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Title: A COMPARISON OF THE WAIS-R AND WISC-R FOR SIXTEEN-YEAR-OLD LEARNING DISABLED AND EDUCABLE MENTALLY HANDICAPPED STUDENTS

Abstract approved: Stephen F. Davis

The purpose of the present study was to investigate what relationship exists between the WAIS-R and WISC-R for groups of 16-year-old learning disabled and educable mentally handicapped students. For each group, mean scores on the Verbal, Performance, and Full Scale IQs as well as the subtests were compared to determine correlations and significance of difference between the two intelligence measures.

The sample consisted of 14 learning disabled and 11 educable mentally handicapped sixteen-year-old students from schools in a midwestern rural area and a large midwestern city. Subjects were administered both the WAIS-R and WISC-R in a counterbalanced fashion in order to control for practice effects, with an average 33 day interval between tests.

The results indicated, for learning disabled subjects, a correlation of .86 ($p < .001$) between Full Scale IQs of the two instruments, with similar correlations for the Verbal and Performance IQs. Further analysis revealed that the WISC-R yielded significantly higher mean

Performance ($p < .02$), and Full Scale ($p < .05$) IQs. Correlations between the subtests ranged from .50 for picture arrangement to .86 for vocabulary, and the WISC-R yielded a significantly higher score ($p < .05$) on digit symbol/coding. All other differences were non-significant.

Correlations of .92 ($p < .001$), .67 ($p < .01$), and .91 ($p < .001$) were found between Verbal, Performance, and Full Scale IQs, respectively, for the educable mentally handicapped subjects. The WAIS-R yielded significantly higher ($p < .01$) scores on all three IQ scales. Subtest correlations ranged from .51 for picture completion to .81 for vocabulary. All WAIS-R subtests yielded higher scores than their WISC-R counterparts, with varying significance of differences.

A COMPARISON OF THE WAIS-R AND WISC-R FOR SIXTEEN-YEAR-OLD LEARNING DISABLED AND EDUCABLE MENTALLY HANDICAPPED STUDENTS

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CHAPTER 1

INTRODUCTION

The Wechsler Adult Intelligence Scale-Revised (WAIS-R), published in 1981, marks the third revision of the original Wechsler Bellevue Intelligence Scale (WB-I) developed by David Wechsler in 1939. The original Wechsler-Bellevue was designed to evaluate the intellectual functioning of older children (age five and upward) through adulthood. The WB-I was offered as an alternative to Forms L and M of the Stanford-Binet which had been found to be unsuitable for use with adults. A second version of the Wechsler-Bellevue (WB-II) was developed approximately five years later for use as an alternate instrument in test-retest situations. The WB-II did not receive the wide acceptance that Form I had accomplished, and in 1949 Wechsler modified items from this scale and constructed the Wechsler Intelligence Scale for Children (WISC). The WISC was designed for use with children ages five (5-0-0) through 15 (15-11-30).

The WB-I and WISC overlapped a total of ten years. Thus problems regarding the choice of the proper instrument for use with older children by diagnosticians and other professionals were created. This was especially true when decisions centered around placement of borderline students in special classes. When the Wechsler Adult Intelligence Scale (WAIS) was introduced in 1955, the overlap was eliminated. The WAIS was specifically designed for older adolescents (16-0-0 years and above) and adults. The revised version of the Intelligence Scale for Children (WISC-R) was published in 1974. The WISC-R covers an age

range from 6-0-0 to 16-11-30 years, returning an overlap of one year between the Wechsler test for children and that for adults. That is, either of the two tests can be used to test adolescents ages 16-0-0 to 16-11-30. The new WAIS-R retains the age structure of the WAIS, so the overlap remains.

Studies comparing the WISC and the original WB-I, which was designed to test persons age five and up, produced conflicting results. Delattre and Cole (1952) compared scores for 50 children with IQs ranging from 43 to 132. Mean obtained Full Scale IQs were 106 for the WB-I and 112 for the WISC, with a .87 correlation. Differences in mean Verbal and Performance IQs were 6 points and 5 points respectively, with the WISC resulting in the higher scores. Correlations of .86 for the Verbal scales and .82 for the Performance scales were found.

