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CONCURRENT VALIDITY OF THE MISSOURI ADAPTIVE BEHAVIOR INVENTORY

Hannah Janecek

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CHAPTER ONE: INTRODUCTION

Although many definitions of adaptive behavior are employed, the definitions consistently indicate that adaptive behavior is the ability to meet the natural and social demands of the environment. The American Association on Mental Retardation (AAMR) described adaptive behavior within three broad domains: conceptual, social, and practical. The Conceptual domain consists of language, reading and writing skills, as well as money, time, and number concepts. The Social domain consists of interpersonal and social skills, self-esteem, the ability to follow rules and obey laws, avoidance of victimization, and social problem solving. The Practical domain includes daily living and personal care skills, occupational skills, use of money, use of safety and health care, use of transportation options, use of schedules/routines, and use of communication devices (2002).

Sparrow, Cicchetti, and Balla (2005) outline four considerations for the adaptive behavior definition. First, adaptive behavior is age related, as it increases with age. The adaptive behavior demands and expectations for a 4-year-old are much less than that required for a 24-year-old. Second, adaptive behavior is defined by social norms and expectations, so it is anchored to the culture. Third, adaptive behavior is fluid. This fluidity means that the skills acquired can regress depending upon the environment. For example, an adolescent who is accustomed to preparing meals over the summer because their parent is working may not continue to do so if the parent changes jobs and takes over that domestic responsibility. Finally, adaptive behavior is typically defined by

performance of skills, not the ability. In other words, adaptive behavior is the extent that a behavior *is* performed and not *can be* performed.

The construct of adaptive behavior has been around for generations. The first definition of mental retardation, set out by the AAMR, indicated that mental retardation was diagnosed upon the basis of adaptive behavior deficits and limited intellectual functioning. Every definition since this original definition in 1959 has included these two components (Thomas & Grimes, 2008). For example, special education legislation, such as Education for All Handicapped Children Act of 1975 and the 2004 reauthorization of Individuals with Disabilities Education Act (IDEA), defined mental retardation based upon limitations in both adaptive behavior and intellectual functioning. It should be noted the American Association on Mental Retardation changed its name in 2007 to the American Association on Intellectual and Developmental Disabilities (Thomas & Grimes, 2008). Similarly, Public Law 111-256, also known as Rosa's Law, replaced the term mental retardation with intellectual disability in 2009 (American Psychiatric Association, 2013).

The assessment of adaptive behavior is important for several reasons. For example, under IDEA, children can be identified with and found eligible for special educational programming when their adaptive behavior is significantly below age expectations and they are under age nine. Also under IDEA, children can be identified with an intellectual disability when their intellectual abilities and adaptive skills are more than two standard deviation units below the mean. In practice, scores below 70 on most intelligence and adaptive behavior tests are two standard deviation units below the normative mean. Additionally, the assessment of adaptive behavior can be important in

helping schools' assessment teams, mental health practitioners, and other professionals better understand the strengths and weaknesses of children and adults with whom they work. Since adaptive behavior includes such things as self-help skills, domestic skills, and social skills, knowing how well an individual performs these tasks is important in developing intervention plans.

In contrast to adaptive behavior, intelligence can be defined as a person's ability to solve problems, adapt to his or her environment, think abstractly, and utilize experiences appropriately (Kaplan & Saccuzo, 2001). This definition is consistent with previous historical definitions. For example, Alfred Binet (as cited by Terman, 1916), defined intelligence as the tendency to maintain a definite direction in one's life, the capacity to adapt to circumstances for the purpose of obtaining a goal, and the ability to reflect upon and criticize one's self. Freeman (1955) defined intelligence as "adjustment or adaptation of the individual to his total environment," "the ability to learn", and "the ability to carry on abstract thinking (pp. 60-61). Unlike intelligence, adaptive behavior, which includes daily living skills and social responsibility, can be taught and improved. Conversely, one's intellectual functioning, or more precisely, one's score on a measure of intelligence, tends to remain relatively stable over time (Sattler & Hoge, 2006).

The assessment of adaptive behavior not only helps establish eligibility for school-based services, it also helps establish services after one leaves school (Department of Health and Human Services, 2015). A number of state and federal programs and agencies that rely upon the assessment of adaptive behavior to establish eligibility for community support such as Easter Seals and social security disability benefits. When those who have been diagnosed with intellectual disabilities leave school, the nature and

extent of their government-provided services hinges in part on their adaptive behavior levels. For example, an individual with mild to moderate adaptive behavior deficits may live in a community home while those with more severe to profound deficits may reside in a specialized facility or apartment with more intensive supports (Harrison & Oakland, 2015). Under the Home and Community-based Settings Rule or HCSR, individuals must have substantial limitations in three or more major life activities, including self-care, receptive and expressive language, learning, mobility, self-direction, and capacity for independent living in order to receive certain services and benefits, including subsidized housing, low or no-cost medical services, and other supported living benefits (Department of Health and Human Services, 2015).

When access to these post-secondary services hinge upon adaptive behavior, it is important that the measures are valid and reliable and that the measures align with federal statute. Currently, there is no single norm-referenced measure of adaptive behavior that fully matches the federal rule cited above. Specifically, the Learning requirement under the rule is missing. The Learning domain under the HCSR is the ability to acquire information, process experiences, and appropriately perform ordinary, cognitive, age-appropriate tasks. This omission is understandable since adaptive behavior assessment is conducted by asking an informant, such as a parent, the extent that the individual performs specific tasks.

