

# WISC IV-AR

## ويسك ٤ - عربي

Wechsler Intelligence Scale for Children - Fourth Edition - Arabic

سَلَم وِيسكِر لِقِياس الذِّكاء لدى الأَطْفال، بطبعته الرابعة، العربية

# Technical Report

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## Design and development of WISC-IV over the years

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The Wechsler intelligence scales have been frequently updated over the last 60 years to incorporate advances in the field of intellectual assessment, as well as to reflect the practical and clinical needs of contemporary society.

The original *Wechsler Intelligence Scale for Children* (WISC; Wechsler, 1949) adapted the Information, Arithmetic, Similarities, Vocabulary, Digit Span, Comprehension, Picture Completion, Picture Arrangement, Block Design, Object Assembly, and Coding subtests of the *Wechsler-Bellevue Intelligence Scale* (Wechsler, 1939) for use with children.

The WISC-IV-AR, adapted version of the US WISCIV, provides a measure of general intellectual functioning (FSIQ) and four index scores: the Verbal Comprehension Index (VCI), the Perceptual Reasoning Index (PRI), the Working Memory Index (WMI), and the Processing Speed Index (PSI).

The WISC IV, adapted version is published after 3 years research program 2010-2013 and based on national standardization samples representative of the Lebanese population and the Omani population (Sultana of Oman), of children aged 6:0 → 16:11.

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## WISC-IV AR, Psychometric properties

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The WISC-IV Arabic version normative data was established using a sample collected starting January 2010. The sample was stratified on key demographic variables (i.e, age, sex, geographic region) and was collected in two countries: Lebanon and the Sultana of Oman.

A number of modifications have been made to the original WISC-IV, including changes to subtest content. No changes in administration and scoring procedures.

### **Evidence of Internal Consistency**

**(Details in chapter 4, technical and interpretation manual WISCIV AR © LTE, 2013)**

The evidence for internal consistency was obtained using the normative sample and the split-half method. The reliability coefficient of the subtest is the correlation between the total scores of the two half tests corrected by the spearman-Brown formula for the full subtest (Crocker & Algina, 1986; Li, Rosenthal & Rubin, 1996).

Because Coding, Symbol Search, and Cancellation are processing speed subtests, the split-half coefficient is not a proper estimate of reliability. Therefore, test-retest stability coefficients were used as the reliability estimates for these subtests and the CAR and CAS process scores. These stability coefficients were based on the scores of children participating in the test-retest study.

The stability coefficient is the correlation between the scores on the first and second testing corrected for the variability of the standardization sample (Allen & Yen, 1979; Magnusson, 1967).

**Table 4.1** Reliability Coefficients of the Subtests, Process Scores, and Composite Scales, by Age Group

| Subtest                    | Age group |     |     |     |     |     |     |     |     |     |     | All Age |
|----------------------------|-----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---------|
|                            | 6         | 7   | 8   | 9   | 10  | 11  | 12  | 13  | 14  | 15  | 16  |         |
| Block Design               | .92       | .89 | .89 | .84 | .89 | .89 | .85 | .82 | .85 | .86 | .91 | .88     |
| Similarities               | .67       | .85 | .84 | .86 | .86 | .82 | .82 | .88 | .85 | .84 | .81 | .83     |
| Digit Span                 | .87       | .83 | .84 | .85 | .88 | .88 | .90 | .89 | .88 | .89 | .93 | .88     |
| Picture Concept            | .84       | .89 | .84 | .85 | .79 | .81 | .88 | .84 | .91 | .88 | .86 | .86     |
| Coding                     | .72       | .72 | .83 | .83 | .89 | .89 | .87 | .87 | .87 | .87 | .87 | .85     |
| Vocabulary                 | .70       | .85 | .88 | .86 | .91 | .93 | .90 | .90 | .89 | .88 | .85 | .88     |
| Letter-Number Sequencing   | .92       | .94 | .90 | .90 | .94 | .93 | .93 | .94 | .95 | .91 | .91 | .93     |
| Matrix Reasoning           | .89       | .90 | .92 | .92 | .93 | .94 | .96 | .94 | .93 | .92 | .93 | .93     |
| Comprehension              | .76       | .82 | .78 | .74 | .79 | .84 | .79 | .87 | .69 | .84 | .77 | .80     |
| Symbol Search              | .79       | .79 | .82 | .82 | .80 | .80 | .79 | .79 | .78 | .78 | .78 | .79     |
| Picture completion         | .90       | .87 | .88 | .91 | .92 | .93 | .92 | .91 | .94 | .93 | .90 | .91     |
| Cancellation               | .83       | .83 | .73 | .73 | .84 | .84 | .75 | .75 | .79 | .79 | .79 | .79     |
| Information                | .75       | .75 | .79 | .85 | .83 | .79 | .88 | .86 | .83 | .87 | .82 | .82     |
| Arithmetic                 | .87       | .88 | .92 | .87 | .93 | .91 | .93 | .88 | .91 | .91 | .92 | .91     |
| Word reasoning             | .66       | .76 | .79 | .77 | .73 | .73 | .73 | .79 | .76 | .82 | .79 | .76     |
| Block Design No time Bonus | .92       | .89 | .89 | .84 | .89 | .89 | .85 | .82 | .85 | .86 | .91 | .88     |
| Digit Span Forward         | .84       | .78 | .75 | .78 | .82 | .80 | .81 | .83 | .86 | .87 | .90 | .83     |
| Digit Span Backward        | .76       | .78 | .78 | .83 | .78 | .83 | .85 | .80 | .83 | .83 | .83 | .81     |
| Cancellation Random        | .75       | .75 | .70 | .70 | .72 | .72 | .67 | .67 | .65 | .65 | .65 | .70     |
| Cancellation Structured    | .70       | .70 | .72 | .72 | .73 | .73 | .76 | .76 | .80 | .80 | .80 | .75     |
| Verbal Comprehension       | .82       | .91 | .92 | .90 | .93 | .94 | .92 | .95 | .90 | .93 | .90 | .92     |
| Perceptual Reasoning       | .91       | .93 | .93 | .91 | .90 | .92 | .94 | .92 | .93 | .92 | .94 | .92     |
| Working Memory             | .93       | .91 | .90 | .91 | .94 | .93 | .94 | .93 | .93 | .93 | .94 | .93     |
| Processing Speed           | .83       | .84 | .89 | .88 | .90 | .91 | .90 | .89 | .89 | .88 | .87 | .88     |
| Full Scale                 | .93       | .94 | .96 | .96 | .96 | .96 | .97 | .97 | .96 | .96 | .96 | .96     |

