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## Criterion-Related Validity of the Children's Occupational Performance Questionnaire

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Running head: CRITERION-RELATED VALIDITY OF THE CHILDREN'S  
OCCUPATIONAL PERFORMANCE QUESTIONNAIRE

Criterion-Related Validity of the Children's Occupational Performance Questionnaire

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This study examined concurrent, criterion-related validity of a new measure of occupational performance for children, the Children's Occupational Performance Questionnaire (COP-Q). The COP-Q is completed by caregivers of children to measure performance in five areas of occupation: Activities of Daily Living, Instrumental Activities of Daily Living, Social Participation, Play/Leisure, and Education/Work. Scores from a sample of children ranging in age from birth to 18 years were correlated with scores from the Vineland Adaptive Behavior Scales-II (VABS), a well-established assessment tool of adaptive behavior that measures similar functional areas as the COP-Q. The results indicated that the COP-Q correlates highly and significantly with the constructs measured by the VABS including social interaction, communication, daily living skills, and to a lesser extent, motor skills. The strong relations between these measures suggest that adaptive behavior and occupational performance address similar constructs, and the results supported the validity of the COP-Q as a measure of occupational performance.

## Introduction

Occupational therapists working with children and their families aim to promote child health and well-being by helping children and families perform their everyday activities and occupations, and participate successfully within their roles. Occupational engagement allows children to create a sense of self, complete daily routines, and fulfill roles. Furthermore, successful engagement in meaningful activities facilitates skill development and learning, and promotes life enjoyment (LaVesser & Berg, 2011). For children with and without disabilities, successful performance in valued occupations is directly related to an increase in quality of life (LaVesser & Berg, 2011). The essence of what occupational therapists try to accomplish with clients in occupational therapy then, is enhancement of occupational engagement or occupational performance of the client.

Occupational performance is defined as an act of doing and accomplishing a selected action or skill, activity, or occupation resulting from the dynamic transaction among the client, context and activity (Fisher & Griswold, 2014). Occupational performance is a complex, multi-faceted construct that involves factors related to the client including developmental level, skills, abilities, and values. Client values are considered because they place a level of importance on the activities and occupations that are performed by the individual. The context that the activity or occupation is performed in must also be considered along with the demands or level of difficulty of the tasks and activities required to successfully engage in the occupation. Comprehensive occupational therapy evaluations of children include an assessment of occupational performance which helps to guide the intervention planning process by identifying those occupational areas that the client would like to improve upon, and address in treatment (Mulligan, 2014). They also provide a baseline of client functioning in select occupational areas

so that appropriate intervention goals can be developed, and progress towards goal achievement monitored. When administered as one of the initial steps in the occupational therapy evaluation process, assessments of occupational performance are helpful for uncovering factors that support or hinder performance. For example, specific body functions that are impaired, or contextual situations that appear to be interfering with occupational engagement can be uncovered, and a need for further evaluation of more focused areas or functions revealed. In addition to their value for clinical purposes, assessments of occupational performance are vital as outcome measures necessary for conducting research examining the effectiveness of occupational therapy interventions (Mulligan, 2014).

Unfortunately there are few comprehensive measures of occupational performance for use with children that are sensitive to detect changes in performance, psychometrically sound, efficient in their administration, and easy for therapists to use clinically. Such information is often gathered through informal observations or interviews. Perhaps the complex nature of occupational performance as a construct has contributed to the challenges occupational therapists have faced in developing objective, effective ways to measure it. The few measures that are available are discussed below.

The Canadian Occupational Performance Measure (COPM) (Law, Baptiste, Carswell, McColl, Polatajko, & Pollock, 2005) is one of the mostly widely used measures of occupational performance for use with adults as well as children (Wallen & Ziviani, 2012; Tam, Teachman & Wright, 2008). The COPM (Law et al., 2005) uses a structured interview format whereby the client is asked to rate his or her self-perceived ability and level of satisfaction of performance within the occupational domains of self-care, productivity (work or school activities), and leisure. According to Law et al. (2005), occupational performance is defined as the competency

and satisfaction with which one performs his or her meaningful occupations, and the balance that resides in one's engagement in the areas of self-care, productivity and leisure. Law et al. (2005) also describes occupational performance as being dependent upon the interactions among person factors such as physical and cognitive skills, physical and social environments, and characteristics of the occupations being performed. When used to assess children, the interview and ratings are most often completed by the child's caregiver, although children older than about 8 years of age can complete it. In terms of its psychometric properties, Cusick, Lannin, and Kevin (2007) reported good internal consistency of both Performance and Satisfaction scales in children with cerebral palsy. Law et al. (2005) provided evidence for its construct validity, and Verkerk, Wolf, Louwers, Meester-Delver, and Nollet (2006) provided further evidence of criterion-related validity by confirming similarities of COPM with items from the Pediatric Evaluation of Disability Inventory (PEDI) (Haley, Coster, Ludlow, Haltiwanger, & Andrellos, 1992). Inter-rater agreement was found to be acceptable by Verkerk et al. (2006) and the COPM's utility as an outcome measure has been demonstrated through its use in many studies showing that it is responsive to changes in occupational performance as a result of occupational therapy intervention (Cusick et al., 2007; Wallen & Ziviani, 2012). Although the psychometric properties of the COPM are adequate, research regarding the tools' reliability and validity are limited for pediatric populations. Another weakness is that the COPM only addresses three areas of occupation (self-care, productivity, and play/leisure), and within those domains, only activities or tasks identified by the client as areas of concern, or potential activities to address in intervention are rated. While this information is useful for identifying goals for intervention, the COPM does not provide a comprehensive measure of performance within each occupational domain, and without normative data, its use with children is limited for determining eligibility

for services, and for diagnostic purposes. Its administration as an interview is relatively time consuming (40-60 minutes) compromising its practical use in health care settings where efficiency of service delivery is highly desired. Finally, when completed by a caregiver as the child proxy, one might question the reliability and validity of ratings, especially related to the child's perceived satisfaction with their performance.