In contrast to traditional definitions of adaptive behavior, the accurate measurement of learning requires a much more interactive and dynamic assessment and is not easily measured via informant opinion. As a result, state agencies that employ the federal definitions are required to rely upon a combination of direct and indirect measures

of adaptive functioning in order to measure the different aspects of adaptive behavior required by law. This process can be expensive and time consuming. For example, currently in the state of Missouri, mental health professions employed by the state who are tasked with identifying individuals who qualify for services under HCSR must administer three separate measures (C. Stearns, personal communication March 16, 2017).

To address the multiple measures and expense issue vis-à-vis federal statute, the Missouri Adaptive Behavior Inventory (MABI) was developed by Dunham in 2016. Currently in development, the MABI was designed to address the weakness in other adaptive behavior measures and to provide one measure of adaptive behavior that could be easily administered and interpreted by most practitioners working for states who are responsible for determining which applicants for state and federal support are eligible for services. However, before any new norm-referenced measure of academic skills, adaptive behavior skills, personality, or intelligence can be used, its factor structure, validity, and reliability must be established. There are different ways to determine factor structure (e.g., confirmatory and exploratory factor analysis), reliability (e.g., test-re-test, alternative forms) and validity (e.g., predictive, concurrent). Each of these is important to establishing the statistical properties and the validity of the instrument. The present study addressed the concurrent validity of the MABI.

Purpose of the Study

The purpose of this study was to determine the concurrent validity of the MABI by comparing it to another widely accepted measure of adaptive behavior. The Adaptive Behavior Assessment System Third Edition (ABAS-3), published in 2015 (Oakland &

Harrison), is a norm-referenced measure of adaptive behavior appropriate for children and adults ages 0 through 89. For the present study, MABI was compared to the ABAS-3 to establish its concurrent validity. Although the MABI's content validity has been established by experts in the field, other aspects of validity have yet to be determined.

Terms and Definitions

- **Adaptive Behavior:** According to the Diagnostic and Statistical Manual 5th Edition (APA, 2013) adaptive behavior is how well a person meets community standards of personal independence and social responsibility in comparison to others of similar age and sociocultural background. Adaptive functioning involves adaptive reasoning in three domains: Conceptual, Social and Practical.
 1. **Conceptual:** This involves competence in memory, language, reading, writing, math reasoning; acquisition of practical knowledge, problem solving, and judgement in novel situations.
 2. **Social:** This component involves awareness of others thoughts, feelings, and experiences; empathy, interpersonal communication skills, friendship abilities, and social judgement.
 3. **Practical:** This area involves learning and self-management across life settings including personal care, job responsibilities, money management, recreation, self-management of behavior, and school and work task organization (pg. 37).
- **Concurrent Validity:** the degree to which a test corresponds to an external criterion when both measures are obtained simultaneously (within a few days of one another). A measure must be tested to determine if it is valid, or that the measure accurately measures what it purports to measure. To do so, measures that

have already been determined to be a valid measure of their construct (an existing test) can be administered along with the new measure which has been designed to measure the same construct. Data from both measures are then compared via correlation.

- **Mental Retardation/Mental Impairment/Intellectual Disability:** The AAMR (2002) defines mental retardation as a disability characterized by significant limitations both in intellectual functioning and adaptive behavior as expressed in conceptual, social, and practical adaptive skills. The Diagnostic and Statistical Manual of Mental Disorders—Fifth Edition or DSM-5 (2013) notes that an Intellectual Disability is diagnosed when there is evidence of significant deficits in intellectual functioning and adaptive functioning that is manifested during the developmental period (American Psychiatric Association, 2013).
- **The Home and Community-Based Settings Rules:** These federal rules, finalized in 2015, establish the procedures for states when they serve individuals with developmental disabilities. These rules outline the eligibility determination process and instructs staff to utilize effective, accurate, comprehensive evaluations to determine eligibility and needed services for individuals if found eligible. These rules also establish a shared savings program to implement accountability for patients, coordinates services under Medicare, and encourages investment in high quality care/services to patients (Department of Health and Human Services, 2015). For this study, the acronym HCSR will be used to represent this statute.

CHAPTER TWO: REVIEW OF THE LITERATURE

Adaptive Behavior Assessment

Adaptive behavior assessment is mostly emphasized for its implications for the diagnosis of intellectual disabilities (AAMR, 2002). However, every person utilizes adaptive skills to function in their environment independently. Adaptive skills include taking care of daily personal needs, interacting with people and the environment appropriately, and functioning independently across settings. There are the three definitions of intellectual disability that are most commonly used when diagnosing both adults and children with this condition. First, according to the AAMR (2002), an intellectual disability is characterized by significant limitations both in intellectual functioning and adaptive behavior as expressed in conceptual, social, and practical adaptive skills. Second, according to the DSM-5 (2013), the diagnostic system employed by hospitals, clinics, and non-school agencies, an intellectual disability is defined by “significantly subaverage general intellectual functioning that is accompanied by significant limitations in adaptive functioning in at least two of the follow skill areas: communication, self-care, home living, social/interpersonal skills, use of community resources, self-direction, functional academic skills, work, leisure, health, and safety, and onset must be before age 18” (pg. 33). Last, under the 2004 reauthorization of IDEA, the eligibility criteria used in public schools, an intellectual disability is “significantly subaverage general intellectual functioning, existing concurrently, with deficits in

adaptive behavior and manifested during the developmental period that adversely affects a child's educational performance" (Individuals with Disabilities Education Act, 2004, Sec. 300.8). All three definitions are very similar in content and application.

