

A COMPARISON OF THE BRIGANCE DIAGNOSTIC INVENTORY
OF BASIC SKILLS AND THE CALIFORNIA
ACHIEVEMENT TESTS

A THESIS
SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF MASTER OF ARTS
IN THE GRADUATE SCHOOL OF THE
TEXAS WOMAN'S UNIVERSITY

COLLEGE OF EDUCATION

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DENTON, TEXAS
DECEMBER, 1983

Thesis
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The Graduate School
Texas Woman's University
Denton, Texas

November 1, 1983

We hereby recommend that the Thesis prepared under
our supervision by Rachel B. Anderson

entitled A COMPARISON OF THE BRIGANCE DIAGNOSTIC INVENTORY
OF BASIC SKILLS AND THE CALIFORNIA ACHIEVEMENT TESTS

be accepted as fulfilling this part of the requirements for the Degree of Master of
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84-Direct / 3480

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CHAPTER I

INTRODUCTION

Achievement in school is an issue of great concern today. Accountability, basic skill development, and minimum competencies are perennially discussed by teachers, administrators, governmental officials, the news media, and the general public. But how accurate are the instruments being used to measure the skill level of children? Should test scores be quoted to parents and written about in newspapers?

Achievement tests are given in schools for various reasons. They are administered yearly to students in order to monitor progress in academics. Some achievement tests are used in diagnosing learning disabilities and in placement in special education and Title I programs. Other achievement tests measure basic skill development. These tests are frequently used in making decisions concerning passing or retaining students. They may be used in some school districts for recommending and/or selecting children into gifted programs. Test scores are also used for acceptance into universities and for advanced course placement. Individual schools, districts, states, and nations are judged by their achievement test records. Different achievement tests mea-

sure different areas of learning. Subtests range from the basic reading, language, and math areas to even further breakdowns of each area and including many other academic areas.

This paper deals with the areas of word recognition, or vocabulary, reading comprehension, total mathematics achievement, and spelling. Word recognition involves the simple calling of words correctly by the student. Word recognition is only a small but very important segment of reading. Reading comprehension can be broken down into many areas. Recall of facts and details are at the lowest level of reading comprehension. Other areas include sequencing, identifying main ideas, making inferences, recognizing cause and effect, and following directions. Math achievement tests measure the four basic operations as well as measurement skills, geometry, word problems, number identification, place value, and fractions. Spelling achievement tests usually require the student to spell correctly a dictated word or sentence or to choose correctly spelled words from lists containing misspelled words. Achievement tests give more than one type of score. Grade level scores, raw scores, and national percentiles are only a few of the many types of scores which may be obtained from these tests.

Statement of the Problem

The Brigance Diagnostic Inventory of Basic Skills and the California Achievement Tests (CAT) are used in Grapevine-Colleyville Independent School District (G-CISD). The CAT is given every spring in the elementary schools to monitor pupil progress. The Brigance is given to elementary students who have been diagnosed as learning disabled (LD) or emotionally disturbed (ED) in order to establish a basis for beginning resource support and also as a means to monitor progress in the resource setting. After the initial testing, these students are given the Brigance every spring in order to gauge their academic progress.

The Brigance is a widely used test, but, according to Buros (1978, p. 17), reliability and validity have not been established. The catalog advertising the Brigance indicates that it has been extensively field tested and proven effective with students (Curriculum Associates, Note 1). A publication entitled Brigance Excerpts states the Brigance to be more reliable and valid than other tests (Note 2). But if actual statistical evidence is available to back up these statements, I have not been able to find it.

More information needs to be obtained concerning the validity of the Brigance if this instrument is going to be utilized correctly. Whether or not the Brigance does or

does not give an accurate picture of progress and achievement of elementary LD and ED students needs to be established. This study attempts to validate concurrently the Brigance Diagnostic Inventory of Basic Skills with the already validated California Achievement Test using a learning disabled population.

Significance of the Study

The Brigance scores are being used in G-CISD elementary schools to admit students to resource classes and to dismiss them from resource classes. Grade level scores are quoted to teachers, administrators, supervisors, and parents. The Brigance is also used to write instructional objectives and long range goals for these special students. Records are kept comparing students' scores from year to year in order to measure progress in resource classes. In the G-CISD, the Brigance is used to assess if students are functioning on grade level. For this study, the Brigance scores will not be used to judge student grade levels.