As the data in table 4.1 indicate, for the overall standardization sample, the average reliability coefficient of the WISC-IV AR subtests range, from .79 (Symbol Search and Cancellation) to .93 (Letter-Number Sequencing).

All remaining reliability coefficient are good, ranging from .76 (Word reasoning) to .88 (Vocabulary) and .93 (Matrix Reasoning).

The reliability coefficient for WISC-IV composite scales range from .88 (Processing Speed) to .96 (Full Scale) and are generally higher than those of the individual subtests that comprise the composite scales (coding: .85, symbol search: .79, cancellation: .79). This difference occurs because each subtest represents only a narrow portion of an individual's performance on a broader sample of abilities.

The high overall average reliability coefficients for the WISC-IV composite scales are expected. The average reliability coefficient for the Processing Speed composite scale is slightly lower (.88); it is based on test-retest reliabilities, which tend to be lower than split-half reliabilities.

## Standard Error of Measurement (SEM) and Confidence Intervals

The standard error of measurement (SEM) provides an estimate of the amount of error in an individual's observed test score. Because the standard error of measurement is inversely related to the reliability of a subtest, the greater the reliability is, the smaller the standard error of measurement, and the more confidence the test user can have in the precision of the observed test score.

**Table 4.3 Standard Errors of Measurement of the subtests, Process scores, and composite scales, by Age Group**

| subtest | Age  |      |      |      |      |      |      |      |      |      |      | All Age |
|---------|------|------|------|------|------|------|------|------|------|------|------|---------|
|         | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   |         |
| BD      | 0.85 | 0.99 | 0.99 | 1.20 | 0.99 | 0.99 | 1.16 | 1.27 | 1.16 | 1.12 | 0.90 | 1.06    |
| SI      | 1.72 | 1.16 | 1.20 | 1.12 | 1.12 | 1.27 | 1.27 | 1.04 | 1.16 | 1.20 | 1.31 | 1.25    |
| DS      | 1.08 | 1.24 | 1.20 | 1.16 | 1.04 | 1.04 | 0.95 | 0.99 | 1.04 | 0.99 | 0.79 | 1.05    |
| PCn     | 1.20 | 0.99 | 1.20 | 1.16 | 1.37 | 1.31 | 1.04 | 1.20 | 0.90 | 1.04 | 1.12 | 1.15    |
| CD      | 1.59 | 1.59 | 1.24 | 1.24 | 0.99 | 0.99 | 1.08 | 1.08 | 1.08 | 1.08 | 1.08 | 1.20    |
| VC      | 1.64 | 1.16 | 1.04 | 1.12 | 0.90 | 0.79 | 0.95 | 0.95 | 0.99 | 1.04 | 1.16 | 1.09    |
| LN      | 0.85 | 0.73 | 0.95 | 0.95 | 0.73 | 0.79 | 0.79 | 0.73 | 0.67 | 0.90 | 0.90 | .82     |