Under the IDEA, a child aged 3 through 8 could be identified and determined eligible for services under the developmental delay category with adaptive behavior deficits as one of the criterion (IDEA, 2004). This is one of five areas of potential deficits employed under this category. Under the Developmental Delay category, adaptive behavior does not have to be paired with cognitive deficits in order to be eligible for services. Specifically, adaptive behavior could be an area of deficit if a score on a measure of adaptive behavior falls two standard deviation units below the mean.

While adaptive behavior is most commonly used to help identify intellectual disabilities, adaptive skill development is important for children and adults with a vast array of disabilities (Harrison & Oakland, 2015). Assessment of adaptive skills is often utilized during a comprehensive evaluation with several suspected disabilities and disorders. Identifying how a person can adapt to their environment is important to developing service plans and appropriate individualized interventions. The goal of intervention, then, is to strengthen adaptive skills so the individual can thrive and function across settings in their everyday life, with the ultimate goal of gaining more self-sufficiency and/or independence.

For the educational setting, adaptive behavior deficits, as well as cognitive functioning deficits, must be present to a substantial degree before an individual can meet the criteria to be serviced as a student with an Intellectual Disability (IDEA, 2004). Conversely, under the DSM-5 (American Psychiatric Association, 2013, p. 33) an

intellectual disability is appropriate when all three of the following conditions have been met:

- A. “Deficits in intellectual functions, such as reasoning, problem solving, planning, abstract thinking, judgment, academic learning, and learning from experience, confirmed by both clinical assessment and individualized, standardized intelligence testing”
- B. “Deficits in adaptive functioning that result in failure to meet developmental and social cultural standards for personal independence and social responsibility. Without ongoing support, the adaptive deficits limit functioning in one or more activities of daily life, such as communication, social participation, and independent living, across multiple environments, such as home, school, and community”
- C. “Onset of intellectual and adaptive deficits during the developmental period”

Unlike the IDEA eligibility criteria which is used in schools, non-school agencies, such as clinics and hospitals use the DSM criteria. The DSM also recognizes four levels of Intellectual Disability—Mild, Moderate, Severe, and Profound—which correspond not to the individual’s level of intelligence but their level of adaptive behavior impairment (APA, 2013).

Adaptive Behavior is often considered across other recognized disabilities (Harrison & Oakland, 2015). For example, a school-based examiner may consider adaptive functioning when suspecting the student has an Emotional Behavioral Disability and wants to examine how a student interacts with the environment around them. Though not necessarily required for every eligibility in the educational setting, adaptive behavior

scales can provide examiners and school assessment teams a vast array of information for consideration to plan and accommodate a child referred or evaluated for special education services.

Harrison and Oakland (2015) outline additional uses for adaptive behavior assessment. Adaptive behavior assessment may be used with individuals who exhibit the effects of trauma and display symptoms of Attention-Deficit/Hyperactivity Disorder, disruptive behaviors, mood disorders, and anxiety disorders. Additionally, adaptive behavior assessment can contribute to understanding those with neuro-cognitive impairments, autism spectrum disorder, developmental delays, learning disabilities, and thought disorders.

Similarly, community services funded by the state and federal government often use adaptive behavior measures to determine if an individual qualifies for community based services or financial support after they leave school. For example, adults with an Intellectual Disability may qualify for assisted living using adaptive behavioral criterion as one of the eligibility factors for funding under the HCSR (Department of Health and Human Services, 2015). This process would help determine their level of independence as well as determine their needs and degree of assistance needed to address any identified limitations.

Current Measures of Adaptive Behavior

There are several measures of adaptive behavior currently utilized in schools, private mental health agencies, and clinics. Sattler and Hoge (2006) described the following three commonly used adaptive behavior scales, all of which have solid validity and reliability. The Vineland Adaptive Behavior Scale (VABS-II) is an individually

administered adaptive behavior scale for ages 0 through 90 (Sparrow, Cicchetti, & Balla, 2005). The VABS-II measures the domains of Communication (receptive, expressive, written), Daily Living Skills (personal, domestic, community), Socialization, (interpersonal relationships, play and leisure time, coping skills), and Motor Skills (ages 5-11 only). An item example for Communication is “Says correct age when asked” (pg. 17). Daily Living Skills includes items such as “Is careful around hot objects” and “Cares for minor cuts” (pg. 19). Socialization has items such as “Shares toys or possessions when asked”, “Follows rules in simple games”, and “talks with others without interruption or being rude” (pg. 23). The Motor Skills portion includes skills related to both gross and fine motor skills, such as “runs smoothly without falling” (pg. 24), and “holds pencil in proper position (not with fist) for writing or drawing” (pg. 26)(Sparrow, Cicchetti, & Balla, 2005),

The Survey and Expanded form of the VABS-II has a parent or caregiver rating form and a teacher rating form. Items in each of the domains are scored by the informant using one of five categories: 2 = yes, usually; 1 = sometimes, partially; 0 = no, never; N = no opportunity; and DK= don't know.

The Adaptive Behavior Assessment System, now on its third edition, has a variety of forms (adult, daycare provider, parent or caregiver, and teacher). The rating scales are noted in the manual to be acceptable when given out to the rater or completed with the rater. The scale has a variety of adaptive behaviors with the raters' choices ranging from 0 through 3, with the ranges “is not able” to “always.” There is also a box for the rater to check if the item was guessed. The scales assessed are communication, community use, functional academics, home/school living, health and safety, leisure, self-care, self-

direction, and social. Scales measuring work and motor are also completed as necessary for the age and situation (Harrison & Oakland, 2015).

The Scales of Independent Behavior-Revised (SIB-R) is a broad measure of adaptive behavior that measures four adaptive 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)
- Community Living (time and punctuality, money and value, work skills, home/community orientation)

The items within each domain are scored using a four point scale. The informant is asked to rate each item based upon if the individual does (or could do) task completely, without help or supervision, with the following answer choices: 0 = Never or rarely; 1 = Does, but not well; 2 = Does fairly well; and 3 = Does very well.

