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Assessing The Reliability Of The Cor Advantage

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CHAPTER 1

INTRODUCTION

Background Information

In 1993, the HighScope Educational Research Foundation developed the Child Observation Record (COR) to assess the outcomes of the HighScope Preschool Curriculum (Schweinhart, McNair, & Larner, 1993). Over the course of its development, it was rewritten for programs by persons either trained or untrained in the HighScope Curriculum. It is an objectively scored, observation-based instrument in which assessors spend a few minutes a day recording anecdotes of significant instances of children's activities. These anecdotes are then given a numeric value after being categorized and scored based on the different COR dimensions and items that represent multiple areas of child development. This information is then compiled in order to provide an all-inclusive depiction of individual child developmental gains as well as group and classroom progression. The six developmental domains represented in the COR were:

1. Initiative (4 items)
2. Social relations (5 items)
3. Creative representation (3 items)
4. Music and movement (4 items)
5. Language and literacy (6 items)
6. Logic and mathematics (8 items)

HighScope released a revised second version of the COR in 2003, which included a few important differences from the original COR. A major change was that the COR items were updated to reflect the current standards that reflected important areas of development. The original six categories that reflected these areas in the original COR remained the same with the exception of *language and literacy* and *mathematics and science* (previously *logic and math*). Items were added to these two domains in order to more accurately represent literacy, math and science foundations (Neill, 2004). Another important revision to the COR was that the lowest skill point, assigned by the assessor, was changed to "basic exploration" from its previously known "not yet demonstrating" (HighScope, 2003, p. 1) a specific skills. The number of items was changed from 30 to 32 items on the final revision of the COR.

Educational needs and policies continued to evolve and the COR needed to be revised in order to accommodate these educational changes. There were three main revisions: (1) the ability to track the developmental progress of children from birth to kindergarten in all major key areas of child development, (2) made viable for children with different background with diverse abilities, and (3) concurrently track child development while capturing program impact (HighScope, 2013).

In 2012, the COR was revised based on those needs, as well as standards set by the HighScope Curriculum, state requirements, Common Core Standards for kindergarten, the Head Start Child Development and Early Learning Framework, and other factors. The COR became known as the Child Observation Record (COR) Advantage subsequent to that revision process.

The COR Advantage is currently used by early childhood educators and school administrators to track child developments and progress, assist in translating anecdotal reports into a comprehensible language that parents, teachers and administrators can understand, and improve lesson plans and curriculums. It consists of 34 items across eight primary dimensions that represent broad domains of child development and one domain related to English language learners:

1. Approaches to Learning (3 items)
2. Social and Emotional Development (5 items)
3. Physical Development and Health (3 items)
4. Language, Literacy, and Communication (7 items)
5. Mathematics (5 items)
6. Creative Arts (4 items)
7. Science and Technology (4 items)
8. Social Studies (3 items)
9. English Language Learning (2 items)

Teachers enter anecdotes about each child regarding the different behaviors within the dimensions on a daily basis, and then assign a numeric value (0-7) to each anecdote to indicate an average developmental progression for the specific behavior. Statistical summaries and descriptive statistics of these numeric values can then be presented on tally sheets, growth profiles, category reports, family reports, Office of Special Education Programs (OSEP) reports and Head Start

Outcomes reports using various graphs and tables to easily convey some of the information to those less fluent in statistics.

Psychometrics based on the results of a study conducted by Schweinhart et al. (1993) indicated the COR's "alpha coefficients of internal consistency yielded acceptable levels on each of the six COR scales, ranging from .80 to .93 (*mdn* = .87) for teachers and .72 to .91 (*mdn* = .845) for assistant teachers." However, the revised instrument has two additional developmental domains., so the reliability must be reassessed. Moreover, instrument reliability is a necessary precursor to the ability to validate the usage of the COR Advantage for its intended purposes, and hence the revised instrument motivates a reexamination of its construct validity.

