THE VALIDITY OF THE INFORMATION AND VOCABULARY SUBTESTS OF THE WAIS

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Performed an analysis of published data on the WAIS to ascertain whether the highly reliable Information and Vocabulary subtests can function as measures of intelligence in their own right. The median criterion-related validity coefficients of these two subtests were found to be .38. The Verbal and Full Scale IQs had median validity coefficients that surprisingly were not appreciably higher (.41 and .38, respectively). It was concluded that the addition of more WAIS subtests to a battery that already includes Information or Vocabulary will not result in any increase in predictive validity and that these additional tests, therefore, lack incremental validity.

The development of a short and valid measure of intelligence long has been a grail of psychologists. Consequently, numerous efforts have been made to devise a short form of the Wechsler Adult Intelligence Scale (WAIS) (Matarazzo, 1972, pp. 252-255). An abbreviated WAIS usually consists of a few subtests, from which a Full Scale IQ score is estimated (e.g., Silverstein, 1970). No conclusive attempts have been made to ascertain the validity of single WAIS subtests as IQ indicators. This is particularly surprising because there is cogent evidence that two WAIS tests, Information (Info) and Vocabulary (Voc), have excellent potential as intelligence measures in their own right.

Split-half reliabilities in three age groupings in the WAIS standardization sample range from .91 to .96, which compares favorably with the .93 through .97 reliabilities of the WAIS IQs (Wechsler, 1955). Info and Voc are also the most stable subtests, with test-retest reliabilities in the .75 to .90 range in clinical (Wagner & Caldwell, 1979) and nonclinical (Matarazzo, Wiens, Matarazzo, & Manaugh, 1973) samples. (The corresponding range for the three IQ scores is .84 to .91). The correlation between each subtest and the Full Scale IQ is in the mid .80s, which is as high as the correlation between the WAIS and the Stanford-Binet (Wechsler, 1955). Furthermore, Cohen (1957) reported factor loadings of Info and Voc on *g* that range from .66 to .86 (Mdn = .82) across four age groupings of the WAIS standardization sample. Wallbrown, Blaha, and Wherry (1974) replicated this finding and also concluded, "All subtests provided relatively good measures of *g* but Vocabulary and Information were consistently best [p. 55]."

The intent of the present paper is to determine the validity of Info and Voc as intelligence tests. Equally important is the calculation of the amount of increased validity obtained when all 11 subtests are administered instead of a single subtest. If one cannot obtain higher validity by using more subtests, the additional subtests lack incremental validity (Sechrest, 1963) and their administration is superfluous.

Evaluations of validity of Info and Voc will be conducted through examination of the correlates of these subscale scores. These will include correlations with other standardized ability measures (verbal and nonverbal) and also with extratest manifestations of intelligence (e.g., scholastic achievement and attainment). The emphasis, however, will be on "comparative" validity. This paper will not be concerned with reviewing the validity of the WAIS Verbal, Performance, and Full Scale IQ scores. That task has been accomplished adequately by Wechsler (1958) and Matarazzo (1972), and it was concluded that these measures are valid. Fortunately, in most studies in which validity coefficients were reported for Info

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TABLE 1

WAIS VALIDITY COEFFICIENTS: VERBAL TEST CRITERIA

Criterion	*N*	VIQ[a]	PIQ[a]	FIQ[a]	Info[a]	Voc[a]
ACT Composite[a] (Steinberg, Segel, & Levine, 1967)	84	.71***	—[b]	—	.51***	.56***
Full Range Picture Vocabulary Test (Medians of six coefficients[c])	243	.84***	.54***	.76***	.83***	.85***
Geriatric Interpersonal Evaluation Scale (Smith, Oswald, & Waterman, 1977)	27	.80***	—	—	.74***	.67***
Peabody Picture Vocabulary Test (Bonner & Belden, 1970)	31	.67***	.35*	.58***	.50**	.67***
Quick Test (Medians of 10 coefficients[d])	716	.82***	.56***	.78***	.82***	.83***
SAT Verbal[a] (Bailey & Federman, 1979)	45	—	—	—	—	.73***
Stanford-Binet L-M (Kennedy, Willcutt, & Smith, 1963)	130	.60***	NS[e]	.45***	.45***	.54***
Wide Range Achievement Test, Reading[f] (Graham & Kamano, 1958)	68	—	—	—	.68***	.82***
Number of *r*s		6	4	4	7	8
Median		.76	.44	.67	.68	.70

[a]VIQ = Verbal IQ; PIQ = Performance IQ; FIQ = Full Scale IQ; Info = Information; Voc = Vocabulary; ACT = American College Test; SAT = Scholastic Aptitude Test.
[b]Not administered or not reported.
[c]Only one validity coefficient for Info, $N = 54$.
[d]Seven validity coefficients for Info, $N = 580$.
[e]Not significant.
[f]"Unsuccessful readers" vs. "successful readers."