The SIB-R offers different forms, the Full Scale, the Short Form (40 items from the Full Scale), Early Development Form (infancy to 6 years or those whose developmental level is below 8 years of age), and the Problem Behavior Scale, which measures a range of inappropriate, offensive, or disruptive behavior (Bruininks, Woodcock, Weatherman, & Hill, 1996).

While norm referenced rating scales utilized for adaptive behavior have some advantages, such as gathering information across settings from different raters and different perspectives and providing age equivalencies, there are certain limitations.

Rating scales are not to be utilized as the sole measure of adaptive behavior assessment. An informant may, knowingly or unknowingly, rate an individual with a biased perception. An informant may put their own set of expectations and standards into the rating. For example, a teacher in a highly structured setting may have different expectations than a parent at home. Thus, the results may be inconsistent and inconclusive of the individual's true adaptive skill ability level. Similarly, a parent or teacher with investment in the child may deem their adaptive abilities too high or low (Thomas & Grimes, 2008). Raters may skew information for a self-serving purpose, such as getting their loved one to have a better chance of qualifying for services. An informant may not know the individual well enough to be a valid rater, as the informant may guess or not have knowledge of the individual's particular skill set in certain areas. Remote administration, where the informant completes a rating scale or test at their convenience (i.e., at home) rather than face to face with a trained examiner, can come with ease and convenience, but there are potentially many problems with using remote administration. For example, a parent or caregiver may be incompetent or unable to read, well enough to understand the question at hand (Thomas & Grimes, 2008).

Current Federal Legislation

Individuals with disabilities who are under age 21 and in public schools, are provided services under the IDEA. However, those individuals who are no longer eligible to stay in school because of their age seek continued services through state and federal agencies, such as Easter Seals. When this happens, eligibility for services change. Specifically, under federal statute (specifically the HCSR), people seeking community services for Intellectual Disability must have impairment of general intellectual

functioning and deficits in adaptive behavior. Under the HCSR, to be eligible for services, individuals with an intellectual disability and related conditions (such as cerebral palsy or motor impairments), must have substantial limitations in three or more of the following areas of major life activities:

1. Self-Care: the daily activities that enable a person to meet basic needs for food, hygiene, and appearance, and the 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 with others and the general public with or without assistive devices. It also includes the 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: the general cognitive competence and ability to acquire new behaviors, perceptions, and information and to apply experiences in new situations. It is the ability to acquire information, process experiences, and appropriately perform ordinary, cognitive, age-appropriate tasks on an ongoing basis.
4. Mobility: this includes motor development and the ability to use fine and gross motor skills, as well as the ability to move about while performing purposeful activities with or without assistive devices and with little or no assistance or supervision.

5. Self-Direction: the management and control over one's social and personal life and ability to make decisions and perform activities affecting and protecting personal interests. It also includes the ability to take charge of age-appropriate life activities, self-responsibility, and assertiveness.

6. Capacity for independent living or economic self-sufficiency: the age appropriate ability to live without extraordinary assistance from other persons or devices, especially the ability to maintain normal societal roles, to maintain adequate employment and financial support, and to earn a living wage after payment of extraordinary expenses caused by the disability.

It is important to note that current measures of adaptive behavior do not meet the current federal definition requirements under HSCR because of the "Learning" requirement. Currently, before adults can be considered for post-secondary services under the statute, they must demonstrate impairments in adaptive functioning. The purpose of this study, therefore, is to provide concurrent validity of a new measure of adaptive functioning that meets the HSCR by comparing it to an existing measure of adaptive functioning.

Test Development

Factor Analysis. Sattler (2008) describes factor analysis as a mathematical process utilized to assess the pattern of intercorrelations amongst variables by deriving the smallest number of meaningful variables or factors. There are two major types of factor analysis. First, exploratory factory analysis is used to explore the underlying structure of a collection of variables where there are no a priori (pre-existing) hypotheses about the factor structure. Second, a confirmatory factor analysis is utilized to confirm a

hypothesized factor structure. The variables for this type of analysis are based upon prior theory (Sattler, 2008). Sparrow, Cicchetti, and Balla (2005) describe exploratory analysis as being used most often to generate ideas about the structure of an instrument while confirmatory factor analysis provides a more in depth analysis.

A confirmatory factor analysis is typically utilized to account for the interrelationships amongst variables by hypothesizing that each individual variable serves a function to a number of factors. When using a confirmatory factor analysis, the analyst must determine the model structure before the analysis. The fit of the structure is then analyzed and evaluated to determine which model is most appropriate (Sparrow, Cicchetti, & Balla, 2005).

A vital part of examining the validity of any measure is to examine the factor structure. According to Harrison and Oakland (2015), when developing the ABAS-3, confirmatory factor analysis was utilized to test one and three factor models, and these models were compared to a null model in which there were no common factors. The confirmatory factor analysis was based upon the AAMR's criteria in that the ten adaptive skills measured by the ABAS-3 can be grouped into the three major domains of adaptive behavior (Conceptual, Social, and Practical).

To analyze the one factor model, all skill areas were combined to form a single factor, which was described to be analogous with the General Adaptive Composite score. For the three-factor model, the skills areas were combined to replicate the Conceptual, Social, and Practical domain scores. It was noted for both models the Work and Motor skills were not included due to missing data for Work (which is only utilized for a certain age group), and because Motor skills are not included in the AAMR (2002) guidelines.

