Experimental Evaluation of the *Tools of the Mind* Pre-K Curriculum

8/8/2011

Report from Full Implementation Year, 2010-11

PEABODY research institute

VANDERBILT PEABODY COLLEGE

Peabody Research Institute
Vanderbilt University
PMB 181
Nashville, TN 37203

PRI Project Staff

Principal Investigators

Dale C. Farran, PhD

Mark W. Lipsey, PhD

Sandra Wilson, PhD

Project Coordinators

Elizabeth Vorhaus, MEd

Deanna Meador, MA

Diane Spencer, MEd (North Carolina)

Research Assistants

Ashley Keene

Jennifer Norvell, MEd

Marianne Reale

Doctoral Fellows

Karen Anthony

Amy Holmes

Katherine Newman

Cathy Yun

Post-Doctoral Fellows

Mary Wagner Fuhs, PhD

Kimberly Turner, PhD

Multiple part time child assessors and classroom observers in Tennessee and North Carolina

Tools of the Mind Curriculum Staff

Curriculum Developers

Deborah Leong, PhD

Elena Bodrova, PhD

***Tools of the Mind* Trainer**

Sheila Corbin Williams, MEd

***Tools of the Mind* Coaches**

Carolyn Boyles, GCSS

Barbara Corry, Cannon

Patti Dale, FSSD

Anne Whitefield, LSSD, Wilson

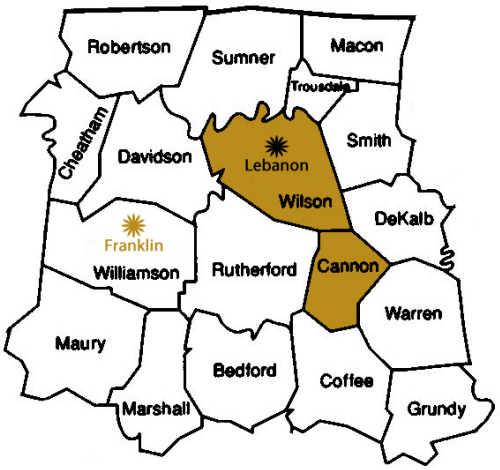
The research reported here was supported by the Institute of Education Sciences, U.S. Department of Education, through Grant R305A090533 awarded to Drs. Dale C. Farran, Mark Lipsey, and Sandra Wilson at Vanderbilt University with subawards to Dr. Deborah Leong at Metropolitan State University and Dr. Elena Bodrova at McRel Research Institute.

PARTICIPANTS

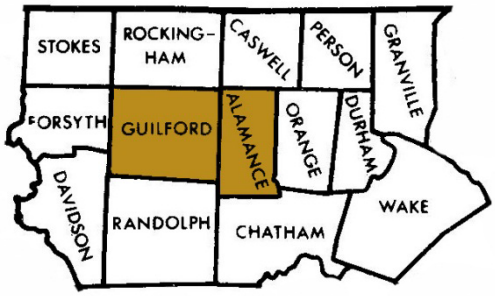
The *Experimental Evaluation of the Tools of the Mind Pre-K Curriculum* is fortunate to have participants from Franklin Special School District, Lebanon Special School District, Wilson County School District, and Canon County School District in Tennessee as well as Guilford County School District in North Carolina and (coming in a year later and not included in this report) Alamance Burlington School District in North Carolina.

- In all, 828 children (*Tools* = 477) were seen at the beginning of Pre-K and 821 children (*Tools* = 472) at the end of Pre-K.
- Children were from 60 classrooms (*Tools* = 32) in 45 schools (*Tools* = 25).

Tennessee



North Carolina



TIMELINE

Below is the timeline for the *Experimental Evaluation of the Tools of the Mind Pre-K Curriculum*. This timeline shows the assessments, behavioral ratings, and classroom observations in which students and teachers have already participated and which continue through Spring 2013 when the children are completing 1st Grade.

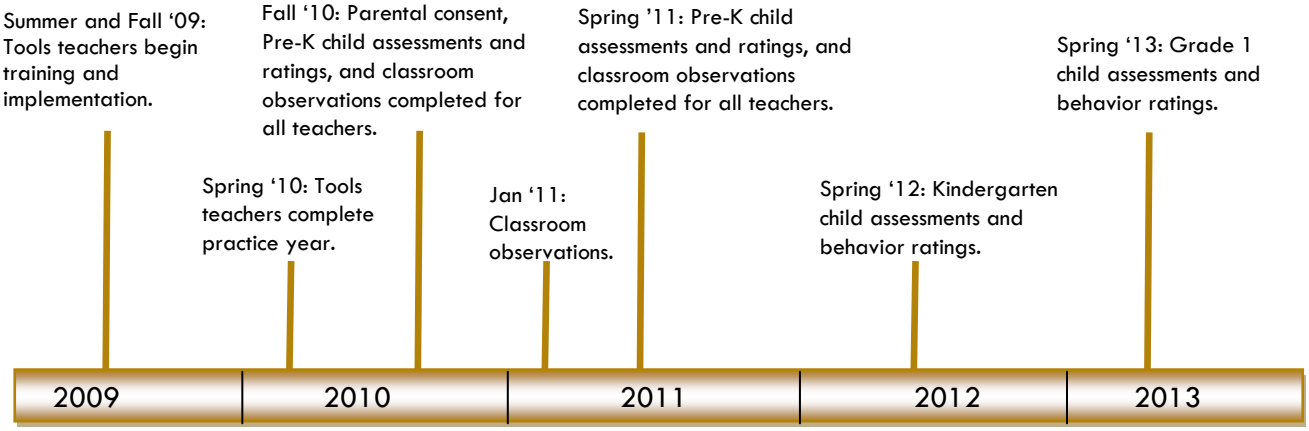


TABLE 1: CHILD DESCRIPTIVES BY STATE AND CONDITION

Variable	Tools Condition	Comparison Condition	Overall
North Carolina Sample			
Total N	217	217	434
N with Complete Data	208	213	421
N Pretest Range	215 - 217	214 - 217	429 - 434
N Posttest Range	211 - 217	216 - 217	427 - 434
Mean Age (mos.)	54.72	55.01	54.87
Gender (% female)	47.9	40.1	44
Ethnicity			
Black (%)	49.3	33.2	41.2
Hispanic (%)	29	35.5	32.3
White (%)	4	18	11.3
Other (%)	17.1	13.4	15.2
IEP Status (%)	12.9	14.3	13.6
ELL Status (%)	38.2	41.5	39.9
Tennessee Sample			
Total N	260	134	394
N with Complete Data	247	126	373
N Pretest Range	258 - 259	131 - 134	390 - 393
N Posttest Range	253 - 255	131 - 132	384 - 387
Mean Age (mos.)	53.73	54.16	53.88
Gender (% female)	47.3	48.5	47.7
Ethnicity			
Black (%)	13.5	3	9.9
Hispanic (%)	19.6	9.7	16.2
White (%)	64.6	79.9	69.8
Other (%)	2.3	7.5	14.8
IEP Status (%)	14	16.4	14.8
ELL Status (%)	18.5	12.7	16.5

TABLE 2: CHILD DESCRIPTIVES FULL SAMPLE BY CONDITION

Variable	Tools Condition	Comparison Condition	Overall
Full Sample			
Total N	477	351	828
N with Complete Data	455	339	794
N Pretest Range	474 - 475	345 - 350	819 - 825
N Posttest Range	464 - 472	347 - 349	811 - 821
Mean Age (mos.)	54.18	54.69	54.4
Gender (% female)	47.6	43.3	45.8
Ethnicity			
Black (%)	29.8	21.7	26.3
Hispanic (%)	23.9	25.6	24.6
White (%)	37.3	41.6	39.1
Other (%)	9	11.1	9.9
IEP Status (%)	13.5	15.1	14.2
ELL Status (%)	27.5	30.5	28.7

TABLE 3: CLASSROOM DESCRIPTIVES BY STATE AND CONDITION

Variable	Tools Condition	Comparison Condition	Overall
North Carolina Sample			
Fall Class Size	16.2	17.2	16.7
Spring Class Size	16.27	17.07	16.67
Fall ELL Status (% of class)	38.86	34.3	36.58
Spring ELL Status (% of class)	39.99	37.45	38.72
Fall IEP Status (% of class)	10.48	10.37	10.42
Spring IEP Status (% of class)	11.11	13.28	12.2
Tennessee Sample			
Fall Class Size	18.29	18.62	18.43
Spring Class Size	18.12	18.46	18.27
Fall ELL Status (% of class)	20.1	19.85	19.99
Spring ELL Status (% of class)	20.24	20.71	20.44
Fall IEP Status (% of class)	9.57	14.1	11.53
Spring IEP Status (% of class)	11.43	13.5	12.33
Full Sample			
Fall Class Size	17.31	17.86	17.57
Spring Class Size	17.25	17.71	17.47
Fall ELL Status (% of class)	28.9	12.1	28.29
Spring ELL Status (% of class)	29.5	29.68	29.58
Fall IEP Status (% of class)	10	12.1	10.98
Spring IEP Status (% of class)	11.28	13.38	12.26

TABLE 4: TEACHER DESCRIPTIVES BY STATE AND CONDITION

Variable	Tools Condition		Comparison Condition		Overall	
	Mean/Freq	Range/%	Mean/Freq	Range/%	Mean/Freq	Range/%
North Carolina Sample	(N=15)		(N=15)		(N=30)	
Years of Experience						
Years Teaching	11.7	3-25	16.2	6-34	14	3-34
Years Teaching Pre-K	9.7	2-22	9.2	1-17	9.5	1-22
Education Level						
Bachelor's Degree	6	40%	8	53%	14	47%
Some Graduate Coursework	6	40%	3	20%	9	30%
Master's Degree	3	20%	4	27%	7	23%
Licensure Area						
Early Childhood (Birth-K)	14	93%	10	66%	24	80%
Elementary Ed (Pre-K-3,4,8)	-	-	4	27%	4	13%
Early Childhood and Spec Ed	1	7%	1	7%	2	7%
Tennessee Sample	(N=17)		(N=13)		(N=30)	
Years of Experience						
Years Teaching	12.4	2-30	6.4	1-19	9.4	1-30
Years Teaching Pre-K	5.8	2-16	3.4	1-8	4.6	1-16
Education Level						
Bachelor's Degree	6	35%	9	70%	15	50%
Some Graduate Coursework	5	30%	2	15%	7	23%
Master's Degree	6	35%	2	15%	8	27%
Licensure Area						
Early Childhood (Birth-K)	5	29%	7	54%	12	40%
Pre-K- 3rd	2	12%	1	8%	3	10%
Elementary Ed (Pre-K- 3,4,8)	8	47%	5	38%	13	43%
Early Childhood and Spec Ed	2	12%	-	-	2	7%

TABLE 5: TEACHER DESCRIPTIVES FULL SAMPLE BY CONDITION

Variable	Tools Condition (N=32)		Comparison Condition (N=28)		Overall (N=60)	
Full Sample	Mean/Freq	Range/%	Mean/Freq	Range/%	Mean/Freq	Range/%
Years of Experience						
Years Teaching	12	2-30	12.1	1-34	12	1-34
Years Teaching Pre-K	7.7	2-22	6.6	1-17	7.1	1-22
Education Level						
Bachelor's Degree	12	38%	17	61%	29	48%
Some Graduate Coursework	11	34%	5	18%	16	27%
Master's Degree	9	28%	6	21%	15	25%
Licensure Area						
Early Childhood (Birth-K)	19	60%	18	64%	37	62%
Pre-K- 3rd	2	6%	1	3%	3	5%
Elementary Ed (Pre-K- 3,4,8)	8	25%	8	29%	16	26%
Early Childhood and Spec Ed	3	9%	1	4%	4	7%

TABLE 6: ASSISTANTS DESCRIPTIVES BY STATE AND CONDITION

Variable	Tools Condition		Comparison Condition		Overall	
	Mean/Freq	Range/%	Mean/Freq	Range/%	Mean/Freq	Range/%
North Carolina Sample	(N=15)		(N=15)		(N=30)	
Years of Experience						
Years Teaching Pre-K	5.2	.25-17	4.6	.25-12	4.9	.25-17
Years Working w/Teacher	3.7	.25-17	2.7	.25- 8	3.2	.25-17
Education Level						
GED/High School Diploma	1	7%	3	20%	4	13%
CDA	3	20%	2	13%	5	17%
Montessori Training	-	-	1	7%	1	3%
Some College	1	7%	1	7%	2	7%
Associate's Degree	3	20%	3	20%	6	20%
Bachelor's Degree	6	39%	5	33%	11	37%
Master's Degree	1	7%	-	-	1	3%
Tennessee Sample	(N=17)		(N=13)		(N=30)	
Years of Experience						
Years Teaching Pre-K	4.1	.3-8	4	1-7	4	.3-8
Years Working w/Teacher	3.1	.3-9	2.2	1-4	2.7	.3-9
Education Level						
GED/High School Diploma	4	24%	4	31%	8	26%
CDA	5	29%	4	31%	9	30%
Some College	1	6%	1	8%	2	7%
Associate's Degree	1	6%	1	8%	2	7%
Bachelor's Degree	5	29%	2	14%	7	23%
Master's Degree	1	6%	1	8%	2	7%

TABLE 7: ASSISTANTS DESCRIPTIVES FULL SAMPLE BY CONDITION

Variable	Tools Condition (N=32)		Comparison Condition (N=28)		Overall (N=60)	
Full Sample	Mean/Freq	Range/%	Mean/Freq	Range/%	Mean/Freq	Range/%
Years of Experience						
Years Teaching Pre-K	4.5	.25-17	4.3	.25-12	4.4	.25-17
Years Working w/Teacher	3.4	.25-17	2.5	.25-8	3	.25-17
Education Level						
GED/High School Diploma	5	16%	7	25%	12	20%
CDA	8	25%	6	21%	14	23%
Montessori Training	-	-	1	4%	1	2%
Some College	2	6%	2	7%	4	7%
Associate's Degree	4	13%	4	14%	8	13%
Bachelor's Degree	11	34%	7	25%	18	30%
Master's Degree	2	6%	1	4%	3	5%

Notes: There were 7 classrooms in this study that had two educational assistants (NC-2, TN-5). Demographics listed in the table above include information only from the primary assistant. Three classrooms reported a staff change in the classroom assistant during the 2010-11 school year with one of these classrooms having multiple assistant changes throughout the school year.

TABLE 8: CONTROL CURRICULA BY STATE AND FULL SAMPLE

Variable	Frequency
North Carolina Sample	
Creative Curriculum	15
Literacy First	4
Houghton Mifflin	0
Scott Foresman	0
CSEFEL	0
Other	3
Tennessee Sample	
Creative Curriculum	0
Literacy First	0
Houghton Mifflin	2
Scott Foresman	5
CSEFEL	6
Other	7
Full Sample	
Creative Curriculum	15
Literacy First	4
Houghton Mifflin	2
Scott Foresman	5
CSEFEL	6
Other	10

Notes: Many control teachers within this study cited using more than one curriculum. Within the North Carolina control teachers, 11 cited using Creative Curriculum only and 4 cited using multiple curricula. Within the Tennessee control teachers, 8 cited using multiple curricula, 3 cited using only one curriculum, and 2 cited not using any curricula.

Curricula that compose the "Other" category: Color Me Healthy, Letter People, Early Years, Incredible Years, Conscious Discipline, Talking About Touching, Handwriting Without Tears, Healthy Steps, P.A.S.T, Frog Street Press Letter Books, and Foundations.

DESCRIPTION OF MEASURES

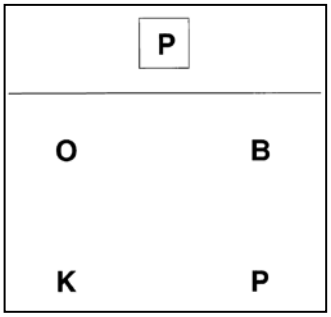
The goal of the *Experimental Evaluation of the Tools of the Mind Curriculum* is to determine if the *Tools* curriculum is more effective in enhancing children's learning-related self-regulation and academic preparedness for kindergarten when compared to other "business as usual" preschool curricula.

Woodcock-Johnson III Tests of Achievement (WJ-III)

- WJ-III standard scores are reported, which are normed to a representative sample of American youth. Standard scores have a mean of 100 and a standard deviation of 15. A score of 100 therefore is considered average. Higher scores on the measures reflect better academic performance. An increase in *standard scores* from fall to spring indicates learning at a faster rate than previously.
- These same measures will be used in follow up assessments.

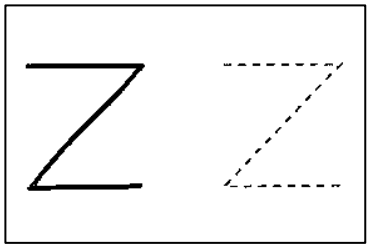
WJ-III Literacy Measures

Letter Word Identification



- Letter Word Identification assesses children's letter and word identification ability. Items include identifying and pronouncing presented letters and pronouncing presented words.
- Sample Script: *This is the letter "P." Find the "P" down here.*

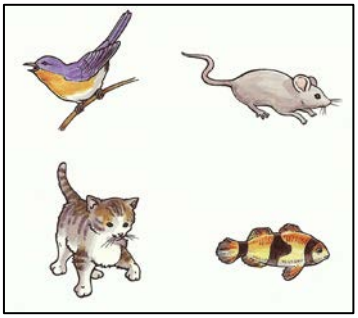
Spelling



- Spelling measures the ability to write orally presented letters and words correctly beginning with tracing simple shapes.
- Sample Script: Watch Me. [Trace "Z" on left. Hand pencil to child, point to "Z" on right] Now you make one just like I did. Stay on the line.

WJ-III Language Measures

Academic Knowledge



- Academic Knowledge is given in three subtests measuring factual knowledge of science, social studies, and humanities.
- Sample Script: *Look at the pictures, put your finger on the one that flies.*

Language Measures (continued)

Oral Comprehension

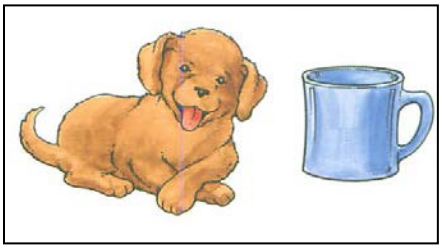
- Oral Comprehension assesses children's ability to understand a short passage by providing a missing word based on the syntactic and semantic cues of the sentence.
- Sample Script: Water looks blue and grass looks _____. (pause expectantly).

Picture Vocabulary

- Picture Vocabulary assesses children's receptive and expressive language and word knowledge at the single word level. After the initial items, children must say the name of the picture.
- Sample Script of initial item: *Put your finger on the flower.*

WJ-III Mathematics Measures

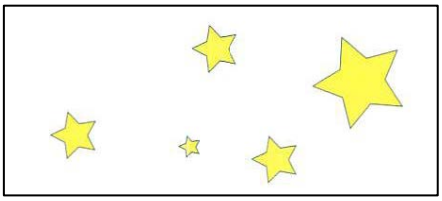
Applied Problems



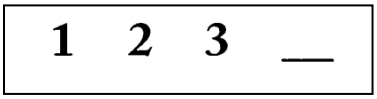
- Applied Problems assesses children's ability to solve mathematics problems. The items in the scale measure children's ability identify information necessary to solve problems and to determine an appropriate strategy to solve the problem.
- Sample Script: *How many dogs are there in this picture?*

Quantitative Concepts

- Quantitative Concepts is a measure given in two parts. The first part assesses children's knowledge of mathematical concepts, including vocabulary, numbers, shapes, and symbols. The second part measures sequencing of numbers with difficulty increasing with each problem.



