

1992

Adequate and appropriate intelligence testing of moderately mentally retarded children

Nancy Lynn Robertson Orrison
College of William & Mary - School of Education

Follow this and additional works at: <https://scholarworks.wm.edu/etd>



Part of the [Educational Assessment, Evaluation, and Research Commons](#), [Educational Psychology Commons](#), and the [Special Education and Teaching Commons](#)

Recommended Citation

Orrison, Nancy Lynn Robertson, "Adequate and appropriate intelligence testing of moderately mentally retarded children" (1992). *Dissertations, Theses, and Masters Projects*. Paper 1539618394.
<https://dx.doi.org/doi:10.25774/w4-mr93-rw17>

This Dissertation is brought to you for free and open access by the Theses, Dissertations, & Master Projects at W&M ScholarWorks. It has been accepted for inclusion in Dissertations, Theses, and Masters Projects by an authorized administrator of W&M ScholarWorks. For more information, please contact scholarworks@wm.edu.

INFORMATION TO USERS

This manuscript has been reproduced from the microfilm master. UMI films the text directly from the original or copy submitted. Thus, some thesis and dissertation copies are in typewriter face, while others may be from any type of computer printer.

The quality of this reproduction is dependent upon the quality of the copy submitted. Broken or indistinct print, colored or poor quality illustrations and photographs, print bleedthrough, substandard margins, and improper alignment can adversely affect reproduction.

In the unlikely event that the author did not send UMI a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.

Oversize materials (e.g., maps, drawings, charts) are reproduced by sectioning the original, beginning at the upper left-hand corner and continuing from left to right in equal sections with small overlaps. Each original is also photographed in one exposure and is included in reduced form at the back of the book.

Photographs included in the original manuscript have been reproduced xerographically in this copy. Higher quality 6" x 9" black and white photographic prints are available for any photographs or illustrations appearing in this copy for an additional charge. Contact UMI directly to order.

U·M·I

University Microfilms International
A Bell & Howell Information Company
300 North Zeeb Road, Ann Arbor, MI 48106-1346 USA
313/761-4700 800/521-0600

Order Number 9226634

**Adequate and appropriate intelligence testing of moderately
mentally retarded children**

Orrison, Nancy Lynn Robertson, Ed.D.

The College of William and Mary, 1992

Copyright ©1992 by Orrison, Nancy Lynn Robertson. All rights reserved.

U·M·I
300 N. Zeeb Rd.
Ann Arbor, MI 48106



ADEQUATE AND APPROPRIATE INTELLIGENCE TESTING
OF MODERATELY MENTALLY RETARDED CHILDREN

A Dissertation
Presented to
The Faculty of the School of Education
The College of William and Mary in Virginia

In Partial Fulfillment
Of the Requirements for the Degree
Doctor of Education

by
Nancy Lynn Robertson Orrison

May 1992

ADEQUATE AND APPROPRIATE INTELLIGENCE TESTING
OF MODERATELY MENTALLY RETARDED CHILDREN

by

Nancy Lynn Robertson Orrison

Approved May 1992 by

Louis R. Mason, Ed. D.

Roger R. Riss

John R. Zilli

TABLE OF CONTENTS

Chapter 1: The Problem 2
Statement of Need 2
Purpose of Study 4
Research Questions 5

Chapter 2: Review of Literature 7
Mental Retardation Defined 7
 Deficits in general intellectual functioning 7
 Deficits in adaptive behavior 9
 Developmental period 11
Description of Population 12
 Mental retardation and deficits in speech/language 12
 Mental retardation and visual impairment 13
 Mental retardation and hearing impairment 13
 Mental retardation and motor impairment 13
Intelligence Testing of Moderately Mentally Retarded Children 15
 The Wechsler Intelligence Scale for Children 15
 The Stanford-Binet Intelligence Scale for Children 18
 The Kaufman Assessment Battery for Children 19
 The Woodcock-Johnson Psychoeducational Battery 20
 The McCarthy Scales of Children's Abilities 21
 The Leiter International Performance Scale 23
Adaptive Behavior Scales 24
 The AAMD Adaptive Behavior Scale 25
 The Vineland Adaptive Behavior Scale 26

Chapter 3: Design of Study 28
 Need and Purpose of Study 28
 Experimental Design 28
 Response Rate 29

Chapter 4: Analysis of Results 31
 Research Question 1 31
 Research Question 2 32
 Research Question 3 35
 Research Question 4 40
 Research Question 5 41
 Research Question 6 42
 Research Question 7 43
 Research Question 8 44

Chapter 5: Conclusions 46

Appendix: Survey Form

Bibliography

Vita

TABLES

Table 1: Level of Retardation Indicated by IQ Range Obtained on Measure of General Intellectual Functioning 2

Table 2: Tests in Use for Moderately Mentally Retarded Children with Speech/Language Impairments 36

Table 3: Tests in Use for Moderately Mentally Retarded Children with Fine Motor Impairments 37

Table 4: Tests in Use for Moderately Mentally Retarded Children who are Visually Impaired 38

Table 5: Tests in Use for Moderately Mentally Retarded Children who are Hearing Impaired 39

FIGURES

Figure 1: Frequency of Testing Moderately MR Children	30
Figure 2: Tests in Use in Virginia	31
Figure 3: Testing Moderately MR Children with Other Impairments	33
Figure 4: Testing Moderately MR Children with Other Impairments	33
Figure 5: Testing Moderately MR Children with Other Impairments	34
Figure 6: Frequency of Multiple Tests	40
Figure 7: Frequency of Use of Adaptive Behavior Scales	41
Figure 8: Adaptive Behavior Scales in Use in Virginia	42
Figure 9: Personnel Who Administer Behavior Scales	43
Figure 10: Frequency of Multiple Informants	44

ADEQUATE AND APPROPRIATE INTELLIGENCE TESTING
OF MODERATELY MENTALLY RETARDED CHILDREN

ABSTRACT

The intelligence of moderately mentally retarded (MR) children is difficult to assess because they often have concurrent physical or sensory impairments which adversely affect their test performance. The purpose of this study was to determine if necessary adaptations are made when assessing children who are moderately MR for educational placement in the State of Virginia.

A survey was sent to the public school psychologists in the State of Virginia as identified by the 1990-91 roster from the Virginia Department of Education. The survey inquired as to their normal methods of intelligence testing used with the moderately mentally retarded population. The results of the survey and a review of literature were used to determine methods of successful assessment of children who are moderately mentally retarded.

The results of the study indicate that more than one intelligence measure must be made to validate the results. The inclusion of adaptive behavior scales is necessary to satisfy the criteria for mental retardation. Modifications are often necessary to prevent physical handicaps from suppressing the child's scores on standard intelligence tests. What is needed are precisely stated modifications, included with standard intelligence tests, which accommodate for the needs of moderately mentally retarded children.

NANCY LYNN ROBERTSON ORRISON
DEPARTMENT OF EDUCATION
THE COLLEGE OF WILLIAM AND MARY IN VIRGINIA

**ADEQUATE AND APPROPRIATE INTELLIGENCE TESTING
OF MODERATELY MENTALLY RETARDED CHILDREN**

CHAPTER 1

Need

The intelligence of moderately mentally retarded children is extremely difficult to assess. In addition to low intellectual ability, these children may also have weaknesses in other areas of development. Many are limited in speech and language ability, some being totally nonverbal. Concomitant muscular weaknesses or neurological deficits affecting gross and fine motor ability are common to this population. Many have visual or auditory deficits as well (AMA, 1978), (Budoff et al., 1976), (O'Connor et al., 1970), (APA, 1987).

Assessment of mentally retarded (MR) children to determine appropriate educational placement largely relies on their performance on the Wechsler (WISC-R/WISC-III) or Stanford-Binet (SB-4) intelligence test. The items on these tests require fine motor ability, speech, and visual and auditory acuity which are at times beyond the ability of moderately retarded children. They might comprehend the question and know the answer, but be incapable of making the needed verbal expression. They may be unable to pick up or manipulate the tiny buttons or pegs as is required of them. They may not see the details in a visual presentation needed to correctly answer the question, or might not hear the examiner clearly. In such cases the test is not a true measure of cognition, as the respondents are limited by other physical disabilities. Thus the tests may not be a valid measure of intelligence.

Because "deficits in adaptive social behavior" are stated by the American Association on Mental Retardation (AAMR)(formerly the American Association on Mental Deficiency, AAMD) to be a defining characteristic of mental retardation, measures of the moderately MR child's ability to function in society should also be included in assessment (Grossman,1983). The WISC-R/WISC-III and SB-4 measure current intellectual functioning which correlates with potential academic success. They do not measure social behavior skills. The moderately MR child's life objective is to be a functional and contributing member of his/her family and community. Academic achievement is not a prime educational emphasis for this population. Therefore the use of standard IQ tests alone fails to measure the functional ability of the moderately retarded individual. Further

measures of the child's abilities must be ascertained in order to provide a true description of the child's potential.

In the Eligibility process (P.L. 94-142, 1976), placement of mentally retarded children into educational settings is determined in part the scores they obtain from intelligence tests. The levels of mental retardation as defined by IQ scores are shown on the following table (Grossman, 1983):

TABLE 1
LEVEL OF RETARDATION INDICATED BY IQ RANGE OBTAINED ON
MEASURE OF GENERAL INTELLECTUAL FUNCTIONING

Term	IQ range for level
Mild mental retardation	50-55 to approx. 70
Moderate mental retardation	35-40 to 50-55
Severe mental retardation	20-25 to 35-40
Profound mental retardation	Below 20 or 25
Unspecified	

Mildly retarded, or educable mentally retarded, children generally follow an academic track, in mainstream placements whenever possible with age appropriate peers. Moderately retarded, or trainable mentally retarded, children receive training to improve self-help, vocational, and survival skills. Children classified as severely or profoundly mentally retarded are also taught self-help and basic manipulative skills on a much simpler basis.

The above mentioned levels are markedly different from one another. To score a child too low could overlook his/her potential to read or learn a trade. To score him/her too high could cause the child to be placed in a program in which he/she could not succeed. In order to place the child in the "least restrictive environment" (P.L. 94-142, 1976), attention must be paid to his/her attributes and abilities which may not be revealed by standard intelligence testing.

In The Regulations Governing Special Education Programs for Handicapped Children and Youth in Virginia (1990), published by the Virginia Department of Education, the definition of mental retardation is stated as follows: "significantly subaverage general intellectual

functioning existing concurrently with deficits in adaptive behavior and manifested during the developmental period, which adversely affects a child's educational performance." This definition meets the criteria of the AAMR and of P.L. 94-142, which include adaptive behavior.

Under "Assessment Component Requirements" for mentally retarded children only the following are listed: "psychological, medical, sociocultural, and educational/ developmental reports". Adaptive behavior scales are not required, even though "deficits in adaptive behavior" is clearly a part of the definition of mental retardation (Virginia Department of Education, 1990).

Studies have revealed that nationwide State Departments of Education are not consistent in their inclusion of adaptive behavior in the definition and assessment of mental retardation (Huberty, Koller & Brink, 1980), (Utley, Lowitzer & Baumeister, 1987). In 1987, a telephone survey to State Departments of Education indicated that while "88% of the states referred to the term adaptive behavior in their definition of MR" [...] "only 10% of the states identified [the use of] standardized adaptive behavior instruments" (Utley et al., 1987).

In the Virginia State regulations (Virginia Department of Education, 1990) the following requirement for evaluation for eligibility is stated: Tests are selected and administered so as to best ensure that when 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."

Requirements of additional testing are not included.

If Virginia regulations do not require adaptive behavior scales, do conscientious psychologists still administer them? Do they modify their testing procedures/choices of tests to accommodate for "the child's impaired sensory, manual, or speaking skills" (Virginia Department of Education, 1990)?

Purpose

The purpose of this study is to analyze and evaluate the current testing practices, across the State of Virginia, used with children who

are moderately mentally retarded, between five and eight years of age. By means of a survey sent to Virginia public school psychologists, the selection of intelligence tests, the use of supplemental tests, and the inclusion of adaptive behavior scales to determine eligibility and make placement decisions will be examined.

The following research questions will be addressed:

Research Question 1: What tests are currently used by psychologists or others for the assessment of moderately retarded children, five to eight years of age?

Research Question 2: What percentage of moderately MR children have deficits in: a) speech & language
b) fine motor ability
c) vision
d) hearing?

Research Question 3: What intelligence test(s) currently available are most appropriate for this population?

Research Question 4: In Virginia, are other tests of intelligence used in conjunction with the SB-4 or WISC- R? If so, which tests are used?

Research Question 5: What is the frequency of use by Virginia school divisions of adaptive behavior scales for the assessment of moderately MR children?

Research Question 6: What adaptive behavior scales are in use?

Research Question 7: Are adaptive behavior scales completed by:
a) a psychologist
b) a social worker
c) a teacher
d) other?

Research Question 8: Are measures made by more than one observer (e.g. parent and teacher)?

Summary

In summary, this study is to determine if moderately MR children, due to the complexity of their handicaps, require additional assessment measures to evaluate their intelligence and functional abilities. Based on the results of the survey sent to Virginia school psychologists and a review of related literature and test instruments, suggestions for

optimizing the performance of moderately mentally retarded children on standard intelligence tests will be developed.

