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ABSTRACT

Since the Wechsler Intelligence Scale for Children-Third Edition (WISC-III) was published in 1991, it has been reported that fewer students are qualifying for gifted programs that use the WISC-III as a criterion measure. WISC-III differs from the WISC-Revised (WISC-R) in having a greater emphasis on speed of response, which could "penalize" reflective gifted children. The WISC-III was administered to 141 rural West Virginia children aged 6-12.5 who had full-scale IQ scores above 114. The children were categorized according to level of IQ as bright (115-123), superior (124-131), or gifted (132-148). Multivariate analysis of covariance (MANCOVA) was used to compare the groups on subtest scores, verbal and performance IQ scores, and two of the four WISC-III factorial indices--verbal comprehension index (VCI) and perceptual organization index (POI). When adjusted for full-scale IQ as the covariate, analyses showed significant differences between the IQ groups for four subtests, for VCI and POI, and for untimed and speed-bonus groups of subtests. The bright group showed comparatively lower scores on subtests yielding bonus points for quick performance; this deficit was not observed for superior and gifted groups. Bright group scores were similar to those of the superior group for VCI, but well below the superior group on POI. Although perceptual organization skills are important in advanced learning, it would appear that WISC-III does not measure these skills in gifted children, but instead measures the "speed" with which children organize perceptual materials. Implications for identification and placement in gifted programs are discussed. Contains 23 references. (SV)

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WISC-III SUBTEST SCATTER PATTERNS FOR RURAL SUPERIOR AND HIGH-ABILITY CHILDREN

Since the Wechsler Intelligence Scale for Children-Third Edition (WISC-III) was published in 1991 (Wechsler, 1991), school psychologists and specialists in gifted education have reported that fewer students are qualifying for gifted programs that use the WISC-III as a criterion measure. If so, it is important to determine its adequacy to measure the intelligence of gifted children. Recent exploratory studies found significantly lower scores on the WISC-III than on prior WISC-R tests (Bryant, 1992; Sevier, Bain & Hildman, 1994), and weaker Block Design subtests for gifted children (Fishkin, Garlow, & Kampsnider, 1994; Fishkin, Kampsnider, & Pack, in press). The WISC-III differs from the WISC-R with a greatly increased emphasis on speed of response to the extent that the speed factor could "penalize" reflective gifted children (Kaufman, 1992). To date little research has been published to compare its performance for potentially gifted students. The purposes of this study were to determine whether a) subtest scatter patterns of superior ability children on the WISC-III differ from scatter patterns of children of lesser ability; and b) to assess the importance of processing speed as a cognitive ability at three different ability levels.

Review of the Literature

Patterns of Cognitive Abilities for Gifted Children on the WISC-R and WISC-III

Characteristic patterns of IQ subtests were previously documented on the WISC-R and its predecessor, the WISC, for children in the superior range (Brown & Yakimowski, 1987; Silver & Clampit, 1990; Webb & Dyer, 1993; Wilkinson, 1993). When assessed with the WISC-R gifted students had often showed lower performance than verbal IQ scores with a resultant depressed full scale IQ (FSIQ) that did not fully reflect the child's level of cognitive ability. Silver and Clampit (1990) said that the WISC-R discrepancy tables showing frequency of expected differences between verbal and performance IQ scores (Wechsler, 1991) may lead examiners to mistakenly identify many high IQ children as having "rare" discrepancies and possible learning disabilities when the discrepancies are common among high IQ children (Malone, Brounstein, von Brock & Shaywitz, 1991; Patchett & Stansfield, 1992; Webb & Dyer, 1993; Wilkinson, 1993). Discrepancies as large as 21 points are not at all rare in the gifted population; these occurred in at least one-fifth of the children whose verbal or performance IQ was greater than 130 (Silver & Clampit, 1990).