- Sample Script A: *Point to the largest star. Now point to the smallest star.*
- Sample Script B: *Look at these numbers and tell me the number that belongs in the blank space.*



Learning-Related Cognitive Self-Regulation

Children were assessed individually in two sessions in the fall and spring of the 2010-2011 school year. The following assessments were used:

Peg Tapping

- Children are instructed to tap once with a wooden dowel when the examiner taps twice and to tap twice when the examiner taps once.
- The Peg Tapping Task is a measure of inhibitory control. A child must inhibit the most powerful immediate response of imitating the examiner.
- Each item is scored 0 if the child gives the incorrect number of taps and 1 if the child gives the correct number of taps. Scores on the items are summed and converted to a portion correct out of a possible score of 16. Larger scores on the task reflect greater inhibitory control.
- For more information see: Diamond, A., & Taylor, C. (1996). Development of an aspect of executive control: Development of the ability to remember what I said and to "do as I say, not as I do." *Developmental Psychobiology*, 29, 315-334.

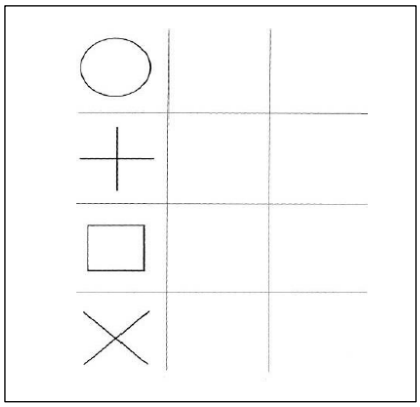
Head Toes Knees Shoulders (HTKS)

- Children are asked to play a game in which they must do the opposite of what the examiner says. The examiner instructs children to touch their head (or their toes), but instead of following the command, the children are supposed to do the opposite and touch their toes. If children pass the head/toes part of the task, they complete an advanced trial where the knees and shoulders commands are added.
- The HTKS task is a measure of inhibitory control; a child must inhibit the dominant response of imitating the examiner.
- Each response is scored with the following system: 0 = incorrect response, 1 = any motion to an incorrect response, but self-corrected to the correct response, and 2 = correct response. Scores on the first six practice items and the 20 test items are summed and converted to a proportion correct out of a possible score of 52. Larger scores on the task reflect greater inhibitory control.
- For more information see: Ponitz, C. C., McClelland, M. M., Matthews, J. S., & Morrison, F. J. (2009). A structured observation of behavioral regulation and its contributions to kindergarten outcomes. *Developmental Psychology*, 45, 605-619.

Dimensional Change Card Sort (DCCS)

- Children are required to sort picture cards first according to one dimension (e.g., color) and then according to another dimension (e.g., shape). If they can make this switch, children are then asked to complete an advanced version of the DCCS that adds a third sorting rule, sorting by the borders on the cards (e.g., the presence of a border means one rule, no border means another rule).
- The DCCS is a measure of attention shifting. To complete the task children must shift their attention to a different dimension of the card – from the color of the object to the shape of the object (e. g. focus on the shape on a card and not the color of the shape). To complete the advanced phase, children must children shift their focus from one dimension to another from card to card.
- The task is scored as follows, using a system developed by Zelazo. Scores were converted to a proportion correct out of 3. Larger scores on the task reflect greater ability to shift attention with task demands and less perseveration.
  - 0 = Sorted by color on fewer than 5/6 cards
  - 1 = Sorted by color on at least 5/6 cards, but sorted by shape on fewer than 5/6 cards
  - 2 = Sorted by color and shape on at least 5/6 cards; but sorted fewer than 9/12 cards correctly on advanced version
  - 3 = Sorted by color and shape on at least 5/6 card and sorted at least 9/12 cards correctly on advanced version.
- For more information see: Zelazo, P. D. (2006). The dimensional change card sort (DCCS): A method of assessing executive function in children. *Nature Protocols, 1*, 297-301.

Copy Design



- Children are asked to copy 8 simple geometric designs. Children are given two attempts to draw each of the 8 designs. The attempts are scored to indicate if the child was able to properly replicate the design.
- The Copy Design task is a measure of persistence and sustained attention during a difficult task.
- Each design is given a score of 1 if at least one attempt is correct, 2 points if both attempts are correct, and 0 if both attempts are incorrect or are not attempted. Scores on the items are summed and converted to a portion correct out of a possible score of 16. Larger scores the task indicate greater attention and sustained focus.
- For more information see: Osborn, A. F., Butler, N. R., & Morris, A. C. (1984). *The social life of Britain's five-year-olds: A report of the child health and education study*. London: Routledge & Kegan Paul.

Corsi Blocks

- Children are asked to point to a series of blocks as indicated by the examiner. Children are first asked to repeat the pattern exactly as the examiner did (i.e., forwards) then they are asked to reverse the pattern given by the examiner (i.e., backwards). Task difficultly increases by asking children to repeat increasingly longer block patterns. The child gets two attempts at each pattern and continues until the recalled pattern is no longer correct.
- Corsi Blocks is a measure of working memory.
- The task is scored as the largest pattern span that the child is able to reproduce. The maximum forward span possible was 9 and 7 for backward span. Larger scores indicate a greater working memory.
- For more information see: Berch, D. B., Krikorian, R., & Huha, E. M. (1998). The corsi block-tapping task: Methodological and theoretical considerations. Brain and Cognition, 38, 317-338.

Self-Regulation Assessor Ratings (SAR)

- At the end of each assessment session, the assessor completed a rating of children's self-regulatory behavior during the testing. The 17 items provide a global picture of attention and impulsivity throughout the assessment interaction. Each child therefore was rated twice during pretesting and twice during post testing by independent raters.
- Sample item:

  A3. Sustains concentration; willing to try repetitive tasks

  3. Child able to concentrate and persist with task, even toward end of tasks and with distractions

  2. Child occasionally distracted but generally persistent, but does not require prompt from assessor

  1. Child frequently distracted, requires multiple prompts from assessor

  0. Child not able to concentrate or persist on much of the assessment

- For more information, see: Smith-Donald, R., Raver, C. C., Hayes, T., & Richardson, B. (2007). Preliminary construct and concurrent validity of the Preschool Self-regulation Assessment (PSRA) for field-based research. *Early Childhood Research Quarterly, 22*(2), 173-187. doi: DOI: 10.1016/j.ecresq.2007.01.002

Behavior Rating Scales (collected from teachers)

Teachers rated the children in their classes 6 weeks after school began and again at the end of the year.

Cooper-Farran Behavior Rating Scales

The Cooper-Farran is composed of 37 items in two subscales. The Interpersonal Skills subscale (IPS) includes 21 items and the Work-Related Skills (WRS) subscale includes 16 items. The IPS subscale measures how well children get along with peers and the teacher. The WRS subscale includes items about independent work, compliance with instructions, and memory for instructions. Items are rated on a 1-7 scale with descriptive phrases to "anchor" points 1, 3, 5, and 7.

- Example item for Interpersonal Skills (IPS):

  EFFECT ON OTHER CHILDREN

1	2	3	4	5	6	7
Does not purposefully annoy anyone		Teases others but stops short of actual annoyance		Occasionally tries to get attention by playful but annoying behavior		Repeatedly irritates others by hostile touching, poking, verbal insulting, etc.

- Example item for Work-Related Skills (WRS):

  RELEVANT PARTICIPATION IN GROUP DISCUSSIONS

1	2	3	4	5	6	7
Often contributes original ideas; relevant and responsive to others' comments and interests		Makes an occasional relevant comment; attentive		Inattentive to others; quite but uninvolved		Makes irrelevant remarks; interrupts the flow

- For more information see: Cooper, D., & Farran, D. C. (1988). Behavioral risk in kindergarten. *Early Childhood Research Quarterly*, 3, 1-20.

Adaptive Language Inventory (ALI)

- The ALI focuses on Children's comprehension and use of language in classroom settings in comparison to their peers and has been used both at the preschool and elementary levels. The measure consists of 18 items that focus on comprehension, production, rephrasing, spontaneity, listening, and fluency. Children are rated on 1-5 scale.

1	2	3	4	5
Well below average	Somewhat below average	Average for his/her age	Somewhat above average	Well above average

- Sample items: Responds to questions asked of him/her in a thoughtful logical way. Listens carefully when the teacher is giving instructions to the class.
- For more information see: Feagans, L., Fendt, K. & Farran, D.C. (1995). The effects of day care intervention on teachers' ratings of the elementary school discourse skills in disadvantaged children. *International Journal of Behavioral Development*, 243-261.

RESULTS: CHILD OUTCOMES

Effect of *Tools of the Mind* on children in classrooms where teachers have received two years of training on the curriculum:

- Did the randomization produce comparable groups? Were children who received the *Tools* curriculum comparable at the outset to those who did not?
- Do children in *Tools of the Mind* classrooms improve more in literacy, language and math during the preschool year than children in "business as usual" control classrooms?
- Do children in *Tools of the Mind* classrooms show greater gains in direct assessments of learning-related self-regulation than children in the control classrooms?
- Do children in *Tools of the Mind* classrooms show greater gains in teacher reported social skills and appropriate work related classroom behaviors than children in the control classrooms?
- Are gains in self-regulation related to gains in achievement?

WOODCOCK-JOHNSON TESTS OF ACHIEVEMENT

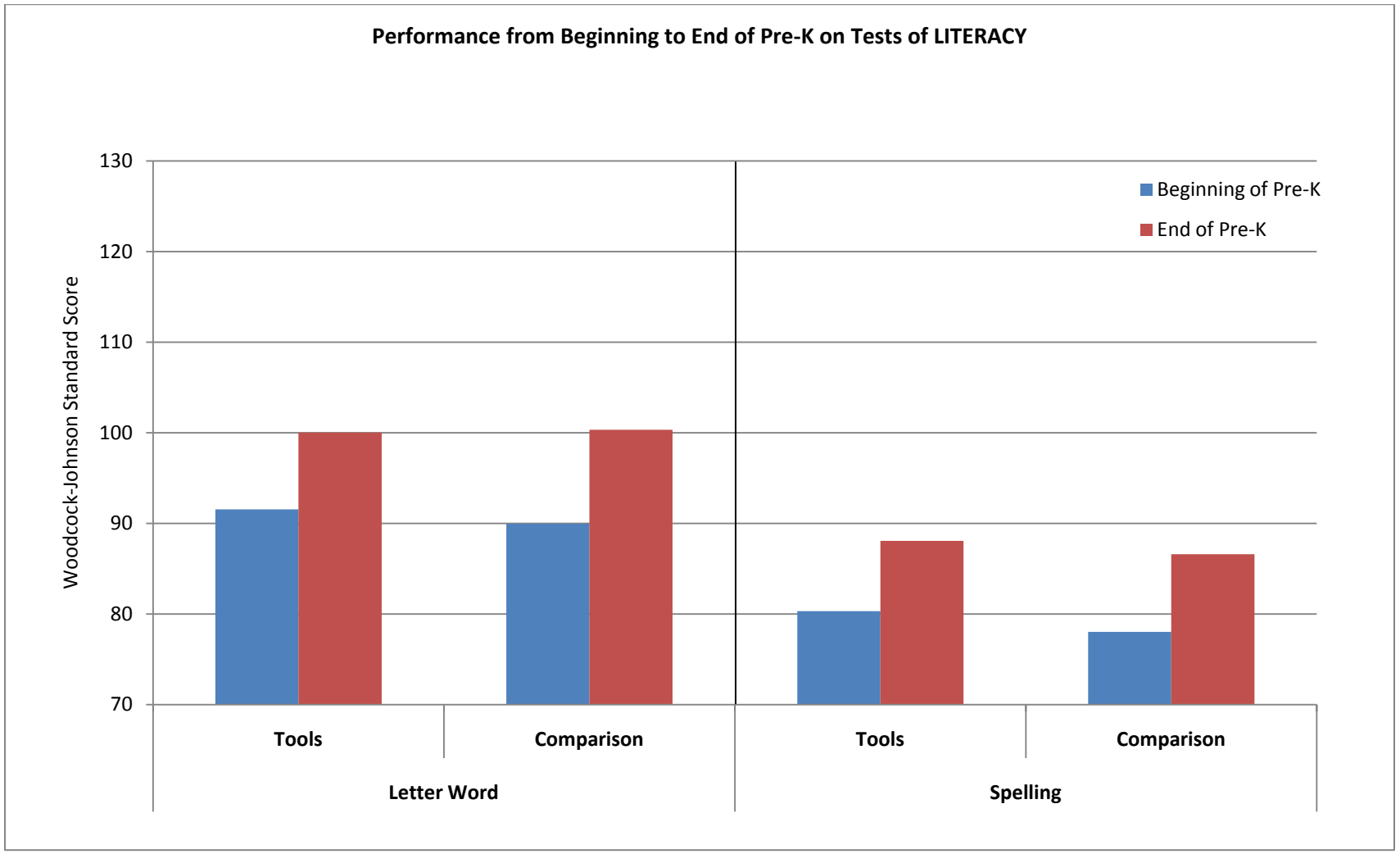


TABLE 9: EFFECTS OF THE TOOLS OF THE MIND CURRICULUM ON LITERACY OUTCOMES

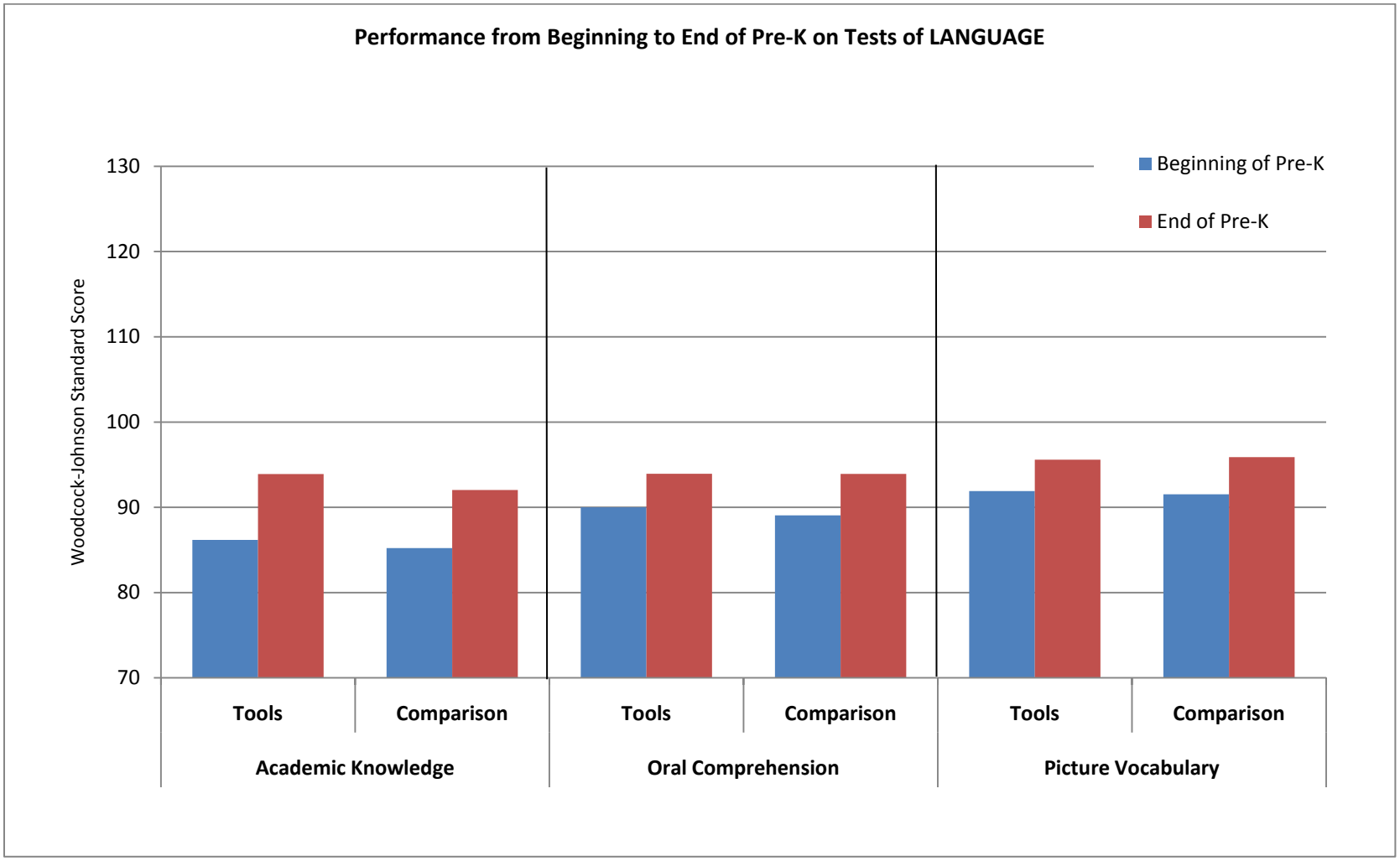
	Letter-Word ID		Spelling	
	F	*p*	*F*	*p*
Tools Condition (vs. Comparison)	0.15	.700	1.98	.160
Gender=male	13.83	.000	27.21	.000
Language status=ELL	0.55	.461	0.52	.472
Ethnicity=Black	5.33	.021	6.00	.015
Ethnicity=White	4.56	.034	1.81	.179
Ethnicity=Hispanic	2.58	.109	0.62	.433
Pretest	392.57	.000	232.88	.000
Age at pretest	0.04	.841	3.95	.047
Pre-post interval	1.19	.288	0.31	.581
Interactions				
Condition x Pretest	0.68	.412	1.52	.219
Condition x Gender	3.18	.075	1.18	.278
Condition x ELL	0.03	.864	1.72	.191
Condition x Black Ethnicity	0.07	.789	0.96	.328
Condition x White Ethnicity	0.01	.940	0.24	.622

[1] *Tested via multi-level models with students nested within classrooms, schools, and school systems.*

TABLE 10: POST HOC TESTS OF THE GENDER INTERACTION: LETTER-WORD IDENTIFICATION

	Tools of the Mind		Comparison		Mean Difference		
	Post Mean	se	Post Mean	se	diff	se	p
Male	98.00	.75	100.36	.85	-2.36	1.13	.041
Female	101.49	.78	101.50	.90	-.01	1.19	.996

There is a statistically significant difference between the Tools and Comparison conditions for boys on Letter-Word Identification. The difference favors the Comparison group boys.



