A FACTOR ANALYSIS OF THE 32-ITEM CHILD OBSERVATION RECORD (COR)

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Summary/Abstract

This study addresses the identification and validity of constructs for the 32-item Child Observation Record (COR) when used for skill assessments of low-income urban preschool and kindergarten children in Rochester, N.Y. COR scores were collected, and analyzed using factor analysis, for the 2004-05 and 2005-06 school-years. A total 3,932 COR observations were collected for pre-kindergarten students (3 and 4-year-olds). Additionally, a total of 403 kindergarten scores (5-year-olds) were also collected and included in this study.

These analyses yielded the following four-dimensional construct structure for the 32-Item COR:

- Initiative & Social Skills
- Movement & Music
- Math & Science
- Language & Literacy

These 4 skill areas had strong convergence between sample years and worked especially well to discriminate the skill levels of 4-year-olds. While 4-year-olds represented the majority of the sample (77% of the prekindergarten students), these 4 factors also proved be useful to assess the skills for younger and older children. Compared to the results from 4-year-olds, 3-year-old children tended to have "Initiative & Social Relations" and "Movement & Music" skills more closely tied together. Also, compared to 4-year-olds, 5-year-olds tended to have "Language & Literacy" and "Math & Science" skills more closely related.

A series of internal and external validity tests were completed on these factors. The final factors showed significant internal reliability with Cronbach Alpha values ranging from 0.85 to 0.90. To help examine construct validity, a confirmatory analysis using maximum likelihood estimation was performed. CFA results indicated that 3 of the 4 constructs had good fit as measured by RMSEA (root mean square error of approximation). The fourth construct, "Movement and Music" had a slightly poorer fit.

An equating analysis, determined that this new 32-Ytem COR was highly correlated with a previous 30-Item measure (r=0.89).

Introduction

The Preschool Child Observation Record (COR) is an observational instrument that provides well-rounded, systematic assessments in programs serving children from the ages of 2 ½ to 6 years (COR User Guide, High/Scope Educational Research Foundation, published by High/Scope Press, 2003).

The authors of the High/Scope 32-Item COR originally identified 32 items for preschool development categorized into six categories: initiative; social relations; creative representation, movement and music; language and literacy; and mathematics and science (High/Scope, 2003).

The purpose of this study was to examine whether these six factors adequately captured the teacher's assessments of low-income urban preschoolers (ages 3-5). In addition to developing and testing COR constructs, another goal of these analyses was to reduce, if possible, the number of COR items that a teacher would be required assess. 3,932 fall COR-32 observations were collected over a 2-year span for pre-kindergarten students. The pre-kindergarten sample included 77% 4-year-olds and 22% 3-year-olds. In addition, 403 kindergarten 32-item COR scores were collected in the fall of 2005-06, of which 82% were 5-year-olds.

Participants

Pre-kindergarten Students

Table 1 below shows the distribution of age, Race/Ethnicity, and gender in the fall 2004-05 and fall 2005-06 prekindergarten samples.

32-Item COR scores were collected for 2,037 Pre-k students in the fall of 2004-05 and 1,895 were collected in the fall of 2005-06. 77% of the students were 4-year-olds when the fall observations were conducted in both samples. There were 132 pre-k teachers performing the 2004-05 observations and 129 pre-k teachers completing the 2005-06 observations.

Table 1
Pre-Kindergarten Student Demographics

	Fall 2004-05		Fall 2005-06	
Demographic	**Frequency**	**Percent***	**Frequency**	**Percent***
Age				
2	10	0.5%	20	1.1%
3	458	22.7	408	21.8
4	1,545	76.5	1,436	76.8
5	6	0.3	7	0.4
6	0	0.0	20	1.1
Age Missing	18	---	24	---
Total Non-Missing	2,019	---	1,871	---
Race/Ethnicity				
Black	1,193	62.1	1,077	61.0
Hispanic	307	16.0	324	18.3
White	300	15.6%	267	15.1%
Other	120	6.3	99	5.6
Race/Ethnicity Missing	117	---	128	---
Total Non-Missing	1,920	---	1,767	---
Gender				
Boys	971	47.7%	953	50.3%
Girls	1,066	52.3	941	49.7
Gender Missing	0	---	1	---
Total Non-Missing	1,066	---	1,894	---
Total Students	2,037	---	1,895	---

Note: * Percent is derived from the Total Non-Missing for each of the demographic characteristics.

Kindergarten Students

32-Item COR scores were also collected for 403 kindergarten students in the fall of 2005-06. Table 2 below shows the demographics for these students. Of the 403 kindergartners, 82% percent of these students were 5 years old when the observations were performed. There were 32 different teachers performing the 403 fall 2005-06 kindergarten observations.

Table 2
Fall 2005-06
Kindergarten Student Demographics

Demographic	Frequency	Percent*
Age		
4	39	13.5%
5	237	82.0
6	11	3.8
Age Missing	114	---
Total Non-Missing	289	---
Race/Ethnicity		
Black	235	58.6
Hispanic	84	21.0
White	71	17.7%
Other	11	2.7
Race/Ethnicity Missing	2	---
Total Non-Missing	401	---
Gender		
Boys	198	49.1%
Girls	205	50.9
Gender Missing	2	---
Total Non-Missing	401	---
Total Students	403	---

Note: * Percent is derived from the Total Non-Missing for each of the demographic characteristics.

Missing Values in the COR Observations

All COR items were not completed by the teachers for each observation. Observations that have even one missing item are ignored by factor analysis. This is why it is important to analyze whether our results might be different if all data were collected. In other words, it should be examined whether the observations with missing data are different than the observations that were complete.

Looking at Table 3 below, overall about 88% of the COR data was complete for all 32 items, for all ages of students combined in 2004-05, and 89% in 2005-06. These overall percentages include both Pre-k and Kindergarten observations. These statistics are quite favorable when compared to the reported findings in 2003 by the High/Scope Educational Foundation in their COR User Guide, Appendix A: Statistical Findings for the Preschool Child Observation Record

(COR). They reported 41% with all items present for 160 observations and 26% with all items present for 233 observations in their two studies.

Table 3
Number of COR Observations with Missing Items
Combining Pre-kindergarten and Kindergarten Data

	Fall 2004-05		Fall 2005-06	
	Number Observations	Percent*	Number Observations	Percent*
For All Ages Combined				
w/all 23 Items	1,818	89.0%	2,117	92.1%
w/all 32 Items	1,794	88.0%	2,044	89.0%
Total Observations	2,037	---	2,298	---
4-year-olds Only				
w/all 23 Items	1,396	90.4%	1,349	93.9%
w/all 32 Items	1,373	88.9%	1,313	91.4%
Total Observations	1,545	---	1,436	---
3-year-olds Only				
w/all 23 Items	392	85.6%	346	84.8%
w/all 32 Items	391	85.4%	337	82.6%
Total Observations	458	---	408	---
5-year-olds Only (Kindergarten)				
w/all 23 Items	NA	NA	225	94.9%
w/all 32 Items	NA	NA	221	93.3%
Total Observations	NA	NA	237	---

Notes: * Percent is derived from the total number by age group.
NA means not collected and therefore not available.

To test whether the observations with missing data were different than the observations that were complete, the factor analyses reported earlier were rerun. They were rerun for all age groups, with the missing values replaced by an imputing technique (replaced missing values with series means).

After replacing the missing values with imputed values, in all cases, very similar factor structures and loadings were seen, just as when the analyses had been run using missing values. For 4-yeare-olds, the results were identical in factor makeup and almost identical in the factor loadings for both the 2004-05 and 2005-06 cohorts. For 4-year-olds, when comparing the results using missing values and imputed values, the biggest differences in the loading factors were +/-.04 in the 2004-05 data and +/-.01 in 2005-06.

For 3-year-olds and 5-year-olds, when comparing the results using missing values and imputed values, the resulting factor structures were close but not as exact as for 4-year-olds.

