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Research Implications

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Intellectual and Special Aptitudes of Tenth Grade EMH Students

Abstract: Special aptitude scores of a group of 84 tenth-grade Educable Mentally Handicapped (EMH) students were obtained with the Nonreading Aptitude Test Battery (NATB) while intelligence was quantified with the Wechsler Intelligence Scale for Children-Revised (WISC-R). It was hypothesized that aptitudes would emerge from the NATB which would have been overlooked by sole reliance on the WISC-R. Low to moderate correlations between NATB and WISC-R scores prevented immediate extraction of aptitudes independent of intelligence but cross-tabulations of NATB aptitude scores across IQ levels revealed that students often scored at average or above levels on such NATB factors as Form Perception, Clerical Perception, Spatial, and Dexterity. It was concluded that EMH students possess a variety of special aptitudes which could broaden their vocational choice and dissipate the myths surrounding their place in the world of work.

It has long been known that mentally retarded persons could take part in the useful work of society (Cowdry, 1922), and a new appreciation is growing that mentally retarded workers may have a more extensive work potential than was previously thought possible (Blackman & Siperstein, 1968; Gold, 1973). However, efforts to predict this work potential have generally been restricted to standardized intelligence tests that may not adequately measure other specific abilities crucial for vocational prediction for retarded persons (Taylor, 1964). Perhaps because of this oversight, stereotypes of mentally retarded persons persist.

Standardized tests of vocational aptitude have been developed to sample a wide range of abilities and have found wide use with general populations but have been considered to be inappropriate with even the borderline retarded (Neff, 1966). For example, the General Aptitude Test Battery (GATB) is reported to be the most highly validated multiple aptitude test battery in existence for use in vocational guidance (U.S. Department of Labor, 1970a,b), but is designed for persons with a sixth-grade education and may not appropriately serve people with educational handicaps (Cronbach, 1970). An alternative to the GATB, the Nonreading Aptitude Test Battery (NATB), was developed by the U.S. Department of Labor (1971) to measure essentially the same aptitudes as the GATB but within a disadvantaged population. Although not specifically normed on a mentally retarded sample, the NATB seems to hold promise for use with mentally retarded persons. It has been successfully used to select vocational trainees from an institutionalized men-

tally retarded population (Carbuhn & Wells, 1973) and its application with EMH and borderline intelligence high school students reveals that NATB scores can be viewed more positively than GATB scores and can provide valuable counseling information (Halloran, 1974; Hull & Halloran, 1976).

The present investigation used the NATB with a group of 10th-grade educable mentally handicapped (EMH) students and was designed to display vocational aptitude scores in relation to intelligence test scores. It was hypothesized that aptitudes would emerge from the NATB which would have been overlooked by reliance on intelligence test scores alone, and that these aptitudes could be presented as a method to use in dispelling the myths which equate subaverage general intellectual functioning with inability to perform other than menial work tasks.

Method

Subjects

Subjects were 84 tenth-grade EMH students, identified by state certified school psychologists, receiving special education services in a large urban Southwestern high school district. The students ranged in age from 15 to 18.5 years (Mean = 16.3, *SD* = .7), were members of several racial/cultural groups (56 Anglo, 18 Mexican-American, and 10 black), and were primarily male (55 male and 29 female). Their Wechsler Intelligence Scale for Children-Revised (WISC-R) Full Scale IQ scores ranged from 44 to 84 (Mean = 66.74, *SD* = 8.87).

Procedure

Ninety-five 10th-grade EMH students were administered the NATB during the fall semester of the school year as part of a routine vocational assessment program. Of this group, 84 students' psychological records contained complete and current WISC-R scores. The remaining 11 students were assessed with alternate instruments, had WISC-R scores more than two years old, or were missing WISC-R data, and so were eliminated from further consideration in the present investigation. NATB testing was accomplished on the students' home campus by two vocational examiners (1 male and 1 female) with the assistance of the students' counselor and/or teachers so that the examiner-to-student ratio ranged from 1:1 to 1:8. Protocols were hand scored with the appropriate scoring keys and the obtained raw scores converted to aptitude scores following procedures outlined in the NATB manual (U.S. Department of Labor, 1971). These aptitude scores were compared to 10th-grade norms for minimum scores "required to perform satisfactorily the major tasks of the groups of occupations identified with each . . . Occupational Aptitude Pattern" (p. 97). Table 1 lists the nine NATB aptitudes and presents a brief explaination of each.