Purpose of the Study

There are two purposes of the study. The first is to assess the internal consistency reliability of the COR Advantage with Cronbach's alpha for the entire scale and the Spearman-Brown prophecy formula for the subscales. The second is to examine the internal factor structure of the eight developmental domains by exploratory factor analysis.

Significance of the Study

The COR Advantage is a commonly used instrument. The psychometric properties of previous iterations of the instrument must be updated, given the major revisions that have been made to the COR Advantage.

Assumptions

This study is based on the assumption that training of assessors results in accurately able to document their anecdotes and subsequent scoring. Additional study would be required to determine the impact of training on reliability.

Limitations

The age of participants in the sample is limited to children deemed as preschool, which is 36-60 months. Ages younger than 36 months were deemed as infant/toddler and over 60 months as kindergarten age. Infant/toddler and kindergarten data is not included in this study due to a lack of data availability.

CHAPTER 2

LITERATURE REVIEW

Reliability

Reliability should be of concern in developing an assessment instrument. According to Nunnally (1978), "Reliability concerns the extent to which measurements are repeatable… In other words, measurements are intended to be stable overs a variety of conditions which essentially the same results should be obtained" (p. 191). An educational measurement such as the COR Advantage is used teachers, administrators and researchers daily for previously stated reasons. An investigation of reliability needs to be conducted for the COR Advantage to determine its ability to produce consistent scores

Within classical test theory, internal consistency is a type of reliability, "used to measure the consistency of items within a single test form" (Miller, 2008, p. 848). Investigating internal consistency reliability consists of administering an instrument once to a sample and basing the reliability on the correlation of one part of the instrument with the other part of the instrument. Both the correlations between the items within the same domains as well as across domains help to determine the internal consistency

Obtaining the internal consistency provides insight to the test's item homogeneity. According to Crocker and Algina (1986), "In order for a group of items to be homogeneous, they must measure the same type of performance (or represent the same content domain)" (p. 135). It will indicate the level of item homogeneity within the eight developmental domains. Thus, if the reliability coefficient is high there is an indication the items within each domain are consistent measuring the construct.

Cronbach's alpha is a method that helps to assess the reliability of a test under the constraint of internal consistency. Cronbach (1951) evaluated multiple methods of estimating internal consistency and showed the relationship of them to the formula coefficient alpha, also known as Cronbach's alpha. The formula for computing Cronbach's alpha is as follows

$$\hat{\alpha} = \frac{k}{k-1}\left(1 - \frac{\Sigma\hat{\sigma}_i^2}{\hat{\sigma}_x^2}\right)$$

where k represents the number of items , $\hat{\sigma}_x^2$ is the total test variance and $\Sigma\hat{\sigma}_i^2$ is the sum of the variance for item i. Cronbach's alpha is a common method used to estimate internal consistency because it can tell the researcher many things about the test regarding the reliability.

A test that yields a low alpha level can indicate that either the test is to short or the test items are mostly unrelated; whereas a test that yields a high alpha level lets the researcher know where the upper limit is and the approximate level of measurement error (Nunnally, 1978, p. 230). This corresponds to the true score model that states that X = T + E, where X represents the observed score, T represents the individual's true score and E represents the random error chance.

In relation to Cronbach's alpha, for example, a coefficient alpha of .75 equates to meaning that 75% of the total test variance is due to the true score variance and the remaining 25% can be attributed to random error. The numbers that are produced from using Cronbach alpha's method are approximate and it should be understood that other factors may have greatly influenced the outcome produced. As pointed out by Crocker and Algina (1986), "coefficient alpha is generally applicable to any situation where the reliability of a composite is estimated" (p. 143). Cronbach's alpha is a method that's based on item covariances and is a good method to estimate the reliability under the constraint of internal consistency. In spring of 2012, the HighScope Educational Research Foundation conducted phase 1 of a multiphasic validation study on the COR Advantage. Cronbach's alpha was used to investigate the internal consistency of the items. The results yielded high alpha levels for all of the content areas, "ranging from r = 0.87 (physical development and health) to r = 0.94 (language, literacy and communication)" (HighScope, 2013, p. 4). These results are good indicators of items strongly correlating with each of the content areas. In order to assess the reliability of a test as a whole, another method should be used that incorporates more of the test as a whole and doesn't segregate the items as much.