Vanderhost, Sloan, and Bensberg (1953) compared the two tests for 38 mental defectives ages 11 through 16. The WISC yielded significantly higher mean Verbal scores than the WB-I (mean VIQ = 62 and 58, respectively). Performance and Full Scale IQs were also higher on the WISC, but not significantly so. Correlations were .54, .77, and .72 for the Verbal, Performance, and Full Scales, respectively. Knopf, Murfett, and Milstein (1954) found the Verbal and Full Scale mean scores to be significantly higher for the WISC, but found no significant difference in mean Performance scores. Thirty 14-year-old boys with a more normally distributed IQ range of 79-116 were used in this study.

WB-I and WISC scores were compared for the same 80 subjects at age 11-6-0 and again at age 14-6-0 by Price and Thorne (1955). At both ages, higher mean IQs were obtained on the Verbal and Full Scales of the WISC than the WB-I whereas a higher mean Performance score was found

with the WB-I. The two tests were found to be significantly different for the Verbal Scale at both ages 11-6-0 and 14-6-0 ($p < .01$), and for the Performance Scale at age 11-6-0 ($p < .05$). Insignificant differences were found for the Performance Scale at age 14-6-0 and for the Full Scale at both ages. Full Scale correlations were .95 at age 11-6-0 and .91 at 14-6-0.

The bulk of the research comparing the childrens' and adult versions of the Wechsler tests has employed the WAIS and WISC. For persons of low-level intelligence, a significant and generally consistent difference in attained IQ scores has been found for the same individuals tested with the WAIS and WISC. Fisher (1962) tested 127 institutionalized retardates over a six-year period and found an average ten-point IQ increase from the WISC to the WAIS. An overall correlation of .70 was found between the two instruments.

Twenty black mentally retarded adolescents were tested by Webb (1963) at age 15 with the WISC and again at age 17 using the WAIS. He found an average difference of 11 IQ points favoring the WAIS, with a high .94 correlation, i.e., they rank ordered the individuals almost identically, differing by a constant number of IQ points. In 1964 Webb again published the results of a study using retarded subjects, this time using 16 blacks and 16 whites tested with the WISC at age 14 and the WAIS at 17. Mean differences between the two tests were nine IQ points for blacks and 11 for whites, the WAIS surpassing the WISC; with correlations of .91 and .83, respectively.

Walker and Gross (1970) tested 15 educable mentally retarded students at age 13 with the WISC and again at age 16 using the WAIS. They found an average gain of ten IQ points with the WAIS, and an overall

correlation of .94. Using a counterbalanced design in which one test was administered in the morning and the other in the afternoon, Simpson (1970) tested 120 sixteen-year-olds, classified as slow learners (mean WISC IQ = 82). The WAIS yielded Verbal, Performance, and Full Scale IQs that were 8, 3, and 7 IQ points higher than those on the WISC. Correlations between the two instruments were .76, .73, and .80, respectively.

In a study of 51 institutionalized educable mentally retarded adolescents, Wesner (1973) found the WAIS to yield significantly higher IQ estimates than the WISC, with the highest differential occurring in the Verbal IQ. He did, however, find high correlations (.79 to .90) between the two tests. A smaller study by Lowe, Roberts, and Whidden (1974) involving 13 trainable and educable retarded adolescents revealed very similar results, the WAIS scores being consistently higher than the WISC scores by an average of six IQ points.

In a comparative study using a more normally distributed population of adolescents (mean WISC IQ = 100), Ross and Morledge (1967) tested 30 school children at age 15-11 using the WISC and again one month later using the WAIS. They found essentially comparable scores, with a mean difference of only two IQ points between the two tests favoring the WAIS. A .96 correlation between the two tests was reported.

Quereshi (1968) found a mean difference of five IQ points, favoring the WISC, in a sample of brighter 15-year-olds (mean WISC IQ = 111) using a counterbalanced design to control for practice effects with three months between tests. The largest difference was found in the Performance IQ, where a six-point-average difference was found. A single IQ point difference existed between the two on the Verbal scale. Overall correlation between the two tests was a relatively low .78.

