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Comparisons of the Peabody Picture Vocabulary Test and The Wechsler Intelligence Scale for Children-Revised with Late Elementary Aged Children

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COMPARISONS OF THE PEABODY PICTURE VOCABULARY TEST
AND THE WECHSLER INTELLIGENCE SCALE FOR CHILDREN-REVISED
WITH LATE ELEMENTARY AGED CHILDREN

A Thesis
Presented to
the Faculty of the Department of Psychology
Western Kentucky University
Bowling Green, Kentucky

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

by
David G. Hughes
November 1977

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David G. Hughes November 1977 21 pages

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The purpose of the study was to compare the Peabody Picture Vocabulary Test (PPVT) and the Wechsler Intelligence Scale for Children-Revised (WISC-R) in an effort to establish an estimate of the similarity between the two measures. The sample included 194 nine, ten, and eleven year old children referred to the University's Psychological Clinic. There were 100 males and 94 females with a mean age of 10 years and six months. Out of the 194 children, 106 were white, 46 black and 42 of unknown race. Pearson Product Moment Correlations were performed between the PPVT IQ and the WISC-R variables. As a result of frequent clinical comparisons, t tests of the mean z scores between the WISC-R Verbal, Full Scale and Vocabulary measures and PPVT measures were also done. Correlations between the PPVT and WISC-R variables yielded validity coefficients significant at or beyond the .001 level. Generally the Verbal Scale variables correlated more highly with the PPVT than the Performance Scale variables. The analysis of the differences between the mean z scores indicated a significant difference between the PPVT and the Verbal, Full Scale and the Vocabulary variables. These differences were significant at or beyond the .01 level of confidence. Even

though a significant difference was obtained between the mean scores, for practical use a direct interpretation would appear possible between the two tests in that the mean scores were within two IQ points of each other.

CHAPTER 1

INTRODUCTION

In recent years increased demand for psychological services in the community, especially the school systems, has resulted in a greater demand for measures designed to assess intellectual level with lesser time expenditures. While the Wechsler Intelligence Scale for Children-Revised (WISC-R) is considered to be the more comprehensive measure of intelligence in children, many psychometric evaluations and screening procedures are limited to the administration of shorter instruments.

One such instrument that enjoys wide popularity is the Peabody Picture Vocabulary Test (PPVT), which was designed to provide an estimate of a subject's verbal intelligence through measuring his hearing vocabulary (Dunn, 1965). According to Dunn the PPVT offers several advantages over the more comprehensive measures of intelligence. The instrument has been found to have high interest value with children and therefore, is a good method of establishing rapport. The test does not require extensive specialized preparation and can be quickly administered in 10 to 15 minutes. Scoring of the test is completely objective and can be accomplished quickly. The test is completely untimed making it a power

test rather than a speed test, and it requires no reading ability on the part of the subject. Neither pointing nor oral response is required for the test. If the child cannot point, the examiner can administer the test by pointing to each picture and have the child by some prearranged sign designate whether it is correct or incorrect. These qualities make the test suitable for testing a variety of exceptional children that could not complete many of the tasks incorporated in the more comprehensive tests such as the WISC-R.

All ability measures are set tasks presented to the subject to elicit a response that can be qualified. To the extent that tests are particular modes of communication, they may be regarded as utilizing different language systems. These language systems may be easier or harder for different subjects, but it cannot be assumed that one language system is necessarily of greater value than another. The WISC-R utilizes as many different language systems or tasks as possible in an attempt to be as comprehensive and effective as possible in measuring intelligence. It is recognized that the process of measuring hearing vocabulary utilized in the PPVT is not equivalent to defining words as in the Vocabulary Subtest of the WISC-R. The PPVT assessed language via a receptive, passive mode as contrasted with the expressive language measure on the WISC-R Vocabulary Subtest. Both measures assess the subjects comprehension of the spoken word (Dunn, 1965).