Chi-square tests were conducted to see if there were differences in the student's demographic characteristics for the observations with missing data compared to the observations that were complete. Chi-square tests were performed for both the 2004-05 and 2005-06 cohorts separately, comparing the gender and Race/Ethnicity between groups. In all tests but one, these differences

between groups were not found to be significant. In the 2004-05 data, Race/Ethnicity differences for the 3-year-olds only was found to be significant (Pearson χ^2 =18.48, Pr(t) <= .001 using 23 item set, Pearson χ^2 =17.61, Pr(t) <= .001 using 32 item set). It is not clear as to what actually caused this result.

Exploratory Factor Analysis

Exploratory factor analyses were conducted across two independent years of 32-Item COR data. The initial phase of the investigation tested the construct validity of the six factors. The authors of the 32-item measure originally designed 6 categories of items within the measure (COR User Guide, High/Scope Educational Research Foundation, published by High/Scope Press, 2003). After the initial phase, additional analyses focused on alternative factor structures, and also which items might be deleted. Deleting items was desirable both to improve factor convergence between samples, and also to lessen the time and effort required by the classroom teachers to complete an assessment.

Principle Component Analysis (PCA) was the main factor analysis extraction method used, with the Varimax rotation method. Maximum Likelihood and Image techniques were also used both in the exploratory and validation stages of the study.

Because the sample included almost 2,000 fall observations for both 2004-05 and 2005-06, factor analysis techniques were applied to each cohort individually and the results were then compared looking for consistency across both years, across different age groups, and using different factor analysis techniques.

In the early stages of the analyses, it was observed that 3, 4, and 5-year-olds had quite a different makeup of COR factors. However, the main focus of this factor analysis was 4-year old children.

Initial Analyses Results Using All 32 COR Items

The early investigation included performing factor analyses with the following combinations of parameters:

- Trying 2-factor through 6-factor possible solutions.
- Using 3 different factor analysis techniques.
- Grouping the pre-k student samples into different age groups; all together and then separately as 3-year-old and 4-year-olds.
- Combining 2 independent years of data and then analyzing 2 years separately.
- Using all 32 Items in the COR.

After assessing a wide range of results from the variables listed above, it was decided at least at first, to focus, on only 4-year-olds. Four year-olds represented the majority of our pre-k student population (77%). Tables 4 through 7 below display the results for 4-year-olds for both 4-factor and 3-factor constructs, and for each of the 2 different years.

From the early results, the best factor convergence was found using either for 4-factors or 3-factors. However, when comparing the results between our two years of data, the solution was narrowed down to a 4-factor solution being the most consistent. What was seen in these initial results was that while the 4-factor solution appeared to be the most consistent when using all 32 items, the factors still changed from 1 year to the next. Also, there appeared to be quite a bit of double and triple loading of the items on these factors.

Factor Loading Tables

Tables 4 through 7 below show the results for 4-year-olds using both 4-factor and 3-factor constructs, and for each of the 2 different years.

Table 4
Analysis Using All 32 COR Items – 4-year-olds Only
Principle Component Analysis Technique - Varimax Rotation - 4 Factors
Fall 2004-2005
N=1,373; Mean Age=4.46

Factor loadings >=0.40 are highlighted	Factor1	Factor2	Factor3	Factor4
P. Singing	0.74	0.20	0.13	0.33
N. Feeling and expressing beat	0.67	0.05	0.28	0.17
L. Moving in various ways	0.63	0.39	0.24	0.08
O. Moving to music	0.62	0.25	0.16	0.30
K. Pretending	0.59	0.28	0.39	0.15
U. Demonstrating knowledge about books	0.58	0.29	0.24	0.28
Q. Listening to & understanding speech	0.55	0.37	0.36	0.18
S. Using complex patterns of speech	0.53	0.43	0.39	0.14
M. Moving with objects	0.49	0.26	0.30	0.06
J. Drawing and painting pictures	0.47	0.15	0.30	0.42
R. Using vocabulary	0.46	0.44	0.39	0.29
EE. Identifying materials & properties	0.24	0.76	0.23	0.23
DD. Identifying sequence change & causality	0.26	0.73	0.28	0.26
FF. Identifying natural & living things	0.21	0.73	0.18	0.21
CC. Identifying position & direction	0.32	0.68	0.20	0.28
AA. Comparing properties	0.30	0.68	0.30	0.27
T. Showing awareness of sounds in words	0.32	0.55	0.15	0.47
Z. Identifying patterns	0.05	0.45	0.43	0.43
G. Resolving interpersonal conflict	0.12	0.23	0.72	0.18
B. Solving problems with material	0.27	0.11	0.63	0.25
E. Relating to adults	0.44	0.13	0.61	0.15
D. Taking care of personal needs	0.29	0.19	0.61	0.16
F. Relating to other children	0.54	0.21	0.54	0.10
C. Initiating play	0.47	0.29	0.54	0.08
A. Making choices and plans	0.41	0.40	0.51	0.08
I. Making and building models	0.28	0.34	0.51	0.29
H. Understanding & expressing feelings	0.34	0.31	0.49	0.19
X. Writing	0.19	0.09	0.17	0.80
V. Using letter names and sounds	0.14	0.38	0.10	0.70
BB. Counting	0.21	0.37	0.26	0.56
W. Reading	0.28	0.32	0.17	0.51
Y. Sorting objects	0.24	0.44	0.34	0.48
Percentage of Variance Explained	17.7%	16.6%	14.8%	11.2%

Table 5 Analysis Using All 32 COR Items – 4-year-olds Only Fall 2005-2006 Principle Component Analysis Technique - Varimax Rotation - 4 Factors N=1,313; Mean Age=4.44 years				
Factor loadings >=0.40 are highlighted	**Factor1**	**Factor2**	**Factor3**	**Factor4**
C. Initiating play	0.77	0.16	0.15	0.19
F. Relating to other children	0.68	0.22	0.09	0.31
A. Making choices and plans	0.66	0.32	0.22	0.21
E. Relating to adults	0.66	0.26	0.12	0.28
G. Resolving interpersonal conflict	0.64	0.12	0.34	0.09
B. Solving problems with material	0.64	0.21	0.18	0.19
K. Pretending	0.62	0.22	0.31	0.31
D. Taking care of personal needs	0.62	0.11	0.20	0.38
H. Understanding & expressing feelings	0.58	0.28	0.28	0.19
I. Making and building models	0.51	0.24	0.37	0.29
R. Using vocabulary	0.51	0.39	0.34	0.31
S. Using complex patterns of speech	0.48	0.44	0.11	0.42
V. Using letter names and sounds	0.12	0.73	0.34	0.21
X. Writing	0.26	0.71	0.23	0.06
T. Showing awareness of sounds in words	0.22	0.62	0.42	0.25
BB. Counting	0.34	0.59	0.23	0.28
W. Reading	0.33	0.57	0.30	0.09
J. Drawing and painting pictures	0.43	0.47	0.18	0.30
U. Demonstrating knowledge about books	0.32	0.42	0.25	0.40
AA. Comparing properties	0.29	0.27	0.73	0.16
FF. Identifying natural & living things	0.18	0.19	0.73	0.22
DD. Identifying sequence change & causality	0.28	0.37	0.67	0.22
EE. Identifying materials & properties	0.20	0.36	0.67	0.25
Y. Sorting objects	0.41	0.26	0.58	0.25
CC. Identifying position & direction	0.21	0.44	0.51	0.42
Z. Identifying patterns	0.21	0.47	0.49	0.23
N. Feeling and expressing beat	0.27	0.26	0.15	0.74
O. Moving to music	0.18	0.13	0.38	0.69
L. Moving in various ways	0.30	0.13	0.27	0.68
M. Moving with objects	0.27	0.11	0.23	0.63
P. Singing	0.39	0.24	0.08	0.62
Q. Listening to & understanding speech	0.31	0.50	0.15	0.51
Percentage of Variance Explained	19.6%	14.4%	13.7%	13.7%

