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# A CONCURRENT VALIDITY STUDY OF THE MISSOURI ADAPTIVE ABILITY SCALE AND THE ADAPTIVE BEHAVIOR ASSESSMENT SYSTEM, THIRD EDITION—TEACHER FORM

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# A CONCURRENT VALIDITY STUDY OF THE MISSOURI ADAPTIVE ABILITY SCALE AND THE ADAPTIVE BEHAVIOR ASSESSMENT SYSTEM, THIRD EDITION—TEACHER FORM

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# ABSTRACT

This study utilizes correlational data to demonstrate the construct validity of the Missouri Adaptive Ability Scale (MAAS) by comparing it to Adaptive Behavior Assessment System, Third Edition (ABAS-3) Teacher Form, a thoroughly researched and validated measure of independent living and adaptive functioning. The purpose was designed to extend research conducted to achieve construct validity of the MAAS. Twenty-six high school students with low incidence handicapping conditions (M = 17 years old) were included in this study. The ABAS-3 Teacher Form was obtained from archives and the MAAS was administered directly to the participants by the author. Pearson correlations revealed strong correlations across most MAAS/ABAS-3 combinations, supporting the concurrent validity of the MAAS. Implications, limitations, and suggestions for future research are discussed.

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# CHAPTER ONE: INTRODUCTION

Adaptive behavior, in general, is defined as the collection of conceptual, social, and practical skills that have been learned and are performed by people in their everyday lives (Tasse et. al., 2012). This construct, which was originally defined by Rick F. Heber in 1959, is important in the fields of school psychology, developmental psychology, and special education. In particular, measurement of adaptive behavior is a vital component in the assessment of intellectual disabilities (Tasse et. al., 2012).

Many definitions of adaptive behavior have been promulgated over the years. Consistent factors included in each definition contain the consideration of an individual's ability to effectively meet the social and community expectations for establishing personal independence, maintaining physical needs, conforming to social norms, and sustaining interpersonal relationships (Bruininks, Woodcock, Weatherman, & Hill, 1996). According to Tasse and colleagues (2012), adaptive behavior was defined as the collection of conceptual, social, and practical skills that have been learned and are performed by people in their everyday lives. Conceptual skills include language, reading and writing, and money, time, and number concepts. Social skills included interpersonal skills, social responsibility, self-esteem, gullibility, naiveté, following rules/obeying laws, avoiding victimization, and social problem solving. Practical skills included activities of daily living (personal care), occupational skills, use of money, safety, health care, travel/transportation, schedules/routines, and use of the telephone.

Sparrow, Cicchetti, and Saulnier (2016) outlined four important principles, which are inherent within the adaptive behavior construct. First, adaptive behavior is age-related. For most individuals, the repertoire of adaptive behaviors becomes larger and more complex with increased age. Second, because humans are social creatures, adaptive behavior is evaluated in a

social context; adaptive competence cannot be defined in any absolute way, but only in reference to the expectations and standards of others. Third, adaptive behavior is modifiable. In contrast to cognitive ability, which is considered relatively stable for most people over time, adaptive functioning can erode or improve as a result of interventions, changes in the individual's environment, physical or emotional trauma, or other events (Sparrow, Cicchetti, & Saulnier, 2016). Finally, adaptive behavior is defined by typical performance, not by ability. Ability is a necessary but not a sufficient, condition for the satisfactory performance of required daily activities. Factors such as limitations imposed by others or lack of motivation on the part of the individual can result in adequate ability not translating into adequate performance.

The concept of adaptive behavior is a continuation of the historical attention given to adaptive behavior in the diagnosis of mental retardation, now known as an intellectual disability (Wehmeyer et. al., 2008). The role that adaptive behavior measurement plays within the diagnosis of intellectual disabilities is substantial; likewise, an accurate diagnosis of an intellectual disability can open doors of opportunity for individuals with substantial needs. By identifying an individual's independent adaptive behavior ability level, practitioners (therapists, counselors, teachers, etc.) are able to develop an intervention plan that utilizes research-based strategies that most appropriately address that persons' needs. The applications of adaptive behavior assessments in regard to diagnosing intellectual disabilities are specifically defined by the American Association on Intellectual and Developmental Disabilities (AAIDD), the Diagnostic and Statistical Manual of Mental Disorders, Fifth edition (DSM-V), and the Individuals with Disabilities Education Act (IDEA, 2004).

The AAIDD manual specifies that adaptive behavior should be assessed by standardized measures that have been normed on the general population, and that a diagnosis of intellectual

disability must include a score that is approximately two standard deviations below the normative mean on either the overall score of adaptive functioning or on one of the three adaptive behavior domains—conceptual, social, or practical (Harrison & Oakland, 2015).

The DSM-V is less specific than the AAIDD about adaptive behavior score cut-offs, indicating that at least one domain of adaptive functioning (conceptual, social, or practical) is sufficiently impaired to warrant ongoing support in one or more settings. Nevertheless, the DSM-V provides some guidelines for adaptive behavior assessment, including the use of psychometrically sound, standardized measures, administered to knowledgeable informants, and interpreted using clinical judgement (American Psychiatric Association, 2013).

Special education legislation, as listed in IDEA (2004), defines an intellectual disability based upon limitations in both adaptive behavior and intellectual functioning (Thomas & Grimes, 2008). In order for individuals to receive special education services as a student with an intellectual disability, their adaptive behavior must be significantly below same-age expectations (i.e. at least two standard deviation units below the mean). IDEA highlights the importance of adaptive behavior assessment in determining eligibility for special education services for children from infancy through age 21; adaptive functioning is an explicit part of the definitions of intellectual disability and developmental delay under IDEA (Sparrow, Cicchetti, & Saulnier, 2016).