CHAPTER 2

In order that children who are mentally retarded (MR) may receive needed social services and education, there must be "a clear and universally accepted definition of MR" (Zigler, Balla, & Hodapp, 1984). The most widely accepted definition to date is found in the American Association on Mental Deficiency (AAMD) Classification in Mental Retardation (Grossman, 1983). This definition is also incorporated into Public Law 94-142 (The Education for All Handicapped Act, 1976) and reads as follows:

Mental retardation refers to significantly subaverage general intellectual functioning existing concurrently with deficits in adaptive behavior and manifested during the developmental period (Grossman, 1983, p.1)

This definition will be analyzed and discussed in the context of related literature.

General intellectual functioning is defined as the results obtained by assessment with one or more of the individually administered general intelligence tests developed for the purpose of assessing intellectual functioning (Grossman, 1983, p.1).

The instruments most widely used to measure general intelligence are the Stanford-Binet Intelligence Scale - 4th Edition (SB-4) and the Wechsler Intelligence Scale for Children - Revised (WISC-R) [now the WISC-III] (Salvia & Ysseldyke, 1988). There has been much discussion in the literature regarding the appropriateness of these instruments for use with MR children.

"Beyond predicting academic performance within the relatively fixed school system, intelligence tests have dubious validity for differential diagnosis of MR. Correlations between IQ and measures of achievement outside of school are relatively low" (Baumeister, 1987). In most cases, school curricula for moderately MR children give greater emphasis to self-care and vocational skills than to academic subjects. Scores on an intelligence test would have little relevance to the moderately MR child's educational program.

Still, these standardized tests remain "indispensable when making assessments, even if they are not sufficient in themselves for use in final diagnosis and planning" (Grossman, 1983, p.39). These instruments have been carefully developed, tested, retested, refined, and validated. They are the standard to which other tests are compared.

"IQ [also] provides a common denominator for mental deficiency which allows additional categories with respect to level and etiology". It is largely by IQ that decisions are made between "the categories 'mild', 'moderate', 'severe', and 'profound' and the groups referred to as 'trainable' and 'educable'" (Clausen, 1972, p.59).

Currently there is "no alternative but to utilize scores obtained on standard measures such as the Stanford-Binet and the WISC-R in the operational definition of MR" (Zigler et al., 1984, p.225). Zigler further recommends that an individual should be tested "at least twice before the label retarded is applied. The additional test(s) might be a cognitive-developmental measure, different intelligence test, or specific area assessment" (Zigler et al., 1984, p.226). The additional test could also be an instrument designed for use with children who have physical or sensory deficits, such as the Leiter International Performance Scale for a hearing impaired child.

Significantly subaverage general intellectual functioning is defined as approximately IQ 70 or below (Grossman, 1983, p.1).

One aspect of mental retardation is determined by standard deviations (SD) below the mean, or average, IQ score of 100. One SD is fifteen points for WISC-R/WISC-III and sixteen points for SB-4.

But why two SD's [for mental retardation]? In fact, some years ago the AAMD advanced the definition that all scores below one SD from the mean comprised the retarded range [...] increasing the ranks of retarded persons from approximately 6 to 32 million! [This] underscores the need for a definition of mental retardation based on a sounder criteria and for a classification system that is more informative about the significance of variations in human intelligence (Zigler et al., 1984, p.216).

Some state and local school divisions classify children with IQ scores one SD below the mean to be "borderline MR"; others do not (Utley, Lowitzer, & Baumeister, 1987,p.38). Two SD's below is classified as "mildly MR", or "educable"(EMR). Three SD's below is "moderately MR", or "trainable"(TMR). Four SD's below is "severe MR"; five below is "profound MR" (Grossman, 1983,p.13). Frequently these last two categories are grouped as one: "severe-profound MR". These categories are the usual basis for placement into educational and social services. This attempts to be a "homogeneous grouping ... with respect to IQ" of an extremely heterogeneous population, showing great "within-subject variability" (Baumeister, 1987, p.787). Some mentally retarded people may have little more in common than their IQ scores. Characteristics of the moderately MR population will be addressed later.

Adaptive behavior is defined as the effectiveness or degree with which individuals meet the standards of personal independence and social responsibility expected for age and cultural group (Grossman, 1983).

Adaptive behavior is included in the AAMD definition, along with intellectual functioning, as an identifying characteristic of mental retardation. There has been much discussion, both pro and con, concerning the inclusion of adaptive behavior in the assessment of mentally retarded persons.

Adaptive social behavior, sometimes referred to as "social competence" (Bailey & Simeonsson, 1985), (Odom & McConnell, 1985), (Newman & Doby, 1973), is difficult to identify and describe. What are the behaviors that demonstrate adaptive/maladaptive social behavior? Lists of social behaviors have considerable variation from author to author. For example, some include communication skills, while others do not. The AAMD manual lists areas of adaptive behavior as follows:

INFANCY AND EARLY CHILDHOOD

1. sensory motor skills development
2. communication skills
3. self-help skills
4. socialization

CHILDHOOD AND EARLY ADOLESCENCE

5. application of basic academic skills in daily life activities

6. application of appropriate reasoning and judgement in mastery of the environment
7. social skills (participation in group activities and interpersonal relationships)

LATE ADOLESCENCE AND ADULT LIFE

8. vocational and social responsibilities

(Grossman, 1983)

These may or may not match the domains tested by various adaptive behavior scales. Two commonly used behavior scales will be compared later in this paper.

The most widely used adaptive behavior scales are the AAMD Adaptive Behavior Scale - School Edition and the Vineland Adaptive Behavior Scale. For both of these instruments, information is gathered from persons who know the subject as caregiver or teacher. In both cases there is possibility of error, either from lack of information or personal bias toward the subject. Statistical aspects of adaptive behavior scales will be discussed later.

Concern is also stated in the literature that the nature of the child's environment is not considered in evaluation of the child's behavior. Many factors of the environment have impact on the child.

"... components of the past and present environments, attitudes and expectations of significant others, and interaction [of] the child with the above are possible explanations of a child's present behavior and social abilities" (Newman & Doby, 1973). Factors in the environment can either stimulate or deprive the child, affecting his/her adaptive behavior in a positive or negative manner (Clausen, 1972).

Zigler maintains that adaptive behavior is "too elusive and illdefined" to be used as criteria for the MR label (Zigler et al., 1984). Halpern stresses, however that social competence is a "definitive factor of mental retardation". To ignore this factor could lead to the "erroneous attitude that mental deficiency is nothing other than a defect in intellectual functioning" (Halpern, 1968).

Identifying children as MR by IQ scores alone runs the risk of overidentification. In the case of EMR, or mildly retarded children, they may only appear handicapped in the school setting where they are faced with academic failure. "The discovery of the 'six-hour retarded child' reflects this differential prediction of school versus nonschool behavior"

(Baumeister, 1987,p.1), and the importance of social behavior data in the identification process.

When identifying moderately MR (TMR) children, use of IQ alone could overlook abilities in social, self-help, or communication skills which could indicate ability to function in the EMR range. Likewise, children in the lower TMR range could appear severely retarded by use of IQ alone. For example, a child whose IQ test results fall in the severe MR range due to a hearing impairment might be capable of independent self-care in his/her home. This information would be obtainable through an adaptive behavior scale, and might otherwise be overlooked.

In summary, adaptive behavior is difficult to assess accurately due to the effects and demands of environment which are unique to each child. Information gathered from caretakers or teachers regarding the child could be biased, for or against the child, as others view his/her abilities or disabilities.

To overlook adaptive behavior, however, would be to ignore the areas of ability in which a TMR child might show competence. It would be to overlook areas of learning stressed by his/her school curriculum. In short, it would be to disregard a defining aspect of mental retardation necessary for a full evaluation and appropriate placement recommendations. Acceptance of the AAMD definition as criteria for evaluation demands that adaptive behavior be included in the assessment of moderately MR children.

The developmental period is defined as the period of time between conception and the 18th birthday. Developmental deficits may be manifested by slow , arrested, or incomplete development resulting from brain damage, degenerative processes in the central nervous system or regression from a previously normal state due to psychosocial factors.

(Grossman, 1983, p.11)

If any of the above occur after eighteen years of age, "the condition is more properly classified as 'dementia' (APA, 1987). A person over age eighteen who receives a head injury, for example, would not be labelled as MR. A child classified as MR before this age, however, could retain the MR label throughout his/her lifespan.

In summary, mental retardation, as defined by Grossman, requires that the child has significantly subaverage general intellectual functioning, as demonstrated by his/her scores on an individually administered intelligence test. The child must also have deficits in adaptive behavior, which requires that an adaptive behavior scale be administered. This definition also requires that these deficits be identified during the developmental period, before the child's eighteenth birthday. This definition is accepted by the American Association on Mental Retardation, and it is a part of Public Law 94-142, which mandates identification and service delivery for all mentally handicapped children.

There are many causes and conditions that may result in mental retardation. These include: infections and intoxications, traumas or physical agents, disorders of metabolism or nutrition, gross postnatal brain diseases, unknown prenatal influences, chromosomal abnormalities, conditions originating in the perinatal period, psychiatric disorders, environmental influences, and other conditions (Grossman, 1983, p.130-134), (McCaffrey & Isaac, 1985, p.63). "Regardless of the specific etiology of the intellectual disorder of MR, they all serve directly (e.g. head trauma) or indirectly (e.g. infections or metabolic conditions) to produce changes in the central nervous system" (CNS) (McCaffrey & Isaac, 1985, p.63). When damage is sustained to any part of the CNS, "there is likely to be a corresponding assault to another part of that system." A person who is MR is therefore likely to have other neurological impairments, such as epilepsy, cerebral palsy, or spina bifida (Brimer, 1990, p.111), (APA, 1987).

Grossman lists "concurrent medical problems" with mental retardation as: speech and language abnormalities, blindness and low vision, hearing loss, infantile cerebral palsy, and epilepsy (Grossman, 1983, p.150-154). As the severity of the mental retardation increases, so does the likelihood of other handicapping conditions. Those who are classified as moderately, severely, or profoundly MR (15-25% of the MR population) are more likely to manifest physical or sensory impairments than those who are mildly MR (AMA, 1978, p.4), (Sattler, 1988).

There is much diversity in the type and extent of these additional impairments. They can affect the individual's ability to function in many ways. His/her speech may be lacking or difficult to understand. There may be impairments to his/her vision or hearing. Fine motor coordination might be limited so that the individual is unable to grasp, point, or write. The severity of these deficits may be minimal or extremely handicapping.

Visual impairment among people who are MR occurs ten times as often as in the normal population. Visual problems frequently occur among those with Down's Syndrome or cerebral palsy. Data indicates that up to 50% of the MR population may need optical correction (Ellis, 1986, p.9-12).

Persons with Down's Syndrome are also prone to hearing deficits due to congenital malformations of the ear structures. Although it is difficult to assess the hearing of many retarded children, data indicates that the prevalence of hearing impairment in the MR population could be as high as 80% (Ellis, 1986).

In light of these handicaps, one should regard with caution the scores of handicapped children on general intelligence tests. "Mental retardation is not the only depressant of learning capacity. A child who seems retarded may be suffering from defective hearing or vision, cerebral palsy, communication or language disorder, emotional disorder, perceptual handicap, another chronic illness or from chronic malnutrition" (AMA, 1978, p.10).

Especially when testing children with cerebral palsy, lack of speech, sensory deficits, lack of motor coordination, or apparent inattention could easily be confused for lack of intelligence (Sattler, 1988). "It is hard to justify a diagnosis of MR in persons with cerebral palsy based on intelligence tests that are standardized on children with adequate speech, language, and motor abilities" (Brimer, 1990).

Sensory impairments have a compound effect on the child's apparent abilities. Hearing impairment suppresses learning, while mental retardation "affects the use of auditory inputs". The combined effects visual impairment and mental handicaps can further reduce functional ability. Sensory impairments may also have overall negative effects on

the child's development, learning, and integration of experiences (Ellis, 1986).

"Intelligent behavior can be and often is exhibited by people who lack coordination in movement or who are blind or deaf. In order to appraise that behavior for the purpose of inferring intelligence, it is necessary to distinguish between performance limitations that are due to sensory or motor impediments or those that are due to impaired intelligence" (Grossman, 1983, p.27).

Vision and hearing screenings prior to intelligence testing are essential. If the child is not able to respond to standard vision and hearing tests, close observation of the child by teachers or parents familiar to him/her might reveal signs of vision or hearing impairment, such as squinting to see a book, or failing to respond when spoken to from behind (Sattler, 1988). The use of additional intelligence tests that do not require speech or motor coordination, or that are designed for persons with sensory impairments, may improve the accuracy of the testing. A discussion of test instruments and testing practices will follow.

The following section will review some existing intelligence tests with regard to psychometric properties and appropriateness for use with moderately MR children. Demands of the tests, in terms of eye-hand coordination, communication skills, vision, and hearing will also be discussed. The tests reviewed are: The Wechsler Intelligence Scale for Children-Revised (also WISC-III and WPPSI), The Stanford-Binet Intelligence Scale: 4th Edition, The Kaufman Assessment Battery for Children, The Woodcock-Johnson Psychoeducational Battery, The McCarthy Scales of Children's Abilities, and the Arthur Adaptation of the Leiter International Performance Scale.