Overall, the results revealed that the first and third factors showed improved fit when compared to the null model, supporting the categorization of adaptive skills areas into the Conceptual, Social, and Practical domains.

Reliability. Reliability relates to the consistency of measurements. A test is unreliable if the results yields large fluctuations under the same conditions. Reliability of measurement refers to the extent to which random or unsystematic variation affects the measurements of a trait, characteristic, or quality (Sattler, 2008).

Test-Retest Reliability is a common form of reliability. It is used to test the consistency of a particular measure from one time to a separate time. The same test is administered twice over a course of time identified by the examiner to test the stability of the measure. Alternative Forms Reliability is a form of reliability in which a measure is designed to have two equivalent versions—both versions are administered at the same time. The resulting scores are then compared to determine the correlation, or reliability, of the two administrations.

On the ABAS-3, reliability coefficients for the General Adaptive Composite were consistent across the six standardization samples, ranging from .96 to .99. Regarding test-retest reliability, the ABAS-3 studies included a total of 265 children and adults from the standardization sample. Comparison from Time 1 and Time 2 scores produced overall small effect size, and was deemed acceptable for clinical use. Typically, a reliability coefficient greater than or equal to .70 is considered acceptable, with 1.0 being considered a perfect reliability.

Two analyses were conducted regarding alternate-forms reliability from a sample of 85 individuals with ages that overlapped on two forms. Of the 37 5-year-old children

rated by the same parent on the Parent/Primary Caregiver and Parent form, the average effect size of the difference between the forms was near 0, suggesting that the two forms were near perfectly correlated. Of the ABAS-3 Parent and Adult forms, most effect sizes were small and near zero. Confirmatory factor analysis revealed good fit for a single factor model of general adaptive behavior (Harrison & Oakland, 2015).

Validity. The validity of a test is defined as whether the test measures what it is supposed to measure. Predictive validity is the degree in which a measure accurately predicts the criteria that will occur in the future. Concurrent validity is the degree to which a test corresponds to an external criterion that is occurring at the same time. For example, a new measure might be statistically compared to an existing measure that has established validity and reliability. This is determined via correlation.

According to Harrison and Oakland (2015), validity of the ABAS-3 were presented with intercorrelations and concurrent validity with the ABAS-2 and other common measures of adaptive behavior. Intercorrelations for the Parent/Primary Caregiver form showed an average intercorrelation of $r = .60$ between adaptive skill area scaled scores, $r = .79$ between adaptive skill area and adaptive domain scores, and $r = .76$ between adaptive skill area and General Adaptive Composite (GAC) scores.

The average intercorrelations on the Parent Form were quite strong. Specifically, the average adaptive skills subtests intercorrelation was $r = .62$. The adaptive skills areas and the adaptive domains correlated $r = .82$ and the adaptive skill areas and the GAC score correlated $r = .78$. On the Teacher form, the average intercorrelation between adaptive skills area scales scores was $r = .62$, and between adaptive skill area and

adaptive domain scores was $r = .81$. Between adaptive skills areas and the GAC the average intercorrelation was $r = .78$.

Finally, on the Adult Form self-report, the average intercorrelations were as follows: between adaptive skills areas the average correlation was $r = .60$, between adaptive skills areas and adaptive domain scores was $r = .80$, between adaptive skills areas and adaptive domain scores was $.80$, and between the adaptive skills areas and GAC scores was $r = .78$.

To determine concurrent validity, Harrison and Oakland (2015) examined the relationships between the ABAS-3 with the ABAS-2, the Behavioral Assessment System for Children, Second Edition (BASC-2), the Vineland Adaptive Behavior Scales, and the Reynolds Intellectual Assessment Scales (RIAS). When comparing the ABAS-3 to the ABAS-2, the corrected correlations across all scores, as well as the GAC, were as follows:

- Parent/Primary Caregiver form: $.76/.88$
- Parent Form: $.72/.88$
- Teacher/Daycare Provider Form: $.89/.93$
- Teacher Form: $.81/.89$
- Adult Form (self-report): $.79/.90$
- Adult Form (rated by others): $.79/.90$

Correlations between the Vineland Adaptive Behavior Rating Scale, Second Edition (VABS-II), and the ABAS-3 were also obtained. Participants were given the ABAS-3 and the VABS-II in the same testing session. The order of administration was counter-balanced. For relevant comparison purposes, on the study on the Parent Form, a

sample consisted of 28 children and adolescents (mean age = 10.3). Corrected correlations between the two measures averaged $r = .67$, which was strong.

CHAPTER THREE: METHODS

Participants

There were 25 children included in this study. The mean age was 7.7 years with a standard deviation of 2.3 years. The age of the sample ranged from 5 to 14. There were 11 males (44%) and 14 females (56%). Eighty-eight percent of the sample were Caucasian, and 12 percent of the sample were African American. The sample included 13 children who were recruited by the author and 12 children who were recruited from a University clinic. All of the procedures were approved by the Murray State University Institutional Review Board (IRB).

According to the Harrison and Oakland (2015), when determining correlations between the ABAS-3 and other measures, sample sizes ranging from 24 (ABAS-3 and Reynold's Intellectual Ability Scale) to 188 (ABAS-2 and ABAS-3) were documented.

Procedures

Following IRB approval to conduct the study and parent consent, the MABI and the ABAS-3 were administered in a counter-balanced fashion to the child participants (for the MABI) and their parents (for the MABI and the ABAS-3). The tests were administered after school or on the weekends at church or the participant's home or in the clinic as part of other clinic procedures.