The Department of Health and Human Services (DHHS) also delineates specifications regarding the classification of an intellectual disability via the Federal statute 42 C.F.R. § 425 (DHHS, 2015). This law was developed to address the qualifications for individuals with disabilities who are over the age of 21 and no longer qualify for services under IDEA. The definition of an intellectual disability under the federal statute states that people seeking

community services must have an impairment of general intellectual functioning or deficits in adaptive behavior. The disability will have manifested before the age of 22, most likely continues throughout one's lifespan, and substantially limits the individual's ability to participate in three of more major life activities. Life activities include: (1) self-care, (2) receptive and expressive language, (3) learning, (4) mobility, (5) self-direction, and (6) capacity for independent living or economic self-sufficiency. However, no currently available norm-referenced measures of adaptive behavior measure all aspects of independent functioning under the 42 C.F.R. § 425 law.

**Purpose of the Study**

This study was designed to extend previous research on the concurrent validity of the Missouri Adaptive Ability Scale (MAAS). This currently unpublished measure of adaptive behavior was developed by Dr. Mardis Dunham in 2017 to specifically measure all components of adaptive behavior described in federal statute 42 C.F.R. § 425. Unlike other measures of adaptive behavior, the MAAS measures the Learning component under the 42 C.F.R. § 425 law. However, before any new test can be offered to consumers, its validity must be clearly established. Therefore, the purpose of this study is to establish the concurrent validity of the MAAS by correlating it with an existing measure of adaptive behavior, the teacher-version of the Adaptive Behavior Assessment System, third edition (ABAS-3).

**Terms and Definitions**

- Intellectual Disability: deficits in general mental abilities, such as reasoning, problem solving, planning, abstract thinking, judgment, academic learning, and learning from experience. The deficits result in impairments of adaptive functioning, such that the individual fails to meet standards of personal independence of social responsibility in one or

more aspects of daily life, including communication, social participation, academic or occupation functioning, and personal independence at home or in community settings (American Psychiatric Association, 2013).

- Adaptive Behavior: the collection of conceptual, social, and practical skills that have been learned and are performed by people in their everyday lives (Tasse et. al., 2012).
- Construct Validity: validation used in types of research required for developing tests that are interpreted in terms of attributes for which there is no adequate criterion (Cronbach & Meehl, 1955). This is achieved by compiling convergent evidence through the process of correlating scores from one measure to another, in which both assessments measure the same trait (McMillan, 2012).
- Informant Ratings: a method to collect behavioral data using an alternative source of information, most notably ratings provided by knowledgeable informants of the person(s) being rated (Mottus, Allik, & Realo, 2018).
- Federal Statute 42 C.F.R. § 425: the federal statute stating people seeking community services for Intellectual Disability must have impairment of general intellectual functioning or deficits in adaptive behavior. An intellectual disability is manifested before a person reaches the age of 22 and exhibit substantial limitations in three or more major life activities (DHHS, 2015).

# CHAPTER TWO: REVIEW OF EXISTING LITERATURE

The MAAS was specifically developed to measure all aspects of adaptive functioning required under the 42 C.F.R. § 425 law. As such, a deeper analysis of the federal statute 42 C.F.R. § 425 is needed to identify the exact criteria missing from current measures of adaptive behavior and aids in establishing the utility and validity of the MAAS. This information will be discussed in Chapter 2, followed by a discussion of validity and reliability issues are and how they are measured. Further, a review of the reliability and validity for each of the existing adaptive measures that are most commonly used will assist in comparing the coefficients across these measures with the coefficients calculated for the MAAS.

## Current Federal Legislation

Individuals with disabilities, who are under age 21 and in public schools, are provided services under IDEA (2004). However, those individuals who are no longer eligible to stay in school due to their age seek continued services through state and federal agencies (e.g. Easter Seals). At this time, eligibility requirements for these services have changed. Specifically, under federal statute 42 C.F.R. § 425, people seeking community services for intellectual disability must have impairment of general intellectual functioning or deficits in adaptive behavior (DHHS, 2015). An intellectual disability is manifested before a person reaches the age of 22 and continues throughout one's lifespan. Persons with related conditions have substantial limitations in three or more of the following areas of major life activities, in which are defined below by the 42 C.F.R. § 425 law (DHHS, 2015).

1. Self-Care: the daily activities that enable a person to meet basic needs for food, hygiene, and appearance; demonstrated ongoing ability to appropriately perform basic activities of daily living with little or no assistance or supervision.

2. Receptive and Expressive Language: Communication involving verbal and nonverbal behavior enabling a person to understand and express ideas and information to the general public with or without assistive devices; demonstrated ability to understand ordinary spoken and written communications and to speak and write well enough to communicate thoughts accurately and appropriately on an ongoing basis.