The Wechsler Intelligence Scale for Children - Revised (WISC-R) (Wechsler, 1974) is frequently used for assessment of children who are mentally retarded (MR). It covers an age range from 6-0 to 16-11 years. There are six subtests on the Verbal Scale and six on the Performance Scale.

The WISC-R has excellent internal consistency reliability: Full Scale IQ .94; Verbal Scale IQ .90; Performance Scale IQ .90. Numerous studies have been conducted to determine the "criterion validity of the WISC-R by correlating the WISC-R with the WPPSI, WAIS-R, WAIS, and the SB-4, ...other IQ tests, measures of achievement and school grades". These indicate that the WISC-R has "satisfactory" current validity; correlations range from .34 to .82. Standardization on the normal population is "excellent", covering all demographic and geographic populations. Handicapped populations are not included, however (Sattler, 1988).

In order for a child to respond to the Verbal Scale, vision and/or hearing are necessary. Vision and arm and hand use are necessary for the performance subtests. "In administering the WISC-R to children with physical disabilities [one] must attempt to find new ways to give the test without, in the process, providing cues to the child" (Sattler, 1988). On the timed subtests, where higher scores are rewarded to faster responses, "special consideration" must be given to children with motoric impairments who would have delayed or distorted responses (Salvia & Ysseldyke, 1988).

Short forms of the WISC-R can also be selected to avoid these obstacles. For example, a child with "marked visual impairment or severe motor dysfunction of the upper extremities" could be given the Verbal Scale as a short form. The Performance Scale could be used alone as a short form for hearing impaired. It is cautioned, however, that by eliminating subtests, a lesser variety of abilities are tapped, and the stability and reliability of the test may be reduced (Sattler, 1988). There is a special edition of the WISC-R published by Gallaudet University, standardized for deaf and hearing impaired students (Salvia & Ysseldyke, 1988).

The lower range of scores obtainable on the WISC-R is insufficient for severely MR children. "...the WISC-R may not provide precise IQ's for young children who are functioning two or more standard deviations below the mean of the scale" (Sattler, 1988). In addition, only a small range of cognitive abilities are sampled because so few items are administered. "If a child fails all or most of the items on the WISC-R, a different test should be administered to obtain a more accurate estimate of the child's abilities" (Sattler, 1988). This test should be chosen to avoid the physical or sensory deficits which further handicap the MR child.

The WISC-R is a valid and reliable instrument for "assessing mild levels of MR" [...] "WISC-R test results should be used in conjunction with other test results, interviews, observations, and case history information to assess the MR child's abilities" (Sattler, 1988).

The Wechsler Intelligence Scale for Children- Third Edition (WISC-III) (Wechsler, 1991) "embodies the outstanding psychometric features and quality of standardization that the professional community has come to expect from the Wechsler Scales". The WISC-III has updated norms based on 1988 census data; 2200 children were included in the sample from the normal population. Median reliability coefficients are .95 Verbal, .91 Performance, and .96 Full Score. They range from .70 to .94 on subtests. Correlations between scores on the WISC-III and other cognitive measures range from .70 (Woodcock-Johnson BCA revised) to .96 on the WAIS-R. Correlations between the WISC-R and the WISC-III (.81 to .90) provide

"evidence that the WISC-III measures essentially the same constructs as does the WISC-R" (Wechsler, 1991).

In a study conducted with 43 children diagnosed as EMR, scores obtained on the WISC-III were 6.8 - 8.9 IQ points less than on the WISC-R. This is "expected due to the more contemporary norms" of the WISC-III (Wechsler, 1991).

The WISC-III also presents obstacles for physically or sensory impaired children. It is necessary for tests givers to become familiar with the child's "limitations and preferred mode of communication"... "Although modifications of test procedures may be necessary, the WISC-III was not standardized with such modifications". Use of the Verbal Scale alone for physically handicapped children, or the Performance Scale alone for those who are speech impaired weakens the test's validity, as with the WISC-R (Wechsler, 1991).

The floor of the WISC-III fails to provide for the severely MR child. It is recommended that the WPPSI should be used for MR children below age seven "because it has a lower floor than the WISC-III"(Wechsler, 1991).

The Wechsler Preschool and Primary Scale of Intelligence (WPPSI)(Wechsler,1967) has an .82 - .85 correlation with the WISC-III. It shares its "excellent psychometric properties". It was designed for "normal and mildly retarded preschool children [and] has high interest levels for young children" (Sattler, 1988).

The WPPSI does not "clearly differentiate abilities at the ...lower end of the scale". It may not provide precise IQ's for children who are functioning two or more SD's below the mean of scale. "Further research is needed to determine the validity of the WPPSI for moderately MR children" (Sattler, 1988).

It is recommended that other measures and history information be used in conjunction with the WISC-R, WISC-III, or the WPPSI when measuring moderately MR children (Wechsler, 1991). The WPPSI may be more appropriate for 5-7 year olds because of the higher interest tasks and the lower floor.

The Stanford-Binet Intelligence Scale: 4th Edition (SB-4) (Thorndike, Hagan & Sattler, 1986) "can be given to persons between the ages of 2 and 23". Areas tested consist of: Verbal Reasoning (4 subtests), Quantitative Reasoning (3 subtests), Abstract/Visual Reasoning (4 subtests) and Short-term Memory (4 subtests).

The SB-4 has composite scale reliability of .95 to .99 over seventeen age groups. The subtests have somewhat lower reliability, .73 to .94 (Sattler, 1988), (Salvia & Ysseldyke, 1988). Criterion validity is determined by comparisons with other tests: WISC-R, WPPSI, WAIS-R, and Kaufman Assessment Battery for Children, for both normal and exceptional populations. The median criterion of .80 "supports the concurrent validity of the SB-4" (Sattler, 1988).

The standardization of the SB-4 includes 5,013 persons in seventeen age groups. "The sample was selected as to be representative of the U.S. population according to 1980 census data". Weighting was necessary to balance SES backgrounds. Handicapping conditions were not included as stratification variables (Sattler, 1988).

"Adequate hearing and language functions are required for verbal subtests, and adequate vision or visual-motor ability are required for the nonverbal subtests" (Sattler, 1988). When handicapped children are tested, the examiner must attempt to modify test items without giving clues to the answers. Several short forms are given, but for each of these, both language and manual dexterity are required. It is also cautioned that these short forms "should be used primarily for screening purposes", not for full assessment. Hayes-Binet and Perkins-Binet forms are available for visually impaired (Sattler, 1988).

The lowest range of scores on the SB-4, although somewhat lower than the WISC-R, do not extend to the severely MR range. Scores for some age levels extend lower than others.

"The SB-4 appears to be a useful instrument in the assessment of mental retardation. Additional research is needed to determine its validity for this population, however" (Sattler, 1988).

The WISC-R and the SB-4 are both valid and reliable instruments. The SB-4 appears to be more appropriate for use with moderately MR children due to its lower floor. Children with additional handicaps would require further testing to fairly assess their intelligence. If short-forms are used, follow-up testing is a must. Forms are available for visually impaired (Stanford-Binet) and hearing impaired (Wechsler)(Sattler, 1988).

The Kaufman Assessment Battery for Children (K-ABC) (Kaufman & Kaufman, 1983) measures "intelligence" and "achievement". It is designed for children ages 2-6 to 12-5 years of age. There are four scales: Sequential Processing, Simultaneous Processing, Achievement, and Nonverbal Scales.

Kaufman attempts to separate "mental processing" from "achievement". "K-ABC may be a viable option to the WISC-R because it appears to measure ability...without ...academic/verbal concept influences"(Naglieri, 1985). Critics argue that all cognitive tasks measure an underlying ability, often called "g", for general ability" (Page, 1985). The authors in the Interpretive Manual also state that "all cognitive tasks are seen as measures of what the individual has learned" (Kaufman & Kaufman, 1983).

Tests of reliability for the K-ABC are limited to split-half and test-retest reliability. Split-half reliability "for the subtests range from .72 to .92"... "Test-retest reliability for subtests" range from .59 to .98. Concurrent validity with the WISC-R ranged from .50 to .70; to the Stanford-Binet - Form LM from .56 to .68. In each case the correlation is stronger for Achievement than for Mental Processing (Sattler, 1988).

The K-ABC was standardized with a sample of 2,000 children, divided into 6-month age groups, for sex, geographic region, parental education, race, and community size. "About 7% of the sample was drawn from children placed in special education programs for various mental or physical disabilities, as well as from the gifted and talented" (Anastasi, 1985).

The Nonverbal Scale of the K-ABC is "available for hearing impaired, speech and language disordered, and non-English speaking children, ages 4.0 - 12.5" (Mitchell, 1985).

The K-ABC has an attractive format for children; the test items have a "spirit of play". The various sets of tests are displayed on easels which the tester turns (Page, 1985), placing no physical demands on the subject.

Certain cautions are advised, however. In the effort to eliminate verbal requirements, the authors removed verbal comprehension and reasoning items from Mental Processing Composite, felt by some to be "one of the key components of intellectual ability" (Sattler, 1988).

Many of the tasks of the K-ABC have a "heavy reliance on short-term memory and attention", which may reduce its validity when used with children with deficits in these areas (Sattler, 1988). Factors such as hyperactivity, which adversely affect attention, could have negative effects on test performance (Cooley & Ayres, 1983).

The lower range of scores of the K-ABC are too high for accurate classification of MR at young ages. "...at 4 years of age complete failure would result in a composite score of 60".

The authors of the K-ABC do not recommend [its] use as a "complete test battery". It should be supplemented by other test instruments, such as the Stanford-Binet [or] WISC-R (Kaufman & Kaufman, 1983). It is useful, however, in identifying "nonverbal cognitive abilities" (Sattler, 1988).

The K-ABC appears to be valuable for use as a supplemental test to the SB-4. It can be given using the Nonverbal Scale, and does not require eye-hand coordination. If the child has characteristics of attention deficit/hyperactivity disorder, care should be taken that his/her distractibility does not adversely affect test performance.

The Woodcock-Johnson Psychoeducational Battery (W-JPB) (Woodcock, 1977) assesses three areas of functioning : cognitive ability,

achievement, and interest. "The Tests of Cognitive Ability are composed of twelve subtests that cover vocabulary, spatial relations, memory, quantitative concepts, and concept formation (Sattler, 1988). The tests are displayed on two easels, which "results in a lack of manipulative tasks" (Cummings, 1985).

Split-half and test-retest reliabilities range from .57 to .96 for the Cognitive Abilities subtests. Correlations between the Broad Cognitive Ability Cluster and the WISC-R Full Scale ranged from .62 to .93, median .77. Other studies "indicate highly significant correlations between the Broad Cognitive Ability Cluster and measures of reading, mathematics, and language ($r=.55$ -.82). Construct validity is not satisfactory for Cognitive Ability Cluster scores (Sattler, 1988).

The W-JPB was standardized on 4,732 persons, most in school-age range. The variables used in standardization are sex, age, occupational status, geographic regions, and type of community. There are disparities between the norm sample statistics and the 1970 U.S. census data. Weighting was used to achieve "exact comparability" to census data (Salvia & Ysseldyke, 1988).

In twelve studies by McGrew in 1986, EMR and LD scored "considerably lower" on the W-JPB than on the WISC-R (Sattler, 1988). Caution is advised when testing TMR students, based on these results. The Cognitive Ability Full Scale score "should not be used as a replacement for other standardized measures of intelligence such as the WISC-R or SB-4" (Sattler, 1988).

The McCarthy Scales of Children's Abilities (MSCA) (McCarthy, 1972) is designed to assess the general intellectual level of children, ages 2-1/2 to 8-1/2 years. It consists of eighteen subtests which make up six scales: Verbal, Perceptual-Performance, Qualitative, Memory, Motor, and General Cognitive Scales (Salvia & Ysseldyke, 1988). Many of the subtests require fine motor ability and/or speech.

Reliability data consist of internal-consistency coefficients for all but three subtests ... [for which] test-retest coefficients were

computed. These coefficients ranged from a low score of .60 to an "excellent" .96 (Salvia & Ysseldyke).

Concurrent validity is "acceptable" with the Stanford-Binet Form L-M, WPPSI, K-ABC and Slosson intelligence tests. "Satisfactory predictive ability is indicated by correlations with performances on various achievement tests (Sattler, 1988).

Construct validity "appears to be questionable". Factors yielded by the standardization data were not replicated in subsequent studies with different populations. "With low-functioning children, no general factor was found". For this reason, "caution should be exercised in interpreting the McCarthy Scales in a similar manner for all groups of exceptional children" (Sattler, 1988).

"The General Cognitive Index (GCI) provides a measure of the general intellectual level of the child and has properties that are similar to conventional IQ's (mean of 100, SD of 16)" (Bickett, Reuter & Stancin, 1984). GCI's may be extrapolated for scores below 50 or above 150. These may be used to "avoid the floor and ceiling effects which limit the scales's ability to provide GCI's for gifted or low-functioning mentally handicapped children" (Sattler, 1988).

