

**A COMPARISON OF THE WIDE RANGE ACHIEVEMENT
TEST-REVISED AND THE WOODCOCK-JOHNSON
ACHIEVEMENT TEST WITH A REFERRED POPULATION**

CAROL MARIE RYAN

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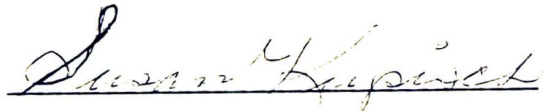
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In Partial Fulfillment
of the Requirements for the Degree
Master of Arts

by
Carol Marie Ryan
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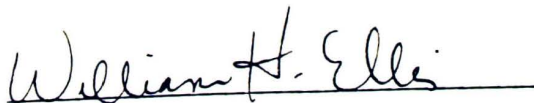
To the Graduate and Research Council:

I am submitting herewith a Research paper written by Carol Marie Ryan entitled "A Comparison of the Wide Range Achievement Test-Revised and The Woodcock-Johnson Achievement Test with a Referred Population." I have examined the final copy of this paper for form and content, and I recommend that it be accepted in partial fulfillment of the requirements for the degree Master of Arts, with a major in Psychology.

A handwritten signature in cursive script, reading "Susan Kuperick", written over a horizontal line.

Major Professor

Accepted for the Graduate and
Research Council:

A handwritten signature in cursive script, reading "William H. Ellis", written over a horizontal line.

Dean of the Graduate School

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CHAPTER 1

Introduction

In Tennessee the criteria for determining eligibility for special education services under the category of Specific Learning Disability is based on a discrepancy formula. The student must exhibit a significant discrepancy of more than one standard deviation between cognitive/intellectual functioning and measured achievement in one or more specific areas (Tennessee Student Evaluation Manual, 1985).

A simplified subtraction method utilizing standard scores is one of the recommended methods of determining if a discrepancy exists. This method presents the possibility of varying results based on the tests administered. Two popular tests currently used to assess achievement in the areas of reading, mathematics, and written expression are the Woodcock-Johnson Tests of Achievement (WJTA) (Woodcock and Johnson, 1977) and the Wide Range Achievement Test-Revised (WRAT-R) (Jastak and Wilkinson, 1984).

The WJTA and WRAT-R do not measure the same skills within each academic area, but there is overlap. The Tennessee Student Evaluation Manual (1985) suggests the use of both tests for assessing basic reading skills and mathematical calculation. The two tests also contain spelling subtests which can be used as part of a written expression assessment.

Comparative data between the WJTA and the WRAT-R are

needed in order to accurately use and interpret these scores in evaluating referred students. To help clarify the strengths and weaknesses of these instruments, this study compares the scores of referred students on both the WJTA and the WRAT-R to determine correlations of scores between and among subtests. In this way the utility of using the WRAT-R and WJTA for determining eligibility for special education will be addressed.

Literature Review

Woodcock-Johnson Tests of Achievement

The Woodcock-Johnson Tests of Achievement (WJTA) is the second part of the Woodcock-Johnson Psycho-Educational Battery, which was published in 1977. This battery consists of 27 individually administered subtests which measure cognitive abilities, scholastic aptitudes, academic achievements, and scholastic and non-scholastic interests. The battery is normed for ages three to eighty.

Administration time for Part II, the achievement subtests, is approximately thirty minutes although the subtests are untimed. The test is in easel format. Answers are recorded by both the examiner and the subject in a response booklet. The subject is required to read orally and silently, calculate and reason mathematically, write spelling words from dictation, and find various errors in typed passages. The subtests yield percentile and standard scores for grade placement and age. Grade and age equivalents are given along with an instructional range.

The Reading Cluster consists of three subtests: Letter-Word Identification, Word Attack, and Passage Comprehension. Hessler (1984) recommends that this cluster be considered as a measurement of basic reading skills only and not used to assess reading comprehension. He contends that the cloze procedure format of the passage comprehension subtest assesses a literal form of comprehension. This test does not address critical or inferential comprehension which are included in a thorough assessment.

The Mathematics Cluster consists of two subtests: Calculation and Applied Problems. Hessler (1984) contends these subtests may be the best choice for measuring mathematics because of their content and technical adequacy.

Two subtests make up the Written Language Cluster. Dictation and Proofing together measure spelling, punctuation, capitalization, and use of specific linguistic forms of words. Hessler (1984) states that these two subtests assess only two of the five components involved in written expression which should be considered when assessing written expression for learning disabilities.