Measures

ABAS-3

The Adaptive Behavior Assessment System, Third Edition, consists of five rating forms that are utilized to assess adaptive behavior skills in different settings (Harrison & Oakland, 2015). The rating forms are designed for ages 0-89. It is to be completed by raters who have known the examinee for at least 6 months and have frequent, prolonged contact with the individual, and who can read at a minimum of a 6th grade reading level. Adaptive behavior is measured using three domains: Conceptual, Social, and Practical, which combine to provide the General Adaptive Composite. The respondent is directed to read each item and circle a rating, ranging from 0-3 depending upon how often they observe the behavior.

MABI

The MABI is an unpublished test currently in development. It is designed as a norm-referenced measure of adaptive behavior functioning for ages one through adulthood. Adaptive functioning is assessed using both informant input and examiner interactions to gain a more reliable and valid assessment of the individuals' adaptive functioning skills. The MABI is administered in three stages: Learning and Observation, Informant Rating, and Specialized Needs Assessment. The Specialized Needs component was not administered given the purpose of the study. The Learning and Observation stage is unique to the MABI—no other measures of adaptive behavior include this component. The Learning and Observation section is administered directly to the individual by the examinee and entails a series of subtests that measures the individual's learning aptitude by items assessing memory, reading, and math skills. A stimulus book contains the

Reading, Visual Memory, and Math subtests. The Reading items begin with asking the examinee to identify letters then advances to asking the examinee to read and comprehend sentences. The Visual Memory subtest requires the view simple shapes and designs for several seconds (depending upon the item) then identify the shapes or designs that they just saw. The Math subtest items begins with identifying and counting objects and advances to more complex math reasoning. The examinee uses paper and pencil for this subtest. The Verbal Memory subtest requires the examiner to read sentences varying in length then requires the examinee to recall what they just heard. There are additional items from the remaining scales that are administered directly to the examinee that are designed to determine if the examinee can interpret common street signs, exercise judgment, and understand insurance, mortgage, and money usage. The Learning and Observation items are scored by examiner—each item is scored 2, 1, or 0 points depending upon the accuracy and sophistication of the response. The Informant Ratings section is administered to the informant or caregiver and is administered in a very similar fashion as the ABAS-3, VABS-II, and SIB-R. This Informant Ratings stage contains the following scales or subtests:

- 1. Mobility:** a measure of fine motor skills (e.g., buttoning clothing, tying shoes) and gross motor skills (e.g., ambulating, carrying groceries).
- 2. Communication:** a measure of the individuals' skill in expressing themselves (expressive language) and ability to understand what others are saying to them (receptive language)

3. Independent Living/Self-Care: a measure of the individuals' ability to meet the age appropriate self-help demands of daily living, such as dressing, toileting, meal preparation, and managing domestic responsibilities.
4. Self-Direction: a measure of the individuals' ability to sustain attention, follow through on directions, set goals, and make appropriate decisions regarding personal and economic safety.
5. Economic Self-Sufficiency: a measure of the individual's ability to find and sustain employment, including the ability to understand and manage money, understand employment contexts/environments. This scale is only administered to individuals that are 15 years of age or older and was therefore not included in this study.

Each subtest is begun according to the examinee's suspected developmental age and has termination rules, as well as a reversal rule—these rules are used to ensure that both a basal and a ceiling are established. Typically, the basal rule is the lowest five consecutive items passed with full credit; the ceiling is the highest five consecutive items failed (received no credit). The total raw score is the number of points the individual accrues for each subtest. Each subtest also has individual scoring rules. For example, the informant or caregiver scores the individual with the following criteria: 2 points means that the individual performs the behavior independently; 1 point means the individual performs the behavior with prompting; and 0 points means the individual does not or cannot perform the behavior.

Hypotheses

There were two hypotheses for this study. First, it was hypothesized that the MABI subtests would be significantly correlated. In other words, it was hypothesized that there would be substantial shared variance among the subtests. Second, it was hypothesized that MABI subtests would be significantly correlated with the ABAS-3 subtests and that the corresponding MABI/ABAS-3 subtests would be correlated.

Analyses

Although there are different ways of measuring concurrent validity, one way is to administer two tests (one that has already been determined to be valid and reliable) and one in development, then correlating the two measures using Pearson correlations (if the data are continuous). The MABI, because it is in development, only provides raw scores (described above). The ABAS-3 also provides raw scores but because it has already been normed and has clearly established reliability and validity, also provides converted T-scores, standard scores, and percentile ranks. For this study, the raw scores for both tests were compared to each other. Raw scores are continuous data and correlating these is appropriate when tests are in development.

For comparison purposes, according to the ABAS-3 manual (Harrison & Oakland, 2015), a study with the ABAS-3 Parent Form and VABS-II consisted of a sample of 28 children (mean age = 10.3). The sample was 67.9 percent White, 7.1% Black, 7.1 % Hispanic, and 17.9% identifying as other. Thus, the current study is similar to that provided by Harrison and Oakland.

Two sets of correlations were calculated using the SPSS computer-based statistics program. First, an inter-correlation matrix was calculated whereby the raw scores from

each of the 10 MABI scales were compared to one another. Second, raw scores from each of the 10 MABI scales were correlated with each of the 9 ABAS-3 scales.

CHAPTER FOUR: RESULTS AND DISCUSSION

Results

Table 1 presents the MABI intercorrelation matrix, where the raw scores from each scale/subtest were compared using Pearson correlation. This process resulted in 57 separate correlations. The average intercorrelation among the MABI subtest pairings was $r = .505$, which is a moderate positive correlation, meaning the subtests have both shared and unique variance. The average intercorrelation on the standardization sample between adaptive skill area scaled scores on the ABAS-3 was $r = .62$ (Harrison & Oakland, 2015).