The Pediatric Evaluation of Disability Inventory (PEDI) (Haley et al., 1992) and its latest version, the Pediatric Evaluation of Disability Inventory-Computer Adaptive Test (PEDI-CAT) (Haley & Coster, 2010) may be considered measures of occupational performance. The PEDI-CAT evaluates skills in three domains including daily activities, mobility, and social/cognition, and is designed for children from birth through 20 years of age. In addition, the PEDI-CAT includes a "responsibility" domain for measuring the extent to which the child takes responsibility for managing daily living tasks (Haley & Coster, 2010). The items are rated using a 4-point scale relating to how difficult the behavior or skill is for the child to do. Rating is done by parents or using the professional judgment of clinicians or educators who are familiar with the child's performance (Haley & Coster, 2010). The authors describe the PEDI-CAT as a measure of functional skills rather than as a measure of occupational performance, and have developed items using concepts aligned with World Health Organization's International Classification of Functioning, Disability and Health for Children and Youth (ICF-CY) (World Health Organization, 2008). The PEDI-CAT operationalizes the ICF concept of "activity" by assessing discrete actions that support participation in major life roles or occupations (Haley & Coster, 2010). The rating scales emphasize the effectiveness or level of competency in performance, rather than the means by which the activity is performed, or satisfaction of performance. As a computer-based assessment tool, the PEDI-CAT is unique in its application of a computer

algorithm, which is based on item response theory and Rasch statistical models (Haley & Coster, 2010). The CAT process involves selecting test items most appropriate for the child being assessed as items selected are based on how previous items were rated. This process minimizes the number of items needed to obtain an accurate and precise score. The psychometric properties, including validity and reliability of the original PEDI (upon which the PEDI-CAT is based) have been well documented. Research on the psychometrics of the PEDI-CAT is emerging and thus far has been very promising. Studies of the PEDI-CAT have demonstrated good discriminant validity in its capacity to differentiate between children with and without disability, and test-retest reliability was reported to be acceptable (Dumas & Fragala-Pinkham, 2012). However, as with the COPM, the PEDI-CAT is limited in scope as it addresses only three areas of occupation. Its definition as a measure of occupational performance lacks clarity, although its conceptualization as a measure of functional skills and how it aligns with the ICF-CY is clearly presented in the test manual. In addition, the tool may be more difficult to access by parents and therapists than other assessments, due to the requirement that it must be completed on a computer, with the necessary software.

Another assessment tool that measures occupational performance is The Assessment of Motor and Process Skills (AMPS) (Fisher & Bray Jones, 2012), and its school version (School AMPs) (Fischer, Bryze, Hume & Griswold, 2007). Both of these measures are standardized, performance-based assessments of the quality of an individual's performance of everyday tasks. The AMPS contains over 100 standardized tasks representing different personal activities of daily living (ADLs) such as putting on socks and shoes, and instrumental activities of daily living (IADLs) such as folding laundry, while the School AMPS involves observations of school-related tasks. The tasks range in difficulty from simple to complex so that the AMPS can



be administered with persons from ages 2 years and older (Fisher & Bray, 2012), although there are relatively fewer standardized tasks designed for young children. The concept of occupational performance is defined uniquely by Fisher and Bray (2012) as “the sum of linked, observable, goal-directed performance skills” (p.1-3). Sixteen ADL motor skills (i.e. stabilizes, aligns, walks, grips, transports) and twenty ADL process skills (i.e. paces, heeds, inquires, initiates, sequences, notices, gathers) are rated as the client performs two ADL tasks, chosen carefully to be adequately challenging, and valued by the client as a typically performed, relevant task. The AMPS applies the many-faceted Rasch measurement model so that the quality of performance of each performance skill is measured on a linear scale. It was important in the development of tool that the ADL motor and process performance skills, and the tasks selected, would have the capacity to measure ADL ability across persons of varying abilities. AMPS results then yield a client score measuring ADL motor skill ability, ADL process skill ability, and overall ability to complete the ADL task. Although only two tasks are observed, because the skills observed are standardized across all tasks, and all tasks are measured with respect to item difficulty, the results reflect more broadly, ADL ability. The AMPS has strong normative data, and research with various population has shown the measure to be sensitive in detecting problems with efficiency, safety, and quality of performance in activities of daily living (Bray, Fisher, & Duran, 2001; Fisher & Bray, 2012). Strong evidence for its reliability and validity is also provided in the test manuals of the AMPs and School-AMPs.

The AMPS, however, is limited in scope in that the only occupational domains addressed are personal and instrumental activities of daily living, and it has not been designed for young children. The School-AMPs is limited to activities only associated occupational area of education or with student roles. The focus of the instrument is on measuring the quality of motor

and process skills associated with performing a functional task, rather than on scoring the overall ability to successfully engage in specific occupations such as gross motor play, or completing personal hygiene routines such as bathing and grooming. Third, the test must be computer scored so that the motor and process measures generated can be appropriately adjusted based on consideration of the difficulty of the task selected, and severity rating of the test administrator. Finally, an extensive, five day formal training program must be completed to ensure observations are made and scored reliably, which limits its accessibility only to those therapists who complete the training, and who have met rater calibration requirements.

The Child Occupational Self-Assessment (COSA) Version 2.1, by Keller, Ten Velden, Kafkes, Basu, Federico and Kielhofner (2005) is a questionnaire that asks children and youth to rate their perceptions of occupational competence, and the importance or value they place on engaging in everyday tasks or activities using a 4-point scale. The COSA consists of a series of statements pertaining to everyday participation in tasks related to school, home, and community, such as “keep my mind on what I am doing” or “do things with my family”. A review of COSA items reveals that a combination of performance skills, such as “calm myself down when upset” and occupations such as “dress myself”, are included. The tool was developed to be consistent with the Model of Human Occupation, and relates most to gathering information regarding the child's values and perceived competency. Kramer, Kielhofner and Smith (2010) provided evidence of the COSA's content and structural validity as a measure that captures the extent to which children feel they meet expectations associated with daily living activities, and the relative value that they place on those activities. However, there is little empirical evidence supporting the measure's reliability and validity, and it is limited for use with children only from 7 to 17 years of age. The primary use of the COSA is to gain information about the child for intervention

planning, and it is also useful for helping to establish a therapeutic relationship with the child (Kramer, Kielhofner & Smith, 2010).