Analysis presented by Wechsler (1974) indicates that the intercorrelations between the 12 subtests and the three IQ scales for each of the 11 age groups in the standardization sample vary from moderate to relatively independent. The intercorrelations among the six Verbal Scale subtests and the Verbal IQ range from .45 to .78, while those among the six Performance Scale subtests and the Performance Scale IQ range from .34 to .58. These results indicate that the subtests in the Verbal Scale are more highly intercorrelated than those of the Performance Scale and the Vocabulary subtest shows the highest correlation with the Full Scale IQ (.74) (Sattler, 1974). Since the PPVT purports to assess the same ability as the Vocabulary subtest and the Vocabulary subtest is more highly correlated with the Full Scale IQ than any other subtest in either scale, then the PPVT IQ would appear to be highly comparable to the WISC-R Full Scale IQ.

Also the PPVT has not been restandardized since 1959 whereas the Wechsler Intelligence Scale for Children (WISC) was restandardized in 1974. What effect this revision had on the similarity between the two instruments is not presently known. It was Wechsler's intention to retain as much of the WISC as possible because of its widespread use and acceptance but to eliminate items felt by users to be ambiguous, obsolete, or differentially unfair to particular groups (Wechsler, 1974). An additional intent was to restandardize and recalibrate the childrens' scale. This process resulted

in a drop of approximately eight IQ points for the typical child in most age groups.

The PPVT and the WISC-R logically should be measuring the same constructs. Presently, there has been no reported research comparing the PPVT and the revised WISC. Therefore it is the purpose of this study to compare the PPVT and the WISC-R in an effort to establish an estimate of the similarity between the two purportedly similar measures of intelligence.

CHAPTER 2

REVIEW OF THE LITERATURE

Since the development of the PPVT, several studies have explored the relationship between the PPVT and the original version of Wechsler's children scale, the Wechsler Intelligence Scale for Children (WISC). Most of these studies were done on restricted populations of retarded or emotionally disturbed children.

Kimbrel (1960) correlated WISC and PPVT IQ's from institutionalized retardates with IQ's above 40. He found correlations between PPVT and WISC Full Scale to be .30 and correlations between PPVT and Verbal Scale to be .43. The Performance Scale of the WISC did not significantly correlate with the PPVT IQ's.

In 1960 Reger reported significant correlations between the PPVT and WISC Scales on 25 emotionally disturbed boys with an IQ range from 71 to 109. He obtained correlations of .60 between the WISC Full Scale and the PPVT, .60 between the WISC Verbal Scale and the PPVT, and .55 between the Performance Scale and the PPVT.

Thorne, Kasper and Schulman (1965) found similar results with 35 educable retarded boys. Correlations between the PPVT IQ's and the WISC Full Scale, Verbal Scale and

Performance Scale were .45, .53, and .30 respectively. They also found that the Verbal Scale subtests correlated significantly, with the Vocabulary, Digit Span, and Comprehension subtests being significant at the .01 level of confidence. None of the Performance Scale subtests correlations were significant.

Sixty-nine children referred for psychological evaluations by regular classroom teachers and special education teachers in Roanoke City, Virginia, were given the WISC and the PPVT. McArthur and Wakefield (1968) found high correlations between the PPVT and the WISC Full Scale and Verbal Scale IQ scores, .71 and .73 respectively. The Performance Scales correlation with the PPVT was .55.

These studies suggested that the PPVT correlates more highly with the WISC Verbal Scale IQ than the Performance Scale IQ scores. It was also found that the scores obtained on the PPVT were slightly higher than those obtained on the WISC. From the magnitude of the correlations it can be interpreted that there is a substantial relationship between the two tests. Other studies further explored whether there was a substantial relationship between the measures and extended their analysis to include whether it would be feasible to substitute shorter tests for the WISC in a psychometric battery of tests.

Himmelstein and Herndon (1962) investigated the relationship between the WISC IQ's with 48 children with emotional problems. Mean IQ's for the WISC Full Scale, Verbal Scale,

and Performance Scale were 95.33, 95.48, and 95.88 respectively. The mean IQ for the PPVT was 98.86. All correlations between the WISC variables and the PPVT were found to be significant beyond the .01 level. Correlations between the WISC Full, Performance, and Verbal Scale with the PPVT were .63, .52, and .64 respectively, with the Verbal Scale correlation being higher than the other two. These researchers concluded that the PPVT cannot be dismissed as a substitute for the WISC nor can it be used as a replacement with confidence.

