back page of each pupil's booklet, the teacher indicated for the pupil the grade in which he or she was first enrolled and whether he or she had been continuously enrolled in the school since that time. (See Teacher's Manual for Reading Test for detailed instructions to the teachers.)

The pupil mobility for a school was the percent of second or third grade pupils who had not been continuously enrolled in the school since kindergarten or first grade. The value of this factor could range from 0 to 100. The value for the median school in the state was 39.5; for the median district in the state, it was 40.0.

Percent AFDC. Percent AFDC was used for the first time in the 1975-76 reports. A special survey was conducted by the Department in early 1976 requesting personnel in each district to supply enrollment figures and the number of pupils whose families were receiving assistance under the Aid to Families with Dependent Children (AFDC) program. In compiling the AFDC figures, the districts relied on the information their office of the county superintendent of schools received from the Department of Benefit Payments. The data reflected the AFDC count as of January, 1976.

The percent AFDC for each school was derived by dividing the number of pupils from AFDC families by the school enrollment and converting the fraction to a percent. The value of percent AFDC for the median school as well as the median district in the state was 11.1.

Survey of Basic Skills: Grade 6

Three background factors were used in the 1974-75 and 1975-76 reports. However, only one background factor, the grade three achievement index, was common in both years' analyses. The other two background factors--socio-economic index and parental education index--were used in 1974-75 but were replaced by percent bilingual and percent AFDC in 1975-76. As described below, the socioeconomic and parental education indices were subjective estimates by the school principals; these were replaced by percent AFDC in 1975-76, which was considered as an objective proxy for the socioeconomic status.

Grade Three Achievement Index. The achievement index for a school is the average score of third graders on the state Reading Test in the year prior to the year of reporting. May, 1974, scores were used in the 1974-75 reports, and May, 1975, scores were used in the 1975-76 reports.

If a school did not have a third grade, scores from feeder schools were used to arrive at the grade three achievement index. If a school had two or more feeder schools, the achievement index was calculated by weighting the score from each feeder school by the number of pupils tested in the third grade of the feeder schools.

The achievement index values could range from 0 to 100 like the values of the Reading Test scores. The grade three achievement index for the median school in the state was 84.3; for the median district in the state, it was 83.9.

Socioeconomic Index. The socioeconomic index was used as a background factor in the 1974-75 reports only. The data were collected on the School Information Form, which was sent to each school with the testing materials. Each principal estimated the percent of students whose parents were engaged in one of the four occupational categories--unskilled, skilled/semiskilled, semiprofessional/clerical/sales worker/technician, or professional/executive/manager.

In the computation of the socioeconomic index, weights were assigned to the percents in each category, and a weighted average was taken. The weights assigned to each category of socioeconomic status were found as follows. A regression analysis was done with the test scores used as the criterion and the four categories of socioeconomic status used as the predictors. The regression weights and multiple correlation (R) were computed. The integer weights were assigned to the categories that reflected nearly

as much variance as did the optimal regression weights computed empirically. Table 23 gives the multiple correlation (R) and the correlation between the criterion and the composite socioeconomic index. Zero weight was assigned for unskilled employees, "1" for skilled/semiskilled, "2" for semiprofessional/clerical/sales worker/technician, and "3" for professional/executive/manager. The values of the socioeconomic index could range between 0 and 3. The value of this index for the median school in the state was 1.20; for the median district in the state, it was also 1.20.

Parental Education Index. The parental education index was used as a background factor in the 1974-75 reports only. The data were collected on the School Information Form from each school principal. The principal estimated the percent of students whose parents had completed the highest of the four educational levels--advanced degree, college graduate, high school graduate, or not a high school graduate.

In the computation of the parental education index, weights were assigned to the percents in each category, and a weighted average was determined. The weights assigned to each category of educational level were found as follows. A regression analysis was done; and the regression weights and multiple correlation (R) were computed. Integer weights, reflecting the relationship of regression weights as closely as possible, were assigned to the categories. Table 24 shows the multiple correlation and the correlation of the composite index with the criterion. The composite index accounts for nearly as much variance in the criterion as does the linear composite, in which exact empirical regression weights were used.

In the computation of the parental education index, weights assigned were as follows: "1" for not a high school graduate, "2" for high school graduates, and "3" for college graduate or advanced degree categories.

Table 23

Correlation Coefficients Between Percent in Each Socioeconomic Category (and Composite Socioeconomic Index) and 1974-75 Test Scores: School Level

Test/ Content Area	Professional/ Executive/ Manager	Semiprofessional/ Clerical/ Sales worker/ Technician	Skilled/ Semiskilled	Unskilled	Multiple Correlation (R)	Composite Index Using Integer Weights
urvey: rade 6						
Reading	.49	.43	.06	-.64	.67	.65
Written Expression	.49	.44	-.08	-.62	.66	.65
Spelling	.42	.35	-.06	-.53	.56	.55
Mathematics	.48	.38	-.10	-.56	.61	.60
rvey: ade 12						
Reading	.50	.34	-.16	-.60	.64	.64
Written Expression	.55	.37	-.24	-.61	.68	.68
Spelling	.48	.32	-.23	-.51	.58	.58
Mathematics	.56	.36	-.22	-.62	.69	.69

Table 24

Correlation Coefficients Between Percent in Each Parental Education Category (and Composite Education Index) and 1974-75 Test Scores: School Level

Test/ Content Area	Advanced Degree	College Graduate	High School Graduate	Not A High School Graduate	Multiple Correlation (R)	Composite Index Using Integer Values
Survey: Grade 6						
Reading	.37	.54	.10	-.62	.65	.65
Written Expression	.38	.54	.06	-.59	.64	.64
Spelling	.32	.45	.07	-.50	.54	.54
Mathematics	.36	.52	.04	-.54	.60	.60
Survey: Grade 12						
Reading	.37	.49	.03	-.57	.60	.60
Written Expression	.43	.56	-.05	-.58	.65	.65
Spelling	.38	.51	-.10	-.47	.56	.56
Mathematics	.42	.55	-.01	-.60	.65	.65

The value of this index could range from 1 to 3. The parental education index value for the median school in the state was 2.00; for the median district in the state, it was 1.97.

Percent AFDC. The procedure for collecting percent AFDC data for sixth grade schools was the same as that for second and third grade schools. (See details under percent AFDC for second and third grades.) The percent AFDC for the median school in the state was 10.8; for the median district in the state, it was 10.4.

Survey of Basic Skills: Grade 12

For the Survey of Basic Skills: Grade 12, three background factors were used in the 1974-75 reports and two were used in the 1975-76 reports. The grade six achievement index was the background factor that was common in both years. The other two background factors in 1974-75 were the socioeconomic index and parental education index. The additional background factor in 1975-76 was the percent AFDC.

Grade Six Achievement Index. The grade six achievement index was used as a proxy to indicate the achievement level of twelfth grade students when they entered the school system in the same way as the Entry Level Test scores are used for grades two and three and the grade three achievement index is used for grade six. The achievement index was based upon the scores of the feeder school students in the year prior to the year of reporting.

A feeder school survey was conducted in January, 1975, to determine which of the sixth grade schools were feeding most of their students to the twelfth grade receiving school. In January, 1976, the same type of survey was repeated, but this time splitting of the sixth grade feeder school students to the twelfth grade receiving schools was taken into account.

The grade six achievement index was the weighted average of the achievement composite; the weights were the number of sixth grade students feeding into the high school. Suppose, for example, that a high school had two feeder schools--A and B--and the data from these schools were the following:

Feeder School	No. Tested Grade 6	Percent Feeding	Composite Score
A	N_1	P_1	S_1
B	N_2	P_2	S_2

The achievement index for the receiving high school would be determined as follows:

$$\text{Achievement Index} = \frac{N_1P_1S_1+N_2P_2S_2}{N_1P_1+N_2P_2}$$

The composite score, or achievement index, of a feeder school was the weighted average of the sixth grade reading and mathematics scores. For the 1974-75 report this achievement index was computed from the administration of the Comprehensive Tests of Basic Skills (CTBS, Form Q, Level 2) in October, 1973. The following formula was used:

$$\text{Achievement Index} = \frac{2\,(\text{mean reading score}) + (\text{mean math score})}{2\,(\text{number of reading items}) + (\text{number of math items})} \times 100$$

The denominator in the above formula was 268 since the numbers of reading and mathematics items on the CTBS were 85 and 98, respectively.

The value of the achievement index could range from 0 to 100. The value of this index for the median school in the state was 68.1, and for the median district in the state, it was 67.7.

For the 1975-76 report the achievement index of each feeder school was computed from the administration of the state-developed Survey of Basic

Table 25

Correlation Between Grade Six Scores and Composite Score and the Criterion Score: School Level, 1975-76

riterion	Grade 6 Reading	Grade 6 Written Expression	Grade 6 Spelling	Grade 6 Math	Multiple R	2 (Readin + Math
ade 12 Reading	.80	.76	.69	.74	.80	.80
ade 12 Written Expression	.81	.78	.73	.75	.81	.81
ade 12 Spelling	.6	.59	.61	.59	.63	.61
ade 12 Mathematics	.81	.77	.71	.76	.82	.82

Skills: Grade 6 in April, 1975. The following formula was used:

$$\text{Achievement Index} = \frac{2\,(\text{reading score}) + (\text{math score})}{3}$$

Since the reading and mathematics scores on the Survey were expressed in percent correct units, the value of this year's achievement index also ranged from 0 to 100. However, the 1974-75 and 1975-76 achievement indices, in raw units, should not be compared because the tests used in the two years were not the same. For 1975-76 the value of the achievement index for the median school in the state was 55.1, and for the median district in the state, it was 54.5.

For computing the achievement index of a twelfth grade school, the reading score of the feeder school was weighted twice as heavily as the mathematics score. From the results of the regression analysis shown in Table 25, the reading score predicts almost as well as the composite of reading and mathematics scores; however, the decision was made to use both scores to balance out any discrepant reading and math score in a particular school.

Socioeconomic Index. The socioeconomic index as a background factor was used in the 1974-75 reports only. The instrument and scaling procedure for the grade twelve socioeconomic index were the same as those for grade six. (See the discussion on the socioeconomic index for grade six for details.)

The value of the socioeconomic index could range from 0 to 3. The value of the socioeconomic index at the twelfth grade level for the median school as well as the median district in the state was 1.30.

Parental Education Index. The parental education index as a background factor was used in the reports for 1974-75 only. The instrument and scaling procedure for the grade twelve parental education index were the same as those for grade six. (See the discussion on the parental education index for grade six for details.)

The value of the parental education index could range from 1 to 3. The value of the parental education index at the twelfth grade level for the median school as well as for the median district in the state was 2.00.

Percent AFDC. The procedure for collecting percent AFDC data for twelfth grade schools was the same as that used for second and third grade schools. (See the discussion on percent AFDC for the second and third grades for details.)

The value of percent AFDC could range from 0 to 100. The percent AFDC for the median school in the state was 6.8, and for the median district in the state it was 6.9.

VII. The California Assessment Program Reports

The California Assessment Program (CAP) produces reports designed to reflect the impact of educational programs at the school, district, and state levels. The data in all the reports pertain to groups of students; the lowest level of analysis is a school. The CAP reports accordingly do not describe a single student or classroom, except in those rare instances in which a school has only one student in a grade or only one classroom at a grade level. Three types of reports are described in this section--school-level reports, district-level reports, and the profiles. The state-level reporting is described in the Student Achievement in California Schools--1974-75 Annual Report and Student Achievement in California Schools--1975-76 Annual Report.

The School-Level Report

Figure 5 shows a typical school-level report for 1975-76 at the sixth grade level. Similar reports are produced for grades two and three and twelve. The upper half of the figure is the first page of a two-page computer-printed report. Page 1 shows three data sets: (1) survey scores expressed as the mean percent correct scores; (2) state percentile ranks of the actual scores and comparison score bands; and (3) values of the background factors used in the computation of the comparison score bands.

Page 2 of the report shows a breakdown of the total score for each content area by skill areas. This page allows school personnel to determine whether pupils performed equally well in all the skill areas. This is done by comparing each skill area score with that of the total content area

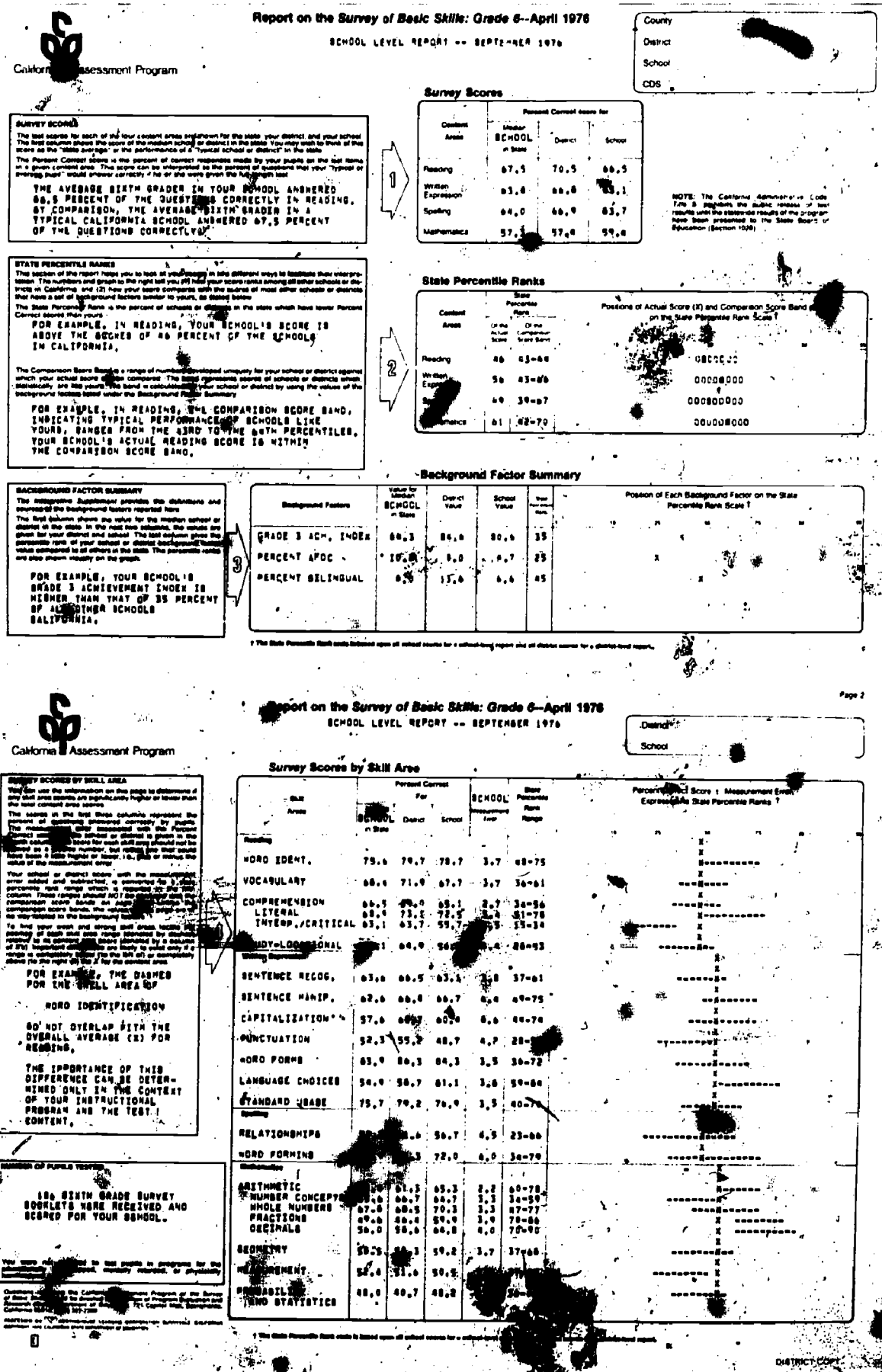

Fig. 5. A typical school-level report for the sixth grade

score. For purposes of avoiding "over-interpretation" of small differences between a skill area score (shown by dashes) and a content area score (represented by a vertical column of Xs), a band representing standard error of estimate for the difference score is shown with each skill area score.

Percent Correct Score

The score for a school is expressed in percent correct units. The percent correct is the percent of items answered correctly by all students collectively.

The percent correct is computed as follows. Suppose that a test has two forms, each having five unique items. Suppose the test is administered in a school having nine pupils and that Form 1 is taken by five pupils and Form 2 by four pupils. If "1" represents a correct answer and "0" represents an incorrect answer, the data matrix resulting from this hypothetical testing will appear as shown in Figure 6.

	Items									
	Form 1					Form 2				
Pupils	1	2	3	4	5	1	2	3	4	5
1	0	1	0	1	1					
2	1	0	1	1	1					
3	0	1	1	1	1					
4	0	0	0	0	1					
5	1	1	1	1	1					
6						1	0	1	1	0
7						1	1	1	1	1
8						0	0	0	0	1
9						1	0	1	0	1

Fig. 6. Hypothetical data matrix obtained from the administration of two forms, each containing five items, to nine pupils

It is apparent from the figure that pupils one through five took Form 1 only; the submatrix representing these pupils' results on Form 2 is therefore blank. The school as a whole (nine pupils), however, has taken both forms. Since there are 17 correct responses out of 25 on Form 1 and 12 out of 20 on Form 2, the percent correct of the total responses is:

$$\frac{\text{Total correct responses}}{\text{Total responses made}} = \frac{17 + 12}{25 + 20} \times 100 = 64.44$$

The following procedure is an alternate way of computing the percent correct score. The procedure also explains why the percent correct score is an unbiased estimate of the true score.

Suppose the "true" score (in percent correct units) of the school is the score obtained by taking the mean of the scores from repeated testing of each pupil on all items in the pool. If the administration of the forms to pupils is randomly done, the performance of pupils one through five will be an unbiased estimate of the true score of the school, and the performance of pupils six through nine will also be an unbiased estimate of the true score of the school. A better estimate of the true score of the school--one having a smaller standard error--will be the average of the estimates obtained from forms 1 and 2. The percent correct score for the school on Form 1 is:

$$\frac{\text{Number of items correct on Form 1}}{(\text{Number of items on Form 1}) \times (\text{Number of pupils taking Form 1})} \times 100$$

$$= \frac{17}{5 \times 5} \times 100 = 68.0$$

Likewise, the percent correct score on Form 2 is

$$\frac{12}{5 \times 4} \times 100 = 60.0$$

An unbiased estimate of the school score, based on the estimated performance on the two forms, is the weighted average of the scores on Form 1 and Form 2:

$$\text{Percent Correct} = \frac{W_1\ (68.0) + W_2\ (60.0)}{W_1 + W_2}$$

where W_1 and W_2 are the number of observations collected through Form 1 and Form 2, respectively. Since, for the example, $W_1 = 25$ and $W_2 = 20$:

$$\text{Percent Correct} = \frac{25\ (68.0) + 20\ (60.0)}{25 + 20} = 64.44$$

The percent correct for a school provides summary information about all students on all items. Since percent correct is a statistic like the mean, it is affected by the performance of each student on each item; that is, every student counts. On the other hand, the median statistic, usually reported by test publishers, is relatively unaffected by the performance of very low scoring students or very high scoring students. For this reason, mean and median statistics will not necessarily be the same for students in a school; the discrepancy in the two statistics will increase if a school has an unusually large number of very low scoring students or very high scoring students. (The median student score for a school or district is not provided in the CAP report.)

The percent correct score has the potential of being interpreted as a criterion score. For correct criterion reference interpretation to establish relationships between a school's program and the test objectives, however, a thorough understanding of the test content specification is required. (See Chapter V, "Using Test Results for Program Improvement," in Handbook for Reporting and Using Test Results. (Sacramento: California State Department of Education, 1976).

The percent correct for the median school is the score of the school that is in the middle (50th percentile) of the state distribution of schools. This score is a simple reference point against which other schools can compare their scores. A school scoring higher than the score of the median school will rank above at least 50 percent of the schools in the state; likewise, a school scoring lower than the score of the median school will rank lower than at least 50 percent of the schools in California. The percent correct scores for median schools in the state are given in Table 5. In the school-level report shown in Figure 5, the percent correct score in reading for the median school is shown to be 67.5.

The value for the median school in the state, in general, will not be the same as the percent correct for all pupils in the state. Percent correct for the state is the mean of the pupil-level distribution, and percent correct for the median school is the school score (percent correct) of the median school in the school-level distribution.

Percentile Rank

The percentile rank of the school score is shown in Box 2 of Figure 5. The percentile rank of a school's score (percent correct) is the percent of schools in California that have scores below that of the school's score. Percentile ranks can range from 1 to 99; a rank of 0 or 100 is meaningless by definition. The percentile rank tables for the content areas tested in grades two, three, six, and twelve are given in appendices J, K, and L. There are separate tables of percentile ranks for the school- and district-level reports. Because individual student scores are not reported, no percentile rank table is produced for the data at the student level.

Since percentile rank and percent correct have similar ranges--1 to 99 and 0 to 100--they are often confused. The two scales are entirely different

from each other and should be treated as such for correct interpretation. The relationship between the two is explained below.

Relationship Between Percentile Rank and Percent Correct

The relationship between percentile ranks and percent correct scores can be understood by comparing the distributional properties of the two. The distribution of the percentile ranks is uniform. On the other hand, the distribution of raw scores--mean percent correct--is an approximately normal, although slightly skewed, distribution. In a uniform distribution equal change in score corresponds to equal number of cases. In a normal distribution, by contrast, the scores are bunched up near the middle of the distribution.

By definition, the total area under each distribution is the same, having 100 equal units. Since each unit area corresponds to unit change in rank, it is easy to visualize the relationship between the percentile rank and percent correct score. In figures 7 and 8, equal areas under the two distributions are shaded at three different regions. It is easy to discern that at the upper and lower tails of the normal distribution, relatively more percent correct score change is needed to reflect a certain percentile rank (area) change than is needed at the middle of the distribution. In other words, a small change in percent correct score in the middle of the normal distribution will cause a large change in the percentile rank because that small percent correct score change is associated with relatively more units (area) in the distribution.

The phenomenon described above--a small change in the percent correct score causing a large change in percentile rank in the middle of the distribution--is <u>not</u> a function of the matrix sampling procedure used in the

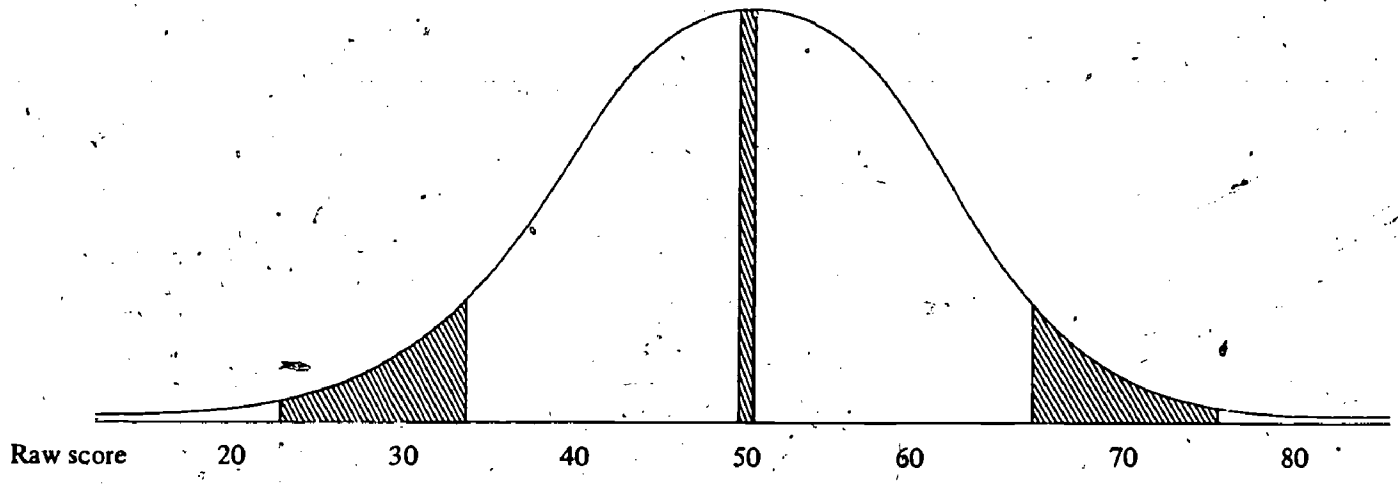

Fig. 7. Normal distribution of school mean (percent correct) scores

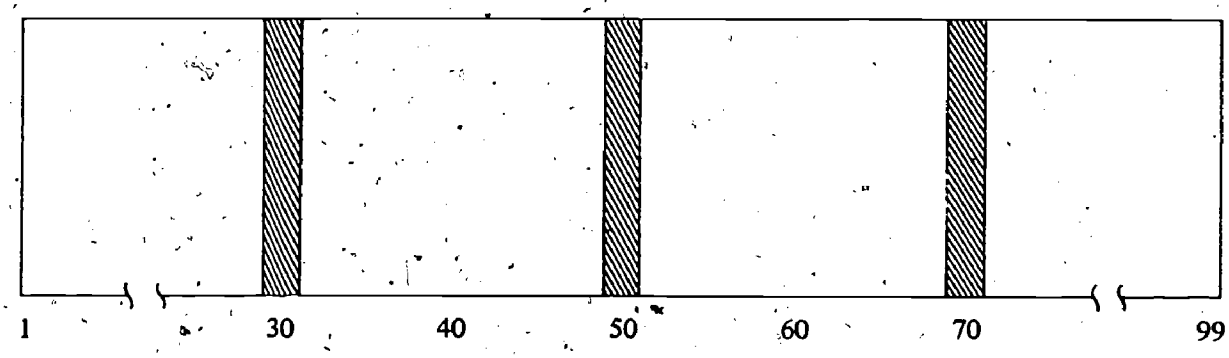

Fig. 8. Uniform distribution of percentile ranks

CAP. The same phenomenon also occurs with data obtained from traditional testing. The following precautions are necessary, however, if one wishes to compare the relationship between test scores and percentile ranks from the CAP data and that obtained from a standardized test publisher's data.

Scaling

The relationship between raw score and percentile rank change is altered, without affecting the reliability, by transforming the raw score. For example, the raw score can be expressed on a scale from 0 to 1,000 instead of 0 to 100, increasing the ratio of raw score to percentile rank change by 10. Since the unit of the CAP scores, except those on the ELT, is percent correct, measures of dispersion of test scores, such as standard deviation or the range obtainable from two instruments, must be compared only after the scale unit has been taken into account.

Aggregation of Data

Most test publishers report a percentile rank distribution for the data at the pupil level. This percentile rank enables one to answer: Where does a pupil rank in the norm group of pupils? The CAP reports percentile rank distributions for the data at the school level and district level. This percentile rank enables one to answer: Where does a school or district rank in the norm group of schools or districts? The relationship between percent correct score and percentile rank change is altered by changing the level of aggregation. Such a change will also affect reliability. When data are aggregated from the student level to the

school level, the standard deviation of scores is reduced, which affects the relationship between raw scores and percentile ranks.[1]

What are the consequences of reduced variance or standard deviation of school-level data? Figure 9 shows a typical distribution of pupil and school scores obtained from the administration of a test. The school curve is more peaked than the pupil curve. For this reason a unit raw score change in the middle of the distribution translates into a larger percentile rank change in the school distribution than in the pupil distribution.

Erroneous judgments are sometimes made regarding the adequacy of the testing instrument or testing procedure when aggregation of data leads to peakedness in the shape of distribution. In general, such thinking is counterproductive because it ignores the fact that schoolwide and districtwide results tend to be highly reliable and stable compared to pupil-level results. Changes of a few points are easy to attain for individual pupils, but to raise the average performance of several hundred students even a fraction of a point would require substantial programmatic efforts.

The Comparison Score Band

Box 2 in Figure 5 shows separate comparison score bands for each of the four content areas: reading, written expression, spelling, and

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[1] For a clearer understanding of the effect of aggregating pupil-level data into school-level data, the total sum of squared deviations from the grand mean can be partitioned into two parts: the sum of squared deviations within (SS within) schools and the sum of squared deviations of school means from the grand mean (SS between). Thus, SS total = SS within + SS between. If the performance of all pupils within a school were identical, the SS within would be zero and SS total = SS between. The SS within, however, is always greater than zero; the SS between is less than SS total. Since SS total is related directly to the variance between pupils, the variance between the school means will always be smaller than the total variance between the pupil scores.

mathematics. The comparison bands are shown numerically as well as pictorially expressed on a percentile rank scale. The percentile rank of the actual score is also shown numerically as well as pictorially. Pictorially, the position of the actual score is shown by an X and that of the comparison score band by a row of zeroes.

Rationale of Comparison Score Band

The percentile rank provides the ranking of a school without regard to any factor directly or indirectly affecting that school's performance. In fairness, however, one would like to see schools compared only if they have similar characteristics, such as the social and economic conditions of parents, expenditures for instruction, and student home environment. The comparison score band is a realistic attempt to answer the question: How does a school compare with "schools like itself"?

The comparison score band, shown in Box 2 of Figure 5, represents the rankings of the middle 50 percent of schools having similar background

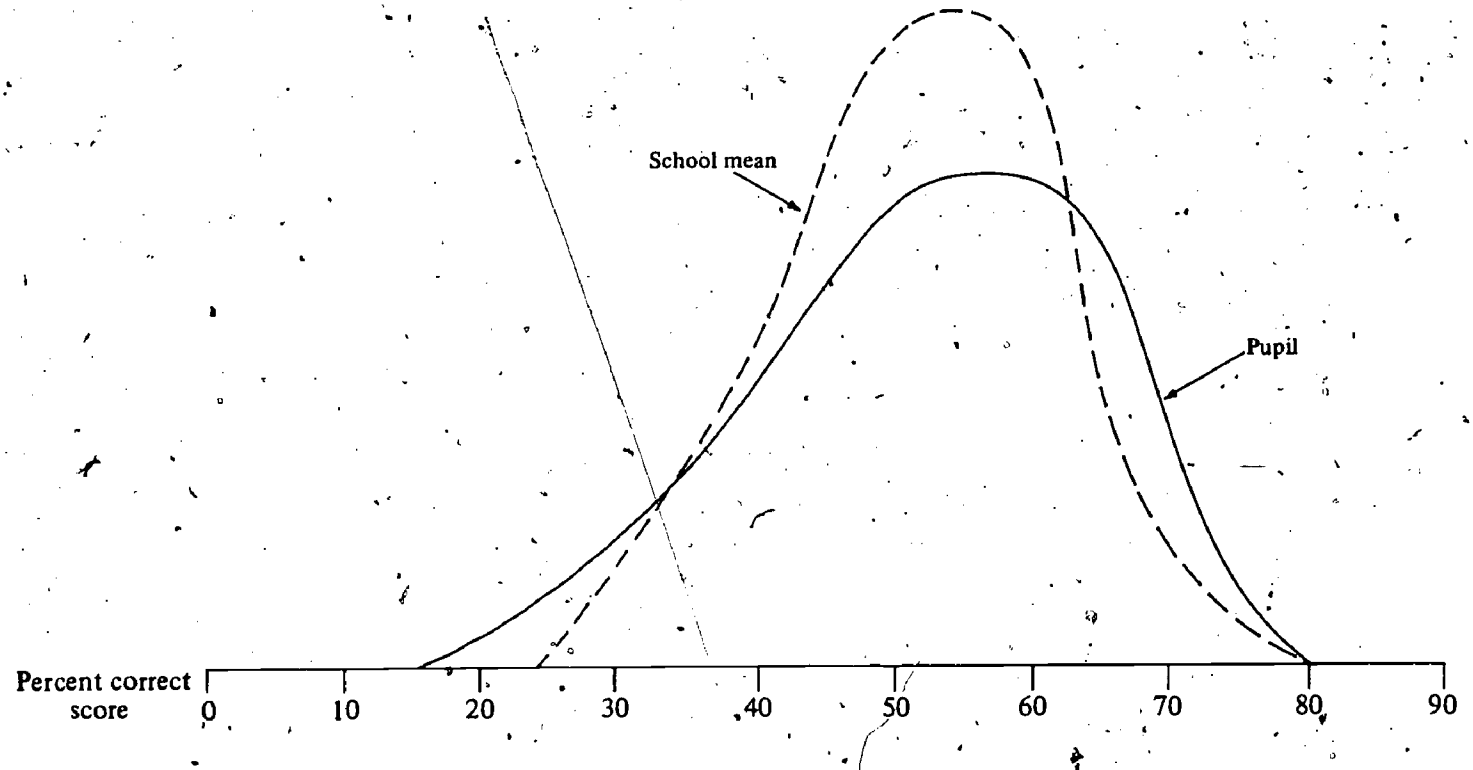

Fig. 9. A typical percent correct score distribution—pupil-level and school-level data

characteristics. The background factors used for this comparison are the ones listed in Box 3 of Figure 5. Thus, the comparison score band is a description of the middle 50 percent of schools from the empirically determined distribution of schools having background factor values equal to that of the given school.

Definition of the Background Factor

For the purpose of this report, a background factor is defined as one which is related to student achievement but which is not under the direct control of the school. For example, a school has no control over parents' ethnicity, personality, occupation, education, economic status, marital status and harmony, mobility, or the neighborhood environment (of home or school). Therefore, these variables were treated as background factors.[2]

On the other hand, a school generally has direct control over locally developed curriculum and instructional approaches; classroom and school organization and administration; locally planned inservice training activities; and individual efforts by teachers and other staff members. Therefore, these and similar variables were not treated as background factors.