Finally, The Goal-Oriented Assessment of Lifeskills (GOAL) is a relatively new performance-based, standardized assessment of functional abilities for use with school-aged children from 7 to 17 years of age by Miller, Oakland, and Herzberg (2013). The child is asked to perform seven activities such as using eating utensils, coloring, opening locks, putting on a t-shirt and kicking a ball in order to assess a range of functional fine motor and gross motor skills. In addition, information regarding the efficiency and level of independence with which the child completes the tasks is gathered. The test manual reports studies supporting the tool's reliability and validity, including the test's ability to discriminate typical children from clinical samples. In addition, it has promising applications for intervention planning and developing goals for intervention. However, like most of the other tools described above, its scope as an occupational performance measure is limited. It cannot be used with children under 7 years of age, and the domains or areas of occupation that are addressed are limited. Similar to the AMPS, the emphasis of the assessment is on measuring motor and other performance skills that are required to complete a select number of functional tasks. This approach is in contrast to occupational performance measures that focus primarily on measuring the competency and capacity of a child to successfully perform common, desired, and expected childhood occupations, such as eating, dressing, completing homework, engaging in meaningful leisure or play activities, and/or socializing effectively with peers.

There are considerable commonalities between what occupational therapists refer to as occupational performance, and what the fields of psychology and education have termed adaptive behavior. Therefore, a brief review of how adaptive behavior has been conceptualized

and measured is presented. Adaptive behavior was defined many decades ago as the ability to function and maintain oneself independently, and the capacity to meet the cultural, personal, and social demands of society satisfactorily (Heber, 1961). The American Association on Intellectual and Developmental Disabilities (AAIDD) defines adaptive behavior simply as the conceptual, social and practical skills that all people learn to function in their daily lives. The AAIDD is developing a new measure of adaptive behavior, the Diagnostic Adaptive Behavior Scale (DABS) for use with children from 4 to 21 years of age (American Association on Intellectual and Developmental Disabilities [AAIDD], 2013). Using a caregiver questionnaire, the DABS (AAIDD, 2013) measures behaviors within three domains: a) conceptual skills including literacy, self-direction, and number, money and time concepts; b) social skills such as interpersonal skills, social responsibility, obeying laws, avoiding being victimized; and c) practical skills such as personal self-care, occupational skills, transportation, and safety and health.

According to Sparrow, Cicchetti and Balla (2005), the conceptualization of adaptive behavior is based upon a number of assumptions. First, social competence is highly valued as being essential for humans to exercise personal independence and social responsibility. Second, adaptive behavior is developmental in nature so what is viewed as self-sufficiency is dependent upon the age of the individual. Furthermore, the types of behaviors expected of children become more complex as they age. Third, like occupational performance, adaptive behavior is a multi-dimensional construct, and while there is not always agreement on how best to organize or categorize multiple domains, the idea of multiple domains or areas, and sub-domains within domains has survived over time. Finally, adaptive behavior may be captured adequately, and

efficiently, by using reports from individuals like a teacher or parent who is familiar with the child's behavior.

One of the most popular norm-referenced, standardized measures of adaptive behavior is the Vineland Adaptive Behavior Scales, 2nd edition (VABS) (Sparrow et al., 2005). The VABS assesses adaptive functioning for individuals from birth to age 90 across four domains: a) Communication (Expressive, Receptive, Written); b) Daily Living Skills (Personal, Domestic, Community); c) Socialization (Interpersonal Relationships, Play and Leisure Time, Coping Skills); and d) Motor Skills (Gross Motor Skills and Fine Motor Skills, which is only used for children up to age 6). The measure also yields an overall adaptive behavior composite score. The VABS has an impressive normative sample of about 3,000 children matched to U.S. census data, and adequate data supporting its internal consistency, and test-retest reliability. While the VABS offers a psychometrically sound, norm-referenced option for measuring and documenting difficulty with adaptive behavior, the way in which the construct of adaptive behavior is operationalized is unclear. In comparison with content measured by assessments of occupational performance, the VABS includes more types of test items, representing a mix of behaviors and skills. Some items represent body functions such as "holds head up", and "articulates clearly", many address performance skills, such as "listens when spoken to", "walks to get around" and "ends conversations appropriately", while other items represent culturally relevant daily living activities such as "manages own money", "dresses self", and "sets table without assistance when asked". There are also items that examine academics, while others address issues related to participation such as "meets with friends regularly", and "plays informal outdoor group games". Items are rated using a 3-point frequency scale as follows: 0-never, 1- sometimes or partially, and 2-usually.

Comparisons of the content between adaptive behavior and occupational performance assessments reveal that the parameters considered tend to be more encompassing with occupational performance. Adaptive behavior focuses primarily on measuring the level of independence of a behavior or skill, and the frequency with which a behavior is observed. In contrast, occupational performance includes these parameters (independence and frequency) as well as many more qualitative aspects. Hinojosa and Kramer (2014), for example, described different parameters to consider when gathering information about client occupational performance including: a) a client's level of independence, capacity, efficiency or safety with their performance of tasks or activities that support participation; b) the extent to which or frequency with which a client engages in valued occupations, or the tasks and activities that support participation in those occupations; c) the degree of satisfaction with how a client participates in valued occupations; and d) the person, environment, and/or occupation factors that appear to be accounting for occupational performance deficits as they are revealed. Finally, adaptive behavior has primarily been measured by caregiver report, while measures of occupational performance have used more variety in types of methodology including performance-based observations, interviews, and caregiver reports.