A question exists concerning whether or not Brigance scores should be quoted to parents of special students. Another question addresses whether or not special education teachers should be evaluated by the Brigance scores of their students. These questions are difficult to answer without more data on the validity of the Brigance.

CHAPTER II

REVIEW OF THE LITERATURE

Countless books and research studies have examined achievement and the measurement of achievement. Tests have been reviewed, compared, criticized, and praised. Entire books have been written about achievement. One book has been totally devoted to the ethics of testing.

According to Dyer (1971, p. 139), the number of ability tests given each year in our country exceeds its total population. This estimate does not even include personality tests, interest inventories, research instruments, and other special purpose tests. Dyer stated that the need for a method of providing sound information concerning the growing interest and use of testing began a movement which led to the series of Mental Measurement Yearbooks (MMY) published by Buros, the latest being the 1978 edition. Buros (1977, p. 9) described his work as a "clearinghouse of critical information of the merits and limitations of tests". Of the MMY, Dyer proclaimed that "the series as a whole constitutes the most nearly exhaustive single source of information about tests and measurements that exists in the world" (p. 140).

Educational achievement consists of the acquiring

of usable knowledge and developing the ability to perform certain tasks (Ebel, 1979, p. 82). Good achievement in education is fostered by the use of good tests of educational achievement (Ebel, 1965, p. 20). Dwyer (1982, p. 12) has defined achievement testing as a sample of indicators of a student's knowledge taken at a particular time. A command of this knowledge should be the main concern of education (Ebel, 1979, p. 42).

Achievement

Achievement has been defined by Aiken (1982) as "the degree of success or accomplishment in a given area of endeavor" (p. 395). Aiken stated that achievement in general is that which a person has accomplished. School achievement is the level of knowledge, skill, or accomplishment in a given school subject area (p. 97).

In his book about educational achievement and personality, Naylor (1972) discussed many aspects of achievement which included: high ability has been related to high achievement (p. 97), low ability has been related to low achievement (p. 97), and intelligence has been correlated with educational achievement (p. 9). Naylor declared that the most important concern of school officials should be to see that children are making the most of their abilities (p. 13).

Naylor said that certain personality traits are related to achievement (p. 53). He specifically named ego strength, conscientiousness, self-sufficiency, and enthusiasm (p. 54). These declarations were made in reference to a study of American children and British children in both elementary and secondary schools (p. 50).

Purkey (1970) has written about the relationship between academic achievement and the self-concept of children. He declared that there is a significant relationship between the self-concept and academic achievement at each grade level. Also, a change in self-concept has been associated with a change in achievement, and a change in achievement has been associated with a change in self-concept. He contrasted how successful students see themselves with how failing students see themselves (p. 27). Purkey proclaimed that enhancing self-concept is a vital influence in improving academic performance.

Achievement of children has been related to expectations of teachers and mothers. A study by Boersma and Chapman concerned LD children, achievement, and expectations of significant others (1982). The sample consisted of 143 students of grade 3, their mothers, and their teachers. Of these children, 70 were LD and 73 were normal achievers. Achievement was measured by the Wide Range Achievement Test (WRAT). A significant difference in achievement was found

between the two groups. The Projected Academic Performance Scale was used to assess teachers' and mothers' expectations of student future achievement. No indication of the focus on LD children was given to the mothers or the teachers. Findings of this study were highly significant. Teachers expected LD children to perform less well in future academic tasks than the normal achievers on all school subjects contained in the expectation scale. The findings from the mothers' expectations were similar, excluding the subjects of math and science. The authors pointed out that these views by the mothers and teachers were unduly pessimistic, since LD children have average to above average IQs and the children were in classes which attempt to remediate their problems. Also, since it is possible that the achievement of LD students will improve, adult expectations will be raised as achievement improves. The long term effect could be more positive adult interactions and increased performance for LD children.