Choice of Background Factors

Because the comparison score band is used as a yardstick for program evaluation, and because it often becomes the focus of attention for the media, personnel of the CAP spend much time and effort searching for reliable background factors and conducting statistical analyses to construct valid comparisons. The background information was collected from several

[2] The CAP uses the previous achievement of students as a background factor because the previous achievement of the school subpopulation for which the report is produced is not directly controlled by the teachers of that subpopulation.

sources, which ranged from classroom teachers who supplied pupil-by-pupil information to statewide surveys of district personnel. The list of background factors used in the CAP reports and analyses and a discussion of their validity is given in Section VI, "The Background Factors."

The decision to include or exclude a background factor depended largely on the statistical criteria set for the purpose. Stepwise regression analysis was used to judge the validity and predictability of each background factor in relation to other background factors. The analysis was performed separately for each grade and content area. Separate analyses were made for the school-level and district-level data. A factor was included as a background factor for calculating the comparison score bands only if it gave a significant F-statistic when entered as a last variable in the regression equation.

As a result of the significant F-statistic constraint, in the 1974-75 prediction equations for grade six, the parent education index was included at the school level but not at the district level.

Research Related to the Estimation of the Comparison Score Band

The key to valid estimation of the comparison score bands is the choice of not only appropriate background factors but also of an appropriate statistical model. Unfortunately, the measurement and statistical research literature contains very little on many of the issues pertaining to prediction equations in a context like California's testing program. Results of studies conducted by the Office of Program Evaluation and Research to resolve some of the significant issues are summarized below.

Linear vs. Nonlinear Prediction Equation

The Technical Supplement for 1973-74 deals extensively with the issue of linear and nonlinear prediction equations and their applicability to

the Reading Test data. An analysis was made for the second and third grade data to determine whether the relationship between the test scores and background factors was best characterized by a linear equation, a quadratic equation, or an equation of a higher order. The results showed the relationships between all background factors, except school size, and test scores to be linear. While the trends with school size were quadratic, the nonlinear component seemed weak enough to be ignored in the prediction equation. Nonetheless, school size was taken into consideration in the computation of the standard error of the predicted score.

Moderator Variables

The Survey of Basic Skills: Grade 12 data for 1974-75 were used to investigate the effect of several moderator variables on the linear prediction equation. The moderator variables were: (1) type of district--unified or high school; (2) size of community--large urban, medium sized, or small rural; and (3) size of the district--large, medium, or small.

Linear multiple regression equations were developed for all the districts as well as separately for districts within each category of the moderator variables. Residuals were computed through the use of the coefficients from the general equation and the equation for each moderator variable. Correlation coefficients between residuals from the two sets (general and moderator) of the regression coefficients were computed. For the area of reading, the coefficients ranged from .96 to 1.0, except for one coefficient; the correlation between the residuals from the large urban community equation and those from the general equation was .82. The cumulative frequency distributions of the residuals yielded similar ogives for the moderator variable and general equations.

The analysis showed the magnitude and pattern of residuals for districts remain the same whether one uses the general regression equation or equations within levels of each moderator variable. Consequently, the CAP used general regression equations for its 1974-75 and 1975-76 analyses.

Schools-Within-District Prediction

Prior to the beginning of the data analysis in 1975-76, the following hypothesis was examined. Does the relationship between the actual score and the comparison score band change if a school is compared with "similar" schools within the district, thus, further controlling the comparison of schools? The statistical models for constructing comparison score bands for "similar" schools are different, depending on the comparison group.

Figure 10 shows the possible effect of using one model instead of the other. The solid lines in the figure show the regression line and bands enclosing the middle 50 percent of schools when the statistical model treats all schools as the basis of comparison. The dotted lines correspond to the statistical model in which the basis of comparison is the schools within a district.

Suppose the value of the predictor variable of a school were X_1 and its actual score were Y_1. As indicated in the figure, the predicted score of this school would be $\hat{Y}_1$ using one model and $\hat{Y}_1$ using the other. The school's actual score, Y_1, is seen to fall outside the confidence band using the between-school model and inside the band using the school-within-district model.

The analysis of the data revealed that there was a good deal of scatter in the within-district slopes for all the districts. The scatter made it difficult to use a pooled within-district line as the within-

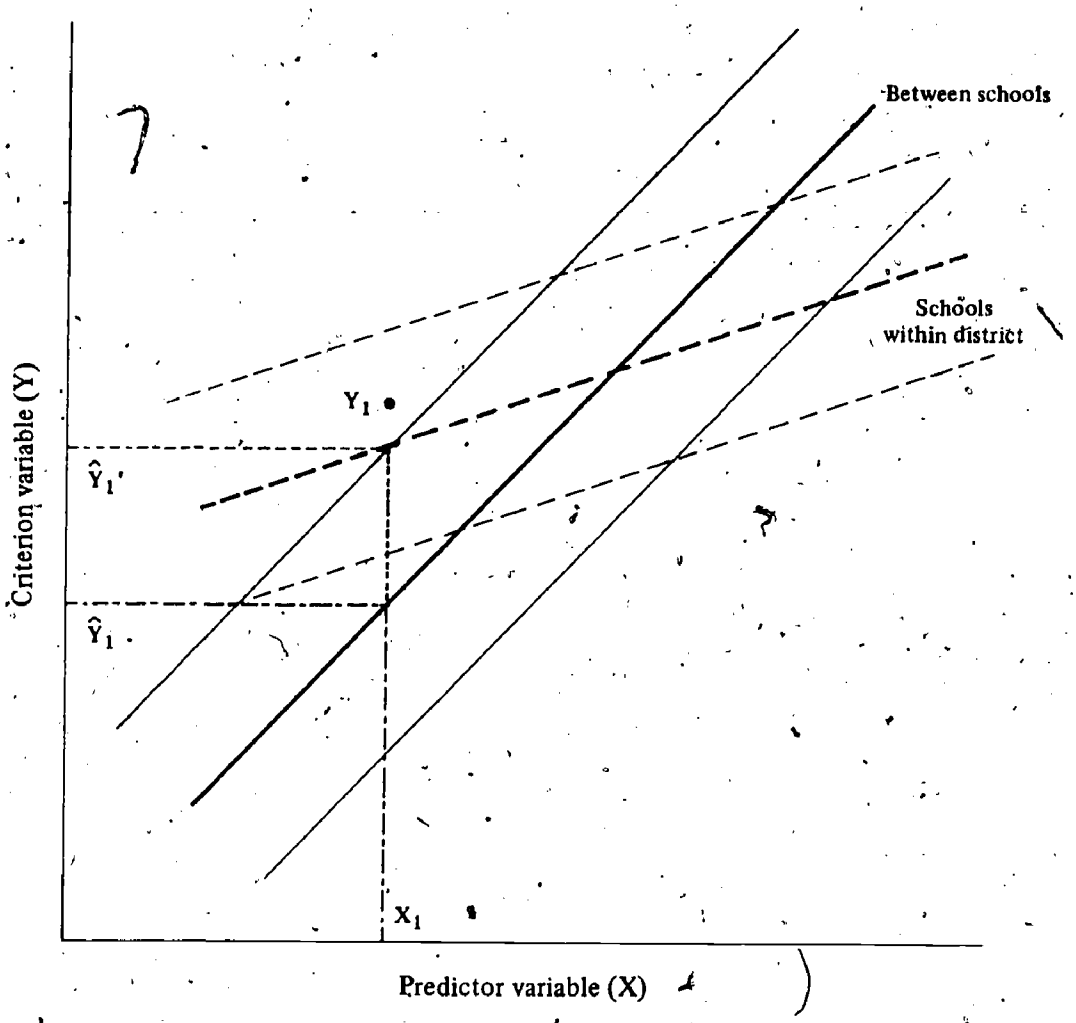

Fig. 10. Regression slopes and confidence bands for (a) between-schools regression; and (b) pooled-between-schools-within-district regression

district line for all districts. And for districts with fewer than 20 schools, an individual district line could not be estimated with acceptable accuracy. Because of too much variation in the within-district slopes, the decision was made to drop the estimation of the pooled-within regression line. The CAP used regression slopes that were derived from an all-school analysis. (The details of this research are also given in Cronbach.[3])

[3] Cronbach, L. J. Research on Classrooms and Schools: Formulation of Questions, Design, and Analysis. Occasional papers of the Stanford Evaluation Consortium. Stanford, Calif.: Stanford University, 1976.

Effect of Weighting Prediction Equations

Over the years it has been the practice in CAP regression analyses to treat each district score (or school score) equally; a district with one student was weighted equally with the largest in the state. It was also possible, of course, to carry out a weighted regression analysis in which each district was weighted by a factor, such as number of students, square root of the number of students, and so on. The reader should bear in mind, however, that the decision to carry out a weighted or unweighted analysis is a policy decision, not a statistical decision, based on the units that should be considered of equal importance.

In the carrying out of the unweighted analysis in previous years, it was observed that the inclusion or exclusion of very small schools or districts (N tested less than 10 or 15) had a significant effect on the stability of the regression coefficients and overall multiple correlations. In the 1974-75 regression analyses, the decision was made to exclude very small schools or districts to improve stability of regression coefficients. It was premised that exclusion of schools or districts would not be necessary if an appropriate weighting factor was introduced in regression analysis.

Prior to the beginning of the 1975-76 regression analyses, the decision was made to carry out a weighted regression analysis. Several preliminary analyses were made using number of students, square root of number of students, and inverse of the standard error of the mean as the weighting factor. The decision was made to use inverse of the standard error of the mean as the weighting factor because this factor takes into account lack of homoscedasticity due not only to different school size or district

size but also to the unreliability resulting from test administration and other factors.

A weighted regression analysis was considered to have three distinct advantages. First, the regression coefficients were more stable than those that could be derived from an unweighted analysis; second, the overall predictability of the equations (R^2) increased; and third, it was not necessary to exclude any school or district, however small, from the analysis.

Moving Averages of Background Factor Values

In the prediction equation the variable which had the greatest predictability at each grade level was previous student achievement. The Entry Level Test score was used as a background factor for the second and third grades; similarly, the grade three and grade six achievement indices were used as achievement indices for the sixth and twelfth grades, respectively.

The question considered was whether a moving average--the average from a series of preceding years' data--rather than one year's data should be used in the prediction equation. A composite of 1972-73 and 1973-74 ELT scores was used to investigate the 1974-75 data for grades two and three.

Although the moving averages would have increased the regression equation's predictability, the improvement was not considered adequate. The CAP tries to present a cross-sectional "snapshot" of the school's program with respect to the most recently available information. If the moving averages were reported to schools and districts, the change in ELT score or achievement index (for example, due to changes in school boundary) would not be reflected. The decision was made, therefore, not to use moving averages in reporting background factor data.

Development of Prediction Equations

After the decision on the choice of background factors was made, separate prediction equations were developed for each grade, content area, and level of reporting--school or district. For the analysis in 1974-75, unweighted multiple linear equations were developed, excluding very small schools or districts in order to improve stability in regression weights. It was decided to exclude schools or districts having fewer than ten pupils in the second or third grades, fewer than 14 students in the sixth grade, and fewer than 18 students in the twelfth grade. These exclusions limits coincided with the number of test forms for a complete administration of the test at that grade level.

For the 1975-76 analysis, however, no school or district was excluded from analysis. A weighted regression analysis was performed for all grades, the weighting factor for each school or district being the inverse of the standard error of the mean. Linear equations were developed for the sixth and twelfth grades; the second and third grade equations had nonlinear components as well. Appendices G-1, G-2, and G-3 provide the results of regression analyses at the school level; and appendices G-4, G-5, and G-6 provide results of regression analyses at the district level.

Contribution of Background Factor

The questions are frequently asked, Which background factor is the most effective predictor of achievement? Which background factor is the lease effective predictor of achievement? The answers to these questions can help school and district personnel to perceive relationships between the value of the background factor (predictor variable) and the location of the comparison score band.

Appendices G-1 through G-6 summarize standard regression weights (beta) for each predictor variable in the regression equation. A standard regression weight indicates the change (in z-score) in predicted score that is due to unit change (in z-score) in the predictor variable, the values of other predictor variables remaining the same. For example, the three predictor variables used in 1975-76 at the school level for grade six reading were grade three achievement index, percent AFDC, and percent bilingual. The absolute values of the beta weights were .49, .32, and .17, respectively. The approximate ratios of these weights were 3:2:1. The ratios indicate that for the same z-score change in the background factors, the change in the predicted score grade three achievement index will be one and one-half times that of percent AFDC and three times that of percent bilingual. On the CAP reports, as shown in Figure 3, the background factors are listed in the order of their relative beta weights.

It is important to point out, however, that the relationships described above are joint relationships. The relationships among the beta weights would change if only one or two predictor variables were used instead of three. For example, the ratio of beta weights of the grade three achievement index to percent AFDC might not remain 3:2 if percent bilingual were excluded from the regression equation.

The question about the relative effectiveness of a predictor variable can also be answered in terms of the "proportion of variance accounted for" by each predictor toward the total variance accounted for (R^2) by the regression equation. Unless the predictors are uncorrelated, however, the relationships between the proportion of variance accounted for by a variable and R^2 is complex and must be viewed in the presence of other variables in the equation.

For uncorrelated predictor variables the standard regression weight (beta) gives a measure of the variance accounted for in the criterion variable when that variable is added in the multiple regression equation. For correlated predictor variables the relationship between R^2 and the amount of variance accounted for is quite complex--although the relationship can be more easily explained when only two predictors are used, as with the regression equation for grade twelve in 1975-76.

As shown in Appendix G-6, the value of R^2 for reading at the school level was .78, and the correlations (r) of the grade six achievement index and percent AFDC with the criterion were .86 and -.76, respectively.

In the Venn diagram shown in Figure 11, the total variance accounted for (R^2) has been broken up into three parts: due to grade six achievement index (AI) alone, due to percent AFDC (PA) alone, and due to both (C).

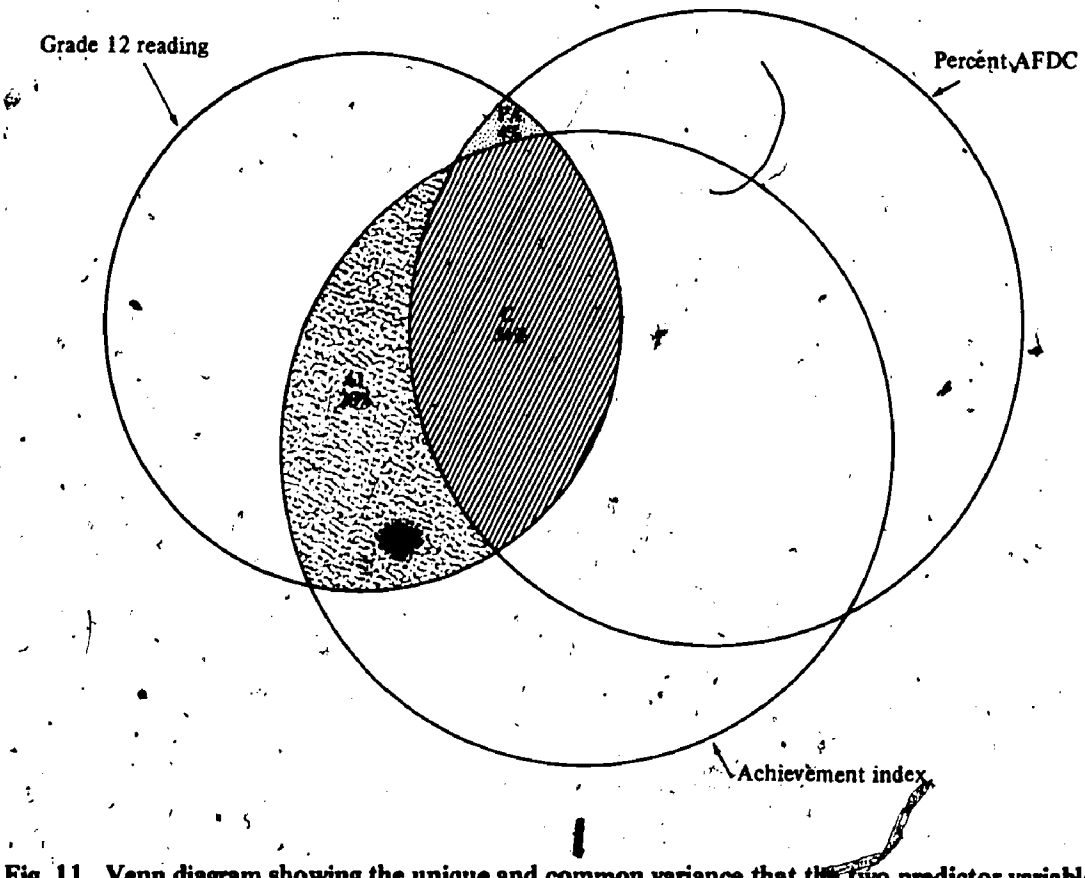

Fig. 11. Venn diagram showing the unique and common variance that the two predictor variables account for in the grade twelve reading scores

Since the amount of variance accounted for by a variable is equal to the squared coefficient of correlation, the grade six achievement index could be used alone as a predictor to account for 74 percent (R^2) of variance. If percent AFDC were used alone, it would account for 58 percent of the variance. If percent AFDC were added to the grade six achievement index, 20 percent of the variance would be due to achievement index alone, 4 percent would be due to percent AFDC alone, and 54 percent would be due to shared variance. In other words, if percent AFDC were added to the achievement index, an additional 4 percent of the variance would be accounted for. When achievement index is added to percent AFDC, the additional variance accounted for would be 20 percent. Obviously, the achievement index is a more effective predictor variable than percent AFDC.

Cautions Regarding Predictability of Background Factors

The following cautions must be borne in mind regarding the use of background factors in the regression analyses.

The CAP Does Not Forecast Scores. Throughout this supplement the word "prediction" has been used in the statistical sense of establishing relationships rather than in its literal or "dictionary" sense. The "comparison score band" should not be considered as setting different expectations for different schools; the comparison score band describes similar schools in the context of their background factors.

Using the existing background factors and test scores, the CAP establishes relationships through regression analysis and describes the standing of the middle 50 percent schools having specified background factor values. The set of middle 50 percent hypothetical schools is characterized as "similar schools" or "comparison score band."

Causality Is Not Established. From the analyses performed, it is not possible to determine whether background variables cause test scores to be high or low. It would be erroneous, for example, to say that in grades two and three pupil mobility causes the test scores to be low. Any determination made about causal relationships could be the result of different data. The reader is referred to the Department's legislative report, School Effectiveness Study, for information on research efforts to isolate factors that may cause test scores to be high or low.[4]

The Quartile Bands

Development of a valid comparison score band is dependent on not only a reasonable prediction model but also on the technique of establishing the quartile bands for the residual scores.[5] Since introduction of the comparison score bands in the state assessment reports in 1972, improvements have been made each year to "fine tune" the methodology of establishing the quartile bands.

To understand how the CAP establishes the quartile bands for computing comparison scores, consider the hypothetical plot of residual scores and predicted scores in Figure 12. The dotted lines are the bands that separate the residuals into three parts--above the upper quartile, below the lower quartile, and between the two quartile bands. The plot in Figure 12 shows that residuals have nearly the same variability for each "slice" of the predicted score.

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[4] California School Effectiveness Study, The First Year: 1974-75. A Report to the California Legislature as Required by Education Code Section 12851. Sacramento: California State Department of Education, 1977. (Section 60664 in the reorganized code.)

[5] Residual score is defined as the difference between the actual and predicted scores.

When residuals are plotted against the size of the school (number of pupils tested), however, the scatterplot, as shown in Figure 13, will show more variability at lower N-tested than for higher N-tested.

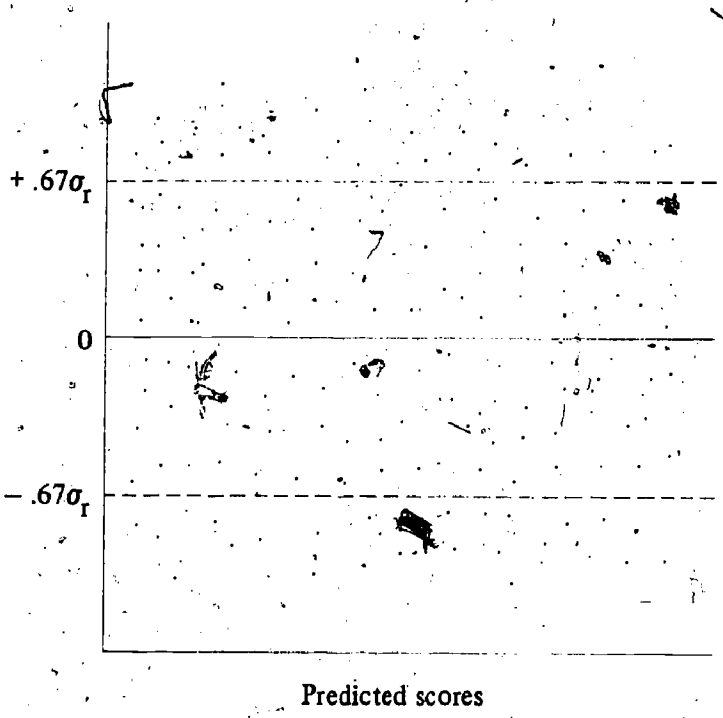

Fig. 12. A hypothetical scatterplot of predicted scores and residuals

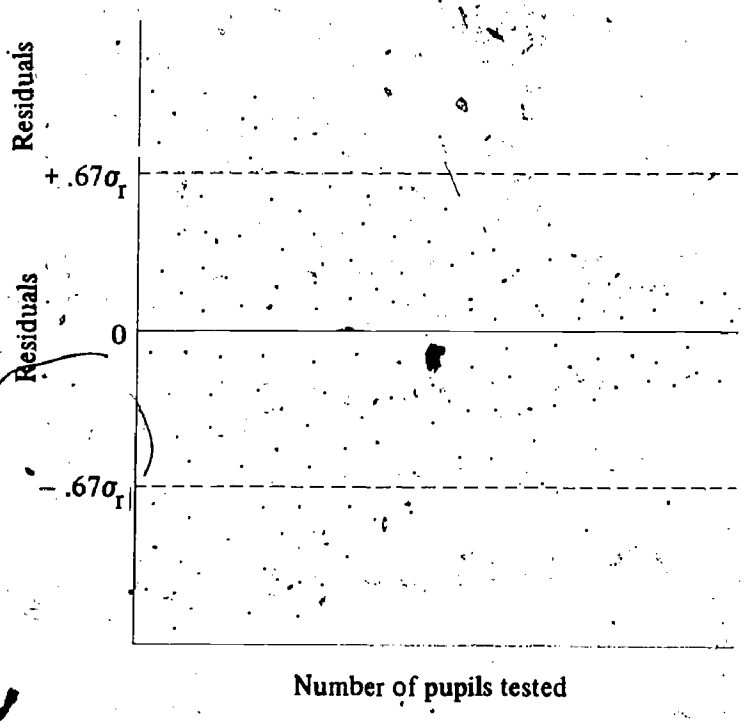

Fig. 13. A hypothetical scatterplot of number of pupils tested and residuals

If quartile bands were established without regard to school size, 50 percent of the schools would be within the quartile bands, 25 percent would be above the upper quartile band, and 25 percent would be below the lower quartile band. For each slice of school size, however, the band would not split schools in a 25-50-25 manner. The CAP uses the following procedure in an effort to ensure that for any slice of school size the middle 50 percent schools are within the quartile bands, 25 percent are above the upper quartile band, and 25 percent are below the lower quartile band.

Procedure Used to Derive Comparison Score Bands in 1974-75

The procedure used to derive comparison score bands in 1974-75 was essentially the same as that used in 1973-74, but with slight changes.[6] The reader is referred to pages 8-12 of the Technical Supplement for 1973-74 for a description of the rationale for this procedure. The steps are outlined below for the sake of completeness.

Plotting a Scatter Diagram. The CAP used subroutines of the Statistical Package for the Social Sciences (SPSS) to generate a scatterplot showing the relationship between the absolute residuals and the number of pupils tested. As an example, the scatterplot for grade six reading is shown in Figure 12.

Assuming a Form for Quartile Regression. The quartile regression is the line which passes through the median plots of the scatterplot shown in Figure 14. An estimation of quartile regression was made by assuming

[6] The procedure was used to analyze data for the sixth and twelfth grade Surveys. The second and third grade Reading Test data were analyzed using the procedure utilized in 1975-76.

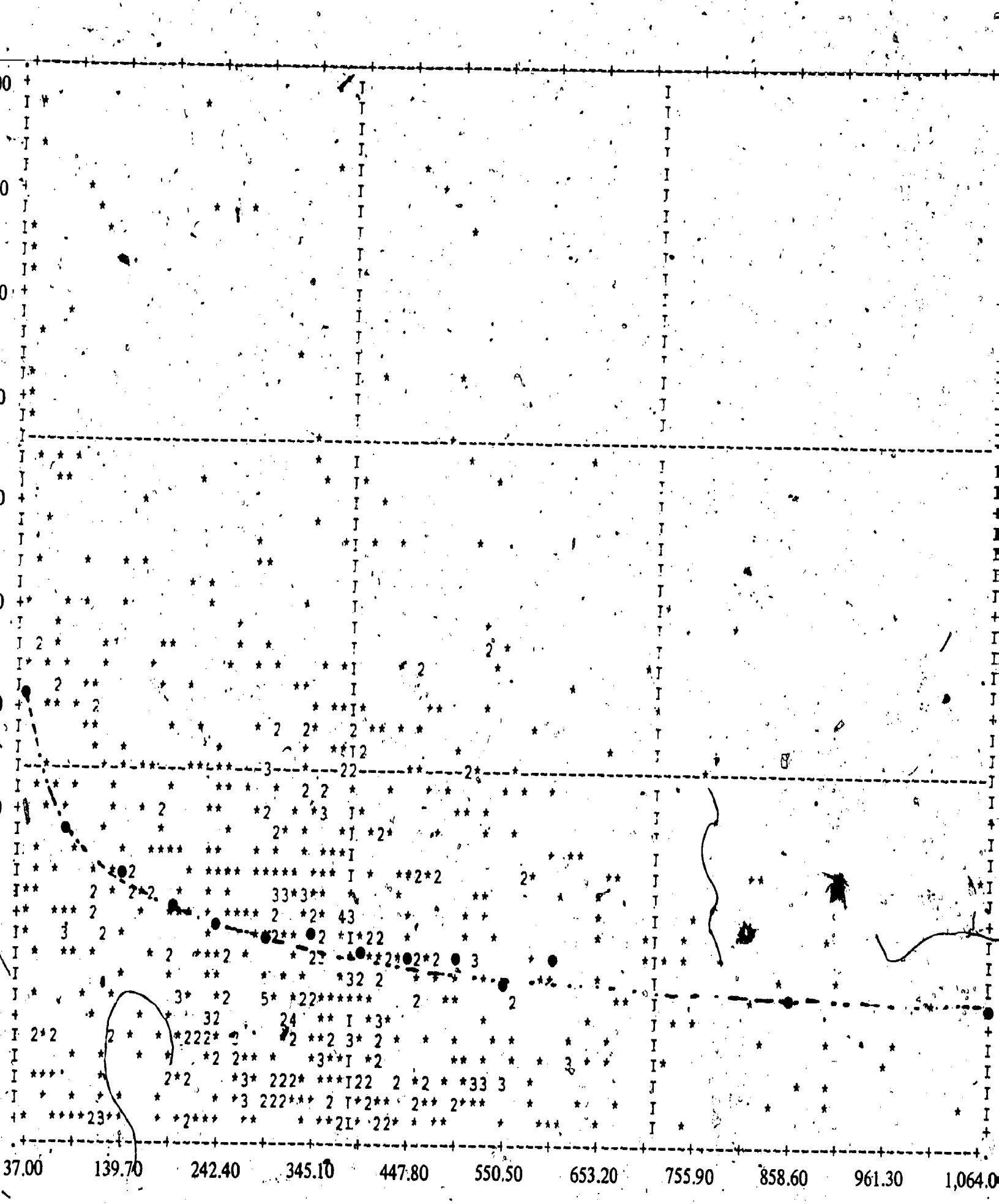

Fig. 14. The scatterplot of the number of students tested and absolute residuals

that normality in the scatterplot prevails at each slice of N-tested.[7] Furthermore, the variance of residuals (σ_E^2) was assumed to be a function of two hypothetical variances: σ_P^2, the variance due to prediction error, and σ_{TE}^2, the variance due to sampling or testing error. In addition, σ_P^2 was assumed to remain constant across schools, whereas for a given school

$$\sigma_{TE}^2 \text{ (school)} = \frac{\sigma_{TE}^2}{N},$$

where N is the number of pupils tested. For a given size school, therefore,

$$\sigma_E^2 \text{ (school)} = \sigma_P^2 + \frac{\sigma_{TE}^2}{N}.$$

Since σ_E^2 for each N are distributed normally, the quartile regression line for a given N will pass through a point having its ordinate at $.67\sigma_E$.

Making Initial Estimates of σ_P^2 and σ_{TE}^2. The scatterplot was divided into eight to ten vertical slices, each slice having a sufficient number of data points. By visual count the ordinate corresponding to the median data point was recorded for each slice. For grade six reading, for example, the values of N and the corresponding ordinates were as follows:

N-tested (N)	Absolute Residual ($.67\sigma_E$)
88	2.70
191	1.80
294	1.69
396	1.44
499	1.44
602	1.40
705	1.40
807	1.40

[7] In fact, the normality requirement is not essential. The determination of the quartile bands by the CAP is based on an empirical curve-fitting logic rather than statistical inference. The procedure starts with normality assumption; the variance estimates are then adjusted until the proper fit is achieved.

Since the absolute residual is equal to $.67\sigma_E$, the equation for the residuals can be written as follows:

$$\left(\frac{\text{absolute residual}}{.67}\right)^2 = \sigma_{TE}^2\left(\frac{1}{N}\right) + \sigma_P^2$$

The above equation has the linear form, $Y = mX + C$, in which m and C are unknowns and $m = \sigma_{TE}^2$ and $C = \sigma_P^2$. Using the above data and solving for the set of linear equations, one can determine the estimates of σ_P^2 and σ_{TE}^2 to be 2.25 and 1,085, respectively.

Making Final Estimates of σ_P^2 and σ_{TE}^2. The initial estimates of σ_P^2 and σ_{TE}^2 were used to compute the limits of the comparison score bands for each school, using the following expression:

$$\text{Predicted score} \pm .67\sqrt{2.25 + \frac{1085}{N}}$$

The proportion of schools whose actual scores were above, within, and below the limits was counted. If the splits were not 25-50-25, the values of the constants σ_P^2 and σ_{TE}^2 were altered by slight amounts and the split was recounted. After several iterations values of σ_P^2 and σ_{TE}^2 were established which gave the desired split. Appendix H-1 provides the values of σ_P^2 and σ_{TE}^2 that were used to compute the comparison score bands in 1974-75.

Procedures Used for Comparison Score Bands in 1975-76

The procedure used to derive comparison score bands in 1975-76 was based on the rationale described above for computing the comparison score band in 1974-75. However, the improvements made in 1975-76 eliminated the arduous process of visually counting the data on the scatterplot.

For the purpose of explaining the new method, the equation for the residuals can be written in the following form:

$$\sigma_E^2 = \sigma_P^2 + C\sigma_{TE}$$

In this equation $C\sigma_{TE}^2$ replaces $\sigma_{TE/N}^2$ of the earlier equation. The procedure, therefore, involves the estimation of C and σ_P^2 for all schools and σ_{TE}^2 for each school.

The values of the estimates of σ_P^2 and C are shown in Appendix H-3. The estimate of σ_{TE}^2 can be calculated by using the matrix sampling procedure. The following steps were performed to estimate σ_P^2 and C.

Estimate of σ_{TE}^2 for Each School. σ_{TE}^2 corresponds to the parameter of variability within the school. This parameter was estimated uniquely for each school, by means of the matrix sampling procedure. (See the following section for details.) In the estimation of σ_{TE}^2, it was assumed that items were sampled from a fixed universe of items and that pupils were sampled from an infinite population of pupils.

Estimate of C. Several values of C were substituted in the equation to find, by trial, which value would split the schools 25-50-25 statewide. It was found that the value of C was 2.0 for the areas of reading, written expression, and mathematics and 1.5 for spelling.

Initial Estimate of σ_P^2. In the estimate of the initial value of σ_P^2, the difference between the residual square, $(Y - \hat{Y})^2$, and $C\sigma_{TE}^2$ was calculated for each school. The mean of these differences gave an initial estimate of σ_P^2.

Final Estimate of σ_P^2. The final estimate of σ_P^2 was calculated in the manner described above after "outlier" cases were excluded. In the identification of outliers, a standardized residual was first calculated for each school, using the following formula:

$$\text{Standardized residual} = \frac{\text{Raw residual } (Y - \hat{Y})}{\sqrt{\sigma_P^2 + C\sigma_{TE}^2}}$$

In the above formula the σ_p^2 is the initial estimate. Schools that had absolute standardized residuals greater than 2.5 were excluded. The mean of the differences between $(Y - \hat{Y})^2$ and $C\sigma_{TE}^2$ for the remaining cases gave the final estimate of σ_p^2.