The Spearman-Brown prophecy formula is a split-half method, which can help to substantiate the results yielded by Cronbach's alpha formula. A split-half method is an alternate method to a method based on item covariances because instead assessing the test as a whole by examining covariances between items, under the split-half method the test is divided into two parallel subtests, each one half the length of the original test. For each individual's scores, the correlation coefficients are computed using the two halves. At this point, a specific split-half formula or method is chosen to be used to estimate the internal consistency. Of the various formulas used, the Spearman-Brown prophecy formula is one of the more common formulas.

The number of items of the internal consistency measures are important, because the statistical engine, the Pearson Product-Moment Correlation, is adversely impacted in terms of attenuation in the presence of small sample size of items. The Spearman-Brown prophecy formula is an attempt to correct for this problem by projecting a coefficient of reliability under the assumption that additional items of the same psychometric caliber are added. This is particularly useful when judging the consistency of subscales, which by definition are a subset of the total item pool, and hence yield an attenuated magnitude of consistency.

Spearman (1910) and Brown (1910) independently published the formula for this correction. As stated by Burnett (1974), their formula was used to estimate the reliability of a composite test that has parallel split halves. The Spearman-Brown prophecy formula is:

$$\rho_{xx'} = \frac{2\rho_{AB}}{1 + \rho_{AB}}$$

where $\rho_{xx'}$ represents the estimated reliability for the entire test and ρ_{AB} represents the correlation between the two halves.

Validity

Validity is another psychometric principle that is important to investigate and consistently improve upon when developing an instrument. There are three types of validity, criterion-related validity, content validity and construct validity. All three types are important to investigate, but each type can have different weights and meanings depending on the type of instrument and what's intended to be measured. For example, an instrument measuring school achievement would be expected to have high predictive validity, a type of criterion-related validity, because the purpose of the instrument is to predict future success and failures. Content validity, is the extent to which the items of the instrument are representative of what is intended to be measured and the items and methods within the instrument are sensible, meaning they can logically be related to the overall purpose of the instrument. Construct validity, is the extent to which the specific items within the instrument that are used to measure latent factors, or constructs, are inter-related to each other within each domain as well as to the overall construct.

There are multiple methods to investigate the different types of validity. Fantuzzo, Hightower, Grim, & Montes (2002), assessed the content validity and the construct validity of the Child Observation Record (COR). Subjecting the data from Head Start and Mixed program samples to an exploratory factor analysis and eventually a confirmatory factor analysis, Fantuzzo et al. revealed a three-factor structure. These three factors, relating to Cognitive Skills, Social Engagement and Coordinated Movement accounted for 60.8% of the item variance (Fantuzzo et al., 2002). The content validity was explored by reviewing item distributions, "to determine if patterns of item frequencies indicated a developmental continuum" (Fantuzzo et al., 2002, p. 114). The results did not yield a unimodal distribution as expected, instead the authors found the distribution to be more multimodal, indicating that the COR scoring of 1-5 are not representative of child developmental steps (Fantuzzo et al., 2002). This method of exploratory factor analysis to examine construct validity is common to identify the latent variable that account for the item variance. Employing this method provides a clearer picture of the latent constructs by examining inter-item correlations and clustering them based on those correlations that relate them to the overall construct.

Barghaus and Fantuzzo (2014) assessed the validity of the COR-2. Both exploratory and confirmatory factor analyses yielded a four factor solution named Social Engagement, Cognitive Skills, Coordinated Movement, and Scientific Process Skills based on the factor loadings (Barghaus and Fantuzzo, 2014, p. 1129). These findings of an extra fourth factor, compared to the previous 2002 study, correspond to the expansion of the Mathematics and Science domain as indicated by Neill (2004).