TABLE 1

Nine NATB Aptitudes and a Brief Description of Each

Attitude	*Description*
G–Intelligence	General learning ability
V–Verbal	Ability to understand meaning of words and to use them effectively
N–Numerical	Ability to perform arithmetic operations quickly and accurately
S–Spatial	Ability to think visually of geometric forms and the movement of objects in space
P–Form Perception	Ability to perceive pertinent detail in objects, pictorial, or graphic material
Q–Clerical Perception	Ability to perceive pertinent detail in verbal or tabular material
K–Motor Coordination	Ability to coordinate eyes and hands or fingers to make a movement response accurately and swiftly
F–Finger Dexterity	Ability to manipulate small objects with the fingers, rapidly and accurately
M–Manual Dexterity	Ability to work with the hands in placing and turning motions

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Results

One initial area of interest was to quantify the relationship between NATB and WISC-R scores. This was accomplished by calculating the Pearson product-moment coefficient of correlation among the WISC-R verbal (VIQ), performance (PIQ), and full scale (FSIQ) scores, and the nine NATB factor scores. For a normal population (i.e., the standardization sample), the WISC-R has a mean of 100 and a standard deviation of 15; the NATB, 100 and 20. The resulting correlation matrix is presented in Table 2. The observed low to moderate correlations indicate that WISC-R scores are related to both verbal and performance NATB factor scores so no clearly defined aptitudes, independent of intelligence, could be extracted from this particular comparison.

To extricate NATB aptitudes from intelligence, students' WISC-R scores were divided into five categories to display the number and pattern of average or above NATB factor scores associated with each FSIQ category. These cross-tabulations reveal that 100% of the students with IQ's between 80 and 84, 77% with IQ's between 70 and 79, 45% with IQ's between 60 and 69, and 18% with IQ's between 50 and 59 obtained a score of 100 or larger on at least one NATB factor. Form Perception, Clerical Perception, Spatial, Manual Dexterity, and Finger Dexterity were the NATB factors on which students most often scored at average levels or above. Student NATB mean factor scores were above mean IQ on the Clerical Perception (92.93), Form Perception (92.68), and Spatial (80.85) factors but were essentially equivalent to mean IQ on the other six factors (58.55 to 63.58). Form Perception and Clerical Perception, in particular, appear to be aptitudes which would have been overlooked had the WISC-R not been supplemented by the NATB.

A final cross-tabulation was undertaken to display the number and variety of Occupational Aptitude Patterns (OAP) associated with each FSIQ category. An OAP is a group of occupations having similar aptitude requirements and was formed by the U.S. Department of Labor on the basis of validity studies and job analysis extrapolations. Sixty-two OAP's are reported for the GATB and NATB (U.S. Department of Labor, 1970b) and thus students could qualify for a total of 62 separate job families. WISC-R FSIQ scores were again divided into five categories and the number of students within each category who qualified for an OAP was tabulated. These cross-tabulations indicate that 100% of the students with IQ's between 80 and 84, 57% with IQ's between 70 and 79, and 34% with IQ's between 60 and 69 qualified for at least one OAP while only those students with FSIQ's below 60 failed to qualify for at least one family of jobs. Overall, 40% of these students qualified for at least one OAP and aggregately they

TABLE 2

Correlations Between WISC-R and NATB Factors

	PIQ	*FSIQ*	*G*	*V*	*N*	*S*	*P*	*Q*	*K*	*F*	*M*
VIQ	.36	.79	.55	.40	.25	.37	.28	.28	.20*	.33	.19*
PIQ		.85	.45	.16*	.44	.45	.67	.40	.24	.44	.36
FSIQ			.61	.33	.42	.51	.59	.43	.27	.49	.36
G				.62	.64	.73	.40	.31	.07*	.28	.26
V					.40	.08*	.02*	.08*	−.05*	−.10*	−.03*
N						.39	.44	.44	.24	.40	.35
S							.51	.31	.08*	.40	.36
P								.56	.39	.48	.49
Q									.45	.36	.49
K										.37	.29
F											.52

Note: $p < .05$ unless marked by * which indicates ns.

qualified for 39 of the possible 62 job families.

Discussion

People with low general intelligence may have average or high ability in other aptitudes yet there is still a tendency to rely on intelligence tests and stereotypic notions when considering retarded people for employment. The present investigation revealed a relationship between WISC-R and NATB aptitude scores of low to moderate magnitude for this group of EMH students who often scored at average or above levels on such NATB factors as Form Perception, Clerical Perception, Spatial, and Dexterity. These results are similar to those reported by Murray (1956) where the GATB was used and to those published by Hull and Halloran (1976) where the NATB was used. They also parallel the dichotomy of intellectual abilities versus special abilities formulated by Nunnally (1978). Thus, while performing at subaverage levels in the intellectual class of aptitudes, many students performed at average or better levels in the special class of aptitudes. This special ability was reflected in OAP qualification rates where 40% of the students met cutting-point scores for at least one OAP and where, as a group, they qualified for 39 of the possible 62 OAP's.

Present results suggest that EMH students possess a variety of special aptitudes which are sufficient in many cases to qualify them for several job families if no other factors are considered. It is obvious, however, that a diverse array of factors other than intellectual and special aptitudes may be closely related to prediction of vocational success: social, economic, personality, physical, interest, educational, training, and experience, to name only a few. None of these factors can be arbitrarily omitted when considering vocational prediction but no single factor should be sufficient to cause a priori narrowing of the deliberation process. A more complete consideration of all factors (intellectual, special, and others) will serve to broaden the vocational choice of mentally retarded workers and to dissipate the myths surrounding their place in the world of work.

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