Computation of Comparison Score Band: An Example

The computation of a comparison score band is illustrated below for the school report shown in Figure 5 for the area of reading. For this school the number of sixth graders tested was 106, and the values of the background factors--grade three achievement index, percent AFDC, and percent bilingual--were 80.6, 4.7, and 6.6, respectively. The following four steps are required to calculate the band.

Computing the Raw Predicted Score. On the basis of the raw score regression weights and constant shown in Appendix G-3, the predicted score (Y) is determined as follows:

$$\hat{Y} = .50906 \text{ (grade 3 achievement index)} - .20561 \text{ (percent AFDC)} - .08544 \text{ (percent bilingual)} + 28.69448 =$$

$$.50906\ (80.6) - .20561\ (4.7) - .08544\ (6.6) + 28.69448 = 68.2$$

Computing the Width Factor of the Comparison Score Band. The width factor of the comparison band is computed in the following manner:

$$W.\ F. = .6745\sqrt{\sigma_p^2 + C\sigma_{TE}^2}$$

From Appendix H-3 the value of σ_p^2 is 3.8668 and the value of C is 2.00. The value of the standard error of the mean reading score, σ_{TE}^2, is 3.9. The standard error can be calculated using the procedure given in the next section. Therefore:

$$W.\ F. = .6745\sqrt{3.8668 + 2(3.9)} = 2.3$$

Computing the Raw Limits of the Comparison Score Band. The upper and lower limits of the comparison score band in raw units are:

$$[U,L] = [\text{Predicted score} \pm \text{W. F.}]$$
$$= [68.2 \pm 2.3]$$
$$= [65.9, 70.5]$$

Changing Raw Limits to PRs. The percentile ranks corresponding to the raw scores can be determined by using the percentile rank chart for the distribution of reading scores for schools. From Appendix L-2 the limits of the comparison score band in PRs are [43, 64]. These values are printed in the school report shown in Figure 5.

Validation of the Comparison Score Bands

After computation of the comparison score band for each school, a statewide analysis was made to check the number of schools having actual scores above, within, and below the comparison score band. Although an analysis similar to that presented in Table 26 (for grade six reading) was made at all grade levels and for all content areas, lack of space prevents presenting complete tables here. Table 26 shows the percent of schools that were in each of the three categories--above, within, and below the comparison score band. These percentages are shown for various slices of N-tested, grade six achievement index, and percent AFDC as well as for the total schools. The table shows that the proportions 25:50:25 for above, within, and below hold not only for the overall population of schools but also for schools within each slice.

Survey Scores, by Skill Area

Page 2 of the school report shown in Figure 5 is designed to answer the question: Is the performance of students in each skill area the same

Table 26

Percent of Schools That Were Above, Within, and Below the Comparison Score Band for Grade 6 Reading, 1975-76

(a) By N-Tested

Category	1-20	21-42	43-61	62-78	79-101	102-399	Total
Above	21	26	23	24	26	30	25
Within	51	48	48	51	48	44	48
Below	28	26	29	25	26	26	27

(b) By Grade 3 Achievement Index

Category	0-74.1	74.2-81.9	82.0-86.3	86.4-89.9	90.0-100.0	Total
Above	26	27	28	27	18	25
Within	43	50	48	50	50	48
Below	31	23	24	23	32	27

(c) By Percent AFDC

Category	0-3.8	3.9-8.3	8.4-14.2	14.3-24.2	24.3-100.0	Total
Above	18	28	30	25	26	25
Within	48	50	47	50	45	48
Below	34	22	23	25	29	27

as their performance for the total test? If it is not the same, for which skill areas is it different?

As shown in Figure 5, the score for each content area--reading, written expression, spelling, and mathematics--has been broken down into its subparts, or skill areas. For example, six skill area scores are shown for reading, seven for written expression, two for spelling, and eight for mathematics.

The lower half of Figure 5 shows five columns of numbers with a graphic display on the right. The first column shows the skill area score, in percent correct units, for the median school in the state; the second column shows the value for the district; and the third column shows the value for the school.

Since the score, such as 78.7 for word identification, is based on a small number of items and is for a small number of students taking those items, an estimate of the standard error of the score is shown in the fourth column, headed "School Measurement Error." The value of the standard error was added to and subtracted from the skill area score, and the resulting values were changed into percentile ranks. These percentile ranks, such as 48--75 for word identification, are shown in the fifth column as well as displayed graphically by a row of dashes. The graphic portion also has a vertical column of Xs corresponding to the percentile rank of the total score. For the illustrated report in Figure 5, the column of Xs for reading corresponds to the percentile rank of 46 shown in Box 2 of Page 1.

Determination of Skill Areas That Are Different

In order to find out which skill area score differs from the total score, one would determine which band(s) is completely to the left or

completely to the right of the position of the total score (shown by an X). Important differences may exist only if the skill area band does not overlap the position of the total score.

In the illustrative example shown in Figure 3, the band for word identification is completely to the right of the position for the total score. The students' performance in word identification skills is therefore better than their performance in the total reading test. The areas that are completely to the right of the position of the total score, such as word identification, can be construed as areas in which the students are strong; similarly, areas that are completely to the left of the position of the total score can be construed as those in which the students are weak. (See Chapter V in Handbook for Reporting and Using Test Results for details of identification of strengths and weaknesses and implementation of curricular changes.)

Assumptions Underlying Standard Error Band

The standard error of the mean is a measure of the accuracy of the score; the smaller the standard error, the more precise the estimate. The value of the standard error also allows the construction of limits of scores within which the true score will lie for specified probabilities. For example, in Figure 3, for the word identification score 78.7, the standard error was estimated to be 3.7. Accordingly, one can say that 68 percent of the time, for estimates like these, the true score would fall between 75.0 (78.7 - 3.7) and 82.4 (78.7 + 3.7) or that 95 percent of the time the true score would fall between 71.5 $[78.7 - 1.96\ (3.7)]$ and 86.0 $[78.7 + 1.96\ (3.7)]$.

The definition of true score, referred to above, follows directly from assumptions made in the computation of standard error using matrix

sampling formulas. In the derivation of the formulas, it was assumed that items in each form were sampled randomly from a finite universe of items and that pupils taking each form were sampled from a finite population of pupils. In other words, the standard error corresponds to the distribution of scores obtained from repeated administration of a particular set of items to a particular set of pupils in matrix sampling fashion.[8]

Formula for Computing the Standard Error

Suppose a matrix sampled test has k forms such that the number of items in each form is m_k, k = 1, 2, . ., K. Also suppose that each form has been administered to n_k pupils. The formula for computing the standard error of the mean (SE) using the multiple matrix sampling procedure is:

$$(SE)^2 = \sigma_P^2\left[\frac{1}{K^2}\sum_{k=1}^{K}\frac{1}{n_k} - \frac{1}{N}\right] + \sigma_I^2\left[\frac{1}{K^2}\sum_{k=1}^{K}\frac{1}{m_k} - \frac{1}{M}\right]$$

$$+ \sigma_{PI}^2\left[\frac{1}{K^2}\sum_{k=1}^{K}\frac{1}{n_k m_k} - \frac{1}{MK^2}\sum_{k=1}^{K}\frac{1}{n_k} - \frac{1}{NK^2}\sum_{k=1}^{K}\frac{1}{m_k} + \frac{1}{NM}\right]$$

where σ_P^2 = the variance due to pupils in the population of pupils

σ_I^2 = the variance due to items in the population of items

σ_{PI}^2 = the variance due to pupil by item population matrix

N = the number of pupils in the population of pupils

M = the number of items in the universe of items

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[8] The estimate of true score and associated standard error would have been different, for example, if the assumption had been made that items were sampled from an infinite universe of items. In a comparison of one district's score with another district's or one school score with another, the assumption of sampling items from a finite universe is not an unreasonable assumption.

Estimating σ_P^2, σ_I^2, and σ_{PI}^2

The three population variances σ_P^2, σ_I^2, and σ_{PI}^2 are estimated by means of the analysis-of-variance procedure. The estimates are first obtained from the item-pupil data matrix for each form within a school, then averaged across the forms.

To understand the estimation of σ_P^2, σ_I^2, and σ_{PI}^2 from the administration of one form, consider the data matrix shown in Figure 6. For the sake of convenience, the item-pupil data matrix from the administration of Form 1 is shown in Figure 15. The matrix shows that m_1 ($m_1 = 5$ in this example) items were sampled randomly from a population of M (say 100) items and that n_1 ($n_1 = 5$ in this example) pupils were sampled randomly from a population of N (say 80) pupils. For determinations of the expected mean squares, the assumptions of the two-way ANOVA Model II can be appropriately applied. The estimates of the population variances σ_P^2, σ_I^2, and σ_{PI}^2 are then given by the following:

$$\hat{\sigma}_P^2 = \left(1 - \frac{1}{N}\right)\left[\frac{1}{m}(MSP) - \left(\frac{1}{m} - \frac{1}{M}\right)(MSPI)\right]$$

$$\hat{\sigma}_I^2 = \left(1 - \frac{1}{M}\right)\left[\frac{1}{n}(MSI) - \left(\frac{1}{n} - \frac{1}{N}\right)(MSPI)\right]$$

$$\hat{\sigma}_{PI}^2 = \left(1 - \frac{1}{N} - \frac{1}{M} + \frac{1}{NM}\right)(MSPI)$$

where, MSP = mean square due to pupils

MSI = mean square due to items

MSPI = mean square due to pupil-by-item interaction

If x_{ij} is the score of Pupil i on Item j, the mean squares can be computed in the following manner:

$$MSP = \left[\Sigma_i(\Sigma_J x_{ij})^2/m_1 - (\Sigma_i \Sigma_j x_{ij})^2/n_1 m_1\right] \div (n_1 - 1)$$

Pupils (i)	Items (j) 1	2	3	4	5	Σx_{ij} j	$(\Sigma x_{ij})^2$
1	0	1	0	1	1	3	9
2	1	0	1	1	1	4	16
3	0	1	1	1	1	4	16
4	0	0	0	0	1	1	1
5	1	1	1	1	1	5	25
Σx_{ij} i	2	3	3	4	5	17 =	$\Sigma\Sigma x_{ij}$ ij
	4	9	9	16	25	289 =	$(\Sigma\Sigma x_{ij})^2$ ij

Fig. 15. Data matrix from the administration of one form of five items to five pupils

$$MSI = \left[\sum_j \left(\sum_i x_{ij} \right)^2 / n_1 - \left(\sum_i \sum_j x_{ij} \right)^2 / n_1 m_1 \right] \div (m_1 - 1)$$

$$MSPI = \left[\sum_i \sum_j x_{ij} - \sum_i \left(\sum_j x_{ij} \right)^2 / m_1 - \sum_j \left(\sum_i x_{ij} \right)^2 / n_1 + \left(\sum_i \sum_j x_{ij} \right)^2 / n_1 m_1 \right] \div (n_1 m_1 - n_1 - m_1 + 1)$$

For this example, $\sum_i \sum_j x_{ij} = 17$

$$\left(\sum_i \sum_j x_{ij} \right)^2 / n_1 m_1 = 289/25 = 11.56$$

$$\frac{1}{m_1} \left[\sum_i \left(\sum_j x_{ij} \right)^2 \right] = \frac{1}{5} \left[9 + 16 + 16 + 1 + 25 \right] = 13.40$$

$$\frac{1}{n_1} \left[\sum_j \left(\sum_i x_{ij} \right)^2 \right] = \frac{1}{5} \left[4 + 9 + 9 + 16 + 25 \right] = 12.60$$

Hence, $MSP = \frac{1}{(5-1)} \left[13.40 - 11.56 \right] = 0.46$

$$MSI = \frac{1}{(5-1)} \left[12.60 - 11.56 \right] = 0.26$$

$$MSPI = \frac{1}{(25-5-5)} \left[17 - 13.40 - 12.60 + 11.56 \right] = 0.16$$

The estimates of population variances for the example are:

$$\hat{\sigma}_P^2 = \left(1 - \frac{1}{80}\right) \left[\frac{1}{5} (0.46) - \left(\frac{1}{5} - \frac{1}{100}\right) (0.16) \right] = 0.06$$

$$\hat{\sigma}_i^2 = \left(1 - \frac{1}{100}\right) \left[\frac{1}{5} (0.26) - \left(\frac{1}{5} - \frac{1}{80}\right) (0.16) \right] = 0.02$$

$$\sigma^2_{PI} = \left[1 - \frac{1}{80} - \frac{1}{100} + \frac{1}{(80)\ (100)} \right] (0.16) = 0.16$$

The values of $\hat{\sigma}^2_P$, $\hat{\sigma}^2_I$, and $\hat{\sigma}^2_{PI}$ were first computed for each school in the state. The statewide means of these estimates were taken to be the best estimates of the parameters.[9] Appendices I-1 through I-3 give the values of these estimates.

Computation of Standard Error for a Skill Area Score

The formula on page 106 is used to compute the standard error for each skill area score. To use this formula, one needs to know the estimates of the population variances σ^2_P, σ^2_I, and σ^2_{PI}. Other constants are either functions of test design or test administration. These constants are K, the number of forms; m_k, the number of items in each form; and n_k, the number of pupils taking each form. From these values one can also determine the total number of items (K) and the total number of pupils tested (N).

Standard error computation will be illustrated for the word identification skill area for the school report shown in Figure 5. For this school the data were as shown below.

Form No.	No. of Pupils	No. of Word I.D. Items	Form No.	No. of Pupils	No. of Word I.D. Items
1	6	2	9	8	-0-
2	8	2	10	7	2
3	6	2	11	7	2
4	5	-0-	12	7	2
5	7	-0-	13	7	-0-
6	6	2	14	5	-0-
7	7	2	15	7	2
8	8	-0-	16	5	-0-

[9] An ANOVA was conducted to determine whether the estimated parameters were different from school to school. The mean square between schools and related F statistics showed essentially no differences. The decision was made to estimate a single parameter for the state rather than separate parameters for each school.

From Appendix I-2 the values of estimated variance components $\hat{\sigma}_p^2$, $\hat{\sigma}_I^2$, and $\hat{\sigma}_{PI}^2$ are .05302, .02294, and .12048, respectively. To compute the standard error of estimate from the formula given on page 106, one also needs the following quantities:

$$\sum_{k=1}^{K} \frac{1}{n_k} = \frac{1}{6} + \frac{1}{8} + \ldots + \frac{1}{5} = 1.339$$

$$\sum_{k=1}^{K} \frac{1}{m_k} = \frac{1}{2} + \frac{1}{2} + \ldots + \frac{1}{2} = 4.500$$

$$\sum_{k=1}^{K} \frac{1}{n_k m_k} = \frac{1}{(6)(2)} + \frac{1}{(8)(2)} + \ldots + \frac{1}{(5)(2)} = 0.670$$

Hence, $(SE)^2 = .05302 \left\{ \frac{1}{9^2} (1.339) - \frac{1}{106} \right\} + .02294 \left\{ \frac{1}{9^2} (4.500 - \frac{1}{18} \right\} +$

$$.12048 \left\{ \frac{1}{9^2} (.670) - \frac{1}{(18)(9^2)} (1.339) - \frac{1}{(106)(9^2)} + \frac{1}{(106)(18)} \right\}$$

$$= .05302 (.007) + .02294 (0) + .12048 (.008) = .00133$$

$$SE = .037$$

This computed standard error is in proportion correct units. In percent correct units the standard error will be 3.7. This value for word identification is shown in Figure 5 under "School Measurement Error."

The District-Level Report

The district-level report is similar in appearance to the school-level report shown in Figure 5. The district-level report is designed to be interpreted in the same manner as the school-level report. Important differences in the computations of the data at the district level are described below.

Percent Correct Score

The percent correct score is computed for the district in the same manner as the percent correct score for the school. (See page 74 of this supplement for details.) The score for a district can range from 0 to 100. The distributional characteristics of the percent correct score at the district level are given in Table 5.

The percent correct score for the median district in the state is the score of the district that is in the middle of the state distribution of district scores. These values are given in Table 5 for each grade and content area.

Percentile Ranks

The percentile ranks on a district-level report are based upon a statewide distribution of district scores. In contrast, the percentile ranks on a school-level report are based upon a statewide distribution of school scores. The percentile rank for a given percent correct score can be found from the tables given in Appendix J. The reader is referred to the section on "Percentile Rank" on page 77 of this supplement for a detailed discussion.

Comparison Score Band

Regression equations were developed for districts by using the district score as the criterion and values of the district background factors as the predictors. In 1974-75 unweighted linear equations were developed for all grades, whereas in 1975-76 weighted linear equations were developed for the sixth and twelfth grades. The results of the regression analysis are given in appendices G-1, G-3, and G-5.

The comparison score band for districts is interpreted in the same manner as that of the schools. The comparison score band was constructed so that approximately 50 percent of the districts were within the band, 25 percent were above the band, and 25 percent were below the band. The band was constructed so that the districts were split approximately 25-50-25 for each slice of the number tested and the background factors. Table 27 shows, for grade six reading, what percents of the districts were above, below, and within the comparison score band, by each slice of N-tested, by grade three achievement index, and by percent AFDC.

Background Factors

The background factors that were used at the district level for computing the comparison score band were the same as those used at the school level, with one exception. In 1974-75 the parental education index was used as a background factor at the school level but not at the district level. The regression analysis showed that the parental education level was a significant factor at the school level but not at the district level. The list of background factors and the procedure for their quantification is given on pages 56-71 of this report. The procedure for their quantification at the district level is described in the following paragraphs. The distributional characteristics of the background factors are given in Table 22.

Except for the Entry Level Test score, the values of the background factors at the district level were computed from the background factor values for each school. The district value was the weighted average of the values at the school level; the weights were the number of students tested in each school. For example, the grade three achievement index

Table 27

Percent of Districts That Were Above, Within, and Below the Comparison Score Band for Grade 6 Reading, 1975-76

(a) By N-Tested

Category	1-8	9-20	21-47	48-138	139-476	477-43,989	Tota
Above	16	23	31	28	24	21	24
Below	52	51	43	50	48	61	51
Within	32	26	26	22	28	18	25

(b) By Grade 3 Achievement Index

Category	0-75.6	75.7-81.6	81.7-85.8	85.9-89.1	89.2-100.0	Tota
Above	23	26	26	27	20	24
Within	45	49	55	55	50	51
Below	32	25	19	18	30	25

(c) By Percent AFDC

Category	0-4.8	4.9-8.5	8.6-12.4	12.5-18.3	18.4-0	Tota
Above	22	28	28	22	23	24
Below	43	53	54	58	47	51
Within	35	19	18	20	30	25

for a district was computed as follows. Suppose a district had two schools, A and B. The number of pupils tested and the Reading Test scores in the year prior to the year of testing and the number of pupils tested in the sixth grade were as shown below.

School	Number of Pupils Tested in Grade 3	Reading Test Score	Number of Pupils Tested in Grade 6
A	30	80.0	60
B	70	70.0	40

The grade three achievement index for the district would be:

$$\frac{(80.0)\quad(60) + (70.0)\quad(40)}{60 + 40} = 76.0$$

It may be noted that the value of the achievement index, 76.0, is not the same as the district test score for the third grade. The district test score for the third grade is the weighted average of scores; the weight is the number of students in the third grade. For this example the district third grade Reading Test score was:

$$\frac{(80.0)\quad(30) + (70.0)\quad(70)}{30 + 70} = 73.0$$

The difference was the result of an increase in the number of pupils in school A from 30 in the third grade to 60 in the sixth grade; also, the number of pupils in school B decreased from 70 in the third grade to 40 in the sixth grade. However, the example presented here may be considered an extreme case; for most districts the grade three achievement index will be very close to the grade three Reading Test score.

Scores, by Skill Area

Page 2 of the district-level report was designed to answer questions similar to those posed about the school-level report. All explanations of the skill area scores for the school-level report given on pages 102–111 of this report apply equally to the district-level report.

The Profiles

The Education Code requires the Department of Education to prepare an annual report of the district-by-district results of the statewide testing program. To this end the Department of Education prepares Profiles of School District Performance. A compendium document, Profiles of School District Performance: A Guide to Interpretation, accompanies Profiles to facilitate understanding and interpretation of the test scores and statistical analyses.

The information presented in a typical Profile is shown in Figure 16. The upper half of the profile presents the test scores, percentile ranks, and comparison score bands; and the lower half of the profile presents background factor data. It will be noted that some background factor data are identified by tests--Reading Test, Survey of Basic Skills: Grade 6, and Survey of Basic Skills: Grade 12--while additional background factors are identified separately. The background factors that are identified by tests are used correspondingly for computing the comparison score bands. The additional background factors are not used in the computation of comparison score bands; the information is reported to assist the reader in understanding fully the conditions under which a district was operating.

Except for the additional background factor data, all data shown on the Profiles were also reported to each district in the district-level

PROFILE OF SCHOOL DISTRICT PERFORMANCE
1975-76

California Assessment Program

County– CALDWELL

School District– CALEAST UNIFIED

Grades and Content Areas Tested	District Mean Score	State Percentile Rank of the District Mean Score	State Percentile Rank of the Comparison Score Band	Percentile Ranks of the District Mean Score (X) and the Comparison Score Band (O) (1 25 50 75 99)
Grade 2 Reading	76.4	77	62-76	COX
Grade 3, Reading	88.4	77	60-76	OOX
Grade 6 Reading	70.1	64	63-78	OXO
Written Expression	67.3	70	63-80	OXO
Spelling	66.3	71	65-75	OX
Mathematics	59.9	63	61-80	OXOO
Grade 12 Reading	65.6	66	66-84	OOOX
Written Expression	62.6	57	67-86	XOOOO
Spelling	68.2	59	62-83	XOOO
Mathematics	66.9	56	69-88	XOOOO

Background Factors	District Value	State Percentile Rank	Percentile Rank of District Value (X) (1 25 50 75 99)
Reading Test			
Entry Level Test	28.64	68	
Socioeconomic Index	2.30	75	
Percent AFDC	6.2	26	
Percent Bilingual	8.3	48	
Pupil Mobility	37.8	40	
Survey of Basic Skills: Grade 6			
Grade 3 Achievement Index	88.0	74	
Percent AFDC	5.3	24	
Percent Bilingual	8.2	56	
Survey of Basic Skills: Grade 12			
Grade 6 Achievement Index	58.9	79	
Percent AFDC	3.5	22	
Additional Background Factors			
Percent minority pupils, total	14.3	50	
Percent American Indian	0.2	47	
Percent Asian American	3.1	88	
Percent Black	1.0	68	
Percent Spanish-surnamed	9.7	54	
Average class size, elementary	28.1	72	
Average class size, high school	26.2	59	
Average daily attendance	32,664	99	
Assessed valuation per unit of a.d.a.	$12,417	20 U	
General purpose tax rate	$4.02	45 U	
Expenditures per unit of a.d.a.	$1,120	33 U	

Fig. 16. An illustrative *Profile*

report. The difference between the profiles and the district-level reports is that the district-level reports are produced separately for each test, whereas the profiles represent a compilation of the data for all the tests administered by the California Assessment Program. Also, district-level reports show data related to skill areas; reported on page 2 of Figure 5; but these data are not reported again in Profiles. The reader is referred to the sections on the school-level report and district-level report on pages 72–116 of this report for the analytic procedures used to prepare the profiles.

It should be pointed out that data on the additional background factors were not collected as part of the California Assessment Program; they were obtained from other agencies within the Department of Education. The details of the data collection procedures are provided in Profiles of School District Performance: A Guide to Interpretation. The following description of additional background factors is provided for the sake of completeness:

- Percent Minority Pupils. The minority enrollment in each district was divided by the district's total enrollment to obtain the percent of minority enrollment. Percents were reported for American Indians, Asian Americans, blacks, and persons with Spanish surnames.
- Average Class Size, Elementary. The average class size for elementary schools means the average class size in grades K through eight.
- Average Class Size, High School. The average class size for high schools means the average class size in grades nine through twelve. For the purposes of the report, grades seven, eight, and nine of a junior high school were included with high school grades in

calculating the average class s[illegible].

- Average Daily Attendance. Average daily attendance means the second period average daily attendance for the district.
- Assessed Valuation per Unit of a.d.a. Assessed valuation per unit of a.d.a. is obtained by dividing the total value of taxable property by the average daily attendance of the district.

The profiles provide the raw value of the additional background factors as well as the statewide percentiles. The percentile ranks of the "financially related" background factors--assessed valuation per unit of a.d.a., general purpose tax rate, and expenditures per unit of a.d.a.--were prepared by ranking the districts by type of district--unified, high school, or elementary school. The letters U (unified), H (high school), or E (elementary school) following the percentile rank printed on the profile identifies the percentile rank tables used for that district. The percentile rank tables for the additional background factors are given in Appendix L.

Appendices

Appendix A

Variance Component Study of the Sixth and Twelfth Grade Surveys

In the reliability studies cited in the text of this report, the implicit assumption was made that a school has a "true" score and a random error. However, by recognizing that there are more than two sources of variations, one can see relationships between any one source or a combination of sources and all sources combined. This type of study is known in the psychometric literature as a generalizability study.[1]

A generalizability study often involves a data collection design that allows the isolation of as many variance components as possible. However, in the study described below, all components could not be determined uniquely because the CAP's matrix sampling design was used for the study; the matrix sampling design does not permit the isolation of all the components. From the available variance estimates, several variance ratios, giving test reliabilities under various assumptions, were computed.

The Data

The data for the study were collected from the 1975-76 administration of the Surveys in grades six and twelve. Random samples of districts were selected independently for each grade. The districts selected were those having at least three schools, and in each school at least six

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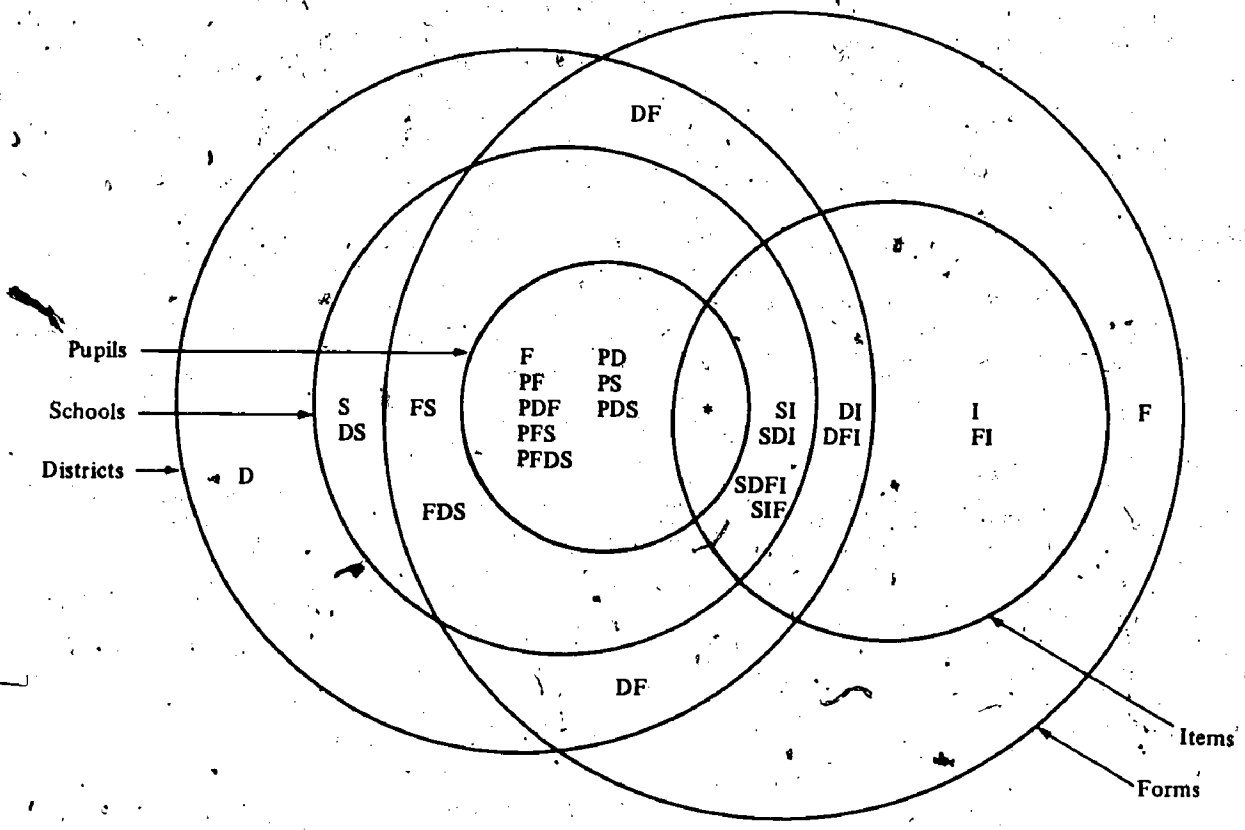
[1] For details on generalizability studies, see Cronbach, Lee J., and others. The Dependability of Behavioral Measurements: New York: John Wiley and Sons, Inc., 1972.

students took each form of the test. Thirty-one districts were selected in the sixth grade sample and 33 in the twelfth grade sample. A balanced design was maintained by randomly excluding schools from the districts until three schools remained for each district. Also, students were excluded randomly until data on six students for each form remained.

The Data Collection Design

The data collection design was the same as that used by the CAP in its assessment procedures; schools were "nested" within districts, students nested within schools, items nested within forms, and forms crossed with schools within districts.* The Venn diagram in Figure 17 shows the nesting and crossing of the various facets of the design. The notations, repre-



*PI, PIS, PSDI, PSDFI, PIFS, PFI, PDI, PDFI

Fig. 17. Venn diagram showing the crossing and nesting of the facets

senting various facets, are D for districts, S for schools, P for pupils, F for forms, and I for items. The areas in the diagram show the sources for which the various components can be estimated. The Venn diagram shows that components due to districts (D) and forms (F) can be determined uniquely but that the component of variance due to items (I) cannot be determined uniquely because items are nested within forms.

Estimation of the Variance Components

For random effects analysis of variance, Table 28 shows the degrees of freedom and expected mean squares associated with each source of variation. The degrees of freedom and coefficients of the expected mean square terms are expressed in n_s, n_f, n_p, and n_i, which stand respectively for the number of schools, forms, pupils taking each form, and items in each form. From the composition of the terms in the expected mean squares, equations can be constructed to compute the estimate of variance component of each source. For example, the variance component for P(DSF) can be estimated from:

$$\frac{MS\left[P(DSF)\right] - MS\left[PI(DSF)\right]}{n_i}$$

Tables 29 and 30 show the sources, degrees of freedom, mean squares, and estimated variance components for the content areas of reading, written expression, and mathematics for grades six and twelve.