Tables 2 and 3 reveal the correlations of the MABI raw scores to the ABAS-3 raw scores. The 90 separate correlations averaged a correlation of $r = .67$ over the entire table. MABI and ABAS-3 scores reflecting similar item content were strongly correlated. Specifically, the MABI Expressive Language scale correlated with the ABAS-3 Communication scale at $r = .874$ and the MABI Receptive Language scale correlated with the ABAS-3 Communication scale at $r = .664$. Both correlations were statistically significant ($p \leq .001$). The MABI total academics raw score correlated with the ABAS-3 Functional Academics raw score at $r = .748$ ($p \leq .001$). The MABI independent living subtest correlated with the ABAS-3 Self Care at $r = .769$ ($p \leq .001$). Additionally, there were statistically significant correlations ($p \leq .05$) which are listed below:

- MABI Independent Living/ABAS-3 Communication ($r = .709$)

- MABI Independent Living/ABAS-3 Health and Safety ($r = .727$)
- MABI Reading/ABAS-3 Community Living ($r = .728$)
- MABI Reading/ABAS-3 Functional Academics ($r = .858$)
- MABI Math/ABAS-3 Functional Academics ($r = .801$)
- MABI Expressive Communication/ABAS-3 Functional Academics ($r = .721$)
- MABI Expressive Communication/ABAS-3 Self-Care ($r = .734$)
- MABI Receptive Communication/ABAS-3 Community Living ($r = .806$)
- MABI Receptive Communication/ABAS-3 Functional Academics ($r = .771$)
- MABI Fine Motor/ABAS-3 Community Living ($r = .762$)
- MABI Expressive Communication/ABAS-3 Social ($r = .775$)

Overall, these findings reveal substantial consistency between both measures, suggesting that they are measuring similar constructs.

Discussion

It is clear that the MABI subtests (the individual scales) overlap considerably, meaning that they share considerable variance with one another. For example, 39 out of the 57 pairings were significantly correlated with one another at probability level of .05 level or lower, with the average correlation of $r = .505$. Given these data, the first hypothesis was confirmed. This is quite similar to the intercorrelations among the ABAS-3 subtests where the average correlation was $r = .62$. The strongest correlations were between the Reading and Total Academics scales, the Reading and Math scales, the Math and Total Academic scales, the Verbal Memory and Total Academics scales, and the

Receptive and Expressive Communication scales. The weakest correlations were between the Reading and Visual Memory scales, the Receptive Communication and Visual Memory scales, and the Math and Self-Direction scales. These intercorrelations are important because they show that the MABI is measuring the construct of adaptive behavior. Had one or more scales not been correlated with the others, where a correlation was expected, this would suggest a problem with the content of that particular scale. The performance of the Learning scales of the MABI, which the other measures of adaptive behavior lack, was especially noteworthy because of their strong correlations with other aspects of the MABI. Only the Self-Direction subtest seems to have minimal correlation with the other MABI subtests.

Next, it is clear that the MABI is significantly correlated with the ABAS-3, suggesting that both instruments are measuring the same or similar constructs. Specifically, 64 out of 90 pairings were significantly correlated at a probability level of .05 level or lower. Additionally, it is apparent that the MABI/ABAS-3 correlations were strong where the scales were designed, a priori, to measure the same construct. For example, the MABI reading and math subtests were highly correlated with the ABAS-3 Functional Academics subscale, and the MABI Independent Living scale correlated highly with the ABAS-3 Self-Care subscale. The strongest correlations were between the MABI Expressive Communication subtest and the ABAS-3 Communication scales, the MABI Expressive Communication subtest and the ABAS-3 Social scale, the MABI Math subtest and the ABAS-3 Functional Academics scale, the MABI Receptive Communication subtest and the ABAS-3 Communication scale, and the MABI Receptive Communication scale and the ABAS-3 Functional Academics scale. The weakest

correlations primarily concerned the MABI Visual Memory subtest which correlated with no ABAS-3 subtests. In fact, none of the MABI Visual Memory/ABAS-3 subtest correlations were significant. Other weak correlations were found between the MABI Math subtest and ABAS-3 Leisure scale and between the MABI Total Academics scale and the ABAS-3 Leisure scale. However, strong correlations here were not anticipated. Overall, the second hypothesis was confirmed.

Compared to previous research with the ABAS-3, the current findings are quite similar. Specifically, when the ABAS-3 subtests were correlated with one another, using a sample size of 50, the average correlation was $r = .67$. The current study, with the MABI, revealed an average correlation of $r = .505$, which was similar. Additionally, when the ABAS-3 was correlated with the ABAS-2, using a sample size of 30, the average correlation was $r = .67$. Essentially, the results of the MABI intercorrelation analysis and the MABI/ABAS-3 correlations, were similar in magnitude when the ABAS-3 was designed, suggesting that the MABI has good internal consistency and good concurrent validity when compared to the ABAS-3.

CHAPTER FIVE: IMPLICATIONS, LIMITATIONS, AND FUTURE RESEARCH

Implications

There are several implications for this study regarding the assessment of adaptive behavior, particularly as it applies to the federal statute—the HCSR). Specifically, it is clear that the learning aspects of the MABI are highly correlated with others aspects of the MABI and the ABAS-3, suggesting that these four subscales provide additional information vis-à-vis adaptive behavior in general and the learning component (under HCSR) in particular. Put another way, it appears that the authors of the HCSR were correct in including a learning component in the statute, rather than relying solely upon informant opinion of adaptive functioning. Learning, especially reading, math, and memory are important aspects of independent functioning. No other measures of adaptive behavior include a learning component or indeed a face to face component with the individual. The MABI, because it includes a learning component and a face to face component, is a unique instrument that should provide important insights regarding all aspects of adaptive functioning required under federal statute. Not all of the learning aspects were clearly associated with adaptive functioning as measured by the ABAS-3. Specifically, the Visual Memory component of the MABI was not statistically associated with any aspect of the ABAS-3. This could mean that this subtest either does not share variance with the ABAS-3 or that it measures a unique set of functionality that the ABAS-3 does not.