| MR      | 0.99 | 0.95 | 0.85 | 0.85 | 0.79 | 0.73 | 0.60 | 0.73 | 0.79 | 0.85 | 0.79 | .82     |
| CO      | 1.47 | 1.27 | 1.41 | 1.53 | 1.37 | 1.20 | 1.37 | 1.08 | 1.67 | 1.20 | 1.44 | 1.37    |
| SS      | 1.37 | 1.37 | 1.27 | 1.27 | 1.34 | 1.34 | 1.37 | 1.37 | 1.41 | 1.41 | 1.41 | 1.36    |
| PCm     | 0.95 | 1.08 | 1.04 | 0.90 | 0.85 | 0.79 | 0.85 | 0.90 | 0.73 | 0.79 | 0.95 | .90     |
| CA      | 1.24 | 1.24 | 1.56 | 1.56 | 1.20 | 1.20 | 1.50 | 1.50 | 1.37 | 1.37 | 1.37 | 1.38    |
| IN      | 1.50 | 1.50 | 1.37 | 1.16 | 1.24 | 1.37 | 1.04 | 1.12 | 1.24 | 1.08 | 1.27 | 1.27    |
| AR      | 1.08 | 1.04 | 0.85 | 1.08 | 0.79 | 0.90 | 0.79 | 1.04 | 0.90 | 0.90 | 0.85 | .94     |
| WR      | 1.75 | 1.47 | 1.37 | 1.44 | 1.56 | 1.56 | 1.56 | 1.37 | 1.47 | 1.27 | 1.37 | 1.48    |
| BDNB    | 0.85 | 0.99 | 0.99 | 1.20 | 0.99 | 0.99 | 1.16 | 1.27 | 1.16 | 1.12 | 0.90 | 1.06    |
| DSF     | 1.20 | 1.41 | 1.50 | 1.41 | 1.27 | 1.34 | 1.31 | 1.24 | 1.12 | 1.08 | 0.95 | 1.27    |
| DSB     | 1.47 | 1.41 | 1.41 | 1.24 | 1.41 | 1.24 | 1.16 | 1.34 | 1.24 | 1.24 | 1.24 | 1.31    |
| CAR     | 1.50 | 1.50 | 1.64 | 1.64 | 1.59 | 1.59 | 1.72 | 1.72 | 1.77 | 1.77 | 1.77 | 1.66    |
| CAS     | 1.64 | 1.64 | 1.59 | 1.59 | 1.56 | 1.56 | 1.47 | 1.47 | 1.34 | 1.34 | 1.34 | 1.51    |
| VCI     | 6.36 | 4.50 | 4.24 | 4.74 | 3.97 | 3.67 | 4.24 | 3.35 | 4.74 | 3.97 | 4.74 | 4.47    |
| PRI     | 4.50 | 3.97 | 3.97 | 4.50 | 4.74 | 4.24 | 3.67 | 4.24 | 3.97 | 4.24 | 3.67 | 4.17    |
| WMI     | 3.97 | 4.50 | 4.74 | 4.50 | 3.67 | 3.97 | 3.67 | 3.97 | 3.97 | 3.97 | 3.67 | 4.07    |
| PSI     | 6.18 | 6.00 | 4.97 | 5.20 | 4.74 | 4.50 | 4.74 | 4.97 | 4.97 | 5.20 | 5.41 | 5.19    |
| FSIQ    | 3.97 | 3.67 | 3.00 | 3.00 | 3.00 | 3.00 | 2.60 | 2.60 | 3.00 | 3.00 | 3.00 | 3.10    |

Because the reliability estimates of the WISC-IV composite scores are relatively high, the confidence intervals calculated with the standard error of measurement centered on the obtained score and those calculated with the standard error of estimation centered on the estimated true score will be the same or similar. Confidence intervals calculated by either method are interpreted in the same way.

### **Intercorrelations of the Subtests and Sums of Scaled Scores for Composites. Attentional Resources**

The table of correlation between subtests, between subtests and indices and between subtests and total IQ shows that subtests that make up the scales working memory and processing speed have a significant correlation with the total IQ.