3. Learning: general cognitive competence and ability to acquire new behaviors, perceptions, and information and to apply experiences in new situations; demonstrated ongoing ability to acquire information, process experiences, and appropriately perform ordinary, cognitive, age-appropriate tasks on an ongoing basis

4. Mobility: Motor development and ability to use fine and gross motor skills; demonstrated ongoing ability to move about while performing purposeful activities with or without assistive devices and with little or no assistance or supervision

5. Self-Direction- management and control over one's social and personal life; ability to make decisions and perform activities affecting and protecting personal interests; demonstrated ongoing ability to take charge of life activities as age-appropriate through an appropriate level of self-responsibility and assertiveness

6. Capacity for independent living or economic self-sufficiency- age appropriate ability to live without extraordinary assistance from other persons or devices, especially to maintain normal societal roles; ability to maintain adequate employment and financial support; ability to earn a living wage after payment of extraordinary expenses caused by the disability; demonstrated ability to function on an ongoing basis as an adult independent of extraordinary emotional, physical, medical, or financial support systems

Despite these criteria, current adaptive measures do not provide data to satisfy the "Learning" requirement. Currently, under federal statute 42 C.F.R. § 425, before adults can be considered for post-secondary services, they must demonstrate impairments in adaptive functioning. However, not all measures of adaptive behavior measure these criteria. These measures also do not measure the learning component outlined by the 42 C.F.R. § 425 law.

**Test Development**

An essential concept in understanding research is knowing that there is never a perfect indication of the trait, skill, knowledge, attitude, etc. is being assessed (McMillan, 2012). When assessing any type of subjective concept, error in measurement occurs. This error in measurement must be taken into consideration and, to the closest degree possible, measured.

**Reliability.** According to McMillan (2012), reliability is the extent to which participant and/or rater scores are free from error. Thus, if a measure has high reliability, then there is relatively little error in the scores; if there is low reliability, then there is a higher amount of error. There are five types of reliability that psychological instruments must demonstrate: (1) stability, (2) equivalence, (3) equivalence and stability, (4) internal consistency, and (5) agreement. A stability estimate of reliability, also called test-retest reliability, is obtained by administering one measure to one group of individuals, waiting a specified period of time, and then readministering the same instrument to the same group (McMillan, 2012). The purpose of this type of estimate is to confirm the consistency of the subjects' performance overtime; if the skill that is being measured changes between the first and second administration, then reliability will be low. Stability estimates are typically used for aptitude tests, tests in the psychomotor domain, and some achievement tests. A measure of equivalence is obtained by administering two forms of the same test to one group of individuals and then correlating the scores from the two

administrations (McMillan, 2012). Each form of the test are identical in content, mean, and standard deviation, however, the specified questions will vary. A measure of equivalence is used in research on achievement when a pretest and a posttest are given to determine how much the performance of the subjects changed. An equivalence and stability estimate is obtained by administering one form of an instrument and then a second form after a time interval to the same group of individuals; this combines equivalence with stability (McMillan, 2012). This type of reliability is the most stringent and is useful when researchers are concerned with the strength of stability and the strength of equivalence. Internal consistency, the most widely used estimate of reliability, indicates the degree to which subjects' answers to items measuring the same trait are consistent (McMillan, 2012). For this type of estimate, only one form of an instrument is given once to one group of individuals. There are three types of internal consistency estimates: (1) split-half, (2) Kuder-Richardson, and (3) Coefficient Alpha (McMillan, 2012). In split-half reliability, the items in a test are divided into equal halves, and the scores of each person on the two halves are correlated for the reliability coefficient. The Kuder-Richardson method, usually denoted as KR-20 or KR-21, is used in tests for which there is a right or wrong answer to each item; it calculates the average of all the correlations that could be obtained from all possible split-half estimates. The Coefficient Alpha method is used with instruments that contain a range of possible answers for each item. Internal consistency is used when the purpose of an instrument is to measure a single trait. The coefficient of agreement exists in three types of situations: (1) establishing the reliability of ratings where the extent to which different raters agree on what they observe/score, (2) solving a situation where there is an insufficient number of items on an instrument measuring a single trait to compute an internal consistency estimate, and (3) addressing a skewed distribution of scores on criterion-referenced tests (McMillan, 2012).

Establishing reliability is a requirement in order to achieve validity—scores cannot be valid unless they are reliable.

**Validity.** The credibility of research is highly dependent upon the quality, or validity, of the measurement; if the measurement is not sound, then results are not useful (McMillan, 2012). According to McMillan (2012), validity is an overall evaluation of the extent to which theory and empirical evidence support interpretations that are implied in given uses of the scores. In other words, validity is a judgment of the appropriateness of a measure for the specific inferences or decisions that results from the score generated by the measure—it is the inference that is valid or invalid, not the measure. Historically, validity was defined as the degree to which an instrument measures what it says it "measures." However, the given definition promotes a more contemporary understanding that the use of the test results determines validity, rather than the test itself (McMillan, 2012). Validity is established by presenting evidence that the inferences are appropriate; there are five major sources of evidence: (1) test content, (2) internal structure, (3) relations to other variables, (4) response processes, and (5) consequences of testing (McMillan, 2012). The first three types of evidence are most closely related to conducting and reporting research. Evidence based on test content demonstrates the extent to which the sample of items or questions in the instrument is representative of appropriate domain of context/tasks. This type of evidence is usually accumulated by having experts examine the contents of the instrument and indicate the degree to which they measure predetermined criteria or objectives. Evidence based on internal structure is provided when the relationships between items and parts of the instrument are empirically consistent with the theory or intended use of the scores (McMillan, 2012). Evidence based on relations to other variables is the most common way that

validity of interpretations is established; this is done by showing how scores from a given measure relate to similar as well as different traits (McMillan, 2012).

**Existing Adaptive Measures**

The most commonly used adaptive behavior assessments include the Adaptive Behavior Assessment System—Third Edition (ABAS-3), the Vineland Adaptive Behavior Scales—Third Edition (VABS-3), and the Scales of Independent Behavior—Revised (SIB-R). Each of the aforementioned assessments focus on a variety of adaptive behavior skills, however, they lack the "Learning" component as mandated within the federal statute 42 C.F.R. § 425. A description of each assessment is as follows.