The WJTA was widely acclaimed when it first appeared and began to replace previously used individualized tests, such as the Peabody Individual Achievement Test (PIAT) (Dunn and Markwardt, 1970) and the Wide Range Achievement Test (WRAT) (Jastak and Jastak, 1973). It was considered to be a more comprehensive measure of reading, written language, and mathematics than the PIAT or WRAT (Cummings, 1985). Hessler's

(1984) review of the WJTA in light of the requirements of the federal rules and regulations for evaluating students suspected of learning disabilities revealed that although the test may be more comprehensive, it needs to be supplemented with tests that evaluate reading comprehension and mechanical, productive, and cognitive abilities of written expression.

Strengths of the WJTA center upon its psychometric properties, sophisticated construction, and technical adequacies (Kaufman, 1935). The Achievement Clusters were normed on the same population as the Cognitive Scale, making comparisons of scores more legitimate. The standardization sample was large and representative of the population.

Reviewers have noted some weaknesses. Although the standardization sample was large, some groups were under represented, such as the non-urban South and adults. Testing was concentrated at grade levels K, 1, 3, 5, 8, and 12. Stratification data were presented for large groups which may not be as accurate. The battery has also been criticized for having a complicated scoring system and cluttered score sheet. Adding to the confusion is an assortment of manuals to derive scores and interpretations (Cummings, 1985; Kaufman, 1935).

The WJTA is a highly reliable instrument yielding median reliabilites of .92 to .96 as reported in the technical manual (Woodcock, 1973).

Concurrent validity data reported in the technical man-

ual is comprehensive and acclaimed to be a model for test developers (Cummings, 1985). The data indicate high correlations in the .70 to .90 range with frequently used tests of achievement for both handicapped and normal samples (Hessler, 1984; Kaufman, 1935).

High correlations have been found in recent studies comparing the WJTA with the WRAT (1978) using learning disability samples. Breen (1983) found significant correlations for both learning disabled and regular education students except for the WJTA and WRAT arithmetic subtest comparison. This was felt to result from the fact that the WJTA measures mathematic reasoning unlike the WRAT.

In comparing the WJTA to the WRAT (1978) and the PIAT, Hall, Reeve, and Zakreski (1984) concluded the WJTA is technically adequate in terms of concurrent validity. The authors questioned the high correlations between all subtests, indicating an apparent content overlap in the four achievement areas. This would affect the extent to which the WJTA could document discrepancies in specific skill areas.

The WJTA has been found to yield slightly lower standard scores than other achievement tests (Breen, 1983, 1984; Breen, Lehman, & Carlson, 1984; Hall, Reeve, and Zakreski, 1984). Lower scores enable practitioners to more easily establish a discrepancy between ability and achievement in determining eligibility of referred students.

Wide Range Achievement Test-Revised

The Wide Range Achievement Test-Revised (WRAT-R) is the

restandardized edition of the Wide Range Achievement Test (WRAT) (Jastak & Jastak, 1973). This edition, published in 1984, was restandardized using a stratified national sample to establish age-level norms. The test items are the same as past editions, except for the addition of a few precomputation items and simple arithmetic problems to the Arithmetic subtest.

The Reading, Spelling, and Arithmetic subtests measure three basic skills: word recognition, spelling, and mathematics calculation, respectively. The Reading subtest consists of naming letters and pronouncing words out of context. The task does not involve reading comprehension. The Arithmetic subtest involves counting, reading number symbols, solving oral problems, and performing written computation. Mathematical reasoning is not measured. The Spelling subtest involves copying marks and writing words from dictation.

The WRAT-R is administered in less than 30 minutes. There are two levels: Level 1 for ages 5 years, 0 months to 11 years, 11 months, and Level 2 for ages 12 years, 0 months to 74 years, 11 months. The subtests yield percentile scores and standard scores. The grade equivalent ratings obtained are not suggested for use other than as a rough reference point.

The previous editions of the WRAT were criticized for not using a norming sample representative of the population. Unfortunately, the standardization procedures for the revision are also questionable. Several shortcomings exist.

Randomization was not described; the Rand McNally Atlas was consulted instead of the U. S. Bureau of the Census data in sample stratification; only 17 states were sampled; and all non-white racial groups were placed in one category (Reid, 1986; Reynolds, 1986).