Measurement of Achievement

Achievement was generally measured orally until the last half of the nineteenth century (Aiken, 1982, p. 98). At this time, Horace Mann argued that written tests were more objective measures of achievement than oral tests. Anastasi (1976, p. 16) reported that it was not until the

turn of the century that standardized tests for measuring school instruction began to appear. She stated that it was E. L. Thorndike who was instrumental in beginning this trend.

In the 1930's, objective tests became more popular than essay tests. Test-scoring machines were also introduced during this decade (Anastasi, 1976, p. 17). These two important occurrences led to a rapid increase in the use of standardized tests for assessing school achievement (Aiken, 1982, p. 98).

Anastasi (1976, pp. 398-402) wrote that achievement tests are made to measure the effect of a program of instruction. They measure the effects of learning under controlled conditions. Achievement tests are used to assign grade levels for students, to reveal weaknesses in past learning, and to give direction to future learning. They are used to aid in individualizing instruction and to formulate educational goals.

Testing programs are employed for the measurement of general educational growth (Aiken, 1982, p. 107). A typical elementary school achievement test battery consists of subtests for measuring reading vocabulary, reading comprehension, spelling, use of language, arithmetic fundamentals, and arithmetic comprehension. Anastasi (1976, pp. 403-404) gave examples of achievement tests which emphasize basic

educational skills. She named the California Achievement Tests, Iowa Tests of Basic Skills, and SRA Achievement Series.

Evaluation of Achievement Tests

Buros (1977) made many recommendations for weighing the advantages and disadvantages of standardized tests. Every test should be accompanied by a manual describing its planning, construction, standardization, reliability, and validity. Having this information available is of great importance when considering the influence on the lives of the examinees. Buros declared that having this information available would impel publishers to construct better tests and would facilitate better test evaluation by educators.

Dwyer (1982, pp. 12-22) has made a number of suggestions concerning the evaluation of the quality of achievement tests: the test publisher should provide information on development, refinement procedures, and availability and appropriateness of experimental data; qualifications of the author should be considered; more than one person should have contributed to or reviewed the test; and information concerning test reliability should be provided in detail.

Talmage and Rasher (1981) emphasized the importance of the validity of the test and its establishment by the

test developer. Messick (1980) proclaimed validity as an imperative in measurement: "validity is the overall degree of justification for test interpretation and use" (p. 1014).

It is essential for a test to be accompanied by a manual that follows its standards and substantiates the test (Standards for Educational & Psychological Tests, 1974). Another essential is that the test manual should describe the development of the test, the test rationale, and the procedures of item analysis. The manual should warn against common misuses of test results and should state the purposes and applications recommended for the test.

The manual or research report should show evidence of validity (Standards for Educational & Psychological Tests, 1974). It should also provide information on the appropriateness of or limits to the generalizability of validity information. The sample used to validate the test should be described in the manual for the user to judge and apply it to its use.

California Achievement Tests

Five achievement test batteries including the CAT were reviewed by Iwanicki (1980). He found the CAT to be a quality product, based upon complete technical information from the publisher. The procedures for giving

the tests were clearly explained in the manual. The format was seen as appropriate for each grade level tested.

Practice materials have been provided for helping teachers prepare students for the actual testing. Interpretive materials provided were said to be helpful in interpreting the test scores and in making decisions about instruction based on the test results. In conclusion, Iwanicki stated that the CAT was an educationally and technically sound achievement test.

The Reading section of the CAT was reviewed by Schell (1980). He stated that in the areas of comprehension and vocabulary the test is sound, highly accurate, and dependable. The comprehension section includes critical level comprehension which broadens the area of information about the child's comprehension. Schell proclaimed the test to be exceptional in construction, tryout, and standardization.

Hammill, Parker, and Newcomer (1975) have researched the relationship between the Illinois Test of Psycholinguistic Abilities (ITPA) and the CAT. Subjects were given the ITPA and the CAT, and 60 one-way analyses of covariance were run. The results of the study did not support a relationship between psycholinguistic abilities and academic achievement except for the ITPA subtest of Grammatical Closure. The authors suggest that psycholinguistic training would not improve academic performance.