Table 6 Analysis Using All 32 COR Items – 4-year-olds Only Fall 2004-2005 Principle Component Analysis Technique - Varimax Rotation - 3 Factors N=1,373; Mean Age=4.46 years			
Factor loadings >=0.40 are highlighted	**Factor1**	**Factor2**	**Factor3**
F. Relating to other children	0.74	0.24	0.15
E. Relating to adults	0.71	0.21	0.15
C. Initiating play	0.69	0.32	0.11
K. Pretending	0.68	0.26	0.25
N. Feeling and expressing beat	0.66	0.01	0.33
S. Using complex patterns of speech	0.64	0.41	0.22
A. Making choices and plans	0.64	0.43	0.09
Q. Listening to & understanding speech	0.63	0.35	0.27
L. Moving in various ways	0.62	0.31	0.22
D. Taking care of personal needs	0.60	0.30	0.11
P. Singing	0.59	0.12	0.53
B. Solving problems with material	0.58	0.25	0.18
R. Using vocabulary	0.57	0.47	0.32
H. Understanding & expressing feelings	0.56	0.38	0.17
U. Demonstrating knowledge about books	0.55	0.26	0.39
M. Moving with objects	0.55	0.23	0.15
G. Resolving interpersonal conflict	0.54	0.40	0.04
O. Moving to music	0.53	0.19	0.45
I. Making and building models	0.51	0.44	0.23
J. Drawing and painting pictures	0.50	0.19	0.47
EE. Identifying materials & properties	0.31	0.76	0.22
DD. Identifying sequence change & causality	0.35	0.74	0.24
FF. Identifying natural & living things	0.25	0.72	0.20
AA. Comparing properties	0.39	0.69	0.27
CC. Identifying position & direction	0.34	0.67	0.30
Z. Identifying patterns	0.27	0.59	0.30
T. Showing awareness of sounds in words	0.28	0.57	0.49
Y. Sorting objects	0.35	0.53	0.43
X. Writing	0.15	0.22	0.75
V. Using letter names and sounds	0.09	0.46	0.66
BB. Counting	0.26	0.46	0.52
W. Reading	0.26	0.37	0.51
Percentage of Variance Explained	26.2%	18.9%	12.1%

Table 7 Analysis Using All 32 COR Items – 4-year-olds Only Fall 2005-2006 Principle Component Analysis Technique - Varimax Rotation - 3 Factors N=1,313; Mean Age=4.44 years			
Factor loadings >=0.40 are highlighted	**Factor1**	**Factor2**	**Factor3**
DD. Identifying sequence change & causality	0.73	0.29	0.25
EE. Identifying materials & properties	0.72	0.20	0.28
V. Using letter names and sounds	0.72	0.19	0.21
AA. Comparing properties	0.71	0.28	0.20
T. Showing awareness of sounds in words	0.71	0.26	0.26
Z. Identifying patterns	0.67	0.23	0.25
FF. Identifying natural & living things	0.66	0.16	0.25
CC. Identifying position & direction	0.65	0.23	0.44
X. Writing	0.63	0.33	0.07
Y. Sorting objects	0.58	0.40	0.28
W. Reading	0.58	0.38	0.10
BB. Counting	0.55	0.40	0.28
U. Demonstrating knowledge about books	0.44	0.36	0.41
C. Initiating play	0.19	0.77	0.20
F. Relating to other children	0.19	0.70	0.31
A. Making choices and plans	0.35	0.68	0.22
E. Relating to adults	0.23	0.67	0.29
B. Solving problems with material	0.25	0.65	0.20
G. Resolving interpersonal conflict	0.31	0.63	0.11
K. Pretending	0.34	0.62	0.32
D. Taking care of personal needs	0.19	0.61	0.39
H. Understanding & expressing feelings	0.37	0.59	0.20
R. Using vocabulary	0.48	0.53	0.32
S. Using complex patterns of speech	0.34	0.53	0.43
I. Making and building models	0.41	0.52	0.31
J. Drawing and painting pictures	0.42	0.47	0.30
N. Feeling and expressing beat	0.26	0.29	0.74
O. Moving to music	0.34	0.17	0.71
L. Moving in various ways	0.26	0.29	0.69
M. Moving with objects	0.22	0.27	0.64
P. Singing	0.19	0.41	0.62
Q. Listening to & understanding speech	0.42	0.36	0.51
Percentage of Variance Explained	23.0%	20.9%	14.4%

Final Results for a Reduced Set of 23 COR Items

On the basis of our findings from analyzing all 32 COR items together and comparing results across 2 years, and 3 factor analysis techniques, we were able to eliminate 9 items. After eliminating these items that were either inconsistently loading on different factors, or were found to have little impact on factor makeup, 23 items remained. A final four-dimensional structure for four year olds was found using the principle component analysis technique which had strong factor convergence, and consistency across both sample years. The final 4 factors and their items were:

I. Initiative & Social Relations

A. Making choices and plans
B. Solving problems with materials
C. Initiating play
D. Taking care of personal needs
E. Relating to adults
F. Relating to other children
G. Resolving interpersonal conflict
H. Understanding & expressing feelings

II. Movement & Music

L. Moving in various ways
M. Moving with objects
N. Feeling and expressing steady beat
O. Moving to music
P. Singing

III. Language & Literacy

T. Showing awareness of sounds in words
V. Using letter names and sounds
W. Reading
X. Writing
BB. Counting

IV. Math & Science

AA. Comparing properties
CC. Identifying position & direction
DD. Identifying sequence change & causality
EE. Identifying materials & properties
FF. Identifying natural & living things

Factor Loading Tables

Table 8 and 9 below show the final factor loadings for 4-year-olds across two years using a reduced set of 23 items and 4 factors. The result is a relatively stable structure with little double-loading across factors and with consistency across 2 independent years of data. It can be seen in these tables that a simple structure 4 factor solution works well for 4-year-olds.

Table 8
Analysis Using a Reduced Set of 23 COR Items – 4-year-olds Only
Fall 2004-05
Principle Component Analysis Technique - Varimax Rotation - 4 Factors
N=1,396; Mean Age=4.46 years

Factor loadings >=0.40 are highlighted	Initiative & Social	Math & Science	Movement & Music	Language & Literacy
G. Resolving interpersonal conflict	0.72	0.28	0.00	0.17
E. Relating to adults	0.70	0.13	0.30	0.18
F. Relating to other children	0.66	0.21	0.37	0.14
B. Solving problems with materials	0.64	0.15	0.21	0.24
D. Taking care of personal needs	0.63	0.22	0.24	0.14
C. Initiating play	0.60	0.31	0.34	0.10
A. Making choices and plans	0.60	0.40	0.30	0.10
H. Understanding & expressing feelings	0.52	0.33	0.27	0.21
EE. Identifying materials & properties	0.24	0.77	0.20	0.22
DD. Identifying sequence change & causality	0.31	0.75	0.20	0.26
FF. Identifying natural & living things	0.24	0.75	0.12	0.21
CC. Identifying position & direction	0.23	0.70	0.28	0.27
AA. Comparing properties	0.34	0.69	0.24	0.27
T. Showing awareness of sounds in words	0.16	0.54	0.32	0.49
O. Moving to music	0.20	0.24	0.69	0.31
P. Singing	0.29	0.18	0.66	0.36
L. Moving in various ways	0.33	0.39	0.64	0.07
M. Moving with objects	0.27	0.29	0.62	-0.02
N. Feeling and expressing steady beat	0.45	0.04	0.59	0.19
X. Writing	0.21	0.12	0.09	0.81
V. Using letter names and sounds	0.09	0.39	0.15	0.71
W. Reading	0.29	0.30	0.14	0.56
BB. Counting	0.22	0.40	0.26	0.52
Percentage of Variance Explained	18.8%	18.6%	13.5%	12.1%

