Using the DWI or GAI

Since Ron and I are allergic to the blind application of numerical discrepancy formulae to determine whether a student has a specific learning disability [9, 10], it was not our intent when Ron generated the DWI-1 and DWI-2 tables to generate new numbers to plug into such formulae. Rather, we hoped, following the lead of Kaufman, Prifitera, Soklofske, Tulsky, Wilkins, Weiss, and others [4, 5, 6, 7, 8] to assist evaluators in communicating their analyses of examinees' WISC-IV scores.

The concern with the inclusion of low-g "processing" scores in the FSIQ long predates the revisions made in the WISC-IV [1]. Even with the earliest Wechsler scales, some of us simply prorated scores for groups of tests [11] to avoid the "Mark Penalty" [9, p. 174; 12]. Weighting the contributions of (sub)tests by their g loading or correlation with the total score (the WJ III model, cited by one recent poster) does not eliminate the contribution of low-g, so-called "processing" (sub)tests. That procedure merely diminishes their contribution in proportion to their lack of relationship to the total score or g. Colin Elliott's approach [13], rather than weighting subtests on the basis of g loadings, was to include in the total score for the DAS only subtests with relatively high g loadings and only three CHC factors: Gc, Gv, and Gf. However, even that approach does not eliminate the potential for the Mark Penalty [9, p.174; 12]. A student might, for example, have visual perception weaknesses that make an occupational therapist weep and depress scores on Gv tests dramatically and scores on some Gf tests moderately. For such a student, the total score would disguise both strengths and weaknesses.

As noted below in the excerpt from Ron's discussion of the DWI tables at http://alpha.fdu.edu/psychology/WISCIV_DWI.htm, one would not routinely look up such scores for examinees. However, there are some cases in which there are (a) no significant differences within VCI, (b) no significant differences within PRI, (c) no significant differences within WMI, (d) no significant differences within PSI, (e) no significant difference between VCI and PRI, and (f) no significant difference between WMI and PSI, but there are (g) significant differences between VCI and FDI , between PRI and PSI, or both. In that case, as Colin Elliott [13, p. 88] says with regard to the Differential Ability Scales, "If its contributing cluster scores are significantly diverse, we would conclude that the [total score] alone provides an incomplete description of the child's cognitive abilities as measured by the subtests."

Under the circumstances outlined above, a more detailed understanding of the child's cognitive functioning that day on that test might be obtained by considering the VCI and PRI subtests as one group (DWI-1, GAI) and the WMI and PSI subtests as another group (DWI-2, SCAD). Children with very low FSIQ scores are likely to have DWI-1 < DWI-2, and children with very high FSIQ scores are likely to have DWI-1 > DWI-2, because of the higher g loadings of DWI-1 than DWI-2 subtests, but that is not always the case, and an unexpected outcome should trigger further investigation. As with all test scores, DWI (GAI and SCAD) scores would simply serve to generate hypotheses that one would pursue through review of records, classroom observations, questionnaires, interviews, and additional assessment.

Flanagan and Kaufman [14] provide a cogent and detailed discussion (pp. 125 - 132), with specific numerical guidelines, of when and how to use their GAI tables (pp. 331 □ 334) as part of their overall approach to WISC-IV interpretation (pp. 121 □ 170). As Cecil Reynolds and others have explained, there are differences between tables based on Tellegen and Briggs procedures, depending, for example on whether the scores are derived from sums of scaled scores on the subtests or from sums of standard scores on the indices, and those tables would differ from tables derived directly from original normative data [5, 6].

We think that there are clearly circumstances, as outlined above, in which it makes sense to use the DWI-1 (GAI) and DWI-2 scores to help understand a child's current intellectual performance on the WISC-IV. As Cathy Fiorello and others have commented, it would not make sense to use the DWI-2 or SCAD score as an estimate of higher-level cognitive abilities.