Test developers and researchers use the method of factor analysis to investigate the construct validity of an instrument for multiple reasons. Two of the most important reasons are (1) “a matrix of item intercorrelations (for n items on the same instrument) is factored to determine whether item responses ‘cluster’ together in patterns predictable or reasonable in light of the theoretical structure of the construct of interest” (Crocker and Algina, 1986, p. 232). These clusters of items that highly correlate with one another help to represent some unobservable construct. This is representative of the internal statistical structure of the items that represent the different constructs. As for instrument developers, it’s hoped that the constructs identified from a factor analysis correspond to the hypothesized constructs. Strong correlations indicate, what has been referred to by many as factorial validity. Factor analysis also helps to (2) determine, “the statistical cross structures between the different measures of one construct and those of other constructs" (Nunnally, 1978, p. 112). A confirmatory factor analysis would help to investigate the cross structures amongst the different constructs, once the exploratory factor analysis has helped to establish a basis for them.

In the phase 1 of the validation study of the COR Advantage, the substantive and structural validity was reported. The order of item difficulty resulted in as what was expected, meaning that "items designed to represent level 1 are the hardest items to give high scores to, items designed to represent level 7 are the easiest items to give high scores to" (HighScope, 2013, p. 5). It was also noted that the different developmental areas on the COR Advantage adhere to the theorized categories. Employing the factor analysis method would support this a result such as this.

The external validity was examined by looking at child scores on the COR Advantage as well as their scores from different standardized assessment scores that presumably measure similar developmental areas. These standardized tests include the Social Skills Improvement System (SSIS), the Bayley Infant-Toddler Development Scale 3rd edition, and the Woodcock-Johnson Tests of Achievement, 3rd edition. Correlations for the infant and toddler COR Advantage content area scores and the Bayley-3 scores were high across all content domains. Correlations for the preschool and kindergarten COR Advantage content area scores and the Woodcock-Johnson-3 scores were moderate between the Language, Literacy and Communications, Mathematics, Science and Technology and Social Studies domains (*range* = .20 - .60) (HighScope, 2013). Correlations between the preschool and kindergarten COR Advantage content area scores and the SSIS scores were a bit lower for the Approaches to Learning and Social and Emotional Development domains, but they were still positive (*range* = .21 - .47) (HighScope, 2013). The correlations yielded indicate positive external validity for the COR Advantage, meaning the theoretical content areas originally hypothesized by the test developers positively correspond to similar constructs of other validated instruments.

CHAPTER 3

METHODOLOGY

Participants

For this study, 31,958 child assessments were drawn from the COR Advantage database provided by the HighScope Educational Research Foundation. The assessment data was collected in the Fall school semester of 2013 from 40 states, including the District of Columbia, and 13 foreign countries. The age of the children in the sample include ages 36-60 months (3-5 years old), which corresponds to preschool age.

Procedures

Permissions for data availability and usage were granted at the beginning of this study after multiple meetings with the director and analyst of the Center for Early Education Evaluation (CEEE) at the HighScope Educational Research Foundation. The data was then requested from Red-e Set Grow, LLC, the company that manages the COR Advantage data. The SPSS data file was transferred via network access at the HighScope headquarters in Ypsilanti, Michigan to ensure data security and confidentiality.

Using SPSS (22), the data was organized to fit the study based on demographic and assessment variables relevant to the study. The statistical analysis performed on the data was used to investigate the internal consistency reliability and construct validity of the assessment.

Data Collection

The data in the sample was collected by lead teachers, assistant teachers, administrators and other individuals who have direct contact with children entering anecdotes and respective scores through the HighScope Education Research Foundation's COR Advantage online. The COR Advantage online is managed by Red-e Set Grow, LLC. They're responsible for maintaining the online database, technology related to the instrument, data collection, data storage and data reporting. The data is stored in an SPSS file, which is requested by CEEE at HighScope when needed for analysis.