Overall

| Table 5.1. Intercorrelations of the Subtests and Sums of Scaled Scores for Composites: Ages 6:0-16:11 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       |       |       |       |
|---|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|
| Subtest/<br>Composite   | BD   | SI   | DS   | PS   | CD   | VC   | LN   | MR   | CO   | SS   | PC   | CA   | IN   | AR   | WR   | VCI   | PSI   | WMI   | PSI   | FSIQ  |
| BD  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       | .23   |       |       | .28   |
| SI  | .18  |      |      |      |      |      |      |      |      |      |      |      |      |      |      | .55   |       |       |       | .57   |
| DS  | .17  | .39  |      |      |      |      |      |      |      |      |      |      |      |      |      |       |       | .35   |       | .49   |
| PS  | .16  | .35  | .26  |      |      |      |      |      |      |      |      |      |      |      |      |       | .35   |       |       | .46   |
| CD  | .09  | .20  | .25  | .14  |      |      |      |      |      |      |      |      |      |      |      |       |       |       | .53   | .35   |
| VC  | .17  | .49  | .29  | .36  | .20  |      |      |      |      |      |      |      |      |      |      | .59   |       |       |       | .55   |
| LN  | .17  | .27  | .35  | .26  | .13  | .31  |      |      |      |      |      |      |      |      |      |       |       | .35   |       | .42   |
| MR  | .24  | .40  | .36  | .39  | .20  | .33  | .32  |      |      |      |      |      |      |      |      |       | .41   |       |       | .54   |
| CO  | .21  | .48  | .28  | .33  | .18  | .52  | .27  | .36  |      |      |      |      |      |      |      | .58   |       |       |       | .55   |
| SS  | .13  | .19  | .19  | .16  | .53  | .20  | .17  | .23  | .21  |      |      |      |      |      |      |       |       |       | .53   | .37   |
| PC  | .13  | .31  | .24  | .30  | .12  | .26  | .20  | .29  | .28  | .13  |      |      |      |      |      |       |       |       |       |       |
| CA  | .11  | .26  | .29  | .09  | .41  | .10  | .09  | .20  | .21  | .51  | .19  |      |      |      |      |       |       |       |       |       |
| IN  | .21  | .49  | .29  | .27  | .22  | .45  | .26  | .37  | .49  | .21  | .33  | .23  |      |      |      |       |       |       |       |       |
| AR  | .14  | .33  | .40  | .24  | .20  | .33  | .35  | .39  | .33  | .20  | .22  | .20  | .37  |      |      |       |       |       |       |       |
| WR  | .20  | .44  | .28  | .26  | .09  | .37  | .24  | .34  | .39  | .13  | .23  | .18  | .45  | .36  |      |       |       |       |       |       |
| VCI   | .23  | .80  | .40  | .43  | .24  | .82  | .35  | .45  | .82  | .25  | .35  | .23  | .58  | .41  | .49  |       |       |       |       |       |
| PSI   | .65  | .43  | .37  | .72  | .19  | .40  | .34  | .76  | .42  | .24  | .33  | .18  | .40  | .35  | .37  | .52   |       |       |       |       |
| WMI   | .21  | .41  | .82  | .32  | .24  | .37  | .82  | .42  | .34  | .22  | .27  | .23  | .34  | .46  | .32  | .46   | .43   |       |       |       |
| PSI   | .13  | .23  | .25  | .17  | .87  | .24  | .18  | .24  | .23  | .87  | .15  | .52  | .25  | .23  | .13  | .29   | .25   | .26   |       |       |
| FSIQ  | .43  | .68  | .61  | .59  | .49  | .66  | .55  | .66  | .66  | .51  | .39  | .38  | .56  | .49  | .47  | .82   | .78   | .71   | .58   |       |
| Mean  | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| SD  | 3.0  | 3.0  | 3.0  | 3.0  | 3.0  | 3.0  | 3.0  | 3.0  | 3.0  | 3.0  | 3.0  | 3.0  | 3.0  | 3.0  | 3.0  | 15.0  | 15.0  | 15.0  | 15.0  | 15.0  |
| N   | 1300 | 1300 | 1300 | 1300 | 1300 | 1300 | 1300 | 1300 | 1300 | 1300 | 1300 | 1300 | 1300 | 1300 | 1300 | 1300  | 1300  | 1300  | 1300  | 1300  |

## Evidence based on internal structure: Evidence of validity

### 1-Exploratory Factor Analysis and Intercorrelations (Four Factors)

Table 5.2 reports the results of the factor analysis of the core subtests for all ages. Factor analysis of core subtests related to the adapted WISC IV-AR, finds solid four-factor structure of the WISC-IV. The results were consistent with the predicted factor model.

| All Ages (N = 1300) |                      |                      |                |                  |
|---------------------|----------------------|----------------------|----------------|------------------|
| Subtest             | Verbal Comprehension | Perceptual Reasoning | Working Memory | Processing Speed |
| siss                | .56                  | -.01                 | .19            | -.01             |
| vcss                | .74                  | -.03                 | .00            | .00              |
| cooss               | .70                  | .08                  | -.10           | .02              |
| bdss                | .01                  | .32                  | -.01           | .04              |
| psss                | .19                  | .41                  | .02            | -.04             |
| mrss                | .02                  | .49                  | .17            | .01              |
| dsos                | .00                  | .00                  | .59            | .04              |
| lnss                | .02                  | .12                  | .43            | -.04             |
| cdss                | .02                  | -.08                 | .07            | .69              |
| ssos                | -.01                 | .10                  | -.07           | .68              |

Table 5.2 Exploratory Factor Pattern Loadings of Core Subtests

- **Verbal Comprehension.** The three tests Similarities (.56), Vocabulary (.74) and Comprehension (.70) heavily saturate the verbal comprehension factor and proved to be a good measure of Gc called crystallized intelligence by Cattell (1963). The crystallized intelligence relies on the organization of cultural knowledge in the subject and aggregates throughout life. The acquisition of concepts makes it possible to acquire more and better understand the complexity of the world.