Studies comparing the performance of EMR children on the MSCA to their performance on the Stanford-Binet reported "mean IQ's 18 to 20 points greater than the mean GCI's". For many EMR subjects "investigators ...were unable to table GCI's for many of their EMR subjects"; they were below the scale, even with extrapolations. "The extension of the MSCA Index only three SD's below the mean and the reports on the performance of EMR children on the MSCA would seem to preclude its use with moderately MR children"...[GCI's "should not be viewed as interchangeable with IQ scores for diagnosis and classification of MR children" (Bickett et al., 1984).

Kaufman and Kaufman (1977) provided MSCA mental age (MA) scores, which are thought to be "valid estimates of the abilities of moderately MR children " (Bickett et al., 1984). But they caution that MA scores are much less "rigorous" and "exact" than standard scores (Kaufman & Kaufman, 1977).

Caution should be exercised in using GCI scores for placement decisions of MR children because of their inconsistency with WISC-R scores. Whether they are more or less valid than the WISC-R remains to be proven. The MSCA does provide "a profile of abilities that may be particularly useful in evaluating young children" (Sattler, 1988).

The MSCA assesses areas which are not covered by other IQ tests (i.e. Perceptual Performance skills). If this information is needed, this test could be a valuable supplement. Because of the questionable nature of GCI's and MA's as compared to IQ scores, this test would not add validity to the scores obtained on the SB-4.

The Arthur Adaptation of the Leiter International Performance Scale (AALIPS) (Arthur, 1950) is "an untimed, nonverbal age scale" for children two to twelve years of age (Salvia & Ysseldyke, 1988). "It is considered most suitable for the testing of children from three to eight years [of age], and others whose MA's fall within this range" (Werner, 1965).

Directions to all items may be administered by pantomime; the children respond by placing blocks in the response frame (Salvia & Ysseldyke, 1988). The behaviors sampled include "discrimination, generalization, sequencing, analogies and pattern completion". Most items require "considerable perceptual organization and discrimination" (Salvia & Ysseldyke, 1988). The items require no verbalization, making the AALIPS "especially useful " for the testing of children who are speech and/or hearing impaired, MR, speakers of other languages, or those who are shy or withdrawn (Werner, 1965).

The 289 children sampled for standardization were all from "middle-class, Midwestern, metropolitan backgrounds", resulting in a small and homogeneous sample. The sample does not include the population for whom the test was designed: "children who would be handicapped on a verbal scale" (Werner, 1965).

No reliability data are given in Arthur's manual because of the small number of test items for each age range. Split-half reliabilities are in the .90's. Correlations between performance on the AALIPS and the Stanford-Binet ranged from .69 to .93. When MR and brain-injured children

were sampled correlates were lower, between .56 and .86 (Sattler, 1988).

A "bonus system" that "raises the basal and increases credit for the subtests passed at various year levels", brings the scores on the AALIPS "into line with those on other tests" (Salvia & Ysseldyke, 1988).

The AALIPS "holds considerable promise" for the testing of children who are unable to respond verbally or are hearing impaired. However, it lacks the "necessary technical characteristics to make it psychometrically adequate". Its use should be limited to "special diagnosis" by experienced clinicians (Salvia & Ysseldyke, 1988).

The format of the AALIPS demands ability of the child to comprehend directions which vary from section to section. For example, they may be asked first to match objects, and then to sequence or categorize them. For many moderately MR students this would be very confusing, especially without the advantage of verbal directions. The children could miss items in the beginning of each section as they struggle to learn the new directions.

Adaptive behavior scales provide useful information for the evaluation of mentally retarded persons. The domains of the tests assess the child's abilities in practical areas of his/her functioning (e.g. Daily Living Skills, Socialization). The responses for these scales are obtained from informants who know the subject well.

Two adaptive behavior scales will reviewed. They are: The AAMD Adaptive Behavior Scale - School Edition, and the Vineland Adaptive Behavior Scale.

The AAMD Adaptive Behavior Scale - School Edition (ABS-SE) (Lambert, Windmiller, Tharinger & Cole, 1981) "aids school personnel in determining the child's adaptive behavior level and areas of functioning within which remediation may be applied (Sattler, 1988). "Teachers are the preferred respondents" (Salvia & Ysseldyke, 1988).

The domains tested are: Part I - Independent Functioning, Physical Development, Economic Activity, Language Development, Numbers and Time, Vocational Activity, Self-direction, Responsibility, and Socialization; Part II - 12 domains related to personality and behavior disorders (i.e. violent and destructive behavior, withdrawal, hyperactive behavior, stereotyped behaviors).

The sample on which the ABS-SE was standardized includes EMR and TMR subjects, but no information is provided to determine its representativeness to the normal population (Sattler, 1988), (Salvia & Ysseldyke, 1988).

For TMR students, internal consistency reliability coefficients range from .94 to .27. No reliability data is available for domain, total, or composite scores; no stability data is reported (Salvia & Ysseldyke, 1988).

Validity studies were run to determine correlations between IQ and adaptive behaviors. Little relationship was found between IQ and Personal or Social Adjustment; IQ was most highly related to Self-direction and Responsibility. The Comparison Score, used to discriminate between EMR and TMR students, correctly identified 74% of them (Sattler, 1988), (Elliott, 1985).

"Part I of the scale (i.e. Independent Functioning) may be inappropriate for children who have physical handicaps", such as orthopedic impairments, blindness, or deafness (Sattler, 1988).

"The ABS-SE is not recommended for classifying children" on its own basis due to its lack of reliability. It does, however, have very good validity data to substantiate its use in screening and placement decisions. It "provides a plethora of diagnostic and instructional information" (Elliott, 1985). weaknesses, however" (Sattler, 1988).

The Vineland Adaptive Behavior Scale (VABS) (Sparrow, Balla & Cicchetti, 1984) "assesses the social competence of handicapped and nonhandicapped individuals from birth through age 19". The domains tested are: Communication, Daily Living Skills, Socialization, Motor Domains, and Maladaptive Behavior (Salvia & Ysseldyke, 1988).

"The VABS [Survey and Expanded Forms] requires a respondent "familiar with the behavior of the [child] to answer behavior-oriented questions posed by a trained examiner...to complete a questionnaire". The informant is a parent or guardian or a teacher in the Survey and Expanded Forms; a teacher would complete the Classroom Edition. There is a possibility of bias on the part of the respondent, for or against the subject (Sattler, 1988). Interviewing more than one to verify results is advisable.

The VABS is well standardized on the 1980 census. "Separate norms are provided for MR, emotionally disturbed and physically handicapped children and adults (Sattler, 1988). Split-half reliabilities range from .83 to .97. Test-retest reliabilities are in the .80's and .90's. Interrater reliabilities range from .62 to .75. Validity for the VABS is "adequate" (Salvia & Ysseldyke, 1988).

The VABS is scored with a median of 100 and a SD of 15. Unfortunately these are not stable for all age groups. These scores should be treated as "rough approximations", especially for the MR population (Sattler, 1988).

"The VABS is a potentially useful tool for the assessment of adaptive behavior". Caution should be observed in interpretation of results, however, due to "interrater variability" and "fluctuation of scores" (Sattler, 1988). It appears to be preferable to the ABS-SE.

Adaptive behavior scales provide much useful information to verify, along with IQ, the condition of mental retardation. They can also identify areas in need of educational remediation. Caution is advised, however, due to sometimes poor validity/reliability of scores.

Because the items on the scale are answered by an informant, all physical or sensory barriers are removed; the child does not need to

verbalize answers, see or manipulate materials, or hear the questions. Accuracy of answers on the part of the respondent is crucial, however. Questions could be asked that the informant does not know, and bias for or against the subject could raise or lower his/her scores. Preferably information should be gathered from more than one informant to avoid these inconsistencies (Sattler, 1988). The examiner should take care to observe any expressions of bias toward the child by the respondent(s). Observations to support the informant's descriptions of the child's abilities would be beneficial.

CHAPTER 3

Purpose

In order that children who are MR receive educational services which are appropriate to their needs, the assessment process must be as complete and accurate as possible. Not only do multiple IQ tests need to be administered because of the possibility of error, but adaptive behavior scales must be included, because they provide valuable information needed for appropriate placement and program delivery. In other words, unless all aspects of mental retardation are included in assessment, adequate and appropriate placement might not occur, to the disadvantage of the child.

The purpose of this research is to determine if, in practice, Virginia school psychologists use multiple tests and adaptive behavior scales when assessing the intelligence of moderately mentally retarded children.

Method

In order to learn the condition of assessment procedures for the Eligibility process in Virginia, the subjects chosen for research are the public school psychologists, who administer the above mentioned tests. The roster of Virginia school psychologists, current in December, 1990, was obtained from the Virginia Department of Education in Richmond, Virginia. A survey format was the instrument of choice to obtain the needed data.

Because the survey was to be answered by school psychologists, many of whom have an overload of cases and very busy schedules, the responses needed to provide a maximum amount of data with a minimum amount of effort on the part of the respondents. A multiple choice/short answer format was selected. The Research Questions from Chapter One of this paper were used to develop survey questions. (see Appendix A - Survey)

An optional section allows the psychologist to share assessment techniques he/she would use with a hypothetical handicapped child. Case studies were written on three children: John, who is visually impaired, Nancy who has limited speech, and Andy, who has cerebral palsy. Each survey enclosed one case study, selected randomly.

A pilot survey was sent to the psychologists of Newport News Public Schools in the Winter of 1990. Ten of the seventeen psychologists in Newport News responded (10/17, or 58%). Revisions were made based on the pilot responses (e.g. selection of test instruments and space allowed for answers), and the first mailing was sent to all school psychologists in Virginia in Spring, 1991. Twenty-nine percent of the psychologists responded. A second mailing was sent to those who did not respond extending their time for completion until mid-July, 1991. 25 additional responses were received, raising the total number of responses to 184/544, or 34%. More responses might have been received if a second copy of the survey had been sent with the second mailing. Two psychologists telephoned requesting another copy, as theirs had been discarded.

While the total response rate to the survey was low (34%), it must be considered that TMR is also a low incidence population; approximately .2% of the total population are moderately MR (Brimer, 1990). TMR children in some school divisions may be combined with other exceptionalities (e.g. EMR or Severe-Profound Handicaps); others may commute to other school divisions. For these reasons, a percentage of psychologists would not have TMR children on their caseloads, and may have chosen not to reply.

Question 1 of the survey asks how often the psychologists evaluate children in the moderate range of mental retardation. Of the 184 responding, 10 answered frequently, 78 answered occasionally, 49 answered seldom, 44 answered never (see Figure 1). The responses are graphed by geographic regions; no names refers to the surveys which did not identify their location. Notice that four times as many replied never as "frequently, which could indicate the low incidence of this population.

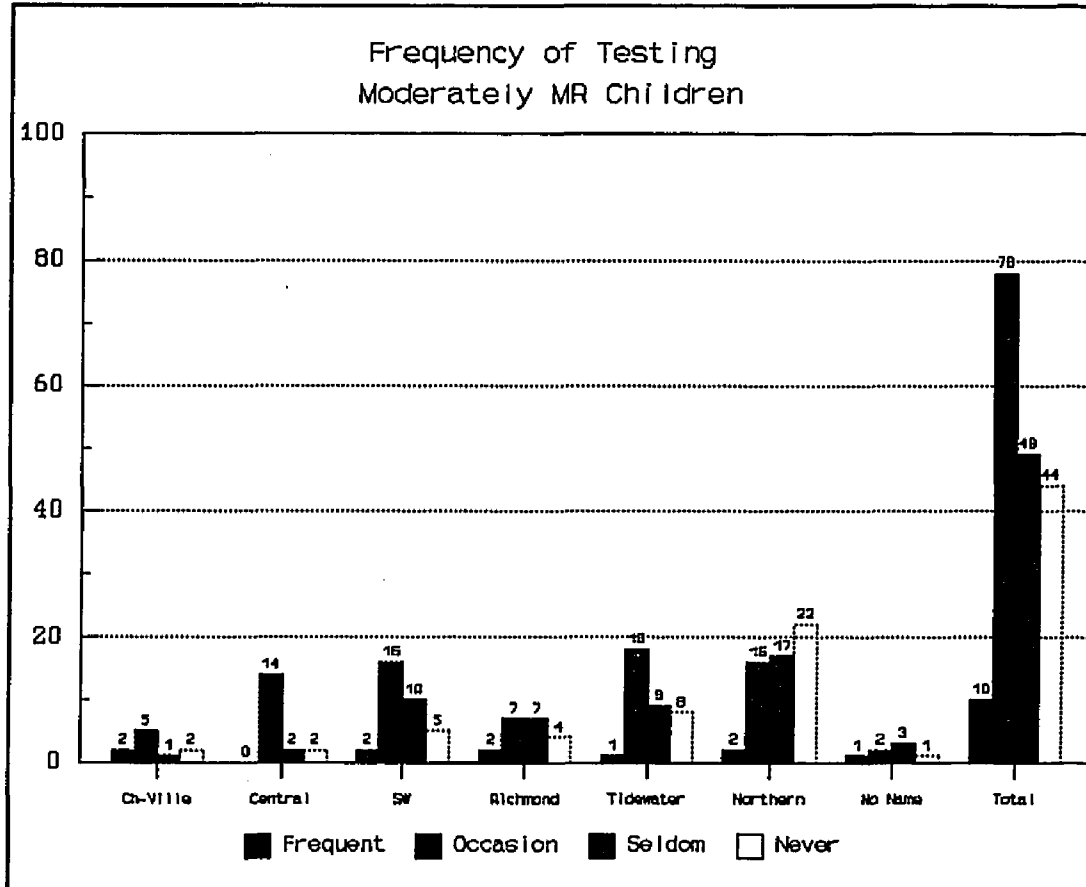


Figure 1

The responses to the survey will be given in Chapter 4.