Data Analysis

To investigate the internal consistency reliability and the construct validity, multiple statistical methods were used. Cronbach's Alpha and the Spearman Brown Prophecy formula were both examined to predict reliability by using SPSS (22). Cronbach's Alpha assisted in examining the inter-item correlations within the 8 different domains of the COR Advantage and the Spearman Brown Prophecy assisted in examining the reliability of the whole test by splitting the items into 2 halves. For this testing, a significance level of .05 was used as a cutoff. This significance level is a commonly accepted level in the field of education as well as other social sciences.

An exploratory factor analysis was used in order to investigate both the internal consistency reliability and the construct validity. Eigenvalues greater than 1 were regarded as acceptable, as they account for the same, if not more, variance of a single factor. This method assisted in distinguishing the latent variables that make up what the items are actually measuring.

The results were presented using multiple descriptive tables produced by SPSS (22) and a scree plot displaying eigenvalue relationships with the factors. The results of these analyses were then discussed in regards to their overall impact on the assessment and the results' impact on future recommendations.

CHAPTER 4

RESULTS

Cronbach alphas were obtained for all 34 variables. The original sample size of 31,958 was reduced to 13,457 cases because 18,501 cases were missing data. Cronbach alpha only takes into account cases with all 34 items. When running Cronbach alphas for the eight different categories, sample sizes varied due to missing data.

Table 1

Cronbach Alpha Coefficients

	N	%	Cronbach's Alpha
All 34 Items	13457	42.1	.963
Approaches to Learning	18548	58.0	.742
Social & Emotional	16541	51.8	.821
Physical Development & Health	18892	59.1	.659
Language, Literature & Communication	15752	49.3	.848
Mathematics	16043	50.2	.815
Creative Arts	16595	51.9	.763
Science & Technology	15640	48.9	.775
Social Studies	15224	47.6	.723
Factor 1 w/Cross loadings	13831	43.3	.947
Factor 2 w/Cross loadings	14323	44.8	.906
Factor 1 w/out Cross loadings	14685	46.0	.923
Factor 2 w/out Cross loadings	14936	46.7	.881

Table 2

Spearman-Brown Coefficients

	N of Items	Spearman-Brown Coefficient
All 34 Items	34	.948
Approaches to Learning	3	.757
Social & Emotional	5	.816
Physical Development & Health	3	.681
Language, Literature & Communication	7	.858
Mathematics	5	.814
Creative Arts	4	.770
Science & Technology	4	.766
Social Studies	3	.731
Factor 1 w/Cross loadings	22	.929
Factor 2 w/Cross loadings	12	.893
Factor 1 w/out Cross loadings	15	.921
Factor 2 w/out Cross loadings	9	.873

Table 3

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.989
Bartlett's Test of Sphericity	Approx. Chi-Square	253167.979
	df	561
	Sig.	.000