The effectiveness of the CAT, the American College Testing Program (ACT) Academic Tests, the College Board Scholastic Aptitude Test (SAT), and high school grade point average (GPA) in predicting college freshman GPA has been researched by Halpin, Halpin, and Schaer (1981). The authors have pointed out that much test score data have been collected by the schools. They questioned using results of standardized tests given in high school to aid in making decisions concerning college admissions. Intercorrelations were computed using the ACT, SAT, CAT, high school GPA, and college freshman GPA. High school grades were the most valid predictor of freshman GPA. The CAT was found to be as effective in combination with high school grades as either the ACT or SAT.

Malley (1975) compared the Prescriptive Reading Inventory (PRI) with the CAT, WRAT, and a Teacher Rating Scale. These four instruments were given to third-grade students in a rural elementary school. The CAT was found to be a good indicator of overall reading ability.

Touliatos, Lindholm, and Rich (1978) examined the influence of family background on academic achievement for elementary boys and girls and for different social classes. The CAT grade equivalent scores were used to measure scholastic achievement. The authors came to many conclusions including that boys generally achieve less than girls at

the elementary school level and that children from higher social classes and children from smaller families score higher on achievement tests than children from larger families.

Much writing has been done about the relationship between self-concept and academic achievement. In a study by Bledsoe (1964), the CAT was used to study self-concept of fourth- and sixth-grade boys and girls. Self-concept was found to correlate positively with academic achievement.

CAT and Exceptional Children

Achievement testing of special education students has been shown to give measures as accurate as testing of normal populations. Zingale, Smith, and Doeckei (1980) investigated the stability of achievement tests when used on LD children. The Metropolitan Achievement Test (MAT) was given to LD elementary students. The authors concluded that the MAT is reliable when administered to LD students. They also declared that "assessment instruments standardized on normal populations maintain their psychometric properties when used with exceptional populations" (p. 86). Jenkins and Pany (1978) pointed out that special education has relied a great deal on standardized achievement tests for identifying special children, evaluating their growth, and individualizing instruction. According to the authors,

achievement tests have also been used to evaluate instructional programs for special education.

The CAT was used in a concurrent validity study of the Peabody Individual Achievement Test (PIAT) by Bray and Estes (1975). The authors stated that there was little published evidence of the validity of the PIAT with a special education population. The PIAT, CAT, WRAT, and Teacher Ratings were used as criterion measures. The PIAT is similar to the Brigance in that it is an individually administered achievement test.

Subjects for the study were 45 middle class LD students. Their ages ranged from 7 years old to 12 years old. Their mean IQ scores as measured by the Wechsler Intelligence Scale for Children (WISC) was 93. All subjects were administered the PIAT, CAT, and WRAT by a school psychologist. Teachers classified each student according to their actual achievement level using grade equivalent scores. Grade placement scores for the PIAT, CAT, WRAT, and Teacher's Rating were analyzed by Pearson product-moment coefficients of correlation. Moderate to high correlation coefficients were obtained in all subject areas tested.

Tinney (1975) compared the KeyMath Diagnostic Arithmetic Test and the Arithmetic section of the CAT using LD students. The tests were given in the fall and the spring of the same school year. Results obtained suggested that

there is a significant positive relationship between the KeyMath and the CAT for LD students.

The CAT was used with ED students by Lanthier and Deiker (1974). In this study, the relationship between parents' educational levels and achievement scores of their emotionally disturbed children was examined. The subjects were 117 patients of a short-term unit of a Louisiana hospital. After being admitted to the hospital, the students were given the CAT, and family background data were taken. Females scored higher on all the CAT scores. None of the correlations between daughters' CAT scores and parents' educational levels were significant. The academic achievement levels of the sons were positively related to the education of both parents on all CAT measures. Correlations were higher between sons and mothers. The authors recommended that when treating emotionally disturbed children, special attention needs to be given to the mothers' attitude toward her son's academic performance.

