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# WAIS-R short-forms: Criterion validity in healthy and clinical samples

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Regression equations developed by Crawford, Allan & Jack (1992) to estimate full-length WAIS-R IQs from seven short-forms were evaluated in healthy *(N* — 153) and neurological (N = 471) cross-validation samples. In the healthy sample the correlations between the short-forms and full-length IQs did not differ significantly from those obtained by Crawford *et al.* (1992). In the neurological sample the six- and seven-subtest short-forms, proposed by Crawford *et at.* (1992) and Warrington, James & Maciejewski (1986) respectively, differed from the other short-forms in that they had significantly higher criterion validity coefficients and did not systematically under- or overestimate IQs.

Crawford *et al.* (1992) developed regression equations in a healthy sample to predict full-length WAIS-R IQs from seven short-forms. A list of the subtest combinations used in the short-forms along with the authors originally proposing them is presented in Table 1. In the present study the criterion validity of these short-forms was examined in healthy and neurological cross-validation samples.

The healthy sample consisted of 153 participants (80 females, 73 males), free of neurological or psychiatric disability. Mean age was 39.5 years (SD = 13.7), range 18 to 84 years, and mean years of education was 12.8 (SD = 2.9). A neurological sample of 471 participants (295 male, 176 females) was recruited from six neuropsychology services. Mean age was 41.8 years (SD = 17.5), range 16 to 90 years. Mean years of education was 11.3 (SD = 2.1). Reflecting their high prevalence, traumatic brain injuries (49.5 per cent), dementing illnesses (15.1 per cent) and cerebrovascular accidents (8.7 per cent) had the greatest representation (fuller details of this sample are included in an expanded report available from the first author). All participants completed a full-length UK WAIS-R (Lea, 1986; Wechsler, 1981). For each short-form the age-graded scaled scores of the relevant subtests were summed and entered into Crawford *et* a/.'s (1992) regression equations.

The mean scores and SDs *fot full-length* WAIS-R IQs in the two samples are presented at the foot of Table 1. The correlations between short-form IQs and full-lengths IQs in both samples are also

* Requests for reprints. An extended report is also available.

**Table 1.** Mean short-form estimated IQs in healthy ($N = 153$) and neurological ($N = 471$) samples and correlations with full-length IQs

| | Healthy sample ($N = 153$) | | | Clinical sample ($N = 471$) | | | |
|---|---|---|---|---|---|---|---|
| Short-form | $r$ | Mean | SD | $r$ | Mean | SD | SF-FL |
| Silverstein (1982) | | | | | | | |
| FSIQ | .89 | 104.9 | 12.44 | .93 | 91.1 | 14.31 | 4.1 |
| VIQ (V) | .86 | 106.1 | 12.41 | .88 | 94.8 | 13.06 | 5.2 |
| PIQ (BD) | .82 | 102.5 | 10.21 | .88 | 92.3 | 12.51 | 7.2 |
| Silverstein (1982) | | | | | | | |
| FSIQ | .94 | 105.0 | 12.97 | .96 | 86.7 | 16.13 | −0.3 |
| VIQ (V, A) | .93 | 105.3 | 13.10 | .94 | 89.5 | 15.11 | −0.1 |
| PIQ (BD, PA) | .90 | 103.8 | 11.88 | .93 | 87.8 | 15.20 | 2.7 |
| Reynolds, Wilson & Clark (1983) | | | | | | | |
| FSIQ | .92 | 103.6 | 11.96 | .95 | 87.9 | 15.98 | 0.9 |
| VIQ (I, A) | .90 | 104.0 | 11.54 | .92 | 90.2 | 13.77 | 0.6 |
| PIQ (BD, PC) | .89 | 102.3 | 11.19 | .94 | 89.6 | 15.24 | 4.5 |
| Britton & Savage (1966) | | | | | | | |
| FSIQ | .92 | 106.0 | 12.50 | .95 | 90.2 | 16.96 | 3.2 |
| VIQ (V, C) | .87 | 106.6 | 11.57 | .93 | 93.9 | 14.58 | 4.3 |
| PIQ (BD, OA) | .87 | 103.6 | 12.24 | .92 | 90.7 | 15.98 | 5.6 |
| Crawford *et al.* (1992) | | | | | | | |
| FSIQ | .91 | 106.4 | 12.04 | .94 | 90.7 | 17.15 | 3.7 |
| VIQ (C, S) | .85 | 107.5 | 10.79 | .92 | 94.4 | 15.31 | 4.8 |
| PIQ (BD, OA) | .87 | 103.6 | 12.24 | .92 | 90.7 | 15.98 | 5.6 |
| Crawford *et al.* (1992) | | | | | | | |
| FSIQ | .95 | 106.3 | 12.88 | .96 | 87.1 | 17.08 | 0.1 |
| VIQ (C, S, A) | .93 | 106.9 | 11.98 | .96 | 90.3 | 16.74 | 0.7 |
| PIQ (BD, OA, PA) | .94 | 104.2 | 13.02 | .95 | 87.0 | 17.54 | 1.9 |
| Warrington *et al.* (1986) | | | | | | | |
| FSIQ | .97 | 105.4 | 12.81 | .97 | 86.3 | 16.77 | −0.7 |
| VIQ (V, DS, A, S) | .97 | 106.1 | 13.22 | .97 | 88.1 | 15.81 | −1.5 |
| PIQ (BD, PC, PA) | .94 | 103.4 | 11.71 | .96 | 87.3 | 16.07 | 2.2 |
| Full-length IQs | | | | | | | |
| FSIQ | — | 106.3 | 14.04 | — | 87.0 | 15.79 | — |
| VIQ | — | 106.6 | 13.71 | — | 89.6 | 15.51 | — |
| PIQ | — | 104.7 | 13.93 | — | 85.1 | 16.10 | — |