Table 9 Analysis Using a Reduced Set of 23 COR Items – 4-year-olds Only Fall 2005-2006 Principle Component Analysis Technique - Varimax Rotation - 4 Factors N=1,349; Mean Age=4.44 years				
Factor loadings >=0.40 are highlighted	**Initiative & Social**	**Math & Science**	**Movement & Music**	**Language & Literacy**
C. Initiating play	0.76	0.13	0.20	0.18
F. Relating to other children	0.70	0.14	0.29	0.20
A. Making choices and plans	0.69	0.25	0.22	0.29
G. Resolving interpersonal conflict	0.67	0.35	0.10	0.09
E. Relating to adults	0.67	0.13	0.29	0.23
B. Solving problems with materials	0.65	0.14	0.22	0.23
D. Taking care of personal needs	0.61	0.16	0.40	0.15
H. Understanding & expressing feelings	0.59	0.33	0.19	0.20
FF. Identifying natural & living things	0.19	0.76	0.19	0.18
AA. Comparing properties	0.28	0.72	0.18	0.27
EE. Identifying materials & properties	0.21	0.70	0.24	0.34
DD. Identifying sequence change & causality	0.29	0.67	0.23	0.36
CC. Identifying position & direction	0.23	0.56	0.40	0.38
N. Feeling and expressing steady beat	0.26	0.14	0.76	0.29
O. Moving to music	0.18	0.36	0.70	0.13
L. Moving in various ways	0.31	0.29	0.67	0.08
M. Moving with objects	0.25	0.20	0.66	0.12
P. Singing	0.38	0.06	0.65	0.27
V. Using letter names and sounds	0.13	0.33	0.23	0.75
X. Writing	0.25	0.21	0.10	0.75
W. Reading	0.33	0.24	0.13	0.60
T. Showing awareness of sounds in words	0.23	0.45	0.25	0.58
BB. Counting	0.37	0.24	0.28	0.57
Percentage of Variance Explained	20.2%	15.2%	15.0%	13.9%

Tables 10 and 11 below show the final factor loadings for 3-year-olds across two years using the same 23 items and 4 factors as for 4-year-olds.

Table 10

Analysis Using a Reduced Set of 23 COR Items – 3-year-olds Only
Fall 2004-05
Principle Component Analysis Technique - Varimax Rotation - 4 Factors
N=392; Mean Age=3.52 years

Factor loadings >=0.40 are highlighted	Factor1	Factor2	Factor3	Factor4
C. Initiating play	0.81	0.24	0.15	0.17
E. Relating to adults	0.80	0.30	0.04	0.09
D. Taking care of personal needs	0.79	0.29	0.07	0.01
A. Making choices and plans	0.76	0.38	0.13	0.10
F. Relating to other children	0.76	0.33	0.24	0.05
B. Solving problems with materials	0.73	0.36	0.03	0.15
N. Feeling and expressing steady beat	0.72	0.14	0.43	0.22
M. Moving with objects	0.68	0.31	0.23	-0.08
G. Resolving interpersonal conflict	0.68	0.16	0.05	0.48
O. Moving to music	0.66	0.24	0.50	0.22
L. Moving in various ways	0.66	0.43	0.35	-0.11
H. Understanding & expressing feelings	0.60	0.35	0.17	0.40
FF. Identifying natural & living things	0.27	0.81	0.07	0.20
EE. Identifying materials & properties	0.28	0.78	0.25	0.18
AA. Comparing properties	0.42	0.78	0.15	0.05
W. Reading	0.34	0.75	0.17	0.15
CC. Identifying position & direction	0.44	0.74	0.19	0.10
DD. Identifying sequence change & causality	0.42	0.73	0.06	0.25
BB. Counting	0.38	0.67	0.23	0.10
V. Using letter names and sounds	0.01	0.61	0.51	0.30
T. Showing awareness of sounds in words	0.28	0.58	0.55	0.08
P. Singing	0.55	0.37	0.58	0.04
X. Writing	0.09	0.48	0.13	0.72
Percentage of Variance Explained	33.1%	26.7%	8.1%	6.0%

Table 11 Analysis Using a Reduced Set of 23 COR Items – 3-year-olds Only Fall 2005-06 Principle Component Analysis Technique - Varimax Rotation - 4 Factors N=346; Mean Age=3.53 years				
Factor loadings >=0.40 are highlighted	**Factor1**	**Factor2**	**Factor3**	**Factor4**
F. Relating to other children	0.77	0.31	0.11	0.27
D. Taking care of personal needs	0.75	0.10	0.21	0.25
H. Understanding & expressing feelings	0.75	0.28	0.24	0.16
C. Initiating play	0.74	0.28	0.04	0.30
A. Making choices and plans	0.72	0.32	0.10	0.29
E. Relating to adults	0.72	0.24	0.21	0.29
G. Resolving interpersonal conflict	0.67	0.23	0.33	0.12
B. Solving problems with materials	0.66	0.25	0.32	0.29
P. Singing	0.55	0.18	0.36	0.41
FF. Identifying natural & living things	0.26	0.83	0.24	0.08
DD. Identifying sequence change & causality	0.36	0.77	0.32	0.06
AA. Comparing properties	0.29	0.76	0.27	0.14
EE. Identifying materials & properties	0.16	0.68	0.47	0.27
CC. Identifying position & direction	0.33	0.61	0.42	0.27
X. Writing	0.11	0.27	0.79	0.06
V. Using letter names and sounds	0.15	0.34	0.75	0.10
W. Reading	0.26	0.20	0.71	0.16
BB. Counting	0.33	0.29	0.60	0.27
T. Showing awareness of sounds in words	0.24	0.40	0.53	0.38
M. Moving with objects	0.32	0.23	0.05	0.80
L. Moving in various ways	0.45	0.19	0.17	0.66
N. Feeling and expressing steady beat	0.47	0.07	0.34	0.60
O. Moving to music	0.48	0.00	0.33	0.56
Percentage of Variance Explained	25.9%	16.6%	16.2%	12.4%

Table 12 shows the final factor loadings for 5-year-olds across for 2005-06 data, and using a reduced set of 23 items and 4 factors.

Table 12 Analysis Using a Reduced Set of 23 COR Items – 5-year-olds Only (Kindergarten) Fall 2005-06 Principle Component Analysis Technique - Varimax Rotation - 4 Factors N=225; Mean Age=5.46 years				
Factor loadings >=0.40 are highlighted	**Factor1**	**Factor2**	**Factor3**	**Factor4**
FF. Identifying natural & living things	0.89	0.15	0.12	0.22
EE. Identifying materials & properties	0.85	0.27	0.30	0.00
DD. Identifying sequence change & causality	0.85	0.32	0.24	0.03
AA. Comparing properties	0.85	0.32	0.23	0.08
CC. Identifying position & direction	0.80	0.30	0.13	0.32
BB. Counting	0.75	0.32	0.30	0.26
X. Writing	0.70	0.41	0.24	0.26
W. Reading	0.64	0.52	0.15	0.22
T. Showing awareness of sounds in words	0.59	0.56	0.33	0.07
E. Relating to adults	0.23	0.80	0.20	0.32
F. Relating to other children	0.23	0.78	0.17	0.35
C. Initiating play	0.24	0.77	0.22	0.21
G. Resolving interpersonal conflict	0.31	0.76	0.22	0.06
D. Taking care of personal needs	0.22	0.70	0.34	0.31
H. Understanding & expressing feelings	0.42	0.69	0.29	0.21
B. Solving problems with material	0.52	0.68	0.17	0.06
A. Making choices and plans	0.47	0.68	0.38	0.05
V. Using letter names and sounds	0.45	0.65	0.40	-0.08
O. Moving to music	0.26	0.30	0.84	0.24
N. Feeling and expressing steady beat	0.27	0.32	0.81	0.21
P. Singing	0.37	0.34	0.67	0.31
L. Moving in various ways	0.25	0.33	0.41	0.73
M. Moving with objects	0.26	0.34	0.46	0.64
Percentage of Variance Explained	30.6%	28.3%	14.7%	8.2%

Factors by Age Group

In Tables 8 and 9 above, we observed that 4 skill constructs and a reduced set of 21 items worked well to discriminate the skill levels of 4-year-olds. However, in Tables 10 through 12, it observed that 3-year-olds and 5-year-olds appear to have a different set of factors.

Tables 13 and 14 below, show the relationships between the 4 COR factors by age group. It can be seen in Table 13 that the two factors that had the highest correlation coefficient (r) for 3-year-olds was between "Initiative & Social Relations" and "Movement & Music" skills at 0.79. Compared to 4-year-olds, 3-year-olds tended to have these 2 factors move more closely tied together (more like a 3 factor structure).