Administration can be confusing since the instructions in the manual are not organized in the same order as the tests are on the answer sheet. Also the arithmetic instructions are too long to hold a child's attention.

Reliability data for the WRAT-R were provided through use of the Rasch model for item selection. Reviewers have judged this method to be inadequate, confusing, and no substitute for traditional reliability estimates (Reid, 1986; Reynolds, 1986).

The validity of the WRAT-R is also questioned. The authors reported "the content validity of the WRAT-R is apparent" (p. 62). This reliance on face validity was strongly questioned by Reid (1986) and Reynolds (1986). The tests are short and range from simple to difficult items. This does not guarantee a representative sample of what is currently taught in these achievement domains. The items have not been changed since the 1965 edition except for the addition of a few simple items to the Arithmetic subtest.

Construct validity was reported to be measured by item separation reliability using the Rasch Model. It was also said to be supported by increasing raw score means over age groups. Mean scores increased steadily from age five until

adulthood, after which they plateaued (Jastak & Wilkinson, 1934). Both Reynolds (1936) and Reid (1936) question the adequacy of these methods in determining construct validity.

Concurrent studies are summarized in the manual, but were based on studies with the 1978 edition of the WRAT, not the WRAT-R. The WRAT correlated highly with the PIAT (Matuszek, 1935) and the WJTA (Breen, 1933; Hall, Reeve, & Jakreski, 1934; Woodcock, 1973).

Comparison of the WJTA and the WRAT-R

A review of recent research literature indicated no published studies comparing the WJTA with the WRAT-R. Recent data compares the WJTA with the 1978 edition of the WRAT. Since use of the WRAT-R has replaced the WRAT in most school settings, new studies comparing the WJTA to the WRAT-R are needed.

Studies comparing the WJTA to the WRAT indicated that the WRAT had significantly higher mean scores on the subtests. Comparisons with the WRAT-R need to be completed to determine if this difference still exists. Also, correlational data between subtests are needed to determine if any significant changes have occurred.

Current Study

The purpose of this investigation is to provide information regarding comparability of the brief WRAT-R and the longer, more diagnostic WJTA for a referred population. The results of this comparison will provide information concerning differences in scores and the desirability of using these

achievement tests in determining eligibility for special education. In order to investigate these concerns four hypotheses will be tested:

1. There will be no significant difference between related subtest mean scores of the WRAT-R and the WJTA.
2. There will be a small positive correlation between related subtests of the WRAT-R and the WJTA.
3. There will be significant differences between mean scores of subtests within the WRAT-R and likewise between mean scores of subtests within the WJTA.
4. The correlations among subtests of the WRAT-R and among subtests of the WJTA will not be significant.

CHAPTER 2

Method

Sample

The sample consisted of 35 referred students from Clarksville-Montgomery County Schools and 24 students from Fort Campbell Dependent Schools. The students were referred for educational difficulties. Included were 43 males and 16 females for a total of 59 students. The subjects ranged in age from 6 years and 5 months to 11 years and 7 months and from grades kindergarten through sixth.

Procedure

Data were gathered from the psychological testing files of the Clarksville-Montgomery County School System and Fort Campbell School System. Permission was granted for data to be gathered (See Appendix). The data gathered included age, sex, grade level, and achievement standard scores from the WRAT-R and WJTA that were administered between December, 1985, and February, 1987. A limit of six months between testing dates was established. The mean difference in time between testing with each instrument was 1.05 months.

Subjects in the Clarksville-Montgomery School System were tested by school psychologists. Subjects from the Fort Campbell School System were tested by both guidance counselors and school psychologists. There was no consistent pattern as to which instrument was administered first or by

which professional.

After data were collected, t-tests and Pearson product-moment correlations were performed to evaluate research hypotheses.

Instrumentation

The instruments used to measure achievement of each subject were the Wide Range Achievement Test-Revised (WRAT-R) and the Woodcock-Johnson Tests of Achievement (WJTA). The WRAT-R is the 1984 revision of the WRAT, which was published in 1978. The test was revised to provide new norms based on a broader population sample. The norm group consisted of 5600 individuals divided into 28 age groups with 100 males and 100 females in each group. The WRAT-R has two levels. For this study, Level 1 for ages 5 years and 0 months to 11 years and 11 months was used.

The Woodcock-Johnson Tests of Achievement (WJTA) was published in 1978 and is Part II of the Woodcock-Johnson Psycho-Educational Battery. The test was normed on 4732 individuals, consisting of 555 preschoolers, 3577 school-aged children and 600 adults.