*Key.* SF = Short-form; FL = Full-length, FSIQ = Full-Scale IQ; VIQ = Verbal IQ; PIQ = Performance IQ; V = Vocabulary; BD = Block Design; A = Arithmetic; PA = Picture Arrangement; I = Information; PC = Picture Completion; OA = Object Assembly; C = Comprehension; S = Similarities; DS = Digit Span.

presented in Table 1 (/> < .001 for all coefficients). The correlations in the present healthy sample were compared with those obtained by Crawford *et al.* (1992) by converting both sets of coefficients to Fisher's ^ scores and testing for a significant difference between the relevant pairs. Setting alpha at .025 (as multiple comparisons were involved) none of the pairs of coefficients differed significantly. In the present healthy sample there was a close correspondence between the short-form and full-length mean IQs (see Table 1); i.e. the short-forms did not systematically under- or overestimate full-length IQs to any great extent. These cross-validation results suggest that Crawford *et al.'?,* (1992) regression equations will provide highly stable estimates of full-length IQs in individuals for whom the presence of cognitive impairment is not at issue.

William's (1959) test for dependent correlations was used to determine if there were significant differences between the seven short-forms in terms of their criterion validity in the neurological sample.

The Warrington *et al.* (1986) seven-subtest short-form and the Crawford *et al.* (1992) six-subtest short-form had significantly higher correlations with full-length IQs (Full-Scale, Verbal and Performance) than any of the other short-forms ($p < .01$ for all comparisons). The mean discrepancies between short-form and full length IQs in the neurological sample are presented in the final column of Table 1. Many of the short-forms systematically overestimated full-length IQs to a degree that would be of concern in clinical practice. The Silverstein (1982) two-subtest short-form produced particularly large discrepancies; e.g. the mean difference between estimated and obtained Performance IQ approached half an IQ standard deviation. However, with the exception of the Silverstein four-subtest short-form, all four-subtest short-forms also exhibited substantial discrepancies; these approached or exceeded five IQ points (i.e. 1/3 of an SD) on one or other of the IQ scales.

The results in the neurological sample have clear implications for the use of short-forms in clients who are known or suspected to be cognitively impaired. The six- and seven-subtest short-forms performed very adequately; both had very high correlations with full-length IQs (e.g. .96 and .97 respectively with Full-Scale IQ) and, unlike the other short-forms, neither systematically under- or overestimated full-length IQs to an appreciable extent.

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