PEABODY research institute

TABLE 11: EFFECTS OF THE TOOLS OF THE MIND CURRICULUM ON LANGUAGE OUTCOMES

	Oral Comprehension		Picture Vocabulary		Academic Knowledge	
	F	*p*	*F*	*p*	*F*	*p*
Tools Condition (vs. Comparison)	0.71	.399	0.41	.522	0.56	.457
Gender=male	0.06	.811	0.04	.846	14.48	.000
Language status=ELL	6.55	.011	3.97	.047	0.19	.662
Ethnicity=Black	0.26	.611	1.46	.227	0.75	.388
Ethnicity=White	1.32	.251	0.30	.581	0.06	.802
Ethnicity=Hispanic	0.36	.549	3.25	.072	1.92	.166
Pretest	533.85	.000	637.94	.000	935.98	.000
Age at pretest	0.97	.325	0.44	.509	0.01	.916
Pre-post interval	0.08	.774	2.06	.154	0.87	.352
Interactions						
Condition x Pretest	1.16	.281	3.79	.052	3.87	.049
Condition x Gender	0.02	.889	1.73	.189	0.68	.411
Condition x ELL	0.34	.563	0.01	.927	0.65	.419
Condition x Black Ethnicity	0.08	.775	0.90	.343	0.67	.414
Condition x White Ethnicity	0.02	.890	0.70	.404	5.59	.018

[1] *Tested via multi-level models with students nested within classrooms, schools, and school systems.*

TABLE 12: POST HOC TESTS OF ETHNICITY BY CONDITION INTERACTION: ACADEMIC KNOWLEDGE

	Tools of the Mind		Comparison		Mean Difference		
	Post Mean	se	Post Mean	se	diff	se	p
White	93.94	1.48	90.96	1.41	2.98	1.56	.058
Non-white	91.38	1.28	93.75	1.30	-2.37	1.20	.049

White students in Tools classrooms gained more on Academic Knowledge than those in Comparison classrooms, while non-White students in Comparison classrooms gained more on Academic Knowledge than those in Tools classrooms.

TABLE 13: PRETEST AND POSTTEST MEANS BY CONDITION ON PICTURE VOCABULARY AND ACADEMIC KNOWLEDGE: ILLUSTRATION OF PRETEST BY CONDITION INTERACTION

	Tools of the Mind		Comparison	
	Mean	sd	Mean	sd
Picture Vocabulary				
Pretest	91.90	20.69	91.53	20.18
Posttest	95.58	13.79	95.89	13.91
Academic Knowledge				
Pretest	86.18	19.43	85.23	19.20
Posttest	92.65	14.57	92.03	15.51

Picture Vocabulary: the gains experienced by Comparison group students were slightly greater than those experienced by students in Tools classrooms, though there were no differences overall between Tools and Comparison groups.

Academic Knowledge: the gains experienced by Tools students were slightly greater than those experienced by Comparison students, though there were no overall differences between Tools and Comparison groups.

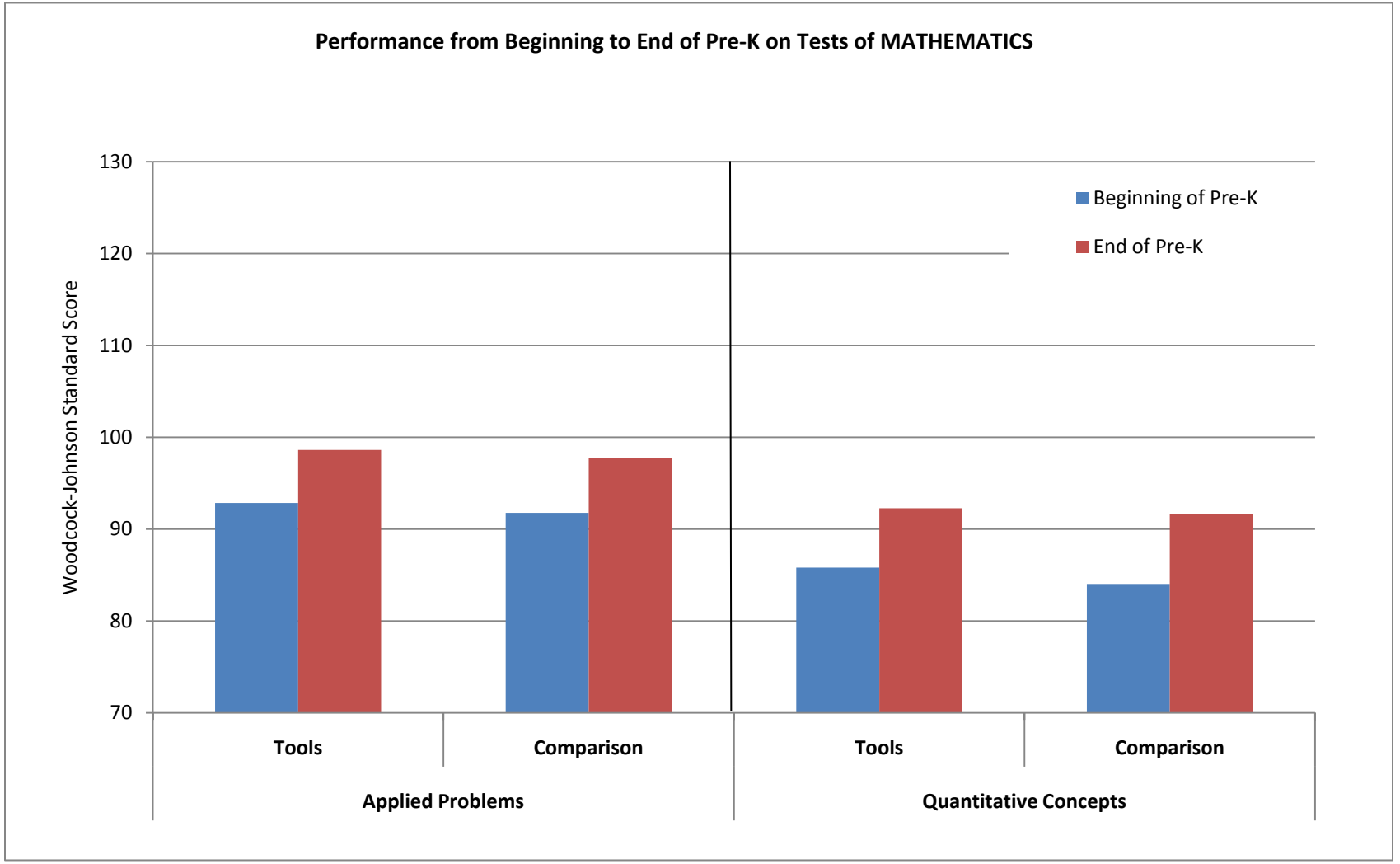

Performance from Beginning to End of Pre-K on Tests of MATHEMATICS
Woodcock-Johnson Standard Score
130
120
110
100
90
80
70
Beginning of Pre-K
End of Pre-K
Tools
Comparison
Tools
Comparison
Applied Problems
Quantitative Concepts

TABLE 14: EFFECTS OF THE TOOLS OF THE MIND CURRICULUM ON MATHEMATICS OUTCOMES

	Applied Problems		Quantitative Concepts	
	F	*p*	*F*	*p*
Tools Condition (vs. Comparison)	2.26	.133	0.02	.883
Gender=male	0.00	.977	0.02	.891
Language status=ELL	0.00	.952	1.46	.227
Ethnicity=Black	14.25	.000	3.24	.072
Ethnicity=White	2.04	.154	1.49	.223
Ethnicity=Hispanic	2.64	.105	0.02	.901
Pretest	529.07	.000	509.45	.000
Age at pretest	0.18	.670	2.80	.095
Pre-post interval	1.93	.176	3.68	.065
Interactions				
Condition x Pretest	0.25	.617	0.22	.637
Condition x Gender	0.32	.570	1.11	.292
Condition x ELL	1.53	.216	0.50	.478
Condition x Black Ethnicity	1.00	.317	0.11	.735
Condition x White Ethnicity	1.40	.238	0.05	.824

MEASURES OF SELF-REGULATION

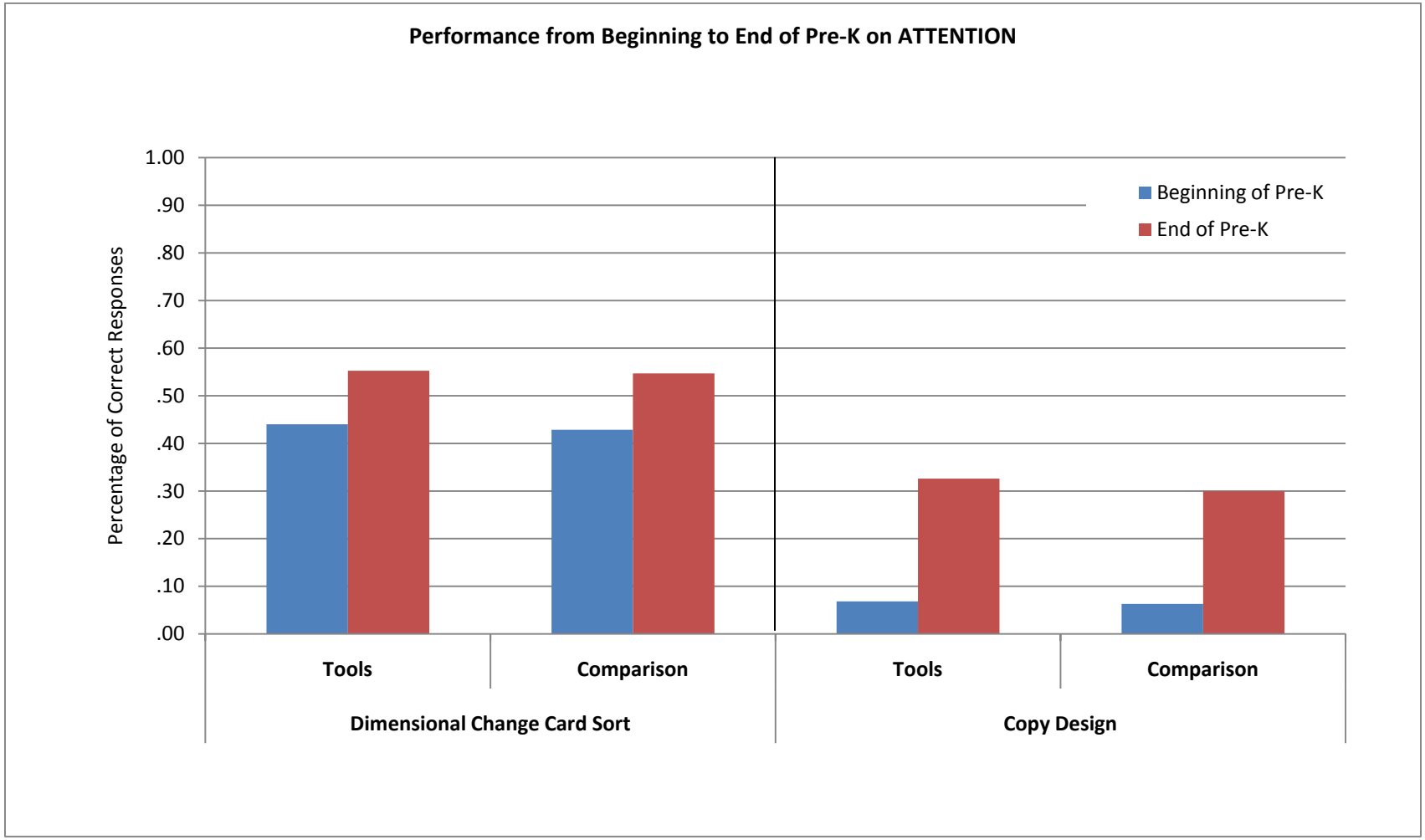


TABLE 15: EFFECTS OF THE TOOLS OF THE MIND CURRICULUM ON DIRECT ASSESSMENTS OF ATTENTION

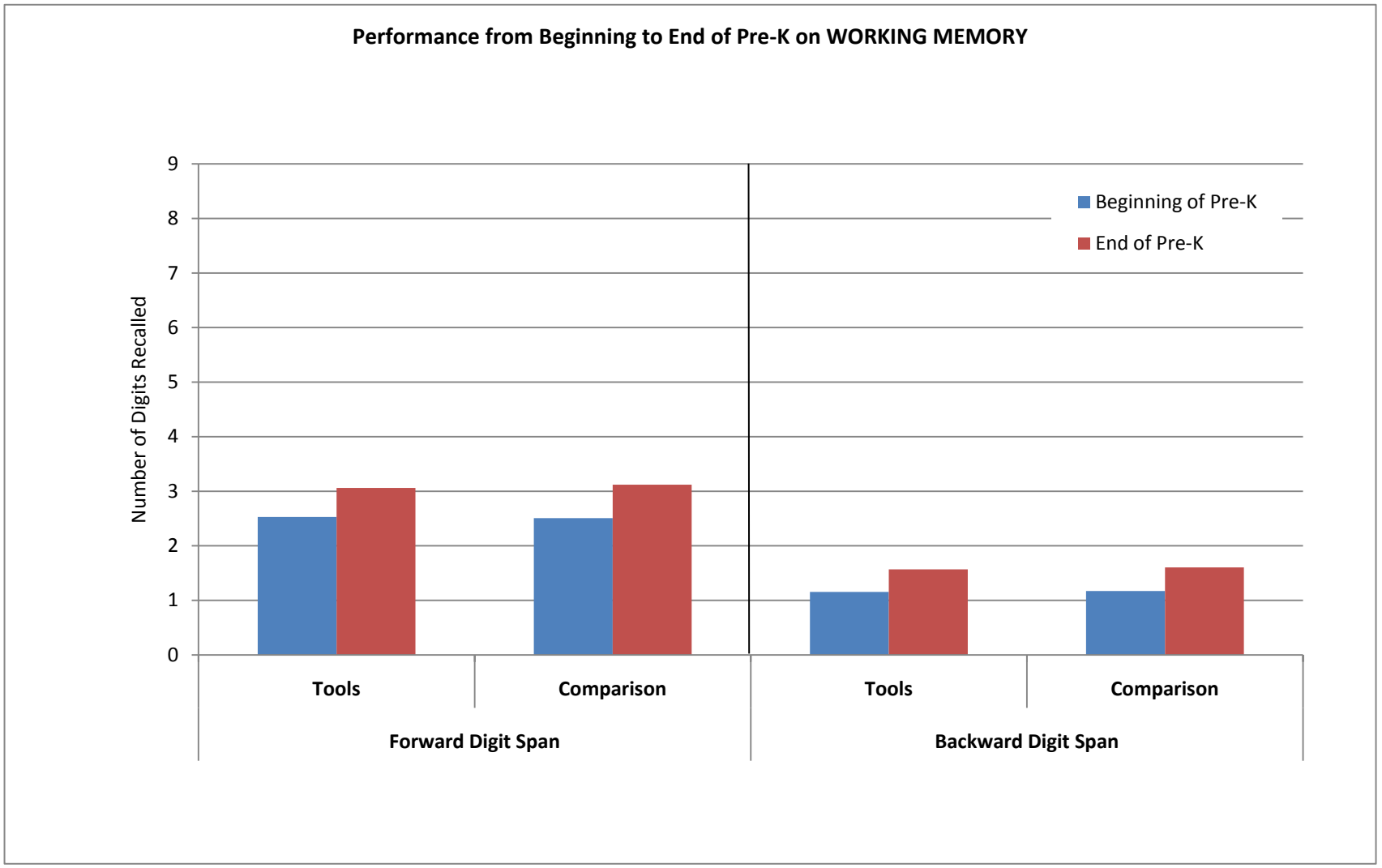
	DCCS		Copy Design	
	F	p	F	p
Tools Condition (vs. Comparison)	0.01	.935	0.14	.707
Gender=male	11.93	.001	2.46	.117
Language status=ELL	0.83	.364	2.41	.121
Ethnicity=Black	1.08	.299	6.33	.012
Ethnicity=White	2.37	.125	3.03	.082
Ethnicity=Hispanic	0.64	.426	0.11	.738
Pretest	76.78	.000	172.76	.000
Age at pretest	0.71	.399	14.55	.000
Pre-post interval	0.02	.903	0.16	.688
Interactions				
Condition x Pretest	0.96	.327	1.84	.175
Condition x Gender	3.81	.051	0.15	.696
Condition x ELL	0.02	.891	0.35	.554
Condition x Black Ethnicity	0.01	.932	0.10	.754
Condition x White Ethnicity	0.25	.616	0.10	.757

[1] *Tested via multi-level models with students nested within classrooms, schools, and school systems.*

TABLE 16: POST HOC TESTS OF THE GENDER INTERACTION: DCCS

	Tools of the Mind		Comparison		Mean Difference		
	Mean	se	Mean	se	diff	se	p
Male	1.56	0.05	1.63	0.05	-0.07	0.07	.322
Female	1.77	0.05	1.68	0.06	0.08	0.07	.241

While the overall interaction between gender and intervention condition was marginally significant, the pairwise comparisons of Tools vs. Comparison for the boys and girls did not reach statistical significance. The source of the interaction appears to be the difference between boys and girls in the intervention condition, with girls outperforming boys.



PEABODY research institute

TABLE 17: EFFECTS OF THE TOOLS OF THE MIND CURRICULUM ON DIRECT ASSESSMENTS OF WORKING MEMORY

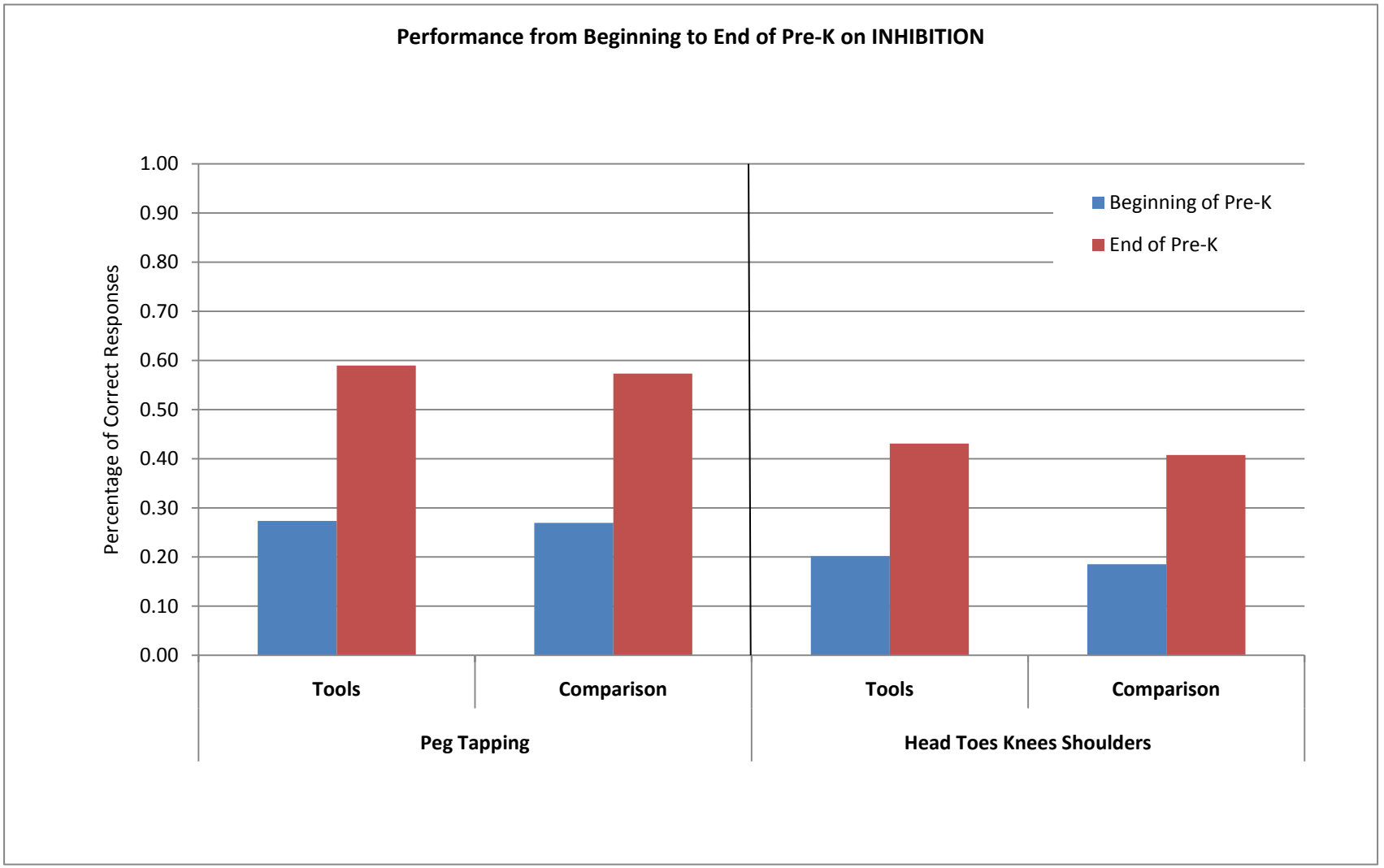
	Forward Digit Span		Backward Digit Span	
	F	p	F	p
Tools Condition (vs. Comparison)	0.31	.576	0.00	.998
Gender=male	0.11	.738	5.29	.022
Language status=ELL	0.25	.620	2.23	.136
Ethnicity=Black	4.67	.031	2.60	.107
Ethnicity=White	0.30	.584	0.01	.925
Ethnicity=Hispanic	0.69	.405	0.00	.997
Pretest	140.22	.000	27.90	.000
Age at pretest	4.89	.027	17.43	.000
Pre-post interval	0.35	.559	7.58	.007
Interactions				
Condition x Pretest	0.05	.829	0.00	.973
Condition x Gender	0.00	.947	6.47	.011
Condition x ELL	0.98	.322	0.33	.563
Condition x Black Ethnicity	1.61	.205	1.76	.186
Condition x White Ethnicity	0.49	.485	0.01	.926

[1] *Tested via multi-level models with students nested within classrooms, schools, and school systems.*

TABLE 18: POST HOC TESTS OF GENDER BY CONDITION INTERACTION: BACKWARD DIGIT SPAN

	Tools of the Mind		Comparison		Mean Difference		
	Mean	se	Mean	se	diff	se	p
Male	1.64	0.10	1.46	0.12	0.18	0.13	.154
Female	1.62	0.11	1.90	0.12	0-.29	0.14	.035

There is a statistically significant difference between the Tools and Comparison conditions for girls on Backward Digit Span. The difference favors the Comparison group girls.