Quereshi and Miller (1970) tested another sample of 72 teens (age 17) in a counterbalanced fashion with an average of one month between tests. This time they found the WAIS IQs to average two IQ points higher than the WISC. The difference, and direction of this difference, was inconsistent between the Verbal and Performance IQs. The average WISC Verbal IQ was two points higher than the WAIS with a correlation of .84, while the average WAIS Performance IQ was seven points higher than the WISC with a lower correlation (.70). Based upon the essentially comparable WAIS and WISC IQ scores found in this study, the authors suggested that the age of transition between the two tests should be 17 rather than 16.

Hannon and Kicklighter (1970) reported that in a sample of 120 16-year-old boys the two tests yielded essentially comparable scores (average WISC IQ = 104; WAIS = 103) with a correlation of .95 for the entire group. However, when the total was divided into low, average and high groups (average WISC IQs = 69, 106, and 132, respectively), only the average group displayed comparable WISC and WAIS IQs. Obtained scores on the WAIS averaged seven IQ points higher than on the WISC for the low group, while WISC scores averaged seven points above the WAIS for the high group.

Murray, Waites, Veldman, and Heatly (1973) compared WISC and WAIS scores for groups of black, white, and Mexican-American delinquent boys (mean WISC IQ = 82). Their investigation found WISC scores to be lower than WAIS scores for all groups, with the difference significantly exaggerated for blacks. It was also reported that the Performance-Verbal difference was twice as large on the WISC as on the WAIS for all groups. Based on this and the previously cited studies, Sattler (1974) concluded that "the WAIS yields IQs that are, on the average, eight

points higher than the WISC IQs in mentally retarded samples. In contrast, WISC IQs tend to be higher than WAIS IQs in samples of bright children."

Surprisingly little research has been done comparing the WAIS with the WISC-R. The WISC-R manual (Wechsler, 1974) cites a study conducted during the WISC-R standardization period in which forty 16-year-old adolescents (21 males, 19 females) were given the WAIS and the WISC-R in counterbalanced order, with an interval of one to three weeks between tests. Subjects were selected according to 1970 Census proportions on the variables of race and occupation of head of household; and were chosen from urban and rural areas in all four geographic regions of the United States. Mean scores obtained on the WAIS for the Verbal, Performance, and Full Scale IQs were 6.3, 5.2, and 6.2 IQ points higher, respectively, than the corresponding WISC-R scores. The correlations between the three scales on the two tests were .96, .83, and .95, respectively. Correlations between subtests ranged from a low .48 for picture arrangement and object assembly to a high .90 for vocabulary. Wechsler (1974) suggested that the differences observed between the WAIS and WISC-R may have resulted from 16-year-olds in the 1970's performing better on the WAIS than did their counterparts two decades earlier when the WAIS was standardized.

In a presentation to a convention of the Council for Exceptional Children, Alcorn (1976) reported the results of a study comparing obtained WAIS and WISC-R scores of mentally retarded 16-year-olds. A total of 25 subjects were tested, 10 white and 15 black; 15 male and 10 female. The scales were administered consecutively with a short rest period between sessions in a counterbalanced fashion. Differences between the

mean IQs obtained on the two tests for the Verbal, Performance, and Full Scales were 14.4, 10.2, and 13.5 IQ points respectively, with higher IQs being shown on the WAIS than on the WISC-R. Differences for blacks were reported to be significantly greater than the differences for whites ($p < .05$) on the Verbal and Full Scales, but not for the Performance scale. Correlations between the two tests were not reported.

Craft and Kronenberger (1979) compared WAIS and WISC-R IQ scores in a group of 30 educable mentally handicapped (WISC-R IQ = 50-80) 16-year-olds (18 males, 12 females). The tests were administered using a counterbalanced design with an average of 37 days elapsing (range = 29-47 days) between administration of the two tests. The *t*-test statistic was used to determine the significance of the difference between the three scales on the two tests. Significant differences ($p < .001$) were shown for all scales. The average difference for the Verbal, Performance, and Full Scales were 12.6, 8.6, and 11.6, respectively, with the WAIS consistently yielding higher IQ scores. Correlations between the two tests were not reported.

Nagle and Lazarus (1979) reported a study involving 30 educable mentally retarded 16-year-old students chosen from public school special education classes. More specifically, the subjects were 20 males and 10 females. Nineteen were black, while eleven were Caucasian. The subjects were administered the WAIS and WISC-R by two female graduate students in a counterbalanced fashion with an average test-retest interval of ten days. One-tailed *t*-tests for related means indicated that the WAIS yielded significantly ($p < .001$) higher Verbal, Performance, and Full Scale IQs than the WISC-R, with an average difference of 13.8, 9.3, and 12.7 IQ points, respectively.