Estimate of Generalizability Coefficients

A generalizability coefficient is the ratio of the true score variance to the expected observed score variance. The expected observed score variance consists of all variance terms except those involving nesting and exhaustive sampling. Assuming that schools within districts are

Table 28

Sources, Degrees of Freedom, and Expected Mean Squares for the Random Effects ANOVA Design

Source	Degrees of Freedom	Expected Mean Square
D	$n_d - 1$	$\sigma_e^2 + n_i n_p n_f \sigma_{S(D)}^2 + n_i n_p \sigma_{SF(D)}^2 + n_s n_p \sigma_{DI(F)}^2 + n_p \sigma_{SI(DF)}^2 + n_i \sigma_{P(DSF)}^2 + n_i n_p n_s n_f \sigma_D^2$
S(D)	$n_d(n_s - 1)$	$\sigma_e^2 + n_i n_p \sigma_{SF(D)}^2 + n_p \sigma_{SI(DF)}^2 + n_i \sigma_{P(DSF)}^2 + n_i n_p n_f \sigma_{S(D)}^2$
F	$n_f - 1$	$\sigma_e^2 + n_p n_d n_s \sigma_{I(F)}^2 + n_i n_p n_s \sigma_{DF}^2 + n_i n_p \sigma_{SF(D)}^2 + n_s n_p \sigma_{DI(F)}^2 + n_p \sigma_{SI(DF)}^2 + n_i \sigma_{P(DSF)}^2 + n_i n_p n_s n_d \sigma_F^2$
I(F)	$n_f(n_i - 1)$	$\sigma_e^2 + n_s n_p \sigma_{DI(F)}^2 + n_p \sigma_{SI(DF)}^2 + n_p n_d n_s \sigma_{I(F)}^2$
DF	$(n_d - 1)(n_f - 1)$	$\sigma_e^2 + n_i n_p \sigma_{SF(D)}^2 + n_s n_p \sigma_{DI(F)}^2 + n_p \sigma_{SI(DF)}^2 + n_i \sigma_{P(DSF)}^2 + n_i n_p n_s \sigma_{DF}^2$
SF(D)	$n_d(n_s - 1)(n_f - 1)$	$\sigma_e^2 + n_p \sigma_{SI(DF)}^2 + n_i \sigma_{P(DSF)}^2 + n_i n_p \sigma_{SF(D)}^2$
DI(F)	$n_f(n_d - 1)(n_i - 1)$	$\sigma_e^2 + n_p \sigma_{SI(DF)}^2 + n_s n_p \sigma_{DI(F)}^2$
P(DSF)	$n_d n_s n_f(n_p - 1)$	$\sigma_e^2 + n_i \sigma_{P(DSF)}^2$
SI(DF)	$n_d n_f(n_s - 1)(n_i - 1)$	$\sigma_e^2 + n_p \sigma_{SI(DF)}^2$
PI(DSF)	$n_d n_s n_f(n_p - 1)(n_i - 1)$	σ_e^2

Table 29

Analysis of Variance for the Grade 6 Survey, by Content Area

Source	Degrees of Freedom	Mean Square	Estimated Variance Component
Reading			
Mean	1	33,094.00	.463
D	30	16.78	$.670 \times 10^{-2}$
F	15	28.13	$.384 \times 10^{-2}$
S(D)	62	1.29	$.118 \times 10^{-2}$
I(F)	112	10.72	$.189 \times 10^{-1}$
DF	450	0.43	$.194 \times 10^{-3}$
SF(D)	930	0.38	$.503 \times 10^{-3}$
DI(F)	3,360	0.18	$.104 \times 10^{-3}$
P(DSF)	7,440	0.40	$.313 \times 10^{-1}$
SI(DF)	6,944	0.16	$.621 \times 10^{-3}$
PI(DSF)	52,080	0.15	.153
Written Expression			
Mean	1	30,029.14	.420
D	30	12.42	$.469 \times 10^{-2}$
F	15	39.70	$.501 \times 10^{-2}$
S(D)	62	1.51	$.148 \times 10^{-2}$
I(F)	112	17.05	$.302 \times 10^{-1}$
DF	450	0.49	$.587 \times 10^{-3}$
SF(D)	930	0.38	$-.303 \times 10^{-3}$
DI(F)	3,360	0.18	$.128 \times 10^{-2}$
P(DSF)	7,440	0.39	$.295 \times 10^{-1}$
SI(DF)	6,944	0.16	$.787 \times 10^{-3}$
PI(DSF)	52,080	0.15	.154
Mathematics			
Mean	1	30,634.90	.343
D	30	11.51	$.322 \times 10^{-2}$
F	15	10.38	$-.350 \times 10^{-2}$
S(D)	62	2.21	$.192 \times 10^{-2}$
I(F)	144	29.68	$.528 \times 10^{-1}$
DF	450	0.39	$-.307 \times 10^{-4}$
SF(D)	930	0.36	$-.265 \times 10^{-3}$
DI(F)	4,320	0.21	$.181 \times 10^{-2}$
P(DSF)	7,440	0.36	$.200 \times 10^{-1}$
SI(DF)	8,928	0.18	$.266 \times 10^{-2}$
PI(DSF)	66,960	0.16	.163

Table 30

Analysis of Variance for the
Grade 12 Survey, by Content Area

Source	Degrees of Freedom	Mean Square	Estimated Variance Component
Reading			
Mean	1	28,541.52	.375
D	32	8.79	$.327 \times 10^{-2}$
F	15	22.94	$.602 \times 10^{-4}$
S(D)	66	1.20	$.112 \times 10^{-2}$
I(F)	112	22.45	$.375 \times 10^{-1}$
DF	480	0.39	$.265 \times 10^{-3}$
SF(D)	990	0.34	$.241 \times 10^{-3}$
DI(F)	3,584	0.19	$.819 \times 10^{-3}$
P(DSF)	7,920	0.33	$.192 \times 10^{-1}$
SI(DF)	7,392	0.17	$.163 \times 10^{-3}$
PI(DSF)	55,440	0.17	.174
Written Expression			
Mean	1	28,895.52	.380
D	32	8.00	$.278 \times 10^{-2}$
F	15	26.14	$.524 \times 10^{-3}$
S(D)	66	1.54	$.156 \times 10^{-2}$
I(F)	112	23.45	$.392 \times 10^{-1}$
DF	480	0.40	$.354 \times 10^{-3}$
SF(D)	990	0.34	$.718 \times 10^{-4}$
DI(F)	3,584	0.19	$.547 \times 10^{-3}$
P(DSF)	7,920	0.33	$.201 \times 10^{-1}$
SI(DF)	7,392	0.18	$.161 \times 10^{-2}$
PI(DSF)	55,440	0.17	.169
Mathematics			
Mean	1	30,634.86	.420
D	32	11.51	$.348 \times 10^{-2}$
F	15	10.38	$-.385 \times 10^{-2}$
S(D)	62	2.21	$.174 \times 10^{-1}$
I(F)	144	29.69	$.467 \times 10^{-4}$
DF	450	0.39	$-.261 \times 10^{-3}$
SF(D)	930	0.36	$.313 \times 10^{-2}$
DI(F)	4,320	0.21	$.117 \times 10^{-1}$
P(DSF)	7,440	0.36	$.284 \times 10^{-2}$
SI(DF)	8,928	0.18	$.152 \times 10^{-2}$
PI(DSF)	66,960	0.16	.147

sampled exhaustively, the expected observed score variance is given by:

$$\sigma_D^2 + \frac{1}{n_f}\sigma_{DF}^2 + \frac{1}{n_i n_f}\sigma_{DI(F)}^2 + \frac{1}{n_p n_s n_f}\sigma_{P(DSF)}^2 + \frac{1}{n_p n_i n_s n_f}\sigma_{PI(DSF)}^2$$

Here n_s, n_p, n_f, and n_i are the numbers that were actually used in collecting the data.

The terms for the estimation of the true score variance depend upon the assumptions regarding the facets of generalization. The facets of generalization—pupils and items within forms--can be assumed to be samples from a fixed or infinite population. For example, eight items in each form of the sixth grade reading test can be assumed to be a sample from a finite pool of 128 items or a sample from an infinite pool of items. Similarly, pupils taking each form can be assumed to be a sample from a finite population of pupils (pupils in the district) or from an infinite population of pupils. The two ways of sampling pupils within schools and the two ways of sampling items within forms can give rise to the following four cases of true score variance.

Case I

The pupils are assumed to have been sampled randomly from an infinite population of pupils and items sampled randomly from an infinite pool of items. The true score variance will be σ_D^2.

Case II

The pupils are assumed to have been sampled randomly from a finite population of pupils and items sampled randomly from an infinite pool of items. The true score variance is given by:

$$\sigma_D^2 + \frac{1}{n_p n_s n_f}\sigma_{P(DSF)}^2$$

Case III

The pupils are assumed to have been sampled randomly from an infinite population of pupils and items sampled randomly from a finite pool of items. The true score variance is given by:

$$\sigma_D^2 + \frac{1}{n_i n_f} \sigma_{DI(F)}^2$$

Case IV

The pupils are assumed to have been sampled randomly from a finite population of pupils and items sampled randomly from a finite pool of items. The true score variance is given by:

$$\sigma_D^2 + \frac{1}{n_i n_f} \sigma_{DI(F)}^2 + \frac{1}{n_p n_s n_f} \sigma_{P(DSF)}^2$$

The generalizability coefficients resulting from the above four cases are given in Table 31, which shows that CAP tests have very high generalizability coefficients for all four cases. The generalizability coefficients were calculated for a district's mean test score, the district having three schools and in each school at least six students took each form.

Table 31

Estimated Generalizability Coefficients

Test and Content Area	Case I	Case II	Case III	Case IV
Survey of Basic Skills: Grade 6				
Reading	.972	.988	.973	.989
Written Expression	.956	.977	.958	.979
Mathematics	.955	.976	.958	.979
Survey of Basic Skills: Grade 12				
Reading	.956	.973	.958	.975
Written Expression	.949	.970	.950	.971
Mathematics	.961	.986	.961	.987

Appendix B

A Note on the Correlation Coefficients

Several types of correlation coefficients are presented in the text of this supplement as well as in appendices C through E. The computed coefficients are all Pearson product moment correlations; however, the level of data at which the correlation is computed makes a significant difference in the relative magnitude of the coefficient. Most of the correlations presented in this supplement are for the aggregated data, such as schools and districts, because this report is concerned with describing the progress of schools and districts. The level of data aggregation and other factors affecting measures of association are described below.

Level of Data Aggregation

Aggregating the data from pupil level to school level or from school level to district level can result in substantial change in correlation coefficient. For example, tables 11 and 12 present correlations between test scores from the state-developed tests and publishers' tests. For the same variables the correlations at the district level are lower than those at the school level. If correlations were available at the pupil level, they would probably differ significantly from the school- or district-level correlations.

Blocking Variable

For the same level of data aggregation, the correlations are affected

if the data are blocked. For example, Table 19 presents the correlations for various school sizes (number of pupils tested), or blocks. Sometimes the value of the overall correlation coefficient becomes more meaningful if the coefficients are also known for appropriate blocks. For a more meaningful interpretation of the correlation coefficients, the correlations in Appendix C are presented by type of district.

Exclusion of Outliers

The correlation coefficients may be substantially altered due to the presence or absence of a few outlying data points. For the establishment of stable relationships, it is sometimes useful to ignore the "outliers." For example, in the 1974-75 regression analyses, very small schools and districts were excluded because of the great degree of instability associated with the scores of small schools or districts. (The 1974-75 regression analysis tables are not presented here because of lack of space; however, the tables can be obtained from the Department upon request.)

Weighted vs. Unweighted Analysis

In least squares correlational (regression) analysis, the sum of squared deviation from the line of fit can be either weighted or unweighted. In unweighted analysis each unit weighs equally, whereas in weighted analysis each unit weighs in accordance with the importance attributed to each unit.

The school- and district-level multiple correlation coefficients presented in appendices G-1 through G-6 were based upon weighted analyses; the weight was the inverse of standard error of the mean. If the standard error of the mean of School A was twice that of School B, School B was weighted twice as heavily as School A in the summing of the squared deviations.

Appendix C-1

Intercorrelation Matrix for the Ten Test Score Variables for Unified School Districts, 1975-76*

N = 250

Test Score Variable	1	2	3	4	5	6	7	8	9	10
1. Grade 2 Reading	1.00									
2. Grade 3 Reading	.88	1.00								
3. Grade 6 Reading	.75	.82	1.00							
4. Grade 6 W. Expression	.77	.79	.88	1.00						
5. Grade 6 Spelling	.63	.68	.83	.84	1.00					
6. Grade 6 Mathematics	.66	.68	.82	.85	.78	1.00				
7. Grade 12 Reading	.60	.62	.75	.64	.53	.58	1.00			
8. Grade 12 W. Expression	.60	.57	.70	.65	.61	.63	.77	1.00		
9. Grade 12 Spelling	.50	.40	.50	.52	.49	.48	.56	.63	1.00	
10. Grade 12 Mathematics	.60	.59	.72	.65	.55	.63	.83	.82	.59	1.00

* Coefficients exceeding .13 are significant at the .05 level. Those exceeding .17 are significant at the .01 level.

Appendix C-2

Correlation Matrix for Test Scores Variables and Background Factors for Unified School Districts, 1975-76*

Background Factors	Test Score Variables									
	Grade 2	Grade 3	Grade 6			Grade 12				
	Reading	Reading	Reading	Written Expression	Spelling	Math	Reading	Written Expression	Spelling	Math
Reading Test										
1. Entry Level Test	.78	.81	.72	.70	.58	.61	.62	.64	.42	.61
2. Socioeconomic index	.77	.72	.76	.72	.57	.67	.72	.69	.55	.72
3. Percent AFDC	-.58	-.57	-.63	-.60	-.49	-.54	-.56	-.53	-.38	-.58
4. Percent bilingual	-.58	-.63	-.58	-.51	-.41	-.44	-.51	-.48	-.29	-.43
5. Pupil mobility	-.14	-.15	-.12	-.11	-.14	-.17	-.07	-.17	-.16	-.05
Survey of Basic Skills: Grade 6										
6. Grade 3 achievement index	.76	.79	.68	.70	.57	.58	.63	.61	.41	.61
7. Percent AFDC	-.60	-.62	-.66	-.61	-.50	-.55	-.61	-.57	-.41	-.60
8. Percent bilingual	-.53	-.61	-.61	-.53	-.47	-.44	-.52	-.45	-.23	-.44
Survey of Basic Skills: Grade 12										
9. Grade 6 achievement index	.76	.77	.82	.77	.67	.75	.70	.71	.49	.74
10. Percent AFDC	-.60	-.65	-.68	-.62	-.55	-.57	-.59	-.55	-.37	-.59
Additional background factors										
11. Percent minority pupils, total	-.59	-.68	-.70	-.63	-.50	-.58	-.67	-.60	-.33	-.63
12. Percent American Indian										
13. Percent Asian American										
14. Percent black										
15. Percent Spanish-surnamed										
16. Average class size, elementary	-.11	-.17	-.18	-.04	-.11	-.06	-.10	-.05	.07	-.05
17. Average class size, high school	-.05	-.10	-.11	-.03	-.08	-.03	.04	.07	.12	.07
18. Average daily attendance	-.07	-.10	-.08	-.07	-.04	-.05	-.04	-.03	.00	-.01
19. Assessed valuation per unit of a.d.a.	.21	.24	.21	.14	.22	.15	.10	.07	-.03	.09
20. General purpose tax rate	-.03	.06	.02	.03	-.00	.03	.08	.09	.12	.10
21. Expenditures per unit of a.d.a.	.09	.11	.10	.01	.11	.05	-.01	-.04	-.03	-.02

*Coefficients exceeding .13 are significant at the .05 level; those exceeding .17 are significant at the .01 level.

Appendix C-3

Intercorrelation Matrix for the 21 Background Variables for Unified School Districts, 1975-76

N = 250*

Background Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Reading Test																					
Entry Level Test	1.00																				
2. Socioeconomic Index	.72	1.00																			
3. Percent AFDC	-.52	-.65	1.00																		
4. Percent Bilingual	-.72	-.58	.28	1.00																	
5. Pupil Mobility	-.13	-.05	.19	-.02	1.00																
Survey of Basic Skills: Grade 6																					
6. Grade 3 Achievement Index	.79	.70	-.56	-.62	-.08	1.00															
7. Percent AFDC	-.55	-.65	.95	.34	.22	-.59	1.00														
8. Percent Bilingual	-.69	-.55	.33	.92	-.05	-.60	.37	1.00													
Survey of Basic Skills: Grade 12																					
9. Grade 6 Achievement Index	.74	.81	-.59	-.55	-.10	.76	-.63	-.52	1.00												
10. Percent AFDC	-.57	-.62	.82	.39	.17	-.61	.83	.40	-.62	1.00											
Aditional Background Factors																					
11. Percent Minority Pupils, Total	-.69	-.65	.59	.76	.07	-.66	.64	.76	-.68	.64	1.00										
12. Percent American Indian	.04	-.13	.03	-.15	-.00	-.01	.05	-.11	-.19	-.08	.09	1.00									
13. Percent Asian American	.05	.02	.09	.23	-.04	-.00	.10	.26	.06	.04	.31	-.14	1.00								
14. Percent Black	-.21	-.20	.55	.01	.17	-.28	.57	.02	-.27	.55	.53	-.08	.26	1.00							
15. Percent Spanish-Surnamed	-.70	-.61	.33	.93	-.02	-.61	.38	.89	-.60	.44	.79	-.14	.09	-.03	1.00						
16. Average Class Size, Elem.	-.16	.04	.16	.14	.09	-.12	.15	.19	-.03	.20	.18	-.28	.12	.13	.20	1.00					
17. Average Class Size, High School	-.07	.16	.17	.08	.08	-.10	.17	.15	.10	.14	.13	-.33	.13	.16	.12	.69	1.00				
18. Average Daily Attendence	.10	-.00	.16	.07	.01	-.07	.16	.08	-.00	.12	.15	-.07	.16	.22	.03	.17	.22	1.00			
19. Assessed Valuation/Unit of A.D.A.	.19	.04	-.15	-.10	-.04	.16	-.15	-.20	.16	-.17	.14	.17	-.05	-.00	-.22	-.57	-.52	-.11	1.00		
20. General Purpose Tax Rate	-.02	.17	.04	.01	.05	-.00	.06	.03	.01	.09	.09	-.11	.09	.10	.06	.34	.30	.08	-.63	1.00	
21. Expenditures Per Unit of A.D.A.	.07	-.03	-.01	-.10	.02	.05	.00	-.15	-.01	-.03	.06	.30	.06	.23	-.18	-.62	-.58	-.06	.71	-.25	1.00

* Coefficients exceeding .13 are significant at the .05 level; those exceeding .17 are significant at the .01 level.

Appendix C-4

Intercorrelation Matrix for the Grade Twelve Test Scores and Background Factors for High School Districts, 1975-76
N = 115*

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
st Variables															
Grade 12 Reading	1.00														
Grade 12 W. Expression	.89	1.00													
Grade 12 Spelling	.58	.63	1.00												
Grade 12 Mathematics	.90	.87	.66	1.00											
ade 12 Background Factors															
Grade 6 Ach. Index	.80	.81	.53	.78	1.00										
Percent AFDC	-.57	-.54	-.36	-.51	-.64	1.00									
her Background Factors															
Percent Minority Pupils, Total	-.68	-.61	-.30	-.61	-.75	.64	1.00								
Percent American Indian	.02	.07	-.14	.04	.23	-.14	-.22	1.00							
Percent Asian American	-.05	-.06	.17	-.01	-.10	.11	.39	-.22	1.00						
Percent Black	-.31	-.29	-.18	-.29	-.35	.43	.40	-.12	.12	1.00					
Percent Spanish-surnamed	-.64	-.57	-.27	-.57	-.73	.57	.99	-.31	.31	.14	1.00				
Average Class Size, High School	.30	.18	.22	.29	.14	-.08	-.02	-.30	.21	.07	-.02	1.00			
Average Daily Attendance	.28	.20	.29	.21	.19	-.13	-.04	-.22	.23	.03	-.05	.52	1.00		
Assessed Valuation per Unit of A.D.A.	-.03	.06	-.03	-.01	.10	-.10	-.14	-.23	-.17	.06	-.15	-.34	-.26	1.00	
General Purpose Tax Rate	-.00	.11	.08	.05	.12	-.00	-.01	.24	.13	-.02	.02	.34	.18	-.53	1.00
Expenditures per Unit of A.D.A.	-.15	-.06	-.07	-.10	.04	-.02	-.02	.32	-.03	.02	-.06	-.48	-.29	.46	-.22

*Coefficients exceeding .18 are significant at the .05 level; those exceeding .23 are significant at the .01 level.

Appendix C-5

Intercorrelation Matrix for the Grades Two, Three, and Six Test Scores and Background Factors for Elementary School Districts, 1975-76

N = 665*

Variables	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	24.
Test Variables																								
1. Grade 2 Reading	1.00																							
2. Grade 3 Reading	.64	1.00																						
3. Grade 6 Reading	.55	.56	1.00																					
4. Grade 6 W. Expression	.50	.51	.75	1.00																				
5. Grade 6 Spelling	.40	.37	.57	.57	1.00																			
6. Grade 6 Mathematics	.48	.48	.72	.70	.59	1.00																		
Grades 2 and 3 Background Factors																								
7. Entry Level Test	.56	.56	.42	.43	.26	.34	1.00																	
8. Socioeconomic Index	.60	.61	.54	.49	.35	.51	.54	1.00																
9. Percent AFDC	-.40	-.40	-.32	-.32	-.18	-.32	-.32	-.44	1.00															
10. Percent Bilingual	-.49	-.56	-.47	-.41	-.28	-.38	-.59	-.58	.23	1.00														
11. Pupil Mobility	-.08	-.07	-.03	-.01	-.00	-.03	.02	-.15	.13	.03	1.00													
Grade 6 Background Factors																								
12. Grade 3 Ach. Index	.65	.68	.53	.54	.41	.46	.54	.58	-.43	-.53	-.03	1.00												
13. Percent AFDC	-.41	-.41	-.34	-.34	-.19	-.33	-.32	-.47	.94	.24	.13	-.43	1.00											
14. Percent Bilingual	-.48	-.53	-.51	-.45	-.29	-.45	-.59	-.51	.25	.81	-.09	-.54	.27	1.00										
Additional Background Factors																								
15. Percent Minority Pupils, Total	-.50	-.58	-.51	-.47	-.34	-.42	-.60	-.58	.40	.79	-.03	-.59	.42	.75	1.00									
16. Percent American Indian	-.01	-.08	.01	-.01	.05	.05	.08	-.01	-.03	-.16	.01	.05	-.05	-.16	.09	1.00								
17. Percent Asian American	.03	.01	.05	-.01	.04	.08	.13	-.01	.02	.11	-.02	.01	.03	.11	.29	-.08	1.00							
18. Percent Black	-.15	-.20	-.19	-.16	-.12	-.17	-.14	-.18	.47	.06	.07	-.20	.52	.03	.34	-.06	.04	1.00						
19. Percent Spanish-surnamed	-.50	-.55	-.50	-.46	-.34	-.43	-.61	-.57	.28	.87	-.05	-.59	.30	.85	.90	-.18	.11	.05	1.00					
20. Average Class Size, Elementary	-.01	-.04	-.12	-.07	-.03	-.09	-.09	.02	.14	.07	-.06	.02	.16	.12	.09	-.24	.03	.10	.13	1.00				
21. Average Daily Attendance	.08	.05	.01	.04	.04	.02	.01	.15	.04	.02	-.02	.08	.03	.05	.06	-.11	.11	.09	.05	.36	1.00			
22. Assessed Valuation/Unit of A.D.A.	.04	.11	.06	.03	-.03	.02	.06	-.04	-.06	-.07	.07	-.03	-.06	-.11	-.10	.02	-.02	-.04	-.10	-.46	-.16	1.00		
23. General Purpose Tax Rate	-.00	-.01	-.01	.04	.02	.02	-.03	.07	.10	.11	-.09	.03	.10	.09	.13	-.21	.06	.13	.15	.40	.32	-.40	1.00	
24. Expenditures/Unit of A.D.A.	.03	.04	.11	.11	-.00	.06	.03	-.07	.00	-.04	.21	-.00	-.01	-.11	.07	.27	.12	.10	-.07	-.49	-.12	.44	-.16	1.00

*Coefficients exceeding .08 are significant at the .05 level; those exceeding .10 are significant at the .01 level.

Correlation Coefficients Between 1974-75 and 1975-76 Test Scores and Common Background Factor Variables
N = 250 to 903*

Variables	1974-75 / 1975-76	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Test Variables																				
1. Grade 2 Reading		.68	.65	.59	.56	.38	.49	.57	.55	.46	.64	.64	.56	-.49	-.13	.62	.64	-.06	-.02	-.02
2. Grade 3 Reading		.76	.68	.56	.55	.41	.46	.57	.55	.40	.62	.63	.57	-.56	-.13	.67	.70	-.09	-.09	-.03
3. Grade 6 Reading		.52	.56	.61	.59	.44	.51	.64	.64	.45	.69	.49	.50	-.49	-.02	.56	.79	-.17	-.04	-.03
4. Grade 6 W. Expression		.52	.57	.58	.56	.45	.50	.57	.53	.40	.58	.40	.53	-.43	-.12	.58	.69	-.10	-.02	-.02
5. Grade 6 Spelling		.42	.43	.50	.42	.35	.43	.53	.49	.45	.52	.34	.38	-.31	-.09	.45	.57	-.01	-.00	-.00
6. Grade 6 Mathematics		.49	.49	.53	.55	.41	.54	.52	.51	.43	.55	.39	.46	-.41	-.02	.48	.64	-.12	-.04	-.02
7. Grade 12 Reading		.67	.64	.71	.63	.53	.62	.66	.68	.51	.76	.60	.68	-.36	.01	.69	.75	-.02	.10	-.02
8. Grade 12 W. Expression		.60	.61	.71	.67	.59	.66	.67	.68	.57	.72	.62	.68	-.36	-.02	.68	.66	-.02	.11	-.02
9. Grade 12 Spelling		.48	.40	.47	.49	.47	.48	.47	.49	.47	.46	.41	.52	-.18	.01	.53	.46	.05	.14	.02
10. Grade 12 Mathematics		.63	.62	.73	.65	.57	.68	.60	.65	.50	.73	.61	.71	-.32	.01	.70	.72	-.06	.12	.00
Grades 2 and 3 Background Factors																				
11. Entry Level Test		.60	.58	.56	.46	.33	.40	.57	.52	.43	.59	.66	.55	-.61	-.07	.54	.65	-.12	-.07	-.04
12. Socioeconomic Index		.61	.59	.58	.56	.42	.47	.64	.66	.53	.74	.60	.81	-.55	-.13	.59	.76	.04	.14	.03
13. Percent Bilingual		-.50	-.55	-.48	-.39	-.26	-.35	-.36	-.31	-.17	-.32	-.61	-.51	.89	.20	-.50	-.38	.12	.08	.03
14. Pupil Mobility		-.03	-.03	-.00	-.05	-.02	-.03	-.02	-.03	.02	-.02	-.05	-.03	.13	.65	-.05	-.00	-.10	.04	-.01
Grade 6 Background Factors																				
15. Grade 3 Ach. Index		.67	1.00	.60	.57	.42	.48	.59	.54	.46	.62	.59	.58	-.56	-.15	.66	.72	-.04	-.10	-.02
Grade 12 Background Factors																				
16. Grade 6 Ach. Index		.77	.76	.98	.93	.83	.93	.71	.70	.54	.75	.77	.79	-.41	-.03	.81	.82	-.08	.09	.01
Additional Background Factors																				
17. Average Class Size, Elementary		-.07	-.04	-.13	-.11	-.10	-.16	.10	.04	.09	.03	-.08	.09	.12	-.09	.05	-.16	.88	.67	.14
18. Average Class Size, High School		-.07	-.13	.06	.10	.18	.11	.17	.14	.17	.17	-.07	.16	.08	.03	-.02	.01	.71	.93	.21
19. Average Daily Attendance		-.01	-.03	-.03	-.02	-.00	-.02	-.01	.00	.04	.03	-.04	.04	.03	-.01	.00	-.00	.14	.21	1.00

*All possible pairs of observations have been used to compute a coefficient. For example, the coefficient between grade 2 reading and grade 12 reading is based upon 250 observations, and that between grade 2 reading and grade 3 reading is based upon 903 observations.

Appendix D-1

Intercorrelation Matrix for the Ten Test Score Variables
for Unified School Districts, 1974-75
N = 250*

Test Variables	1	2	3	4	5	6	7	8	9	10
1. Grade 2 Reading	1.00									
2. Grade 3 Reading	.84	1.00								
3. Grade 6 Reading	.77	.78	1.00							
4. Grade 6 W. Expression	.73	.71	.91	1.00						
5. Grade 6 Spelling	.62	.61	.80	.84	1.00					
6. Grade 6 Mathematics	.69	.67	.87	.90	.77	1.00				
7. Grade 12 Reading	.54	.58	.69	.66	.58	.65	1.00			
8. Grade 12 W. Expression	.51	.53	.67	.65	.58	.63	.86	1.00		
9. Grade 12 Spelling	.44	.46	.54	.55	.61	.52	.65	.73	1.00	
10. Grade 12 Mathematics	.59	.62	.73	.69	.64	.67	.82	.86	.73	1.00

*Coefficients exceeding .12 are significant at the .05 level; those exceeding .16 are significant at the .01 level.

Appendix D-2

Intercorrelation Matrix for the Background Factors for Unified School Districts, 1974-75
N = 250*

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Grade 2 and 3 Background Factors																					
1. Entry Level Test	1.00																				
2. Socioeconomic Index	.72	1.00																			
3. Pupil Mobility	-.03	-.01	1.00																		
4. Percent Bilingual	-.74	-.60	-.03	1.00																	
Grade 6 Background Factors																					
5. Grade 3 Achievement Index	.80	.72	-.16	-.62	1.00																
6. Socioeconomic Index	.62	.85	-.01	-.43	.63	1.00															
7. Parent Education Index	.63	.83	-.04	-.49	.68	.87	1.00														
Grade 12 Background Factors																					
8. Grade 6 Achievement Index	.66	.75	-.07	-.53	.76	.68	.71	1.00													
9. Socioeconomic Index	.51	.75	-.03	-.35	.58	.75	.74	.60	1.00												
10. Parent Education Index	.49	.71	-.03	-.38	.53	.73	.70	.56	.81	1.00											
Additional Background Factors																					
11. Percent Minority Pupils, Total	-.74	-.63	.04	.76	-.68	-.52	-.59	-.65	-.44	-.45	1.00										
12. Percent American Indian	-.02	-.13	-.06	-.17	-.04	-.16	-.15	-.08	-.23	-.24	.09	1.00									
13. Percent Asian American	-.07	.03	.00	.23	.00	.04	.01	-.00	.04	-.01	.31	-.14	1.00								
14. Percent Black	-.24	-.16	.14	-.00	-.27	-.19	-.21	-.29	-.11	-.09	.53	-.08	-.26	1.00							
15. Percent Spanish-surnamed	-.72	-.61	-.03	.94	-.63	-.46	-.52	-.57	-.40	-.42	.79	-.14	-.09	-.03	1.00						
16. Average Class Size, Elementary	-.21	.06	.13	.17	-.15	.06	.02	-.11	.09	.09	.14	.27	.05	.09	.19	1.00					
17. Average Class Size, High School	-.08	.14	.14	.13	-.04	.17	.15	.01	.19	.18	.15	-.30	.14	.17	.13	.71	1.00				
18. Average Daily Attendance	-.10	.01	.01	.07	-.05	.02	.01	-.02	.07	.06	.15	-.07	.17	.23	.03	.18	.22	1.00			
19. Assessed Valuation/Unit A.D.A.	.29	.03	-.10	-.23	.17	-.04	-.01	.13	-.03	-.02	-.17	.19	-.08	-.02	-.24	-.64	-.53	-.11	1.00		
20. General Purpose Tax Rate	-.04	.22	.08	.06	-.02	.25	.19	.10	.22	.17	.12	-.19	.20	.20	.04	.38	.41	.13	.58	1.00	
21. Expenditures/Unit of A.D.A.	.08	.04	-.09	-.10	.09	.03	-.02	.08	.02	.02	.11	.13	.19	.32	-.14	-.54	-.41	-.01	.63	-.10	1.00

*Coefficients exceeding .12 are significant at the .05 level; those exceeding .16 are significant at the .01 level.

Appendix D-3

Intercorrelation Matrix for the Test Score and Background Factor Variables for High School Districts, 1974-75

N = 114*

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Test Variables																	
1. Grade 12 Reading	1.00																
2. Grade 12 W. Expression	.88	1.00															
3. Grade 12 Spelling	.69	.72	1.00														
4. Grade 12 Mathematics	.88	.88	.77	1.00													
Grade 12 Background Factors																	
5. Grade 6 Achievement Index	.76	.73	.55	.77	1.00												
6. Socioeconomic Index	.64	.64	.62	.73	.69	1.00											
7. Parent Education Index	.65	.67	.53	.70	.63	.71	1.00										
Additional Background Factors																	
8. Percent Minority Pupils, Total	-.66	-.57	-.31	-.63	-.66	-.43	-.50	1.00									
9. Percent American Indian	.07	.12	-.12	.03	.15	-.14	.06	-.22	1.00								
10. Percent Asian American	-.07	-.02	.12	-.03	-.09	.14	-.00	.39	-.22	1.00							
11. Percent Black	-.36	-.31	-.25	-.36	-.37	-.13	-.18	.40	-.12	.12	1.00						
12. Percent Spanish-surnamed	-.61	-.54	-.26	-.57	-.61	-.42	-.49	.95	-.31	.31	.14	1.00					
13. Average Class Size, High School	.23	.22	.25	.27	.08	.31	.07	-.04	-.30	.20	.05	-.04	1.00				
14. Average Daily Attendance	.24	.23	.31	.32	.22	.32	.19	-.05	-.28	.23	.03	-.06	.53	1.00			
15. Assessed Valuation/Unit A.D.A.	-.00	.06	-.03	.03	.08	-.02	.07	-.18	.36	-.22	-.08	-.19	-.50	-.33	1.00		
16. General Purpose Tax Rate	.03	.02	.12	.10	.10	.14	.08	-.02	-.20	.18	-.06	.01	.33	.35	-.55	1.00	
17. Expenditures/Unit of A.D.A.	.08	.10	.14	.12	.27	.10	.20	-.09	.31	-.07	-.05	-.11	-.55	-.17	.45	.15	1.00

*Coefficients exceeding .18 are significant at the .05 level; those exceeding .23 are significant at the .01 level.