PEABODY research institute

TABLE 19: EFFECTS OF THE TOOLS OF THE MIND CURRICULUM ON DIRECT ASSESSMENTS OF INHIBITORY CONTROL

	HTKS		Peg Tapping	
	F	p	F	p
Tools Condition (vs. Comparison)	0.04	.837	0.17	.685
Gender=male	8.75	.003	6.78	.009
Language status=ELL	0.68	.409	0.44	.506
Ethnicity=Black	1.20	.273	4.87	.028
Ethnicity=White	2.03	.154	0.05	.819
Ethnicity=Hispanic	0.22	.641	1.22	.271
Pretest	199.22	.000	308.76	.000
Age at pretest	14.64	.000	5.16	.023
Pre-post interval	8.68	.004	0.07	.792
Interactions				
Condition x Pretest	0.95	.331	0.61	.436
Condition x Gender	0.54	.464	0.09	.767
Condition x ELL	0.51	.477	0.00	.950
Condition x Black Ethnicity	0.24	.622	4.08	.044
Condition x White Ethnicity	0.33	.565	1.01	.316

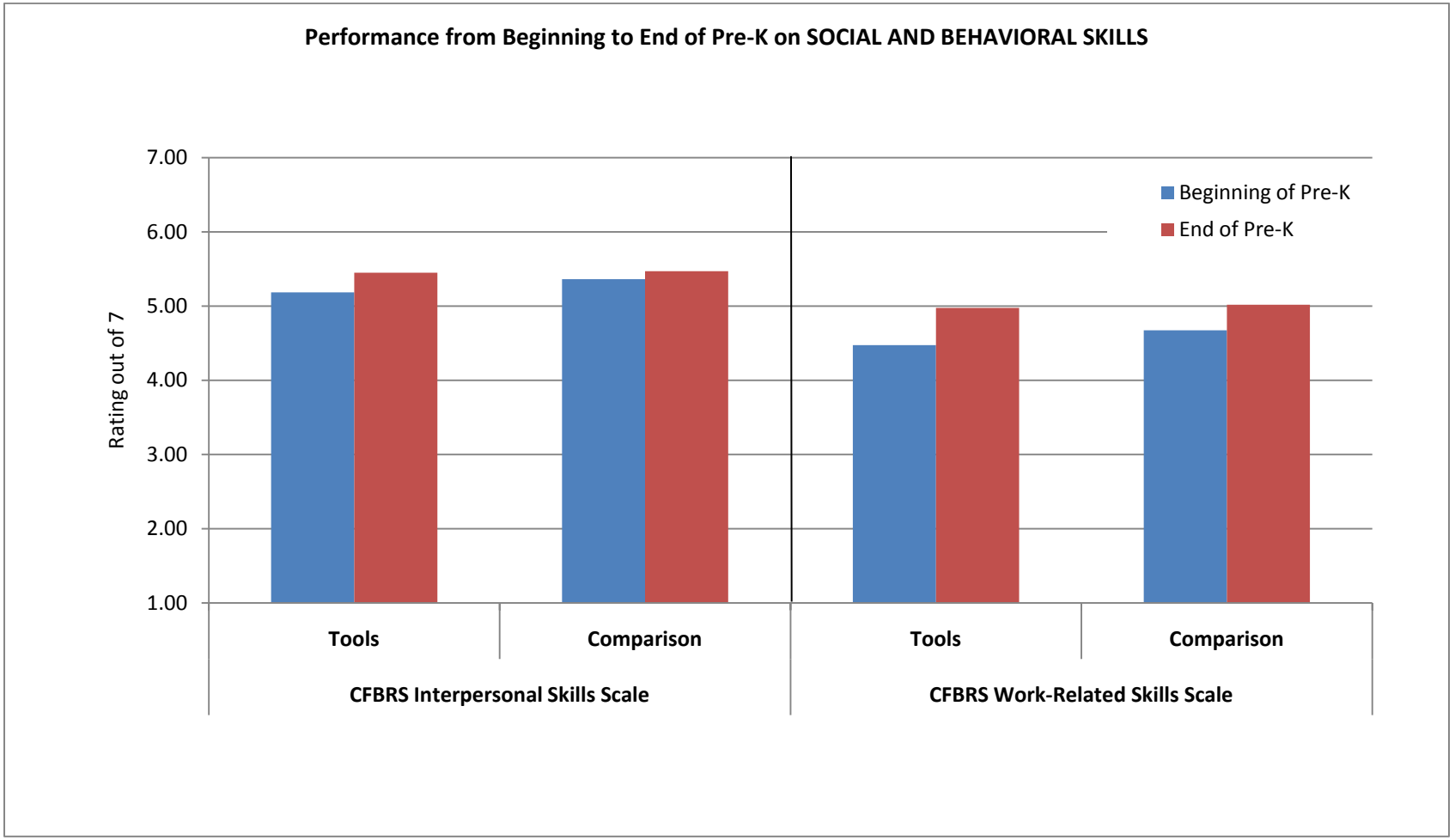
[1] *Tested via multi-level models with students nested within classrooms, schools, and school systems.*

TABLE 20: POST HOC TESTS OF ETHNICITY BY CONDITION INTERACTION: PEG TAPPING

	Tools of the Mind		Comparison		Mean Difference		
	Mean	se	Mean	se	diff	se	p
Black	9.27	0.75	7.09	0.77	2.18	1.01	.031
Non-black	9.55	0.39	9.89	0.40	-0.35	0.51	.499

Black students in Tools classrooms evidenced significantly greater gains on the Peg Tapping assessment than Black students in Comparison classrooms. For non-black students, there were no Tools vs. Comparison differences on Peg Tapping.

CHILD BEHAVIORAL RATINGS



PEABODY research institute

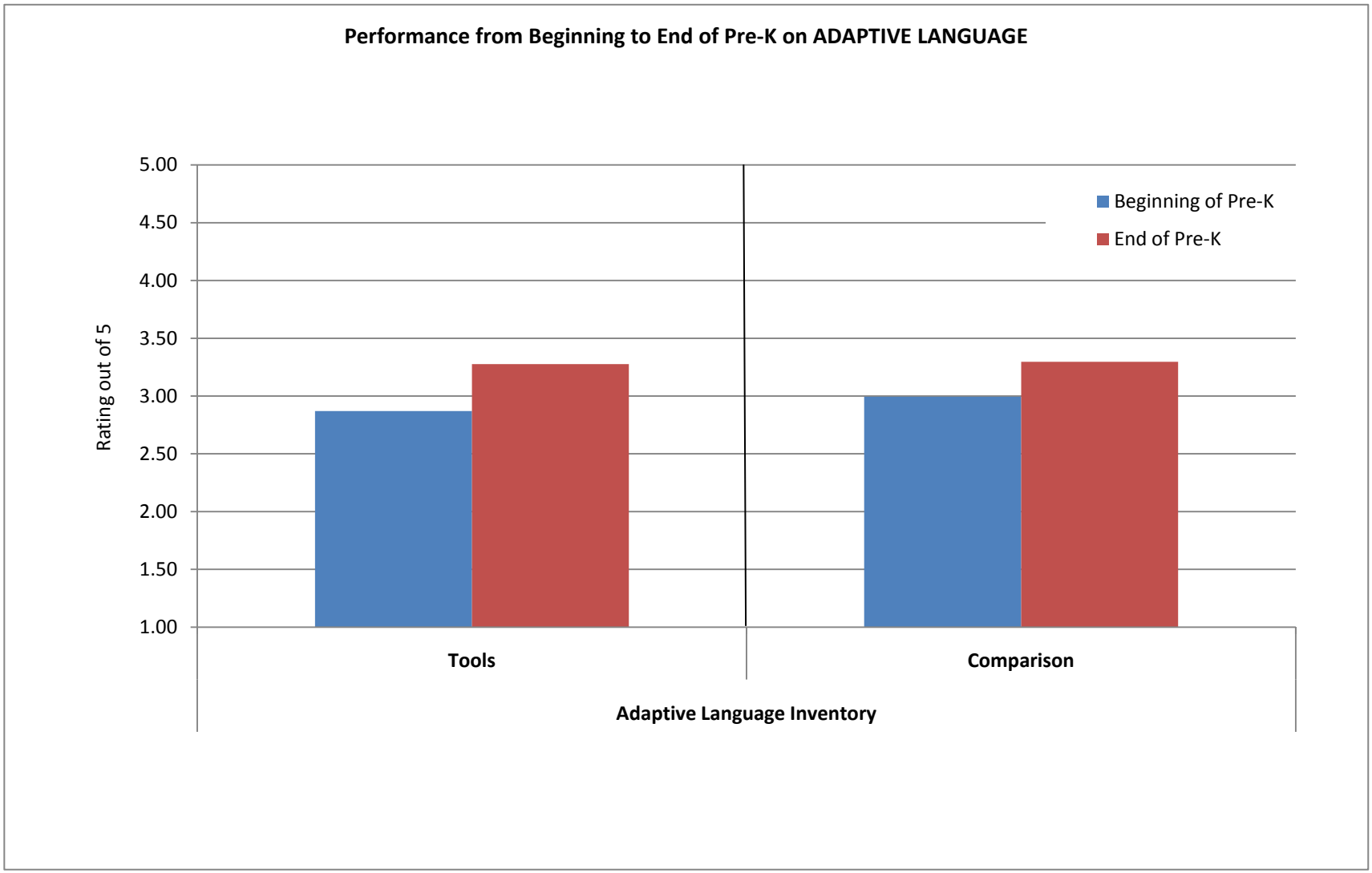

Performance from Beginning to End of Pre-K on ADAPTIVE LANGUAGE
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
Rating out of 5
Beginning of Pre-K
End of Pre-K
Tools
Comparison
Adaptive Language Inventory

TABLE 21: EFFECTS OF THE TOOLS OF THE MIND CURRICULUM ON TEACHER RATINGS OF INTERPERSONAL SKILLS, WORK-RELATED SKILLS AND ADAPTIVE LANGUAGE

	Interpersonal Skills		Work-related Skills		Adaptive Language	
	F	p	F	p	F	p
Tools Condition (vs. Comparison)	1.81	.180	0.24	.624	1.64	.202
Gender=male	0.05	.820	3.09	.079	2.45	.118
Language status=ELL	0.63	.428	3.71	.054	0.33	.568
Ethnicity=Black	8.71	.003	19.49	.000	10.22	.001
Ethnicity=White	3.79	.052	6.68	.010	4.09	.043
Ethnicity=Hispanic	1.44	.230	9.78	.002	3.91	.048
Pretest	1268.90	.000	932.07	.000	867.40	.000
Age at pretest	1.17	.281	2.59	.108	4.55	.033
Pre-post interval	0.15	.702	0.69	.407	2.35	.128
Interactions						
Condition x Pretest	7.74	.006	2.00	.157	2.24	.135
Condition x Gender	0.66	.417	0.10	.751	0.81	.370
Condition x ELL	0.43	.513	0.03	.860	1.21	.271
Condition x Black Ethnicity	0.00	.986	0.81	.369	0.18	.674
Condition x White Ethnicity	0.34	.559	0.20	.654	0.66	.417

[1] *Tested via multi-level models with students nested within classrooms, schools, and school systems.*

TABLE 22: PRETEST AND POSTTEST MEANS BY CONDITION INTERPERSONAL SKILLS: ILLUSTRATION OF PRETEST BY CONDITION INTERACTION

	Tools of the Mind		Comparison	
	Post Mean	sd	Post Mean	sd
Pretest	5.19	1.07	5.36	1.07
Posttest	5.45	1.05	5.47	1.07

The gains experienced by Tools students on the Interpersonal Skills teacher ratings were greater than those experienced by Comparison students, though there were no overall differences at posttest between Tools and Comparison groups.

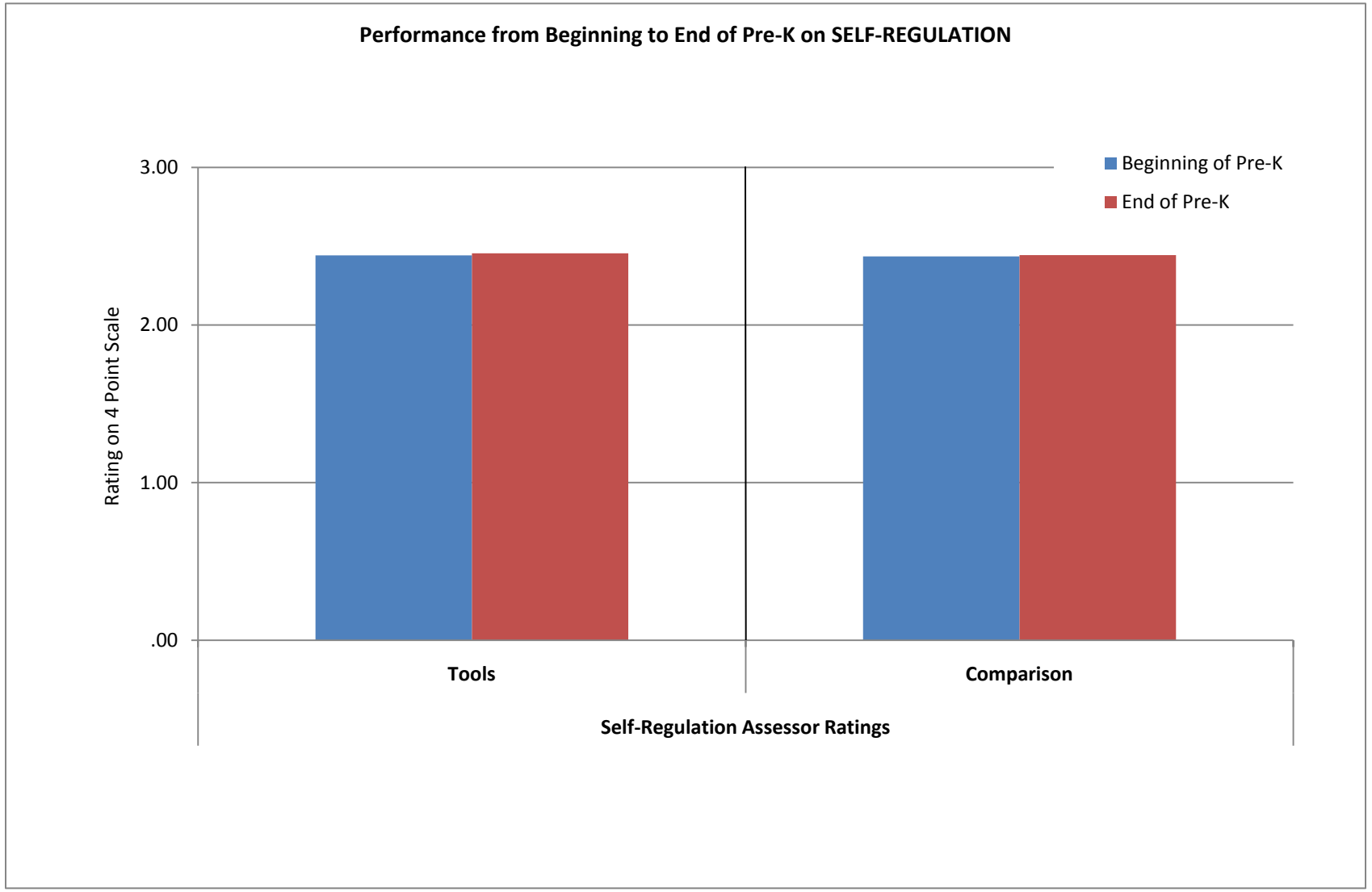

Performance from Beginning to End of Pre-K on SELF-REGULATION
Beginning of Pre-K
End of Pre-K
3.00
2.00
1.00
.00
Rating on 4 Point Scale
Tools
Comparison
Self-Regulation Assessor Ratings

TABLE 23: EFFECTS OF THE TOOLS OF THE MIND CURRICULUM ON ASSESSOR RATINGS OF ATTENTIVENESS, IMPULSIVENESS, AND COOPERATIVENESS

	Attentiveness		Impulsiveness		Cooperativeness	
	F	p	F	p	F	p
Tools Condition (vs. Comparison)	0.00	.983	0.14	.706	0.25	.615
Gender=male	1.23	.268	0.07	.786	2.22	.137
Language status=ELL	2.87	.091	3.65	.056	2.94	.087
Ethnicity=Black	4.01	.046	0.41	.523	0.01	.932
Ethnicity=White	0.03	.852	0.00	.981	3.40	.066
Ethnicity=Hispanic	0.52	.473	0.77	.380	2.89	.090
Pretest	300.68	.000	380.63	.000	160.75	.000
Age at pretest	0.27	.601	1.86	.173	0.73	.394
Pre-post interval	1.55	.214	1.87	.177	0.24	.626
Interactions						
Condition x Pretest	0.04	.848	1.15	.285	2.21	.137
Condition x Gender	0.02	.877	0.64	.423	0.17	.677
Condition x ELL	0.02	.902	1.76	.185	2.32	.128
Condition x Black Ethnicity	0.65	.421	2.83	.093	3.44	.064
Condition x White Ethnicity	0.09	.765	0.01	.920	0.83	.362

[1] *Tested via multi-level models with students nested within classrooms, schools, and school systems.*

TABLE 24: POST HOC TESTS OF ETHNICITY BY CONDITION INTERACTION: IMPULSIVENESS ASSESSOR RATINGS

	Tools of the Mind		Comparison		Mean Difference		
	Post Mean	se	Post Mean	se	diff	se	p
Black	2.14	0.05	2.04	0.05	0.09	0.06	.137
Non-black	2.10	0.03	2.13	0.03	-0.03	0.04	.405

While the overall interaction between black ethnicity and intervention condition was marginally significant, the pairwise comparisons of Tools vs. Comparison for the Black students and non-black students did not separately reach statistical significance. The source of the interaction appears to be the differences between Black and non-Black students within the different intervention conditions.