Also, in Table 13, it can be seen that the highest correlation coefficient for 5-year-olds was 0.85 between the "Language & Literacy" and "Math & Science" skills. Compared to 3-year-olds and

4-year-olds, 5-year-olds tended to have these 2 factors move more closely tied together. Table 14 expresses these same correlations seen in Table 13, but as the percentage of variance in factors that are explained by each of the other factors (r-squared).

Table 13
Pearson Correlation Coefficients Between Factors By Age Group
Fall 2005-06 Data [2]

		Four COR Factors**				
Four COR Factors	**Age Group**	**Initiative & Social**	**Movement & Music**	**Language & Literacy**	**Math & Science**	**COR Total**
Initiative & Social	3	1.00	0.79*	0.62	0.69	0.93
	4	1.00	0.70	0.68	0.66	0.90
	5	1.00	0.77	0.83	0.71	0.93
Movement & Music	3		1.00	0.65	0.60	0.87
	4		1.00	0.62	0.65	0.84
	5		1.00	0.74	0.64	0.86
Language & Literacy	3			1.00	0.76	0.83
	4			1.00	0.76*	0.87
	5			1.00	0.85*	0.94
Math & Science	3				1.00	0.85
	4				1.00	0.87
	5				1.00	0.94
COR Total	3					1.00
	4					1.00
	5					1.00

Notes: * Highest 2-way inter-correlation for that age group (not including COR Total).
** All correlation coefficients were significant at Pr(t) <=.001.
[2] Signifies that the number observations ranged from 402 to 408 for 3-year-olds, 1,429 to 1,436 for 4-year-olds, and n=237 for 5-year-olds

Table 14 Percentage of Factor Variance in Factors Explained (Correlation Coefficient r-Squared) By Factor and Age Group Fall 2005-06 Data [2]						
		Four COR Factors**				
Four COR Factors	**Age Group**	**Initiative & Social**	**Movement & Music**	**Language & Literacy**	**Math & Science**	**COR Total**
Initiative & Social	3	1.00	0.62*	0.38	0.48	0.86
	4	1.00	0.49	0.46	0.44	0.81
	5	1.00	0.59	0.69	0.50	0.86
Movement & Music	3		1.00	0.42	0.36	0.76
	4		1.00	0.38	0.42	0.71
	5		1.00	0.55	0.41	0.74
Language & Literacy	3			1.00	0.58	0.69
	4			1.00	0.58*	0.76
	5			1.00	0.72*	0.88
Math & Science	3				1.00	0.72
	4				1.00	0.76
	5				1.00	0.88
COR Total	3					1.00
	4					1.00
	5					1.00

Notes: * Highest 2-way inter-correlation for that age group (not including COR Total).
**All correlation coefficients were significant at Pr(t) <=.001.
[2] Signifies that the number of observations ranged from 402 to 408 for 3-year-olds, 1,429 to 1,436 for 4-year-olds, and n=237 for 5-year-olds)

Figure 1 below shows the same correlation coefficients as in Table 13, but in graphical form. Figure 1 illustrates the relative degree of correlation between factors for each age group. For three-year-olds, the "Initiative & Social" and "Movement & Music" (r=0.79) factors seemed to move together compared to 4-year-olds. This tendency for two factors to move together may be explained as younger children have fewer skills.

Compared to 3 and 4-year-olds, 5-year-olds tended to have "Language & Literacy" and "Math & Science" skills that were more highly related (comparing r=0.85 for 5-year-olds to r=0.76 for 3 and 4-year-olds).

The relationships between the 4 factors by age group are also shown in Figure 2 below. Figure 2 graphically shows the mean scores of the 4 COR factors by age group for the fall of 2005-06.

Because it is not really practical to have different sets of COR factors for 3 different age groups and because 77% of the Rochester, New York prekindergarten students are 4-year-olds, the best compromise and best fit across all age groups appears to be a 4 factor set solution for use with Rochester students in prekindergarten.

Figure 1 Relationship of the 4 COR Factors (Correlation Coefficient r) by Age Group.

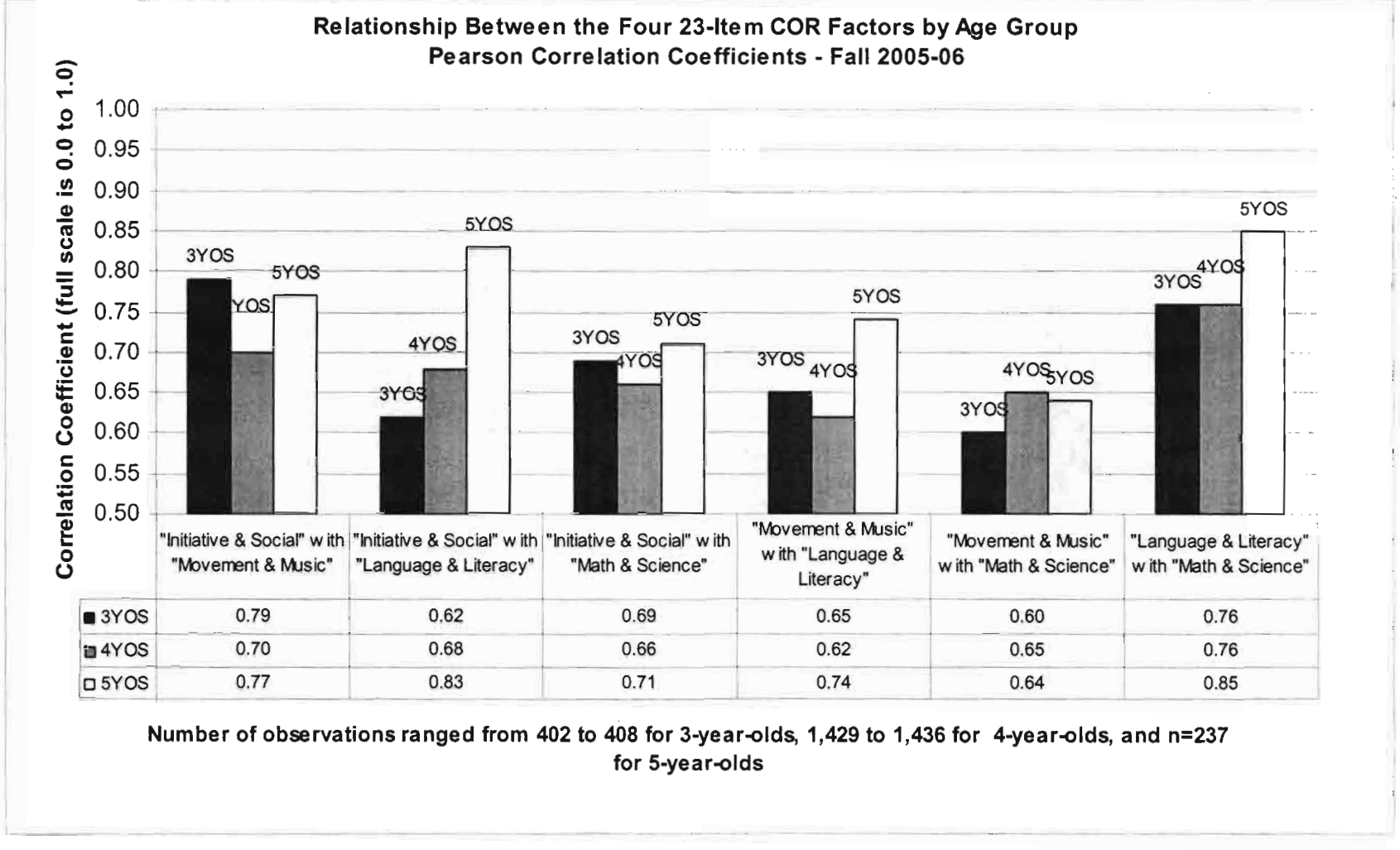
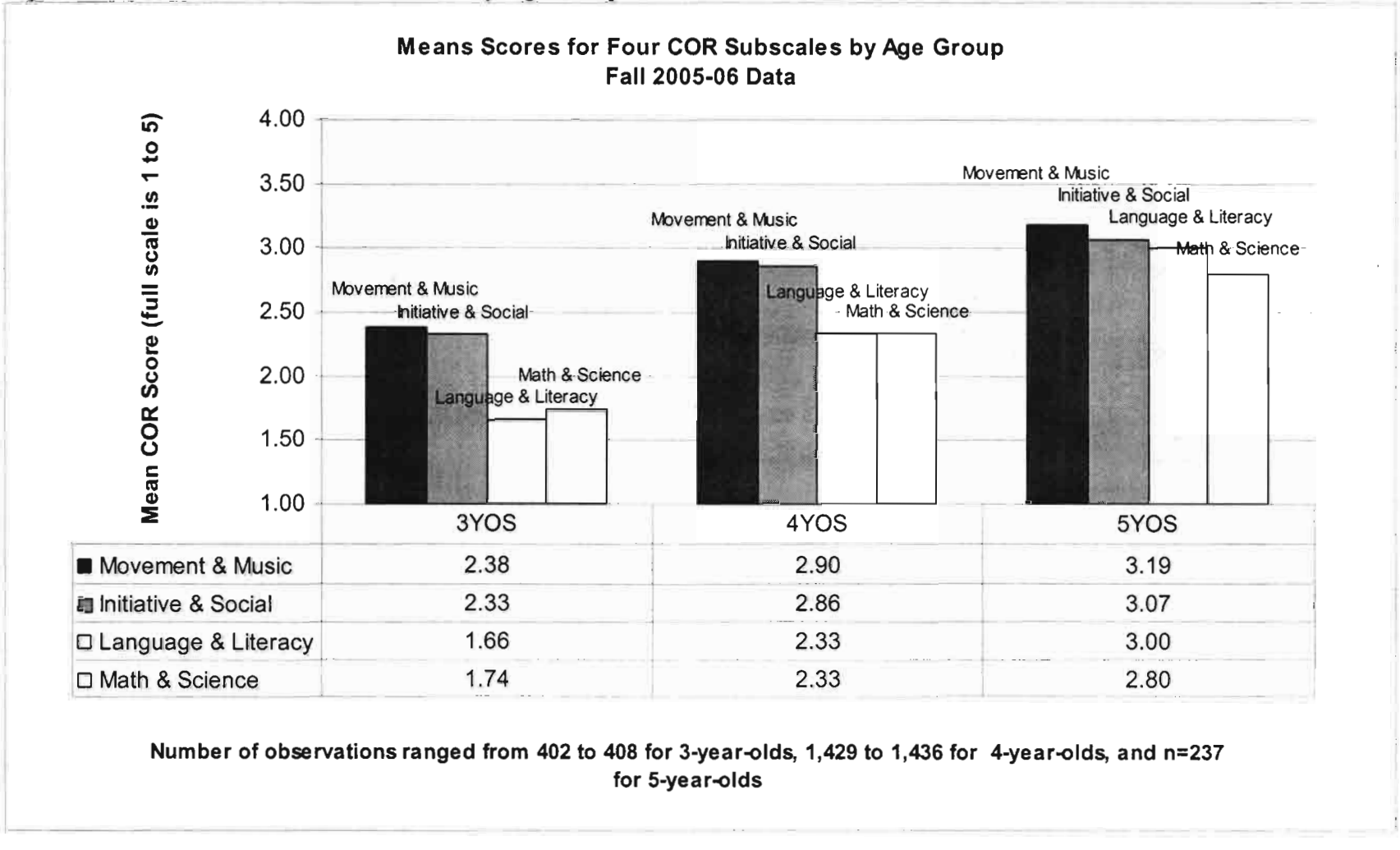