Moreover, gifted children often showed considerable deviation among their subtest scores on the WISC-R (Brown & Yakimowski, 1987; Hollinger & Kosek, 1986; Patchett & Stansfield, 1992; Wilkinson, 1993). Webb and Dyer (1993) found that such scatter occurred in the gifted children in their sample who were younger than 10 years. Patchett and Stansfield suggested that atypical scaled scores occur more frequently in higher IQ children due to their greater range of scores. Scaled scores ranges of 9 points or greater occurred more frequently in children with an IQ greater than 120 than in the 110-119 IQ group.

Brown and Yakimowski (1987) found higher verbal than performance IQs for the identified gifted and the high IQ groups whereas the average ability subjects did not show evidence of verbal/performance IQ differences. Coding and Digit Span showed the lowest mean subtest scaled scores for the high IQ group, whereas Similarities, Comprehension, Vocabulary, Information, and then Block Design had the highest scores. They concluded by suggesting use of patterns of subtest scores as a basis to identify giftedness instead of relying only on the magnitude of an IQ score.

Fishkin et al. (in press) studied whether similar subtest variability was evident on the WISC-III for 42 gifted children. They found greater variability among the gifted children's subtest scores than among the scores of average ability children in the standardization sample. They also examined the gifted children's pattern of subtest scores and found significant peaks for Similarities, Vocabulary, and Comprehension, and valleys for Digit Span and Object Assembly. However, Block Design, a peak subtest for the gifted on the WISC-R, earned below average scores.

Speed of Performance as a Cognitive Ability

Many measures used to identify intellectually or academically gifted students place value on speed of performance and therefore penalize those who use careful, reflective thought processes. Kaufman (1992) considered emphasis on speeded performance to be extreme on the WISC-III. For fair and accurate assessments, students should be given adequate opportunity to demonstrate their abilities under conditions that tap careful thought as well as "fast, reactive" thinking (Gallagher & Johnson, 1992).

Young children may respond slowly to items for reasons that have more to do with personality or maturation than with intellect. Kaufman (1992) suggested that younger children may earn depressed IQ scores on the WISC-III due to age-inappropriate emphasis on speed of their problem solving on several subtests (Kaufman, 1992). He further indicated that the WISC-III may not have enough challenging items for an adequate "top" on test scores for potentially gifted children older than 14.

Speed of Performance on the WISC-R and on the WISC-III

Speed of performance affects test scores of gifted children (Reams, Chamrad, & Robinson, 1990). On the WISC-R bonus points were given for 3 of the 5 performance subtests: Picture Arrangement, Object Assembly, and Block Design. A greater number of bonus points may be earned on these WISC-III subtests and also on the last five items of Arithmetic, a verbal scale subtest. Speed is also involved in achieving high scores on the Coding subtest of the performance scale (Reams et al., 1990; Wechsler, 1991).

In 1994 Fishkin et al. examined the effects of age and gender for speeded subtests that reward very quick responses with bonus points, timed, and untimed subtests of the WISC-III for 153 children referred for gifted services. Older girls and younger boys performed poorly while girls younger than nine years of age did as well as the older boys on the subtests with bonus points. Boys showed strength on Information and Vocabulary, and girls on Coding. In addition, boys tended to earn higher scores on Block Design. However, each age and gender group had its lowest average scores on the subtests that awarded speed of performance with bonus points and highest scores on the untimed subtests. These results suggest that the FSIQ scores of some of these children may have been adversely affected by their performance on tasks with bonus points for speed: Block Design, Picture Arrangement, Object Assembly, the last items on the Arithmetic subtest, and Coding for children under 8.