It was also reported that all WAIS subtest scaled scores were significantly higher ($p < .05$) than the corresponding WISC-R subtest with the exception of picture completion. The correlations between each of the three scales on the two tests were .83 for the Verbal scale, .51 for the Performance scale, and .81 for the Full scale. Correlations for the subtest scaled scores ranged from .38 to .87. Comparison of subtest rankings for each instrument yielded a correlation of .86 ($p < .01$), suggesting that the subtest patterns obtained on the WAIS and WISC-R were highly comparable. Discussing their results and those reported by Wechsler (1974), Nagle and Lazarus (1979) concluded that significant discrepancies appear to exist between the WAIS and WISC-R for both intellectually average and subnormal 16-year-old children. However, the magnitude of such differences would appear to be approximately twice as large among EMR children. Given the increased literacy rates and educational levels of adults and adolescents in our society over the past decades, they also agreed with Wechsler's (1974) suggestion that the observed differences may have resulted from 16-year-olds in the 1970's performing better on the WAIS than did 16-year-olds in the 1950's when the WAIS was standardized.

Given the demonstrated nonequivalency between the WAIS and WISC-R and the bearing that this fact has had upon placement decisions regarding mentally handicapped children, it is important that we discover whether or not such a difference still exists between the new WAIS-R and the WISC-R. Wechsler (1981) reports in the WAIS-R manual that 80 sixteen-year-olds were administered the WAIS-R and WISC-R in counterbalanced order with intervals between test administrations from 1 to 6 weeks. Mean IQ differences of 0, 2, and 1 points were reported between the

Verbal, Performance, and Full scales, respectively; with the WISC-R yielding the higher average score. Wechsler (1981) concluded that these very small differences suggest that the WAIS-R and the WISC-R yield equivalent IQs for normal 16-year-olds. Correlations between the three scales on the two tests were .89 for the Verbal scale, .76 for the Performance scale, and .88 for the Full scale. Correlations between subtests ranged from a low .39 for picture arrangement to a high .86 for vocabulary. Because of a lower variability of IQs in this group of subjects than in the WAIS-R standardization group coupled with practice effects influencing IQ scores, it was suggested that the correlations between the two tests were underestimated in this study.

Certainly, Wechsler's (1981) data are encouraging, at least for normals. However, the question of such comparability between the WISC-R and WAIS-R for special education children does not appear to have been addressed. The present study was designed to provide preliminary data on this relationship. More specifically, a group of 14 sixteen-year-old learning disabled and 11 educable mentally handicapped students were administered both the WAIS-R and WISC-R. Individual scores were grouped so that a comparison of mean IQs from the two tests could be made for LD subjects and for EMH subjects. Of further interest were the subtests contained within each scale, which were compared for equivalence for this group of students.

CHAPTER 2

METHOD

Subjects

The sample consisted of 25 sixteen-year-old learning disabled (n = 14; mean WISC-R IQ = 93, range 80-109) and educable mentally handicapped (n = 11; mean WISC-R IQ = 59, range 44-71) students. Fourteen subjects were from a rural setting and eleven from a large midwest urban area. Nine of the subjects were female, and sixteen male. Nine were black, and sixteen Caucasian.

Testing Instruments

Wechsler Adult Intelligence Scale - Revised (WAIS-R). The WAIS-R is composed of eleven tests, six verbal (1. Information, 3. Digit Span, 5. Vocabulary, 7. Arithmetic, 9. Comprehension, and 11. Similarities) and five nonverbal (2. Picture Completion, 4. Picture Arrangement, 6. Block Design, 8. Object Assembly, and 10. Digit Symbol). The verbal and nonverbal tests are administered alternately as numbered above and yield three separate IQ scores--Verbal, Performance, and Full Scale. The WAIS-R is administered individually by a trained examiner in a single session lasting approximately 80 minutes. Following the actual administration, raw scores are determined for each test, which are then converted to scaled scores. The Verbal and Performance scaled scores are summed separately and then together to yield the Full Scale score. Finally, Verbal, Performance, and Full Scale IQs are determined from the

appropriate tables in the WAIS-R manual. Scaled scores for the WAIS-R are based on a reference group of examinees aged 20-34, and are used for all subjects, regardless of age.