Burnett (1965) using a total of 238 educable mentally retarded children and adolescents found a significant relationship between the PPVT and WISC IQ's. He found correlations between the PPVT and Wechsler Verbal, Performance, and Full Scale to be .47, .27, and .40 respectively. He accounted for the low correlations by the fact that the groups had such a restricted IQ range (50-84). He determined from this study that the PPVT could be considered useful in terms of giving a reasonably good estimate of intelligence in a short period of time.

Similar results were found by Pasewark, Fitzgerald, and Gloeckler (1971) using a restricted group of educable retarded subjects. Correlations obtained between the PPVT and the WISC Full Scale, Verbal Scale, and Performance Scale were .47, .45, and .36 respectively. Again, these reduced correlations were explained by the fact the group had such a restricted range of IQ's. It was also found that the mean PPVT IQ's

were higher than the WISC IQ's. The mean PPVT IQ was 74.91 as compared with 68.31, 69.02, and 73.06 for the WISC Full, Verbal, and Performance Scales.

Tobias and Gorelick (1961) found significant relationships between the two tests with a population of retarded adults. They also found that the PPVT IQ's are systematically higher than those of the Wechsler Scales.

A study that suggested stronger relationships between the two tests was reported by Anderson and Flax (1968). They used a total of 405 children, ranging in ages six through 13, who had been given the WISC and PPVT in individual administrations. At all age levels from eight and above the PPVT IQ was greater than the WISC Verbal, Performance, or Full Scale scores. Correlations between the PPVT and WISC Verbal, Performance, and Full Scale were found to be .66, .46, and .63 respectively. Anderson and Flax concluded that since the patterns of intercorrelations are quite similar for the PPVT and WISC, the tests are measuring approximately comparable human variables.

In another study by Moed, Wright, and James (1963) it was concluded that the PPVT could be substituted for the WISC with physically disabled children. The subjects consisted of 83 children in a rehabilitation hospital. This was the only study available in the literature that suggested the IQ's were lower than the WISC IQ's.

From these studies it can be assumed that the PPVT had a substantial relationship with the WISC. It has been shown

the measures correlate significantly, but the PPVT generally provided a slightly higher estimate of IQ than the WISC. To date, most studies have used restricted groups in correlating the two tests and none have established a correction factor to compensate for the higher PPVT IQ's. All studies cited have used the WISC as the criterion measure. None were available in the literature that used the more recent WISC-R. It was the purpose of this study to investigate the correlate relationships between the PPVT and WISC-R variables. Furthermore, differences and directions of differences between the mean levels of functioning were explored.

CHAPTER 3

METHOD

The sample was composed of nine, 10, and 11 year old students referred to the Psychological Clinic at Western Kentucky University. The referrals were of wide variety including many normal children used for training purposes, questions as to grade placement, and behavior and emotional problems. The sample included 194 students which had completed both WISC-R and PPVT measures. The sample which included nine, 10, and 11 year old students was selected because of the high frequency of subjects in each group and because the ages fell in the middle of the chronological age range for each instrument. There were 100 males and 94 females included in the sample with a mean age of 10 years and six months. The sample included 106 white, 46 black and 42 children of unknown race. The sample was not designed to be descriptive of the general population but was felt quite similar to the population with which those instruments are frequently used by psychologists.

Each student was individually administered the PPVT by a graduate student in the two year clinical psychology training program at Western Kentucky University. The testing sessions were conducted in individual testing booths in the

University's Psychological Clinic. The testing sessions were supervised and observed by doctoral level psychologists. Standardized procedures were followed for all administrations and scoring in accordance with the PPVT manual (Dunn, 1965). Each student was also administered the WISC-R in the same session as the PPVT under the same conditions. Standardized procedures were followed for all administrations and scoring in accordance to the WISC-R manual (Wechsler, 1974). Verbal, Performance, and Full Scale deviation IQ's and scaled scores for each subtest were used in the analysis.