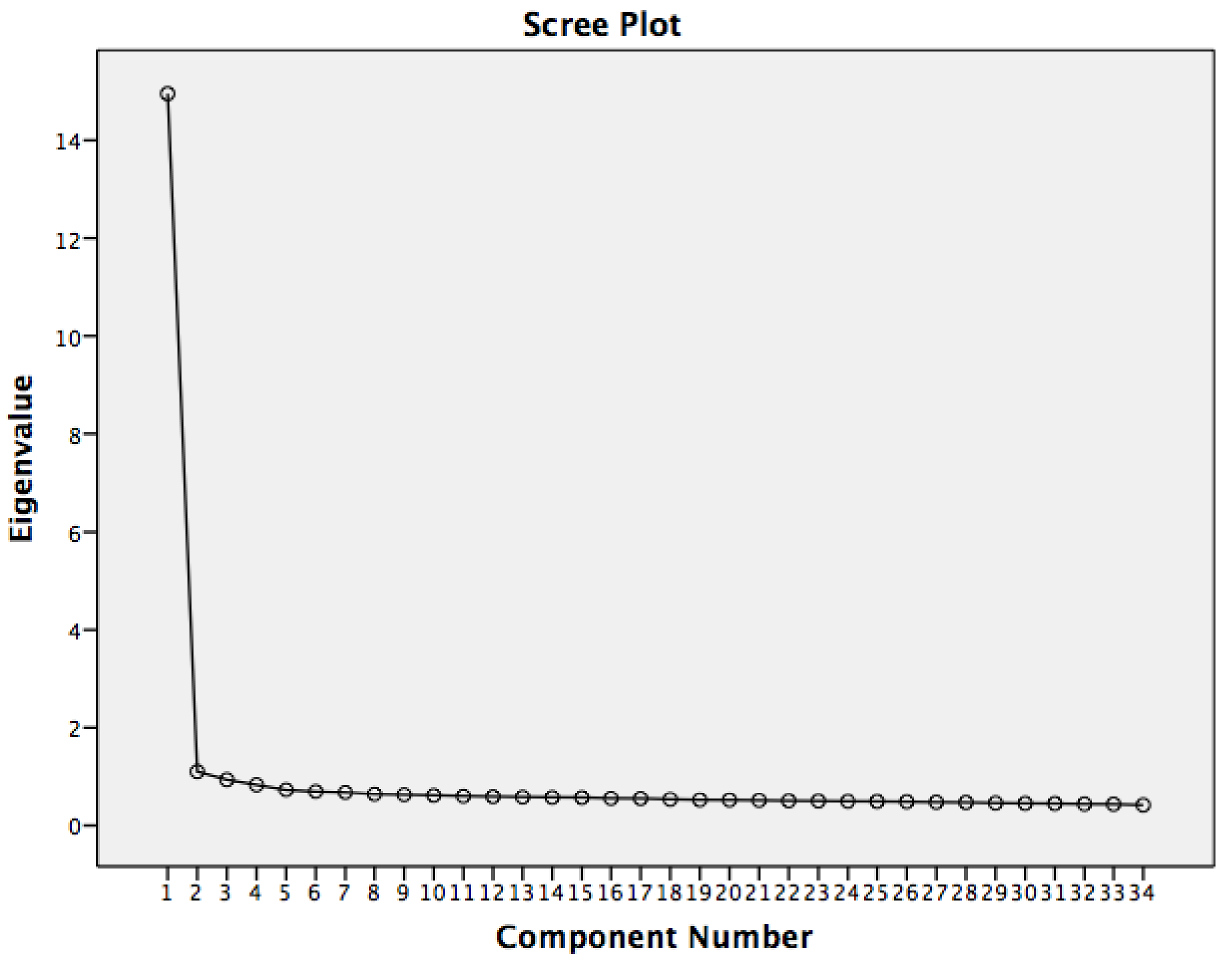

Figure 1. EFA screeplot

Table 4

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotations Sums of Squared Loadings		
Comp.	Total	% Var.	Cum. %	Total	% Var.	Cum. %	Total	% Var.	Cum. %
1	14.948	43.965	43.965	14.948	43.965	43.965	8.725	25.661	25.661
2	1.107	3.256	47.22	1.107	3.256	47.220	7.330	21.559	47.220
3	.941	2.768	49.988						
4	.836	2.46	52.448						
5	.731	2.151	54.6						
6	.698	2.052	56.652						
7	.679	1.997	58.648						
8	.642	1.889	60.538						
9	.631	1.855	62.392						
10	.617	1.814	64.206						
11	.601	1.768	65.974						
12	.591	1.737	67.711						
13	.581	1.708	69.419						
14	.575	1.691	71.11						
15	.571	1.679	72.789						
16	.554	1.63	74.419						
17	.551	1.622	76.041						
18	.534	1.57	77.611						
19	.522	1.536	79.147						
20	.520	1.529	80.677						
21	.513	1.51	82.186						
22	.504	1.482	83.668						
23	.500	1.47	85.138						
24	.494	1.452	86.59						
25	.491	1.443	88.033						
26	.484	1.423	89.457						
27	.475	1.396	90.853						
28	.469	1.381	92.233						
29	.457	1.344	93.577						
30	.450	1.325	94.902						
31	.447	1.313	96.215						
32	.437	1.286	97.502						
33	.434	1.276	98.778						
34	.415	1.222	100						

Note. Comp. = Component. % Var = % of Variance. Cum. % = Cumulative %.