Limitations

Like all studies, this study has limitations that will hinder its generalization and applicability. First, the sample size was rather small—the study would be stronger with a larger sample size. Second, the sample was a combination of convenience and clinically-referred children and therefore might not generalize the larger population. Lastly, this study was conducted prior to any factor analysis or item analysis investigations. The correlations could improve once these analyses have been conducted. Typically, factor analysis and item analysis “tightens” the test in that items that do not contribute to the test (via correlation) are changed or omitted. This would naturally increase the correlations with other tests. The goal of these additional analyses is to develop an instrument that requires the fewest number of items that continue to correlate highly with other instruments. Striking this balance obviously requires substantial additional study before the test can be offered for clinical application.

Future Research

Extensive future research with the MABI obviously needs to be conducted before it can be used in any applied setting. First, an extensive factor and item analysis needs to be conducted and additional concurrent validity studies with the ABAS-3 as well as the SIB-R and VABS-II using larger sample sizes need to be conducted. Second, the MABI in general and the academic/learning subtests in particular need to be compared to other standardized measures of academic and intellectual functioning, such as the Woodcock-Johnson IV; Tests of Achievement and the Wechsler Intelligence Scale for Children—Fifth Edition and the Wechsler Adult Intelligence Scale—Fourth Edition. Third, the MABI needs to be compared to other measures of adaptive functioning using a more

diverse population—specifically, a disabled population (and not just typically-developing children and adults) as well as a more racially diverse population. New instruments require considerable refinement and statistical analyses and until factor and item analyses are conducted, it is impossible to know if this version of the MABI will be the final version. However, based on this study, it is clear that the current edition of the MABI appears to be a good measure of adaptive functioning that offers what other tests do not.

Table 1

MABI Intercorrelation Matrix

	<u>Read</u>	<u>Verb</u>	<u>Vis</u>	<u>Math</u>	<u>T. Aca.</u>	<u>Exp</u>	<u>Rec</u>	<u>FM</u>	<u>GM</u>	<u>IL</u>	<u>SD</u>
Read	---	.580*	.207	.868*	.915*	.591*	.628*	.536*	.407	.471*	.248
Verb	---	---	.431*	.530*	.739*	.362	.460*	.298	.355	.487*	.413*
Vis	---	---	---	.125	.489*	.050	.187	.178	.340	.423*	.309
Math	---	---	---	---	.828*	.542*	.672*	.501*	.376	.387	.284
T. Aca.	---	---	---	---	---	.500*	.616*	.456*	.419*	.519*	.352
Exp	---	---	---	---	---	---	.725*	.648*	.702*	.659*	.374
Rec	---	---	---	---	---	---	---	.724*	.776*	.693*	.512*
FM	---	---	---	---	---	---	---	---	.727*	.763*	.384
GM	---	---	---	---	---	---	---	---	---	.566*	.363
IL	---	---	---	---	---	---	---	---	---	---	.730*

Note: Read = Reading; Ver = Verbal Memory; Vis. = Visual Memory; T.Aca. = Total Academics; Exp = Expressive Language; Rec = Receptive Language; FM = Fine Motor scale; GM = Gross Motor; IL = Independent Living; SD = Self-direction.

Table 2

MABI/ABAS-3 Correlation Matrix

	<u>ABAS-3 Subtests</u>								
	<u>Com</u>	<u>C.Use</u>	<u>Aca</u>	<u>Home</u>	<u>Health</u>	<u>Leis</u>	<u>SCare</u>	<u>S.Dir</u>	<u>Soc</u>
Read	.618*	.728*	.858*	.452*	.480*	.228*	.420*	.483*	.460*
Verb	.452*	.581*	.596*	.323	.321	.117	.307	.215	.344
Vis	.050	.173	.037	.003	.042	.010	.007	.305	.111
Math	.581*	.683*	.801*	.354	.489*	.192	.382	.469*	.335
T. Aca.	.490*	.674*	.748*	.356	.416*	.167	.341	.320	.381
Exp	.874*	.663*	.721*	.574*	.652*	.668*	.734*	.637*	.775*
Rec	.664*	.806*	.771*	.620*	.699*	.427*	.687*	.616*	.642*
FM	.679*	.762*	.668*	.616*	.600*	.280	.702*	.467*	.596*
GM	.467*	.606*	.497*	.522*	.551*	.369	.506*	.320	.561*
IL	.681*	.709*	.624*	.639*	.727*	.496*	.769*	.389	.596*
SD	.373	.496*	.418*	.561*	.614*	.509*	.474*	.165	.294

Note: Read = Reading; Ver = Verbal Memory; Vis. = Visual Memory; T.Aca. = Total Academics; Exp = Expressive Language; Rec = Receptive Language; FM = Fine Motor scale; GM = Gross Motor; IL = Independent Living; SD = Self-direction
 Com = ABAS-3 Communication; C.Use = ABAS Community Use; Aca = ABAS Functional Academics; Home = ABAS Home Living; Health = ABAS Health & Safety
 Leis = ABAS Leisure; SCare = ABAS Self-care S.Dir = ABAS Self-direction; Soc = ABAS Social

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