Pearson Product Moment Correlations were performed between the PPVT IQ scores and the Wechsler Verbal IQ, Performance IQ, Full Scale IQ, and the 12 subtests. As a result of frequent clinical comparison, t -tests between the WISC-R Verbal, Full Scale, and the Vocabulary measures and the PPVT measures were done. For the t -test comparisons the variables were converted to z scores so a more accurate comparison could be made. The z scores were based upon the national standardization sample and not upon the sample used for this study. The correlations between the PPVT and the WISC-R variables were accepted at or beyond the .01 level of significance.

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CHAPTER 4

RESULTS

The means, standard deviations, and the ranges for the PPVT IQ's and the WISC-R Verbal, Performance, Full Scale IQ's, and the 12 subtests are presented in Table 1. The WISC-R mean IQ's fell below the standardization mean of 100 but were still within the Low Average range of intelligence. The PPVT mean IQ score was also below the standardization mean of 100 but it also was in the Average range of intelligence. The standardization mean and standard deviation for the WISC-R subtest scaled scores is 10 and 3 respectively. Generally, the sample Vocabulary mean fell below this but was within one standard deviation of the mean. Even though the group was slightly below average in their performances, very little restriction of variance appeared present. All of the standard deviations equaled or exceeded national distributions.

The Pearson Product Moment correlations between the PPVT and the Wechsler variables are presented in Table 2. All variables yielded validity coefficients significant at the $p < .001$ level. The WISC-R Verbal IQ, Full Scale IQ, and the Vocabulary subtest correlated more highly with the PPVT than the Performance IQ did. Generally the Verbal scale subtests

TABLE 1
Means, Standard Deviations, and Ranges
of PPVT and WISC-R Variables
(N = 194)

Variable	X	S.D.	Range
<u>PPVT IQ</u>	86.36	20.78	46-147
<u>WISC-R Deviation IQ's</u>			
Verbal IQ	83.82	18.12	45-142
Performance IQ	88.27	19.32	45-130
Full Scale IQ	84.59	18.93	40-141
<u>WISC-R Verbal Subtests</u>			
Information	6.7	3.42	1-17
Similarities	7.3	3.39	1-19
Arithmetic	7.2	2.85	1-16
Vocabulary	6.5	3.64	1-19
Comprehension	8.7	3.65	1-19
Digit span	7.1	3.03	1-14
<u>WISC-R Performance Subtests</u>			
Picture completion	8.9	3.48	1-17
Block design	7.3	3.60	1-18
Object assembly	8.5	3.46	1-18
Coding	7.8	3.57	1-19
Mazes	8.7	3.79	1-19
Picture arrangement	8.4	4.01	1-19

TABLE 2
 Pearson Product Moment Correlations
 Between PPVT and WISC-R Variables
 (N = 194)

	<u>PPVT</u>
<u>WISC-R Deviation IQ's</u>	
Verbal	.80
Performance	.66
Full scale	.79
<u>WISC-R Verbal Subtest</u>	
Information	.74
Similarities	.69
Arithmetic	.59
Vocabulary	.76
Comprehension	.63
Digit span	.50
<u>WISC-R Performance Subtest</u>	
Picture completion	.54
Picture arrangement	.62
Block design	.61
Object assembly	.51
Coding	.34
Mazes	.47

correlated more highly with the PPVT than the Performance Subtests did.

Table 3 summarizes the statistical comparisons between the PPVT and Wechsler Verbal, Full Scale, and Vocabulary z-score means. A significant difference between the PPVT and the Wechsler variables was obtained at or beyond the .01 level of confidence. The probability that the differences found between the PPVT and Wechsler Verbal Scale and PPVT and Wechsler Vocabulary Subtest was due to chance was one out of a thousand. The probability that the difference found between the PPVT and Wechsler Full Scale was due to chance was four out of a thousand.

When transformed into IQ units the PPVT mean IQ score equaled 86, the Wechsler Verbal mean IQ score equaled 84, and the Wechsler Full Scale mean IQ equaled 85. When transformed into scaled score units the Vocabulary Subtest mean scaled score equaled 7. When the PPVT was transformed to scaled score units the mean PPVT scaled score equaled 7. Even though a significant difference was found between the PPVT IQ and the Wechsler variables, in practical use they could be considered the same. It appeared that the PPVT yielded IQ estimates approximately two points higher than the Wechsler Verbal and Full Scale IQ's. If a compensation score were to be used to make the scores equal, then approximately two IQ points should be subtracted from the PPVT IQ or added to the Wechsler IQ's.