Wechsler Intelligence Scale for Children - Revised (WISC-R). Very similar to the WAIS-R in structure, the WISC-R consists of ten mandatory and two supplementary tests, six verbal (1. Information, 3. Similarities, 5. Arithmetic, 7. Vocabulary, 9. Comprehension, and optional 11. Digit Span) and six nonverbal (2. Picture Completion, 4. Picture Arrangement, 6. Block Design, 8. Object Assembly, 10. Coding, and optional 12. Mazes). All WISC-R tests except Mazes correspond with tests included in the WAIS-R. The same administration and scoring procedures are followed for the WISC-R as for the WAIS-R, except that the supplementary Digit Span and Mazes tests are not used in determining IQs with the WISC-R. Scaled scores of the WISC-R differ for each age group.

Procedure

For each school district, permission to conduct research was first obtained from the appropriate administrator. A list of appropriate subjects was then obtained from school psychologists. A letter explaining the project and requesting permission to test the student was then mailed to parents. Those students for whom permission was granted were then tested. In order to control for practice effects, the WAIS-R and WISC-R were administered in counterbalanced order--one student was administered the WAIS-R and then the WISC-R; the next was administered the WISC-R and then the WAIS-R; and so forth. The interval between testings ranged from 4 to 125 days, with a median interval of 33 days. In three instances, students had recently been administered the WISC-R

by a school psychologist. In these instances, the WAIS-R was the only test administered, and scores from the already completed WISC-R were used.

CHAPTER 3

RESULTS

The WAIS-R and WISC-R scores of the 14 learning disabled students and the 11 educable mentally handicapped students were compared separately on each of the ten subtests and on the Verbal, Performance, and Full IQ Scales. The digit span subtest, which is not used in calculating IQ scores on the WISC-R, was not calculated. For purposes of clarity, the mean and standard deviation values of these test scores are shown in Table 1 for LD subjects, and Table 2 for EMH subjects. These tables are presented in the Appendix. Means, standard deviations, and differences are in scaled-score units for the subtests and in IQ units for the Verbal, Performance, and Full Scale IQs.

Mean Verbal, Performance, and Full Scale IQs for the LD students were 88.57, 93.36, and 89.86, respectively, on the WAIS-R; and 89.00, 99.64, and 93.29 for the WISC-R. Mean differences between the two instruments for these subjects were .43 IQ point for the Verbal Scale, 6.29 on the Performance Scale, and 3.57 for the Full Scale. In each instance, the WISC-R resulted in the higher IQ score.

The results of non-directional t-tests used to determine significance of difference between related means indicate that for the LD students, there was no significant difference between the two instruments on the Verbal IQ, $t(13) = .27$, as shown in Table 1. WISC-R IQ scores were significantly higher than the WAIS-R for the Performance, $t(13) = 2.71$, $p < .02$, and Full, $t(13) = 2.22$, $p < .05$, Scales. This

would mean that for this sample of LD students, the Verbal IQs from the two instruments were essentially equivalent. However, the Performance and Full Scale IQs were not equivalent; the WISC-R resulting in an average Performance IQ 6.29 points higher than the WAIS-R, and an average 3.57 points higher on the Full Scale.

In order to conduct *t*-test analyses comparing each WAIS-R subtest with its WISC-R counterpart, WAIS-R subtest raw scores were first converted to age-scaled scores. As pointed out by Wechsler (1981), scaled scores for the WAIS-R and WISC-R are not comparable. The use of age-scaled scores results in different means and standard deviations for the *t*-test analyses than are used with scaled scores for use with correlation analysis. Means and standard deviations for the subtests are presented in Table 1 and Table 2 for both age-scaled scores and scaled scores for the WAIS-R. It should be noted that this difference does not affect Verbal, Performance, and Full Scale analyses, since these are based on IQ units rather than scaled score units.

For the LD group, the *t*-test revealed no significant differences between the subtests, except for the digit symbol/coding subtest, $t(13) = 2.59$, $p < .05$, with the WISC-R resulting in a mean score 1.28 points higher than the WAIS-R. An examination of the *t* values for the Performance Scale subtests in Table 1 illustrates the relative weight each contributed to the significantly higher WISC-R Performance IQ.