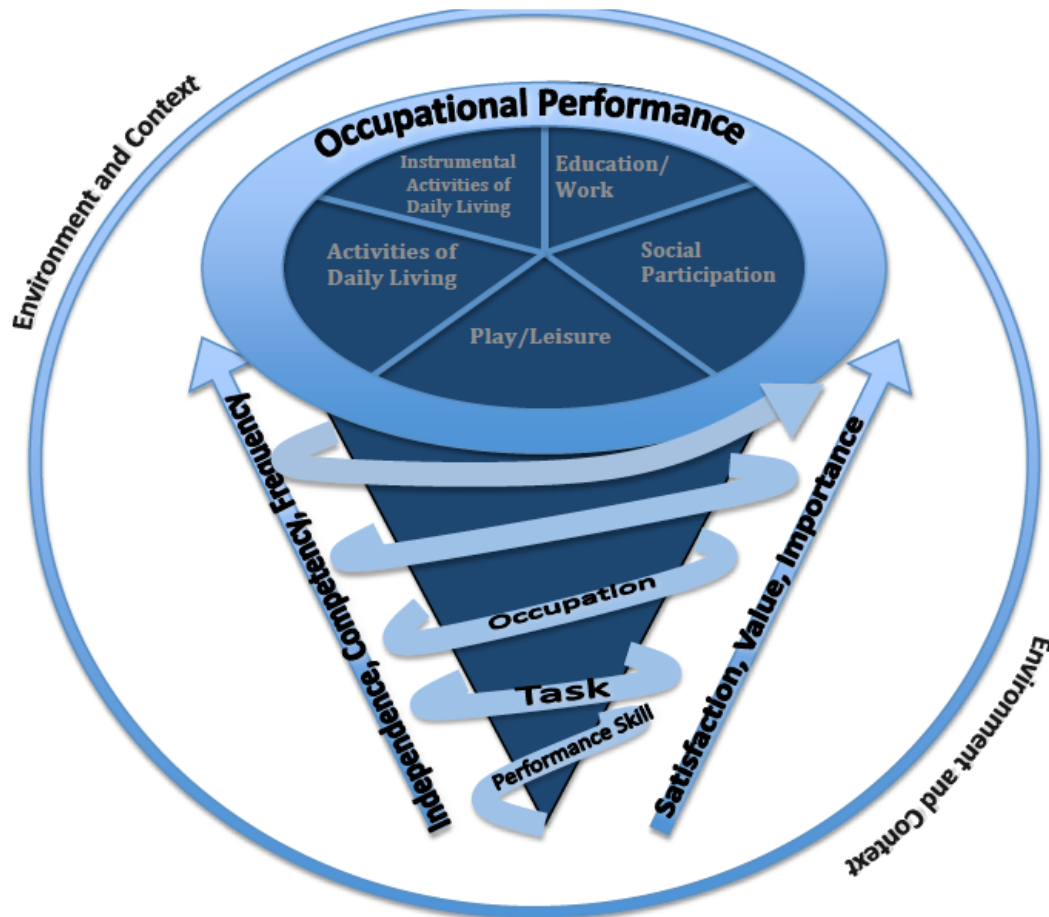
In summary, the assessment tools mentioned above have some versatility for measuring aspects of occupational performance in children. However, none are comprehensive, and most lack clarity regarding how occupational performance is defined or conceptualized. These limitations led to the development of a new measure of occupational performance for children, the Children's Occupational Performance Questionnaire or COP-Q. The COP-Q gathers data about a child's ability to perform skills and activities that directly support successful engagement in the occupations that are commonly expected of, or desired by children. The Children's

Occupational Performance Questionnaire is being developed as both a norm-referenced, and criterion-referenced measure that asks caregivers (or others who know the child well) to rate the child's ability to complete tasks that are associated directly with the performance of common occupations of children. It is comprehensive in that five occupational areas or domains are included, and each has its own scale as follows: Personal Activities of Daily Living; Instrumental Activities of Daily Living; Education/Work; Play/Leisure, and Social Participation. The COP-Q is designed for children of all ages (from birth to 18 years of age) and the five scales represent all of the occupational areas included Occupational Therapy Practice Framework (American Occupational Therapy Association [AOTA], 2014) as being within the domain of occupational therapy. Two of the scales, Instrumental Activities of Daily Living, and Education/Work are however, not used with children under three years of age as these children rarely engage in occupations associated with those domains.

The COP-Q was based upon a conceptual model developed to fully describe and visually depict what is meant by occupational performance (see Figure 1). In this model, occupational performance includes the five main areas of occupation believed to be important for children as depicted at the top of the cone-shaped diagram. A number of occupations fit within each area of occupation, and all child occupations are believed to fit within one or more of these five areas. For example, dressing and eating are considered occupations under the activities of daily living area, and school homework and engaging in classroom activities are considered occupations under the education/work area. Occupations are the everyday life activities that children want and need to do in order to fully participate in their daily roles and routines. Each occupation is then made up of smaller units, a multitude of tasks and performance skills that are required to successfully engage in that occupation. It is these smaller units that make up the items rated in

the COP-Q. The shape of the cone and the arrows within which skills, tasks, and occupations are housed illustrate the idea that occupational performance is a developmental construct. Skills support task performance, tasks support the engagement in occupations, and the successful doing of occupations reflects occupational performance in each respective area. Furthermore, as an individual matures, he or she develops higher levels of occupational performance, which allows that individual to perform more complex occupations, and to derive more satisfaction with his or her occupational engagement. It follows that the level of difficulty of the smaller units (motor, process, and social skills, and task performance) also increases as occupations become more complex.

Figure 1:





Two main parameters for measurement are included in the model as depicted in the diagram by the continuums placed along each side of the cone. Along the left side, this parameter demonstrates that increasing levels of performance has to do with competency; how well the skills, tasks, or occupations are performed, completed or achieved, how much help is required for the child to perform them, or how often they are performed. This continuum is operationalized in the COP-Q by the 4-point rating scale (from 0-unable to do it, to 3- able to do it, and does it when desired or required). The parameter along the right side relates to how much personal value or meaningfulness is placed on the doing of that occupation, task or skill, and the level of satisfaction the child feels regarding how he or she performs it. The last important component of occupational performance is context and environment, as physical, social, cultural, temporal, virtual and other situational factors have the potential to either support or hinder one's performance of occupations. The COP-Q focuses mostly on the measurement of the competency parameter, meaning that it measures what a child does or is capable of doing with respect to performance skills, tasks, and occupations that are commonly required of or desired by children.