Figure 2 Mean Scores of the 4 COR Factors by Age Group for the fall 2005-06



	3YOS	4YOS	5YOS
Movement & Music	2.38	2.90	3.19
Initiative & Social	2.33	2.86	3.07
Language & Literacy	1.66	2.33	3.00
Math & Science	1.74	2.33	2.80

Number of observations ranged from 402 to 408 for 3-year-olds, 1,429 to 1,436 for 4-year-olds, and n=237 for 5-year-olds

Measure Reliability

Cronbach's alpha assesses the internal reliability of a measure's responses. By measuring and reporting Cronbach alpha values, we have what is considered a numerical coefficient of reliability. Table 15 below displays Cronbach's alpha values for the four identified COR factors and COR total for each of 2 cohorts.

Table15

Cronbach's Alpha Values
4-year-olds Only
Analysis Using the Reduced Set of 23 Items

	Fall 2004-05		Fall 2005-06	
Subscale	**N**	**Alpha**	**N**	**Alpha**
COR Initiative & Social	1,508	0.89	1,412	0.90
COR Movement & Music	1,498	0.84	1,405	0.85
COR Math & Science	1,473	0.91	1,397	0.89
COR Language & Literacy	1,465	0.83	1,402	0.86
COR Total	1,396	0.95	1,349	0.95

The final 4 factors using 23 COR Items show a very high internal reliability with Cronbach Alpha values ranging from 0.85 to 0.90.

Equating the 32-Item COR with the 30-Item COR

The previous version of the COR used 30 items. A 30-Item COR versus the 32-Item COR equating analysis was conducted to check the relationships between the two versions of COR.

Data Used:

In the fall 0f 2004-05 twenty participating teachers collected both 30-Item COR and 32-Item COR data for 10 randomly chosen students in their class. Table 16 below shows the demographics of the sample.

Table 16 Study Equating the 32-Item COR with the 30-Item COR Demographics - Fall 2004-05 Data Mean Age = 4.32 years		
Demographic	**Frequency**	**Percent***
Age		
2	2	1.1%
3	25	13.3
4	161	85.6
Age Missing	9	
Total Non-Missing	188	
Race/Ethnicity		
Black	111	60.3%
Hispanic	29	15.8
White	24	13.0
Other	20	10.9
Race/Ethnicity Missing	13	---
Total Non-Missing	184	---
Gender		
Boys	86	43.7%
Girls	111	56.4
Gender Missing	0	---
Total Non-Missing	197	---
Total Students	197	---
Note: * Percent is derived from the Total Non-Missing for each of the demographic characteristics.		

Table 17 below displays the correlation coefficients of the factors for each of the measures. Depending upon the subscale, these values ranged from 0.68 for "Movement and Music" to 0.82 for the Initiative and Creative Representation subscales. The correlation between the COR totals was 0.89. The internal consistency or Alpha reliability was very high for COR total, for both versions of COR: 0.94 for 30-Item COR and 0.93 for 32-Item COR.

Table 17

32-Item COR and 30-Item COR Equating Analysis

Correlation Between the Measures by Factor and Total

Fall 2004-05 Data

All Ages of Pre-kindergarten Students Included (n=187, mean age=4.32 years)

Pearson Correlation Coefficients Shown*

	30-Item COR Factors							
32-Item COR Factors	**Initiative**	**Social Relations**	**Creative Representation**	**Movement & Music**	**Language & Literacy**	**Logic & Mathematics**	**COR Total All 30 items**	**Alpha Reliability**
Initiative	0.82	0.66	0.59	0.58	0.64	0.69	0.79	0.63
Social Relations	0.66	0.78	0.51	0.49	0.58	0.56	0.71	0.71
Creative Representation	0.70	0.59	0.82	0.41	0.51	0.64	0.72	0.68
Movement & Music	0.69	0.55	0.53	0.68	0.59	0.61	0.72	0.68
Language & Literacy	0.70	0.63	0.63	0.57	0.78	0.75	0.81	0.78
Mathematics & Science	0.61	0.46	0.49	0.54	0.58	0.81	0.72	0.82
COR Total All 32 Items	0.81	0.71	0.69	0.66	0.74	0.83	0.89	0.93
Alpha Reliability	0.64	0.78	0.72	0.76	0.75	0.88	0.94	

Note: *All correlations significant at p<.001

Internal Construct Validity

Internal construct validity tests, along with Confirmatory Analysis, are used to assess whether the internal structure or factors within the measure do indeed consistently and reliably measure what they were designed to measure. Additionally, external construct validity is achieved by analyzing relationships between the measure and other significant, related measures. Examples of other related measures are the Teacher-Child Rating Scale (T-CRS), Parent-Child Rating Scale (P-CRS), The Peabody Picture Vocabulary Test (PPVT), and the Test of Early Reading Achievement (TERA).