CHAPTER 4

In this chapter, the Research Questions presented in Chapter 1 will be answered by the results from the survey. Illustrations will be used to explain and compare the data.

Results

Research Question 1 asks, "What tests are commonly used by psychologists (or others) for the assessment of moderately retarded children, five to eight years of age?" This question was presented to the psychologists by survey question one, to which they were to indicate the names of tests they used most often. Choices of tests given were: WISC-R, SB-4, K-ABC, McCarthy Scales, Leiter, Woodcock-Johnson, Bayley Scales of Infant Development, Merrill-Palmer Scales, Callier-Azusa, WPPSI-R, Columbia Mental Maturity Scales, Brigance Inventory, and other. (See Appendix 1 - Survey) These tests were chosen because the pilot survey showed them to be the ones with the highest frequency of use.

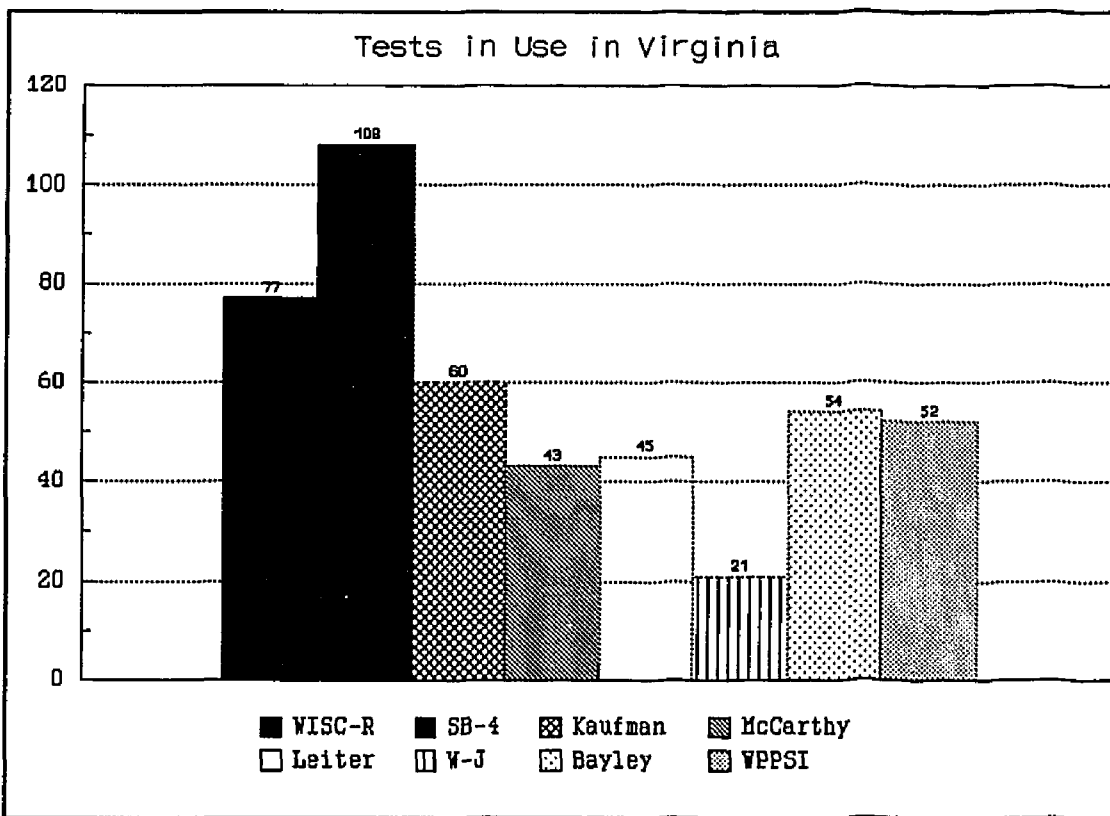


Figure 2

The psychologists were allowed to select more than one test instrument, and could write in names of other instruments. Because there were an infinite number of responses, percentages were not obtainable. The results indicate that the psychologists' first choice was the SB-4 with 108 responses, followed by the WISC-R (77), K-ABC (60), the Bayley Scales of Infant Development (54), and the WPPSI-R (52). The top eight responses are shown on Figure 2.

It should be noted that the SB-4 was most frequently selected by all geographic regions. Tests written in for other include the Stanford-Binet: Form L-M, Raven's Progressive Matrices, the Test of Nonverbal Intelligence (TONI), French's Pictorial Test of Intelligence (PTI), Battelle Developmental Inventory, Cattell Culture Fair Intelligence Test, and the Peabody Picture Vocabulary Test (PPVT).

Research Question 2: "What percentage of moderately MR children have deficits in a) speech and language, b) fine motor ability, c) vision and d) hearing?" Survey question 2 asks if, in their professional experience, the psychologists had worked with moderately MR children with these disabilities. Psychologists reported working with moderately MR children who are impaired in: speech/language - 138 had/ 0 had not; fine motor deficits - 135 had/ 1 had not; vision - 101 had/ 29 had not; hearing - 82 had/ 42 had not. In every geographic region more psychologists reported working with deficits in speech and fine motor than with deficits in vision or hearing. Figures 3 and 4 analyze the responses by geographic region; Figure 5 presents total responses for the state. Psychologists working with speech/language impaired are shown by 2a; fine motor impaired (2b); visually impaired (2c); and hearing impaired (2d).

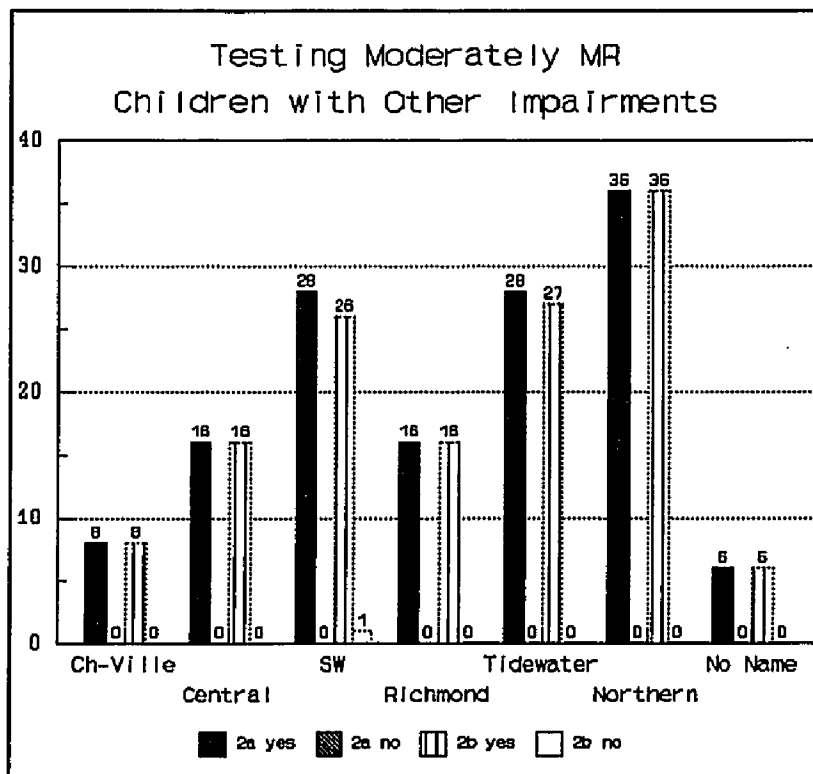


Figure 3

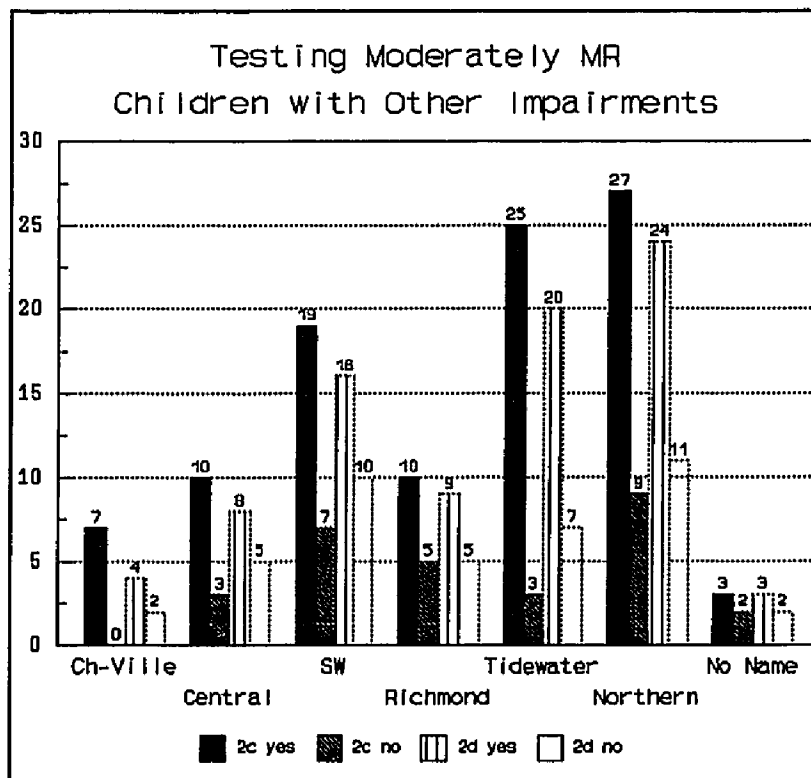


Figure 4

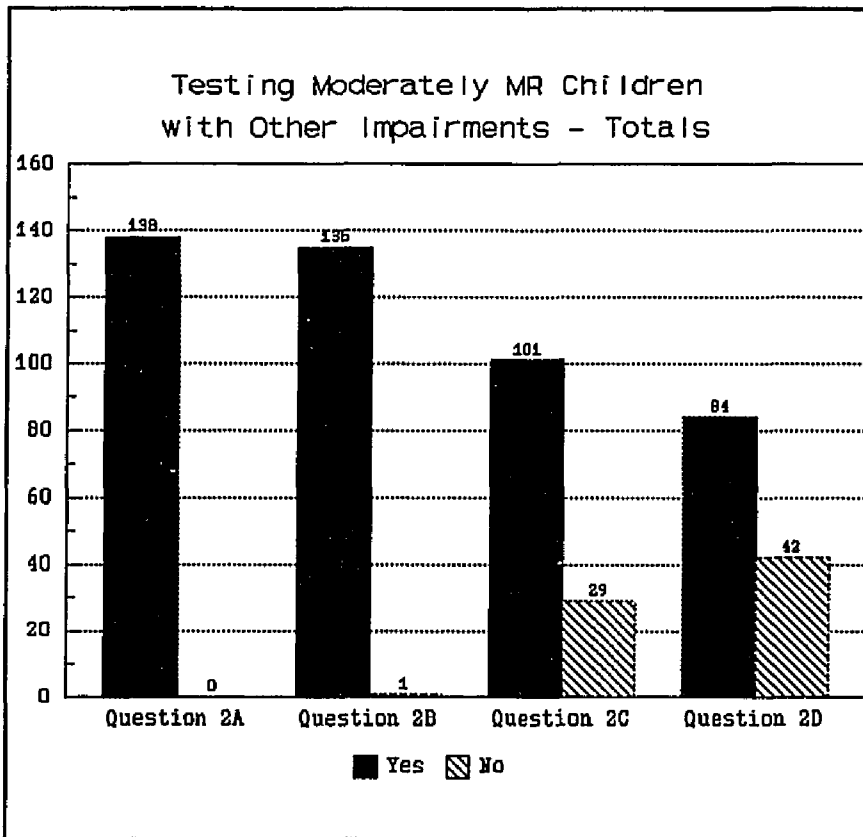


Figure 5

Research Question 3: "What intelligence tests are most appropriate for this population?" This question is answered by survey questions five through eight. Question 5 asks which test(s) would be used with moderately MR children who are unable to speak; question 6 - those who are limited in fine motor; question 7 - those who are visually impaired; and question 8 - those who are hearing impaired.

For moderately MR children who are speech/language impaired, the responses indicate the tests of choice to be the SB-4 (60 responses), Leiter (51), and WISC-R (50). K-ABC received 35 responses, Columbia 28, and PPVT 25. Twenty-four different tests were given as responses by psychologists. (See Table 2)

For moderately MR children who are fine motor impaired, SB-4 was the first choice with 77 responses, WISC-R was second (55), and the K-ABC was third (22). Twenty-eight different tests were named in all. (See Table 3).