As new assessment tools are being developed, it is important to conduct research to evaluate their validity; studies that aim to provide evidence that the test is actually measuring what the author(s) have designed the tool to measure. Studies of validity allow for a better understanding of what the scores that are generated from a particular scale or assessment mean, how they can be interpreted, and for what purposes they can or should not be used. There are many types of validity evidence such as content and discriminate validity. Content validity examines that the test items are measuring what it is intending to measure (Wodarski & Hopson, 2012). On the other hand, discriminant validity examines whether or not a concept is different enough from other closely related concepts (Wodarski & Hopson, 2012). Multiple studies are

typically done to gain a solid understanding of the construct(s) being measured by an assessment tool, and this is particularly important when the variables being measured represent a complex construct such as occupational performance.

The purpose of this study was to examine concurrent, criterion-related validity of the COP-Q by correlating COP-Q scores from a sample of children with another assessment known to measure similar constructs, the Vineland Adaptive Behavior Scale, Second Edition, Parent and Caregiver Questionnaire (VABS) (Sparrow et al., 2005). This type of research may also be referred to as a study of convergent validity because it is assumed that there would be positive relations between the scores of children on these measures, as they are believed to measure similar constructs. Scores from the VABS serve as the criteria by which scores from the COP-Q will be compared. The VABS was selected for this criterion-related validity study because it is a well established measure of adaptive behavior with strong psychometrics, it addresses similar constructs as the COP-Q, and it uses the same basic method for administration (i.e. both are questionnaires completed by caregivers).

For this study, it was hypothesized that there would be moderate to high positive correlations between all the domains of the COP-Q, and most scales and subscale scores from the VABS. In particular, moderate to high correlations were expected between a) Activities of Daily Living domain of the COP-Q and the Daily Living Skills scale of the VABS; b) The Instrumental Activities of Daily Living domain of the COP-Q and the Daily Living Skills scale of the VABS; c) the Social Participation domain of the COP-Q and the Socialization scale of the VABS; d) similar subscales, such as the VABS Play and Leisure Time Socialization subscale with the Play and Leisure domain of the COP-Q; e) Comprehensive Adaptive Behavioral Score from the

VABS and the sum of the COP-Q domain scores representing an overall occupational performance score.

### Research Methods

#### Recruitment and Participants:

Caregivers were recruited from personal and professional contacts of the researchers, and were primarily from the New England area. Additionally, some parents were recruited from the Child Study and Development Center in Durham, New Hampshire, where their children were enrolled in daycare. A total of 48 participants were recruited for the study. Parents or caregivers were responsible for filling out both the Children's Occupational Performance Questionnaire and the Vineland Adaptive Behavior Scale. Participants of the studies were given information about the study, and their rights as study participations, and completion of the questionnaires served as informed consent. The study was approved through the researchers' institutional review board for the protection of human subjects. Data were analyzed from children ranging in age from 3 months to 17 years old, with a mean age of 7 years and 4 months old. Eight children fell into the 0- 2 years 11 months category (16.7%), 13 children fell into the 3 year to 5 year and 11 month category (27.1%), 19 children were in the 6 year to 11 years, 11 months age group (39.6%), and eight children fell into the oldest category which was 12 to 18 years old (16.7%). Most of the study participants were white, although data on race was not collected and analyzed. There were 31 males (64.6%) and 17 (35.4%) females, and 47 were reported to be typically developing, while one child was reported to have a learning disability.

#### Instruments:

The VABS is a measure of adaptive behavior that examines the personal and social skills required for daily life (Sparrow et al., 2005). The VABS is a caregiver questionnaire, and it includes test items organized into four different domains: a) Communication; b) Daily Living Skills; c) Socialization; and d) Motor Skills (Sparrow et al., 2005). Each domain is further divided into subsections – the Communication section is composed of Receptive, Expressive, and Written subsections. The Daily Living skills domain is comprised of Personal, Domestic, and Community subsections. Interpersonal Relationships, Play and Leisure Time, and Coping Skills are the subsections that make up the Socialization domain, and the Motor Skills domain is comprised of Gross Motor Skills and Fine Motor Skills. The VABS was primarily designed to evaluate adaptive behavior of individuals with intellectual disabilities and other developmental disabilities, such as autism spectrum disorders (ASDs) and attention deficit/hyperactivity disorder (ADHD) (Sparrow et al., 2005). The measure is used with individuals from birth to ninety years old, and there are four different forms for the various age groups. For this study, the Parent and Caregiver Rating Form was used.

The items of the VABS are rated on a 3-point frequency scale with 0 representing never, 1 representing sometimes or partially, and 2 representing usually. The Communication scale consists of 99 items (with Receptive having 20 items, Expressive having 54 items, and Writing having 25 items). The Daily Living Skills scale consists of 109 items (with Personal having 41 items, Domestic having 24 items, and Community having 44 items). The Socialization scale is comprised of 99 items (with Interpersonal Relationships having 38 items, Play and Leisure Time having 31 items, and Coping Skills having 30 items). Lastly, the Motor Skills scale is made up of 76 items (with Gross Motor Skills having 40 items, and Fine Motor Skills having 36 items).

The VABS is a norm-referenced test that is typically used when the test generated standardized scores. However, for the purposes of this study, the raw scores were used by adding the values given to each item, giving a subsection raw score total. The totals of the subsections were then added to obtain the raw score for each scale. The scores of the scales were then added to obtain the VABS Total raw score. The VABS has strong data supporting its validity and reliability. There were four methods used to examine the test's reliability – internal consistency, test-retest reliability, inter-interviewer reliability, and inter-rater reliability (Community-University Partnership for the Study of Children, Youth, and Families [CUP], 2011). Test-retest reliability ranged from .76 to .92 across the scales. Validity was examined through test content, group differences, and relationships to other measures. The concurrent validity of the VABS-II ranged from .69 to .96 across scales, subscales, and ages when compared to the first editions of the VABS (CUP, 2011).