Correlation between Factors Using Reduced Set of 23 Items

Table 18 below shows the results of a correlation analysis relating each of the 4 COR factors, and total, with each other. The results demonstrate that each factor is moderately correlated with each of the other factors.

Table 18
Correlation Between Factors - 2004-05 and 2005-06 Cohorts
4 Year-olds Only
Pearson Correlation Coefficients Shown (r)*

	Initiative & Social	Movement & Music	Language & Literacy	Math & Science	COR Total
2004-05 Data (n ranged from 1,532 to 1,544)					
Initiative & Social	**1.00**	**0.76**	**0.64**	**0.69**	**0.91**
Movement & Music		**1.00**	**0.63**	**0.67**	**0.87**
Language & Literacy			**1.00**	**0.74**	**0.83**
Math & Science				**1.00**	**0.88**
Total					**1.00**
2005-06 Data (n ranged from 1,429 to 1,436)					
Initiative & Social	**1.00**	**0.70**	**0.68**	**0.66**	**0.90**
Movement & Music		**1.00**	**0.62**	**0.65**	**0.84**
Language & Literacy			**1.00**	**0.76**	**0.87**
Math & Science				**1.00**	**0.87**
COR Total					**1.00**

Note: * All correlation coefficients were significant at Pr(t) <=.001.

Matching Pre and Post Scores

Internal validity of the COR is also indicated if a child, while both aging normally and participating in a Pre-K program, has his/her scores increase a reasonable amount. The pre and post mean COR scores can be seen in Table 19 below. This analysis was performed on COR data from 4-year-old students only. The mean and standard deviation of pre to post score increases seen in this table show a total COR mean score of 2.54. The mean increase in the total COR was 1.15. Both of these statistics are comparable to results seen from analyses in earlier years, using earlier versions of the COR.

Table 19						
2004-05 Pre to Post COR Scores*						
Using a Reduced Set of 23 COR Items and 4 Factors						
4-year-olds Only						
	Pre-Period			Post-Period		
Factor	**N**	**Mean**	**Std. Dev.**	**N**	**Mean**	**Std. Dev.**
Initiative & Social	1,545	2.78	0.77	1,363	3.87	0.75
Movement & Music	1,543	2.84	0.82	1,363	3.93	0.79
Language & Literacy	1,545	2.20	0.77	1,363	3.36	0.92
Mathematics & Science	1,533	2.18	0.90	1,350	3.48	0.96
Total - All 23 Items	1,545	2.54	0.72	1,363	3.69	0.74
Note: *Scores were included only where a student had both a matching pre and post score.						

Correlation of Matching Pre to Post Scores

Internal validity of COR can also be examined by analyzing the correlation of matching Pre to Post-period scores. The following analysis was performed on the 2004-05 matching pre and post-period scores of 4-year-olds. The correlation of each matching fall and spring COR scores is shown in Tables 20 below. The correlation of pre to post scores seen in these tables suggests that there is a moderate correlation with age and school experience, but not strongly correlated.

Table 20					
Correlation of Matching Pre to Post Scores Using 4 Factors and 23 COR Items 2004-05 Data					
4-year-olds Only (n ranged from 1,195 to 1,211)*					
Pearson Correlation Coefficients Shown**					
	Spring 23-Item COR with 4 Subscales				
Fall 23-Item COR with 4 Subscales	**Initiative & Social**	**Movement & Music**	**Language & Literacy**	**Mathematics & Science**	**Total - All 23 items**
Initiative & Social	0.61	0.52	0.50	0.52	0.61
Movement & Music	0.47	0.56	0.40	0.46	0.53
Language & Literacy	0.45	0.41	0.61	0.53	0.57
Mathematics & Science	0.53	0.47	0.54	0.66	0.63
Total - All 23 Items	0.60	0.56	0.58	0.62	0.67
Note: *Scores were included only where a student had both a matching pre and post score. Note: ** All correlation coefficients were significant at Pr(t) <=.001.					

Confirmatory Factor Analysis

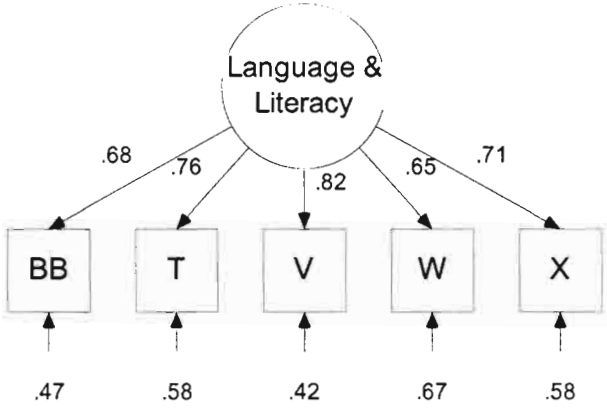
Analysis

To examine the validity of the four proposed COR constructs, a CFA model using maximum likelihood estimation was tested. This analysis was performed on 4-year-olds only, and 2004-05 and 2005-06 cohort data combined.

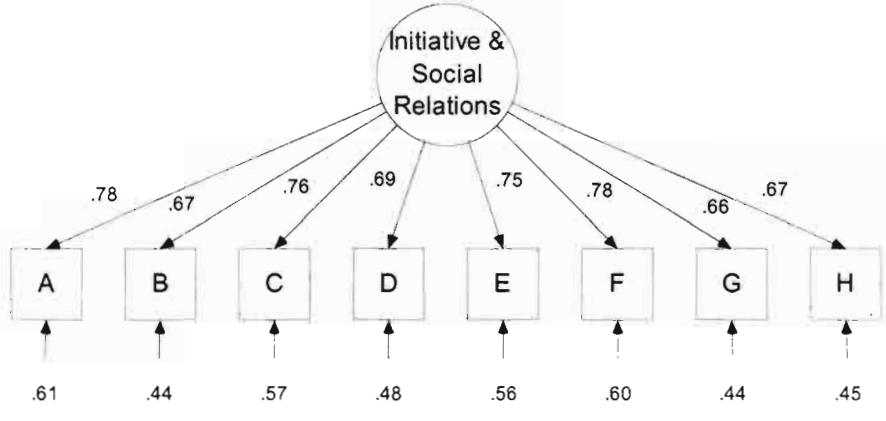
Results

As can be seen in Figure 3, three of the four models had good fit based on a three-index combinational rule recommended by Jaccard and Wan (1996). The chi-square difference score, Bollen's incremental fit index (1989), and the root mean square error of approximation are reported. The "Language & Literacy" and "Math & Science" factors each had excellent fit. While the RMSEA score for the "Initiative and Social Relations" factor was larger than the conventionally accepted level (> .05), Hu and Bentler (1999) have more recently suggested .06 as cutoff for good model fit. The "Movement and Music" factor was a slightly poorer fit according to the RMSEA. Exploratory analyses showed that removing item N (Feeling and Expressing Steady Beat) from the CFA dropped the RMSEA down to an acceptable .054, but the item was retained in the factor due to theoretical considerations.