Appendix D-4

Intercorrelation Matrix for the Test Score and Background Factor Variables for Elementary School Districts, 1974-75

N = 650*

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Test Variable																							
1. Grade 2 Reading	1.00																						
2. Grade 3 Reading	.63	1.00																					
3. Grade 6 Reading	.56	.57	1.00																				
4. Grade 6 W. Expression	.54	.54	.70	1.00																			
5. Grade 6 Spelling	.43	.38	.58	.68	1.00																		
6. Grade 6 Math	.44	.45	.71	.76	.61	1.00																	
Grades 2 and 3 Background Factors																							
7. Entry Level Test	.53	.54	.50	.47	.28	.43	1.00																
8. Socioeconomic Index	.59	.54	.46	.48	.36	.37	.50	1.00															
9. Pupil Mobility	-.11	-.14	-.02	.01	-.02	-.01	-.03	-.15	1.00														
10. Percent Bilingual	-.51	-.52	-.45	-.38	-.26	-.32	-.55	-.54	.01	1.00													
Grade 6 Background Factors																							
11. Grade 3 Achievement Index	.55	.63	.45	.47	.38	.36	.50	.52	-.14	-.47	1.00												
12. Socioeconomic Index	.44	.47	.48	.46	.33	.41	.45	.60	-.11	-.40	.47	1.00											
13. Parent Education Index	.46	.45	.49	.43	.29	.40	.50	.61	-.15	-.45	.48	.83	1.00										
Additional Background Factors																							
14. Percent Minority Pupils, Total	-.52	-.57	-.54	-.47	-.29	-.42	-.62	-.57	.04	.81	-.49	-.46	-.52	1.00									
15. Percent American Indian	-.03	.08	.02	.04	-.03	.02	.03	-.06	.00	-.06	.60	-.08	-.04	.08	1.00								
16. Percent Asian American	.04	.01	-.06	-.00	.01	-.08	-.05	-.07	.10	.12	.03	.03	-.02	.29	-.06	1.00							
17. Percent Black	-.18	-.20	-.23	-.18	-.12	-.20	-.18	-.15	.07	.06	-.17	-.14	-.18	.06	-.04	1.00							
18. Percent Spanish-surnamed	-.49	-.59	-.50	-.44	-.27	-.38	-.61	-.54	-.00	.87	-.48	-.44	-.50	.90	-.18	.11	.05	1.00					
19. Average Class Size, Elementary	-.10	-.07	-.20	-.19	-.16	-.24	-.12	.06	-.11	.13	.05	.03	.04	.13	-.28	.03	.11	.17	1.00				
20. Average Daily Attendance	.07	.06	.00	.03	.02	-.02	.03	.19	-.06	.03	.12	.13	.14	.06	-.11	.11	.09	.05	.32	1.00			
21. Assessed Valuation/Unit A.D.A.	.11	-.02	.03	.00	.08	.04	.06	-.03	.14	-.10	-.08	-.10	-.11	-.12	.06	-.06	.06	-.12	-.53	-.19	1.00		
22. General Purpose Tax Rate	.04	.06	.05	.09	.09	.02	.01	.21	-.09	.03	.17	.20	.20	.06	-.18	.05	.15	.06	.32	.33	-.39	1.00	
23. Expenditures/Unit A.D.A.	.15	-.00	.08	.16	.14	.13	.03	.07	.18	-.02	.01	.00	.03	.06	.17	.09	.11	-.04	-.49	-.55	-.00	1.00	

* Coefficients exceeding .08 are significant at the .05 level; those exceeding .10 are significant at the .01 level.

Table 26

Percent of Schools That Were Above, Within, and Below the Comparison Score Band for Grade 6 Reading, 1975-76

(a) By N-Tested

Category	1-20	21-42	43-61	62-78	79-101	102-399	Total
Above	21	26	23	24	26	30	25
Within	51	48	48	51	48	44	48
Below	28	26	29	25	26	26	27

(b) By Grade 3 Achievement Index

Category	0-74.1	74.2-81.9	82.0-86.3	86.4-89.9	90.0-100.0	Total
Above	26	27	28	27	18	25
Within	43	50	48	50	50	48
Below	31	23	24	23	32	27

(c) By Percent AFDC

Category	0-3.8	3.9-8.3	8.4-14.2	14.3-24.2	24.3-100.0	Total
Above	18	28	30	25	26	25
Within	48	50	47	50	45	48
Below	34	22	23	25	29	27

Appendix E-2

Correlation Coefficients Among Grade Six Content Area Scores Within and Across Years
District Level

Year and Content Area		1972-73 (CTBS)				1973-74 (CTBS)				1974-75 (SBS-I)				1975-76 (SBS-II)			
		R	W	S	M	R	W	S	M	R	W	S	M	R	W	S	M
1972-73 (CTBS)	R	---															
	W	.82	---														
	S	.77	.83	---													
	M	.77	.77	.71	---												
1973-74 (CTBS)	R	.61	.55	.44	.50	---											
	W	.59	.52	.42	.49	.84	---										
	S	.44	.45	.39	.41	.76	.86	---									
	M	.53	.52	.46	.52	.82	.81	.77	---								
1974-75 (SBS-I)	R	.51	.51	.42	.42	.56	.54	.45	.50	---							
	W	.53	.56	.43	.43	.57	.56	.48	.53	.75	---						
	S	.41	.42	.33	.37	.39	.39	.35	.35	.61	.70	---					
	M	.47	.46	.39	.40	.50	.43	.39	.45	.73	.77	.63	---				
1975-76 (SBS-II)	R	.54	.50	.40	.45	.60	.53	.42	.48	.61	.59	.44	.51	---			
	W	.51	.51	.39	.46	.51	.47	.32	.41	.58	.56	.45	.50	.77	---		
	S	.37	.38	.28	.31	.34	.34	.28	.31	.50	.42	.35	.43	.60	.60	---	
	M	.47	.42	.33	.36	.48	.43	.31	.42	.53	.55	.41	.54	.74	.72	.61	---

Appendix E-3

Correlation Coefficients Among Grade Twelve Content Area Scores Within and Across Years
District Level

Year and Content Area		1972-73 (ITED)				1973-74 (ITED)				1974-75 (SBS-I)				1975-76 (SBS-II)			
		R	W	S	M	R	W	S	M	R	W	S	M	R	W	S	M
1972-73 (ITED)	R	---															
	W	.73	---														
	S	.66	.79	---													
	M	.83	.75	.73	---												
1973-74 (ITED)	R	.74	.72	.64	.75	---											
	W	.68	.77	.64	.69	.79	---										
	S	.57	.67	.65	.59	.65	.80	---									
	M	.71	.69	.63	.78	.81	.81	.72	---								
1974-75 (SBS-I)	R	.64	.66	.62	.66	.63	.62	.55	.63	---							
	W	.68	.71	.67	.70	.65	.67	.60	.67	.86	---						
	S	.55	.61	.63	.57	.46	.53	.53	.50	.65	.72	---					
	M	.69	.74	.63	.74	.68	.69	.61	.70	.83	.87	.74	---				
1975-76 (SBS-II)	R	.67	.66	.57	.69	.65	.62	.54	.70	.66	.68	.51	.76	---			
	W	.66	.65	.58	.73	.70	.69	.58	.75	.67	.68	.57	.72	.80	---		
	S	.44	.46	.50	.59	.41	.48	.44	.53	.47	.49	.47	.46	.56	.63	---	
	M	.69	.65	.58	.75	.68	.66	.54	.77	.60	.65	.50	.73	.85	.83	.61	---

Appendix F-1

Intercorrelation Matrix Among Total Test and Skill Area Scores, Survey of Basic Skills: Grade 6
School Level, 1975-76

VARIABLE	READING							WRITTEN EXPRESSION								SPELLING			MATHEMATICS								
1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
1. READING	1.00																										
2. Word Identification	.84	1.00																									
3. Vocabulary	.90	.72	1.00																								
4. Comprehension	.96	.76	.81	1.00																							
5. Literal	.92	.72	.79	.95	1.00																						
6. Interp. & Critical	.86	.68	.72	.91	.74	1.00																					
7. Study Locational	.79	.62	.68	.69	.67	.62	1.00																				
8. WRITTEN EXPRESSION	.88	.76	.81	.82	.80	.73	.77	1.00																			
9. Word Forms	.74	.64	.67	.71	.68	.65	.63	.76	1.00																		
10. Standard Usage	.67	.59	.63	.64	.62	.58	.58	.74	.52	1.00																	
11. Language Choices	.76	.66	.69	.72	.70	.65	.65	.84	.62	.58	1.00																
12. Sentence Recognition	.74	.64	.69	.69	.68	.60	.65	.80	.56	.56	.64	1.00															
13. Sentence Manipulation	.74	.63	.69	.70	.67	.64	.65	.83	.63	.58	.64	.60	1.00														
14. Capitalization	.64	.56	.57	.60	.58	.55	.58	.75	.54	.54	.56	.53	.55	1.00													
15. Punctuation	.72	.61	.67	.67	.66	.59	.62	.80	.55	.56	.59	.59	.60	.59	1.00												
16. SPELLING	.76	.64	.69	.71	.67	.65	.65	.77	.63	.60	.64	.63	.64	.61	.64	1.00											
17. Relationships	.71	.60	.65	.66	.65	.60	.61	.70	.57	.55	.59	.60	.59	.57	.61	.90	1.00										
18. Word Forming	.61	.53	.55	.56	.53	.53	.53	.62	.52	.49	.53	.49	.52	.51	.51	.82	.52	1.00									
19. MATHEMATICS	.84	.71	.76	.78	.75	.70	.72	.84	.66	.64	.71	.68	.70	.67	.70	.76	.70	.62	1.00								
20. Arithmetic	.82	.70	.75	.75	.73	.68	.71	.82	.65	.63	.69	.67	.69	.66	.69	.74	.68	.61	.97	1.00							
21. Number Concepts	.77	.67	.70	.71	.70	.63	.67	.77	.63	.60	.64	.65	.64	.59	.64	.67	.64	.54	.87	.89	1.00						
22. Whole Numbers	.74	.65	.68	.69	.66	.62	.63	.73	.60	.57	.63	.59	.63	.58	.61	.67	.60	.57	.84	.86	.69	1.00					
23. Fractions	.68	.58	.64	.64	.61	.58	.59	.69	.52	.54	.56	.57	.59	.57	.58	.62	.58	.51	.84	.87	.69	.66	1.00				
24. Decimals	.61	.53	.54	.58	.56	.52	.56	.63	.49	.47	.56	.50	.52	.52	.53	.56	.53	.45	.78	.81	.62	.61	.64	1.00			
25. Geometry	.62	.54	.57	.58	.57	.52	.52	.62	.50	.47	.53	.52	.55	.50	.53	.56	.53	.45	.74	.64	.62	.55	.56	.50	1.00		
26. Measurement	.72	.60	.66	.68	.65	.62	.64	.71	.58	.56	.62	.59	.61	.58	.61	.66	.63	.53	.87	.77	.71	.70	.66	.65	.61	1.00	
27. Prob. & Statistics	.64	.55	.57	.61	.58	.57	.57	.65	.50	.51	.56	.54	.55	.53	.53	.57	.55	.46	.75	.68	.63	.58	.60	.56	.53	.63	1.00

Appendix F-2

Intercorrelation Matrix Among Total Test and Skill Area Scores, Survey of Basic Skills: Grade 12
School Level, 1975-76
N = 785

VARIABLE	READING							WRITTEN EXPRESSION										MATHEMATICS									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
1. READING	1.00																											
2. Vocabulary	.89	1.00																										
3. Comprehension	.98	.80	1.00																									
4. Literal	.93	.77	.95	1.00																								
5. Interpretive	.88	.72	.90	.77	1.00																							
6. Inter./Crit.	.91	.74	.94	.79	.95	1.00																						
7. Study Locational	.71	.55	.64	.61	.60	.60	1.00																					
8. WRITTEN EXPRESSION	.89	.82	.86	.85	.75	.77	.63	1.00																				
9. Word Forms	.77	.71	.75	.73	.67	.69	.50	.85	1.00																			
10. Language Choice	.85	.78	.82	.82	.72	.73	.63	.91	.72	1.00																		
11. Attitude or Tone	.74	.66	.72	.70	.65	.66	.57	.80	.64	.89	1.00																	
12. Specificity	.73	.66	.70	.72	.60	.61	.54	.80	.65	.87	.64	1.00																
13. Sentence Rec. & Man.	.76	.70	.73	.71	.65	.66	.57	.86	.68	.71	.61	.63	1.00															
14. Recognition	.68	.63	.65	.66	.54	.56	.51	.77	.62	.63	.54	.59	.90	1.00														
15. Manipulation	.64	.59	.61	.59	.57	.57	.48	.72	.58	.61	.52	.52	.83	.54	1.00													
16. Paragraphs	.75	.68	.72	.72	.62	.64	.52	.83	.67	.73	.61	.67	.62	.58	.51	1.00												
17. Cap. & Punct.	.65	.61	.60	.62	.50	.51	.42	.76	.55	.61	.54	.53	.56	.55	.44	.55	1.00											
18. SPELLING	.67	.68	.61	.61	.54	.54	.47	.71	.60	.65	.53	.61	.63	.58	.53	.60	.53	1.00										
19. MATHEMATICS	.90	.80	.87	.87	.76	.78	.66	.90	.75	.84	.71	.74	.77	.68	.67	.75	.65	.71	1.00									
20. Arithmetic	.87	.77	.85	.85	.74	.75	.63	.85	.71	.80	.67	.70	.74	.65	.65	.71	.62	.68	.98	1.00								
21. No. Concepts	.83	.74	.82	.80	.73	.74	.59	.82	.71	.76	.67	.66	.72	.63	.61	.64	.61	.61	.91	.91	1.00							
22. Whole No.	.75	.62	.75	.77	.63	.65	.58	.70	.57	.68	.55	.62	.57	.50	.53	.64	.49	.56	.83	.86	.70	1.00						
23. Fractions	.78	.72	.75	.75	.64	.67	.58	.76	.60	.71	.58	.62	.66	.58	.59	.65	.56	.64	.89	.91	.76	.73	1.00					
24. Decimals	.73	.65	.71	.73	.62	.61	.49	.74	.62	.68	.58	.60	.66	.60	.55	.60	.55	.60	.83	.88	.75	.72	.71	1.00				
25. Algebra	.83	.76	.80	.80	.70	.72	.62	.86	.68	.80	.68	.70	.72	.64	.61	.73	.66	.69	.93	.86	.82	.73	.80	.71	1.00			
26. Geometry	.78	.72	.76	.74	.67	.69	.54	.79	.70	.73	.67	.62	.67	.59	.57	.67	.55	.61	.86	.79	.78	.68	.69	.66	.80	1.00		
27. Measurement	.80	.70	.77	.75	.67	.70	.64	.80	.66	.75	.63	.68	.67	.56	.63	.66	.58	.65	.90	.85	.78	.71	.80	.71	.80	.70	1.00	
28. Prob. & Statistics	.77	.69	.75	.75	.65	.67	.59	.78	.68	.74	.64	.67	.66	.62	.55	.67	.52	.55	.83	.78	.76	.63	.73	.63	.74	.72	.71	1.00

Appendix G-1

Weighted Regression Analysis Results for the Reading Test for Grades Two and Three District Level, 1975-76

Variable	Beta	B	Correlation Coefficient (r)	Stepwise Multiple Correlation (R)	Stepwise R^2
Grade 2 Reading					
Entry Level Test	.45	2.05679	.79	.79	.63
Socioeconomic Index	.36	9.85456	.79	.84	.71
Percent AFDC	-.10	-.09152	-.61	.85	.72
Percent Bilingual	-.06	-.03536	-.63	.85	.72
(ELT-27.1785)**3	-.05	-.00726	.42	.85	.72
Pupil Mobility	-.03	-.35147	-.11	.85	.72
(Constant)		-5.15791			
Grade 3 Reading					
Entry Level Test	.45	1.65872	.81	.81	.66
Socioeconomic Index	.26	5.72580	.77	.85	.72
Percent AFDC	-.15	-.10848	-.61	.85	.73
Percent Bilingual	-.13	-.05639	-.68	.86	.74
(ELT-27.1785)**2	-.13	-.12629	-.37	.86	.74
(ELT-27.1785)**3	-.11	-.01354	.47	.86	.74
Pupil Mobility	-.02	-.19242	-.10	.86	.74
(Constant)		28.55797			

Appendix G-2

Weighted Regression Analysis Results for the Reading Test for Grades Two and Three School Level, 1975-76

Variable	Beta	B	Correlation Coefficient (r)	Stepwise Multiple Correlation (R)	Stepwise R^2
Grade 2 Reading					
Entry Level Test	.41	1.96388	.76	.76	.58
Socioeconomic Index	.27	7.86989	.75	.81	.66
Percent AFDC	-.19	-.14967	-.65	.82	.67
Percent Bilingual	-.10	-.06007	-.57	.82	.67
(ELT-27.1785)**3	-.06	-.00657	.44	.82	.67
Pupil Mobility	-.03	-.02930	-.15	.82	.67
(Constant)		2.63036			
Grade 3 Reading					
Entry Level Test	.36	1.38221	.77	.77	.59
Percent AFDC	-.25	-.16499	-.67	.81	.65
Socioeconomic Index	.21	5.06696	.74	.82	.67
Percent Bilingual	-.13	-.06549	-.59	.83	.68
(ELT-27.1785)**2	-.12	-.09993	-.42	.83	.68
(ELT-27.1785)**3	-.09	-.00889	.48	.83	.69
Pupil Mobility	-.02	-.09709	-.14	.83	.69
(Constant)		38.46465			

Appendix G-3

Weighted Regression Analysis for the Survey of Basic Skills: Grade 6
District Level, 1975-76

Variable	Beta	B	Correlation Coefficient (r)	Stepwise Multiple Correlation (R)	Stepwise R^2
Reading					
Gr. 3 Ach. Index	.47	.49154	.78	.78	.61
Percent AFDC	-.27	-.21334	-.64	.81	.66
Percent Bilingual	-.23	-.10799	-.62	.82	.67
(Constant)		30.32316			
Written Expression					
Gr. 3 Ach. Index	.52	.51919	.77	.77	.59
Percent AFDC	-.24	-.18502	-.62	.79	.62
Percent Bilingual	-.16	-.07213	-.57	.80	.64
(Constant)		23.80568			
Spelling					
Gr. 3 Ach. Index	.52	.38097	.67	.67	.45
Percent AFDC	-.15	-.08289	-.51	.68	.46
Percent Bilingual	-.08	-.02739	-.47	.68	.46
(Constant)		33.58102			
Mathematics					
Gr. 3 Ach. Index	.45	.42191	.69	.69	.48
Percent AFDC	-.24	-.17144	-.57	.72	.52
Percent Bilingual	-.15	-.06189	-.52	.73	.53
(Constant)		25.71561			

Appendix G-4

Weighted Regression Analysis Results for the Survey of Basic Skills: Grade 6
School Level, 1975-76

Variable	Beta	B	Correlation Coefficient (r)	Stepwise Multiple Correlation (R)	Stepwise R^2
Reading					
Gr. 3 Ach. Index	.49	.50906	.81	.81	.66
Percent AFDC	-.32	-.20561	-.72	.84	.71
Percent Bilingual	-.17	-.08544	-.56	.85	.73
(Constant)		28.69448			
Written Expression					
Gr. 3 Ach. Index	.49	.48967	.79	.79	.63
Percent AFDC	-.32	-.19453	-.70	.82	.67
Percent Bilingual	-.15	-.07074	-.53	.83	.69
(Constant)		26.55424			
Spelling					
Gr. 3 Ach. Index	.49	.35382	.70	.70	.49
Percent AFDC	-.20	-.08721	-.58	.71	.51
Percent Bilingual	-.13	-.04272	-.47	.72	.52
(Constant)		36.45190			
Mathematics					
Gr. 3 Ach. Index	.47	.42726	.72	.72	.52
Percent AFDC	-.29	-.16425	-.64	.75	.56
Percent Bilingual	-.10	-.04188	-.46	.75	.56
(Constant)		25.28481			

Appendix G-5

Weighted Regression Analysis for the Survey of Basic Skills: Grade 12
District Level, 1975-76

Variable	Beta	B	Correlation Coefficient (r)	Stepwise Multiple Correlation (R)	Stepwise R^2
Reading					
Gr. 6 Ach. Index	.71	.54047	.84	.84	.71
Percent AFDC	-.19	-.10475	-.67	.85	.72
(Constant)		35.14752			
Written Expression					
Gr. 6 Ach. Index	.75	.533	.83	.83	.69
Percent AFDC	-.13	-.07258	-.64	.84	.71
(Constant)		30.66600			
Spelling					
Gr. 6 Ach. Index	.60	.32302	.66	.66	.43
Percent AFDC	-.08	-.03067	-.49	.66	.43
(Constant)		50.46142			
Mathematics					
Gr. 6 Ach. Index	.72	.67149	.83	.83	.69
Percent AFDC	-.16	-.11080	-.66	.84	.71
(Constant)		30.48156			

Appendix G-6

Weighted Regression Analysis Results for the Survey of Basic Skills: Grade 12
School Level, 1975-76

Variable	Beta	B	Correlation Coefficient (r)	Stepwise Multiple Correlation (R)	Stepwise R^2
Reading					
Gr. 6 Ach. Index	.66	.53535	.86	.86	.74
Percent AFDC	-.28	-.12604	-.76	.88	.78
(Constant)		35.56133			
Written Expression					
Gr. 6 Ach. Index	.70	.57697	.87	.87	.75
Percent AFDC	-.23	-.10450	-.74	.88	.78
(Constant)		31.22841			
Spelling					
Gr. 6 Ach. Index	.59	.31260	.72	.72	.52
Percent AFDC	-.18	-.05170	-.61	.73	.54
(Constant)		51.24358			
Mathematics					
Gr. 6 Ach. Index	.67	.65252	.86	.87	.75
Percent AFDC	-.26	-.13975	-.75	.88	.78
(Constant)		31.82598			

Appendix H-1

Values of σ_E^2 and σ_{TE}^2 Used in the Computation of Comparison Score Bands in 1974-75

Grade/Content Area	Schools		Districts	
	σ_E^2	σ_{TE}^2	σ_E^2	σ_{TE}^2
Grade 6 Reading	13.30	555	1.80	1,100
Grade 6 W. Expression	9.90	690	2.87	1,078
Grade 6 Spelling	8.03	973	2.66	1,310
Grade 6 Mathematics	10.58	421	1.37	977
Grade 12 Reading	[illegible]	1,002	2.02	850
Grade 12 W. Expression	2.[illegible]	650	2.50	450
Grade 12 Spelling	3.1[illegible]	550	2.60	380
Grade 12 Mathematics	4.25	900	3.25	825

Appendix H-2

Values of σ_p^2 and C Used in the Computation of Comparison Score Bands in 1974-75

Grade/Content Area	Schools		Districts	
	σ_p^2	C	σ_p^2	C
Grade 2 Reading	29.5860	1.00	15.8910	1.00
Grade 3 Reading	20.5020	1.00	15.3050	1.00

Appendix H-3

Values of σ_P^2 and C Used in the Computation of Comparison Score Bands in 1975-76

Grade/Content Area	Schools		Districts	
	σ_P^2	C	σ_P^2	C
Grade 2 Reading	17.64704	2.5	7.5216	2.5
Grade 3 Reading	6.6879	2.5	4.2691	2.5
Grade 6 Reading	3.8668	2.0	5.6333	2.0
Grade 6 W. Expression	5.9589	2.0	6.3569	2.0
Grade 6 Spelling	1.0326	1.5	1.1529	1.5
Grade 6 Mathematics	12.2187	2.0	10.7294	2.0
Grade 12 Reading	2.3012	1.5	1.8638	1.5
Grade 12 W. Expression	3.1452	1.5	2.7019	1.5
Grade 12 Spelling	1.6219	1.0	1.8081	1.0
Grade 12 Mathematics	4.7441	1.5	4.2074	1.5

Appendix I-1

Variance Component Estimates $\hat{\sigma}^2_P$, $\hat{\sigma}^2_I$, and $\hat{\sigma}^2_{PI}$ for the Scores from the Reading Test, 1975-76

Variable	School Level			District Level		
	$\hat{\sigma}^2_P$	$\hat{\sigma}^2_I$	$\hat{\sigma}^2_{PI}$	$\hat{\sigma}^2_P$	$\hat{\sigma}^2_I$	$\hat{\sigma}^2_{PI}$
Grade Two						
1. Word Ident.	.03513	.02218	.13180	.02882	.01770	.11778
2. Phonetic Anal.	.05760	.00855	.13987	.05917	.00587	.12952
3. Consonants	.05261	.01642	.15623	.05557	.01383	.15083
4. Vowels	.03182	.02069	.12462	.02857	.01534	.11550
5. Vocabulary	.03634	.02228	.12783	.02889	.01675	.11353
6. Denotational	.03981	.07471	.11849	.03835	.05748	.10362
7. Relational	.04755	.00997	.11105	.03258	.00750	.09504
8. Synonyms	.07261	.00615	.12356	.06943	.00420	.11560
9. Comprehension	.05292	.00949	.14537	.05740	.00643	.13524
10. Literal	.07267	.00616	.12519	.07585	.00463	.11398
11. Details	.05446	.01651	.15217	.05499	.01438	.14472
12. Interpretive	.05416	.01684	.15003	.05597	.01525	.14313
13. Details	.05370	.01638	.16026	.05698	.01369	.15677
14. Main Idea	.07079	.01618	.14294	.07560	.01087	.13860
15. Study Locational	.07893	.00556	.14021	.08585	.00428	.13533
Grade Three						
1. Word Ident.	.02350	.01354	.09185	.01712	.00800	.07556
2. Phonetic Anal.	.04330	.00627	.09507	.03378	.00393	.07736
3. Consonants	.04139	.01414	.12060	.03465	.01066	.10686
4. Vowels	.01897	.00834	.07749	.01561	.00565	.06777
5. Vocabulary	.02433	.01360	.08956	.01747	.00679	.07081
6. Denotational	.02996	.04364	.08703	.02423	.02106	.07001
7. Relational	.02957	.00713	.07664	.01797	.00421	.06092
8. Synonyms	.05069	.00391	.08196	.03876	.00273	.06331
9. Comprehension	.04240	.00726	.09925	.03234	.00360	.07992
10. Literal	.05575	.00467	.08120	.04254	.00362	.06394
11. Details	.04250	.01357	.11531	.03415	.00974	.10258
12. Interpretive	.04079	.01303	.11317	.03308	.00937	.10174
13. Details	.04275	.01536	.12904	.03909	.01264	.11[illegible]
14. Main Idea	.06706	.01124	.10697	.06006	.00519	.09266
15. Study Locational	.07129	.00[illegible]0	.11111	.06676	.00245	.09[illegible]54

Appendix I-2

Variance Component Estimates $\hat{\sigma}_P^2$, $\hat{\sigma}_I^2$, and $\hat{\sigma}_{PI}^2$ for the Scores from the Survey of Basic Skills: Grade 6, 1975-76

Variable	School Level			District Level		
	$\hat{\sigma}_P^2$	$\hat{\sigma}_I^2$	$\hat{\sigma}_{PI}^2$	$\hat{\sigma}_P^2$	$\hat{\sigma}_I^2$	$\hat{\sigma}_{PI}^2$
1. Reading	.03427	.02407	.15505	.03786	.02553	.15510
2. Word Ident.	.05302	.02294	.12048	.05522	.02115	.12459
3. Vocabulary	.04804	.02947	.14687	.05035	.02963	.14808
4. Comprehension	.03848	.02285	.15236	.04096	.02453	.15229
5. Literal	.05000	.01755	.13736	.05335	.01866	.13837
6. Interp. & Crit.	.03768	.03642	.16387	.03961	.03707	.16454
7. Study Locational	.06092	.03455	.15234	.06374	.03419	.15633
8. Written Expression	.03083	.03610	.15450	.03301	.03604	.15626
9. Word Forms	.03038	.02690	.09415	.03159	.02660	.09620
10. Standard Usage	.03469	.03160	.09886	.03655	.03125	.10391
11. Language Choices	.06211	.03538	.13093	.06400	.03649	.13316
12. Sentence Recog.	.07892	.02470	.12471	.08102	.02308	.12808
13. Sentence Manip.	.08796	.01875	.10569	.09553	.01724	.10779
14. Capitalization	.06159	.04213	.16064	.06385	.03617	.16615
15. Punctuation	.05081	.03207	.17400	.05387	.02834	.17820
16. Spelling	.02498	.04438	.16463	.02521	.04588	.16774
17. Relationships	.03251	.06164	.17184	.03381	.06328	.17391
18. Word Forming	.03088	.04170	.14700	.03129	.04278	.14914
19. Mathematics	.02115	.06038	.16102	.02230	.05976	.16303
20. Arithmetic	.02492	.05329	.15852	.02692	.05311	.16068
21. Number Concepts	.03575	.06258	.14584	.03616	.06549	.14852
22. Whole Numbers	.03157	.06[illegible]	.14711	.03235	.07037	.15119
23. Fractions	.04651	.04[illegible]	.16591	.04746	.04472	.17011
24. Decimals	.03845	.05339	.16554	.03795	.05155	.17061
25. Geometry	.03434	.08949	.14[illegible]	.03154	.08992	.15332
26. Measurement	.03649	.04829	.150[illegible]	.03762	.04968	.15558
27. Prob. & Stat.	.05485	.04085	.15737	.05451	.03447	.16196

Appendix I-3

Variance Component Estimates $\hat{\sigma}_P^2$, $\hat{\sigma}_I^2$, and $\hat{\sigma}_{PI}^2$ for the Scores from the Survey of Basic Skills: Grade 12, 1975-76

Variable	School Level			District Level		
	$\hat{\sigma}_P^2$	$\hat{\sigma}_I^2$	$\hat{\sigma}_{PI}^2$	$\hat{\sigma}_P^2$	$\hat{\sigma}_I^2$	$\hat{\sigma}_{PI}^2$
1. Reading	.01994	.03820	.16997	.01969	.03808	.17050
2. Vocabulary	.03341	.02914	.15997	.03349	.03012	.15955
3. Comprehension	.02060	.03738	.16757	.02037	.03702	.16803
4. Literal	.02803	.02898	.15103	.02786	.02922	.15034
5. Interpretive	.01922	.04809	.17538	.01881	.04790	.17558
6. Inter./Crit.	.01694	.04312	.18151	.01612	.04233	.18245
7. Study Locational	.03161	.01922	.16003	.03157	.02006	.16202
8. Written Expression	.02009	.04479	.16840	.01974	.04539	.16821
9. Word Forms	.02342	.03246	.13754	.02301	.03395	.13595
10. Language Choices	.02958	.03331	.15896	.02936	.03387	.15958
11. Attitude or Tone	.04141	.02[illegible]2	.14976	.04045	.02862	.15126
12. Specificity	.05508	.02955	.15656	.05329	.03078	.15970
13. Sentence Rec. & Man.	.02679	.02690	.16928	.02647	.02808	.16863
14. Recognition	.03327	.02323	.14429	.03230	.02408	.14414
15. Manipulation	.04025	.01316	.186[illegible]	.04028	.01489	.18523
16. Paragraphs	.02999	.03606	.16216	.02[illegible]91	.03647	.16138
17. Cap. & Punct.	.02298	.04215	.17653	.02307	.04247	.17518
18. Spelling	.01845	.03822	.16439	.01850	.037[illegible]4	.16503
19. Mathematics	.02715	.04981	.14813	.02672	.05043	.14832
20. Arithmetic	.02646	.04131	.13611	.02637	.04129	.13641
21. No. Concepts	.03329	.03853	.12462	.03282	.03934	.12499
22. Whole No.	.02482	.01405	.11360	.[illegible]503	.01515	.11208
23. Fractions	.04425	.03035	.15032	.04326	.02898	.15048
24. Decimals	.02[illegible]81	.03678	.13003	.02787	.03555	.13084
25. Algebra	.04013	.04233	.14651	.[illegible]4031	.04528	.14590
26. Geometry	.03055	.06129	.14752	.02933	.06325	.14737
27. Measurement	.03752	.03412	.15417	.03624	.[illegible]411	.15445
28. Prob. & Stat.	.04901	.04317	.14942	.05019	.04607	.15030

Appendix J-1

Percentile Ranks of Reading Test Scores for Grades Two and Three
District Norms, Spring, 1976