The COP-Q, also a caregiver questionnaire, is a measure of occupational performance. It has five different domains or scales: Activities of Daily Living; Instrumental Activities of Daily Living; Education/Work; Play/Leisure, and Social Participation. The COP-Q is designed for children of all ages (from birth to 18 years of age). For children under three years of age, caregivers complete only the Activities of Daily Living, Play/Leisure, and Social Participation domains.

The COP-Q is rated on a 4-point scale with 0 representing “child does not do this”, 1 representing “child does this with a lot of help”, 2 representing “child can almost do this; sometimes true” and 3 representing “yes the child does this; almost always true”. The Activities of Daily Living domain has 106 test items, the Social Participation domain is comprised of 101 items, the Play and Leisure domain has 86 items, the Instrumental Activities of Daily Living

domain has 67 items, and the Education and Work domain has 83 items. In this developmental phase of the COP-Q, it was simply scored by summing the ratings given for each item within each of the scales. A total score was also calculated by adding the totals from each 5 scales. For children under three years of age, only the Activities of Daily Living, Social Participation, and Play and Leisure domains were completed, so only these three sections were added together to obtain a comprehensive score of occupational performance. As the COP-Q is a new tool that is currently being developed, there is no published data on the tests of its reliability or validity.

#### Data Collection and Analyses:

This study used a non-experimental, descriptive, correlational research design. Parents completed both the COP-Q and the VABS at one sitting. Some completed them on their own with typed instructions, while others completed them in a face-to-face session. In its entirety, the COP-Q and the VABS took approximately 50-65 minutes to complete. Participants were given the paper versions of both the COP-Q and the VABS. The study took place at the University of New Hampshire, and was approved by the university's review board for the protection of human subjects.

SPSS version 21 was used to compute correlations between the five domains of the COP-Q, as well as the comprehensive occupational performance score (total of the three domains for children under 3 years of age); total of all of the five domains for children older than 3 years with each of the subsections and sections of the VABS. Domain and comprehensive scores from the COP-Q were also correlated with the Total Adaptive Behavior scores from the VABS. The Total Adaptive Behavior Scores is generated by adding the scores from the Communication, Daily Living Skills, and Socialization scales for children older than 6 years of age, and by adding in the Motor Skills score for children 6 years of age and younger.

Correlation coefficients were considered statistically significant when associated significant levels (p-values) were  $<.05$ . In addition, correlations were interpreted as representing strong relations when r-values were between .8 and 1, moderate between .5 and .7, and weak between .3 and .5.

### Results

Correlations between the Vineland Adaptive Behavior (VABS) scores and the COP-Q five occupational domain total scores are provided in Table 1. The results clearly show that the two measures have many aspects in common. The majority of the correlations are positive and strong, with Pearson-r values ranging from .56 to .97.

The COP-Q ADL domain correlated highly, and significantly ( $p<.001$ ) with every scale and subscale on the VABS, with correlations ranging from  $r=.67$  to  $r=.93$ . The total of all three Communication subscales (Receptive, Expressive, and Written) yielded a correlation of .88, with the relation between the COP-Q ADL domain and the VABS Expressive Communication being the strongest of the three communication areas ( $r=.91$ ). The ADL domain correlated significantly with all three Daily Living Skills scales (Personal  $r=.81$ , Domestic  $r=.70$ , and Community  $r=.76$ ), and the Total Daily Living Skills score ( $r=.82$ ,  $p<.001$ ). Correlations with the VABS Socialization Scales were also very high, with the correlation between the VABS Total Socialization score being  $r=.90$ . The Play and Leisure Time subscale correlated the highest of the three subscales in this area ( $r=.87$ ,  $p<.001$ ). Finally, the COP-Q ADL subscale correlated strongly with both the VABS Gross Motor ( $r=.93$ ,  $p<.001$ ), and the Fine Motor subscales ( $r=.86$ ,  $p<.001$ ). It was somewhat surprising that the correlations between the COP-Q ADL domain and the VABS Daily Living scores although strong, were slightly lower than those with the VABS Communication, Socialization, and Motor scales.

The COP-Q Social Participation domain correlated moderately to highly with every scale and subscale of the VABS with correlation coefficients ranging from  $r=.68$  to  $r=.91$  ( $p<.001$ ). The correlation between the COP-Q Social Participation domain and VABS Communication Total Score was  $r=.89$ , and the strongest relation in the VABS communication area was with Receptive Language ( $r=.91$ ). Slightly weaker relations were seen between COP-Q Social Participation domain and VABS Daily Living Skills scores, with the Community subsection having the strongest relation of the three subscales in that area, ( $r=.79$ ,  $p<.001$ ). Correlations between The COP-Q Social Participation domain and VABS Interpersonal Relationships Total score and subscales scores were all strong as would be expected (Social Interaction  $r=.85$ ; Play and Leisure Time,  $r=.88$ , and Coping Skills,  $r=.86$ ). Finally, the COP-Q Social Participation domain correlated positively with the Gross Motor ( $r=.83$ ), and Fine Motor ( $r=.77$ ) areas of the VABS. As was expected, the strongest relations with the COP-Q Social Participation domain were obtained with the scales of the VABS that addressed abilities related to communication and socialization.

The COP-Q Play/Leisure domain Total Score also correlated highly and significantly with each scale and subscale of the VABS, with correlations ranging from  $r=.71$  to  $r=.94$  ( $p<.001$ ). The VABS Communication Total score correlated very highly with this domain, ( $r=.93$ ), with the highest correlating subsections being Receptive and Expressive Language (both  $r=.93$ ). The correlation between the COP-Q Play/Leisure domain and the VABS Daily Living Scale was  $r=.85$ , with the strongest relation within that area being with the Community subsection ( $r=.85$ ). The COP-Q Play/Leisure domain correlated highly with the VABS Socialization Scale ( $r=.94$ ), with the strongest relation being with the Play and Leisure Time subsection ( $r=.93$ ), as would be expected. Lastly, correlations between the COP-Q Play/Leisure



domain and the VABS Motor Skill area were  $r=.92$ , Total Motor;  $r=.91$ , Gross Motor; and  $r=.84$ , Fine Motor.