For moderately MR children who are visually impaired, the test of choice according to responses was the WISC-R (53). SB-4 had 45 responses, and WPPSI was third with 15. In all, twenty-eight different tests were given as responses. (See Table 4)

For moderately MR children who are hearing impaired, responses indicate that the test of choice is the Leiter (43), followed by the WISC-R (40) and the SB-4 (38). In all, twenty-one different tests were given as responses. (See Table 5)

These results indicate which tests are most often in use; those preferred by working psychologists. Recommended tests and suggested strategies for testing handicapped children will be presented in Chapter 5.

Table II

Tests in Use for Moderately MR Children
with Speech/Language Impairments

	No Names	Tidevtr	Ch Vllle	Richmond	Central	SWest	North	Totals
S-B	2	7	5	8	8	12	10	60
WISC-R	3	8	5	7	6	12	9	60
Leiter	3	16	2	8	3	6	13	51
KABC	1	4	4	2	1	12	11	35
Merrill	0	0	0	1	0	0	2	3
McCarthy	0	2	1	0	1	3	4	11
CMMS	1	5	0	7	3	4	6	28
PPVT	0	5	0	4	0	9	7	25
French	0	0	0	1	1	1	2	5
TONI	0	5	1	2	3	0	5	15
DAM	0	1	0	2	1	0	1	5
Otis-Lennon	0	0	0	0	0	0	1	1
WPPSI	0	2	1	3	0	1	8	15
Hiskey-Neb	0	2	1	2	0	2	1	8
Collier-Azusa	0	0	0	0	0	0	1	1
VHI	0	1	1	0	2	1	1	6
Bayley	0	3	0	0	4	1	6	14
Matrix	0	1	0	0	0	1	0	2
Alpern-Boll	0	2	0	1	0	1	0	4
DASH	0	0	0	1	0	1	0	2
Bender	0	0	0	0	0	1	1	2
Gattell	0	0	0	0	1	0	0	1
ROWPUT	0	0	0	0	1	0	0	1
Battelle	0	1	0	0	0	0	0	1

Table III

Tests in Use for Moderately MR Children
with Fine Motor Impairments

	North	West	Central	Richmond	Ch. Ville	Tidewater	No Name	Totals
WISC-R	12	16	5	5	6	8	3	55
KABC	4	7	1	2	4	2	2	22
S-B	25	12	10	9	6	16	1	77
Columbia	3	0	2	4	1	7	0	17
TORI	3	0	1	1	0	3	0	8
V-J	0	0	0	0	0	2	0	2
Battelle	0	0	0	0	0	1	0	1
WPPSI	5	3	0	2	1	2	0	13
PPVT	4	5	1	0	1	3	0	14
Alpern-Boll	0	1	1	0	0	1	0	3
Bayley	2	2	2	2	2	3	0	13
VMI	0	2	0	0	0	2	0	4
KTEA	0	0	0	0	0	1	0	1
MFVPT	0	0	0	0	0	1	0	1
Bender	0	1	1	0	0	1	0	3
French	3	0	0	0	0	1	0	4
Matrix	0	0	0	0	1	0	0	1
McCarthy	2	3	2	1	1	0	0	9
Herrill	0	0	0	1	0	0	0	1
Leiter	4	0	0	3	0	0	0	7
Carolina	0	0	0	1	0	0	0	1
DAP	0	0	1	0	0	0	0	1
VIO	0	1	0	0	0	0	0	1
DASH	0	1	0	0	0	0	0	1
SIT	0	1	0	0	0	0	0	1
WAIS-R	1	0	0	0	0	0	0	1
HFD	1	0	0	0	0	0	0	1
VADS	1	0	0	0	0	0	0	1

Table IV

Tests in Use for Moderately MR Children
Who are Visually Impaired

	No Names	Tidewater	Chville	Richmond	Central	Sweet	Northern	Totals
VPPSI	0	4	0	1	0	3	7	15
Letter	0	0	0	1	0	0	1	2
WISC-R	2	11	1	7	7	10	13	53
SB L&M	0	2	0	0	0	0	2	4
Bayley	0	2	0	0	1	1	3	7
SB-4	1	11	3	4	5	0	13	48
MCC	0	1	2	0	1	2	2	8
PPVT	0	0	0	0	0	0	1	1
XABC	0	1	2	0	0	0	1	4
HPD	0	0	0	0	0	0	1	1
YADS	0	0	0	0	0	0	1	1
BLAT	0	1	0	0	0	0	1	2
Callier-Azusa	0	0	0	0	0	0	1	1
VIQ	0	0	0	0	0	1	0	1
Oregon	0	0	0	0	0	1	0	1
Slosson	0	0	0	1	0	2	0	3
Hays Binet	0	0	1	0	0	1	0	2
TONI	0	0	0	0	1	0	0	1
Alpern-Boll	0	0	0	1	1	0	0	2
Merrill	0	0	0	1	0	0	0	1
DAS	0	0	0	1	0	0	0	1
Carolina	0	0	0	1	0	0	0	1
Cattell	0	0	0	1	0	0	0	1
Battelle	0	1	0	0	0	0	0	1
STH	0	1	0	0	0	0	0	1
KTEA	0	1	0	0	0	0	0	1
VMI	0	1	0	0	0	0	0	1
W-J	0	1	0	0	0	0	0	1

Research Question 4: "In Virginia, are other tests of intelligence used in conjunction with the SB-4 or the WISC-R? If so, which tests are used?" This question is answered by survey question 4, which asks whether single tests, or tests in combination, are used for initial referrals, or for triennials and reviews. Initial referral refers to the placement of a child into special education for the first time. After this initial placement, the child must be re-evaluated every three years (triennial review) to assure that his/her placement is appropriate. Reviews can occur at any time when the child appears to be in need of other services or a different placement (Va. Department of Education, 1990).

For initial referrals, 133 psychologists report using tests in combination; only 3 use single tests. For reviews and triennials, 25 use single tests, and 113 use tests in combination. Figure 6 shows the responses by geographic regions. The other tests used in combination have already been addressed.

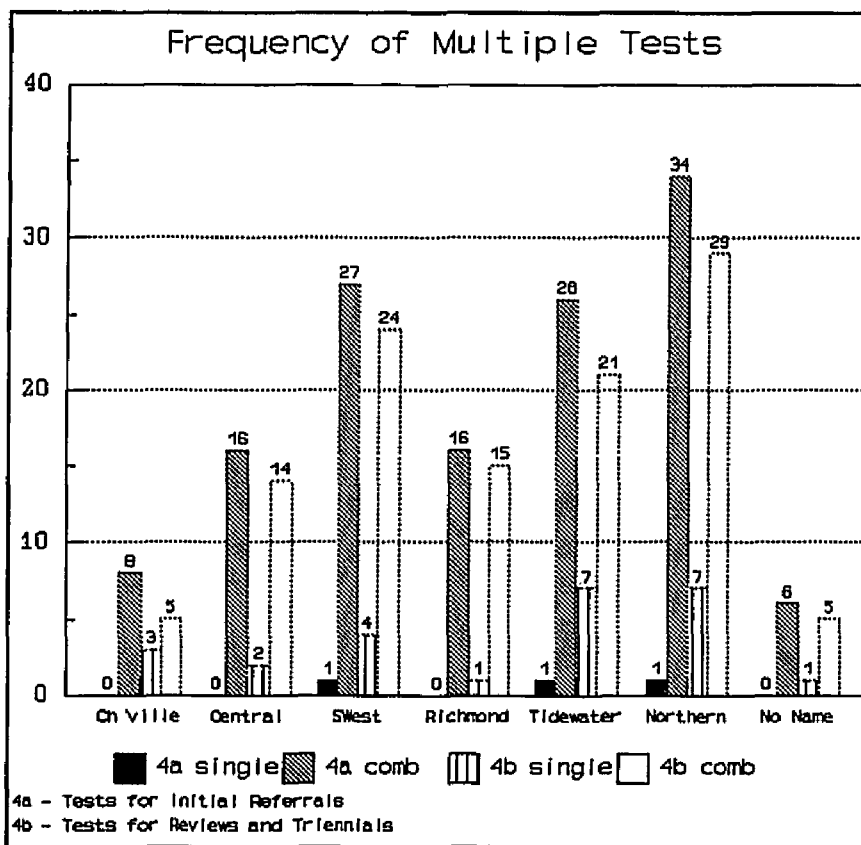


Figure 6

Research Question 5 asks, "What is the frequency of use by Virginia school divisions of adaptive behavior scales for the assessment of moderately MR children?" This is answered by question 9 of the survey. One hundred thirteen psychologists report that their school divisions use adaptive behavior scales always, 22 use them usually, 4 seldom, and 1 never for the assessment of moderately MR children. Figure 7 shows the responses by geographic region, which indicates that the scales are used consistently across the state.

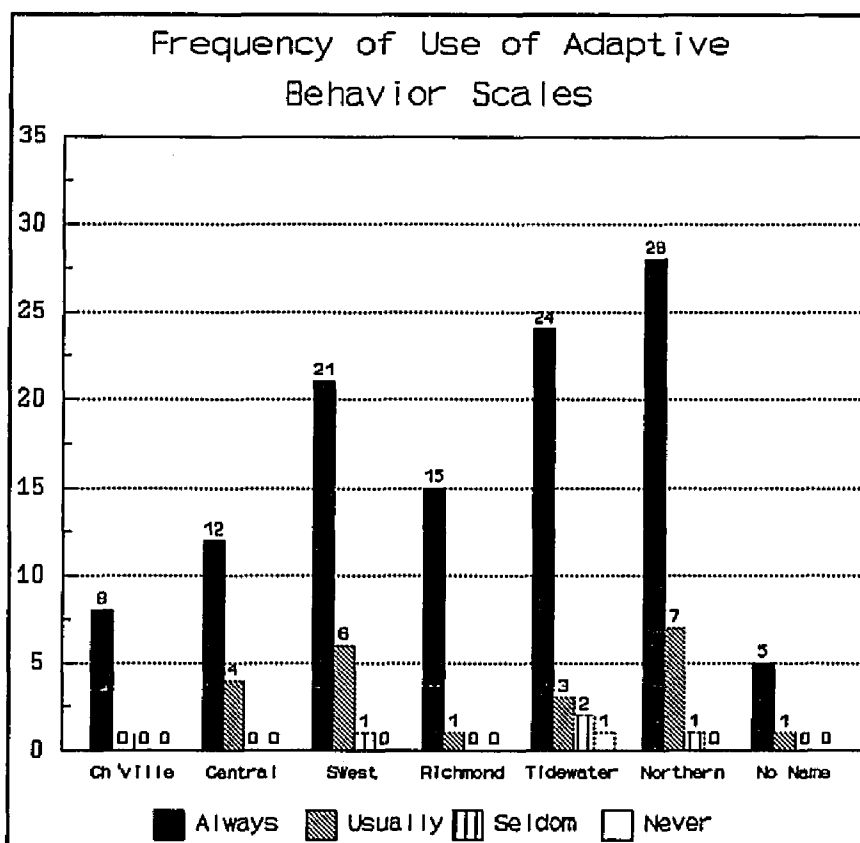


Figure 7

Research Question 6 asks which adaptive behavior scales are in use. The responses to survey question eleven indicate that 55% use the Vineland Adaptive Behavior Scale, 24% use the AAMD Adaptive Behavior Scale, and 19% use other scales. These other scales include: Hawthorne Adaptive Behavior Evaluation, Alpern-Boll Developmental Profile, Adaptive Behavior Inventory for Children (ABIC), Caine-Levine, T.M.R. School Competency Scales, Woodcock-Johnson, and the Virginia State Department Adaptation Checklist.

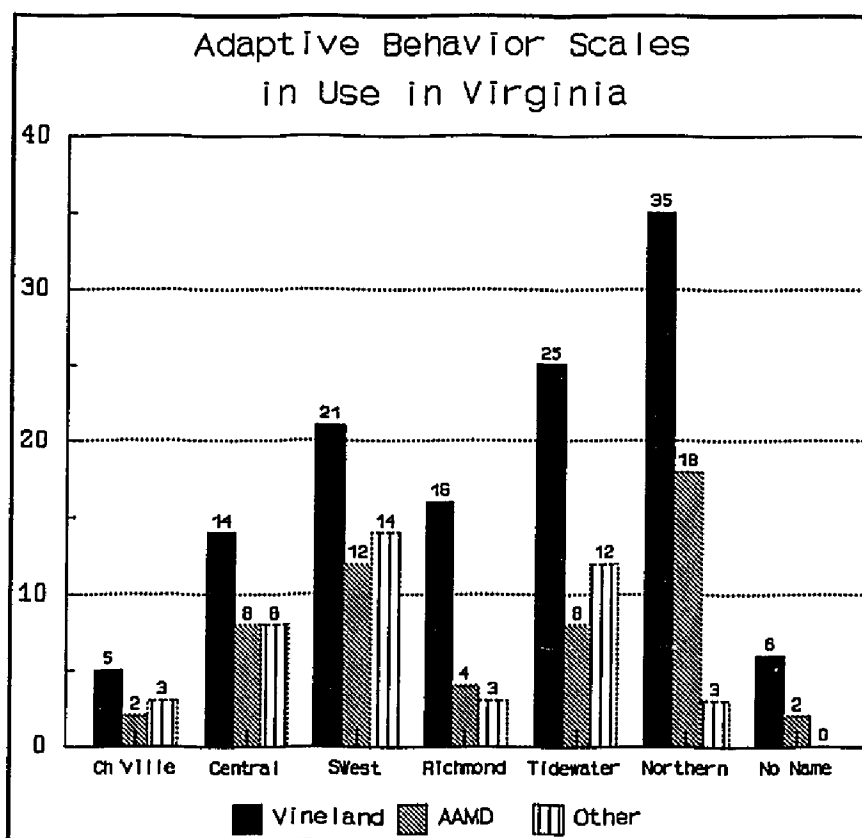


Figure 8

Figure 8 shows the use of adaptive behavior scales by geographic regions. The Vineland was the scale of choice in every area of the state.