To assess more fully the comparability of the WAIS-R and WISC-R, a Pearson product-moment coefficient of correlation was computed for each corresponding IQ and subtest score. The coefficients for the LD group are also presented in Table 1. As shown in the table, the WAIS-R and WISC-R Verbal, Performance, and Full Scale IQs were all significantly

related. The correlations were $r = .87$, $p < .001$ for the Verbal IQ; $r = .81$, $p < .001$ for the Performance IQ; and $r = .86$, $p < .001$ for the Full Scale IQ. Correlations for the subtest scaled scores ranged from .50 to .86 for the LD group, with all correlations reaching significance, $p < .01$ or $p < .001$, except for picture arrangement, which was not significantly correlated.

For the EMH group, as shown in Table 2, mean IQ scores were 71.64 WAIS-R and 59.73 WISC-R on the Verbal Scales. Performance scores were 71.91 and 64.45 for the WAIS-R and WISC-R, respectively, with 70.91 and 59.00 for the Full Scale. The t-tests revealed that the two instruments resulted in significantly different mean scores on all three IQs for the EMH group, with the WAIS-R resulting in higher IQ scores in each instance. The mean WAIS-R Verbal IQ was 11.91 points higher, $t(10) = 8.44$, $p < .001$, than its corresponding WISC-R IQ. WAIS-R Performance and Full Scale IQs were 7.46, $t(10) = 3.43$, $p < .01$, and 11.91, $t(10) = 7.08$, $p < .001$, than its corresponding WISC-R IQ. WAIS-R age-scale scored subtests for the EMH group were found to be significantly higher than their WISC-R counterparts in all instances except for arithmetic and object assembly. In these two instances, the WAIS-R did result in the higher score, but not significantly so.

Correlations presented in Table 2 for the three IQs were $r = .92$, $p < .001$; $r = .67$, $p < .01$; $r = .91$, $p < .001$ for the Verbal, Performance, and Full Scales, respectively. Correlations for the subtest scaled scores ranged from a non-significant low .49 for similarities to a high .81 ($p < .001$) for vocabulary. The correlation for picture completion was also not significant.

CHAPTER 4

DISCUSSION

The WISC-R resulted in a higher mean Full Scale IQ than the WAIS-R by approximately $3\frac{1}{2}$ points for the learning disabled group (mean WISC-R = 93, range 80-109). The mean WISC-R Performance IQ was 6 points higher than the WAIS-R, and there was no significant difference between the mean Verbal IQs of the two instruments. No previous research comparing the adult and children's Wechsler intelligence tests has included learning disabled subjects, therefore a comparison to previous results is not possible with this group of subjects. However, a comparison of the present results with those of Wechsler (1981), involving a normal population, may prove enlightening.

Wechsler found insignificant differences in mean IQs of 0, 2, and 1 points, respectively, between the Verbal, Performance, and Full Scale IQs on the two instruments, with the WISC-R resulting in the higher Performance and Full Scale IQs. The present LD group obtained mean WISC-R IQs 0, 6, and 3 points, respectively, higher than WAIS-R IQs. It appears that the pattern is the same for both samples, but that the LD group differences are three times that of the normal group.

In his comparison, Wechsler found the picture arrangement subtest to have the lowest correlation, and vocabulary the highest. The present study also found picture arrangement to be the least correlated, and vocabulary the highest. Within the Performance Scale, the block design

subtest was found to be the most highly correlated by both Wechsler and the present study.

School psychologists examine the extent of discrepancy between a student's Verbal and Performance IQs on the Wechsler as a tool in determining the presence of a learning disability. Differences of nine points between the two IQ scales are considered to evidence the existence of a disability (Satler, 1982). The vast majority of diagnosed learning disabilities involve a higher Performance IQ than Verbal IQ (P>V), as was the case in the present study. Using the nine-point discrepancy criteria with the mean obtained scores of the present LD group, the WAIS-R would not evidence the presence of learning disability, since there is less than five points separating the mean Performance and Verbal IQs. The mean WISC-R scores do, however, evidence the existence of learning disability, as indicated by a mean Performance IQ ten points greater than the mean Verbal IQ. As a diagnostic instrument, it appears that the WISC-R may be more discriminating of differences in the psychophysiological processes involved in learning disabilities. This may be due in part to the fact that the WISC-R is standardized on groups whose age spans only four months, as opposed to the WAIS-R, standardized on groups with age spans of two years or more.