TABLE 3

Mean z Scores, Standard Deviations, t Values, and Probability
Levels of Statistical Comparisons Between the PPVT and
Wechsler Variables
(N = 194)

Variable	Mean	S.D.	<u>t</u> value	Probability
PPVT	-.8521	1.29	2.94	.004
Full scale IQ	-1.0271	1.26		
PPVT	-.8521	1.29	3.96	.001
Verbal IQ	-1.0787	1.21		
PPVT	-.8521	1.29	4.88	.001
Vocabulary Subtest	-1.1529	1.21		

CHAPTER 5

DISCUSSION AND IMPLICATIONS

The results of the correlation analysis indicated a significant and substantial relationship between the PPVT and the WISC-R variables. It was found that the WISC-R Verbal and Full Scale IQ's correlated more highly with the PPVT IQ than the Performance IQ did. This finding was similar to those found in earlier studies with the WISC (Kimbrel, Himelstein and Herndon; Anderson and Flax; and Burnett).

Since the PPVT is a measure of hearing vocabulary it was expected that the Verbal Subtests would yield higher correlations than the Performance Subtests of the WISC-R. As was expected this was found with the Vocabulary Subtest yielding a higher correlation (.76) than any of the other verbal subtests. This would be expected since the Vocabulary Subtest and the PPVT are both measures of language development.

The correlations of .80 for the Verbal IQ and .79 for the Full Scale IQ were higher than those found in previous studies with the WISC and the PPVT. Correlations found in previous studies with the PPVT and WISC ranged approximately from .35 to .73. One explanation for the higher correlations is that in this study the sample was not as restricted in IQ range or type of subjects. In this study the IQ ranged from

40 to 142 and the subjects included children with emotional and behavioral problems as well as normal children. Kimbrel correlated WISC and PPVT IQ's and found correlations approximating .40 with a group of institutionalized retardates with IQ's above 40. Thorne, Kasper, and Schulman found similar results with 35 educable retarded boys. Anderson and Flax found higher correlations approximating .63 using 406 children ranging in ages from six to 13 who had been referred to a school psychologist. Most of these studies found that the Performance Scale did not correlate significantly with the PPVT IQ. This study found that it did correlate significantly at the .001 level even though the correlation was not as high as those for the Verbal and Full Scale IQ's of the WISC-R. Again, this could be accounted for by the less restricted sample. Another explanation that could account for the higher correlations is that the revised WISC is measuring more closely the same constructs as the PPVT.

The analysis of the differences between the mean \bar{z} scores indicated a significant difference between the PPVT IQ and the Verbal Scale, Full Scale, and the Vocabulary Subtest of the WISC-R. This significant difference between the PPVT and Wechsler variables was obtained at or beyond the .01 level of confidence.

The mean scores for the four variables were 86 for the PPVT, 84 for the WISC-R Verbal IQ, 85 for the Full Scale IQ, and approximately 85 for the Vocabulary Subtest. Even though a significant difference was obtained between the mean scores,

for practical use a direct interpretation would appear possible between the two tests. It was found that the PPVT yielded slightly higher IQ scores than the WISC-R Full Scale IQ score. If a compensation factor is to be used, then two points should be subtracted from the PPVT IQ score or added to the Wechsler IQ's.

There are several implications from this study. The PPVT can be used with confidence in situations where it would be improper or impossible to use the WISC-R. Such situations would include obtaining an estimate of intelligence with children that cannot respond verbally, or in situations where the child cannot manipulate objects with his hands such as is required on the WISC-R Performance Subtests. In many psychometric screening procedures there is not enough time to give a complete battery of tests including the WISC-R so in these cases the PPVT could be substituted with confidence as a measure of global IQ.

On the other hand, one-third of the variance between the two variables was undefined. As a result, the PPVT may approximate the WISC-R IQ's but should not be used as a substitute in situations where comprehensive estimates of intellectual functioning are required.

Further research with these measures is needed to determine the effects of different age groups on the results. It would be important to determine whether or not the relationships between the two measures remain the same with a group of older or younger children.

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