- **Perceptual Reasoning.** The three events that make up the scale of perceptual reasoning are moderately saturated by the corresponding factor. They are quite strongly influenced by specific variables (As seen in the American (2003) and the French (2005) versions of WISC-IV).

We also note that the three compulsory tests of perceptual reasoning scale are divided into two groups with one hand proof Cubes, saturated with a visuospatial factor and other tests Identification of concepts and matrix, saturated factor fluid intelligence (Gf). This factor saturates tests that assess the ability to reason and solve new problems by doing as little as possible use of knowledge.

- **Working Memory.** WM can be assessed using subtests Code Sequence letters and numbers, but also with the arithmetic subtest having a saturation of .59, greater than letters Sequence numbers (.43). Working memory requires temporarily storing information, performing cognitive treatments on this stored information and being able to return them.

- **Processing Speed.** The two compulsory examinations scale processing speed show a homogeneous saturation coding (.69), symbol search (.68).

## 2-Goodness-of-Fit Statistics for Confirmatory Factor Analysis of Core Subtests

- Model 1 (One factor): 10 subtests on a general factor.
- Model 2 (Two factors): 3 Verbal Comprehension subtests and 2 Working Memory subtests on the first factor and 3 Perceptual Reasoning subtests and 2 Processing Speed subtests on the second factor.
- Model 3 (Three factors): 3 Verbal Comprehension subtests on the first factor, 3 Perceptual Reasoning subtests on the second factor and 2 Working Memory and 2 Processing Speed subtests on the third factor.
- Model 4 (Four factors): 3 Verbal Comprehension subtests on the first factor, 3 Perceptual Reasoning subtests on the second factor, and 2 Working Memory subtests on the third factor, and 2 Processing Speed subtests on the fourth factor.

**Table 5.3 Goodness-of-Fit Statistics for Confirmatory Factor Analysis of Core Subtests**

Num of subtests: 10

| Model              | Goodness of fit indices |    |           |      |       | Improvement |    |               |      |
|--------------------|-------------------------|----|-----------|------|-------|-------------|----|---------------|------|
|                    | Chi-square              | df | chi-sq/df | AGFI | RMSR  | chi-sq      | df | Modified TLI* | TLI  |
| Age 6 - 16 N= 1300 |                         |    |           |      |       |             |    |               |      |
| Null model         | 2863.30                 | 45 | 63.63     |      |       |             |    |               |      |
| 1 Model 1          | 522.8                   | 35 | 14.94     | 0.89 | 0.104 | 2340.50     | 10 |               | 0.78 |
| 2 Model 2          | 482.7                   | 34 | 14.20     | 0.89 | 0.101 | 40.10       | 1  | 0.05          | 0.79 |
| 3 Model 3          | 380.6                   | 32 | 11.89     | 0.90 | 0.092 | 102.10      | 2  | 0.22          | 0.83 |
| 4 Model 4          | 83.3                    | 29 | 2.87      | 0.98 | 0.038 | 297.30      | 3  | 0.87          | 0.97 |

NOTE - The Chi-Square values are Weighted Least Squares Chi-Squares from LISREL 8.

\* - this is a modified version of the TLI, in which Model 1 is used as the baseline, rather than the null model.

**Table 5.4 Goodness-of-Fit Statistics for Confirmatory Factor Analysis of Core Subtests**

Num of subtests: 15

| Model              | Goodness of fit indices |     |           |      |       | Improvement |    |               |      |
|--------------------|-------------------------|-----|-----------|------|-------|-------------|----|---------------|------|
|                    | Chi-square              | df  | chi-sq/df | AGFI | RMSR  | chi-sq      | df | Modified TLI* | TLI  |
| Age 6 - 16 N= 1300 |                         |     |           |      |       |             |    |               |      |
| Null model         | 5204.50                 | 105 | 49.57     |      |       |             |    |               |      |
| 1 Model 1          | 1116.7                  | 90  | 12.41     | 0.85 | 0.094 | 4087.80     | 15 |               | 0.82 |
| 2 Model 2          | 1024.2                  | 89  | 11.51     | 0.86 | 0.090 | 92.50       | 1  | 0.25          | 0.83 |
| 3 Model 3          | 760.7                   | 87  | 8.74      | 0.89 | 0.077 | 263.50      | 2  | 0.44          | 0.88 |
| 4 Model 4          | 301.5                   | 84  | 3.59      | 0.96 | 0.045 | 459.20      | 3  | 0.81          | 0.96 |
| 5 Model 5          | 296.3                   | 80  | 3.70      | 0.95 | 0.046 | 5.20        | 4  | 0.81          | 0.96 |

NOTE - The Chi-Square values are Weighted Least Squares Chi-Squares from LISREL 8.