Table 5

Rotated Component Matrix

	Component	
Item	1	2
P1_F	0.678	
P1_E	0.639	
P1_AA	0.637	
P1_A	0.635	
P1_G	0.633	
P1_C	0.599	
P1_D	0.598	
P1_K	0.59	
P1_B	0.589	
P1_L	0.589	
P1_H	0.58	
P1_I	0.569	
P1_FF	0.557	.408
P1_Z	0.551	
P1_M	0.547	.433
P1_Q	0.542	.445
P1_Y	0.538	
P1_HH	0.509	.479
P1_J	0.505	
P1_EE	0.489	0.462
P1_DD	0.471	0.46
P1_GG	0.469	0.434
P1_O		0.701
P1_V		0.672
P1_S		0.649
P1_R		0.642
P1_W		0.631
P1_P		0.607
P1_N		0.597
P1_T		0.589
P1_U		0.587
P1_BB	.437	0.526
P1_CC	.463	0.509
P1_X	.449	0.482

CHAPTER 5

DISCUSSION

The purpose of this study was to assess the internal consistency reliability of the COR Advantage by looking at Cronbach alpha's and the Spearman-Brown coefficients between the different variables of the instrument. Using an exploratory factor analysis to examine the factor structure and then also looking at the reliability estimates of those produced factors would also provide a better understanding of the instrument's reliability.

Cronbach's Alpha

The coefficient Cronbach's alpha is used to estimate the reliability of an instrument. This estimate tells us how much of the total item score variance is due to true score variance (Crocker and Algina, 1986, p. 139). Cronbach alpha can be obtained multiple times on instrument that contains multiple subcategories such as the COR Advantage. Being able to view some of the psychometric properties of an instrument from multiple aspects, so to speak, give a clearer image of where the strong and weak points are, as well as where and how the instrument can be improved.

The results from this study were similar to that of the studies conducted by Schweinhart et al. (1993) and Barghaus and Fantuzzo (2014) on previous versions of the COR. Obtaining a Cronbach coefficient level of .963 for all 34 items indicates a possibility of a psychometrically sound instrument. High coefficient levels are desired when estimating an instrument's reliability, but it is accepted that a reliability coefficient of at least .70 is generally accepted. A rule of thumb regarding alpha coefficient levels that was provided by George and Mallory (2003) states, "_ > .9 – Excellent, _ > .8 – Good, _ > .7 – Acceptable, _ > .6 – Questionable, _ > .5 – Poor, and _ < .5 – Unacceptable" (p. 231). In the study conducted by Schweinhart et al. (1993), alpha coefficients ranged from .72 to .93 for the six developmental domains. In their study, scales with many items tended to have higher coefficients and those with fewer items had lower coefficients. As displayed in Table 1, these results correspond to the results yielded by this study where alpha coefficients ranged from .659 to .848 (Physical Development & Health, 3 items and Language, Literacy, and Communication, 7 items, respectively).

These results enforce the idea that, "the precision of the reliability estimate is directly related to the number of test items" (Nunnally, 1978, p. 243). For these 8 developmental areas having an average of coefficient of .768, ranging from .659 to .848, the ones that really stick out and should be addressed are Approaches to Learning, Social Studies and, most importantly, Physical Development & Health. All 3 of these developmental areas have the lowest number of items (3) as well as the lowest alpha coefficients. With Physical Development & Health only having an alpha coefficient of .659, it's something that should be revised. The best method to rectify these low coefficients is to add more relative items to each of these developmental areas.