TABLE 25: POST HOC TESTS OF ETHNICITY BY CONDITION INTERACTION: COOPERATIVENESS ASSESSOR RATINGS

	Tools of the Mind		Comparison		Mean Difference		
	Post Mean	se	Post Mean	se	diff	se	p
Black	2.65	0.05	2.52	0.05	0.12	0.07	.081
Non-black	2.56	0.03	2.60	0.03	-0.03	0.04	.430

Black students in Tools classrooms evidenced significantly greater gains on assessor ratings of cooperativeness than Black students in Comparison classrooms. For non-black students, there were no Tools vs. Comparison differences on assessor ratings of cooperativeness.

RESULTS: IMPLEMENTATION FIDELITY

- Do teachers trained in the *Tools of the Mind* curriculum carry out *Tools* Activities, enact the required steps in each activity, conduct the Activities at the appropriate times and carry out a range of easy to difficult activities?

- Are the Activities, Steps enacted and the implementation score weighted by difficulty of the item related to achievement and self-regulation outcomes?

- Are the mediators and "Should Not's" specified by the curriculum related to achievement and self-regulation outcomes?

- Do the factors associated with implementation from our Fidelity Implementation system distinguish the 8 teachers identified by Tools Trainers, Coaches, Observers and teacher post ratings as High Implementers?

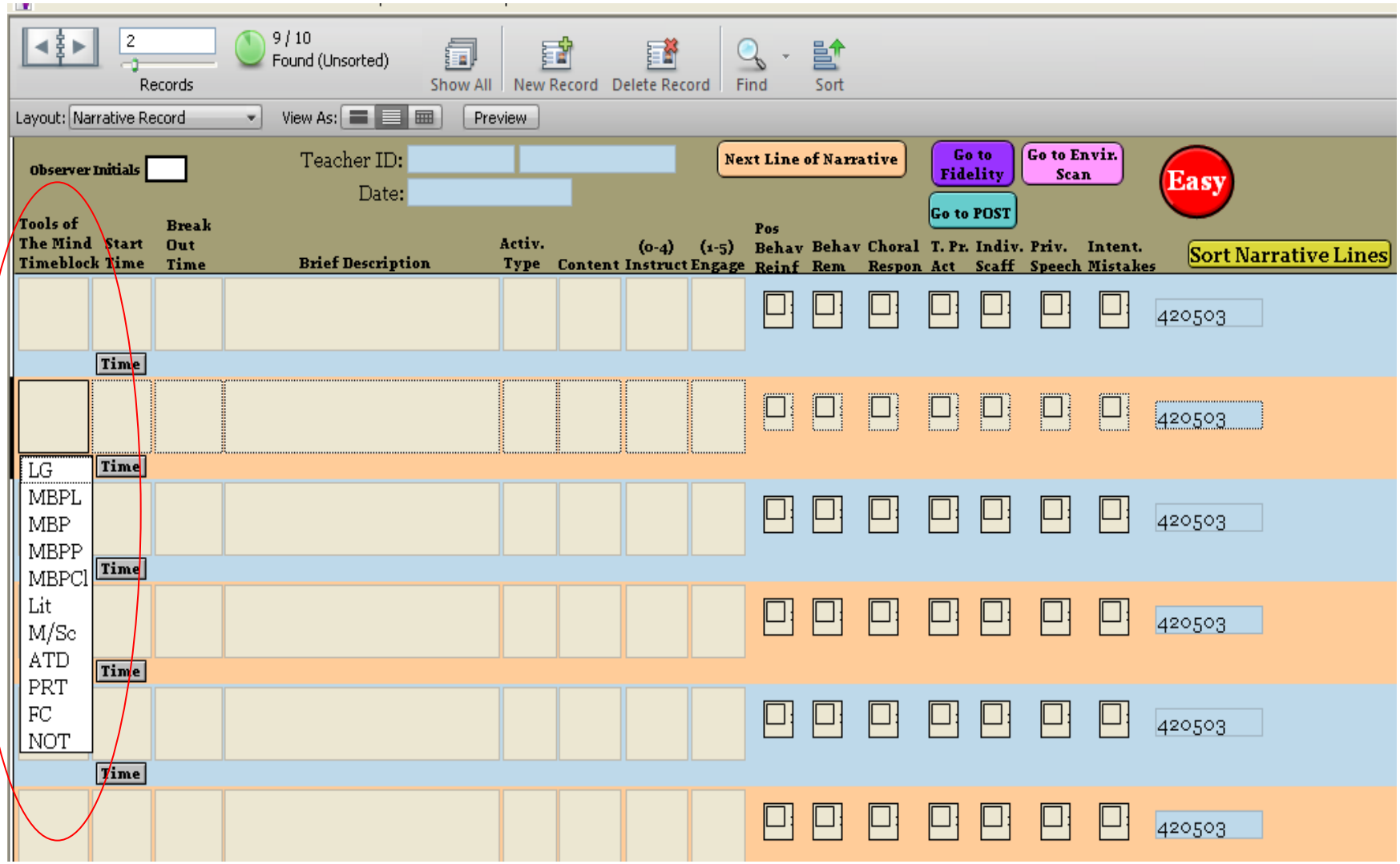
- Do the 8 teachers identified as High Implementers of the curriculum have stronger effects on achievement and self-regulation outcomes than the 24 other trained teachers?

Tools Fidelity

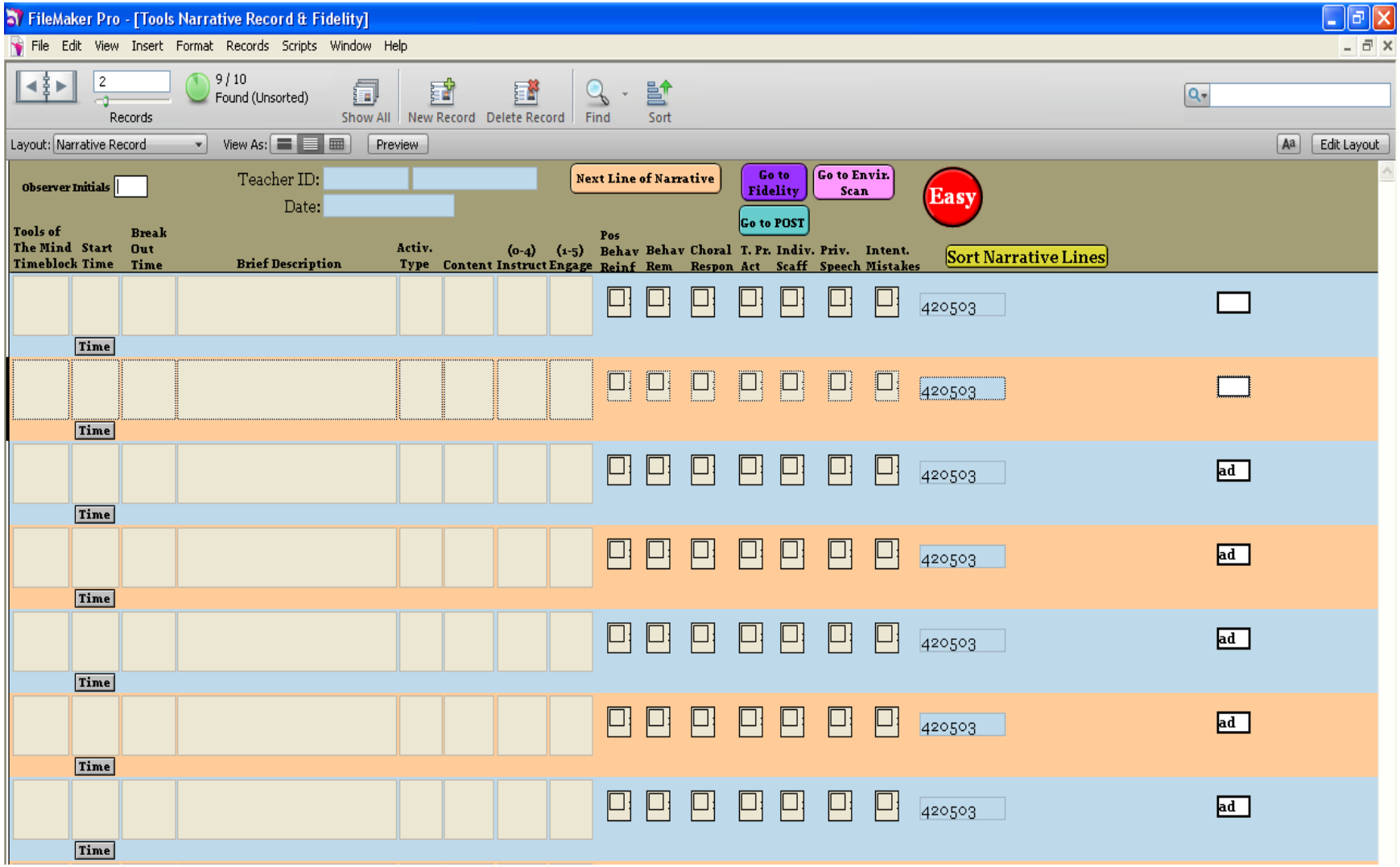
The Tools Fidelity captures the specific *Tools* curriculum activities that occur within a classroom observation period along with information about the specific implementation steps that occur, and mediators that are used. In addition, the curriculum developers furnished a list of behaviors that "should not" happen during each activity that are also captured by observers. The *Tools* Fidelity Measure provides an in-depth look at the degree of curriculum implementation across the year within experimental classrooms. Although this instrument was used in both *Tools* and comparison classrooms, relatively few *Tools* activities were ever coded in comparison rooms.

For more information see: Vorhaus, E. & Meador, D. (2010). Tools of the Mind curriculum implementation fidelity checklist. Nashville, TN: Peabody Research Institute, Vanderbilt University.

Tools of the Mind Timeblocks

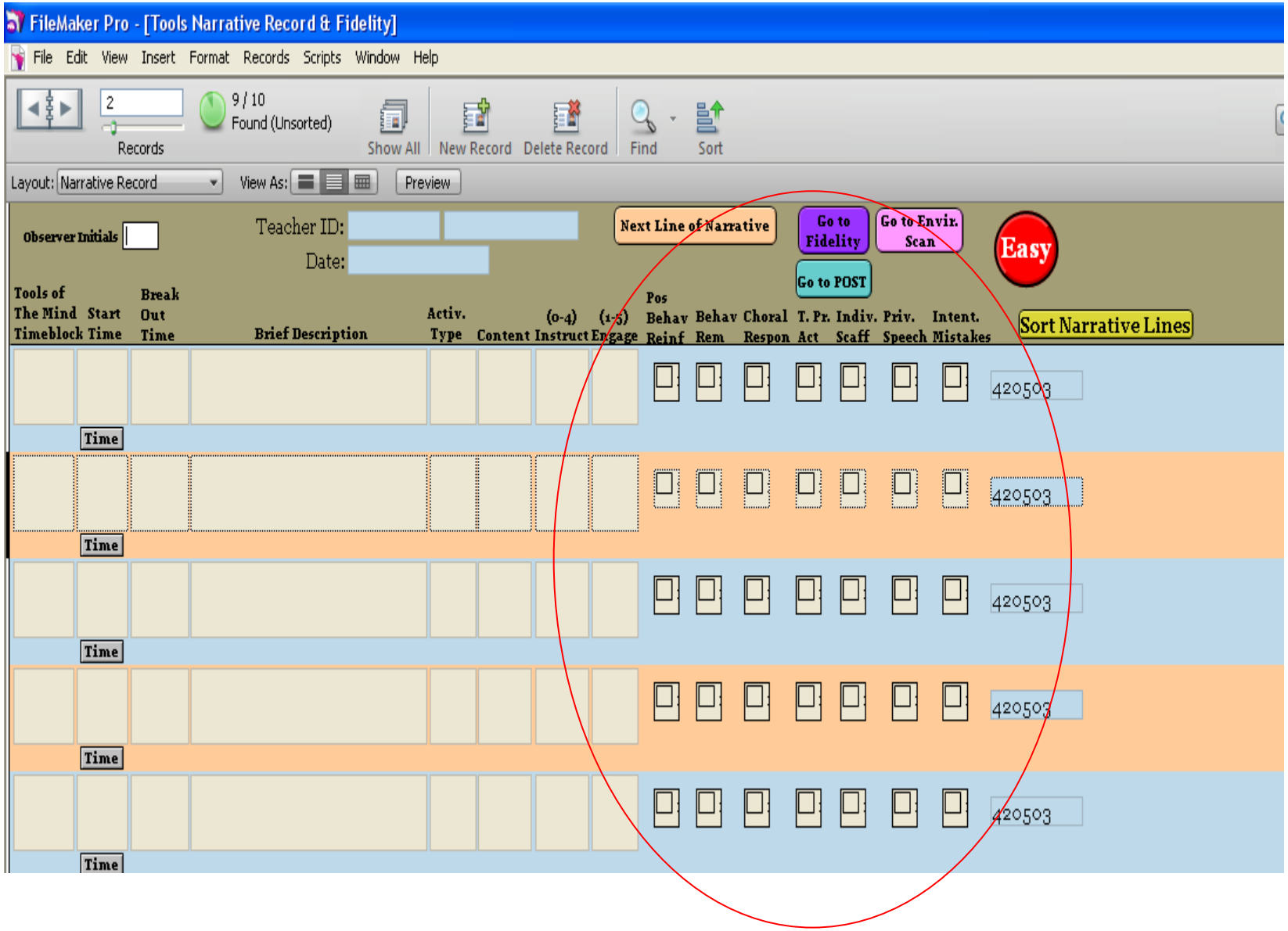


Narrative



PEABODY research institute

Observational Check Boxes



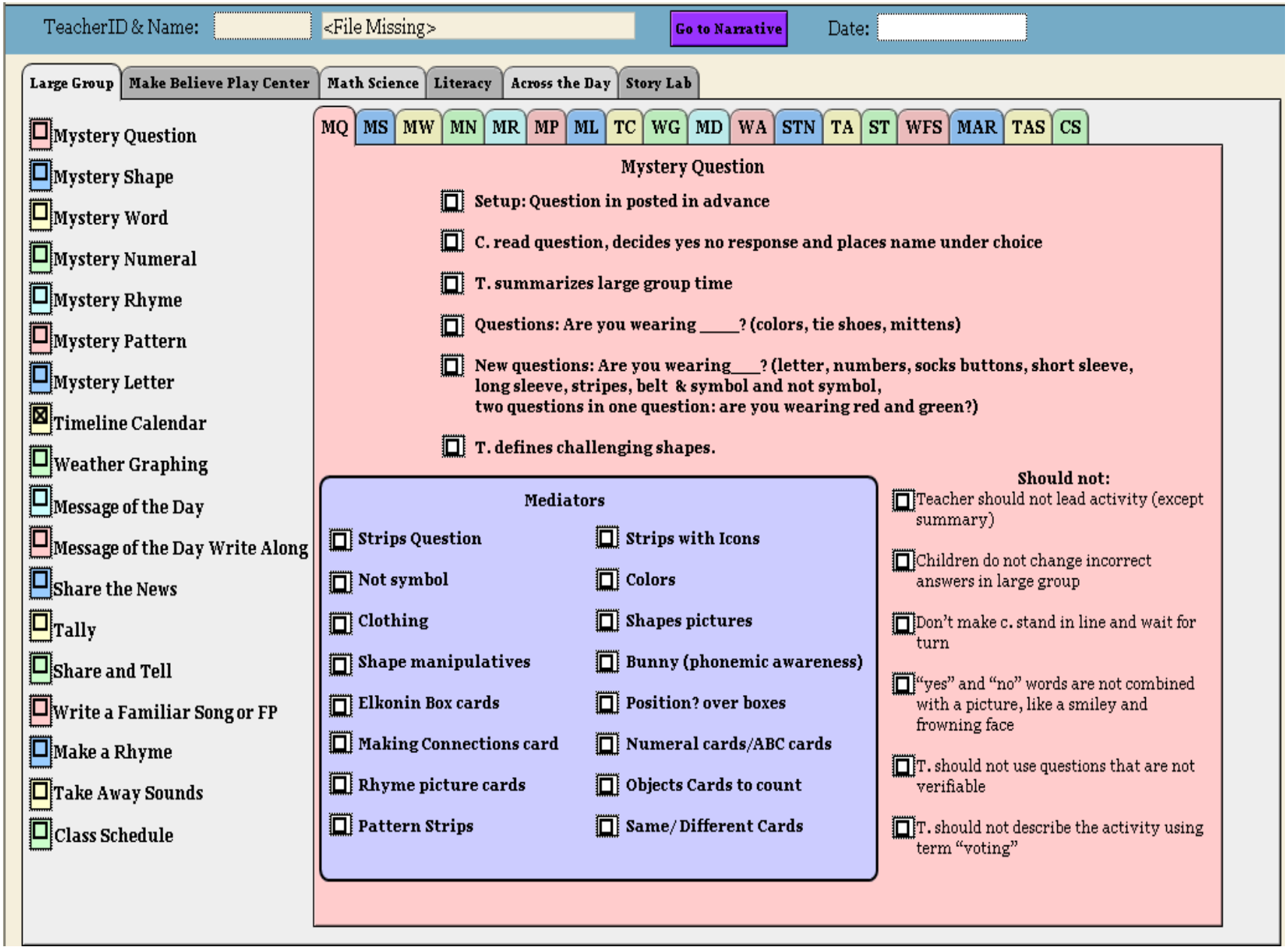

TeacherID & Name:
<File Missing>
Go to Narrative
Date:
Large Group
Make Believe Play Center
Math Science
Literacy
Across the Day
Story Lab
Mystery Question
Mystery Shape
Mystery Word
Mystery Numeral
Mystery Rhyme
Mystery Pattern
Mystery Letter
Timeline Calendar
Weather Graphing
Message of the Day
Message of the Day Write Along
Share the News
Tally
Share and Tell
Write a Familiar Song or FP
Make a Rhyme
Take Away Sounds
Class Schedule
MQ
MS
MW
MN
MR
MP
ML
TC
WG
MD
WA
STN
TA
ST
WFS
MAR
TAS
CS
Mystery Question
Setup: Question in posted in advance
C. read question, decides yes no response and places name under choice
T. summarizes large group time
Questions: Are you wearing ____? (colors, tie shoes, mittens)
New questions: Are you wearing___? (letter, numbers, socks buttons, short sleeve, long sleeve, stripes, belt & symbol and not symbol, two questions in one question: are you wearing red and green?)
T. defines challenging shapes.
Mediators
Strips Question
Not symbol
Clothing
Shape manipulatives
Elkonin Box cards
Making Connections card
Rhyme picture cards
Pattern Strips
Strips with Icons
Colors
Shapes pictures
Bunny (phonemic awareness)
Position? over boxes
Numeral cards/ABC cards
Objects Cards to count
Same/ Different Cards
Should not:
Teacher should not lead activity (except summary)
Children do not change incorrect answers in large group
Don't make c. stand in line and wait for turn
"yes" and "no" words are not combined with a picture, like a smiley and frowning face
T. should not use questions that are not verifiable
T. should not describe the activity using term "voting"