\* - this is a modified version of the TLI, in which Model 1 is used as the baseline, rather than the null model.

## WISC IV-EN, WISC IV-FR, WISC IV-AR: Comparison between versions

### G.COGNET, coordinator ECPA-PEARSON, France

The inter correlation table between subtests, between subtests and indexes and between subtests and total IQ, shows that the subtests of working memory and processing speed have a significant correlation with the total IQ.

Ages 6:0-16:11 WISCIV AR

| Composite   | BD  | SI  | DS  | PS  | CD  | VC  | LN  | MR  | CO  | SS  |
|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| <b>BD</b>   |     |     |     |     |     |     |     |     |     |     |
| <b>SI</b>   | ,18 |     |     |     |     |     |     |     |     |     |
| <b>DS</b>   | ,17 | ,39 |     |     |     |     |     |     |     |     |
| <b>PS</b>   | ,16 | ,35 | ,26 |     |     |     |     |     |     |     |
| <b>CD</b>   | ,09 | ,20 | ,25 | ,14 |     |     |     |     |     |     |
| <b>VC</b>   | ,17 | ,49 | ,29 | ,36 | ,20 |     |     |     |     |     |
| <b>LN</b>   | ,17 | ,27 | ,35 | ,26 | ,13 | ,31 |     |     |     |     |
| <b>MR</b>   | ,24 | ,40 | ,36 | ,39 | ,20 | ,33 | ,32 |     |     |     |
| <b>CO</b>   | ,21 | ,48 | ,28 | ,33 | ,18 | ,52 | ,27 | ,36 |     |     |
| <b>SS</b>   | ,13 | ,19 | ,19 | ,16 | ,53 | ,20 | ,17 | ,23 | ,21 |     |
| <b>PC</b>   | ,13 | ,31 | ,24 | ,30 | ,12 | ,26 | ,20 | ,29 | ,28 | ,13 |
| <b>CA</b>   | ,11 | ,26 | ,29 | ,09 | ,41 | ,10 | ,09 | ,20 | ,21 | ,51 |
| <b>IN</b>   | ,21 | ,49 | ,29 | ,27 | ,22 | ,45 | ,26 | ,37 | ,49 | ,21 |
| <b>AR</b>   | ,14 | ,33 | ,40 | ,24 | ,20 | ,33 | ,35 | ,39 | ,33 | ,20 |
| <b>WR</b>   | ,20 | ,44 | ,28 | ,26 | ,09 | ,37 | ,24 | ,34 | ,39 | ,13 |
| <b>VCI</b>  | ,23 | ,80 | ,40 | ,43 | ,24 | ,82 | ,35 | ,45 | ,82 | ,25 |
| <b>PSI</b>  | ,65 | ,43 | ,37 | ,72 | ,19 | ,40 | ,34 | ,76 | ,42 | ,24 |
| <b>WMI</b>  | ,21 | ,41 | ,82 | ,32 | ,24 | ,37 | ,82 | ,42 | ,34 | ,22 |
| <b>PSI</b>  | ,13 | ,23 | ,25 | ,17 | ,87 | ,24 | ,18 | ,24 | ,23 | ,87 |
| <b>FSIQ</b> | ,43 | ,68 | ,61 | ,59 | ,49 | ,66 | ,55 | ,66 | ,66 | ,51 |

Extract from Table 5.1- Intercorrelations of the Subtests and sums of scaled scores for  
Composites Ages 6.0-16.11

## 1- Reliability

The reliability of a test is a guarantee of accuracy and stability of scores in the different evaluations. The internal consistency indices were calculated from the results of the calibration sample of WISCIV Arabic, using the odd-even method.

| WISCIV AR | All age |
|-----------|---------|
| VCI       | ,92     |
| PRI       | ,92     |
| WMI       | ,93     |
| PSI       | ,88     |
| FSIQ      | ,96     |

Extract from Table 4.1- WISC-IV AR -  
Reliability coefficients of composite

The reliability coefficients of the WISCIV-AR are remarkably high (.88 - .96) as for the French adapted version of the scale (.83 - .94). Both coefficients are very close which shows the reliability of WISIV AR.