Differences between WAIS-R age-scaled scores and WISC-R scaled scores were non-significant, with the exception of digit symbol/coding. With this subtest, the WISC-R yielded the higher mean score. Possibly specific to the LD group, administration procedures of the two tests may have influenced the differences. Examinees are allowed 90 seconds to complete as many items as possible on the WAIS-R digit symbol, while they are allowed 120 seconds on the WISC-R coding subtest. Aside from

the obvious increase in completed items allowed by the extra time, learning disabled students, who can be conceived of as having a perceptual processing deficit (Satler, 1982), may be able to overcome partially that deficit in the extra time allowed by the WISC-R. In other words, the LD students may take longer to coordinate and focus their effort, but be able to make up partially the lost ground if allowed to continue long enough.

The above conclusions are of course preliminary, but it does appear that the WISC-R may be more useful in determining the existence of a learning disability. As a practical matter, the WISC-R would be the instrument of choice for 16-year-old LD students, since learning disabilities are first diagnosed at a much earlier age, when the WISC-R is the only appropriate Wechsler test.

It can be noted that although significant differences did appear between the WAIS-R and WISC-R for the LD students, the IQs resulting from the two tests were highly correlated. So it may be said that they measure intelligence in a very similar fashion, even for LD subjects.

Results from the present study suggest that a similar relationship exists between the WAIS-R and WISC-R for educable mentally handicapped students as existed between the WAIS and WISC-R and, indeed, the WAIS and WISC. Beginning with comparisons of WAIS and WISC using 16-year-old EMH children, virtually all studies have found the adult Wechsler test to result in significantly higher IQ scores than the children's test. Differences favoring the WAIS in comparison to the WISC ranged from six Full Scale IQ points (Lowe, et. al., 1974) to 11 points (Webb, 1963).

Also consistent with past research comparing the WAIS and WISC-R with samples of educable mentally handicapped students (Alcorn, 1976;

Craft and Kronenberger, 1976; Nagle and Lazarus, 1979), the present comparison of the WAIS-R and WISC-R resulted in significantly higher WAIS-R mean IQs. The lower correlation of the Performance IQs is also consistent with the previous studies. This phenomenon is likely due in part to the lower reliability reported by Wechsler (1974, 1981) for the Performance Scales of both instruments. Subtest correlations are also generally consistent with previous findings, with picture completion displaying the lowest correlation and vocabulary the highest. The fact that similarities, a Verbal Scale subtest, was also insignificantly correlated in this study may reflect the homogeneous nature of the EMH group, as illustrated by a 1.1 WAIS-R standard deviation for similarities of the present EMH group compared to a standard deviation of 2.7 in the Wechsler (1981) study. As noted in Hinkle, Wiersma and Jurs (1979), the more restricted the spread of scores (the more homogeneous), the lower the correlation.

The present study did not address the issue of comparability between the WAIS-R and WISC-R for intellectually average and superior students. Hannon and Kicklighter (1970) and Sattler (1974) concluded that the WAIS tended to yield higher IQs for mentally handicapped students, the two instruments were comparable for average subjects, while WISC IQs tended to be higher for bright children. The studies of Wechsler (1974) and Nagle and Lazarus (1979) evince that the WAIS resulted in significantly higher IQs than the WISC-R for both intellectually average and subnormal 16-year-olds, with the difference about twice as large for EMH children. Wechsler (1981) has concluded that the WAIS-R and WISC-R are equivalent for normal 16-year-olds. A larger sample of 16-year-old children divided into high, average, and low intellectual functioning would

provide the most ideal condition in which to compare the WAIS-R and WISC-R for the entire spectrum of intellectual functioning which these instruments are designed to measure.