State Percentile Ranks	Reading Test Scores Grade 2	Reading Test Scores Grade 3	State Percentile Ranks	Reading Test Scores Grade 2	Reading Test Scores Grade 3
99	88.1-96.0	96.2-100.0	49	68.8-68.9	83.9-84.0
98	87.4-88.0	95.7-96.1	48	68.6-68.7	83.8
97	85.9-87.3	95.0-95.6	47	68.4-68.5	83.7
96	85.2-85.8	94.4-94.9	46	68.2-68.3	83.6
95	84.3-85.1	93.9-94.3	45	68.0-68.1	83.4-83.5
94	84.0-84.2	93.3-93.8	44	67.5-67.9	83.2-83.3
93	83.1-83.9	92.9-93.2	43	67.2-67.4	83.1
92	82.8-83.0	92.5-92.8	42	66.9-67.1	82.9-83.0
91	82.0-82.7	92.1-92.4	41	66.7-66.8	82.6-82.8
90	81.0-81.9	91.9-92.0	40	66.3-66.6	82.3-82.5
89	80.5-80.9	91.4-91.8	39	66.0-66.2	82.0-82.2
88	80.2-80.4	91.0-91.3	38	65.5-65.9	81.8-81.9
87	79.9-80.1	90.7-90.9	37	65.3-65.4	81.6-81.7
86	79.4-79.8	90.3-90.6	36	65.0-65.2	81.4-81.5
85	79.1-79.3	89.9-90.2	35	64.8-64.9	81.1-81.3
84	78.8-79.0	89.8	34	64.4-64.7	80.6-81.0
83	78.2-78.7	89.6-89.7	33	64.0-64.3	80.4-80.5
82	77.9-78.1	89.5	32	63.7-63.9	80.2-80.3
81	77.6-77.8	89.3-89.4	31	63.4-63.6	79.9-80.1
80	77.2-77.5	89.1-89.2	30	63.1-63.3	79.6-79.8
79	76.9-77.1	88.9-89.0	29	62.8-63.0	79.3-79.5
78	76.6-76.8	88.7-88.8	28	62.5-62.7	78.9-79.2
77	76.2-76.5	88.5-88.6	27	62.1-62.4	78.6-78.8
76	76.0-76.1	88.2-88.4	26	61.8-62.0	78.2-78.5
75	75.8-79.9	88.1	25	61.6-61.7	77.8-78.1
74	75.4-75.7	88.0	24	61.3-61.5	77.4-77.7
73	75.3	87.8-87.9	23	60.7-61.2	77.2-77.3
72	75.0-75.2	87.7	22	60.0-60.6	76.9-77.1
71	74.8-74.9	87.5	21	59.4-59.9	76.5-76.8
70	74.5-74.7	87.3-87.4	20	58.9-59.3	76.0-76.4
69	74.1-74.4	87.1-87.2	19	58.3-58.8	75.4-75.9
68	74.0	86.9-87.0	18	58.0-58.2	74.9-75.3
67	73.7-73.9	86.8	17	57.5-57.9	74.3-74.8
66	73.5-73.6	86.6-86.7	16	57.2-57.4	73.9-74.2
65	73.1-73.4	86.4-86.5	15	56.6-57.1	73.4-73.8
64	72.9-73.0	86.2-86.3	14	56.4-56.5	72.8-73.3
63	72.7-72.8	86.1	13	55.9-56.3	72.1-72.7
62	72.4-72.6	85.9-86.0	12	55.1-55.8	71.4-72.0
61	72.1-72.3	85.7-85.8	11	54.7-55.0	71.2-71.3
60	71.8-72.0	85.5-85.6	10	53.9-54.6	70.2-71.1
59	71.5-71.7	85.4	9	53.3-53.8	69.3-70.1
58	71.1-71.4	85.3	8	52.0-53.2	68.2-69.2
57	70.8-71.0	85.1-85.2	7	50.3-51.9	66.8-68.1
56	70.6-70.7	84.9-85.0	6	49.4-50.2	65.6-66.7
55	70.4-70.5	84.7-84.8	5	48.0-49.3	64.3-65.5
54	70.2-70.3	84.5-84.6	4	46.5-47.9	61.7-64.2
53	69.9-70.1	84.4	3	44.5-46.4	60.0-61.6
52	69.4-69.8	84.3	2	40.1-44.4	58.0-59.9
51	69.2-69.3	84.2	1	31.0-40.0	43.0-57.9
50	69.0-69.1	84.1			

Appendix J-2

Percentile Ranks of Content Areas of Survey of Basic Skills: Grade 6
District Norms, Spring, 1976

State Percentile Ranks	Reading	Written Expression	Spelling	Mathematics	State Percentile Ranks
99	98.4-100.0	85.6-100.0	84.2-100.0	80.2-93.3	99
98	85.7-89.3	82.1-85.5	80.0-84.1	77.4-80.1	98
97	84.0-85.6	80.1-82.0	76.8-79.9	75.0-77.3	97
96	81.7-83.9	78.1-80.0	75.[illegible]-76.7	72.8-74.9	96
95	80.9-81.6	77.4-78.0	75.0	72.1-72.7	95
94	80.5-80.8	76.1-77.3	74.9	71.4-72.0	94
93	79.8-80.4	75.1-76.0	73.9	70.4-71.3	93
92	79.4-79.7	75.0	72.6-73.8	70.0-70.3	92
91	79.0-79.3	74.6-74.9	71.9-72.5	69.3-69.9	91
90	78.3-78.9	73.8-74.5	71.5-71.8	68.6-69.2	90
89	77.5-78.2	73.2-73.7	70.9-71.4	67.8-68.5	89
88	76.7-77.4	72.7-73.1	70.6-70.8	67.2-67.7	88
87	76.2-76.6	72.3-72.6	70.1-70.5	66.7-67.1	87
86	75.8-76.1	71.7-72.2	69.7-70.0	65.6-66.6	86
85	75.3-75.7	71.3-71.6	69.5-69.6	65.1-65.5	85
84	75.1-75.2	71.0-71.2	69.2-69.4	64.7-65.0	84
83	74.9-75.0	70.7-70.9	69.0-69.1	64.3-64.6	83
82	74.3-74.8	70.4-70.6	68.6-68.9	64.0-64.2	82
81	74.0-74.2	69.9-70.3	68.4-68.5	63.7-63.9	81
80	73.7-73.9	69.7-69.8	68.2-68.3	63.3-63.6	80
79	73.5-73.6	69.4-69.6	68.0-68.1	63.0-63.2	79
78	73.2-73.4	69.2-69.3	67.8-67.9	62.6-62.9	78
77	72.9-73.1	68.8-69.1	67.5-67.7	62.5	77
76	72.5-72.8	68.6-68.7	67.3-67.4	62.3-62.4	76
75	72.4	68.4-68.5	67.1-67.2	62.0-62.2	75
74	72.0-72.3	68.2-68.3	66.9-67.0	61.8-61.9	74
73	71.8-71.9	68.0-68.1	66.8	61.6-61.7	73
72	71.5-71.7	67.9	66.7	61.4-61.5	72
71	71.3-71.4	67.5-67.8	66.3-66.6	61.2-61.3	71
70	71.1-71.2	67.3-67.4	66.2	61.0-61.1	70
69	70.9-71.0	67.1-67.2	66.1	60.8-60.9	69
68	70.7-70.8	67.0-67.0	66.0	60.7	68
67	70.5-70.6	66.9	65.8-65.9	60.5-60.6	67
66	70.3-70.4	66.8	65.[illegible]	60.3-60.4	66
65	70.2	66.6-66.7	65.5-65.6	60.1-60.2	65
64	70.1	66.2-66.5	65.4	60.0	64
63	69.9-70.0	66.1	65.2-65.3	59.8-59.9	63
62	69.6-69.8	65.9-66.0	65.1	59.5-59.7	62
61	69.4-69.5	65.7-65.8	64.8-65.0	59.2-59.4	61
60	69.1-69.3	65.6	64.7	59.0-59.1	60
59	68.9-69.0	65.3-65.5	64.6	58.8-58.9	59
58	68.8	65.2	64.5	58.7	58
57	68.6-68.7	65.0-65.1	64.4	58.5-58.6	57
56	68.4-68.5	64.8-64.9	64.3	58.2-58.4	56
55	68.2-68.3	64.6-64.7	64.1-64.2	58.0-58.1	55
54	68.0-68.1	64.3-64.5	64.0	57.9	54
53	67.8-67.9	64.2	63.9	57.7-57.8	53
52	67.6-67.7	63.9-64.1	63.8	57.6	52
51	67.4-67.5	63.7-63.8	63.7	57.5	51
50	67.2-67.3	63.3-63.6	63.5-63.6	57.4	50

Appendix J-2 (Cont.)

Percentile Ranks of Content Areas of Survey of Basic Skills: Grade 6
District Norms, Spring, 1976

State Percentile Ranks	Reading	Written Expression	Spelling	Mathematics	State Percentile Ranks
49	66.9-67.1	63.0-63.2	63.3-63.4	57.1-57.3	49
48	66.8	62.8-62.9	63.2	56.9-57.0	48
47	66.7	62.6-62.7	63.1	56.8	47
46	66.4-66.6	62.5	62.9-63.0	56.5-56.7	46
45	66.3	62.3-62.4	62.7-62.8	56.3-56.4	45
44	66.2	62.1-62.2	62.6	56.1-56.2	44
43	66.0-66.1	61.9-62.0	62.5	55.9-56.0	43
42	65.8-65.9	61.7-61.8	62.4	55.7-55.8	42
41	65.6-65.7	61.5-61.6	62.3	55.5-55.6	41
40	65.3-65.5	61.3-61.4	62.2	55.2-55.4	40
39	65.0-65.2	61.1-61.2	62.0-62.1	55.0-55.1	39
38	64.8-64.9	61.0	61.7-61.9	54.9	38
37	64.6-64.7	60.7-60.9	61.6	54.7-54.8	37
36	64.5	60.6	61.5-61.5	54.5-54.6	36
35	64.2-64.4	60.3-60.5	61.2-61.3	54.3-54.4	35
34	64.1	60.1-60.2	61.1	54.1-54.2	34
33	63.8-64.0	59.8-60.0	60.8-61.0	54.0	33
32	63.2-63.7	59.5-59.7	60.7	53.8-53.9	32
31	62.9-63.1	59.3-59.4	60.5-60.6	53.5-53.7	31
30	62.6-62.8	59.0-59.2	60.3-60.4	53.3-53.4	30
29	62.5	58.8-58.9	60.1-60.2	53.0-53.2	29
28	62.3-62.4	58.6-58.7	59.9-60.0	52.9	28
27	62.0-62.2	58.4-58.5	59.6-59.8	52.6-52.8	27
26	61.7-61.9	58.2-58.3	59.4-59.5	52.4-52.5	26
25	61.3-61.6	57.8-58.1	59.2-59.3	52.1-52.3	25
24	60.9-61.2	57.3-57.7	59.0-59.1	51.9-52.0	24
23	60.6-60.8	57.1-57.2	58.9	51.7-51.8	23
22	60.2-60.5	56.4-57.0	58.7-58.8	51.3-51.6	22
21	59.9-60.1	56.2-56.3	58.4-58.6	50.9-51.2	21
20	59.5-59.8	55.8-56.1	58.3	50.6-50.8	20
19	59.1-59.4	55.3-55.7	58.2	50.4-50.5	19
18	58.7-59.0	55.0-55.2	57.8-58.1	50.1-50.3	18
17	58.3-58.6	54.8-54.9	57.4-57.7	50.0	17
16	57.8-58.2	54.6-54.7	57.1-57.3	49.7-49.9	16
15	57.5-57.7	54.4-54.5	56.9-57.0	49.2-49.6	15
14	57.1-57.4	53.9-54.3	56.5-56.8	49.0-49.1	14
13	56.4-57.0	53.4-53.8	56.3-56.4	48.8-48.9	13
12	56.2-56.3	52.9-53.3	55.8-56.2	48.3-48.7	12
11	55.4-56.1	52.2-52.8	55.5-55.7	47.8-48.2	11
10	54.7-55.3	51.6-52.1	55.0-55.4	47.1-47.7	10
9	54.2-54.6	51.2-51.5	53.9-54.9	46.7-47.0	9
8	53.7-54.1	50.5-51.1	52.8-53.8	46.2-46.6	8
7	53.1-53.6	50.1-50.4	41.9-52.7	45.9-46.1	7
6	52.0-53.0	49.8-50.0	50.9-51.8	45.0-45.8	6
5	50.8-51.9	48.3-49.7	50.4-50.8	44.4-44.9	5
4	49.0-50.7	46.9-48.2	50.0-50.3	43.6-44.3	4
3	47.7-48.9	45.8-46.8	48.8-49.9	42.3-43.5	3
2	45.8-47.6	43.2-45.7	44.2-48.7	40.7-42.2	2
1	33.3-45.7	12.5-43.1	33.3-44.1	20.0-40.6	1

Appendix J-3
Percentile Ranks of Content Areas of Survey of Basic Skills: Grade 12
District Norms, December, 1975

State Percentile Ranks	Reading	Written Expression	Spelling	Mathematics	State Percentile Ranks
99	72.9-75.0	72.5-75.4	76.4-82.4	78.8-82.4	99
98	71.6-72.8	70.2-72.4	75.0-76.3	77.8-78.7	98
97	70.8-71.5	69.8-70.1	74.2-74.9	76.7-77.7	97
96	70.5-70.7	69.4-69.7	73.1-74.1	75.4-76.6	96
95	70.3-70.4	68.9-69.3	72.6-73.0	74.8-75.3	95
94	69.9-70.2	68.1-68.8	72.2-72.5	73.5-74.7	94
93	69.5-69.8	67.8-68.0	72.0-72.1	72.7-73.4	93
92	69.3-69.4	67.6-67.7	71.8-71.9	72.2-72.6	92
91	69.1-69.2	67.2-67.5	71.5-71.7	71.7-72.1	91
90	68.7-69.0	66.6-67.1	71.2-71.4	71.4-71.6	90
89	68.4-68.6	66.4-66.5	71.1	71.2-71.3	89
88	68.2-68.3	66.3	71.0	70.9-71.1	88
87	68.0-68.1	66.1-66.2	70.9	70.7-70.8	87
86	67.8-67.9	66.0	70.6-70.8	70.5-70.6	86
85	67.7	65.9	70.5	70.4	85
84	67.6	65.8	----	70.3	84
83	67.4-67.5	65.6-65.7	70.4	70.1-70.2	83
82	67.3	65.5	70.3	70.0	82
81	67.2	65.4	70.1-70.2	69.9	81
80	67.0-67.1	65.3	----	69.8	80
79	66.9	65.1-65.2	69.9-70.0	69.7	79
78	66.8	65.0	69.5-69.8	69.5-69.6	78
77	66.6-66.7	64.9	----	69.3-69.4	77
76	66.4-66.5	64.8	69.4	69.2	76
75	66.3	64.6-64.7	69.3	69.1	75
74	66.2	64.5	----	68.9-69.0	74
73	66.1	64.4	69.2	68.6-68.8	73
72	66.0	64.2-64.3	69.1	68.5	72
71	----	64.0-64.1	64.1	68.0-68.4	71
70	65.9	63.9	----	68.3	70
69	----	63.8	68.9	68.2	69
68	65.8	63.7	----	68.1	68
67	65.7	63.6	68.8	68.0	67
66	65.6	63.5	68.7	----	66
65	65.5	63.3-63.4	68.6	67.8-67.9	65
64	----	63.2	----	67.6-67.7	64
63	65.3-65.4	63.1	68.5	67.5	63
62	----	----	68.4	67.3-67.4	62
61	65.2	62.9-63.0	68.3	----	61
60	65.1	62.8	----	67.2	60
59	65.0	62.7	68.2	67.1	59
58	64.9	----	----	----	58
57	64.8	62.6	68.1	67.0	57
56	64.7	62.5	----	66.9	56
55	64.5-64.6	----	68.0	66.8	55
54	64.4	62.3-62.4	----	----	54
53	64.3	62.2	67.9	66.7	53
52	64.2	62.0-62.1	----	66.6	52
51	64.1	61.9	67.7-67.8	66.5	51
50	64.0	61.8	67.6	66.2-66.4	50

Appendix J-3 (Cont.)
Percentile Ranks of Content Areas of Survey of Basic Skills: Grade 12
District Norms, December, 1975

State Percentile Ranks	Reading	Written Expression	Spelling	Mathematics	State Percentile Ranks
49	63.8-63.9	61.8	----	66.1	49
48	----	61.7	67.5	66.0	48
47	63.7	61.6	67.4	65.9	47
46	63.5-63.6	61.5	67.3	----	46
45	----	61.4	67.2	65.7-65.8	45
44	63.4	----	67.1	65.6	44
43	63.3	61.3	----	65.5	43
42	----	61.2	67.0	65.3-65.4	42
41	63.2	61.1	66.9	65.1-65.2	41
40	63.0-63.1	----	----	65.0	40
39	----	61.0	66.7-66.8	64.8-64.9	39
38	62.9	60.9	66.6	64.7	38
37	62.8	60.7-60.8	----	64.6	37
36	62.6-62.7	60.6	66.5	64.4-64.5	36
35	62.5	60.5	66.4	64.3	35
34	62.4	60.4	----	64.2	34
33	62.1-62.3	60.3	66.3	64.0-64.1	33
32	62.0	60.2	----	63.9	32
31	61.9	60.1	66.2	63.8	31
30	61.8	59.9-60.0	66.1	63.7	30
29	61.5-61.7	59.8	66.0	63.5-63.6	29
28	61.4	59.7	65.9	63.4	28
27	61.2-61.3	59.5-59.6	----	63.1-73.3	27
26	61.1	59.4	65.8	65.7-63.0	26
25	60.9-61.0	59.2-59.3	65.7	62.6-62.8	25
24	60.8	59.1	65.6	62.4-62.5	24
23	60.5-60.7	59.0	65.4-65.5	62.1-62.3	23
22	60.4	58.8-58.9	65.3	61.9-62.0	22
21	60.3	58.5-58.7	65.2	61.7-61.8	21
20	60.1-60.2	5 58.4	64.9-65.1	61.6	20
19	49.9-60.0	58.3	64.8	61.5	19
18	59.7-59.8	58.1-58.2	64.7	61.3-61.4	18
17	49.5-59.6	58.0	64.6	61.1-61.2	17
16	59.2-59.4	57.8-57.9	64.3-64.5	60.9-61.0	16
15	49.0-59.1	57.7	64.2	60.4-60.8	15
14	58.9	57.2-57.6	64.1	60.1-60.3	14
13	58.7-58.8	56.8-57.1	63.8-64.0	60.0	13
12	58.6	56.4-56.7	63.6-63.7	59.7-59.9	12
11	57.6-58.5	56.2-56.3	63.5-63.5	59.2-59.6	11
10	57.4-57.5	55.9-56.1	63.3-63.4	59.1	10
9	57.3	55.6-55.8	63.0-63.2	59.0	9
8	56.8-57.2	55.2-55.5	62.7-62.9	58.7-58.9	8
7	56.6-56.7	54.8-55.1	62.4-62.6	58.0-58.6	7
6	56.3-56.5	54.5-54.7	62.2-62.3	57.2-57.9	6
5	55.4-56.2	54.0-54.4	61.7-62.1	56.2-57.1	5
4	55.0-55.3	52.9-53.9	61.4-61.6	55.9-56.1	4
3	54.4-54.9	52.8-52.8	61.1-61.3	55.2-55.8	3
2	52.5-54.3	51.1-52.1	60.5-61.0	54.8-55.1	2
1	46.8-52.4	45.6-51.0	54.5-60.4	45.1-54.7	1

Appendix J-4
Percentile Ranks of Background Factor Values for Grades Two and Three
District Norms, Spring, 1976
N = 935

State Percentile Rank	Entry Level Test Score	Socio-economic Index	Percent AFDC	Percent Bilingual	Pupil Mobility
99	32.3-35.0	3.0	40.1-94.5	78.4-98.6	94.8-100.0
98	31.4-32.2	2.9	36.1-40.4	71.7-78.3	73.4-94.7
97	31.1-31.3	2.8	32.5-36.0	65.5-71.6	68.8-73.3
96	30.9-31.0	---	31.8-32.4	60.2-65.4	66.7-68.7
95	30.7-30.8	2.7	30.8-31.7	55.3-60.1	64.2-66.6
94	30.6	---	29.0-30.7	52.5-55.2	62.3-64.1
93	30.4-30.5	---	27.6-28.9	50.6-52.4	60.5-62.2
92	30.2-30.3	2.6	26.1-27.5	48.1-50.5	58.9-60.4
91	30.1	---	25.4-26.0	46.8-48.0	57.5-58.8
90	30.0	2.5	24.7-25.3	45.1-46.7	55.6-57.4
89	29.9	---	24.1-24.6	43.0-45.0	54.7-55.5
88	----	---	23.3-24.0	40.8-42.9	54.0-54.6
87	29.8	---	22.6-23.2	39.0-40.7	53.2-53.9
86	----	---	22.1-22.5	36.5-38.9	52.5-53.1
85	29.7	---	21.3-22.0	35.3-36.4	51.8-52.4
84	----	---	20.6-21.2	33.3-35.2	50.9-51.7
83	29.6	2.4	20.1-20.5	31.5-33.2	50.3-50.8
82	----	---	19.6-20.0	30.7-31.4	50.1-50.2
81	29.5	---	19.2-19.5	29.6-30.6	50.0
80	29.4	---	18.9-19.1	28.7-29.5	49.3-49.9
79	29.3	---	18.5-18.8	27.7-28.6	48.9-49.2
78	29.2	---	18.1-18.4	26.9-27.6	48.6-48.8
77	29.1	---	17.7-18.0	25.8-26.8	47.8-48.5
76	----	---	17.4-17.6	24.3-25.7	47.2-47.7
75	29.0	2.3	17.0-17.3	23.1-24.2	46.8-47.1
74	----	---	16.6-16.9	22.4-23.0	46.5-46.7
73	28.9	---	16.4-16.5	21.7-22.3	46.3-46.4
72	----	---	16.1-16.3	20.6-21.6	46.0-46.2
71	----	---	15.8-16.0	20.1-20.5	45.6-45.9
70	28.8	---	15.5-15.7	19.6-20.0	45.0-45.5
69	----	---	15.2-15.4	19.1-19.5	44.7-44.9
68	----	---	14.9-15.1	18.5-19.0	44.5-44.6
67	----	---	14.4-14.8	18.0-18.4	44.4
66	28.7	---	14.2-14.3	17.4-17.9	44.0-44.3
65	----	---	14.0-14.1	16.7-17.3	43.8-43.9
64	----	2.2	13.8-13.9	16.2-16.6	43.4-43.7
63	28.6	---	13.5-13.7	15.4-16.1	43.1-43.3
62	----	---	13.4	14.7-15.3	42.9-43.0
61	28.5	---	13.2-13.3	14.1-14.6	42.7-42.8
60	----	---	13.0-13.1	13.5-14.0	42.6
59	28.4	---	12.7-12.9	12.5-13.4	42.2-42.5
58	----	---	12.6	12.2-12.4	41.8-42.1
57	28.3	---	12.4-12.5	11.5-12.1	41.5-41.7
56	----	---	12.2-12.3	11.1-11.4	41.3-41.4
55	----	---	12.0-12.1	10.6-11.0	41.2
54	28.2	2.1	11.9	10.5	41.1
53	28.1	---	11.7-11.8	10.3-10.4	40.7-41.0
52	----	---	11.5-11.6	9.8-10.2	40.2-40.6
51	28.0	---	11.3-11.4	9.5-9.7	40.1-40.3
50	----	---	11.1-11.2	9.1-9.4	40.0

Percentile Ranks of Background Factor Values for Grades Two and Three
District Norms, Spring, 1976
N = 935

State Percentile Rank	Entry Level Test Score	Socio-economic Index	Percent AFDC	Percent Bilingual	Pupil Mobility
49	27.9	---	10.7-11.0	8.5-9.0	39.7-39.9
48	27.8	---	10.6	8.1-8.4	39.4-39.6
47	----	---	10.3-10.5	7.7-8.0	39.1-39.3
46	27.7	---	10.1-10.2	7.5-7.6	39.0
45	----	---	9.8-10.0	7.2-7.4	38.8-38.9
44	27.6	---	9.6-9.7	7.0-7.1	38.7
43	----	---	9.4-9.5	6.7-6.9	38.4-38.6
42	27.5	2.0	9.3	6.5-6.6	38.2-38.3
41	27.4	---	9.1-9.2	6.3-6.4	37.9-38.1
40	----	---	8.9-9.0	6.0-6.2	37.7-37.8
39	27.3	---	8.8	5.9	37.5-37.6
38	27.2	---	8.6-8.7	5.7-5.8	37.1-37.4
37	----	---	8.5	5.6	36.9-37.0
36	27.1	---	8.3-8.4	5.4-5.5	36.7-36.8
35	27.0	---	8.0-8.2	5.3	36.6
34	----	---	7.8-7.9	5.2	36.4-36.5
33	26.9	---	7.6-7.7	4.9-5.1	36.1-36.3
32	26.8	---	7.3-7.5	4.6-4.8	35.9-36.0
31	----	1.9	7.1-7.2	4.4-4.5	35.7-35.8
30	26.7	---	6.9-7.0	4.1-4.3	35.5-35.6
29	----	---	6.7-6.8	3.7-4.0	35.1-35.4
28	26.6	---	6.5-6.6	3.5-3.6	34.9-35.0
27	----	---	6.3-6.4	3.4	34.7-34.8
26	26.5	---	6.1-6.2	3.2-3.3	34.4-34.6
25	26.4	---	5.8-6.0	2.9-3.1	34.0-34.3
24	26.3	---	5.6-5.7	2.6-2.8	33.5-33.9
23	26.2	1.8	5.3-5.5	2.4-2.5	33.4
22	26.1	---	5.1-5.2	2.1-2.3	32.9-33.3
21	26.0	---	5.0	1.9-2.0	32.5-32.8
20	25.9	---	4.8-4.9	1.5-1.8	32.0-32.4
19	25.8	---	4.6-4.7	1.2-1.4	31.7-31.9
18	25.7	---	4.2-4.5	.6-1.1	31.3-31.6
17	25.6	---	4.0-4.1	.2-.5	30.7-31.2
16	25.4-25.5	1.7	3.8-3.9	.1	30.2-30.6
15	25.2-25.3	---	3.5-3.7	0.0	30.0-30.1
14	25.1	---	3.2-3.4	0.0	29.3-29.9
13	25.0	---	2.8-3.1	0.0	28.7-29.2
12	24.8-24.9	---	2.5-2.7	0.0	28.3-28.6
11	24.6-24.7	---	2.1-2.4	0.0	27.8-28.2
10	24.4-24.5	1.6	1.9-2.0	0.0	27.2-27.7
9	24.2-24.3	---	1.6-1.8	0.0	26.5-27.1
8	24.0-24.1	---	1.2-1.5	0.0	25.5-26.4
7	23.8-23.9	---	.9-1.1	0.0	24.8-25.4
6	23.6-23.7	---	.2-.8	0.0	23.0-24.7
5	23.3-23.5	---	.01	0.0	22.0-22.9
4	22.9-23.2	1.4	0.0	0.0	21.2-21.9
3	22.2-22.8	1.3	0.0	0.0	19.3-21.1
2	21.5-22.1	---	0.0	0.0	11.2-19.2
1	16.2-21.4	0-1.2	0.0	0.0	0-11.1

Percentile Ranks of Background Factor Values for Grade Six
District Norms, Spring, 1976
N = 898

State Percentile Ranks	Grade 3 Achievement Index	Percent AFDC	Percent Bilingual	State Percentile Ranks
99	95.9-100.0	40.6-90.00	77.7-100.0	99
98	94.9-95.8	34.3-40.5	66.6-77.6	98
97	94.1-94.8	32.4-34.2	59.5-66.5	97
96	93.8-94.0	30.9-32.3	54.8-59.4	96
95	93.4-93.7	29.2-30.8	50.5-54.7	95
94	92.9-93.3	27.7-29.1	48.4-50.4	94
93	92.5-92.8	26.4-27.6	45.1-48.3	93
92	92.0-92.4	25.4-26.3	43.2-45.0	92
91	91.7-91.9	24.7-25.3	42.0-43.1	91
90	91.3-91.6	24.0-24.6	39.4-41.9	90
89	91.0-91.2	23.2-23.9	37.5-39.3	89
88	90.8-90.9	22.1-23.1	35.3-37.4	88
87	90.5-90.7	21.4-22.0	33.0-35.2	87
86	90.2-90.4	20.9-21.3	31.0-32.9	86
85	89.9-90.1	20.4-20.8	29.4-30.9	85
84	89.8	20.0-20.3	27.2-29.3	84
83	89.6-89.7	19.4-19.9	26.3-27.1	83
82	89.5	19.0-19.3	24.3-26.2	82
81	89.4	18.6-18.9	23.5-24.2	81
80	89.2-89.3	18.3-18.5	21.9-23.4	80
79	89.0-89.1	17.9-18.2	21.0-21.8	79
78	88.9	17.7-17.8	20.1-20.9	78
77	88.6-88.8	17.2-17.6	19.6-20.0	77
76	88.4-88.5	16.9-17.1	19.1-19.5	76
75	88.2-88.3	16.5-16.8	18.2-19.0	75
74	88.0-88.1	16.1-16.4	17.6-18.1	74
73	87.8-87.9	15.8-16.0	16.9-17.5	73
72	87.6-87.7	15.5-15.7	16.2-16.8	72
71	87.5	15.1-15.4	15.5-16.1	71
70	87.3-87.4	14.9-15.0	14.6-15.4	70
69	87.1-87.2	14.6-14.8	14.3-14.5	69
68	86.9-87.0	14.3-14.5	13.6-14.2	68
67	86.8	14.0-14.2	13.1-13.5	67
66	86.7	13.8-13.9	12.2-13.0	66
65	86.5-86.6	13.4-13.7	11.9-12.1	65
64	86.4	13.1-13.3	11.5-11.8	64
63	86.2-86.3	12.9-13.0	11.1-11.4	63
62	86.1	12.7-12.8	10.5-11.0	62
61	85.9-86.0	12.6	10.0-10.4	61
60	85.8	12.4-12.5	9.6-9.9	60
59	85.5-85.7	12.2-12.3	9.1-9.5	59
58	85.4	12.1	8.7-9.0	58
57	85.2-85.3	11.9-12.0	8.4-8.6	57
56	85.0-85.1	11.7-11.8	7.9-8.3	56
55	84.9	11.5-11.6	7.5-7.8	55
54	84.7-84.8	11.4	7.1-7.4	54
53	84.4-84.6	11.1-11.3	6.7-7.0	53
52	84.2-84.3	10.9-11.0	6.5-6.6	52
51	84.0-84.1	10.6-10.8	6.1-6.4	51
50	83.9	10.3-10.5	5.7-6.0	50

Percentile Ranks of Background Factor Values for Grade Six District Norms, 1975-76

State Percentile Ranks	Grade 3 Achievement Index	Percent AFDC	Percent Bilingual	State Percentile Ranks
49	83.7-83.8	10.1-10.2	5.6	49
48	83.5-83.6	9.9-10.0	5.3-5.5	48
47	83.2-83.4	9.7-9.8	5.1-5.2	47
46	83.1	9.5-9.6	4.8-5.0	46
45	82.8-83.0	9.3-9.4	4.5-4.7	45
44	82.6-82.7	9.2	4.3-4.4	44
43	82.3-82.5	9.0-9.1	4.0-4.2	43
42	82.2	8.8-8.9	3.7-3.9	42
41	82.0-82.1	8.6-8.7	3.5-3.6	41
40	81.7-81.9	8.5	3.3-3.4	40
39	81.5-81.6	8.3-8.4	3.0-3.2	39
38	81.3-81.4	8.0-8.2	2.8-2.9	38
37	81.1-81.2	7.8-7.9	2.6-2.7	37
36	80.8-81.0	7.6-7.7	2.4-2.5	36
35	80.6-80.7	7.4-7.5	2.2-2.3	35
34	80.2-80.5	7.2-7.3	2.0-2.1	34
33	79.9-80.1	7.1	1.9	33
32	79.7-79.8	6.8-7.0	1.8	32
31	79.4-79.6	6.7	1.6-1.7	31
30	79.0-79.3	6.5-6.6	1.5	30
29	78.7-78.9	6.2-6.4	1.2-1.4	29
28	78.6	6.1	0.8-1.1	28
27	78.3-78.5	5.8-6.0	0.6-0.7	27
26	78.1-78.2	5.6-5.7	0.4-0.5	26
25	77.9-78.0	5.5	---	25
24	77.7-77.8	5.3-5.4	---	24
23	77.3-77.6	5.1-5.2	---	23
22	76.7-77.2	4.9-5.0	---	22
21	76.5-76.6	4.7-4.8	---	21
20	75.9-76.4	4.5-4.6	---	20
19	75.6-75.8	4.2-4.4	---	19
18	75.2-75.5	3.9-4.1	---	18
17	74.7-75.1	3.6-3.8	---	17
16	74.3-74.6	3.4-3.5	---	16
15	73.7-74.2	3.2-3.3	---	15
14	73.1-73.6	3.1	---	14
13	72.4-73.0	2.8-3.0	---	13
12	71.9-72.3	2.6-2.7	---	12
11	71.2-71.8	2.3-2.5	---	11
10	70.3-71.1	2.0-2-2	---	10
9	69.6-70.2	1.7-1.9	---	9
8	68.6-69.5	1.3-1.6	---	8
7	67.3-68.5	1.1-1.2	---	7
6	66.0-67.2	0.2-1.0	---	6
5	65.1-65.9	0.1-0.3	---	5
4	64.0-65.0	---	---	4
3	62.6-63.9	---	---	3
2	60.5-62.5	---	---	2
1	35.9-60.4	---	---	1

Appendix J-6

Percentile Ranks of Background Factor Values for Grade Twelve School Norms, December, 1975