TABLE 26: FIDELITY ACTIVITIES, STEPS AND WEIGHTED SCORE MEANS BY OBSERVATION TIME FOR *TOOLS* CLASSROOMS

Activities	Level of Difficulty	Observation 1		Observation 2		Observation 3		Should Nots
		Tools Training	# steps	Tools Training	# steps	Tools Training	# steps	
Large Group:								
Mystery Question	E	1	1-5					6
Mystery Shape	E	2	1-4	2,3	1-6			6
Mystery Word	E			3	1-3	3,4	1-7	6
Mystery Numeral	E			3	1-3	3,4	1, 3-7	6
Mystery Pattern	E					4	1-6	6
Mystery Letter	E					4	1-4	6
Mystery Rhyme	E					4	1-4	6
Timeline Calendar	E	1,2	1-5	2,3	1-7	3,4	1-8	6
Weather Graphing	E	1,2	1-3	2,3	1-3	3,4	1-3	2
Message of the Day	M	1,2	1-6	2,3	1-7	3,4	1-8	8
Message of the Day Write Along	D					4	1-7	8
Share the News	E	1,2	1-6	2,3	1-4, 7	3,4	1-4,8	3
Share and Tell	E	1,2	1-5	2,3	1-5	3,4	1-5	3
Tally	E					4	1-4	0
Write Along a Familiar Song/ Finger Play	D					4	1-5	5
Make a Rhyme	M					4	1-5	2
Take Away Sounds	M					4	1-7	2
Class Schedules	E	1,2	1-3	2,3	1-3	3	1-3	0
Make Believe Play Block								
Make Believe Play Planning	D	1,2	1-8, 10	2,3	1-10	3,4	1-11	7
Make Believe Play Practice	D	1,2	1-4	2,3	1-4	3,4	1-8	2
Make Believe Play	D	1,2	1-5	2,3	1-7	3,4	1-11	2

Activities	Level of Difficulty	Observation 1		Observation 2		Observation 3		Should Nots
		Tools Training	# steps	Tools Training	# steps	Tools Training	# steps	
Math/Science								
Remember and Replicate	M	1,2	1-8	2,3	2-9	3	2-7,9,10	1
Puzzles and Manipulatives	E	1,2	1-3					1
Math Memory	M	2	1-8	2,3	1,3-9	3,4	1,3-13	2
Science Eyes	D	2	1-6	2,3	1,2,4-9	3,4	1,2,4,5, 7-12	5
Numeral Game	M			3	1-5	3,4	1,2,4-8	2
Venger Drawing	D			3	1-5	3,4	1-6	0
Attribute Game	M			3	1-4	3,4	1-6	0
Numberline Hopscotch	M			3	1-4	3	1-6	2
I have who has Colors	E			3	1-8	3	1-8	3
I have who has Numbers	E			3	1-8	3,4	1-8	3
I have who has Shapes	E			3	1-8	3,4	1-8	3
Making Collections	D	2	1-4, 6-12	2,3	1-3, 5-12	3,4	1-3, 5-12	0
Patterns with Manipulatives	M					4	1-5	0
Literacy								
Graphics Practice	M	1,2	1-9	2,3	1-8,	3,4	1-8, 11-13	5
Buddy Reading	M	1,2	1-6	2,3	1-9	3,4	1-5, 7-10	5
Elkonin Boxes 1: Jumping the Sounds	D					4	1-5	4
Elkonin Boxes 2: Token Game	D					4	1-4	4
I have who has Letters	E			3	1-8	3,4	1-8	4
Story Labs								
Story Lab: Active Listening	E	1,2	1-6	2,3	1-6	3,4	1-6	4
Story Lab: Connections	E	1,2	1-5	2,3	1-5	3,4	1-5	3
Story Lab: Vocabulary	D	1,2	1-6	2,3	1-6	3,4	1-6	4
Story Lab: Learning Facts	D	2	1-5	2,3	1-6	3,4	1-7	1
Story Lab: Visualization	M	2	1-7	2,3	1-7	3,4	1-8	2

Activities	Level of Difficulty	Observation 1		Observation 2		Observation 3		Should Nots
		Tools Training	# steps	Tools Training	# steps	Tools Training	# steps	
Story Lab: Grammar	D			3	1-10	3,4	1-10	3
Story Lab: Extensions	D			3	1-8, 10	3,4	1-10	4
Story Lab: Predictions and Inferences	D					4	1-6	1
Activities through the Day								
Attention Focusing Activities	E	1,2	1-5	2,3	1-5	3,4	1-6	2
Freeze Game	E	1,2	1-4	2,3	1-5	3	1-5	4
Partner Freeze	E					4	1-7	4
Two Step Freeze	M					4	1-4	4
Freeze on Number	M			3	1-4	3,4	1-5	4
Pattern Movement Game	M	2	1-7	2,3	1-7	3	1-9	3
Complete and Continue	M			3	1-7	3,4	1-7	3
Number Follow the Leader	M			3	1-4	3,4	1-5	2
Pretend Transitions	E	1,2	1-3	2,3	1-3	3,4	1-3	3
Community Building Activities	E	1,2	1-3	2,3	1-3			0
I have who has Name Game	E	1,2	1-6	2,3	1-6	3,4	1-6	1
Mousetrap	E					4	1-5	2
What are you doing Mr. Wolf?	E					4	1-5	2

TABLE 27: FIDELITY ACTIVITIES, STEPS AND WEIGHTED SCORE MEANS BY OBSERVATION TIME FOR *TOOLS* CLASSROOMS

	Observation 1			Observation 2			Observation 3			Overall		
	Activities	Steps	Score	Activities	Steps	Score	Activities	Steps	Score	Activities	Steps	Score
North Carolina Sample (N= 15)												
Mean	13.07	54.13	154.62	13.20	58.80	178.93	14.27	63.73	158.57	40.53	176.67	492.12
SD	3.65	20.17	65.29	3.78	21.12	75.76	3.75	19.13	55.21	10.20	56.21	175.89
Range	5-17	16-78	28.3-252.8	4-18	11-86	23.3-285.7	5-19	15-88	28.1-250.0	15-52	46-240	99.9-715.5
Tennessee Sample (N= 17)												
Mean	13.24	53.24	147.75	15.24	64.06	170.90	13.94	60.41	162.9	42.41	177.71	481.56
SD	3.13	12.29	48.33	3.11	15.31	38.3	2.77	15.41	41.47	7.29	36.17	111.14
Range	8-21	29-78	61.9-262.8	9-21	27-95	93.8-239.2	9-19	38-94	97.8-247.5	27-56	101-250	258.2-709.32
Total Sample												
Mean	13.16	53.66	150.97	14.28	61.59	174.67	14.09	61.96	160.87	41.53	177.22	486.51
SD	3.33	16.18	56.06	3.54	18.15	58.01	3.22	17.05	47.63	8.68	45.85	142.74
Range	5-21	16-78	28.3–262.8	4-21	11-95	23.3-285.7	5-19	15-94	28.1-250.0	15-56	46-250	99.9–715.5

TABLE 28: TOTAL FIDELITY SHOULD NOTS AND MEDIATORS BY OBSERVATION TIME FOR *TOOLS* CLASSROOMS

	Observation 1		Observation 2		Observation 3		Overall	
	Should Nots	Mediators	Should Nots	Mediators	Should Nots	Mediators	Should Nots	Mediators
North Carolina Sample (N= 15)								
Mean	3.80	31.27	1.27	31.07	2.93	32.67	8.00	95.00
SD	2.68	9.38	1.71	9.90	1.83	10.31	4.21	26.92
Range	0-8	12-42	0-5	12-48	0-6	7-44	2-16	35-117
Tennessee Sample (N= 17)								
Mean	5.65	30.29	4.89	33.41	5.76	33.29	16.29	96.00
SD	2.21	6.73	3.02	5.52	3.07	6.12	6.02	15.49
Range	1-8	20-46	0-9	19-41	0-12	23-42	2-27	67-121
Total Sample								
Mean	4.78	30.75	3.19	32.31	4.44	32.47	12.41	95.24
SD	2.57	7.96	3.06	7.84	2.91	8.21	6.66	21.24
Range	0-8	12-46	0-9	12-48	0-12	7-44	2-27	35-121

TABLE 29: ASSOCIATIONS BETWEEN MEASURES OF FIDELITY AND STUDENTS' ACHIEVEMENT AND SELF-REGULATION OUTCOMES

	Activities	*Steps*	*Should Nots (-)*	*Mediators*	*Weighted Fidelity*
WJ Factor Score	-.09	-.07	-.01	-.07	-.06
Letter-Word Identification	-.01	.04	-.02	.08	.03
Spelling	-.11	-.08	-.16*	-.11	-.06
Academic Knowledge	-.14	-.08	.03	-.12	-.05
Oral Comprehension	-.13†	-.12†	-.04	-.13†	-.13*
Picture Vocabulary	-.10	-.08	-.02	-.07	-.05
Applied Problems	.04	.03	.01	-.01	.05
Quantitative Concepts	.02	-.04	.04	-.02	-.01
	Activities	*Steps*	*Should Nots (-)*	*Mediators*	*Weighted Fidelity*
Self-Regulation Factor Score	-.01	-.02	.01	-.06	.01
Dimensional Change Card Sort	.09	.05	.04	.03	.06
Forward Span	-.07	-.02	.05	-.06	.01
Backward Span	.10	.06	.11†	.04	.06
Peg Tapping	-.09	-.12	.01	-.12	-.09
Head Toes Knees Shoulders	-.08	-.11	-.02	-.15	-.05
Copy Design	.11	.08	-.01	.06	.10

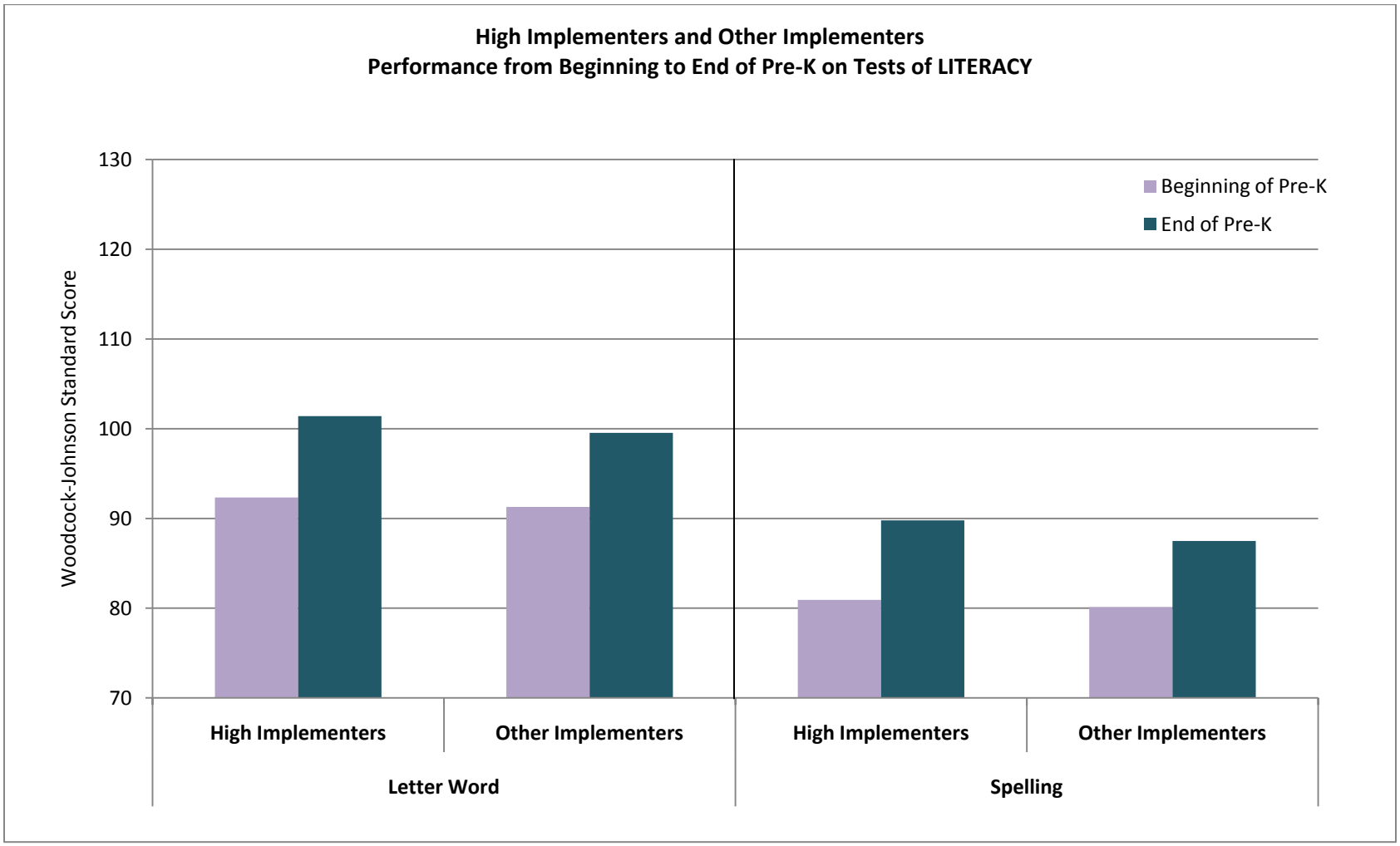
*Notes: Multi-level regression models with students nested within classrooms, schools, and assignment blocks. Models included covariate adjustments for pre-test performance, duration of time between assessments, age, gender, ELL status, IEP status, and ethnicity at the child level. Standardized coefficient estimates reported. † p < .10; * p < .05.*

TABLE 30: RELATIONS BETWEEN TRAINER, COACH, OBSERVER AND TEACHER RATINGS OF TOP IMPLEMENTERS AND OBSERVATIONAL MEASURES OF CURRICULUM IMPLEMENTATION

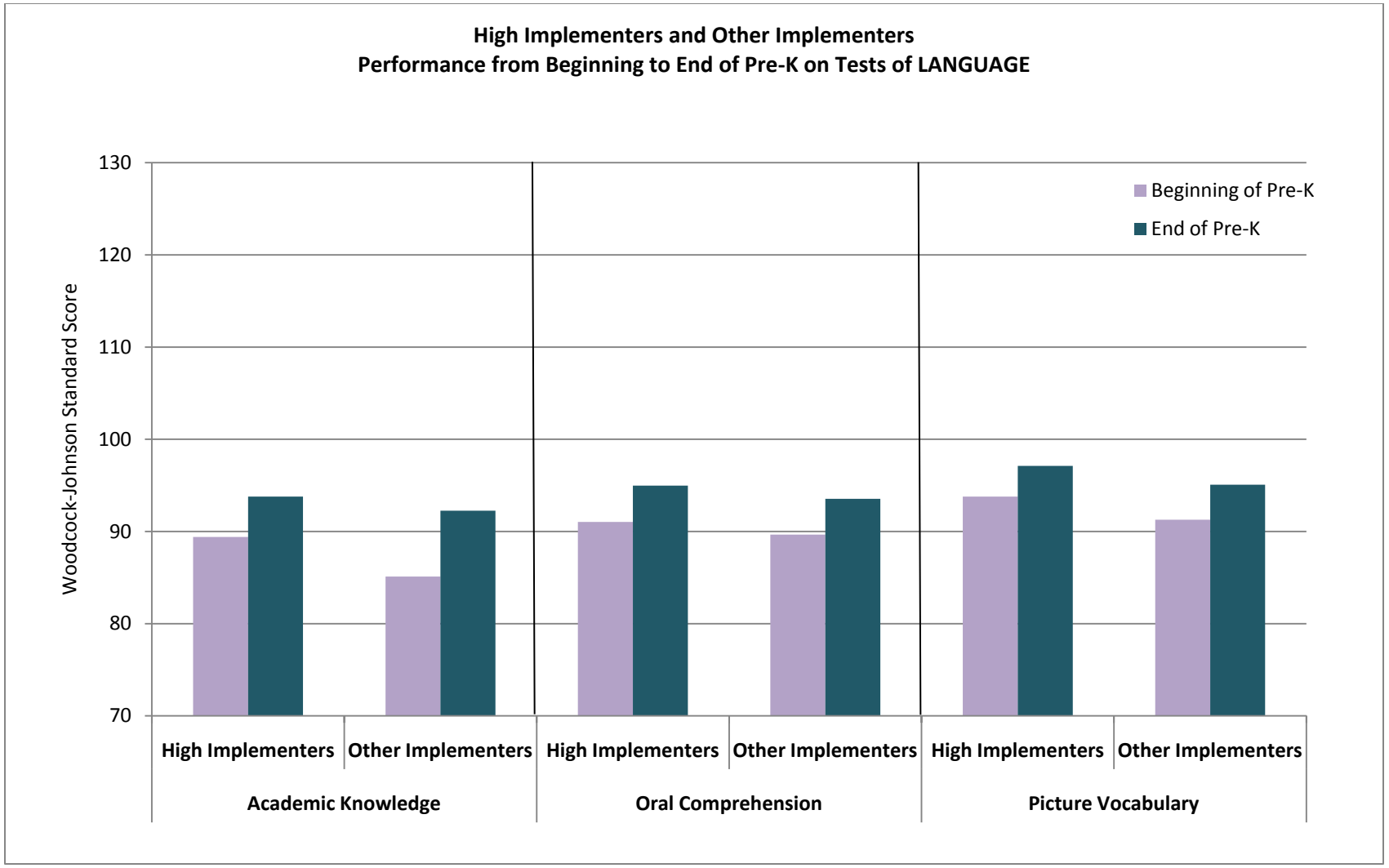
	Top 8		*Other 24*			
	Mean	*SD*	*Mean*	*SD*	*t*	*r*
Total Activities Observed	47.25	4.59	39.63	8.94	3.12*	.37*
Total Steps Observed	200.63	32.63	169.42	47.49	2.07†	.29†
Total Should Nots Observed	11.50	7.56	12.71	6.48	-0.41	-.08
Total Mediators Observed	107.88	9.78	91.42	22.55	2.86*	.34†
Weighted Implementation Score	570.64	11.54	458.47	142.81	2.29*	.35†

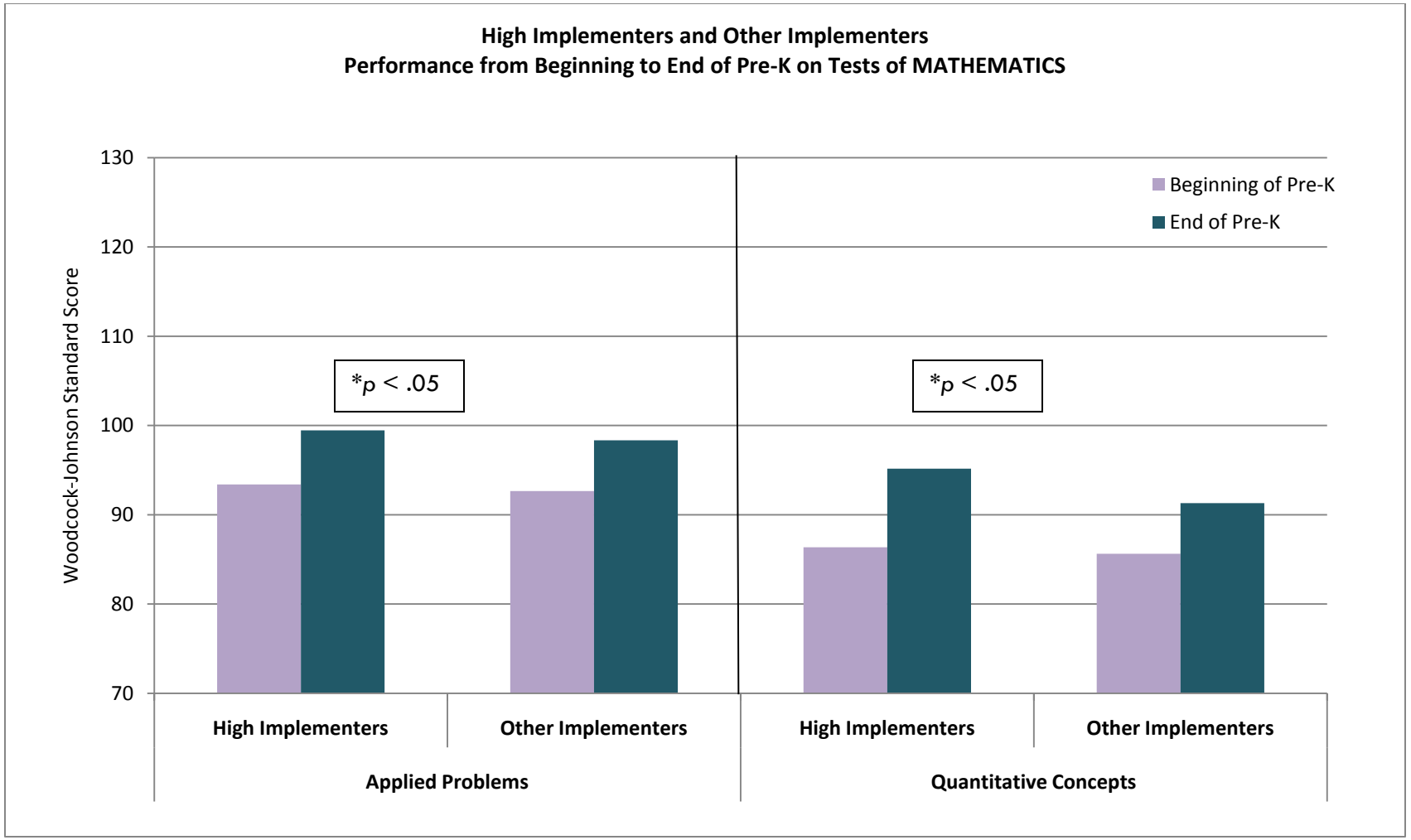
Notes: † $p < .10$; * $p < .05$.