**ABAS-3.** The ABAS-3 provides a standardized assessment utilizing scaled scores for each of the following adaptive skills areas: Communication, Community Use, Functional Academics, Home/School Living, Health and Safety, Leisure, Self-Care, Self-Direction, Social, Work (for young adults and adults), and Motor (for young children); these adaptive skills are conceptually grouped into three board adaptive domains (conceptual, social, and practical) (Harrison & Oakland, 2015). Although the ABAS-3 includes an area of Functional Academics, it is informant-driven and there are no studies correlating the ABAS-3 to academic achievement.

The ABAS-3 standardization study included three independently collected samples: Infant and Preschool (ages 0-5; Parent/Primary Caregiver and Teacher/Daycare Provider forms), School (ages 5-21; Parent and Teacher forms), and Adult (ages 16-89; Adult Form, self-report and rated by others). Taken together, these samples consisted of 7,737 research form completed by respondents who reported on the adaptive behavior of 4,500 individuals (Harrison & Oakland, 2015). The standardization samples were obtained by recruiting data collectors from across the United States who had access to persons ages 0 to 89, and to respondents able to reports on those

persons' adaptive behavior (Harrison & Oakland, 2015). Standardization data were collected at 56 sites in 24 states in all four major U.S. Census regions. The goal was to collect a sample representative of the U.S. population in terms of ethnicity, gender, and household education level (Harrison & Oakland, 2015).

To establish adequate reliability in the development of the ABAS-3, six approaches to estimate the reliability were used: (1) internal consistency, (2) standard error of measurement, (3) test-retest reliability, (4) interrater reliability, (5) cross-form consistency, and (6) alternate-forms reliability (Harrison & Oakland, 2015). Overall, the reliability data suggest that the scaled scores of adaptive skill areas, as well as the standard scores of adaptive domains and General Adaptive Composite (GAC), reflect a high degree of internal consistency in the items. Further, the ABAS-3 scores retain this level of reliability in groups of individuals with difference clinical diagnoses (Harrison & Oakland, 2015).

To address the theoretical and practical dimensions of validity, the ABAS-3 manual presented evidence regarding the item content, response process, internal structure, internal consistency, age group differences, intercorrelations among the adaptive skill areas, factor structure, correlations with other variables, and ability of the ABAS-3 scores to differentiate among groups expected to vary in their levels of adaptive functioning (Harrison & Oakland, 2015). Confirmatory factor analysis revealed good fit for a single-factor model of general adaptive behavior, as well as for a model with three factors analogous to the Conceptual, Social, and Practical adaptive domains (Harrison & Oakland, 2015).

**VABS-3.** The VABS-3 utilizes a domain/subdomain structure. Sparrow, Cicchetti, and Saulnier (2016) describe this structure as follows: Communication (receptive, expressive, written), Daily Living Skills (personal, domestic numeric, community/school community), Socialization

(interpersonal relationships, play and leisure, coping skills), and Motor Skills (gross motor, fine motor).

The VABS-3 standardization was a large-scale, nationwide sample that provided data for each form's normative sample, reliability and validity studies for each form, and special study groups such as individuals with intellectual disabilities (Sparrow, Cicchetti, & Saulnier, 2016). According to Sparrow, Cicchetti, and Saulnier (2016), the VABS-3 norm samples were constructed to be representative of the U.S. population in the age range covered by each form, according to the most recent data available from the U.S. Census Bureau's American Community Survey 2014.

The research methods used to determine the various VABS-3 reliability results were the same for all three forms—the general methods used include: (1) internal consistency reliability, (2) standard errors of measurement, (3) test-retest reliability, and (4) interrater (or inter-interviewer) reliability (Sparrow, Cicchetti, & Saulnier, 2016). The reliability of the VABS-3 using all of the aforementioned methods of research resulted in appropriate levels. The VABS-3 utilizes three core domains—Communication, Daily Living Skills, and Socialization—plus an optional Motor Skills domain (Sparrow, Cicchetti, & Saulnier, 2016). Each domain is divided into subdomains that segment the content into more specific areas of adaptive functioning; the core domains are combined into an overall, global measure of adaptive functioning, called the Adaptive Behavior Composite (ABC) (Sparrow, Cicchetti, & Saulnier, 2016). Sparrow, Cicchetti, and Saulnier (2016) state that the content-based evidence for the validity of the VABS-3 test score interpretations rests primarily on having followed test development procedures that ensured fidelity to the test structure. A large number of VABS-3 experts and users, such as teachers, researchers, and practitioners, were involved in content development; this helps ensure

the relevance of the content to current thinking and practice in adaptive behavior assessment (Sparrow, Cicchetti, & Saulnier, 2016).

**SIB-R.** The SIB-R is a comprehensive measure of adaptive and problem behaviors. It is primarily designed to measure functional independence and adaptive functioning in school, home, employment, and community settings. The test covers a wide age range, with norms provided from early infancy to mature adult levels of 80 years and older (Bruininks, Woodcock, Weatherman, & Hill, 1996). The SIB-R Full Scale is comprised of 14 subscales organized into four adaptive behavior clusters: Motor (gross-motor skills, fine-motor skills), Social Interaction and Communication (social interaction, language comprehension, language expression), Personal Living (eating and meal preparation, toileting, dressing, personal self-care, domestic skills), and Community Living (time and punctuality, money and value, work skills, home/community orientation); each cluster contains from two to five subscales.