Summary

The subject of achievement and achievement testing has been discussed by many authors in various books and journals. The acquiring of knowledge and its measurement are related to many variables including personality, ability, self-concept, and the expectations of others. Measurement of

knowledge has evolved from oral testing to written standardized testing. There are many achievement tests on the market today: some have been studied and validated; some have not. The CAT has been widely studied and has often been used in studying other testing instruments. The CAT has been used with average populations as well as with exceptional children; it has been proven effective in predicting college student GPA, it has been used with LD students to validate the PIAT, and the CAT has been found to be a good indicator of reading ability. Establishing test validity has been proposed to be important by many authors. This study proposes to validate concurrently the Brigance through comparison with the CAT.

CHAPTER III

METHODOLOGY

Subjects

Subjects of this study were LD students from a Grapevine-Colleyville Independent School District resource program. Grapevine is a small town adjacent to the Dallas-Ft. Worth Metroplex. Families in the area are predominantly middle- to lower-class.

The population of the study included the entire LD group which attended resource classes in the first through fifth grades of this elementary school during the 1982-1983 school year. No attempt was made to sample the population.

The group consisted of 41 students. There were 14 girls and 27 boys. Of this group, 10% were Black, 10% were Mexican-American, and 80% were Caucasian. From my experiences teaching resource classes, this population seems typical of most LD groups in G-CISD.

Instruments

Brigance Diagnostic Inventory of Basic Skills

The Brigance is a criterion-referenced skill inventory

used in G-CISD for evaluating students in the areas of reading readiness, reading, math, and language arts. It measures specific skills in these subject areas and provides grade level equivalents for word recognition, reading comprehension, oral reading, spelling, and math. There are no published reliability and validity data on the Brigance. According to Flynn (Note 3), validity has been established through extensive field-testing and recommendations of customers.

California Achievement Test (CAT)

The CAT is a standardized achievement test given to kindergarten through twelfth graders. It is administered to Grapevine-Colleyville ISD elementary students in the spring of each school year. The CAT measures achievement in the area of prereading, reading, spelling, language, math, and reference skills.

Extensive information concerning reliability, validity, standardization, norming, and test bias is given in the Technical Bulletin 1 (1979). The content of the CAT was developed from current curriculum guides and instructional materials from all state departments of education and most major cities in the United States. A staff of professional item writers wrote the test items from guidelines developed from this acquired information. Validity was established

when the test was developed and is not dependent upon correlation with other tests. Intercorrelations have been done using the current edition of the CAT, the Short Form Test of Academic Aptitude, and the 1970 edition of the CAT. Intercorrelation coefficients are given for all grade levels and subject areas in the Technical Bulletin 1. KR-20 reliability coefficients range from .59 to .98 on the tests given to students in the first through fifth grades. The standardization sample consisted of about 200,000 students from kindergarten through the twelfth grade. A stratified random sampling of national public schools and Catholic schools was used.

Research Design

There was no formal research design since this study was a correlational study. The relationship between scores obtained on the CAT and Brigance was measured. Pairs of scores were correlated by means of the Pearson product-moment correlation procedure. This statistical analysis was done using a DEC-20 computer. The following pairs of scores were correlated: CAT reading vocabulary-Brigance word recognition, CAT reading comprehension-Brigance reading comprehension, CAT spelling-Brigance spelling, CAT total math-Brigance math.

Procedures

Permission was obtained from the elementary school principal and the Grapevine-Colleyville ISD special education director to use the test records of students enrolled in the resource program during the 1982-1983 school year. The sample included all LD students who were given the Brigance and the CAT during that school year. The data were collected, tabulated, and analyzed on the DEC-20 computer at Texas Woman's University. The Pearson product-moment coefficient of correlation was used to determine any relationship between the selected CAT subtests and the Brigance subtests. The computer printout was read and interpreted.

CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

The California Achievement Tests and the Brigance Diagnostic Inventory of Basic Skills were given to elementary learning disabled (LD) students in the Grapevine-Colleyville Independent School District in April of 1983. This LD group contained 41 students in the first through fifth grades. Test scores were obtained from student record cards and special education records. The relationships between the CAT subtests and related Brigance subtests were measured by pairing the scores and correlating them by means of the Pearson product-moment correlation procedure using the DEC-20 computer program REGRES.