## 2 -Level of Significance

- **Index scores.** To analyze with accuracy the performance of a child at the WISCIV AR, we need to compare between scores and decide whether the difference is due to measurement errors or not. The table below shows the statistically significant differences between index scores for the level of significance .15 and .05.

| All Ages Group | Level of Significance | VCI- PRI | VCI- WMI | VCI- PSI | PRI- WMI | PRI-PSI | WMI- PSI |
|----------------|-----------------------|----------|----------|----------|----------|---------|----------|
|                | 0,15                  | 8,80     | 8,71     | 9,86     | 8,39     | 9,59    | 9,50     |
|                | 0,05                  | 11,98    | 11,85    | 13,43    | 11,42    | 13,05   | 12,93    |

Table B1- Differences between Index Scores

*Per Example: the difference between the verbal comprehension index (VCI) and the perceptual reasoning index (PRI) for the level of significance .05 is 11.98 points for the WISC-IV Arabic (table B1). This indicates that the probability of obtaining such a difference by chance is very low.*

*The difference between these two indexes (VCI-PRI), for the level of significance .05 is 14.18 points for the French version of the WISC-IV.*

These low differences show that the Arabic version of the WISC-IV is very sensitive and accurate.

- **Scaled score.** Table B.5 shows statistically significant differences between a subtest score and the scores average of several subtests. This procedure is essential to assess the strengths and weaknesses of a subject by comparing Single Subtest Scaled Scores and Mean Scaled Scores. The more significant difference is low, the more comparisons are relevant.

| Subtest           | 0,15 | 0,05 |
|-------------------|------|------|
| Block Design      | 2,45 | 2,84 |
| Similarities      | 2,84 | 3,29 |
| Digit Span        | 2,43 | 2,81 |
| Picture Concept   | 2,64 | 3,05 |
| Coding            | 2,74 | 3,17 |
| Vocabulary        | 2,51 | 2,91 |
| Letter-Number Seq | 1,97 | 2,29 |
| Matrix Reasoning  | 1,97 | 2,29 |
| Comprehension     | 3,09 | 3,57 |
| Symbol Search     | 3,07 | 3,55 |

Table B.5 Differences between Single Subtest Scaled Scores and Mean Scaled Scores

*Per Example: the difference statistically significant for Block design (BD) at the level of significance .05 is 2.84 points. The difference*

between the BD Scaled Scores and the Mean Scaled Scores is sufficient to say that the probability of obtaining such a difference by chance is very low.

The difference statistically significant for Block design (BD) at the level of significance .05 is 3.14 points for the French version of the WISC-IV.

The calibration of the WISC-IV AR shows at this point a quality of sensitivity and accuracy.

### 3- Comparison between different versions of the WISCIV (American, French and Arabic): Test-Age Equivalents of Total Raw Score

|     | bd | ds    | ps | cd    | lns   | mr    | ss    |
|-----|----|-------|----|-------|-------|-------|-------|
| AR  | 30 | 13-14 | 17 | 43    | 15-16 | 16-17 | 21-22 |
| USA | 31 | 15    | 17 | 43-44 | 16    | 21    | 22    |
| FR  | 36 | 14-15 | 18 | 44    | 17-18 | 21    | 23    |

Table A.9 - Test-Age Equivalents of Total Raw Score (extract)

The table above is an extract from the table A.9 in the administration manuals of the American, the French and the Arabic versions of WISCIV for the age of 10 years and 2 months.

The scores show coherence and consistency of performance between the three versions of the WISC-IV with greater proximity between the American calibration and the Arabic one. A high performance to the BD subtest is noticed regarding the French calibration.

## Table – Technical and Interpretation Manual WISCIC AR

|  |           |
|--|-----------|
| <b>Introduction</b>  | <b>6</b>  |
| Design and development of WISC-IV over the years   | 6         |
| <b>Chapter 1: WISC IV Arabic Version</b>   | <b>11</b> |
| 1.1 Structure of the WISC IV-AR  | 11        |
| 1.2 Subtest Terminology  | 12        |
| 1.3 Subtest Description and Rationale  | 14        |
| <b>Chapter 2: Research Procedures, Standardization, and Norms Development WISC-IV Arabic Scale</b> | <b>20</b> |
| Major Research Stages  | 20        |
| 2.1. Study of the wording based on Arabic culture  | 21        |
| 2.2. Pilot Stage   | 23        |
| 2.3. National Tryout Stage   | 24        |
| 2.4. Standardization Stage   | 25        |
| 2.4.1 Locating and Testing the Samples   | 25        |
| 2.4.2 Final Assembly and Evaluation  | 26        |
| 2.4.3 Quality Assurance Procedures   | 27        |
| <b>Chapter 3: WISC-IV AR, Psychometric properties</b>  | <b>30</b> |
| 3.1 General Information  | 30        |
| 3.1.1 Norms  | 30        |
| 3.1.2 Evidence of Reliability and Validity   | 30        |
| 3.1.3 Testing Time   | 31        |
| 3.1.4 Administration Procedures  | 31        |
| 3.1.5 Supplemental Subtests  | 31        |
| 3.1.6 Manual Reorganization  | 32        |
| 3.1.7 Record Form Reorganization   | 32        |
| 3.2 Specific Information   | 32        |
| 3.2.1 Instructions to the Child  | 32        |
| 3.2.2 Teaching Items, Queries, and Prompts   | 33        |