Both the WRAT-R and WJTA consist of three subtests which measure similar basic skills in reading, mathematics, and written language. The WJTA is more comprehensive and thus more diagnostic. All subtests yield standard scores with a mean of 100 and a standard deviation of 15 for each age group based upon the performance of their particular standardization sample.

CHAPTER 3

Results

T-test results yielded significant differences between scores attained on the WRAT-R and WJTA. All related achievement combinations yielded significantly different mean performance levels as measured by standard scores. Also, the WRAT-R means were consistently and significantly lower than WJTA means. Mean differences ranged from -3.58 to -5.73. These findings are summarized in Table 1.

Pearson product-moment correlations were performed on all subtest pairs. All correlations between related subtests of the WRAT-R and WJTA were significant and correlations were moderately high. Reading comparisons were the highest at .39 and Spelling/Written Expression lowest at .71. The correlations of related subtests are shown in Table 2.

A comparison of mean scores from the subtests within the WRAT-R showed there were no significant differences between these scores. Likewise, a comparison of mean scores of the subtests within the WJTA showed no significant differences. The comparisons of mean standard scores and *t*'s for unrelated subtests within test batteries are shown in Table 3.

Correlations of subtests within the WRAT-R and subtests within the WJTA were significant and were in the moderate to moderately high range. The Reading/Spelling comparison from the WRAT-R and the Reading/Written Expression comparison from the WJTA were the highest (.86 and .78 respectively). Math/Arithmetic correlations to Reading, Spelling, and Written

Expression were similar on both achievement batteries and ranged from .57 to .67. These correlations are summarized in Table 4.

Table 1

Results of the t-tests Comparing Standard Scores between
Related Subtests of the WRAT-R and WJTA

Subtests	N	MEAN	SD	t ^a
WRAT-R Reading	58	78.14	14.95	-5.73
WJTA Reading		83.35	11.79	
WRAT-R Spelling	55	77.31	14.02	-5.53
WJTA Writ. Ex.		84.75	11.79	
WRAT-R Reading	55	77.33	14.93	-5.48
WJTA Writ. Ex.		84.35	11.32	
WRAT-R Spelling	58	73.38	14.42	-4.28
WJTA Reading		83.83	12.61	
WRAT-R Arithmetic	58	80.66	13.30	-3.58
WJTA Mathematics		84.57	11.06	

^a $p < .001$ for all comparisons

Table 2

Correlation Coefficients between Standard Scores from Related Subtests of the WRAT-R and WJTA

Subtests	N	r^a
WRAT-R Reading WJTA Reading	58	.89
WRAT-R Spelling WJTA Writ. Ex.	55	.71
WRAT-R Reading WJTA Writ. Ex.	55	.77
WRAT-R Spelling WJTA Reading	58	.75
WRAT-R Arithmetic WJTA Mathematics	58	.80

^a $p > .001$ for all comparisons

Table 3

Results of t-tests Comparing Standard Scores of Unrelated Subtests of the WRAT-R and Unrelated Subtests of the WJTA

Subtests	N	MEAN	t ^a
WRAT-R Reading	57	77.88	-0.14
WRAT-R Spelling		78.02	
WRAT-R Reading	58	78.14	-1.42
WRAT-R Arithmetic		80.48	
WRAT-R Spelling	58	78.38	-1.53
WRAT-R Arithmetic		80.81	
WJTA Reading	56	83.81	-0.52
WJTA Mathematics		84.57	
WJTA Reading	56	83.50	-1.19
WJTA Writ. Ex.		84.79	
WJTA Mathematics	55	84.13	-0.49
WJTA Writ. Ex.		84.76	

^a p is not significant for any comparisons

Table 4

Correlation Coefficients based on Standard Scores between
Unrelated Subtests of the WRAT-R and Unrelated Subtests of
the WJTA

Subtests	N	r^a
WRAT-R Reading WRAT-R Spelling	57	.86
WRAT-R Reading WRAT-R Arithmetic	58	.62
WRAT-R Spelling WRAT-R Arithmetic	56	.63
WJTA Reading WJTA Mathematics	56	.57
WJTA Reading WJTA Writ. Ex.	56	.78
WJTA Mathematics WJTA Writ. Ex.	55	.64

^a $p > .001$ for all comparisons

CHAPTER 4

Discussion

The results of this investigation are similar to previous studies that have compared achievement tests to determine concurrent validity. Previous research has shown the WJTA to correlate highly with other tests of achievement. The WJTA correlated highly with the 1978 edition of the WRAT in past studies.