The COP-Q IADL domain correlated highly with most of the scales of the VABS, with correlations ranging from  $r=.56$  to  $r=.95$  ( $p<.01$ ). It is important to note that only children 3 years and older were included in these analyses. Correlations with the VABS Communication, Total score was  $r=.90$ , with the strongest relation in the area, being with the Written subsection ( $r=.92$ ). The COP-Q IADL domain correlated very highly with the VABS Daily Living area (Total Daily Living,  $r=.95$ ; Personal,  $r=.69$ ; Domestic,  $r=.92$ ; and Community,  $r=.94$ ). There was a strong and significant correlation between COP-Q IADL domain and the VABS Socialization scale ( $r=.87$ ,  $p<.001$ ), with the Play and Leisure Time subsection having the highest correlation ( $r=.89$ ,  $p<.001$ ). Correlations with the VABS Motor area were slightly weaker ranging from  $.56-.72$ . As anticipated, the IADL domain of the COP-Q correlated most strongly with the Daily Living Skills area of the VABS.

As with data from the IADL scale, data from the COP-Q Education/Work domain was restricted to children 3 years of age or older. The COP-Q Education/Work domain correlated highly and significantly with each scale of the VABS, with correlations ranging from  $r=.67$  to  $r=.96$  ( $p<.002$ ). Correlations between this domain and the VABS Communication area were strong (Total,  $r=.93$ ,  $p<.001$ ), with the Written subsection having the strongest correlation of the Communication subsections ( $r=.95$ ,  $p<.001$ ). The COP-Q Education/Work domain correlated very strongly with the VABS Daily Living Total score,  $r=.94$ , with the Community subsection correlating most strongly in this area ( $r=.96$ ). Correlations with the VABS Socialization area also were high, and ranged from  $r=.78$  to  $.92$ , with the Play and Leisure Time subsection having the

strongest correlation. Lastly, correlations between the COP-Q Education/Work domain and the VABS Motor area were significant, ranging from  $r=.67$  to  $r=.85$ .

When examining correlations between the Total Composite Battery scores of the measures, it was necessary to consider age of the child, which determined the number of scales that were administered. The total of three COP-Q domains (Activities of Daily Living, Play and Leisure, and Social Participation) which were administered to all children in the study was correlated with all the Total of all 4 scales of the VABS (only give to children 6 years of age or younger), yielding a coefficient of  $r=.58$  ( $p=.23$ ). The Grand Total COP-Q score summed the totals from all 5 domains (not including children under 3 years of age) and was correlated with the total of the VABS Communication, Daily Living Skills, and Socialization scales, (not including children 6 years of age or younger) yielding a strong correlation of  $r=.94$  ( $p<.001$ ). Therefore, the data suggest that the strongest relations between the measures are obtained with older children (7 years of age and older).

Table 1

	COP-Q ADL	COP-Q SocP	COP-Q PLAY	COP-Q IADL	COP-Q Edu/Work	COP-Q Tot-3 Dom	COP-Q Tot-5 Dom
VC Recep	.90**	.91**	.93**	.75**	.76**	.87*	.81**
VC Express	.91**	.89**	.93**	.81**	.84**	.95*	.84**
VC Writ	.67**	.75**	.85**	.92**	.95**	-	.92**
VComm Tot	.88**	.89**	.93**	.90**	.93**	.94*	.92**
VDL Pers	.81**	.79**	.82**	.69**	.68**	.96*	.70**
VDL Dom	.70**	.68**	.71**	.92**	.86**	.29	.86**
VDL Commun	.76**	.79**	.85**	.94**	.96**	.33	.93**
VDL Tot	.82**	.83**	.85**	.95**	.94**	.95*	.94**
VSoc Int Rel	.83**	.85**	.87**	.75**	.78**	.95*	.83**

VSoc Play/L	.88**	.88**	.93**	.89**	.92**	.98**	.91**
VSoc Cop	.77**	.86**	.83**	.76**	.81**	.74	.85**
VSoc Tot	.90**	.92**	.94**	.87**	.91**	.97**	.94**
VMotor Gross	.93**	.83**	.91**	.56*	.67*	.96*	.61*
VMotor Fine	.86**	.78**	.85**	.72**	.85**	.95*	.77**
VMotor Tot	.93**	.83**	.92**	.69*	.82**	.97*	.74**
VTOT (3 scales)	.66**	.76**	.88**	.89**	.88**	-	.94**
VTOT (4 scales)	.58*	.61*	.63**	.11	.15	.57	.27

\* Signifies a p-value less than .05

\*\*Signifies a p-value less than .001

### Discussion

The results indicated that scores from most occupational areas of the COP-Q correlated strongly and positively with most sections of the VABS. In fact, the relationships between the variables measured by these assessments were higher than expected, suggesting that adaptive behavior and occupational performance are very similar constructs. Furthermore, as expected, correlations between subscales or constructs that measured similar areas of function tended to be slightly higher than the correlations between those measuring less similar areas of function. For example, the Play and Leisure domain of the COP-Q correlated highest with the Play and Leisure Time ( $r=.93$ ) subsection of the Socialization scale of the VABS, in comparison with other subsections. The IADL domain of the COP-Q had a strong relation with the Community subsection of the Daily Living Skills domain of the VABS ( $r=.94$ ), as many Instrumental Activities of Daily Living involve community participation. In addition, the Education/Work domain of the COP-Q had the highest correlation with the Community subsection of the Daily Living Skills scale of the VABS ( $r=.96$ ) supporting the idea that competencies in performing education and work occupations (which are community based) rely on the community-living

skills addressed in that scale of the VABS. Furthermore, highest correlation between the COP-Q Education/Work domain and the subsections of the VABS Communication scale was with the Written subsection ( $r=.95$ ) which suggests that written skills are notably important for performing school and work-related occupations, as would be expected. As conceptually occupational performance shares many commonalities with adaptive behavior, these results support the validity of the COP-Q as a measure of occupational performance of children.