|   |           |
|---|-----------|
| 3.2.3 Scoring Criteria  | 33        |
| 3.2.4 Timed Performance   | 33        |
| 3.2.5 Test Materials  | 34        |
| 3.3 Suggested words for verbal comprehension subtests (VC): items in French and English language        | 34        |
| 3.3.1 Similarities  | 36        |
| 3.3.2 Vocabulary  | 37        |
| 3.3.3 Comprehension   | 39        |
| 3.3.4 Information   | 40        |
| 3.3.5 Word reasoning  | 42        |
| 3.3.6 Saudi Arabia dialect: the 10 core subtests of the WISC IV AR Arabic Version                       | 43        |
| 3.3.7 Sultana of Oman dialect   | 47        |
| <b>Chapter 4:</b>   | <b>48</b> |
| 4.1 Evidence of Reliability   | 49        |
| 4.1.1 Evidence of Internal Consistency  | 49        |
| 4.1.2 Internal reliability coefficients of the subtests and process scores for the special group        | 52        |
| 4.1.3 Standard Error of Measurement (SEM) and Confidence Intervals                                      | 54        |
| 4.1.4 Intercorrelations of the Subtests and Sums of Scaled Scores for Composites. Attentional Resources | 57        |
| 4.2 Evidence based on internal structure: Evidence of validity  | 59        |
| 4.2.1 Exploratory Factor Analysis and Intercorrelations (Four Factors)                                  | 59        |
| 4.2.2 Goodness-of-Fit Statistics for Confirmatory Factor Analysis of Core Subtests                      | 61        |

|   |           |
|---|-----------|
| <b>Chapter 5: WISC IV-EN, WISC IV-FR, WISC IV-AR: Comparison between versions</b>     | <b>63</b> |
| 5.1 Reliability   | 64        |
| 5.2 Level of Significance   | 64        |
| 5.3 Comparison between different versions of the WISCIV (American, French and Arabic) | 66        |
| <b>Appendix A</b>   | <b>67</b> |
| Appendix A.1: Lebanon   | 68        |
| Appendix A.2: Sultana of Oman   | 69        |
| Appendix A.3: Information Subtest   | 70        |
| <b>Appendix B: WISC IV-English, French, Arabic versions:</b>                          |           |
| Comparison of wording   | 72        |
| Appendix B.1: Similarities  | 73        |
| Appendix B.2: Vocabulary  | 75        |
| Appendix B.3: Comprehension   | 77        |
| Appendix B.4: Information   | 79        |
| Appendix B.5: Word Reasoning  | 81        |
| <b>Appendix C : Inter correlation tables</b>  | <b>83</b> |
| <b>Appendix D : Saudi Dialect (extract)</b>   | <b>95</b> |
| <b>Index of tables and figures</b>  |           |
| Figure 1.1: structure of WISC-IV  | 12        |
| Table 1.1: Composites   | 13        |
| Table 1.2: Core subtests and supplemental   | 13        |
| Table 3.1 : Wording proposition: Similarities   | 36        |
| Table 3.2 : Wording proposition: Vocabulary   | 38        |
| Table 3.3 : Wording proposition: Comprehension  | 39        |
| Table 3.4 : Wording proposition: Information  | 41        |

|  |            |
|--|------------|
| Table 3.5 : Wording proposition: Word Reasoning  | 42         |
| Table 4.1 Reliability Coefficients of the Subtests, Process Scores, and Composite Scales, by Age Group       | 50         |
| Table 4.2 Reliability Coefficients of the Subtests and Process Scores for special Groups                     | 53         |
| Table 4.3 Standard Errors of Measurement of the subtests, Process scores, and composite scales, by Age Group | 56         |
| Table 5.1. Intercorrelations of the Subtests and Sums of Scaled Scores for Composites: Ages 6:0-16:11        | 58         |
| Table 5.2 Exploratory Factor Pattern Loadings of Core Subtests   | 59         |
| Table 5.3 Goodness-of-Fit Statistics for Confirmatory Factor Analysis of Core Subtests                       | 62         |
| Table 5.4 Goodness-of-Fit Statistics for Confirmatory Factor Analysis of Core Subtests                       | 62         |
| <b>References</b>  | <b>102</b> |

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