N = 377

State Percentile Ranks	Grade 6 Achievement Index	Percent AFDC
99	67.8-70.0	35.8-48.9
98	66.4-67.7	27.6-35.7
97	65.9-66.3	26.1-27.5
96	64.7-65.8	23.6-26.0
95	63.5-64.6	22.3-23.5
94	67.2-63.4	21.3-22.2
93	62.8-63.1	20.8-21.2
92	61.8-62.7	20.3-20.7
91	61.3-61.7	19.9-20.2
90	61.0-61.2	18.8-19.8
89	60.4-60.9	17.8-18.7
88	60.1-60.3	17.3-17.7
87	59.9-60.0	16.6-17.2
86	59.7-59.8	15.9-16.5
85	59.6	15.5-15.8
84	59.5	14.8-15.4
83	59.4	14.6-14.7
82	59.2-59.3	14.4-14.5
81	59.1	14.1-14.3
80	59.0	13.8-14.0
79	58.8-58.9	13.7
78	58.6-58.7	13.4-13.6
77	58.4-58.5	13.0-13.3
76	58.3	12.9
75	58.1-58.2	12.7-12.8
74	----	12.3-12.6
73	57.9-58.0	11.9-12.2
72	57.8	11.1-11.8
71	57.7	10.9-11.0
70	57.6	10.7-10.8
69	57.5	10.4-10.6
68	57.4	10.2-10.3
67	57.1-57.3	10.1
66	56.9-57.0	10.0
65	56.7-56.8	9.8-9.9
64	56.6	9.6-9.7
63	55.5	9.4-9.5
62	56.3-56.4	9.2-9.3
61	56.2	9.0-9.1
60	56.1	8.7-8.9
59	56.0	8.6
58	55.9	8.4-8.5
57	55.8	8.1-8.3
56	55.6-55.7	8.0
55	55.4-55.5	7.9
54	55.2-55.3	7.6-7.8
53	55.0-55.1	7.5
52	54.7-54.9	7.3-7.4
51	54.6	7.0-7.2
50	54.5	6.9
49	54.4	6.7-6.8
48	54.3	6.6
47	----	6.5
46	54.2	6.3-6.4
45	54.0-54.1	6.2
44	53.8-53.9	6.1
43	53.7	6.0
42	53.6	5.8-5.9
41	53.5	5.7
40	53.4	5.6
39	53.2-53.3	---
38	53.0-53.1	5.5
37	52.8-52.9	5.4
36	52.5-52.7	5.2-5.3
35	52.3-52.4	5.0-5.1
34	52.1-52.2	4.8-4.9
33	52.0	4.7
32	51.8-51.9	4.5-4.6
31	51.7	4.4
30	51.6	4.3
29	51.5	---
28	51.1-51.4	4.2
27	50.9-51.0	4.1
26	50.8	4.0
25	50.6-50.7	3.9
24	50.5	3.8
23	50.4	3.6-3.7
22	50.2-50.3	3.5
21	50.1	3.4
20	49.9-50.0	3.2-3.3
19	49.8	3.0-3.1
18	49.6-49.7	2.9
17	49.5	2.8
16	49.1-49.4	---
15	48.9-49.0	2.7
14	48.8	2.6
13	48.1-48.7	2.5
12	47.8-48.0	2.1-2.4
11	47.6-47.7	1.9-2.0
10	47.3-47.5	1.7-1.8
9	46.5-47.2	1.6
8	46.2-46.4	1.5
7	45.4-46.1	---
6	45.2-45.3	1.2-1.4
5	44.8-45.1	0.9-1.1
4	44.1-44.7	0.6-0.8
3	42.5-44.0	0.5
2	41.7-42.4	0.2-0.4
1	35.8-41.6	0.0-0.1

Appendix K-1

Percentile Ranks of Average Class Size and Average Daily Attendance
All California School Districts, 1975-76

State Percentile Ranks	Average Class Size		Average Daily Attendance	State Percentile Ranks
	Elementary	High School		
99	30.8-33.0	30.8-32.3	32,664 and above	99
98	30.5-30.7	30.6-30.7	25,813-32,663	98
97	30.3-30.4	30.3-30.5	20,608-25,812	97
96	30.1-30.2	30.2	17,320-20,607	96
95	30.0	30.0-30.1	15,241-17,319	95
94	29.9	29.9	13,799-15,240	94
93	29.7-29.8	----	13,176-13,798	93
92	29.6	29.5-29.8	11,887-13,175	92
91	29.5	29.4	11,342-11,886	91
90	29.4	29.2-29.3	10,193-11,341	90
89	29.3	----	9,337-10,192	89
88	29.2	28.8-29.1	8,820-9,336	88
87	29.1	28.7	8,461-8,819	87
86	----	28.4-28.6	7,986-8,460	86
85	29.0	28.3	7,507-7,985	85
84	----	----	6,884-7,506	84
83	28.9	28.2	6,407-6,883	83
82	28.8	28.1	6,017-6,406	82
81	----	28.0	5,532-6,016	81
80	28.7	----	5,004-5,531	80
79	28.6	27.8-27.9	4,766-5,003	79
78	28.5	27.7	4,307-4,765	78
77	----	----	4,099-4,306	77
76	28.4	27.5-27.6	3,793-4,098	76
75	28.3	----	3,562-3,792	75
74	----	27.3-27.4	3,400-3,561	74
73	28.2	----	3,219-3,399	73
72	28.1	----	3,074-3,218	72
71	28.0	27.2	2,937-3,073	71
70	27.9	----	2,763-2,936	70
69	27.8	27.1	2,537-2,762	69
68	27.7	----	2,395-2,536	68
67	27.6	27.0	2,270-2,394	67
66	----	----	2,064-2,269	66
65	27.5	26.9	1,941-2,063	65
64	27.4	----	1,831-1,940	64
63	27.3	26.6-26.8	1,728-1,830	63
62	27.1-27.2	----	1,608-1,727	62
61	----	26.5	1,494-1,607	61
60	27.0	26.4	1,412-1,493	60
59	----	26.2-26.3	1,301-1,411	59
58	26.9	----	1,256-1,300	58
57	26.8	----	1,202-1,255	57
56	26.7	----	1,151-1,201	56
55	26.6	26.1	1,101-1,150	55
54	26.4-26.5	26.0	1,046-1,100	54
53	26.3	25.9	990-1,045	53
52	26.2	----	953-989	52
51	26.0-26.1	25.7-25.8	904-952	51
50	----	----	856-903	50

Percentile Ranks of Average Class Size and Average Daily Attendance
All California School Districts, 1975-76

State Percentile Ranks	Average Class Size		Average Daily Attendance	State Percentile Ranks
	Elementary	High School		
49	25.9	----	800-855	49
48	25.8	25.5-25.6	741-799	48
47	25.7	----	702-740	47
46	25.5-25.6	25.4	654-701	46
45	25.4	----	632-653	45
44	25.3	25.3	610-631	44
43	25.2	----	571-609	43
42	25.1	25.2	540-570	42
41	24.9-25.0	25.0-25.1	508-539	41
40	24.8	----	481-507	40
39	24.7	24.8-24.9	456-480	39
38	24.6	24.7	447-455	38
37	24.4-24.5	24.6	421-446	37
36	24.2-24.3	24.5	395-420	36
35	24.1	24.4	377-394	35
34	24.0	24.3	357-376	34
33	23.9	24.2	338-356	33
32	23.7-23.8	24.1	327-337	32
31	23.6	24.0	313-326	31
30	23.4-23.5	23.8-23.9	278-312	30
29	23.1-23.3	23.5-23.7	267-277	29
28	23.0	23.4	253-266	28
27	22.9	23.3	243-252	27
26	22.7-22.8	23.1-23.2	226-242	26
25	22.5-22.6	23.0	214-225	25
24	22.2-22.4	22.7-22.9	203-213	24
23	22.0-22.1	22.6	191-202	23
22	21.8-21.9	22.4-22.5	178-190	22
21	21.5-21.7	22.0-22.3	162-177	21
20	21.3-21.4	21.6-21.9	152-161	20
19	21.0-21.2	21.4-21.5	142-151	19
18	20.8-20.9	21.1-21.3	136-141	18
17	20.5-20.7	20.7-21.0	123-135	17
16	20.1-20.4	----	115-122	16
15	19.5-20.0	20.5-20.6	103-114	15
14	19.2-19.4	19.8-20.4	91-102	14
13	18.1-19.1	19.7	85-90	13
12	17.3-18.0	19.5-19.6	76-84	12
11	16.9-17.2	19.0-19.4	70-75	11
10	16.3-16.8	----	62-69	10
9	15.7-16.2	18.3-18.9	55-61	9
8	15.1-15.6	17.5-18.2	49-54	8
7	14.1-15.0	16.7-17.4	43-48	7
6	13.3-14.0	16.1-16.6	39-42	6
5	12.4-13.2	15.8-16.0	34-38	5
4	11.6-12.3	14.9-15.7	27-33	4
3	9.3-11.5	14.1-14.8	19-26	3
2	8.0-9.2	12.7-14.0	16-18	2
1	1.3-7.9	9.3-12.6	8-15	1

Percentile Ranks of District Values of Financial Variables
Unified School Districts, 1975-76

State Percentile Ranks	Assessed Valuation per Unit of A.D.A.	General Purpose Tax Rate	Expenditures per Unit of A.D.A.	State Percentile Ranks
99	97,609-131,365	5.88-6.63	2,101-2,831	99
98	79,892-97,608	5.83-5.87	1,960-2,100	98
97	66,724-79,891	5.70-5.82	1,926-1,959	97
96	62,389-66,723	5.42-5.69	1,913-1,925	96
95	55,576-62,388	5.32-5.41	1,854-1,912	95
94	51,924-55,575	5.26-5.31	1,838-1,853	94
93	49,277-51,923	5.23-5.25	1,763-1,837	93
92	48,512-49,276	5.13-5.22	1,690-1,762	92
91	46,117-48,511	5.11-5.12	1,610-1,689	91
90	45,285-46,116	5.05-5.10	1,588-1,609	90
89	44,039-45,284	4.97-5.04	1,577-1,587	89
88	42,461-44,038	4.92-4.96	1,564-1,576	88
87	42,122-42,460	4.88-4.91	1,548-1,563	87
86	40,823-42,121	4.82-4.87	1,537-1,547	86
85	40,196-40,822	4.77-4.81	1,514-1,536	85
84	38,678-40,195	4.71-4.76	1,483-1,513	84
83	37,459-38,677	----	1,470-1,482	83
82	36,419-37,458	4.69-4.70	1,444-1,469	82
81	35,378-36,418	4.64-4.68	1,419-1,443	81
80	34,842-35,377	4.63	1,402-1,418	80
79	32,312-34,841	4.55-4.62	1,398-1,401	79
78	31,948-32,311	4.54	1,387-1,397	78
77	31,282-31,947	4.46-4.53	1,379-1,386	77
76	31,131-31,281	----	1,376-1,378	76
75	30,149-31,130	4.43-4.45	1,368-1,375	75
74	29,281-30,148	4.42	1,361-1,367	74
73	28,590-29,280	4.40-4.41	1,333-1,360	73
72	28,535-28,589	----	1,325-1,332	72
71	27,588-28,534	4.36-4.39	1,317-1,324	71
70	26,967-27,587	4.35	1,310-1,316	70
69	26,443-26,966	4.33-4.34	1,305-1,309	69
68	25,713-26,442	4.28-4.32	1,297-1,304	68
67	25,608-25,712	4.27	1,293-1,296	67
66	24,117-25,607	----	1,287-1,292	66
65	23,587-24,116	4.26	1,283-1,286	65
64	23,516-23,586	4.23-4.25	1,275-1,282	64
63	23,136-23,515	4.21-4.22	1,265-1,274	63
62	22,631-23,135	4.19-4.20	1,264	62
61	22,359-22,630	4.18	1,256-1,263	61
60	21,580-22,358	4.17	1,250-1,255	60
59	21,484-21,579	4.16	1,237-1,249	59
58	21,278-21,483	4.14-4.15	1,231-1,236	58
57	20,915-21,277	4.13	1,228-1,230	57
56	20,640-20,914	4.12	1,224-1,227	56
55	20,401-20,639	----	1,222-1,223	55
54	19,947-20,400	4.10-4.11	1,214-1,221	54
53	19,554-19,946	4.09	1,209-1,213	53
52	19,465-19,553	4.08	1,200-1,208	52
51	19,257-19,464	4.07	1,195-1,199	51
50	19,185-19,256	4.06	1,191-1,194	50

Percentile Ranks of District Values of Financial Variables
Unified School Districts, 1975-76

State Percentile Ranks	Assessed Valuation per Unit of A.D.A.	General Purpose Tax Rate	Expenditures per Unit of A.D.A.	State Percentile Ranks
49	19,041-19,184	----	1,187-1,190	49
48	18,941-19,040	4.05	----	48
47	18,815-18,940	4.03-4.04	1,186	47
46	18,575-18,814	----	1,184-1,185	46
45	18,235-18,574	4.02	1,181-1,183	45
44	17,890-18,234	4.01	1,175-1,180	44
43	17,767-17,889	----	1,168-1,174	43
42	17,535-17,766	4.00	1,160-1,167	42
41	17,307-17,534	3.99	1,155-1,159	41
40	16,959-17,306	3.98	1,148-1,154	40
39	16,577-16,958	3.97	1,143-1,147	39
38	16,522-16,576	3.96	1,141-1,142	38
37	16,233-16,521	3.95	1,134-1,140	37
36	15,870-16,232	3.93-3.94	1,129-1,133	36
35	15,461-15,869	3.91-3.92	1,123-1,128	35
34	15,014-15,460	3.87-3.90	1,121-1,122	34
33	14,868-15,013	3.84-3.86	1,120	33
32	14,758-14,867	3.82-3.83	1,119	32
31	14,432-14,757	3.79-3.81	1,116-1,118	31
30	14,276-14,431	3.78	1,109-1,115	30
29	14,123-14,275	3.75-3.77	1,105-1,108	29
28	13,977-14,122	3.73-3.74	----	28
27	13,785-13,976	3.70-3.72	1,102-1,104	27
26	13,656-13,784	3.67-3.69	1,101	26
25	13,407-13,655	3.55-3.66	1,099-1,100	25
24	13,009-13,406	3.52-3.54	1,096-1,098	24
23	12,805-13,008	3.48-3.51	1,095	23
22	12,673-12,804	3.47	1,090-1,094	22
21	12,476-12,672	3.43-3.46	1,084-1,089	21
20	12,303-12,475	3.34-3.42	1,082-1,083	20
19	11,638-12,302	3.31-3.33	1,074-1,081	19
18	11,485-11,637	3.27-3.30	1,066-1,073	18
17	11,243-11,484	3.26	1,061-1,065	17
16	10,905-11,242	3.22-3.25	1,058-1,060	16
15	10,873-10,904	3.13-3.21	1,057	15
14	10,646-10,872	3.07-3.12	1,056	14
13	10,615-10,645	3.01-3.06	1,047-1,055	13
12	10,497-10,614	2.96-3.00	1,042-1,046	12
11	10,448-10,496	2.73-2.95	1,041	11
10	9,574-10,447	2.64-2.72	1,037-1,040	10
9	9,437-9,573	2.61-2.63	1,035-1,036	9
8	9,205-9,436	2.56-2.60	1,025-1,034	8
7	8,987-9,204	2.51-2.55	1,021-1,024	7
6	8,482-8,986	2.37-2.50	1,015-1,020	6
5	8,126-8,481	2.29-2.36	1,001-1,014	5
4	7,655-8,125	2.25-2.28	999-1,000	4
3	7,181-7,654	2.20-2.24	993-998	3
2	6,418-7,180	1.98-2.19	982-992	2
1	2,575-6,417	0.78-1.97	944-981	1

Percentile Ranks of District Values of Financial Variables
High School Districts, 1975-76

State ercentile Ranks	Assessed Valuation per Unit of A.D.A.	General Purpose Tax Rate	Expenditures per Unit of A.D.A.	State Percentile Ranks
99	191,110-394,912	2.68-2.75	2,629-3,679	99
98	177,195-191,109	2.58-2.67	2,261-2,628	98
97	144,271-177,194	----	2,238-2,260	97
96	140,709-144,270	2.57	2,155-2,237	96
95	136,074-140,708	2.52-2.56	2,064-2,154	95
94	127,476-136,073	2.50-2.51	2,013-2,063	94
93	114,902-127,475	2.40-2.49	1,837-2,012	93
92	107,686-114,901	2.39	1,835-1,836	92
91	102,499-107,685	----	1,831-1,834	91
90	101,218-102,498	2.36-2.38	1,818-1,830	90
89	100,480-101,217	----	1,814-1,817	89
88	98,575-100,479	2.34-2.35	1,798-1,813	88
87	98,096-98,574	2.31-2.33	1,766-1,797	87
86	97,352-98,095	2.29-2.30	1,728-1,765	86
85	97,319-97,351	2.28	1,725-1,727	85
84	94,664-97,318	----	1,720-1,724	84
83	93,178-94,663	2.25-2.27	1,699-1,719	83
82	90,323-93,177	----	1,678-1,698	82
81	89,625-90,322	----	1,667-1,677	81
80	86,279-89,624	2.24	1,623-1,666	80
79	82,395-86,278	2.23	1,614-1,622	79
78	77,421-82,394	2.21-2.22	1,611-1,613	78
77	77,410-77,420	----	1,592-1,610	77
76	76,984-77,409	2.20	1,566-1,591	76
75	76,649-76,983	2.19	1,558-1,567	75
74	75,479-76,648	2.16-2.18	1,528-1,557	74
73	74,791-75,478	----	1,527	73
72	73,504-74,790	----	1,526	72
71	73,016-73,503	----	1,520-1,525	71
70	72,511-73,015	2.15	1,510-1,519	70
69	72,151-72,510	----	1,507-1,509	69
68	70,554-72,150	2.14	1,502-1,506	68
67	67,522-70,553	2.11-2.13	1,491-1,501	67
66	67,186-67,521	----	1,478-1,490	66
65	66,384-67,185	2.10	1,476-1,477	65
64	66,277-66,383	2.08-2.09	1,449-1,475	64
63	64,847-66,276	----	1,443-1,448	63
62	64,017-64,846	----	1,441-1,442	62
61	63,825-64,016	2.05-2.07	1,439-1,440	61
60	63,505-63,824	2.03-2.04	1,438	60
59	62,562-63,504	2.02	1,434-1,437	59
58	61,324-62,561	----	1,423-1,433	58
57	59,672-61,323	2.01	1,408-1,422	57
56	59,623-59,671	----	1,406-1,407	56
55	59,010-59,622	----	1,395-1,405	55
54	57,585-59,009	----	1,391-1,394	54
53	56,339-57,584	2.00	1,385-1,390	53
52	56,250-56,338	1.99	1,382-1,384	52
51	56,189-56,249	1.97-1.98	1,381	51
50	55,938-56,188	1.96	1,360-1,380	50

Percentile Ranks of District Values of Financial Variables
High School Districts, 1975-76

State Percentile Ranks	Assessed Valuation per Unit of A.D.A.	General Purpose Tax Rate	Expenditures per Unit of A.D.A.	State Percentile Ranks
49	55,426-55,937	----	1,355-1,359	49
48	54,807-55,425	----	----	48
47	54,251-54,806	1.95	1,348-1,354	47
46	54,003-54,250	1.93-1.94	1,344-1,347	46
45	53,638-54,002	1.91-1.92	1,343	45
44	53,163-53,637	1.90	1,338-1,342	44
43	53,065-53,162	1.89	1,330-1,337	43
42	52,604-53,064	----	1,329	42
41	51,896-52,603	----	1,324-1,328	41
40	51,044-51,895	1.88	1,323	40
39	50,079-51,043	1.87	1,318-1,322	39
38	49,961-50,078	----	1,315-1,317	38
37	49,867-49,960	1.85-1.86	1,311-1,314	37
36	49,775-49,866	----	1,304-1,310	36
35	49,431-49,774	1.84	1,302-1,303	35
34	48,738-49,430	----	1,301	34
33	48,288-48,737	----	1,300	33
32	47,899-48,287	1.82-1.83	1,288-1,299	32
31	46,974-47,898	----	----	31
30	46,863-46,973	1.80-1.81	1,283-1,287	30
29	46,846-46,862	1.78-1.79	1,276-1,282	29
28	46,549-46,845	----	1,274-1,275	28
27	45,468-46,548	1.77	1,259-1,273	27
26	45,065-45,467	----	1,257-1,258	26
25	44,490-45,064	1.75-1.76	1,248-1,256	25
24	43,102-44,489	1.74	1,247	24
23	42,528-43,101	1.73	1,238-1,246	23
22	42,225-42,527	----	1,235-1,237	22
21	41,959-42,224	1.71-1.72	1,224-1,234	21
20	40,932-41,958	1.69-1.70	1,221-1,223	20
19	40,931	1.67-1.68	1,210-1,220	19
18	40,829-40,930	1.64-1.66	----	18
17	40,719-40,828	----	1,205-1,209	17
16	40,548-40,718	1.63	1,196-1,204	16
15	40,473-40,547	----	1,190-1,195	15
14	40,012-40,472	1.59-1.62	1,189	14
13	38,695-40,011	1.53-1.58	----	13
12	38,123-38,694	1.52	1,181-1,188	12
11	37,280-38,122	1.47-1.51	1,166-1,180	11
10	36,887-37,279	----	1,163-1,165	10
9	35,904-36,886	1.45-1.46	1,153-1,162	9
8	35,700-35,903	1.38-1.44	1,145-1,152	8
7	34,222-35,699	1.30-1.37	1,139-1,144	7
6	33,781-34,221	1.28-1.29	1,124-1,138	6
5	33,108-33,780	1.12-1.27	1,112-1.123	5
4	32,978-33,107	1.10-1.11	1,101-1,111	4
3	31,873-32,977	1.09	1,100	3
2	31,033-31,872	1.08	1,096-1,099	2
1	23,545-31,032	0.6[illegible]-1.07	1,005-1,095	1

Appendix K-4

Percentile Ranks of District Values of Financial Variables
Elementary School Districts, 1975-76

State Percentile Ranks	Assessed Valuation per Unit of A.D.A.	General Purpose Tax Rate	Expenditure for Instruction per Unit of A.D.A.	State Percentile Ranks
99	516,102-2,441,184	3.66-5.11	2,686-5,175	99
98	343,322-516,101	3.42-3.65	2,446-2,685	98
97	260,031-343,321	3.33-3.41	2,117-2,445	97
96	224,671-260,030	3.24-3.32	2,021-2,116	96
95	198,053-224,670	3.15-3.23	1,895-2,020	95
94	172,804-198,052	3.12-3.14	1,850-1,894	94
93	152,883-172,803	3.08-3.11	1,775-1,849	93
92	137,665-152,882	3.04-3.07	1,731-1,774	92
91	125,495-137,664	2.98-3.03	1,706-1,730	91
90	111,207-125,494	----	1,661-1,705	90
89	105,224-111,206	2.92-2.97	1,630-1,660	89
88	99,837-105,223	2.90-2.91	1,605-1,629	88
87	94,318-99,836	2.89	1,563-1,604	87
86	90,117-94,317	2.82-2.88	1,534-1,562	86
85	87,369-90,116	2.80-2.81	1,510-1,533	85
84	85,703-87,368	2.78-2.79	1,490-1,509	84
83	83,080-85,702	2.76-2.77	1,456-1,489	83
82	78,728-83,079	2.72-2.75	1,435-1,455	82
81	74,755-78,727	2.70-2.71	1,411-1,434	81
80	71,033-74,754	2.69	1,401-1,410	80
79	68,318-71,032	2.67-2.68	1,389-1,400	79
78	65,603-68,317	2.66	1,372-1,388	78
77	63,096-65,602	2.64-2.65	1,353-1,371	77
76	60,874-63,095	2.63	1,334-1,352	76
75	58,653-60,873	2.61-2.62	1,310-1,333	75
74	57,465-58,652	---	1,301-1,309	74
73	55,007-57,464	2.59-2.60	1,276-1,300	73
72	54,202-55,006	2.56-2.58	1,262-1,275	72
71	52,872-54,201	----	1,251-1,261	71
70	52,435-52,871	2.54-2.55	1,241-1,250	70
69	51,253-52,434	2.53	1,225-1,240	69
68	50,668-51,252	2.51-2.52	1,215-1,224	68
67	49,777-50,667	2.50	1,210-1,214	67
66	48,952-49,776	2.49	1,197-1,209	66
65	47,447-48,951	2.48	1,179-1,196	65
64	46,575-47,446	2.47	1,169-1,178	64
63	44,931-46,574	2.44-2.46	1,163-1,168	63
62	43,954-44,930	2.43	1,158-1,162	62
61	42,026-43,953	2.41-2.42	1,153-1,157	61
60	40,447-42,025	2.39-2.40	1,149-1,152	60
59	39,622-40,446	2.38	1,144-1,148	59
58	38,259-39,621	----	1,138-1,143	58
57	37,566-38,258	----	1,131-1,137	57
56	36,730-37,565	2.37	1,126-1,130	56
55	35,370-36,729	----	1,118-1,125	55
54	34,916-35,369	2.36	1,110-1,117	54
53	33,923-34,915	2.35	1,097-1,109	53
52	33,379-33,922	2.34	1,093-1,096	52
51	32,417-33,378	2.32-2.33	1,088-1,092	51
50	31,782-32,416	----	1,070-1,087	50

Appendix K-4 (Cont.)

Percentile Ranks of District Values of Financial Variables
Elementary School Districts, 1975-76

State Percentile Ranks	Assessed Valuation per Unit of A.D.A.	General Purpose Tax Rate	Expenditure for Instruction per Unit of A.D.A.	State Percentile Ranks
49	31,092-31,781	2.30-2.31	1,067-1,069	49
48	30,520-31,091	2.29	1,065-1,066	48
47	30,072-30,519	2.28	1,059-1,064	47
46	29,652-30,071	2.27	1,053-1,058	46
45	29,068-29,651	2.26	1,050-1,052	45
44	28,463-29,067	2.25	1,043-1,049	44
43	28,014-28,462	2.24	1,038-1,042	43
42	27,752-28,013	2.22-2.23	1,032-1,037	42
41	27,278-27,751	----	1,029-1,031	41
40	26,864-27,277	2.19-2.21	1,026-1,028	40
39	26,207-26,863	----	1,021-1,025	39
38	25,819-26,206	2.17-2.18	1,015-1,020	38
37	25,647-25,818	2.15-2.16	1,010-1,014	37
36	25,234-25,646	2.14	1,008-1,009	36
35	24,702-25,233	2.12-2.13	1,003-1,007	35
34	24,303-24,701	2.10-2.11	999-1,002	34
33	23,560-24,302	2.07-2.09	993-998	33
32	22,757-23,559	2.06	986-992	32
31	22,509-22,756	2.02-2.05	982-985	31
30	22,047-22,508	2.00-2.01	978-981	30
29	21,645-22,046	1.98-1.99	972-977	29
28	21,355-21,644	1.97	969-971	28
27	21,034-21,354	1.95-1.96	963-968	27
26	20,469-21,033	1.91-1.94	954-962	26
25	20,306-20,468	1.90	949-953	25
24	19,871-20,305	1.85-1.89	946-948	24
23	19,362-19,870	1.82-1.84	940-945	23
22	18,952-19,361	1.80-1.81	934-939	22
21	15,576-18,951	1.77-1.79	926-933	21
20	18,121-18,575	1.75-1.76	920-925	20
19	17,694-18,120	1.74	915-919	19
18	16,999-17,693	1.66-1.73	908-914	18
17	16,632-16,998	1.62-1.65	899-907	17
16	15,885-16,631	1.58-1.61	893-898	16
15	15,445-15,884	1.55-1.57	892	15
14	15,234-15,444	1.53-1.54	888-891	14
13	15,091-15,233	1.51-1.52	881-887	13
12	14,749-15,090	1.47-1.50	874-880	12
11	13,904-14,748	1.43-1.46	862-873	11
10	13,481-13,903	1.35-1.42	852-861	10
9	12,488-13,480	1.33-1.34	843-851	9
8	12,179-12,487	1.27-1.32	829-842	8
7	11,432-12,178	1.18-1.26	819-828	7
6	10,930-11,431	1.13-1.17	813-818	6
5	10,209-10,929	1.09-1.12	794-812	5
4	9,660-10,208	1.07-1.08	781-793	4
3	8,690-9,659	----	767-780	3
2	7,330-8,689	0.95-1.06	731-766	2
1	609-7,329	0.18-0.94	602-730	1

Appendix L-1

Percentile Ranks of Reading Test Scores for Grades Two and Three
School Norms, Spring, 1976

State Percentile Ranks	Reading Test Scores Grade 2	Reading Test Scores Grade 3	State Percentile Ranks	Reading Test Scores Grade 2	Reading Test Scores Grade 3
99	89.9-96.4	95.7-100.0	49	69.7-70.0	84.2-84.3
98	88.0-89.8	94.8-95.6	48	69.4-69.6	83.9-84.1
97	87.1-87.9	94.3-94.7	47	68.9-69.3	83.7-83.8
96	86.3-87.0	93.9-94.2	46	68.5-68.8	83.5-83.6
95	85.7-86.2	93.5-93.8	45	68.1-68.4	83.3-83.4
94	85.0-85.6	93.2-93.4	44	67.8-68.0	83.0-83.2
93	84.5-84.9	92.9-93.1	43	67.5-67.7	82.8-82.9
92	84.0-84.4	92.6-92.8	42	67.2-67.4	82.5-82.7
91	83.4-83.9	92.4-92.5	41	66.8-67.1	82.3-82.4
90	83.0-83.3	92.1-92.3	40	66.3-66.7	82.0-82.2
89	82.6-82.9	91.9-92.0	39	66.1-66.2	81.7-81.9
88	82.2-82.5	91.7-91.8	38	65.6-66.0	81.5-81.6
87	81.8-82.1	91.5-91.6	37	65.2-65.5	81.2-81.4
86	81.4-81.7	91.3-91.4	36	64.9-65.1	80.8-81.1
85	80.9-81.3	91.1-91.2	35	64.5-64.8	80.6-80.7
84	80.5-80.8	90.9-91.0	34	64.1-64.4	80.2-80.5
83	80.2-80.4	90.7-90.8	33	63.7-64.0	79.9-80.1
82	79.9-80.1	90.5-90.6	32	63.4-63.6	79.6-79.8
81	79.6-79.8	90.3-90.4	31	63.0-63.3	79.2-79.5
80	79.3-79.5	90.1-90.2	30	62.7-62.9	78.9-79.1
79	78.0-79.2	89.9-90.0	29	62.3-62.6	78.6-78.8
78	78.6-78.9	89.7-89.8	28	61.8-62.2	78.1-78.5
77	78.3-78.5	89.5-89.6	27	61.4-61.7	77.8-78.0
76	78.0-78.2	89.3-89.4	26	60.8-61.3	77.3-77.7
75	77.7-77.9	89.1-89.2	25	60.3-60.7	77.0-77.2
74	77.4-77.6	88.9-89.0	24	59.9-60.2	76.4-76.9
73	77.1-77.3	88.7-88.8	23	59.3-59.8	75.9-76.3
72	76.8-77.0	88.5-88.6	22	58.9-59.2	75.4-75.8
71	76.5-76.7	88.3-88.4	21	58.5-58.8	74.9-75.3
70	76.3-76.4	88.1-88.2	20	57.9-58.4	74.5-74.8
69	76.0-76.2	88.0	19	57.4-57.8	74.0-74.4
68	75.7-75.9	87.9	18	56.9-57.3	73.5-73.9
67	75.4-75.6	87.7-87.8	17	56.4-56.8	72.8-73.4
66	75.1-75.3	87.5-87.6	16	55.8-56.3	72.2-72.7
65	74.7-75.0	87.3-87.4	15	55.2-55.7	71.6-72.1
64	74.4-74.6	87.1-87.2	14	54.6-55.1	71.0-71.5
63	74.1-74.3	86.9-87.0	13	54.0-54.5	70.4-70.9
62	73.8-74.0	86.7-86.8	12	53.4-53.9	69.7-70.3
61	73.6-73.7	86.6	11	52.5-53.3	68.7-69.6
60	73.3-73.5	86.4-86.5	10	51.8-52.4	67.8-68.6
59	73.0-73.2	86.2-86.3	9	50.8-51.7	66.7-67.7
58	72.6-72.9	86.0-86.1	8	49.6-50.7	65.9-66.6
57	72.3-72.5	85.8-85.9	7	48.6-49.5	64.9-65.8
56	72.0-72.2	85.6-85.7	6	47.5-48.5	63.9-64.8
55	71.7-71.9	85.4-85.5	5	46.4-47.4	62.2-63.8
54	71.4-71.6	85.2-85.3	4	45.2-46.3	60.7-62.1
53	71.0-71.3	85.0-85.1	3	43.1-45.1	58.7-60.6
52	70.7-70.9	84.8-84.9	2	40.7-43.0	56.2-58.6
51	70.4-70.6	84.6-84.7	1	32.0-40.6	37.3-56.1
50	70.1-70.3	84.4-84.5			

Appendix L-2

Percentile Ranks of Content Areas of Survey of Basic Skills: Grade 6
School Norms, Spring, 1976
N = 4,348