In this study, the results of the Pearson product-moment correlation establish that the WJTA subtests of Reading, Mathematics, and Written Expression correlate highly and significantly with the WRAT-R subtests of Reading, Arithmetic, and Spelling, respectively. This suggests that the subtests measure similar basic skills.

The correlations of subtests within each battery were similar to past research findings. The higher correlation between subtests that measure reading and those measuring spelling are explained by the similar use of decoding and word-attack skills needed for each task. When comparing reading and/or spelling subtests with mathematics subtests, the correlations were lower but still in the moderate range, suggesting the measurement of a common academic skill.

Results of the t-test established a significant difference between standard scores of the WRAT-R and the WJTA with the WRAT-R being significantly lower. These results cannot be compared to past studies since all previous research compared the WJTA with the 1978 edition of the WRAT. These

studies indicated a significant difference between scores of the WJTA and WRAT, but in the opposite direction from results of this study. The 1978 edition of the WRAT yielded standard scores higher than those of the WJTA.

The lack of significant mean differences among subtests of the WRAT-R and the lack of mean differences among subtests of the WJTA strengthens the proposition that the norm groups of these two achievement tests were quite different. The scores have greater similarity within each battery (even though different skills are being assessed) than they are between similar subtests from each battery which are assumed to measure the same skills. The results of mean score comparisons add support to Reid's (1936) and Reynolds' (1986) contention that the norming procedures used for the WRAT-R were questionable. The difference in scores makes it difficult for school psychologists to ethically choose an instrument to assess referred students. Knowing the WRAT-R will yield a lower score, makes eligibility for special education easier to justify when this instrument is chosen.

The significant difference in scores attained from these two achievement tests indicate that these tests should not be used interchangeably. The WRAT-R is a quicker and less diagnostic test and may be best used as a screening device. The WJTA, being more diagnostic and having more technical adequacies, may be the preferred choice for assessing achievement in a comprehensive evaluation to determine learning disabilities.

The discrepancy formula for determining eligibility creates problems in trying to determine what constitutes a learning disability. Students' educational needs are often not adequately met because of this process. Students may be either certified and labeled incorrectly or may not be accurately identified.

Other studies comparing the WRAT-R with the WJTA are needed. This study did not compare scores from Level 2 of the WRAT-R. It also did not look at performance of regular education students not referred for special services.

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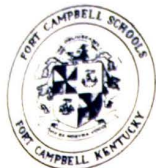
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APPENDIX



FORT CAMPBELL SCHOOLS

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LEON R. SITTER, ED.D.
SUPERINTENDENT

February 20, 1987

To Whom It May Concern:

Carol Ryan has been given permission to examine the testing files in the School Psychology Department of the Fort Campbell School System for the purpose of gathering data for her research paper. It is understood that no name, identification number, or any other method of personal identification will be associated with this data in any way, and that such methods of personal identification will not be used for data storage on electronic or non-electronic media. In this way, the anonymity of the persons involved will be maintained. It is also understood that the data gathered will be used for the purpose of group statistical analysis and interpretation and will not be used for any other purpose not pertaining to the research paper.

Fred Newton
Director of Instruction

Marcia Till
School Psychologist

I understand, and agree to abide by, the provisions stated above.

Carol M. Ryan
Graduate Student, A.P.S.U.



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W. C. Cowan
Coordinator of Pupil Personnel

February 10, 1987

To Whom It May Concern,

Carol Ryan has been given permission to examine the testing files in the Psychological Services Department of the Clarksville-Montgomery County School System for the purpose of gathering data for her research paper. It is understood that no name, identification number, or any other method of personal identification will be associated with this data in anyway, and that such methods of personal identification will not be used for data storage on electronic or non-electronic media. In this way, the anonymity of the persons involved will be maintained. It is also understood that the data gathered will be used for the purpose of group statistical analysis and interpretations and will not be used for any other purpose not pretaining to the research paper.

A handwritten signature in cursive script, appearing to read "W. C. Cowan", written over a horizontal line.

W. C. Cowan

Coordinator of Pupil Personnel

I understand, and agree to abide by, the provisions stated above.

A handwritten signature in cursive script, appearing to read "Carol M. Ryan", written over a horizontal line.

Carol M. Ryan
Graduate Student, A.P.S.U.