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APPENDIX: TABLES

Table 1

t-Score Values of WAIS-R Age-Scaled Scores and WISC-R Scaled Scores, Coefficients of Correlation of Scaled Scores on the WAIS-R and WISC-R, and *t*-Score Values and Coefficients of Correlation with WAIS-R and WISC-R IQs for Learning Disabled Students, Age 16, Tested with Both Instruments

Test	WAIS-R		WISC-R		Diff	*t*'	r^2
	Mean	SD	Mean	SD			
Information	7.43'	1.78			.28	1.17N.S.	
	5.85[2]	1.51	7.71	1.44			.83****
Vocabulary	7.64	2.20			.14	.46N.S.	
	5.79	1.67	7.50	1.74			.86****
Arithmetic	9.36	3.00			.22	.37N.S.	
	8.07	2.37	9.14	2.71			.74****
Comprehension	8.00	3.01			.43	.79N.S.	
	6.64	2.59	8.43	3.11			.80****
Similarities	9.00	2.45			.43	.79N.S.	
	7.64	2.17	8.57	2.90			.76****
Picture Completion	10.64	2.56			.79	1.32N.S.	
	9.86	2.28	11.43	2.65			.66***
Picture Arrangement	10.21	3.70			.50	.59N.S.	
	9.21	3.23	10.71	1.90			.50N.S.
Block Design	9.50	2.85			.43	.92N.S.	
	9.14	2.54	9.93	3.17			.84****
Object Assembly	9.29	2.58			.07	.11N.S.	
	8.50	2.41	9.36	2.53			.60**
Digit Symbol/Coding	7.36	1.45			1.28	2.59*	
	7.21	1.48	8.64	2.40			.65***
Verbal IQ	88.57	9.48	89.00	11.11	.43	.27N.S.	.87****
Performance IQ	93.36	11.78	99.64	12.82	6.29	2.71**	.81****
Full Scale IQ	89.86	10.37	93.29	11.45	3.57	2.22*	.86****

*$p < .05$
**$p < .02$
***$p < .01$
****$p < .001$

'*t*-score values for the subtests are based on WAIS-R age-scaled scores, which are not used for determining IQs, and WISC-R scaled scores.

[2]*r* values for the subtests are based on scaled scores from both instruments.

Table 2

t-Score Values of WAIS-R Age-Scaled Scores and WISC-R Scaled Scores, Coefficients of Correlation of Scaled Scores on the WAIS-R and WISC-R, and t-Score Values and Coefficients of Correlation with WAIS-R and WISC-R IQs for Educable Mentally Handicapped Students, Age 16, Tested with Both Instruments

Test	WAIS-R Mean	WAIS-R SD	WISC-R Mean	WISC-R SD	Diff	t'	r^2
Information	5.00[1]	1.55			1.82	4.82****	
	3.18[2]	1.47	3.18	1.83			.73***
Vocabulary	4.82	1.33			1.09	2.78**	
	3.64	1.21	3.73	1.95			.81****
Arithmetic	5.64	1.57			.91	1.71N.S.	
	5.00	1.41	4.73	2.28			.80****
Comprehension	5.18	1.72			2.09	5.33****	
	4.09	1.30	3.09	1.04			.73***
Similarities	5.18	1.08			1.73	3.41***	
	4.27	1.01	3.45	1.97			.52N.S.
Picture Completion	6.27	2.15			1.54	2.23*	
	5.82	1.89	4.73	2.33			.51N.S.
Picture Arrangement	6.91	2.70			1.64	2.57*	
	6.27	2.61	5.27	3.47			.75***
Block Design	5.00	1.26			1.73	4.81****	
	4.91	1.30	3.27	1.79			.70***
Object Assembly	5.54	1.69			.27	.67N.S.	
	4.82	1.60	5.27	1.42			.73***
Digit Symbol/Coding	5.82	1.78			1.37	2.89**	
	5.64	1.91	4.45	2.46			.76***
Verbal IQ	71.64	5.54	59.73	8.71	11.91	8.44****	.92****
Performance IQ	71.91	6.86	64.45	9.36	7.46	3.43***	.67***
Full Scale IQ	70.91	5.34	59.00	9.31	11.91	7.08****	.91****

*$p < .05$
**$p < .02$
***$p < .01$
****$p < .001$

[1] t-score values for the subtests are based on WAIS-R age-scaled scores, which are not used for determining IQs, and WISC-R scaled scores.

[2] r values for the subtests are based on scaled scores from both instruments.