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

and Voc, the coefficients of the three IQs also are presented, and these can serve as references for gauging the validity of single subtests. Only if the average validity of Info or Voc is comparable to that of the Verbal or Full Scale scores can either or both subtests serve as an acceptable substitute for most purposes.

METHOD

Subjects

*S*s were participants in WAIS research over the past 25 years. Thus, the results can be seen as representative of the groups in which the WAIS is used frequently.

WAIS

All groups completed at minimum the Voc subtest. The majority of groups were administered all 11 WAIS tests and other intelligence scales as part of comprehensive test batteries.

Procedure

It was neither feasible nor necessary to review all of the 1291 articles on the WAIS listed in the Buros reviews (Buros, 1975, 1978). All major papers concerned

with WAIS validation, however, were surveyed. Unfortunately, the vast majority of validity studies limit presented coefficients to the three IQ scores. Only the small fraction of the WAIS literature in which subtest results were reported could be included in the present analysis.

Any validity coefficients were noted, along with the comparative validities of the Verbal, Performance, and Full Scale IQs when reported. These coefficients were grouped under two categories, concurrent validity (correlations with other tests) and criterion-related validity (correlations with scholastic grades, performance ratings, etc.). When validity results were reported as *t*-tests, the critical ratios were converted to point-biserial correlations to present evidence of the magnitude of validity and to facilitate comparisons with Pearson product-moment correlations. When more than one validity coefficient was found for a test criterion, only the median was recorded. Concurrent validity criteria were dichotomized into verbal and nonverbal scales. The relationships between five WAIS measures and verbal test scores, nonverbal test scores, and behavioral measures of intelligence were examined.

Results

Verbal Test Validity

Table 1 presents the correlations between the WAIS and several tests of verbal ability. It was observed that the Verbal IQ is the best predictor of verbal intelligence test scores (Mdn validity coefficient = .76). The Full Scale IQ, Info, and Voc had slightly lower validity (Mdn coefficients of .67–.70). The lowest median validity coefficient (.44) was for the WAIS Performance scale.

TABLE 2

WAIS Validity Coefficients: Nonverbal Test Criteria

Criterion	*N*	VIQ[a]	PIQ[a]	FIQ[a]	Info[a]	Voc[a]
Bender Gestalt (Alyaian & Meltzer, 1962)	127	.48***	.57***	.56***	.44[b]***	.48***
Bender Gestalt Recall (Armentrout, 1976)	111	.34***	.52***	.44***	.25*	.28**
Category Test (Lin & Rennick, 1974[c])	239	.60***	.54***	.62***	.52***	.50***
Knox Cubes (Silberberg & Bourestom, 1968)	327[d]	.50***	.60***	.60***	.34**	.28***
Raven's Modified Matrices (Hall, 1957)	82	.58***	.71***	.72***	.51***	.48***
SRA Non-Verbal Test AH (Holden, Mendelson, & DeVault, 1966)	29	.76***	.81***	.81***	—[e]	.77***
Number of *r*s		6	6	6	5	6
Median		.54	.58	.61	.44	.48

[a]VIQ = Verbal IQ; PIQ = Performance IQ; FIQ = Full Scale IQ; Info = Information; Voc = Vocabulary.

[b]Reported as falling in .40 to .47 range, assumed to be median.

[c]Results reported for two samples; presented data are medians of two validity coefficients.

[d]Results reported for four samples: Three coefficients for PIQ (N = 227) and FIQ (N = 273), two for VIQ (N = 173) and Voc (N = 168), and one for Info (N = 68). Data presented are medians (except for Info).

[e]Not reported.

*p <.05.
**p <.01.
***p <.001.

Nonverbal Test Validity

Table 2 reports the correlations between the WAIS scores and a variety of nonverbal intelligence measures. The Performance and Full Scale IQs had the highest median validity coefficients (about .60). Verbal IQ, Info, and Voc had moderately lower validity (median coefficients of about .50).

Criterion-related Validity

Few ability scales are constructed or used for the purpose of predicting scores on other intelligence tests. Thus, criterion-related validity, or the ability of a test to estimate intelligence as manifested in "real life" behavior, is of paramount importance. ("Intellectual criteria" will be defined here to subsume any behavior about which a valid IQ test might be used for predictive purposes.) Table 3 reports the validity of Info and Voc in terms of the prediction of nontest criteria, including academic achievement, education attained, employability, job performance, and clinicians' ratings of intelligence. The results strongly suggest that Verbal IQ, Full Scale IQ, Info, and Voc predict intelligent behavior with equal