WOODCOCK-JOHNSON TESTS OF ACHIEVEMENT



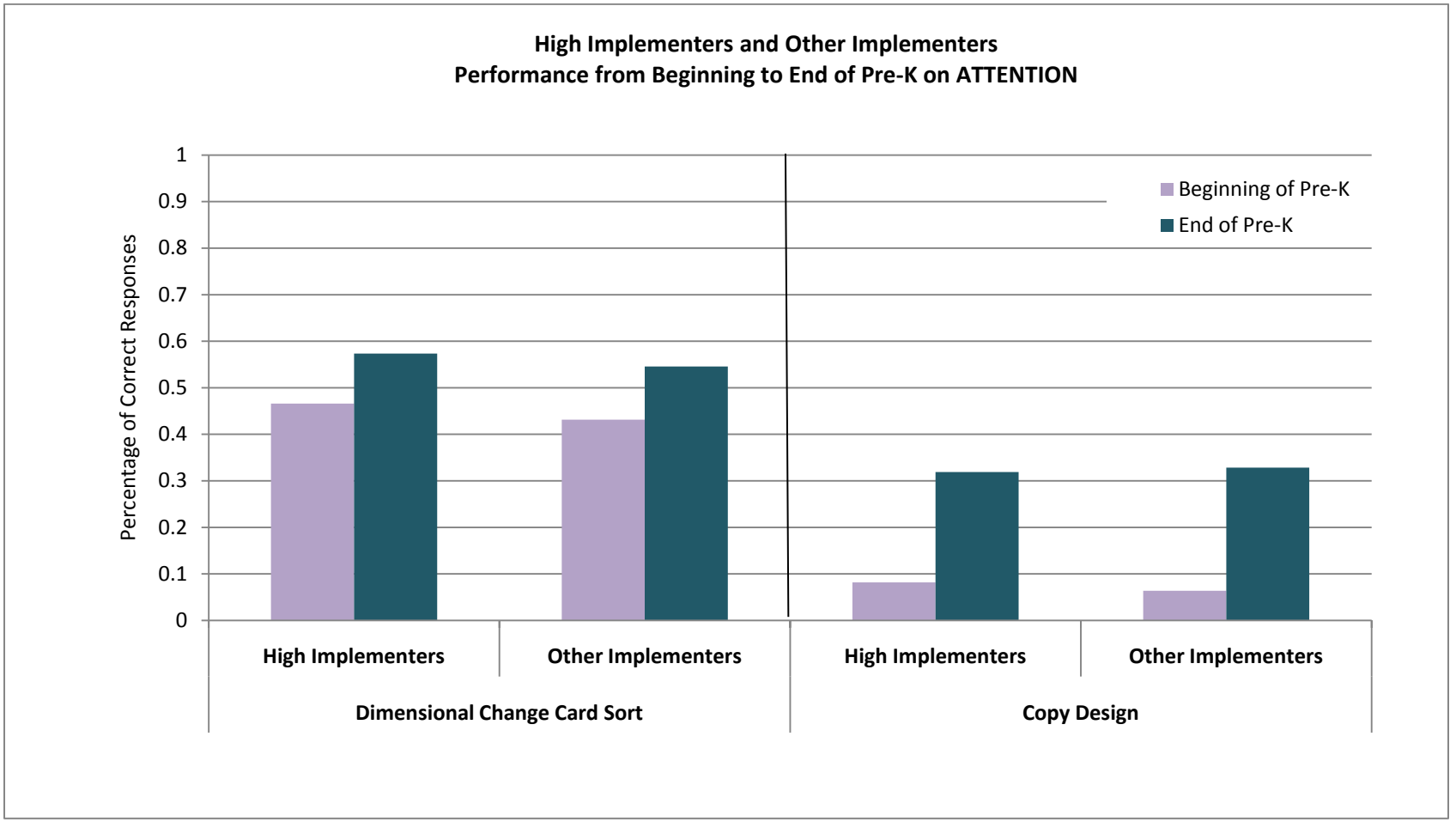
PEABODY research institute

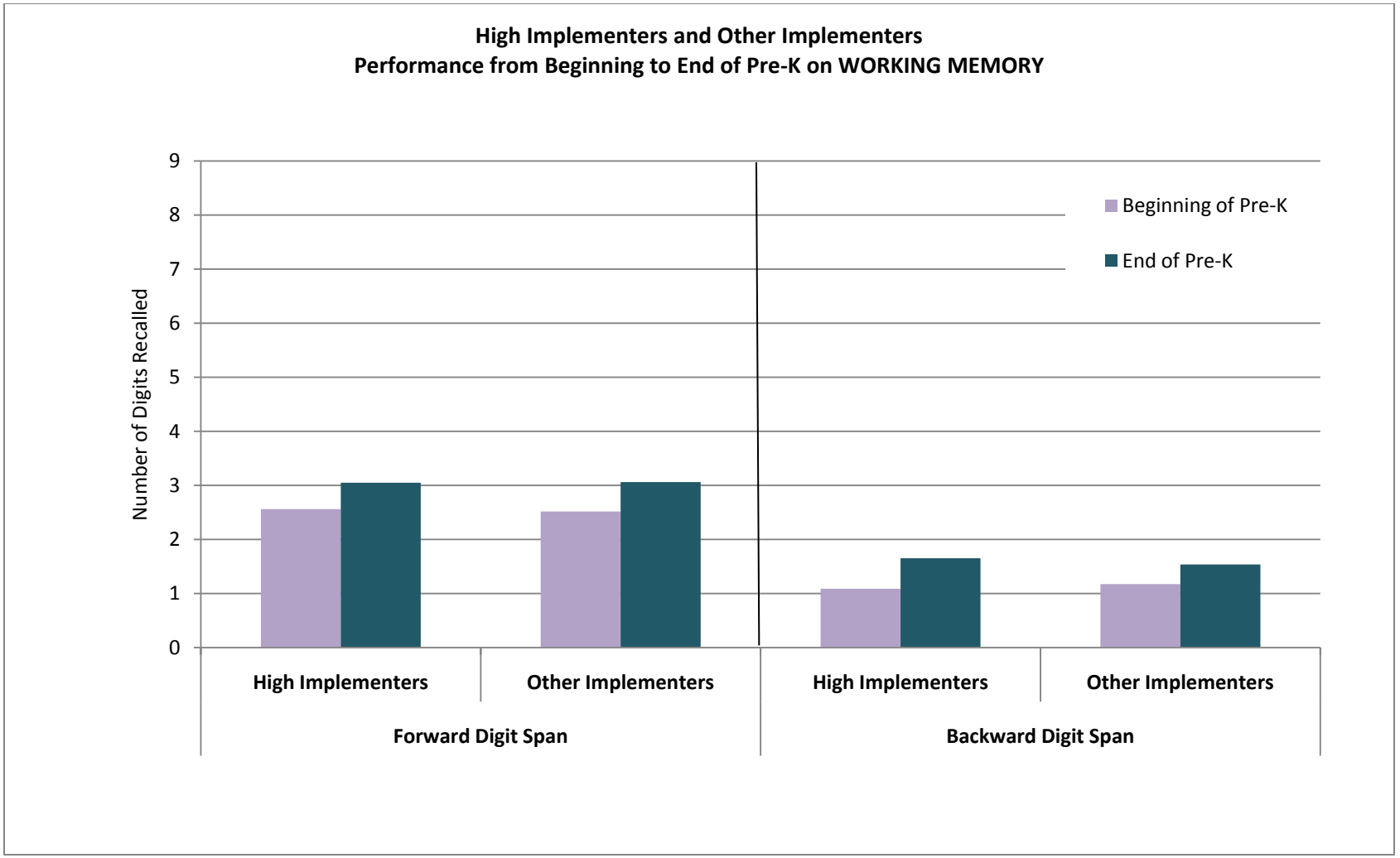

High Implementers and Other Implementers
Performance from Beginning to End of Pre-K on Tests of LANGUAGE
Woodcock-Johnson Standard Score
130
120
110
100
90
80
70
Beginning of Pre-K
End of Pre-K
High Implementers
Other Implementers
High Implementers
Other Implementers
High Implementers
Other Implementers
Academic Knowledge
Oral Comprehension
Picture Vocabulary

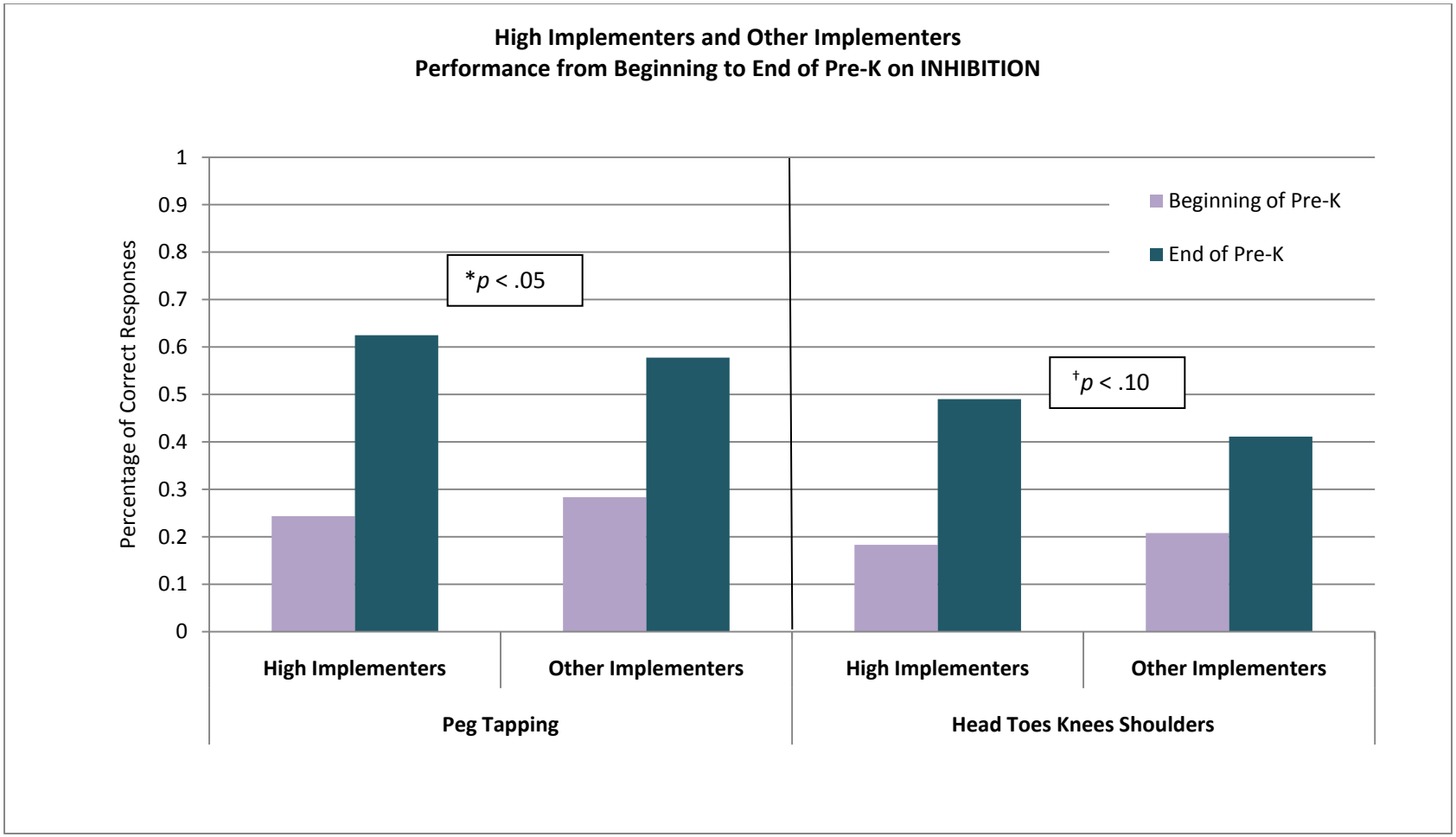


Note: *p < .05 indicates a significant High Tools Implementers and Other Tools Implementers group difference favoring High Implementers.

MEASURES OF SELF-REGULATION

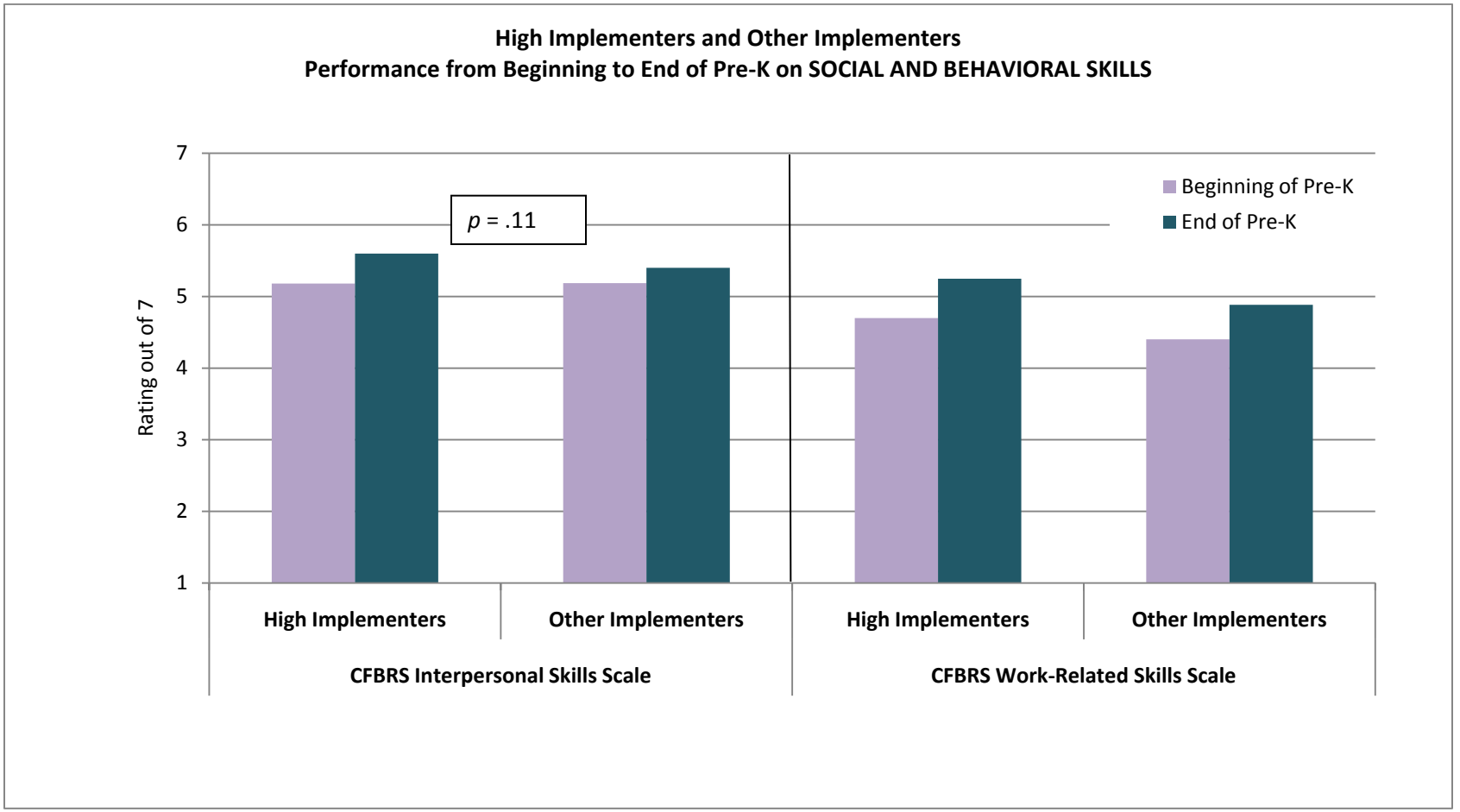



High Implementers and Other Implementers
Performance from Beginning to End of Pre-K on WORKING MEMORY
Number of Digits Recalled
0
1
2
3
4
5
6
7
8
9
Beginning of Pre-K
End of Pre-K
High Implementers
Other Implementers
High Implementers
Other Implementers
Forward Digit Span
Backward Digit Span