Concurrent Validation

Validity is the degree to which a test measures what it is supposed to measure. Concurrent validity is the type of validity used in this study. Concurrent validity is defined by Gay (1981, p. 113) as the degree to which the scores on a test, such as the Brigance, are related to the scores on another test, such as the CAT, which has been already established as a valid instrument. In concurrent validation,

the two tests are administered to the subjects at the same time, and then the two sets of scores are correlated. The statistics obtained from this type of correlation indicate the concurrent validity of the unproven test. In this study, high correlation coefficients were obtained on the word recognition, reading comprehension, and math subtests which suggest that the Brigance is a good test in these areas. A low correlation coefficient, such as the number obtained on the spelling scores, does not indicate good concurrent validity.

Findings

As indicated in Table 1, highly significant relationships were found between the Brigance word recognition and the CAT vocabulary tests, the Brigance reading comprehension and the CAT reading comprehension tests, and the Brigance total math and the CAT total math tests. The correlation of spelling scores was not statistically significant. The number of subjects was deliberately kept to approximately 30 so that r values would not be inflated.

Table 1
Correlation Matrix

		Brigance				
		W.R. ^a	Comp. ^b	Math	Spelling	N
CAT	Voc. ^c	.796				34
	Comp. ^b		.646			32
	Math			.775		20
	Spelling				.090	28

^aWord Recognition

^bComprehension

^cVocabulary

CHAPTER V

SUMMARY AND CONCLUSIONS

The CAT and the Brigance are both being used to measure elementary LD students' achievement in the G-CISD in the areas of reading, math, and spelling. While there is much statistical evidence that the CAT is a reliable and valid instrument, statistics on the Brigance are not currently available. Students and teachers are being evaluated by these instruments, and yearly progress of LD students is being recorded using Brigance scores. Students' scores are quoted to parents in annual meetings in which decisions concerning future special education placement are made. Since Brigance scores are used in writing goals and objectives for these students, standardization data on the Brigance would be helpful in determining its value for these uses in school.

In this study, certain Brigance scores have been correlated with related scores of the CAT. The Brigance was found to be highly correlated with the CAT in this Grapevine-Colleyville ISD learning disabled population in the areas of word recognition, math, and reading comprehension. The spelling subtest did not significantly correlate with

the CAT spelling subtest.

Conclusions

In the areas of reading recognition, reading comprehension, and math, the Brigance appears to be a sound instrument to use with learning disabled populations. The format of the test requires that the majority of it be administered individually which can be advantageous in a learning disabled population. The one-to-one administration of the test would aid LD students in remaining focused on the task, whereas a group-administered test might not hold the LD student's attention.

The extremely low correlation of the spelling subtest may be explained by several factors. The Brigance spelling test can be a disadvantage for the LD child who finds writing tasks more difficult than the average student. The CAT does not require the writing of dictated words, but the Brigance does. Another explanation may be that the Brigance words may be too difficult for the grade levels being measured.

Implications

The highly significant correlations of the Brigance subtests of reading and math with related CAT subtests suggest that use of the Brigance be continued by the G-CISD

in evaluating LD students. The quoting of grade level scores to parents is usually done with caution in reference to the CAT, and this same caution seems to be in order in using the Brigance.

The findings of low correlation on the spelling subtest strongly suggest discontinuance of this subtest with LD students. Further testing of the spelling subtest or a change in the format of the spelling test from a dictation method to a simple multiple-choice method may help in finding a more accurate method of measuring spelling achievement by the Brigance.

Recommendations for Further Research

The research implications of this study are that continued work with the Brigance could be done to include other populations. The Brigance is also being used to test children who have been diagnosed as emotionally disturbed, mentally retarded, hearing impaired, and visually handicapped. Concurrent validity studies could be done using Brigance scores and other achievement tests given to children with these handicapping conditions. Validity studies also could be performed on the two other Brigance tests. These two tests, one a lower level test and the other a higher level test, have not yet been validated. Also, besides concurrent validity studies, predictive validity studies could be done

on the Brigance subtests. Further testing of the spelling subtest is also recommended.

In summary, the Brigance has shown to be a sound test in the areas of reading recognition, reading comprehension, and math in this study; the spelling test has not. Continued use of the Brigance and further testing of the spelling subtest are recommended by these findings.

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