TABLE 3

WAIS VALIDITY COEFFICIENTS: CRITERION-RELATED VALIDITY

Criterion	*N*	VIQ[a]	PIQ[a]	FIQ[a]	Info[a]	Voc[a]
Clinicians' Ratings: Normals (Sperber & Alderstein, 1961)	30[b]	—[c]	—	.72[d]***	—	.76[d]***
Education Attained (Wechsler, 1958[e])	800	.69***	.60***	.69***	.66***	.65***
Employability: Normals[f] (Lowe, 1967)	85[g]	NS[h]	*ns*	*ns*	*ns*	*ns*
Employability: Retardates[f] (Kaufman, 1970)	71	.33**	*ns*	.32**	.33**	*ns*
Grades: College (Conry & Plant, 1965)	335	.45***	.24***	.43***	.48***	.46***
Grades: College (Jex, 1975)	50	.41**	*ns*	.38**	—	.38**
Grades: College (Steinberg, Segel, & Levine, 1967)	84	.51***	—	—	.43***	.38***
Grades: College (Bailey & Federman, 1979)	89	—	—	—	—	.45***
Grades: High School (Conry & Plant, 1965)	98	.63***	.43***	.62***	.54***	.65***
Grades: Nursing (Burgess & Duffey, 1969; Burgess, Duffey, & Temple, 1972[i])	293	.24***	*ns*	.14*	.17**	.31***
Job Performance (Wechsler, 1958)	39	.32*	*ns*	*ns*	*ns*	*ns*
Number of *r*s		9	8	9	8	11
Median		.41	*ns*	.38	.38	.38

[a]VIQ = Verbal IQ; PIQ = Performance IQ; FIQ = Full Scale IQ; Info = Information; Voc = Vocabulary.
[b]*N* = 29 for FIQ.
[c]Not administered or not reported.
[d]Medians of five validity coefficients.
[e]WAIS standardization sample data: Medians of coefficients from three age groupings (18-19, 25-34, 45-54).
[f]Unemployed = 0, Employed = 1.
[g]VIQ: *N* = 83; PIQ: *N* = 70; FIQ: *N* = 71; Voc: *N* = 60.
[h]Not significant.
[i]Medians of four correlation coefficients obtained from samples drawn from the same population.

precision; the median validity coefficients fall in the .38 to .41 range. Interestingly, the median criterion-related validity coefficient of WAIS Performance was not statistically significant.

Discussion

The results almost unequivocally indicate that the Info and Voc subtests individually are as valid as the Verbal and Full Scale scores and considerably better than the Performance IQ. Each of these subtests takes only minutes to administer, and neither requires any testing materials other than the WAIS manual and Record Forms.

Once a test battery includes Info or Voc, adding more WAIS subtests will not result in any increase in the validity of the IQ score obtained. When one is concerned solely with recording a single objective global measure of an individual's intellectual ability, the administration of 11 WAIS subtests appears to be inadvisable. As a revised WAIS is about to be published, there inevitably will be a spate of validity studies on the revision. Authors who use the new scale are exhorted to publish validity coefficients of the Info and Voc subtests as well as the correlates of the Verbal, Performance, and Full Scale IQ scores.

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WISC-R: AN ABBREVIATED VERSION

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Analyzed a total of 400 WISC-R protocols with a stepwise multiple regression in order to determine whether an abbreviated form of this instrument could be identified that would be cost-effective. Subsamples of the data that represent different age, sex, and examiner groups were analyzed independently as well as together as a single total sample. No significant differences between subsamples were found. Results indicate that the derived prediction equation could be applied to the results of five designated WISC-R subtests to predict range of intellectual functioning with acceptable accuracy, thereby reducing test administration and scoring time by one-half.

The Wechsler Intelligence Scale for Children (WISC) was developed (Wechsler, 1949) and revised by David Wechsler (WISC-R) in 1972 (Wechsler, 1974). In the revised edition, many of the items that were ambiguous, obsolete, or differentially unfair to particular groups of children were modified or eliminated, and the order of subtest administration was altered. In addition, there were changes in the standardization sample such as the inclusion of a proportional representation of nonwhites. Although the WISC-R is the most widely used measure of intelligence, it is costly in terms of human resources to administer and score. Even so, the WISC-R is used today routinely within most school systems in both initial and re-evaluation procedures for special education programs. In accordance with Federal regulations, children in special education programs must be re-evaluated at least every 3 years (P.L. 94-142). Children classified as Slow Learners (SL) or who previously scored in the mentally retarded (MR) range must be given an updated intellectual evaluation. The purpose of reassessment in such cases is to determine the child's current range of intellectual functioning and to determine whether his current placement is the most appropriate. Because only the range within which the full scale IQ (FSIQ) falls, e.g. SL, MR, etc. is required for this purpose, it is likely that an abbreviated form of the WISC-R could be constructed thereby increasing the cost-effectiveness in these instances.

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