Block Design was one of the 3 or 4 highest scoring WISC-R subtests found in the profiles of bright children (Hollinger & Kosek, 1986; Wilkinson, 1993). However, Fishkin et al. (in press) also found that Block Design was no longer a strong subtest in the profiles of gifted children on the WISC-III. They suggested that the lower scores on the WISC-III may reflect the "excessive" use of bonus points which Kaufman (1992, p. 157) had stated reward speed to a "foolish" extent. The main concern involving speeded performance is that individuals vary greatly in their ability to unravel problems at various rates of speed. The greatly increased emphasis on quick performance of the WISC-III may cause potentially gifted youth to earn lower performance and FSIQ scores if they are tested with the WISC-III instead of the WISC-R (Fishkin et al., in press; Kaufman, 1992)

Methods

Subjects and Data Gathering. This study used data from the same pool of subjects studied by Fishkin et al. (1994). Requests from school psychologists for anonymous WISC-III information on all children evaluated for gifted services produced 241 test protocols with identifying information deleted. Fifty-eight children were removed from this sample because their obtained FSIQ was below 115, 2 because they were older than 12-6, and 4 others for both reasons. An additional 36 children were not used in this study because some subtests had been omitted (e.g., Comprehension or Coding). The usable sample of 141 consisted of potentially gifted children who ranged in age from 6 through 12-6, from 10 of the 55 counties in West Virginia. The subjects were grouped for three levels of IQ range: bright group = 115-123, superior IQ group = 124-131, and gifted group = 132-148.

Design and Data Analysis. This ex post facto factorial study examined the responses of children of the three ability groups on each of the 10 mandatory WISC-III subtests categorized according to three levels of time demands: untimed, time limits, and tests with bonus points for speed of response. Multivariate analysis of covariance (MANCOVA) was also used to examine possible differences between these IQ groups for: a) subtest scores; b) verbal and performance IQ scores; and c) two of the four WISC-III factorial Indices, Verbal Comprehension Index (VCI) and Perceptual Organization Index (POI). The sum of the remaining two required subtests, Arithmetic and Coding (ArithCd sum), was used to estimate these two subtests' contributions to the Freedom from Distractibility and the Processing Speed Indices.

Results

When adjusted for FSIQ as the covariate, the MANCOVA analyses showed significant differences between the IQ groups for three verbal subtests: Information, Similarities, Comprehension, and for Picture Arrangement; for the VC and PO Indices; and the untimed and speed bonus groups of subtests, but not for the time constraint tests. Children in the bright IQ range showed comparatively lower scores on the subtests yielding bonus

Table 1
MANCOVA of WISC-III Means and Standard Deviations for Bright, Superior Ability, and Gifted Children
Analysis I - Comparison of Untimed, Timed, and Bonus Point Subtests
Analysis II - Comparison of Scores on Subtests
Analyses III, IV - Comparison of Verbal IQ and Performance IQ Scores

Measure	(Bright = 115-123)		IQ Group (Superior = 124 - 131)		(Gifted = 132-148)		
N	55		62		24		
	M	SD	M	SD	M	SD	Mancova F
Analysis I. Comparison of Untimed, Timed, and Bonus Subtests							
Untimed***	13.72	1.20	14.35	1.24	16.04	1.46	7.17
Timed^{ns}	12.57	1.74	13.72	1.45	14.94	1.62	2.23
Speed Bonus*	11.69	1.16	13.85	1.15	14.84	1.22	4.23
Analysis II. - Comparisons of Subtests							
Verbal Comprehension Index (VCI) Subtests							
Information*	13.40	1.72	13.74	1.94	15.79	1.98	4.10
Similarities**	13.71	1.90	14.36	2.06	16.08	2.02	5.03
Vocabulary^{ns}	13.38	2.09	14.61	1.94	15.50	2.98	.33
Comprehension**	14.38	2.24	14.68	1.92	16.79	2.11	5.27
VCI (sum)***	54.87	4.80	57.39	4.97	64.17	5.84	7.17
VC Index[1]	122		124		134		
Perceptual Organization Index Subtests							
Pict. Completion^{ns}	12.20	2.22	13.68	1.70	14.58	1.91	2.35
Picture Arrange**	12.53	2.36	15.50	2.47	15.75	2.79	6.68
Block Design^{ns}	11.64	2.53	14.18	2.33	15.58	2.41	2.13
Object Assembly^{ns}	11.27	2.53	13.05	2.27	13.54	3.06	1.13
POI (sum)***	47.64	4.69	56.40	4.60	59.46	4.61	8.47
PO Index[1]	112		124		130		
Subtests Contributing to Freedom from Distractibility and Processing Speed Indices, ArthCd (sum)							
Arithmetic^{ns}	12.20	2.79	13.53	2.37	15.08	2.00	.14
Coding^{ns}	12.06	2.85	12.89	2.85	14.71	2.46	.86
ArthCd (sum)^{ns}	24.26	3.31	26.42	3.48	29.79	2.64	.96
Estim. FDI or PSI[1]	111.5		117.5		127.5		
Analyses III, IV - ANCOVA Comparison of Verbal IQ, and Performance IQ;							
VIQ**	120.73	7.33	125.29	6.07	134.54	8.23	5.55
PIQ**	113.46	7.71	126.68	7.19	132.29	6.50	6.12
FSIQ-not analyzed	119.09	2.86	128.21	2.49	136.25	4.44	