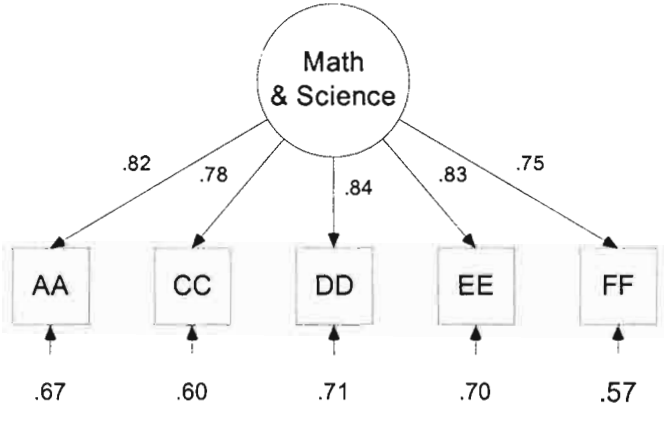
Figure 3. Confirmatory Factor Analyses for the Four COR constructs



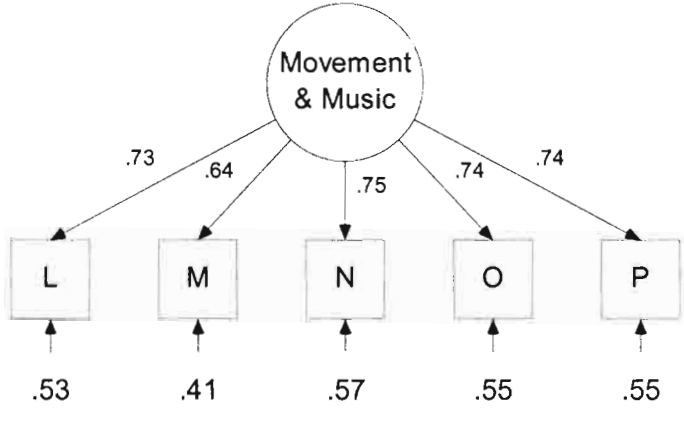
$\chi^2/df = 7.65$, RMSEA = .047 (.034-.062), IFI = .99



$\chi^2/df = 11.45$, RMSEA = .059 (.052-.066), IFI = .98



$\chi^2/df = 1.413$, RMSEA = .012 (.000-.030), IFI = .99



$\chi^2/df = 20.88$, RMSEA = .082 (.068-.096), IFI = .98

External Construct Validity

COR and T-CRS

The T-CRS 2.1 is a third-generation rating form that consists of 32 items assessing positive and negative aspects of a child's socio-emotional school adjustment by four empirically derived scales. The T-CRS 2.1 assesses:

- Task Orientation
- Behavior Control
- Assertiveness
- Peer Social Skills

The T-CRS 2.1 measures teacher agreement using a five-point Likert scale. Table 21 below displays a correlation matrix of the 4 COR subscales and the T-CRS subscales. This data was from 4-year-olds only, and the mean age of the sample was 4.48 years at the time that the COR and T-CRS observations were completed.

It can be seen in Table 21 that the 4 COR factors, and COR total, were moderately correlated with the T-CRS subscales and total. Because T-CRS measures socio-emotional capabilities, it should be no surprise that the COR "Initiative & Social" factor has the highest correlation with the T-CRS subscales.

Table 21

Correlation Matrix - 4 COR Subscales with T-CRS Subscales

2004-05 and 2005-06 Cohorts
4-year-olds only
Pearson Correlation Coefficients are Shown

	Fall 2004-05 COR Using 23 Items				
Fall 2004-05 T-CRS	**Initiative & Social**	**Movement & Music**	**Language & Literacy**	**Mathematics & Science**	**Total All 23 Items**
Fall 2004-05 Scores (n ranged from 1,476 to 1,495)					
Task Orientation	0.49	0.39	0.40	0.37	0.48
Behavior Control	0.30	0.20	0.17	0.19	0.26
Assertiveness	0.55	0.48	0.42	0.41	0.54
Peer Social	0.48	0.41	0.30	0.29	0.43
T-CRS Total	0.54	0.44	0.38	0.37	0.51
Fall 2005-06 Scores (n ranged from 1,277 to 1,286)					
Task Orientation	0.39	0.21	0.35	0.22	0.35
Behavior Control	0.18	0.06*	0.13	0.02*	0.12
Assertiveness	0.45	0.26	0.34	0.28	0.39
Peer Social	0.38	0.20	0.24	0.16	0.30
T-CRS Total	0.42	0.22	0.32	0.20	0.34

Note: * Signifies correlation coefficient was *not significant* at Pr(t) <=.001

COR and P-CRS

P-CRS 5.0 is a 39-item measure that assesses children's behavioral, social and emotional functioning from a parent's perspective. It has excellent psychometric properties.

Table 22 below contains correlation matrices of the 4 COR factors with the P-CRS subscales. These analyses used data from 4-year-olds only.

In Table 22, we can see that although the correlations between COR with P-CRS were generally weak, P-CRS "Assertive Social" skills and P-CRS total had the highest correlation with the COR. In the 2005-06 data only, the P-CRS "Task Orientation" subscale also had a significant degree of correlation with COR. The weak correlations seen in Table 22 is probably due to teachers performing the COR assessments, while the parent is making the assessments with P-CRS.

Table 22
Correlation Matrix of 4 fall COR Factors with P-CRS 5.0 fall Scores
2004-05 and 2005-06 Cohorts
4-year-olds Only
Pearson Correlation Coefficients are Shown

	23 Item COR Factors				
P-CRS Subscales	**Initiative & Social**	**Movement & Music**	**Language & Literacy**	**Mathematics & Science**	**Total All 23 Items**
Fall 2004-05 (n ranged from 884 to 896)					
Positive Peer Social	0.11*	0.10	0.07	0.06	0.10
Task Orientation	0.10	0.05	0.08	0.06	0.08
Shy-Anxious Behavior	0.04	0.04	0.03	0.02	0.04
Assertive Social	0.14*	0.09	0.15*	0.13*	0.14*
Frustration Tolerance	0.04	0.00	-0.01	-0.02	0.01
Negative Peer Social	0.09	0.06	0.09	0.03	0.08
Future Expectations	0.05	0.00	0.08	0.03	0.04
P-CRS Total	0.12*	0.09	0.09	0.07	0.11*
Fall 2005-06 (n ranged from 755 to 776					
Positive Peer Social	0.05	0.03	0.06	0.05	0.05
Task Orientation	0.12*	0.05	0.15*	0.10	0.12*
Shy-Anxious Behavior	0.06	0.05	0.05	0.08	0.07
Assertive Social	0.14*	0.08	0.17*	0.16*	0.16*
Frustration Tolerance	0.03	-0.01	0.06	0.03	0.04
Negative Peer Social	0.05	0.01	0.06	0.02	0.04
Future Expectations	0.04	0.00	0.08	0.05	0.05
P-CRS Total	0.11	0.05	0.14*	0.11	0.12*

Note: * Signifies correlation coefficients were significant at Pr(t) <=.001

COR and PPVT/TERA

The Peabody Picture Vocabulary Test (PPVT) and the Test of Early Reading Achievement (TERA). PPVT-III is a leading measure of receptive vocabulary for Standard English and a screening test of verbal ability developed by PRO-ED, Inc. TERA-3 is a standardized test that measures reading ability at the prekindergarten education level, also developed by PRO-ED, Inc.

A correlation analysis was performed between the 4 COR factors and the PPVT and TERA Literacy measures. Looking at Table 23 below, all fall 2005-06 COR factors except for "Movement & Music" are moderately and significantly correlated with the fall PPVT scores. All but one 2005-06 COR factor was moderately, correlated with the TERA Conventions subtest. This one excluded factor was "Initiative & Social." Fall 2004-05 PPVT/TERA scores were not available.

The strongest correlation seen in Table 23 was between both PPVT and TERA with the COR "Language & Literacy" factor. This matches what would be intuitively expected, i.e. that the literacy measures should track similarly to the COR "literacy related" factor.

Table 23
Correlation of Fall 2005-06 COR with Fall 2005-06 PPVT and TERA
4-year-olds Only (n=107)
Pearson Correlation Coefficients are Shown

	23-Item COR Subscales				
PPVT and TERA Scores	**Initiative & Social**	**Movement & Music**	**Language & Literacy**	**Mathematics & Science**	**Total All 23 Items**
PPVT Raw Score	0.36*	0.26	0.38*	0.47*	0.44*
TERA Alphabet Subtest	0.24	0.22	0.45*	0.31	0.35
TERA Conventions Subtest	0.35	0.36*	0.36*	0.36*	0.42*
TERA Meaning Subtest	0.34	0.33	0.17	0.35	0.36

Note: * Signifies correlation coefficients were significant at Pr(t) <=.001

References:

Jaccard, James and Choi K. Wan (1996). *LISREL approaches to interaction effects in multiple regression.* Thousand Oaks, CA: Sage Publications. In spite of the title, this monograph deals directly with SEM using LISREL.

Hu, L. and P. M. Bentler (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling* 6(1): 1-55.