The norms for the SIB-R provide the reference information to which an individual's performance in compared and evaluated. Normative data for the SIB-R were gathered from 2,182 individuals in 15 states and more than 60 communities distributed throughout the United States. The norming sample was selected to be as representative as possible of the United States population from age 3 months to 90 years, based upon the 1990 U.S. census statistics. To achieve such representation, the following stratifying variables were considered in the sampling plan: gender, race, Hispanic origin, occupational status, occupational level, geographic region, type of community (Bruininks, Woodcock, Weatherman, & Hill, 1996).

The calculations of reliability statistics for the SIB-R used data from the 2,182 individuals in the norming sample and were calculated for all subscales across their range of intended use. Reliabilities for all subscales were calculated using the split-half procedure and

corrected by the Spearman-Brown formula (Bruininks, Woodcock, Weatherman, & Hill, 1996). Test-retest reliability was utilized in order to relate the reliability of the test being used and to the stability of the trait being measured over time. Interrater reliability was established by assessing similarities of responses between two respondents (i.e. mothers and fathers, teachers and teacher aides) (Bruininks, Woodcock, Weatherman, & Hill, 1996).

The extent to which test scores relate to a theoretical construct, such as adaptive behavior, may be inferred from evidence about the degree to which the test's results confirm a series of hypotheses derived from that construct (Bruininks, Woodcock, Weatherman, & Hill, 1996). Construct validity was established by first comparing the SIB-R to the original SIB, using the same individuals but based on the 1994 norms and Rasch calibration (Bruininks, Woodcock, Weatherman, & Hill, 1996). Furthermore, it is generally assumed that adaptive behavior skills increase with age; therefore, they have strong developmental characteristics. The relationship between age and SIB-R scores across wide age ranges is curvilinear. Adaptive behavior skills increase rapidly at early ages, more slowly during adolescence, and level off or gradually decline in later years. Moreover, adaptive behavior limitations should be more pronounced among individuals who have more severe disabilities. Thus, comparative data regarding the performance of individuals with disabilities and individuals without disabilities matched on age and gender was analyzed to establish validity regarding comparative studies (Bruininks, Woodcock, Weatherman, & Hill, 1996).

**Missouri Adaptive Ability Scale**

The Missouri Adaptive Ability Scale (MAAS), according to its author (M. Dunham, personal communication), is a norm-referenced, computer administered measure of adaptive functioning for ages 1 to adulthood. Adaptive functioning is assessed using both informant input

and examiner interactions to gain a more reliable and valid assessment of the individuals' daily living skills. It was specifically developed to measure all aspects of adaptive behavior required under federal statute and to provide a single measure of adaptive behavior that could be easily administered and interpreted by most practitioners working for states who are responsible for determining which applicants are eligible for state and federal support services. The MAAS differs from other measures of adaptive behavior in two important ways. First, part of the test requires the examiner to interact with the client one-on-one in order to measure visual memory, verbal memory, reading skills, and math skills and to gauge the client's understanding of a range of independent functioning skills, including judgement. Second, the MAAS provides an index of reliability. This helps judge the extent that the informant may be exaggerating or otherwise misrepresenting the client's functioning levels.

The most common method of measuring adaptive behavior is through reporting by an informant who is familiar with the adaptive behavior of the individuals being assessed (Sparrow, Cicchetti, & Saulnier, 2016). According to the AAIDD (2010), using standardized adaptive behavior measures to identify significant limitations in adaptive behavior usually involve obtaining information regarding the individual's adaptive behavior from a person or persons who know the individual well. Thus, with current measures, the individual being evaluated does not typically participate in the adaptive behavior assessment. This method fosters the concern of respondent reliability. While some of the existing adaptive behavior assessment have a self-report option, individuals in a low-incidence population may not have the communicative wherewithal needed to complete a self-report. In this type of instance, direct observation of a skill is an important method to utilize, in addition to a third-party respondent, to ensure an accurate depiction of abilities and to give the individual a sense of ownership in the evaluative

process. Additionally, as stated previously, current measures do not include the "Learning" area of major life activities. Consequently, the most accurate form of collecting academic data from an individual is for that person to be actively involved in the assessment. The MAAS utilizes both a third-party approach and direct administration of tasks and/or direct behavioral observation. By implementing both evaluative techniques, the MAAS collects data through a wider scope and is able to collect the most accurate depiction of the individuals' adaptive behavior abilities.

The MAAS is administered in two stages—the Learning and Observation stage and the Informant Ratings stage. The Learning and Observation stage is administered directly to the individual by the examinee. The Observation portion entails the direct observation of the individual's skills on a sample of the informant rating items. The Informant Ratings stage is administered to the informant/caregiver and is administered after the Learning and Observation stage has been completed. This stage contains the following subtests: (1) Mobility, (2) Communication, (3) Independent Living/Self-Care, (4) Self-Direction, and (5) Economic Self Sufficiency. The informant/caregiver rates the client's level of independence using the following criteria: 2 points means the client performs the skill or task in question independently; 1 point means the client performs the skill or task with prompting or somewhat independently; and 0 points means the client is unable to perform the skill or task.

**MAAS Conceptual Development and Content Validity**

The conceptual development of the MAAS began when Dr. Cla Stearns, currently an administrator with Missouri Institute of Mental Health (MIMH), recognized the limitations that characterize available measures of adaptive functioning. When the MAAS contract was approved by MIMH, Dr. Stearns and Dr. Mardis Dunham, with Murray State University,

considered the needs of MIMH clientele and assessment personnel. They researched developmental stages to generate the individual test items, format, scoring, and interpretation. The individual items were analyzed, vetted, and sequenced via level of difficulty by the author and other experts in child development and intellectual disabilities. Once the MAAS prototype was developed, it was administered to 25 individuals from ages 5 to 30. Items that relied upon excessive examiner judgement or that were overly difficult to score or interpret by either the examiner or the informant were eliminated. The norming version of the MAAS resulted in 10 subtests administered in two stages, described below.