Note: *=$p < .05$, **=$p < .01$, ***=$p < .001$. [1]Index Score Equivalents are conversions of each group's mean from norms tables A.5-A.7 (Wechsler, 1991). The FD and PS Indices are composites of two scores that include two alternate subtests: Arithmetic and Digit Span, and Coding and Symbol Search. Thus, we have estimated the FD and PS Indices based upon the sum of Arithmetic and Coding.

points for quick performance (e.g., Picture Arrangement, Block Design, and Object Assembly) but children who earned superior and gifted FSIQ scores on the WISC-III showed little deficit in these subtests that reward quick performance with speed bonus points.

A lower performance than verbal IQ occurred more frequently for children in the bright IQ range than for those in the higher IQ ranges. The VCI was higher than the POI for the gifted and bright IQ groups, but not for the superior ability group. The bright group had the greatest VCI/POI discrepancy of more than 10 Index points.

Discussion

The bright group of children in this sample of children referred for gifted services were found to have VCI scores similar to those categorized as superior IQ. On the other hand, this group's POI scores were well below that of the superior group and were closer to what one would expect for children of average level ability. The speed-based bonus point subtests comprising the POI are measures of cognitive ability that have been criticized as poor indicators of intellectual giftedness (Clark, 1991; Kaufman, 1992; Sattler, 1988).

The first research question is supported by the finding that different patterns of abilities exist among the three high ability groups of children. However, the discrepancy patterns of "peaks and valleys" typically noted for children of superior intellect on the WISC-R (Brown & Yakimowski, 1987; Kaufman, 1979; Wilkinson, 1993) and for gifted children on the WISC-III (Fishkin et al., in press), were not apparent in any of the three high ability groups in this sample. The lack of differences between verbal and performance IQ scales and relative lack of scatter among subtests for the gifted and superior IQ range groups was an unexpected finding. Prior studies with the WISC-R had consistently shown a greater verbal/performance IQ discrepancy among gifted children than average ability children (Silver & Clampit, 1990; Wilkinson, 1993). Inspection of individual student profiles revealed that the verbal IQ ranged from 127-141 for 12 children whose verbal IQ scale was 21 or more points higher than the performance IQ. Nine of these children constituted 16% of the group with a FSIQ of 115-123. Thus, the bright group instead of the gifted or superior group displayed the variability that had been previously observed for superior IQ children on the WISC-R (Silver & Clampit, 1990).

The subtests most influenced by speed, Block Design, Picture Arrangement, Object Assembly, and Coding or Arithmetic (depending upon the child's age) were comparatively lowest for the lower IQ group. Thus, the second research question is answered affirmatively; processing speed apparently had a greater effect for the children in the bright IQ range than for those in the superior or gifted range.