Research Question 7: "Are adaptive behavior scales completed by a) a psychologist, b) a social worker, c) a teacher, or d) other?" According to survey results, 111 responded that psychologists administer adaptive behavior scales, 85 indicated social workers, 33 teachers, and 4 other, which were visiting teachers. Figure 9 shows the responses by geographic regions.

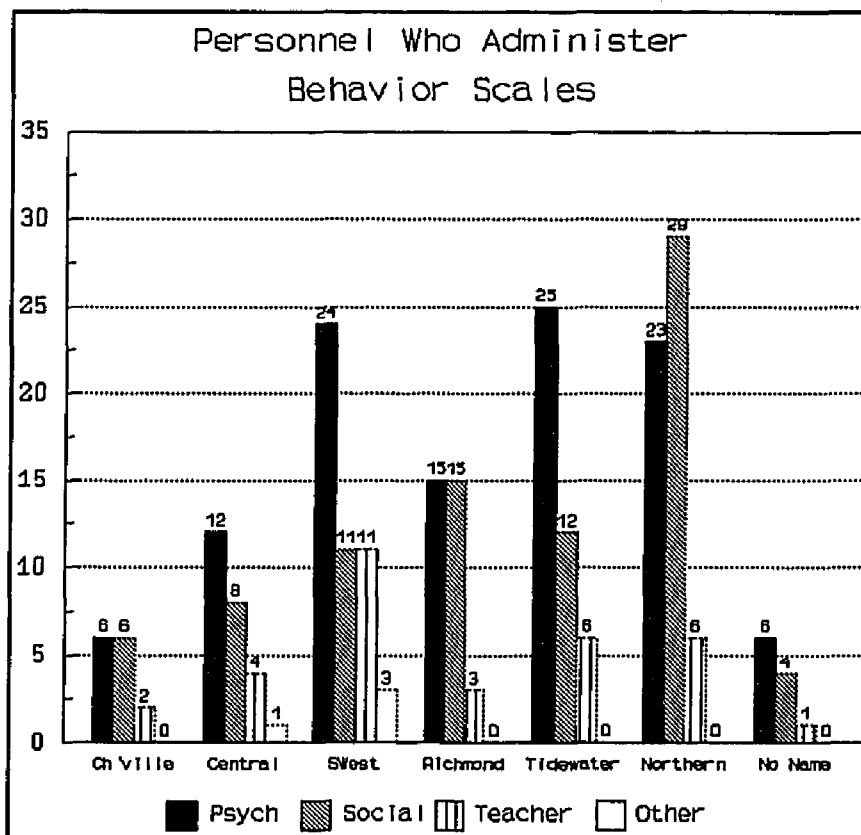


Figure 9

To Research Question 8, which asks if the information for adaptive behavior scales is obtained from more than one informant, 17 psychologists answered always, 64 answered usually, 55 answered sometimes, and 0 answered never. Figure 10 shows the responses by geographic regions. These responses show some inconsistency between regions, some answering usually, others seldom.

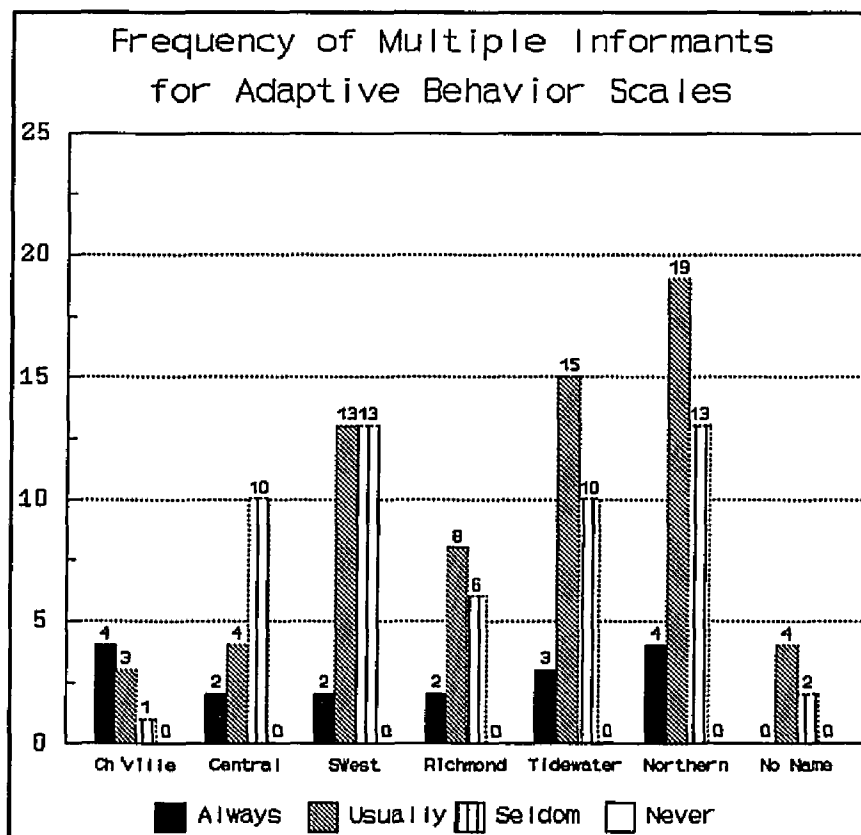


Figure 10

Question 13 of the survey asks the Virginia psychologists to give the "definition/criteria of mental retardation used by [their] school division to determine eligibility". Twenty-six reported using the "Federal" definition, also referred to as "P.L. 94-142", "AAMD", or "Grossman". This was the definition analyzed in Chapter 1: "Mental retardation refers to significantly subaverage general intellectual

functioning existing concurrently with deficits in adaptive behavior and manifested during the developmental period" (Grossman, 1983).

Fifty-six psychologists reported using the definition included in Virginia regulations (Virginia Department of Education, 1990). This definition is identical to Federal regulations, with the added criteria of subaverage school achievement: "Mentally retarded means significantly subaverage intellectual functioning existing concurrently with deficits in adaptive behavior and manifested during the developmental period, which adversely affects a child's educational performance".

Ten psychologists defined mental retardation as subaverage IQ and adaptive behavior, without mention of the developmental period. Three defined MR with IQ alone. Nine defined it as subaverage IQ, adaptive behavior and school achievement. Four included IQ, adaptive behavior, school achievement, and the developmental period.

Ten psychologists quoted the DSM-III-R definition, which includes the following: significantly subaverage general intellectual functioning, and IQ of 70 or below on an individually administered intelligence test, concurrent deficits or impairments in adaptive functioning, onset before age of 18, achievement in the content area commensurate with or below the level of measured ability, low intellectual functioning and adaptive behavior not primarily caused by environmental disadvantage or sensory deficits (APA, 1987).

Other definitions added other handicapping conditions, such as visual-motor deficits (3) and developmental delays (1). Eleven reported use of local handbooks, which emphasize educational placement in TMR classes if the child is unable to function in the mainstream or in an EMR classroom. One psychologist described this criteria as "very confusing".

Some stated that they were unaware of the definition of their school system, and they were speaking for themselves. Overall, there seems to be a lack of uniformity within and between school divisions over the definition of mental retardation. One point of agreement, in all but three of the respondents' definitions, is the inclusion of adaptive behavior.

Further information and discussion of these results will be presented in Chapter 5.

CHAPTER 5

By means of the survey and the review of literature, information was gathered to determine best practices for the testing of moderately MR children who have additional handicaps. The following section will compile these results and recommendations.

Deficits in adaptive behavior are included in the accepted definitions of MR by State and Federal Regulations, the American Association on Mental Retardation and the American Psychological Association. Therefore, adaptive behavior scales must be used in the assessment of MR children. According to the survey results, they are in use consistently across the State of Virginia (Chapter 4 - Figure 6).

The adaptive behavior scale most frequently used by Virginia psychologists is the Vineland Adaptive Behavior Scale. The validity and reliability of the Vineland are rated only as "adequate" by the literature, but are superior to those of the other scales. It does not appear advisable to directly compare adaptive behavior scores to IQ scores; however, deficits in adaptive behavior would be clearly indicated by the scoring of items on the scale. The AAMD behavior scale, and others named by the survey, could also provide valuable information for remediation.

Administration of adaptive behavior scales to more than one informant is also recommended to eliminate possible bias. A majority of psychologists in Virginia report the use of multiple respondents as usual practice.

The literature definitively states that concomitant deficits in speech/language, motor coordination, hearing, or vision occur frequently within the moderately MR population. On the survey, 100% of the psychologists reported working with speech/language impaired, and 99% had worked with fine motor impaired MR children. But for sensory impairments the percentages were less: 78% for vision, 66% for hearing. The literature indicates that visual and hearing impairments are common among MR persons. It may be possible that some of these deficits may be undetected within the moderately MR population. These children are often difficult to test for vision and hearing, as they are often unable to

respond to standard screening tests (i.e. testing with an audiometer and Snellen charts). More definitive neurological testing is costly and often requires general anesthetic, causing it not to be elected for use in many cases. These data suggest that some moderately MR children with poor vision and hearing are given intelligence tests under standard conditions without regard for these deficits. This could adversely affect their school performance as well.

A majority (97%) of Virginia school psychologists use more than one test for the initial placement of children who are moderately MR, while a lesser, but still significant number (81%) continue the process for triennials and reviews. While some may consider MR to be a stable, unchanging condition (Clausen, 1972), the moderately MR child should always have the benefit of multiple testing to assure the accuracy of the results.

For moderately MR children who are speech and language impaired, a battery of tests was recommended, in response to survey question 5 and the case study "Nancy". The first choice of intelligence tests was the SB-4. While most psychologists recommended use of the nonverbal/performance scales only, some stated that they would use the entire test in order to assess the extent of Nancy's language problems, and to ensure the validity and reliability of the testing instrument. These results could be supported by those of the K-ABC, the WISC-R, or the WPPSI. Using nonverbal subtests of many different tests was a frequent suggestion. The Peabody Picture Vocabulary Test (PPVT), the Leiter (AALIPS), and the Columbia Mental Maturity Scale (CMMS) were also suggested for supplemental use. Drawing tests, such as the Bender-Gestalt, Draw a Person, or Visual Motor Integration (VMI) tests were frequently used as well.

Many modifications and techniques were suggested to improve accuracy of testing. Observations of the child in the classroom, at home, at play, and during the testing session were recommended by a majority of respondents. Consultation with the child's teacher, parents, or speech/language pathologist to learn the child's communication systems (i.e. signing, miming, or communication boards) is advisable. The use of an interpreter was also suggested. It was considered important to look at the possible cause(s) of the language deficits, to determine whether

they are caused by physical/medical problems, neuropsychological causes (e.g. aphasia), or emotional trauma.

To assess moderately MR children with fine motor impairments, the responses to survey question 6 and the case study "Andy" were analyzed. Again a battery of battery of tests was recommended. Testing would begin with the SB-4 or the WISC-R; the SB-4 was preferred because it is untimed. Some recommended use of the verbal scales alone; others again advised the use of the entire test to assure validity/reliability and to assess the extent of the motor deficits. Intelligence test results should be supported by other tests, such as the K-ABC, the PPVT, or the Motor Free Visual Perception Test.

Interviews with the child, teacher, and parents, and classroom observations were recommended. Some psychologists reported allowing the child to make extra attempts at fine motor tasks, or eliminating time limits. Collaboration with others who work with this population was suggested. The use of computers was also an option, as some of the tests have computer programs with adaptations for the physically impaired (i.e. PPVT). It was suggested to enable the child to point to objects more easily by enlarging them and spacing them far apart.

The responses from survey question and the case study "John" provide testing preferences for children who are moderately MR and visually impaired. The SB-4 was selected by most psychologists, either to use the verbal scales only, or in its entirety. Again, a battery of tests is recommended. The WISC-R and SB-4 are both in frequent use with this population. Other tests include the PPVT, K-ABC, and large design VMI. The Bender-Gestalt and Draw a Person tests were recommended for use to determine visual limitations.