**Stage I: Learning and Observation Subtests**

**Learning.** This series of subtests measures the individual's learning aptitude through assessment of reading, mathematics, verbal memory, and visual memory and requires the use of a reusable workbook.

1. Reading: The Reading subtest begins by measuring the extent the client can read individual words and increases in difficulty to measure reading comprehension. There are 13 items for this subtest.
2. Mathematics: The Mathematics subtest begins by measuring the client's ability to count simple objects and increased in difficulty to measure knowledge of ratios. There are 15 items on this subtest.
3. Verbal Memory: This subtest measures the client's ability to sustain verbal attention and recall verbally presented information, beginning with single words and increasing to complex sentences. There are 12 items on this subtest.
4. Visual Memory: This subtest measures the client's ability to remember a series of

geometric shapes. The items begin with three items then increase in difficulty by increasing the number of figures to be remembered. There are six Visual Memory items.

**Observation.** This aspect of Stage I utilizes observation of the individual's adaptive skills as well as direct questions of up to 43 items that are embedded in the Informant Ratings section.

**Stage II: Informant Ratings Subtests**

1. Mobility: This subtest measures fine motor skills (skill in using one's hands to meet the demands of daily living) and gross motor skills (skill in using large muscle groups in the process of ambulation and employment). There are 16 Fine Motor subscale items and 18 Gross Motor subscale items.
2. Communication: This subtest measures individuals' skill in expressing themselves and ability to understand what others are saying to them. There are 22 Expressive Language subscale items and 21 Receptive Language subscale items.
3. Independent Living/Self-Care: This subtest measures individuals' ability to meet the age appropriate self-help demands of daily living. It measures skills required for dressing, toileting, meal preparation and managing domestic responsibilities. There are 44 items that comprise this scale.
4. Self-Direction: This subtest measures the individual's ability to sustain attention, follow through on directions, set goals, and make appropriate decisions regarding personal and economic safety. There are 33 items that comprise this scale.
5. Economic Self-Sufficiency: This subtest measures the individual's ability to find and

sustain employment. It includes the ability to understand and manage money and to understand employment contexts and environments. This scale is administered to individuals 15 years and older.

**MAAS Norming**

The normative sample for the MAAS included 722 individuals ages 1 to 79. The normative sample was broken down into 10 age groups: Regarding race, there were 554 Caucasians, 108 African Americans, 20 Hispanic Americans, 21 Asian Americans, and 19 who identified as other or biracial. Approximately 10 percent of the participants had a documented disability, such as ADHD or learning disabilities. Most data were obtained from Kentucky, although some of the participants were from Missouri, Illinois, and Tennessee. The developer trained all examiners involved in the data collection for the norming—there were 10 graduate students in school psychology and five practicing school psychologists involved in data collection. Murray State University's Institutional Review Board approved the norming procedures, including the MAAS and the informed consent documents. To date, several currently unpublished Educational Specialty (Ed.S.) studies have demonstrated the test-retest reliability and the concurrent validity of the MAAS by comparing it to other existing measures of adaptive functioning.

**Summary**

The existing measures of adaptive behavior that are most commonly used do not meet the guidelines mandated in the federal statute 42 C.F.R. § 425. An adaptive measure that encompasses all aspects of adaptive behavior as stated within federal law is needed. In order for individuals with intellectual disabilities to receive services in an educational and in a post-secondary, an accurate diagnosis must be acquired. Thus, the MAAS has been developed in

order to meet this need. The purpose of this study is to provide concurrent validity for the MAAS by comparing it to an existing measure of adaptive functioning, specifically, the ABAS-3: Teacher Rating Scale, ages 5-21. The magnitude and nature of the correlations will be used to help establish the concurrent validity of the MAAS.

# CHAPTER THREE: METHODS

## Participants

The participants for this study included 26 high school students (M = 17.6 years old; *SD* = 1.6; Minimum Age = 14; Maximum Age = 20). There were 17 male participants and 9 female participants. Each student was receiving specially designed instruction (i.e. special education) for low incidence disabilities, including autism, functional mental disabilities, mild mental disabilities, or some combination of autism and intellectual disability. All of the students were enrolled in the same high school in McCracken County, Kentucky.

## Procedures

Following approval by Murray State University's Institutional Review Board (IRB), informed parent consent was obtained permitting the researcher to obtain the teacher-completed Adaptive Behavior Assessment Scale—Third Edition (ABAS-3) data from each participant's file and to individually assess each participant with the MAAS. The parents served as the informant for the participants on the MAAS. The raw scores from the ABAS-3 and the MAAS were uploaded to SPSS for further analysis. No personally identifiable information was collected.

## Hypothesis

It was hypothesized that the results would reveal a strong correlation between MAAS components and ABAS-3 Teacher-form subtests on those subtests that are designed to measure the same construct.

## Analyses

First, intercorrelations among the six MAAS scales were obtained using Pearson Product Moment correlations. This was followed by Pearson correlations among the MAAS scales and the ABAS-3 scales.