Block Design had been considered as a "peak" subtest on the WISC-R where children of superior intellect displayed their abstract figural thinking (Brown & Yakimowski, 1987; Wilkinson, 1993). The present results confirm the findings of other recent studies of gifted students with the WISC-III; children previously identified as gifted by the WISC-R obtained a WISC-III mean Block Design subtest score *below* their mean scale score performance (Fishkin et al., in press; Sevier et al., 1994). The task requirements for superior performance on the Block Design subtest have changed on the WISC-III to reward swiftness of reaction time to perhaps a greater extent than insight and abstract figural reasoning. Children who respond to some items within as few as 5, 10, or 15 seconds receive a greater bonus score than those who respond correctly within the time limit of 45 seconds. The loss of Block Design as a "peak" subtest for the gifted children in these recent studies lends support to Kaufman's (1992) hypothesis that reflective high ability youngsters might fail to earn superior scores due to the highly speeded nature of the WISC-III.

Perhaps some of the children in the bright group are among those whom Kaufman (1992) said could be penalized by the inordinate emphasis of the WISC-III upon speed of performance. Unlike the WISC-III, the Stanford-Binet IV is a power test without speed bonus points (Sattler, 1988). Julia Osborn (1995) recommended that other clinical practitioners use the Binet and "avoid" using the WISC-III to identify potentially gifted children unless evaluating also for possible learning disabilities.

Conclusions

Patterns of high and low abilities among the subtests were not observed for the superior and gifted groups in this study. However, the bright ability children showed patterns of strength and weaknesses that were similar to patterns expected for those with higher ability with poorer performance on the POI subtests than on the VCI subtests. Psychomotor performance, such as that measured by the POI, PSI, and Coding subtests, has been recognized as a poor indicator of intellectual giftedness (Clark, 1991; Kaufman, 1992; Sattler, 1988).

Although perceptual organization skills are important in advanced learning, it would appear that the WISC-III does not measure the perceptual organization skill of potentially gifted children but instead measures the *speed* with which those children organize perceptual materials. As noted by Kaufman (1992), such an interpretation of intelligence seems "silly." This finding takes on further significance when one examines the curricula of gifted programs and often finds the focus to be upon meeting the needs of children with advanced verbal skills to a far greater extent than visual spatial performance skills. We should focus the assessment of giftedness around the skills we identify in initial screening and the skills we expect after placement (Davis & Rimm, 1994).

Variations in versions of assessment instruments are influencing the operational definition of intellectual giftedness. The possibility of overemphasis on speeded performance on the WISC-III subtests may preclude adequate identification of some children who are abstract, reflective thinkers but are not as highly able in speed of their visual motor abilities. If these results are generalizable to other groups, it would seem that children who earn an IQ score in the gifted range of 130+ must be adept and quick at solving performance problems. On the other hand, the children who failed to earn IQs in the gifted range showed patterns previously associated with gifted scores. If so, is it possible that these children are indeed gifted, but misidentified as an artifact of the changes on the WISC-III?

Although the recent studies of cognitive ability patterns of gifted children on the WISC-III each had design limitations (Bryant, 1992; Fishkin et al., 1994; Fishkin et al., in press; Sevier et al., 1994), they add cumulative evidence to the present findings. The WISC-III appears to identify gifted children who have different patterns of cognitive response than those defined as gifted by the WISC-R. The representativeness of this sample is limited to children from 10 counties of one rural state. However, these results add to the growing evidence against use of WISC-III FSIQ scores as the primary criterion to identify gifted levels of ability. These results support recommendations to avoid use of the WISC-III as a measure of giftedness (Osborn, 1995), or to avoid use of its FSIQ and instead substitute appropriate verbal competency measures such as the VCI (Linda Silverman, personal communication, November 10, 1995).

Data from this sample of rural children who were referred for gifted services show that there was little difference in VCI between the children who earned only a bright FSIQ and those whose FSIQ was in the superior range. If the results of this study are replicated, they provide evidence for recommendations to identify children at a broader range of intellectual giftedness. For example, Richert (1991) suggested referring up to 25% of the school population so that any errors would be that of inclusion rather than exclusion of minority, disadvantaged, and other children of high potential. The present data support inclusion of children with an IQ of 115-123 or of those with a VCI in the superior range of 120 or higher. In keeping with recommendations to utilize additional sources of information including qualitative data and authentic or performance measures (Office of Educational Research and Improvement, 1993), it is important to refrain from using intelligence test scores as "cut scores" that exclude children from gifted program services (Hunsaker, 1994).