Despite the results that showed that the strongest correlations were between the subscales or constructs believed to be measuring the most similar areas of function, there were some instances where this did not occur. For example, it was surprising that the COP-Q Activities of Daily Living domain had higher correlations with the Communication ( $r=.88$ ), Socialization ( $r=.90$ ), and Motor Skills scales ( $r=.93$ ) than with the Daily Living Skills scale ( $r=.82$ ). This may have been because basic skills such as motor, communication, and social skills are required or are important for competency in the performance of activities of daily life. Further supporting this idea were strong relations between the COP-Q Activities of Daily Living domain and Gross Motor Skills subsection of the VABS, and the COP-Q Play/Leisure domain with the Receptive and Expressive subsections of the VABS Communication area. It is well known that communication skills support a child's ability to engage in play and leisure, and that gross motor skills are important for supporting performance in activities of daily living. Finally, it is noteworthy that the motor, social, communication, and daily living items included on the VABS overlap with many of the task and skill items included within the domains of the COP-Q. Those COP-Q items were purposely identified as skills and tasks believed to support successful engagement in common occupations of childhood.

According to the American Association on Intellectual and Developmental Disabilities (2013), adaptive behavior is considered conceptual, social and practical skills that people use in their daily lives. These can include skills such as language and literacy, interpersonal skills, social problem solving, social responsibilities, activities of daily living, occupational skills, use of money, and travel and transportation. Similarly, occupational performance is considered the actual doing of a certain activity, skill, or occupation necessary for daily life (AOTA, 2014), further supporting the commonalities between what is considered adaptive behavior and occupational performance.

The correlations between the VABS Comprehensive Adaptive Behavior Score, and Comprehensive Total COP-Q scores were interesting in that strength of the relation between the assessment tools based on these scores was higher for older children (6+ years of age) than for the younger children. One explanation might be simply that there were more older children than younger children in the sample, which statistically may have resulted in stronger correlations with the older group. Another plausible explanation for the stronger relation between the skills measured by the VABS and competency in performing occupations as measured by the COP-Q in the older children might have something to do with the level of complexity in the occupations typically performed or expected of older children. If the level and number of skills required to competently perform complex occupations is greater than the level and number of skills necessary for performing simpler occupations such as those expected of infants, toddlers, and very young children, (and arguably this is true), then the correlations between these measures would be stronger for older children.

Finally, it is important to point out that there were some weak to moderate relations found between the measures, highlighting aspects of the COP-Q that are unique or different from the

VABS. For example, the VABS Daily Living Total with the COP-Q Activities of Daily Living domain, the Coping Skills subsection of the Socialization area with the COP-Q Instrumental Activities of Daily Living domain, and the VABS Motor Skills scale with the COP-Q Social Participation domain yielded correlations of .82, .76, and .83 respectively. In addition, the overall adaptive behavior score from the VABS and overall occupational performance total score for the COP-Q correlated only moderately for the children under 3 years of age (.57) who were administered just three of five COP-Q domains. This indicates that there are aspects of the tools that have unique characteristics, and that occupational performance and adaptive behavior are very similar, but not exactly the same construct.

Some study limitations must be considered in the interpretation of the findings. First, a relatively small sample size was used and given the developmental nature of the constructs being measured for children of all ages, a larger sample would have increased the confidence that the results are representative of all children. The sample also had little ethnic diversity, a gender imbalance with more boys than girls, and did not include adequate representation of children with disabilities. Second, there are some inherent limitations in using self-report questionnaires, a characteristic of both assessment tools used in this study. Parent perceptions of their child's functioning are analyzed, and at times, such perceptions might not accurately reflect their child's true skills or performance. Misinterpretation of the wording of specific test items may also result in such inaccuracies. Third, the decision to use the Vineland Adaptive Behavior Scales as the criterion for this validity study, a measure of adaptive behavior rather than of occupational performance, means that care must be taken when drawing the conclusions about the COP-Q as a measure of occupational performance. This involves consideration of how the concepts are similar and how they might be different.

This study has also revealed some areas where the COP-Q can be improved, and provides some future directions for research. First, a thorough review of the responses on the COP-Q indicated a few items that often responded with the “I don’t know” option, which suggest that these items should be either reworded, or removed. Two such items included such as in the “Has endurance to walk for 1 hour”, from the Activities of Daily Living domain, and the item “Listens attentively to others who need to discuss their problems”, from the Social Participation domain. Future revisions of the COP-Q may also combine some of the scales, as based on the results of this study, they appear to be measuring very similar constructs. For example, the Activities of Daily Living domain might be combined with the Instrumental Activities of Daily Living domains, and the Play/Leisure domain might be combined with the Social Participation domains. The data suggests that these scales may be measuring the same underlying construct. However, this needs to be explored further through future studies examining aspects of validity such as item analysis, and multi-variate studies using a factor analyses, and Rasch analyses to determine the factor structure, and model fit. The COP-Q appears to provide a simple and comprehensive measure of a child’s occupational performance. Further studies are needed to explore its measurement properties including content, construct, and discriminate validity, and the test’s reliability. Other criterion-related validity studies using occupational performance measures such as the PEDI-CAT or COPM are also recommended. In addition, for use in the United States, normative data needs to be collected on a large sample of children representative of children from the U.S., so that meaningful, age-related, and gender-related norms can be collected. This questionnaire would also be beneficial in serving as a baseline to document the child’s functioning from which progress can be measured in the practice setting.

## Conclusion

There are not many measures currently available for occupational therapists to evaluate the occupational performance of children. This study presents some preliminary data that was collected to assist in the development of a new measure of occupational performance for children, called the Children's Occupational Performance Questionnaire (COP-Q). The results of this study provided evidence that constructs measured by the COP-Q correlate highly and positively with the constructs measured by the Vineland Adaptive Behavior Scales (VABS). This finding supports the COP-Q as a measure of occupational performance, as previous research has shown that occupational performance and adaptive behavior have much in common (AAID, 2013; Fisher & Griswold, 2014). Occupational therapists working with children need psychometrically sound, and easy to use assessment tools in order to help in the evaluation and intervention process, to monitor changes in response to intervention, and for research purposes. The COP-Q shows promise as a simple and comprehensive measure of occupational performance of children.



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