Guy McBride raised the question of whether it would make sense to use the DWI-1 or GAI score as a measure of cognitive ability in determining whether there were a severe discrepancy between levels of ability and achievement. We would consider this an instance of Willis and Dumont's Mark Penalty [9, p. 174; 12]. If a student has weaknesses in basic sensory, motor, or psychological processes (e.g., visual impairment, hearing loss, cerebral palsy, oral language disorder, word-finding impairment, auditory perception, visual perception, processing speed, working memory, etc.), we think it is only reasonable to seek a measure of intelligence that is not contaminated by weaknesses that have been documented by testing (other than the cognitive ability test itself), observation, classroom performance, and other sources of information. In fact, Ron Dumont has said that the intelligence test for a child should not be selected until other assessment is completed. If you are trying to assess thinking, reasoning, and problem-solving ability, you do not want to use intelligence tests that require a blind child to copy block designs or a child with an oral language disorder to define words. You want an intelligence measure that is not contaminated by the documented weaknesses, even □ or especially □ if those weaknesses are in abilities important to intellectual functioning.

The *Regulations* regarding evaluation of children are also helpful in this regard: □Tests are selected and administered so as best to ensure that if a test is administered to a child with impaired sensory, manual, or speaking skills, ***the test results accurately reflect the child's aptitude or achievement level*** or whatever other factors the test purports to measure, rather than reflecting the child's impaired sensory, manual, or speaking skills...□ [§300.541 (c) (2) (e)]. (bold, italic added)

The independent documentation of the excluded weaknesses is, we think, very important. It is not reasonable to follow the above guidelines or the very explicit ones developed by Flanagan and Kaufman [14, pp. 125 □ 132] merely as a post-hoc effort to find a higher score. The logic must, we think, include independent confirmation that we are excluding a documented motor, sensory, or basic-process weakness. In that case, use of the DWI-1 or GAI instead of the FSIQ or use of a different test (e.g., DAS rather than WISC or WJ) or use of a highly specialized test (e.g., LIPS-R) or use of only verbal or only visual or only motor-free portions of a test seems to me to be entirely justified.

Excerpts from http://alpha.fdu.edu/psychology/WISCIV_DWI.htm

> . . . . Examiners may wish to report DWIs when the Verbal (VCI) and Perceptual (PRI) abilities are found to be close to one another yet significantly different from those of the Working Memory (WMI) or Processing Speed (PSI) abilities. . . . These tables were developed using the WISC-IV subtest intercorrelations (Table 5.1, page 51, *WISC-IV Technical and Interpretive Manual****[3]***) and the Tellegen and Briggs procedure[4]. Conceptually, the Dumont-Willis DWI-1 Index parallels the General Ability Index (GAI) developed by Prifitera, Weiss, and Saklofske[5] and by Tulsky, Saklofske, Wilkins, & Weiss[6] for the sum of scaled scores for the VCI and POI subtests of the WISC-III and WAIS-III. Unlike the DWI tables, the GAI tables are based directly on the WISC-III and WAIS-III normative data. Similarly, the Dumont-Willis DWI-2 Index is based on the sum of scaled scores for the Digit Span and Letter-Number Sequencing (WMI) and Coding and Symbol Search (PSI) subtests. This score is very similar to Alan Kaufman's "third factor"[7] and "SCAD"[8] scores. It should be computed and considered only when the four WMI and PSI subtest scores are close to one another and substantially separate from the VCI and PRI subtests. In those cases, the DWI-1 and DWI-2 scores may be an efficient alternative means of summarizing the 10 WISC-IV core subtests, but they must never be confused with normative WISC-IV factor and IQ scores. . . . Estimates of overall abilities calculated in this way should always be clearly identified as DWI scores in both text and tables of reports. These scores must not be confused with the Full Scale IQ, although they may be more useful estimates of intellectual ability in some cases, for example, for some gifted children and for some children with relative weaknesses in working memory and/or processing speed. For the latter group, the DWIs may help avoid Dumont and Willis's Mark Penalty,[9] the depression of a measure of intelligence by a low score on a measure of a student's specific weakness. Other children may score significantly higher on the WMI and PSI indices than on the VCI and PSI indices, which may mask important difficulties with conceptual thinking if the FSIQ is used without the DWIs.
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> We hope these tables prove useful until Prifitera, Tulsky, Saklofske, Weiss, and/or Wilkins provide us with normative data.