Consultation with the child's teacher and teachers of visually impaired children is advised. Observation of the child in the classroom is helpful. Placement of materials in the child's visual range, enlargement of materials, spacing selection items far apart, using colored paper, and markers instead of pencils were suggested. It was warned that on tests in easel format (e.g. K-ABC, Woodcock-Johnson, and others) the child might not be able to see all the items equally well. Multiple short sections to avoid fatigue were recommended.

For hearing impaired MR students, the following responses to survey question 8 were given. Recommended tests were the Leiter, SB-4, WISC-R, K-ABC, Hiskey-Nebraska, and the CMMS. Some psychologists recommended administration of nonverbal/performance scales alone; again others maintain that the tests must be given in their entirety.

Suggestions for improved testing include prior observations of the child, and consultation with teachers to determine the severity of the hearing impairment and communication systems used. Having an interpreter to translate sign language might be necessary. Modifications include: testing in a quiet room with little or no background noise, seating the child close to the examiner, so that he/she can see the examiners' lips, modelling the desired behaviors, the use of pantomime to give instructions, and the use of a "phonic ear".

To administer part, not all, of the test, to increase the time allowed, or to change the presentation of test items compromises the validity and reliability of standardized tests. Most of the tests were not normed on handicapped populations, so such modifications were not included in the standardization. But when working with multihandicapped children, there is little choice. It is equally undesirable to penalize the child for his/her physical disabilities. What is needed are added modifications to the standard tests (e.g. enlarged copies or removal of time constraints) normed on handicapped populations.

The psychologists who completed this survey are assumed by this author to be conscientious and professional. This is indicated by their use of adaptive behavior scales and multiple testing, and their observance of the needs and limitations of the children they test. It is hoped that all psychologists are this thorough, but without clarity in State and Federal regulations to establish set procedures, many may not be, especially when pressed to meet timelines and carrying heavy caseloads. The limited number of returns to this survey prohibits generalization on the total number of psychologists in Virginia. But it this author's belief that other psychologists who are less thorough, may not have responded to the survey.

In summary, moderately MR children, due to their concurrent handicaps, require accommodations in testing procedures. Multiple tests, or batteries of tests, are an imperative, as are adaptive behavior scales. Validity of test results must be achieved by comparing scores on multiple tests. The Virginia school psychologists polled in the survey provided a plethora of valuable suggestions for improved testing. Modifications of time, enlargement of materials, or other adaptations may be necessary. Every effort should be made to communicate with the child, by whatever means he/she prefers, and vision and hearing screenings are essential. Test instruments normed on this population are needed, as are more specific State and Federal guidelines for testing. Moderately MR children with physical or sensory deficits are extremely handicapped; we must not further handicap them by inappropriate testing and educational placement.

APPENDIX

SURVEY

SCHOOL DIVISION _____
NAME _____

PART ONE

1. I evaluate children, ages 5-8, suspected to be in the moderate range of mental retardation:(check one)
frequently___ occasionally___ seldom___ never___ (if never, please stop here and return survey.)

2. I have tested moderately retarded children who have:(check yes or no)
speech & language deficits yes___ no___
fine motor deficits yes___ no___
visual deficits yes___ no___
hearing deficits yes___ no___

3. The intelligence test(s) that I most frequently use with moderately MR children (ages 5-8) are:(check one or more - please * test of preference
WISC-R___
Stanford-Binet 4th Edition___
Kaufman Assessment Battery for Children___
McCarthy Scales___
Lieter___
Woodcock-Johnson Psycho-Educational Batteries___
Bayley Scales___
Merrill-Palmer___
Callier-Azusa___
WPPSI-R___
Columbia Mental Maturity Scales___
Brigance___
other (explain as necessary)_____

4. For initial referrals, I most often use: a single test___
tests in combination___
For triennials and reviews, I most often use: a single test___
tests in combination___

5. When testing a moderately retarded child who is unable to speak, what test(s) do you use?_____
Briefly describe any modifications that you make_____

6. When testing a moderately MR child who is limited in fine motor ability what test(s) do you use?_____
Briefly describe any modifications that you make_____

7. When testing a moderately MR child suspected to be visually impaired, what test(s) do you use?
Briefly describe any modifications that you make_____
8. When testing a moderately MR child suspected to be hearing impaired, what test(s) do you use?
Briefly describe any modifications that you make_____
9. Adaptive behavior scales are included in the assessment of moderately MR children in our school division:(check one)
always__ usually__ seldom__ never__(if never, skip to question 13)
10. Adaptive behavior scales are administered by: (check one or more)
a psychologist__
a social worker__
a teacher__
other__ (please explain)_____
11. Which adaptive behavior scales are used? (check one or more - please * test of preference)
Vineland__
AAMD Adaptive Behavior Scale__
other (please name)_____
12. Information on adaptive behavior scales is obtained from more than one informant (e.g. parent/teacher):
always__ usually__ seldom__ never__
13. The definition/criteria of "mental retardation" used by your school division to determine eligibility is: (give definition and/or source)
- _____
- _____
- _____
- _____
- _____

14. Describe any techniques or modifications you have used successfully to improve the test outcomes of moderately MR children.

Please return by May 24, 1991 to: Nancy L. Robertson
39 Shirley Road
Newport News, VA 23601

Please check here if you would like a copy of the survey results. ____

PART TWO

Please briefly describe the testing instrument(s) and techniques you would use to test the following child:

Nancy is six years old. She has extremely limited speech, able to produce only a few sounds. You observe that she is very attentive. She is trying very hard to communicate, smiling and nodding.

PART TWO

Please briefly describe the testing instrument(s) and techniques you would use to test the following child:

Andy is seven years old. He has cerebral palsy. His teacher tells you that he has a very poor pencil grasp, and has difficulty coloring and doing manipulative tasks. His speech is unaffected by his CP.

PART TWO

Please briefly describe the testing instrument(s) and techniques you would use to test the following child:

John is eight years old. He wears glasses to correct myopia, but is blind in the lower left quadrant of his left eye. His teacher reports that this greatly inhibits his ability to trace or copy letters/numbers, and to reproduce bead and pegboard designs. He does not have color blindness. He frustrates easily. He speaks clearly on a five year old level.

References

- American Medical Association. (1978). A handbook for the primary physician. Washington, DC: Author.
- American Psychological Association. (1987). Diagnostic and statistical manual of mental disorders (3rd ed. - rev.). DC:Author.
- Anastasi, A. (1985). Review of Kaufman Assessment Battery for Children. In D.V. Mitchell, Jr. (Ed.), The ninth mental measurements yearbook. Lincoln, Neb: University of Nebraska Press.
- Arthur, G. (1950). The Arthur Adaptation of the Leiter International Performance Scale. Chicago, Il: C.H. Stoeiting.
- Bailey, D.B. & Simeonsson, R.J. (1985). A functional model of competence. Topics in Early Childhood Special Education, 4(4), 20-31.
- Baumeister, A.A. (1987, August). Mental retardation: Some conceptions and dilemmas. American Psychologist.
- Bickett, L., Rueter, J. & Stancin, T. (1984, July). The use of the McCarthy Scales of Children's Abilities to assess moderately mentally retarded children. Psychology in the Schools, 21, 305-312.
- Brimer, R.W. (1990). Students with severe disabilities. Mountainview, CA: Mayfield Publishing Co.
- Budoff, M. & Hamilton, J. (1976). Optimizing test performance of moderately and severely mentally retarded adolescents and adults. American Journal of Mental Deficiency, 81(1), 49-57.
- Campbell, I.A. (1985). Review of Vineland Adaptive Behavior Scales. In J.V. Mitchell, Jr. (Ed.), The ninth mental measurements yearbook (Vol.2). Lincoln, Neb.: The University of Nebraska Press.
- Clausen, J. (1972). Quo vadis, AAMD? The Journal of Special Education, 6(1), 51-60.
- Cooley, E.J. & Ayres, R. (1985, Oct.). Convergent and discriminant validity of the mental processing scales of the Kaufman Assessment Battery for Children. Psychology in the Schools, 22, 373-377.
- Elliott, S.N. (1985). Review of AAMD Adaptive Behavior Scale. In J.V. Mitchell, Jr. (Ed.), The ninth mental measurements yearbook (Vol.2). Lincoln, Neb.: The University of Nebraska Press.
- Ellis, D. (1986). Sensory impairments in mentally handicapped people. San Diego: College Hill Press.
- Grossman, H. (Ed.). (1983). Classification in mental retardation. Washington, DC: American Association on Mental Deficiency.

- Halpern, A.S. (1968). A note on Clausen's call for a psychometric definition of mental deficiency. American Journal of Mental Deficiency, 72, 948-9.
- Huberty, T.J., Koller, J.R. & Brink, T.D.T. (1980). Adaptive behavior in the definition of mental retardation. Exceptional Children, 46 (4), 256-261.
- Kaufman, A.S. & Kaufman, N.L. (1983). K-ABC: Kaufman Assessment Battery for Children. Circle Press, MN: American Guidance Service.
- Leland, H., Shellhaas, M., Nihira, K. & Foster, R. (1967). Adaptive behavior: a new dimension in the classification of the mentally retarded. Mental Retardation Abstracts, 4, 359-387.
- McCaffrey, R.J. & Isaac, W. (1985). Preliminary data on the presence of neuropsychological deficits in adults who are mentally retarded. Mental Retardation, 25(2), 63-66.
- McCarthy, D. (1972). Manual for the McCarthy Scales of Children's Abilities. San Antonio, TX: The Psychological Corp.
- McClelland, D.C. (1973, January). Testing for competence rather than intelligence. American Psychologist.
- Mitchell, J.V. Jr. (Ed.) (1985) The ninth mental measurements yearbook (Vol.2). Lincoln, Neb: The University of Nebraska Press.
- Naglieri, J.A. (1985). Assessment of mentally retarded children with the Kaufman Assessment Battery for Children. American Journal of Mental Deficiency, 89(4), 367-371.
- Newman, H.G. & Doby, J.T. (1973). Correlates of social competence among trainable mentally retarded children. American Journal of Mental Deficiency, 77(6), 722-732.
- O'Connor, G., Justice, R. & Payne, D. (1970). Statistical expectations of physical handicaps of institutionalized retardates. American Journal on Mental Deficiency, 74, 541-547.
- Odom, S.L. & McConnell. (1985). A performance-based conceptualization of social competence of handicapped preschool children: implications for assessment. Topics in Early Childhood Special Education, 4(4), 1-19.
- Page, E.B. Review of Kaufman Assessment Battery for Children. In J.V. Mitchell, Jr. (Ed.), The ninth mental measurements yearbook (Vol. 2). Lincoln, Neb: The University of Nebraska Press.
- Public Law 94-142, Education for All Handicapped Act of 1976.
- Salvia, J. & Ysseldyke, J.E. (1988). Assessment in special and remedial education (4th ed.). Boston: Houghton Mifflin Co.
- Sattler, J.M. (1988). Assessment of Children. San Diego: Author.

- Thorndike, R.L., Hagen, E.P. & Sattler, J.M. (1986). Technical manual Stanford-Binet Intelligence Scale (4th ed.). Chicago: Riverside Publishing.
- Utley, C.A., Lowitzer, A.C. & Baumeister, A.A. (1987, March). A comparison of AAMD's definitions, eligibility criteria, and classification schemes with state departments of education guidelines. Education and Training in Mental Retardation.
- Virginia Department of Education (1990, July). Regulations governing special education programs for the handicapped children and youth in Virginia. Richmond: Author.
- Wechsler, D. (1967). Manual for the Wechsler Preschool and Primary Scale of Intelligence. San Antonio, TX: The Psychological Corp.
- Wechsler, D. (1974). Manual for the Wechsler Intelligence Scale for Children (rev. ed.). San Antonio, TX: The Psychological Corp.
- Wechsler, D. (1991). Wechsler Intelligence Scale for Children: manual (3rd ed.). San Antonio, TX: The Psychological Corp./ Harcourt Brace Jovanovich, Inc.
- Werner, E.E. Review of Arthur Adaptation of the Leiter International Performance Scale. In O.K. Buros (Ed.), The sixth mental measurements yearbook. Highland Park, NJ: The Gryphon Press.
- Wesman, A. (1978). Intelligent testing. Readings in diagnosis and placement. Guilford, CT: Special Learning Corp.
- Woodcock, R.W. (1977). Woodcock-Johnson Psychoeducational Battery: Technical Report. Allen, TX: DLM Teaching Resources.
- Zigler, E., Balla, D. & Hodapp, R. (1984). On the definition and classification of mental retardation. American Journal of Mental Deficiency, 89(3), 215-230.

Vita

Nancy Lynn Robertson Orrison

Birthdate: June 14, 1955

Birthplace: Newport News, Virginia

Education:

- | | |
|-----------|--|
| 1982-1986 | The College of William and Mary
Williamsburg, Virginia
Educational Specialist |
| 1980-1981 | The College of William and Mary
Williamsburg, Virginia
Master of Education |
| 1973-1977 | James Madison University
Harrisonburg, Virginia
Bachelor of Music Education |
| 1981-1992 | Special Education Teacher
TMR and EMR Programs
Special Education Specialist
Newport News Public Schools
Newport News, Virginia |
| 1992-1993 | Who's Who in American Education |