## CHAPTER FOUR: RESULTS AND DISCUSSION

A review of the intercorrelations among the seven MAAS scales revealed statistically significant correlations (<.01 level) among all pairings—this resulted in 21 statistically significant correlations which are summarized in Table 1. Correlations between .10 and .30 are considered weak; between .40 and .60 are considered moderate; and between .70 and above are considered strong (McMillian, 2012). The strongest correlations were noted between the Learning composite (a combination of the reading, math, and memory scales) and the Expressive Language, Receptive Language, Self-Care, and Self-Direction scales. Strong correlations were also noted between the Expressive and Receptive Language scales, Expressive language and the Self-Care and Self-Direction scales, and between the Fine motor and Self-Care scales.

Table 2 summarizes the correlations between the MAAS scales and the Teacher-form of the ABAS-3. Again, all correlations were statistically significant (< .01 level). Strong correlations (.70 or higher) were identified between the MAAS Learning, Expressive Language, Receptive Language and Self-Direction composites and all of the ABAS-3 skill areas (Communication, Community Use, Functional Academics, School Living, Health and Safety, Leisure, Self-Care, Self-Direction, and Social). Additionally, strong correlations were noted between the MAAS Self-Care subtest and the ABAS-3 skill areas of Communication, School Living, Health and Safety, Leisure, Self-Care, Self-Direction, and Social. A strong correlation was also found between the MAAS Fine Motor composite and the ABAS-3 Health and Safety skill area. Moderate correlations (.40 to .60) were noted between the MAAS Fine Motor composite and the ABAS-3 skill areas of Communication, Community Use, Functional Academics, School Living, Leisure, Self-Care, Self-Direction, and Social. Moderation correlations were also found between the MAAS Gross Motor composite and all of the ABAS-3

skill areas. Additionally, moderate correlations were identified between the MAAS Self-Care composite and the ABAS-3 skill areas of Community Use and Functional Academics.

**Discussion**

A test's validity is traditionally evaluated, in part, by evidence that examines relationships between the test and other variables (Harrison & Oakland, 2015). This study establishes construct validity through the collection of evidence based on relations to other variables by identifying the correlations between the MAAS and the ABAS-3 Teacher-form. The ABAS-3 manual (Harrison & Oakland, 2015), includes studies of concurrent validity with other measures: the second edition of the ABAS ($N = 122$, $r = .89$), the second edition of the VABS ($N = 55$, $r = .77$), the second edition of the Behavior Assessment System for Children ($N = 63$, $r = .35$), and the Reynolds Intellectual Assessment Scales ($N = 24$, $r = .37$). The correlation of the scores between the ABAS-3 and other measures provides convergent data which serves as evidence of construct validity. The manuals of the VABS-3 and SIB-R also include convergent data between the current measure and other pertinent adaptive instruments. The VABS-3 manual (2016) presents correlation data between the VABS-3 and the following measures: the ABAS-3 (Teacher-form ages 3-5 $r = .88$, Teacher-form ages 6-18 $r = .75$) and the third edition of the Bayley Scales of Infant and Toddler Development (Parent/Caregiver form $r = .76$). The SIB-R manual (1996) presents correlation data between the SIB-R and the following measures: the Woodcock-Johnson, Revised (WJ-R) Broad Cognitive Ability ($r = .82$), and the Adaptive Behavior Scale, School Edition ($r = .81$).

Within this study, analysis of Table 2 depicts convergent data which provides strong evidence of concurrent validity between the MAAS and ABAS-3 Teacher form. For example, four out of the seven MAAS composites strongly correlated ($N = 26$, $r = .70$ or higher) with all

nine of the ABAS-3 skill sets. The original hypothesis that stated a strong correlation between the MAAS and ABAS-3 Teacher-form has been proven through the presentation of convergent data that provides evidence of construct validity. Given this data, it is clear that the MAAS is significantly correlated with the ABAS-3 Teacher-form, suggesting that both instruments are measuring the same or similar constructs. Specifically, 44 out the 63 pairings were significantly correlated at a level of .70 or higher. Conclusively, the results of the MAAS intercorrelation analysis (Table 1) and the MAAS/ABAS-3 Teacher-form correlations (Table 2) were similar with the validity studies conducted on the ABAS-3 and presented similar results, suggesting that the MAAS has acceptable concurrent validity when compared to the ABAS-3 Teacher-form.

Overall, these findings were similar to those found when the ABAS-3 teacher form was compared to the VABS-II. For example, using a sample size of 34, Harrison and Oakland (2015) found that the ABAS-3 GAC correlated with VABS-II Adaptive Behavior Composite Score at .77. Further, correlations remained within the mostly strong (.70 - .90) range, averaging .77 throughout the data for the VABS-II Teacher Rating Form and the ABAS-3 Teacher Form. The ABAS-3 Parent/Primary Caregiver Form correlated with the VABS-II with an average of .67, ranging from moderate to high correlation. Similarly, Sparrow, Cicchetti, and Saulnier (2016), in their study of 54 children, ages 3-5, comparing the VABS-3 to the ABAS-3 found correlations ranging from .51 between the VABS-3 Motor Skills scale and the ABAS-3 Social Composite, to .91 between the VABS-3 Adaptive Behavior Composite to the ABAS-3 General Adaptive Composite. When Sparrow, Cicchetti, and Saulnier (2016), studied a sample size of 51 children, ages 6-18, a variety of positive correlations were found. For example, the VABS-3 Adaptive Behavior Composite correlated with the ABAS-3 General Adaptive Composite at .76. Comparable findings were identified when Bruininks, et. al. (1996) studied a sample of 52

children when comparing the SIB to the Adaptive Behavior Scale (ABS), where the SIB Home/Community Orientation correlated with the ABS Independent-Functioning scale at .74. Additionally, the SIB-R Broad Independence score correlated with the Woodcock-Johnson Revised Broad Cognitive Ability *W* Score at .78.