Comment from Dr Larry Weiss regarding the differences between the DWI, Flanagan and Kaufman'd tables, and the GAI provided by the PsychCorp (personal communication, Dr. Larry Weiss, November 11, 2004):

> The Psych Corp tables are developed directly from the standardization data, rather then the Tellegan & Briggs forumula used by others. While similar to the tables found on your website, and in Kaufman & Flanagan (2004), there are differences in the tails. Scores on the Psych Corp GAI will be slightly higher in the upper portion of the distribution, and slightly lower in the lower portion of the distribution. Thus, high functioning children will obtain higher GAI scores, and low functioning children will obtain lower GAI scores, using the Psych Corp GAI tables as compared to the Dumont and Willis Index, or the GAI tables provided by Kaufman & Flanagan.
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> On average, these differences are about 2 to 3 points in the tails, but can be as high as 6 points in isolated cases. Near the middle of the distribution, the Psych Corp GAI tables yield scores identical to the other tables.

[1] Wechsler, D. (2003). *Wechsler Intelligence Scale for Children* (4th ed.) (WISC-IV). San Antonio, TX: The Psychological Corporation.

[2] Wechsler, D. (1991). *Wechsler Intelligence Scale for Children* (3rd ed.) (WISC-III). San Antonio, TX: The Psychological Corporation.

[3] Wechsler, D. (2003). *WISC-IV Technical and Interpretive Manual.* San Antonio, TX: The Psychological Corporation.

[4] Tellegen, A., & Briggs, P. (1967). Old wine in new skins: Grouping Wechsler subtests into new scales. *Journal of Consulting Psychology, 31*, 499-506.

[5] Prifitera, A., Weiss, L. G., & Saklofske, D. H. (1998). WISC-III in context. In A. Prifitera & D. H. Saklofske (Eds.) *WISC-III clinical use and interpretation: Scientist-practitioner perspectives* (pp. 1-38). San Diego: Academic Press.

[6] Tulsky, D. S., Saklofske, D. H., Wilkins, C., & Weiss, L. G. (2001). Development of a General Ability Index for the Wechsler Adult Intelligence Scale□Third Edition. *Psychological Assessment, 13*, 566-571.

[7] Kaufman, A. S. (1979). *Intelligent testing with the WISC-R*. New York: Wiley Interscience. [8] Kaufman, A. S. (1994). *Intelligent testing with the WISC-III*. New York: Wiley Interscience. [9] Willis, J. O. & Dumont, R. P. (2002, pp. 131-132). *Guide to identification of learning disabilities* (3rd ed.). Peterborough, NH: authors. [http://alpha.fdu.edu/psychology]

[10] Dumont, R., Willis, J., & McBride, G. (2001). Yes, Virginia, there is a severe discrepancy clause, but is it too much ado about something? *The School Psychologist*, APA Division of School Psychology, *55* (1), 1, 4-13, 15.

[11] Sobotka, K. R., & Black, F. W. (1978). A procedure for the rapid computation of WISC-R factor scores. *Journal of Clinical Psychology*. *34*, 117-119.

[12] http://alpha.fdu.edu/psychology/WISCIV_DWI.htm

[13] Elliott, C. D. (1990). Differential Ability Scales: Introductory and technical handbook. San Antonio, TX: The Psychological Corporation.

[14] Flanagan, D. P., & Kaufman, A. S. (2004). *Essentials of WISC-IV assessment.* New York: Wiley.