State Percentile Ranks	Reading	Written Expression	Spelling	Mathematics	State Percentile Ranks
99	84.4-100.0	81.3-100.0	79.2-100.0	77.1-93.5	99
98	82.4-84.3	79.2-81.2	77.0-79.1	74.4-74.0	98
97	81.3-82.3	78.2-79.1	75.1-76.9	72.8-74.3	97
96	80.5-81.2	77.2-78.1	75.0	72.0-72.0	96
95	79.9-80.4	76.2-77.1	74.2-74.9	71.2-71.9	95
94	79.3-79.8	75.6-76.1	73.6-74.1	70.1-71.1	94
93	78.8-79.2	75.1-75.5	73.1-73.5	69.6-70.0	93
92	78.2-78.7	74.7-75.0	72.5-73.0	69.1-69.5	92
91	77.7-78.1	74.1-74.6	72.1-72.4	68.7-69.0	91
90	77.3-77.6	73.7-74.0	71.6-72.0	68.1-68.6	90
89	77.0-77.2	73.3-73.6	71.2-71.5	67.6-68.0	89
88	76.6-76.9	72.9-73.2	70.9-71.1	67.2-67.5	88
87	76.3-76.5	72.6-72.8	70.7-70.8	66.9-67.1	87
86	76.0-76.2	72.2-72.5	70.3-70.6	66.4-66.8	86
85	75.7-75.9	71.8-72.1	70.1-70.2	66.0-66.3	85
84	75.4-75.6	71.5-71.7	69.8-70.0	65.7-65.9	84
83	75.1-75.3	71.3-71.4	69.6-69.7	65.2-65.6	83
82	75.0	71.0-71.2	69.4-69.5	64.9-65.1	82
81	74.6-74.9	70.7-70.9	69.2-69.3	64.6-64.8	81
80	74.3-74.5	70.4-70.6	68.9-69.1	64.3-64.5	80
79	74.0-74.2	70.2-70.3	68.7-68.8	64.0-64.2	79
78	73.8-73.9	70.0-70.1	68.5-68.6	63.7-63.9	78
77	73.6-73.7	69.7-69.9	68.3-68.4	63.4-63.6	77
76	73.3-73.5	69.5-69.6	68.1-68.2	63.1-63.3	76
75	73.1-73.2	69.3-69.4	67.9-68.0	62.8-63.0	75
74	72.8-73.0	69.0-69.2	67.8	62.5-62.7	74
73	72.6-72.7	68.8-68.9	67.6-67.7	62.3-62.4	73
72	72.3-72.5	68.5-68.7	67.4-67.5	62.0-62.2	72
71	72.1-72.2	68.3-68.4	67.2-67.3	61.8-61.9	71
70	71.8-72.0	68.1-68.2	67.0-67.1	61.6-61.7	70
69	71.6-71.7	67.9-68.0	66.8-66.9	61.4-61.5	69
68	71.3-71.5	67.6-67.8	66.7	61.1-61.3	68
67	71.1-71.2	67.3-67.5	66.5-66.6	60.9-61.0	67
66	70.9-71.0	67.2	66.4	60.7-60.8	66
65	70.8	66.9-67.1	66.2-66.3	60.4-60.6	65
64	70.5-70.7	66.7-66.8	66.1	60.2-60.3	64
63	70.3-70.4	66.5-66.6	65.9-66.0	60.0-60.1	63
62	70.0-70.2	66.3-66.4	65.7-65.8	59.8-59.9	62
61	69.8-69.9	66.1-66.2	65.6	59.6-59.7	61
60	69.6-69.7	65.9-66.0	65.4-65.5	59.3-59.5	60
59	69.4-69.5	65.7-65.8	65.2-65.3	59.2	59
58	69.1-69.3	65.5-65.6	65.1	58.9-59.1	58
57	68.9-69.0	65.3-65.4	64.9-65.0	58.7-58.8	57
56	68.7-68.8	65.1-65.2	64.8	58.5-58.6	56
55	68.4-68.6	64.9-65.0	64.7	58.3-58.4	55
54	68.2-68.3	64.6-64.8	64.5-64.6	58.0-58.2	54
53	68.0-68.1	64.4-64.5	64.4	57.8-57.9	53
52	67.8-67.9	64.1-64.3	64.2-64.3	57.6-57.7	52
51	67.6-67.7	63.9-64.0	64.1	57.4-57.5	51
50	67.4-67.5	63.7-63.8	63.9-64.0	57.2-57.3	50

Percentile Ranks of Content Areas of Survey of Basic Skills: Grade 6
School Norms, Spring, 1976

State Percentile Ranks	Reading	Written Expression	Spelling	Mathematics	State Percentile Ranks
49	67.2-67.3	63.4-63.6	63.7-63.8	57.0-57.1	49
48	66.9-67.1	63.1-63.3	63.6	56.9	48
47	66.7-66.8	62.8-63.0	63.4-63.5	56.7-56.8	47
46	66.4-66.6	62.6-62.7	63.2-63.3	56.5-56.6	46
45	66.2-66.3	62.5	63.1	56.3-56.4	45
44	66.0-66.1	62.2-62.4	62.9-63.0	56.1-56.2	44
43	65.7-65.9	62.0-62.1	62.7-62.8	55.9-56.0	43
42	65.5-65.6	61.7-61.9	62.6	55.7-55.8	42
41	65.2-65.4	61.4-61.6	62.5-62.5	55.5-55.6	41
40	64.9-65.1	61.2-61.3	62.3-62.4	55.3-55.4	40
39	64.6-64.8	61.0-61.1	62.1-62.2	55.1-55.2	39
38	64.3-64.5	60.7-60.9	61.9-62.0	54.9-55.0	38
37	64.0-64.2	60.5-60.6	61.7-61.8	54.6-54.8	37
36	63.8-63.9	60.2-60.4	61.6-61.6	54.4-54.5	36
35	63.4-63.7	59.9-60.1	61.4-61.5	54.2-54.3	35
34	63.2-63.3	59.6-59.8	61.2-61.3	54.0-54.1	34
33	62.9-63.1	59.4-59.5	61.0-61.1	53.7-53.9	33
32	62.6-62.8	59.0-59.3	60.8-60.9	53.4-53.6	32
31	62.3-62.5	58.7-58.9	60.6-60.7	53.2-53.3	31
30	62.0-62.2	58.5-58.6	60.4-60.5	52.9-53.1	30
29	61.6-61.9	58.2-58.4	60.2-60.3	52.7-52.8	29
28	61.1-61.5	57.8-58.1	60.0-60.1	52.4-52.6	28
27	60.8-61.0	57.4-57.7	59.7-59.9	52.1-52.3	27
26	60.4-60.7	57.1-57.3	59.5-59.6	51.8-52.0	26
25	60.1-60.3	56.8-57.0	59.2-59.4	51.5-51.7	25
24	59.7-60.0	56.5-56.7	59.0-59.1	51.2-51.4	24
23	59.3-59.6	56.1-56.4	58.8-58.9	50.9-51.1	23
22	58.9-59.2	55.6-56.0	58.6-58.7	50.5-50.8	22
21	58.3-58.8	55.2-55.5	58.3-58.5	50.2-50.4	21
20	58.0-58.2	54.8-55.1	58.1-58.2	49.9-50.1	20
19	57.6-57.9	54.4-54.7	57.8-58.0	49.6-59.8	19
18	57.1-57.5	54.0-54.3	57.5-57.7	49.2-49.5	18
17	56.6-57.0	53.6-53.9	57.1-57.4	49.0-49.1	17
16	56.2-56.5	53.1-53.5	56.7-57.0	48.6-48.9	16
15	55.6-56.1	52.6-53.0	56.4-56.6	48.2-48.5	15
14	55.1-55.5	52.0-52.5	56.1-56.3	47.8-48.1	14
13	54.6-55.0	51.4-51.9	55.8-56.0	47.4-47.7	13
12	54.1-54.5	50.9-51.3	55.6-55.7	47.1-47.3	12
11	53.5-54.0	50.3-50.8	55.1-55.5	46.4-47.0	11
10	52.6-53.4	49.8-50.2	54.5-55.0	46.0-46.3	10
9	51.8-52.5	49.1-49.7	54.2-54.4	45.4-45.9	9
8	50.9-51.7	48.3-49.0	53.6-54.1	44.9-45.3	8
7	50.0-50.8	47.6-48.2	52.9-53.5	44.2-44.8	7
6	48.8-49.9	46.5-47.5	52.2-52.8	43.7-44.1	6
5	47.7-48.7	45.7-46.4	51.2-52.1	42.9-43.6	5
4	46.3-47.6	44.2-45.6	50.1-51.1	42.1-42.8	4
3	44.8-46.2	42.9-44.1	49.1-50.0	41.1-42.0	3
2	43.2-44.7	41.4-42.8	47.4-49.0	39.9-41.0	2
1	24.9-43.1	12.5-41.3	25.0-47.3	20.0-39.8	1

Appendix L-3

Percentile Ranks of Content Areas of Survey of Basic Skills: Grade 12
School Norms, December, 1975
N = 785

State Percentile Ranks	Reading	Written Expression	Spelling	Mathematics	State Percentile Ranks
99	73.0-76.0	72.7-75.4	76.4-87.5	78.8-85.5	99
98	72.2-72.9	71.6-72.6	75.1-76.3	77.6-78.7	98
97	71.7-72.1	70.6-71.5	74.6-75.0	76.8-77.5	97
96	71.4-71.6	69.9-70.5	74.0-74.5	76.1-76.7	96
95	70.8-71.3	96.6-69.8	73.2-73.9	75.3-76.0	95
94	70.4-70.7	69.3-69.5	72.9-73.1	74.4-75.2	94
93	70.2-70.3	68.6-69.2	72.5-72.8	73.6-74.3	93
92	69.9-70.1	68.1-68.5	72.3-72.4	73.3-73.5	92
91	69.5-69.8	67.8-68.0	72.0-72.2	72.9-73.2	91
90	69.3-69.4	67.4-67.7	71.8-71.9	72.6-72.8	90
89	69.2	67.2-67.3	71.6-71.7	72.4-72.5	89
88	68.9-69.1	67.0-67.1	71.3-71.5	72.2-72.3	88
87	68.7-68.8	66.7-66.9	71.2-71.2	71.9-72.1	87
86	68.5-68.6	66.5-66.6	71.0-71.1	71.6-71.8	86
85	68.3-68.4	66.4	70.9	71.4-71.5	85
84	68.1-68.2	66.3	70.8	71.2-71.3	84
83	68.0	66.2	70.7	71.0-71.1	83
82	67.9	66.0-66.1	70.6	70.9	82
81	67.8	65.9	70.5	70.8	81
80	67.6	65.8	70.4	70.4-70.7	80
79	67.5	65.6-65.7	----	70.3	79
78	67.4	65.5	70.3	70.2	78
77	67.2-67.3	65.3-65.7	70.2	70.0-70.1	77
76	67.1	65.1-65.2	70.1	69.9	76
75	66.9-67.0	65.0	70.0	69.7-69.8	75
74	66.7-66.8	64.9	69.9	69.6	74
73	66.6	64.7-64.8	69.8	69.4-69.5	73
72	66.5	64.6	69.7	69.3	72
71	66.3-66.4	64.5	69.5-69.6	69.1-69.2	71
70	66.2	64.4	69.4	69.0	70
69	66.1	64.3	----	68.8-68.9	69
68	66.0	64.1-64.2	69.3	68.6-68.7	68
67	65.9	64.0	69.2	68.5	67
66	65.8	63.9	69.1	68.3-68.4	66
65	65.7	63.8	69.0	68.1-68.2	65
64	65.6	63.7-63.7	----	68.0	64
63	65.5	63.6-63.6	68.9	67.8-67.9	63
62	65.3-65.4	63.4-63.5	68.8	67.7	62
61	65.1	63.3	68.7	67.6	61
60	65.2-65.2	63.2	68.6	67.4-67.5	60
59	65.1	63.1	68.5	67.3	59
58	65.0	62.9-63.0	68.4	67.2	58
57	64.9	62.8	68.3	67.1	57
56	64.7-64.8	62.7	68.2	67.0	56
55	64.6	62.6	68.1	66.9	55
54	64.5	62.4-62.5	68.0	66.7-66.8	54
53	64.4	62.3	67.9	66.6	53
52	64.3	62.1-62.2	67.8	66.5	52
51	----	62.0	67.7	66.4	51
50	64.2	61.9	67.6	66.3	50

Percentile Ranks of Content Areas of Survey of Basic Skills: Grade 12
School Norms, December, 1975

State Percentile Ranks	Reading	Written Expression	Spelling	Mathematics	State Percentile Ranks
49	64.1	61.8	---	66.2	49
48	63.9-64.0	61.7	67.5	66.1	48
47	63.6	61.6	67.4	66.0	47
46	63.5-63.7	61.5	67.3	65.7-65.9	46
45	63.4	61.4	67.2	65.6	45
44	63.3	61.3	----	65.5	44
43	63.2	61.2	67.1	65.4	43
42	63.0	61.1	67.0	65.2-65.3	42
41	62.9	60.9	66.9	65.1	41
40	62.8	60.8	----	65.0	40
39	62.6-62.7	60.7	66.8	64.8-64.9	39
38	62.5	60.5-60.6	66.7	64.6-64.7	38
37	62.4	60.4	66.6	64.4-64.5	37
36	62.3	60.3	66.5	64.2-64.3	36
35	62.2	60.2	66.4	64.1	35
34	62.0-62.1	60.0-60.1	----	63.9-64.0	34
33	61.9	59.8-59.9	66.3	63.7-63.8	33
32	61.8	59.7	66.2	63.6	32
31	61.6-61.7	59.5-59.6	66.1	63.4-63.5	31
30	61.4-61.5	59.4	66.0	63.2-63.3	30
29	61.2-61.3	59.2-59.3	65.9	63.1	29
28	61.0-61.1	59.1	----	62.8-63.0	28
27	60.8-60.9	58.9-59.0	65.7-65.8	62.7	27
26	60.6-60.7	58.7-58.8	65.6	62.4-62.6	26
25	60.5	58.6	65.5	62.1-62.3	25
24	60.3-60.4	58.4-58.5	65.3-65.4	61.8-62.0	24
23	60.2	58.2-58.3	65.2	61.7	23
22	59.9-60.1	57.9-58.1	65.0-65.1	61.5-61.6	22
21	59.5-59.8	57.7-57.8	64.9	61.2-61.4	21
20	59.3-59.4	57.5-57.6	64.8	60.8-61.1	20
19	59.1-59.2	57.3-57.4	64.5-64.7	60.4-60.7	19
18	58.9-59.0	57.0-57.2	64.3-64.4	60.1-60.3	18
17	58.7-58.8	56.7-56.9	64.2	59.9-60.0	17
16	58.3-58.6	56.3-56.6	64.0-64.1	58.5-59.8	16
15	57.8-58.2	55.8-56.2	63.7-63.9	59.1-59.4	15
14	57.4-57.7	55.5-55.7	63.6	58.9-59.0	14
13	57.2-57.3	55.1-55.4	63.4-63.5	58.6-58.8	13
12	56.8-57.1	54.9-55.0	63.2-63.3	58.4-58.5	12
11	56.6-56.7	54.7-54.8	62.9-63.1	58.0-58.3	11
10	56.2-56.5	54.3-54.6	62.5-62.8	57.6-57.9	10
9	55.5-56.1	53.7-54.2	62.2-62.4	56.7-57.5	9
8	54.9-55.4	52.9-53.6	61.8-62.1	56.0-56.6	8
7	54.5-54.8	52.2-52.8	61.4-61.7	55.4-55.9	7
6	53.6-54.4	51.7-52.1	61.0-61.3	54.8-55.3	6
5	52.2-53.5	51.1-51.6	60.8-60.9	53.6-54.7	5
4	51.1-52.1	49.7-51.0	60.5-60.7	52.1-53.5	4
3	49.7-51.0	48.8-49.6	59.5-60.4	50.9-52.0	3
2	46.9-49.6	46.9-48.7	58.0-59.4	47.9-50.8	2
1	25.7-46.8	29.1-46.8	47.5-57.9	29.3-47.8	1

Percentile Ranks of Background Factor Values for Grades Two and Three
School Norms, Spring, 1976
N = 4,682

State Percentile Rank	Entry Level Test Score	Socio-economic Index	Percent AFDC	Percent Bilingual	Pupil Mobility
99	31.4-35.0	3.0	64.7-100.0	81.3-98.8	89.4-100.0
98	31.1-31.3	---	56.6-64.6	73.9-81.2	74.9-89.3
97	30.9-31.0	2.9	51.2-56.5	67.8-73.8	69.3-74.8
96	30.8	---	46.7-51.1	63.0-67.7	66.7-69.2
95	30.7	---	44.1-46.6	58.5-62.9	64.2-66.6
94	30.5-30.6	2.8	41.0-44.0	55.0-58.4	62.1-64.1
93	30.4	---	38.9-40.9	51.9-54.9	60.5-62.0
92	30.3	---	36.5-38.8	48.8-51.8	59.1-60.4
91	30.2	---	34.8-36.4	46.5-48.7	58.0-59.0
90	30.1	2.7	33.5-34.7	43.9-46.4	57.2-57.9
89	30.0	---	32.3-33.4	42.3-43.8	56.1-57.1
88	----	---	31.2-32.2	40.8-42.2	55.4-56.0
87	29.9	---	30.0-31.1	39.3-40.7	54.6-55.3
86	29.8	---	29.0-29.9	37.5-39.2	53.8-54.5
85	----	2.6	28.0-28.9	36.0-37.4	53.1-53.7
84	29.7	---	27.3-27.9	34.6-35.9	52.4-53.0
83	----	---	26.5-27.2	33.3-34.5	51.9-52.3
82	29.6	---	25.6-26.4	31.4-33.2	51.2-51.8
81	----	---	24.9-25.5	30.2-31.3	50.6-51.1
80	29.5	---	24.3-24.8	29.1-30.1	50.1-50.5
79	----	2.5	23.6-24.2	28.1-29.0	49.9-50.0
78	29.4	---	22.9-23.5	27.0-28.0	49.5-49.8
77	----	---	22.3-22.8	25.7-26.9	48.9-49.4
76	29.3	---	21.8-22.2	24.6-25.6	48.4-48.8
75	29.2	---	21.1-21.7	23.7-24.5	48.0-48.3
74	----	---	20.6-21.0	22.7-23.6	47.5-47.9
73	29.1	---	20.0-20.5	21.8-22.6	47.0-47.4
72	----	2.4	19.3-19.9	21.1-21.7	46.6-46.9
71	29.0	---	18.9-19.2	20.4-21.0	46.3-46.5
70	----	---	18.4-18.8	19.7-20.3	45.9-46.2
69	28.9	---	18.0-18.3	19.0-19.6	45.6-45.8
68	----	---	17.5-17.9	18.5-18.9	45.3-45.5
67	28.8	---	17.0-17.4	17.7-18.4	44.9-45.2
66	----	---	16.6-16.9	17.1-17.6	44.6-44.8
65	28.7	---	16.1-16.5	16.7-17.0	44.3-44.5
64	----	2.3	15.7-16.0	16.2-16.6	43.8-44.2
63	28.6	---	15.5-15.6	15.6-16.1	43.4-43.7
62	----	---	15.0-15.4	15.1-15.5	43.1-43.3
61	28.5	---	14.8-14.9	14.5-15.0	42.7-43.0
60	----	---	14.4-14.7	14.0-14.4	42.4-42.6
59	28.4	---	14.0-14.3	13.6-13.9	42.1-42.3
58	28.3	---	13.6-13.9	13.1-13.5	41.8-42.0
57	----	---	13.3-13.5	12.6-13.0	41.5-41.7
56	28.2	2.2	13.0-13.2	12.4-12.5	41.2-41.4
55	----	---	12.7-12.9	11.1-12.3	40.8-41.1
54	28.1	---	12.4-12.6	11.5-11.9	40.4-40.7
53	----	---	12.0-12.3	11.2-11.4	40.1-40.3
52	28.0	---	11.7-11.9	10.9-11.1	39.9-40.0
51	27.9	---	11.3-11.6	10.6-10.8	39.7-39.8
50	----	---	11.0-11.2	10.3-10.5	39.4-39.6

Percentile Ranks of Background Factor Values for Grades Two and Three
School Norms, Spring, 1976
N = 4,682

State Percentile Rank	Entry Level Test Score	Socio-economic Index	Percent AFDC	Percent Bilingual	Pupil Mobility
49	27.8	---	10.7-10.9	10.0-10.3	39.1-39.3
48	27.7	---	10.3-10.6	9.7-9.9	38.8-39.0
47	----	---	10.1-10.2	9.5-9.6	38.5-38.7
46	27.6	2.1	9.6-9.9	9.1-9.4	38.3-38.4
45	----	---	9.4-9.5	8.9-9.0	38.0-38.2
44	27.5	---	9.2-9.3	8.7-8.8	37.7-37.9
43	27.4	---	9.0-9.1	8.5-8.6	37.4-37.6
42	----	---	8.7-8.9	8.1-8.4	37.1-37.3
41	27.3	---	8.5-8.6	7.9-8.0	36.9-37.0
40	27.2	---	8.3-8.4	7.6-7.8	36.6-36.8
39	----	---	7.9-8.2	7.4-7.5	36.3-36.5
38	27.1	2.0	7.7-7.8	7.1-7.3	35.9-36.2
37	27.0	---	7.4-7.6	6.8-7.0	35.7-35.8
36	26.9	---	7.2-7.3	6.6-6.7	35.4-35.6
35	26.8	---	7.0-7.1	6.4-6.5	35.1-35.3
34	26.7	---	6.8-6.9	6.2-6.3	34.7-35.0
33	----	---	6.5-6.7	6.0-6.1	34.4-34.6
32	26.6	---	6.2-6.4	5.8-5.9	34.0-34.3
31	26.5	---	6.0-6.1	5.6-5.7	33.7-33.9
30	26.4	---	5.8-5.9	5.4-5.5	33.4-33.6
29	26.3	1.9	5.6-5.7	5.2-5.3	33.2-33.3
28	26.2	---	5.4-5.5	5.0-5.1	32.7-33.1
27	26.1	---	5.2-5.3	4.8-4.9	32.4-32.6
26	26.0	---	4.9-5.1	4.6-4.7	32.1-32.3
25	25.9	---	4.7-4.8	4.4-4.5	31.7-32.0
24	25.8	---	4.5-4.6	4.2-4.3	31.4-31.6
23	25.7	---	4.2-4.4	4.0-4.1	31.0-31.3
22	25.6	1.8	3.9-4.1	3.9	30.7-30.9
21	25.5	---	3.7-3.8	3.7-3.8	30.3-30.6
20	25.4	---	3.4-3.6	3.5-3.6	30.0-30.2
19	25.3	---	3.3	3.4	29.6-29.9
18	25.1-25.2	---	3.0-3.2	3.1-3.3	29.2-29.5
17	24.9-25.0	---	2.8-2.9	3.0	28.8-29.1
16	24.8	1.7	2.6-2.7	2.7-2.9	28.4-28.7
15	24.6-24.7	---	2.4-2.5	2.5-2.6	27.9-28.3
14	24.4-24.5	---	2.2-2.3	2.2-2.4	27.4-27.8
13	24.2-24.3	---	2.0-2.1	2.0-2.1	26.9-27.3
12	24.0-24.1	---	1.8-1.9	1.8-1.9	26.3-26.8
11	23.8-23.9	1.6	1.5-1.7	1.5-1.7	25.8-26.2
10	23.6-23.7	---	1.4	1.2-1.4	25.2-25.7
9	23.3-23.5	---	1.2-1.3	1.0-1.1	24.6-25.1
8	23.0-23.2	---	1.0-1.1	.2-.9	23.9-24.5
7	22.6-22.9	1.5	.8-.9	.1	23.2-23.8
6	22.3-22.5	---	.6-.7	0	22.6-23.1
5	21.8-22.2	---	.4-.5	0	22.0-22.5
4	21.3-21.7	1.4	.2-.3	0	20.9-21.9
3	20.6-21.2	---	.1	0	19.5-20.8
2	19.8-20.5	1.3	0	0	17.5-19.4
1	10.2-19.7	0-1.2	0	0	0-17.4

Appendix L-5

Percentile Ranks of Background Factor Values for Grade Six School Norms, Spring, 1976
N = 4,315

State Percentile Ranks	Grade 3 Achievement Index	Percent AFDC	Percent Bilingual	State Percentile Ranks
99	95.1-100.0	64.6-97.2	81.4-100.0	99
98	94.3-95.0	56.7-64.5	74.3-81.3	98
97	94.0-94.2	51.4-56.6	68.6-74.2	97
96	93.6-93.9	46.5-51.3	61.5-68.5	96
95	93.3-93.5	43.7-46.4	57.2-61.4	95
94	92.9-93.2	40.5-43.6	52.0-57.1	94
93	92.5-92.8	38.1-40.4	48.9-51.9	93
92	92.3-92.4	35.8-38.0	46.4-48.8	92
91	92.0-92.2	34.3-35.7	43.6-46.3	91
90	91.7-91.9	32.9-34.2	41.2-43.5	90
89	91.5-91.6	31.6-32.8	38.9-41.1	89
88	91.3-91.4	30.4-31.5	37.2-38.8	88
87	91.1-91.2	29.2-30.3	35.4-37.1	87
86	90.9-91.0	28.1-29.1	33.4-35.3	86
85	90.8	27.4-28.0	31.9-33.3	85
84	90.6-90.7	26.7-27.3	30.3-31.8	84
83	90.4-90.5	25.8-26.6	29.0-30.2	83
82	90.2-90.3	25.0-25.7	27.8-28.9	82
81	90.1	24.3-24.9	26.6-27.7	81
80	89.9-90.0	23.7-24.2	25.5-26.5	80
79	89.7-89.8	23.0-23.6	24.3-25.4	79
78	89.6	22.5-22.9	22.9-24.2	78
77	89.4-89.5	21.8-22.4	21.9-22.8	77
76	89.2-89.3	21.3-21.7	21.1-21.8	76
75	89.0-89.1	20.7-21.2	20.2-21.0	75
74	88.9	20.0-20.6	19.3-20.1	74
73	88.7-88.8	19.4-19.9	18.7-19.2	73
72	88.5-88.6	18.9-19.3	18.0-18.6	72
71	88.3-88.4	18.4-18.8	17.3-17.9	71
70	88.1-88.2	18.0-18.3	16.7-17.2	70
69	88.0	17.6-17.9	16.0-16.6	69
68	87.8-87.9	17.2-17.5	15.5-15.9	68
67	87.6-87.7	16.8-17.1	14.8-15.4	67
66	87.5	16.2-16.7	14.3-14.7	66
65	87.2-87.4	15.8-16.1	13.7-14.2	65
64	87.0-87.1	15.5-15.7	13.3-13.6	64
63	86.8-86.9	15.0-15.4	12.8-13.2	63
62	86.6-86.7	14.8-14.9	12.4-12.7	62
61	86.4-86.5	14.3-14.7	11.9-12.3	61
60	86.3	14.0-14.2	11.4-11.8	60
59	86.1-86.2	13.6-13.9	11.0-11.3	59
58	85.9-86.0	13.3-13.5	10.6-10.9	58
57	85.7-85.8	12.9-13.2	10.1-10.5	57
56	85.5-85.6	12.7-12.8	9.8-10.0	56
55	85.3-85.4	12.3-12.6	9.5-9.7	55
54	85.1-85.2	12.0-12.2	9.2-9.4	54
53	84.9-85.0	11.6-11.9	8.9-9.1	53
52	84.7-84.8	11.3-11.5	8.5-8.8	52
51	84.4-84.6	11.0-11.2	8.2-8.4	51
50	84.2-84.3	10.7-10.9	7.9-8.1	50

Percentile Ranks of Background Factor Values for Grade Six School Norms, Spring, 1976

State Percentile Ranks	Grade 3 Achievement Index	Percent AFDC	Percent Bilingual	State Percentile Ranks
49	84.0-84.1	10.4-10.6	7.5-7.8	49
48	83.8-83.9	10.1-10.3	7.2-7.4	48
47	83.5-83.7	9.8-10.0	6.9-7.1	47
46	83.3-83.4	9.5-9.7	6.7-6.8	46
45	83.1-83.2	9.3-9.4	6.4-6.6	45
44	82.8-83.0	9.1-9.2	6.2-6.3	44
43	82.6-82.7	8.8-9.0	5.9-6.1	43
42	82.4-82.5	8.6-8.7	5.6-5.8	42
41	82.2-82.3	8.4-8.5	5.2-5.5	41
40	81.9-82.1	8.0-8.3	5.0-5.1	40
39	81.6-81.8	7.8-7.9	4.8-4.9	39
38	81.4-81.5	7.5-7.7	4.6-4.7	38
37	81.1-81.3	7.3-7.4	4.3-4.5	37
36	80.8-81.0	7.1-7.2	4.1-4.2	36
35	80.6-80.7	6.9-7.0	3.9-4.0	35
34	80.2-80.5	6.6-6.8	3.7-3.8	34
33	79.9-80.1	6.4-6.5	3.4-3.6	33
32	79.7-79.8	6.2-6.3	3.3	32
31	79.3-79.6	5.9-6.1	3.0-3.2	31
30	78.8-79.2	5.7-5.8	2.9	30
29	78.5-78.7	5.6	2.7-2.8	29
28	78.2-78.4	5.4-5.5	2.5-2.6	28
27	77.8-78.1	5.2-5.3	2.4	27
26	77.4-77.7	4.9-5.1	2.2-2.3	26
25	77.0-77.3	4.7-4.8	2.1	25
24	76.5-76.9	4.5-4.6	1.9-2.0	24
23	76.0-76.4	4.2-4.4	1.8	23
22	75.7-75.9	4.0-4.1	1.6-1.7	22
21	75.1-75.6	3.8-3.9	1.4-1.5	21
20	74.6-75.0	3.5-3.7	1.3	20
19	74.0-74.5	3.3-3.4	1.1-1.2	19
18	73.5-73.9	3.1-3.2	0.9-1.0	18
17	72.9-73.4	2.8-3.0	0.5-0.8	17
16	72.3-72.8	2.7	---	16
15	71.9-72.2	2.4-2.6	---	15
14	71.2-71.8	2.2-2.3	---	14
13	70.5-71.1	2.0-2.1	---	13
12	69.9-70.4	1.8-1.9	---	12
11	69.3-69.8	1.6-1.7	---	11
10	68.5-69.2	1.4-1.5	---	10
9	67.7-68.4	1.3	---	9
8	66.7-67.6	1.1-1.2	---	8
7	65.8-66.6	0.9-1.0	---	7
6	65.0-65.7	0.7-0.8	---	6
5	63.5-64.9	0.5-0.6	---	5
4	61.6-63.4	0.3-0.4	---	4
3	59.5-61.5	0.1-0.2	---	3
2	56.9-59.4	---	---	2
1	23.9-56.8	---	---	1

Appendix L-6

Percentile Ranks of Background Factor Values for Grade Twelve
School Norms, December, 1975
N = 760

State Percentile Ranks	Grade 6 Achievement Index	Percent AFDC
99	67.9-70.0	49.2-98.4
98	67.3-67.8	40.5-49.1
97	66.3-67.2	37.3-40.4
96	65.5-66.2	35.3-37.2
95	64.7-65.4	29.1-35.2
94	64.0-64.6	27.9-29.0
93	63.4-63.9	26.1-27.8
92	63.1-63.3	23.3-26.0
91	62.6-63.0	22.2-23.2
90	62.2-62.5	21.3-22.1
89	62.0-62.1	20.3-21.2
88	61.7-61.9	19.2-20.2
87	61.2-61.6	18.8-19.1
86	60.9-61.1	17.7-18.7
85	60.6-60.8	17.2-17.6
84	60.3-60.5	16.5-17.1
83	60.2	16.0-16.4
82	60.0-60.1	15.5-15.9
81	59.8-59.9	15.1-15.4
80	59.7	14.4-15.0
79	59.5-59.6	14.0-14.3
78	59.3-59.4	13.5-13.9
77	59.2	13.1-13.4
76	58.9-59.1	12.9-13.0
75	58.8	12.6-12.8
74	58.6-58.7	12.1-12.5
73	58.5	11.7-12.0
72	58.3-58.4	11.5-11.6
71	58.2	11.3-11.4
70	58.1	10.9-11.2
69	58.0	10.7-10.8
68	57.8-57.9	10.4-10.6
67	57.6-57.7	10.1-10.3
66	57.4-57.5	9.9-10.0
65	57.3	9.6-9.8
64	47.1-57.2	9.4-9.5
63	57.0	9.2-9.3
62	56.9	9.0-9.1
61	56.7-56.8	8.7-8.9
60	56.6	8.6
59	56.4-56.5	8.4-8.5
58	56.2-56.3	8.1-8.3
57	56.1	8.0
56	56.0	7.8-7.9
55	55.8-55.9	7.6-7.7
54	55.6-55.7	7.3-7.5
53	55.5	7.1-7.2
52	55.3-55.4	7.0
51	55.2	6.9
50	55.0-55.1	6.8
49	54.8-54.9	6.5-6.7
48	54.6-54.7	6.3-6.4
47	5.5	6.2
46	5.4	6.1
45	54.2-54.3	6.0
44	54.0-54.1	5.8-5.9
43	53.8-53.9	5.7
42	53.6-53.7	5.6
41	53.4-53.5	5.5
40	53.3	5.3-5.4
39	53.2	5.2
38	53.1	5.1
37	52.9-53.0	4.9-5.0
36	52.8	4.8
35	52.5-52.7	4.6-4.7
34	52.4	4.5
33	52.2-52.3	4.4
32	52.0-52.1	4.3
31	51.8-51.9	4.2
30	51.6-51.7	4.1
29	51.4-51.5	4.0
28	51.2-51.3	3.8-3.9
27	51.1	3.7
26	51.0	3.4-3.6
25	50.7-50.9	3.3
24	50.5-50.6	3.1-3.2
23	50.3-50.4	2.9-3.0
22	50.2	2.8
21	49.9-50.1	2.8-2.8
20	49.5-49.8	2.6-2.7
19	49.2-49.4	2.5
18	48.9-49.1	2.4
17	48.5-48.8	2.2-2.3
16	48.1-48.4	2.1
15	47.7-48.0	2.0
14	47.4-47.6	1.9
13	47.0-47.3	1.8
12	46.5-46.9	1.8-1.7
11	46.2-46.4	1.5
10	45.5-46.1	1.4
9	45.1-45.4	1.3
8	44.6-45.0	1.2
7	44.2-44.5	1.1
6	43.7-44.1	1.0
5	42.6-43.6	0.6-0.1
4	41.8-42.5	0.5
3	41.1-41.7	0.3-0.4
2	39.1-41.0	0.2
1	34.6-39.0	0.0-0.1

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