# CHAPTER FIVE: IMPLICATIONS, LIMITATIONS AND FUTURE RESEARCH

## Implications

The implications of this study mainly focus on the issue that current adaptive measures do not meet the requirements listed in modern legislation. Specifically, federal statute 42 C.F.R. § 425 states that adaptive behavior should be assessed across six areas of major life activities: (1) self-care, (2) receptive and expressive language, (3) learning, (4) mobility, (5) self-direction, and (6) capacity for independent living/economic self-sufficiency (DHHS, 2015). The MAAS has been developed to specifically measure the areas listed in the federal statute, while other measures of adaptive behavior do not address the Learning component. Before adults with disabilities (individuals over the age of 21) can be considered for post-secondary services, they must exhibit adaptive functioning impairment. The MAAS serves as a measure of adaptive functioning that is aligned with legislation to assist in determining eligibility for post-secondary services for adults with disabilities.

Additionally, the validity of a measure serves as an overall evaluation of the appropriateness of a measure (McMillan, 2012). In other words, establishing the concurrent validity of a test ensures that the assessment will generate similar scores to other measures that claim to be measuring the same construct. Within this study, the validity of the MAAS is supported through examining intercorrelations between MAAS components (Table 1) and through studying correlations with the ABAS-3 Teacher-form (Table 2). By collecting the convergent data presented through correlations, concurrent validity is inferred for the MAAS. Strong positive correlations were identified for the MAAS Learning, Expressive Language, Receptive Language, and Self-Direction composites and all subscales of the ABAS-3. The Gross Motor composite on the MAAS presented discriminate evidence when correlated with the

ABAS-3, showing moderate correlations with all subscales of the ABAS-3 ($r$ = .374 - .497). This could mean that the Gross Motor subtest shows a mild amount of variance with the ABAS-3 or that it measures a differing set of functions related to adaptive functioning and adult independence.

**Limitations**

As with any research, this study has limitations that will affect its applicability. First, the sample size of this study is small, with only 26 subjects. This will likely limit the generalizability of the findings. Second, the sample size was specifically focused on a low-incidence population (i.e. functional and mild mental disabilities, low-functioning autism) and did not include typically-developing children. As such, the results may not generalize to the normally-developing population of children as a whole. Lastly, the manner in which the MAAS is proctored differs from the questionnaire format of the ABAS-3.

**Future Research**

Before the MAAS can be published and distributed for use in professional settings, future research is compulsory. When reviewing literature on existing adaptive behavior measures, construct validity is established by collecting convergent data with a variety of veteran assessments. A thorough establishment of validity needs to occur by comparing the MAAS with other adaptive behavior measures such as the SIB-R and the teacher-version of the VABS-3. Furthermore, the MAAS includes a Learning subtest that is designed to fulfill the requirements stipulated in federal legislature that existing measures of adaptive behavior do not have. Therefore, correlating the MAAS Learning component to other measures of academic skill and cognitive functioning in an atypically-developing population would be helpful.

The results of this study confirm that the MAAS serves as a strong measure of adaptive functioning for individuals with disabilities. With the implementation of further research to strengthen and refine the reliability and validity of this instrument, the MAAS should become a useful tool in measuring adaptive behavior in a manner that is directly aligned with federal legislative requirements.

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Table 1

*Intercorrelations for the MAAS for Sample*

| | Exp. | Recept. | Fine | Gross | S-Care | S-Dir. |
|---|---|---|---|---|---|---|
| Learn. | .793 | .725 | .694 | .410 | .762 | .816 |
| Exp. | | .765 | .667 | .482 | .725 | .779 |
| Recept. | | | .598 | .639 | .750 | .422 |
| Fine | | | | .650 | .748 | .615 |
| Gross | | | | | .560 | .434 |
| S-Care | | | | | | .720 |

*Note*: $N = 26$; all correlations significant at $p < .008$; Exp. = Expressive Language; Recept. = Receptive Language; Fine = Fine Motor; Gross = Gross Motor; S-Care = Self-Care; S-Dir. = Self-Direction; Learn. = Learning

Table 2

*Intercorrelations between the MAAS and the ABAS-3 (Teacher Form)*

| | MAAS Scales | | | | | | |
|---|---|---|---|---|---|---|---|
| ABAS | Learn. | Exp. | Recept. | Fine | Gross | S-Care | S-Dir. |
| Comm. | .696 | .800 | .773 | .598 | .425 | .672 | .762 |
| Com. Use | .683 | .754 | .715 | .627 | .434 | .649 | .743 |
| Func. Aca. | .715 | .698 | .742 | .632 | .407 | .647 | .687 |
| SL | .733 | .780 | .785 | .644 | .448 | .711 | .825 |
| Hea. Safety | .710 | .753 | .740 | .709 | .497 | .713 | .757 |
| Leisure | .725 | .746 | .755 | .552 | .416 | .659 | .763 |
| Self-Care | .715 | .714 | .685 | .649 | .432 | .759 | .743 |
| Self-Dir. | .707 | .696 | .727 | .550 | .374 | .657 | .796 |
| Social | .691 | .718 | .708 | .577 | .413 | .651 | .786 |

*Note*: $N = 26$; all correlations significant at $p < .01$; Learn. = Learning; Exp. = Expresive Language; Recept. = Receptive Language; Fine = Fine Motor; Gross = Gross Motor; S-Care = Self-Care; S-Dir. = Self-Direction; Comm. = Communication; Com. Use = Community Use; Func. Aca. = Functional Academics; SL = School Living; Hea. Safety = Health and Safety; Self-Dir. = Self-Direction