References

Brown, S. W., & Yakimowski, M. E. (1987). Intelligence scores of gifted students on the WISC-R. *Gifted Child Quarterly, 31,* 130-134.

Bryant, D. C. (1992). *A comparison of Wechsler Intelligence Scale for Children-Revised (WISC-R) and Wechsler Intelligence Scale for Children-Third Edition (WISC-III) for gifted children.* Unpublished master's thesis, West Virginia Graduate College, South Charleston.

Clark, B. (1991). *Growing up gifted, 4th ed.*, Columbus, OH: Merrill.

Davis, G.A., & Rimm, S.B. (1994). *Education of the gifted and talented* (3rd ed.). Boston: Allyn and Bacon.

Fishkin, A. S., Garlow, D., & Kampsnider, J. J. (1994). Is the WISC-III gender equitable for the potentially gifted? *Research Briefs, 9,* 53-58.

Fishkin, A. S., Kampsnider, J. J., & Pack, L. (in press). Exploring the WISC-III as a measure of giftedness. *Roeper Review.*

Gallagher, S.A., & Johnson, E.S. (1992). The effect of time limits on performance of mental rotations by gifted adolescents. *Gifted Child Quarterly, 36,* 19-22.

Hollinger, C. L., & Kosek, S. (1986). Beyond the use of full scale IQ scores. *Gifted Child Quarterly, 30,* 74-77.

Hunsaker, S. L. (1994). Adjustments to traditional procedures for identifying underserved students: Successes and failures. *Exceptional Child, 61,* 72-76.

Kaufman, A.S, (1979). *Intelligent testing with the WISC-R*, New York: Wiley.

Kaufman, A. S. (1992). Evaluation of the WISC-III and WPPSI-R for gifted children. *Roeper Review, 14,* 154-158.

Malone, P. S., Brounstein, P. J., von Brock, A., & Shaywitz, S.S. (1991). Components of IQ scores across levels of measured ability. *Journal of Applied Social Psychology, 21,* 15-28.

Office of Educational Research and Improvement. (1993). *National excellence: A case for developing America's talent.* Washington, DC: US Government Printing Office.

Osborn, J. (1995, November). *Identification: What interviews, instruments and why.* Symposium on Highly Gifted presented at the annual meeting of the National Association for Gifted Children, Tampa, FL.

Patchett, R. F. & Stansfield, M. (1992). Subtest scatter on the WISC-R with children of superior intelligence. *Psychology in the Schools, 29*, 5-10.

Reams, R., Chamrad, D., & Robinson, N.M. (1990). The race is not necessarily to the swift: Validity of WISC-R bonus points for speed. *Gifted Child Quarterly, 34*, 108-110.

Richert, E.S. (1991). Rampant problems and promising practices in identification. In N. Colangelo & G.A. Davis (Eds.) *Handbook of gifted education.* (pp. 81-96). Boston: Allyn & Bacon.

Sattler, J. M. (1988). *Assessment of children* (3rd ed.). San Diego: Jerome M. Sattler.

Sevier, R. C., Bain, S. K., & Hildman, L. K. (1994). Comparison of WISC-R and WISC-III for gifted students. *Roeper Review, 17*, 39-42.

Silver, S. J., & Clampit, M. K. (1990). WISC-R profiles of high ability children: Interpretation of verbal-performance discrepancies. *Gifted Child Quarterly, 34*, 76-79.

Webb, J. T. & Dyer, S. P. (1993, November). *Unusual WISC-R patterns among gifted children.* (Paper presented at the annual meeting of the National Association for Gifted Children, Atlanta, GA).

Wechsler, D. (1991). *Manual for the Wechsler Intelligence Scale for Children - Third Edition.* New York: Psychological Corporation.

Wilkinson, S. C. (1993). WISC-R profiles of children with superior intellectual ability. *Gifted Child Quarterly, 37*, 84-91.