In the study conducted by Barghaus and Fantuzzo (2014), all of the factors found in an exploratory factor analysis yielded high internal consistency coefficients, ranging from .89 to .96. These coefficients were very similar to the results of an exploratory factor analysis done in this study where reliability coefficients ranged from .881 to .947.

Spearman-Brown Prophecy Formula

Cronbach's alpha is a commonly accepted coefficient to estimate reliability, but more is needed to get a more accurate picture of the reliability of an instrument. The Spearman-Brown Prophecy formula was used on all of the same variables in the same manner that was used to obtain the multiple Cronbach alphas in this study. Results yielded similar results to that of the Cronbach alphas, the small differences are due to differences in sample variances. Spearman-Brown coefficients ranged from .681 to .858 across the 8 different developmental domains. An examination of the 34 items on the test indicated a Spearman-Brown index of .948. The Spearman-Brown coefficients of the factors produced by the exploratory factor analysis were .873 to .929.

Exploratory Factor Analysis

The Cronbach alpha and Spearman-Brown coefficients produced are indicative of a fairly reliable assessment. Given the relatively small number of items (34), it was not expected that the results of an exploratory factor analysis would yield an 8 factor solution, aligning with the 8 developmental categories. While running an exploratory factor analysis, Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and Bartlett's Test of Sphericity were run to compare correlations to partial correlations and to test for correlations appropriate in a factor analysis. Results of KMO yielded .989, indicating that a lower-dimensional representation of the data is not likely. Based on Kaiser's (1974) characterization of

KMO values, .989 would be classified as 'marvelous.' Bartlett's Test of Sphericity yielded a statistically significant result of $p < .000$. This significant result indicates that the correlations are appropriate to continue on with a factor analysis.

The factor analysis used the default, for SPSS, principal component extraction method, a varimax rotation and only eigenvalues greater than 1 were accepted. Coefficients below .40 were suppressed in order to more clearly see where some of the specific items load. Results of the factor analysis yielded a 2-factor solution. Interpretation of the 2 factors and what items loaded on each were displayed using 2 different methods. One method included cross loadings on the factors and one without them. Under the first method, items that cross-loaded on both factors were included on the factor which the item had a higher loading. Under the second method, items that cross-loaded on both factors were excluded from both factors. The two-factor solution from a rotated exploratory factor analysis explained 47.22% of the variance.

Recommendations

Based on the sample available for this study, it can be concluded the COR Advantage is reliable, with the possible exception of the Physical Development & Health developmental domain. Therefore, this instrument can be recommended for tracking child developments and progress, assist in translating anecdotal reports into a comprehensible language that parents, teachers and administrators can understand, and improve lesson plans and curriculums. If proper items were added to these domains with low alpha coefficients, the coefficients should increase. This process of test evaluation and updates are something that should happen on a regular basis.

The data that was used in this study was taken from one school semester and it was limited only to children aged 36-60 months, preschool. The age of the child and data from multiple semesters should be considered in future studies. This may provide additional insight to the COR Advantage's reliability.

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ABSTRACT

SSESSING THE RELIABILITY OF THE COR ADVANTAGE

by

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Advisor: Dr. Shlomo Sawilowsky

Major: Educational Evaluation and Research

Degree: Master of Education

The purpose of this study is to first assess the internal consistency reliability of the COR Advantage with Cronbach's alpha for the entire scale and the Spearman-Brown prophecy formula for the subscales. The second is to examine the internal factor structure of the eight developmental domains by exploratory factor analysis. Results of the analyses yielded relatively high alpha coefficients ranging from .659 to .963. The exploratory factor analysis produced a two-factor solution that accounted for 47.22% of the variance. These results, with the exception of the Physical Development & Health developmental area having an alpha coefficient of .659, are indicative of a fairly reliable assessment. With an average alpha coefficient of .768, George and Mallery (2003), would classify this assessment as at least "acceptable" (p. 231).

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