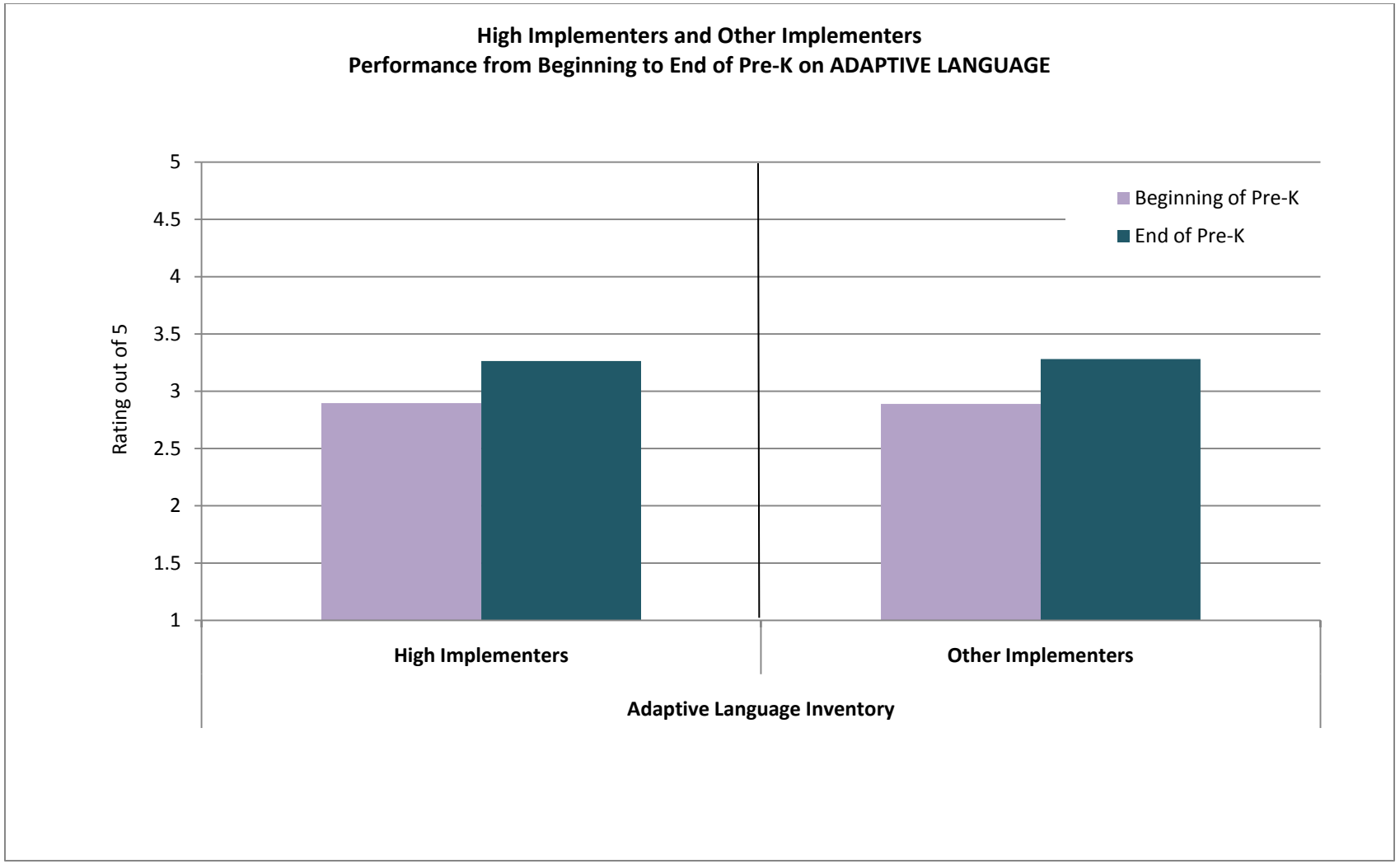


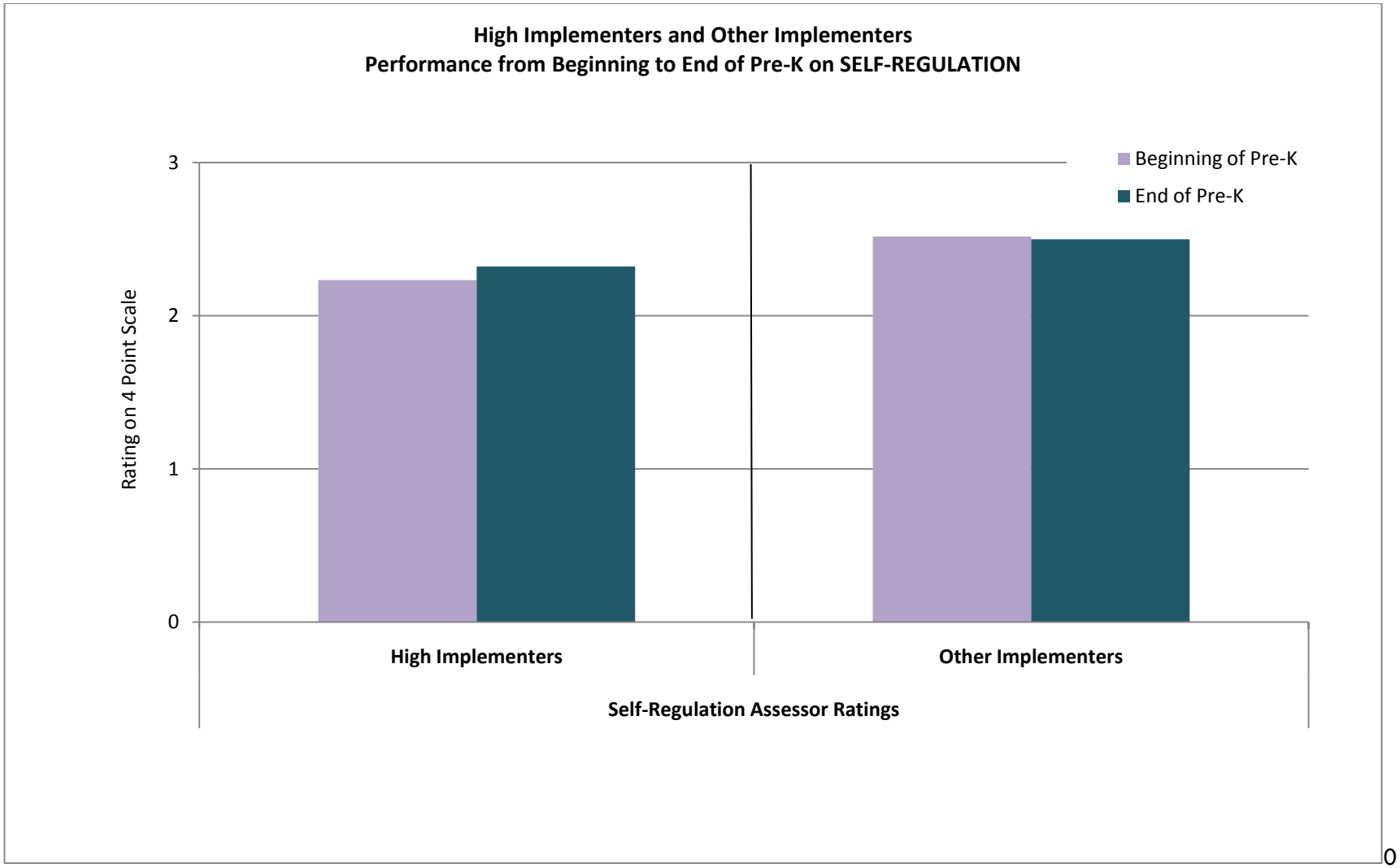
Note: *p < .05 †p < .10 indicates a significant High Tools Implementers and Other Tools Implementers group difference favoring High Implementers.

CHILD BEHAVIORAL RATINGS



P value indicates a High Tools Implementers and Other Tools Implementers group difference favoring High Implementers.


High Implementers and Other Implementers
Performance from Beginning to End of Pre-K on ADAPTIVE LANGUAGE
Rating out of 5
5
4.5
4
3.5
3
2.5
2
1.5
1
Beginning of Pre-K
End of Pre-K
High Implementers
Other Implementers
Adaptive Language Inventory


High Implementers and Other Implementers
Performance from Beginning to End of Pre-K on SELF-REGULATION
Beginning of Pre-K
End of Pre-K
Rating on 4 Point Scale
3
2
1
0
High Implementers
Other Implementers
Self-Regulation Assessor Ratings

RESULTS: CLASSROOM ORGANIZATION ACROSS ALL CLASSROOMS

Does implementing *Tools of the Mind* change the overall classroom activities and learning foci compared to control classrooms?

- Are *Tools* and Control classrooms equivalent in terms of materials present?
- Do *Tools* teachers enact more themes and Make Believe Play Centers in their classrooms across the year compared to Controls?
- Do *Tools* teachers differ from Control teachers in Time Spent in Activities, the Type of Activities, or the Type of Instructional Content covered?
- What is the relationship between classroom organization and achievement and self-regulation outcomes?
- In *Tools* classrooms, how much time is spent on *Tools*-specific activities?
- Do *Tools* teachers differ from Controls in the use of Tools specified behaviors across activities?
- How does the use of these *Tools* specified behaviors relate to achievement and self-regulation outcomes?
- Do *Tools* classrooms differ from Control classrooms in POST observer ratings?
- Do POST ratings relate to achievement and self-regulation outcomes?

Classroom Organization Observation Measures

Environmental Scan and Checklist

The environmental scan is an observational tool to gauge a classroom's environment and materials. It is derived from a list of early childhood materials the *Tools of the Mind* developers indicate should be available in the classroom. The scan focuses on the play centers and materials accessible to children.

For more information see: Vorhaus, E., Meador, D., & Farran, D. (2010). Tools of the Mind classroom environmental inventory. Nashville, TN: Peabody Research Institute, Vanderbilt University.

Narrative Record

The Narrative Record Form is an open-ended format for recording narrative data notes about and rating the activities occurring in the classroom. This system was used in both *Tools* and comparison classrooms to determine similarities and differences among them. The Narrative Record consists of the following items.

- Episodes of Time: Each instructional episode is coded for beginning and ending times. An episode is defined as beginning when there is a change in the method of instruction or a change in the focus of instruction.
- Codes for Type of Activity (Learning Setting) during the episode
    - Single setting: Whole Group with or without Teacher (WG), Small Group (SG), Meal, Transition
    - Multiple settings: Small Groups and/or free time during Centers (SGC), Out of Room (Outdoors or Specials, such as Library)
- Codes for Content of Instruction (Learning Focus) occurring during the episode (math, reading, language arts, science, social studies, art, music & movement, and none)
- Codes for Level of Instruction provided by the teacher across an episode. These range from no instruction to highly inferential instruction.
- Codes for Engagement Level of Students across an episode. These range from very low engagement to extremely and consistently high engagement across the episode.

The Narrative record also tracks the following *Tools*-specific behaviors, that could also be exhibited in Control classrooms:

- Positive Behavior Reinforcement by the Teacher or Assistant
- Behavior Reminders by the Teacher or Assistant
- Choral Responses from the Children (Children are encouraged to call out answers)
- Teacher Paired Activities (meaning the teacher has assigned pairs of children to interact)
- Individual Scaffolding by the Teacher or Assistant
- Teacher Directed Private Speech (meaning the teacher has directed children to use private speech)
- Intentional Teacher Mistakes

For more information see: Farran, D.C. & Bilbrey, C. (2004). Narrative Record Observation for classrooms. Nashville, TN: Peabody Research Institute, Vanderbilt University.

POST Observation Rating Scale

The PRS is completed immediately after a classroom is observed and is a 5-point Likert-type researcher-developed scale for rating classroom-level characteristics. This instrument was developed following extensive discussions with the *Tools of the Mind* developers during which they identified classroom attributes that were most likely to be different between *Tools* classrooms and other early childhood classrooms. The PRS includes items regarding general classroom characteristics as well as teacher practices, classroom activities, and children's social and academic behaviors. Both observers complete the PRS together following the visit.

For more information see: Yun, C., Farran, D.C., Lipsey, M., Vorhaus, E., & Meador D. (2010). Prekindergarten classroom dynamics rating scale. Nashville, TN: Peabody Research Institute, Vanderbilt University.

POST Subscale Descriptions

Subscale	Number of Items	Description
General	11	Items related to the general classroom atmosphere.
Center Time	4	Items characterizing children's play during centers.
Classroom Management	7	Items describing teacher- and child-level factors in classroom management.
Teacher Responsiveness	3	Items related to teachers' interactions with children.
Community	6	Items describing peer interactions.
Academic-Learning Related	5	Items characterizing children's behaviors and engagement during academic activities.

SUMMARY OF OBSERVED CLASSROOM THEMES

Number of teachers out of 32 with

- A theme at all 3 observations: 14
- **Different** themes at all 3 observations: 13
- A theme at 2 out of 3 observations: 15
- A theme at only 1 observation: 3
- The same theme at Observations 2 and 3: 5 (Grocery, Community Helpers, Mall, Restaurant)

TABLE 31: *TOOLS* CLASSROOM THEMES AT 3 TIMEPOINTS

Theme	T1 (n = 32)	T2 (n = 32)	T3 (n = 32)
Home Living / Family	5		
Restaurant	14	3	4
Grocery	1	7	2
Medical		8	5
Walmart		3	3
Community Helpers		3	5
Mall		1	2
School		1	2
Dinosaurs		1	0
Pets			2
Farm			1
Airport			1
Fashion			1
No Theme	12	5	4

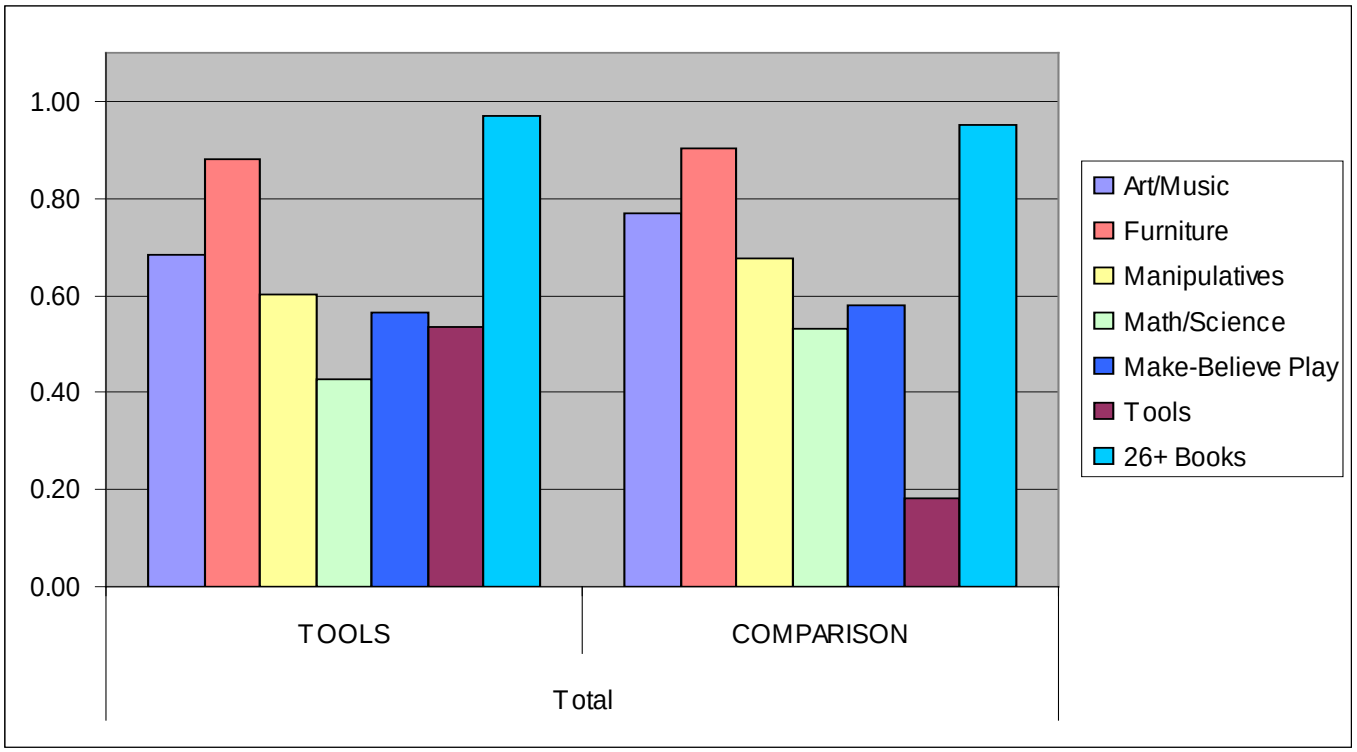
TABLE 32: *TOOLS* CLASSROOMS WITH THEME-RELATED BOOKS

Number of Theme Books	T1 (n = 32)	T2 (n = 32)	T3 (n = 31)
0	12	14	14
1-2	5	3	5
3-5	3	1	4
6+	12	14	8

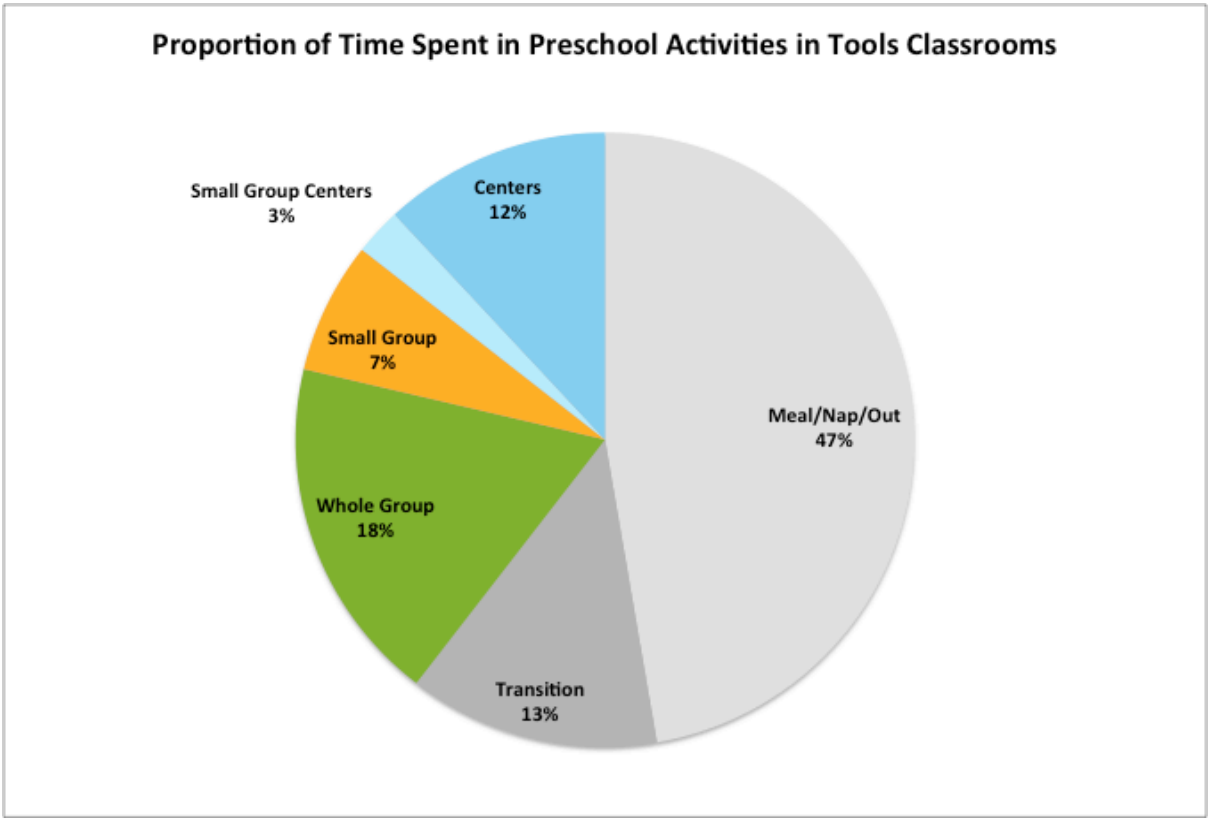
TABLE 33: MEAN NUMBER OF CENTERS IN TOOLS AND COMPARISON CLASSROOMS

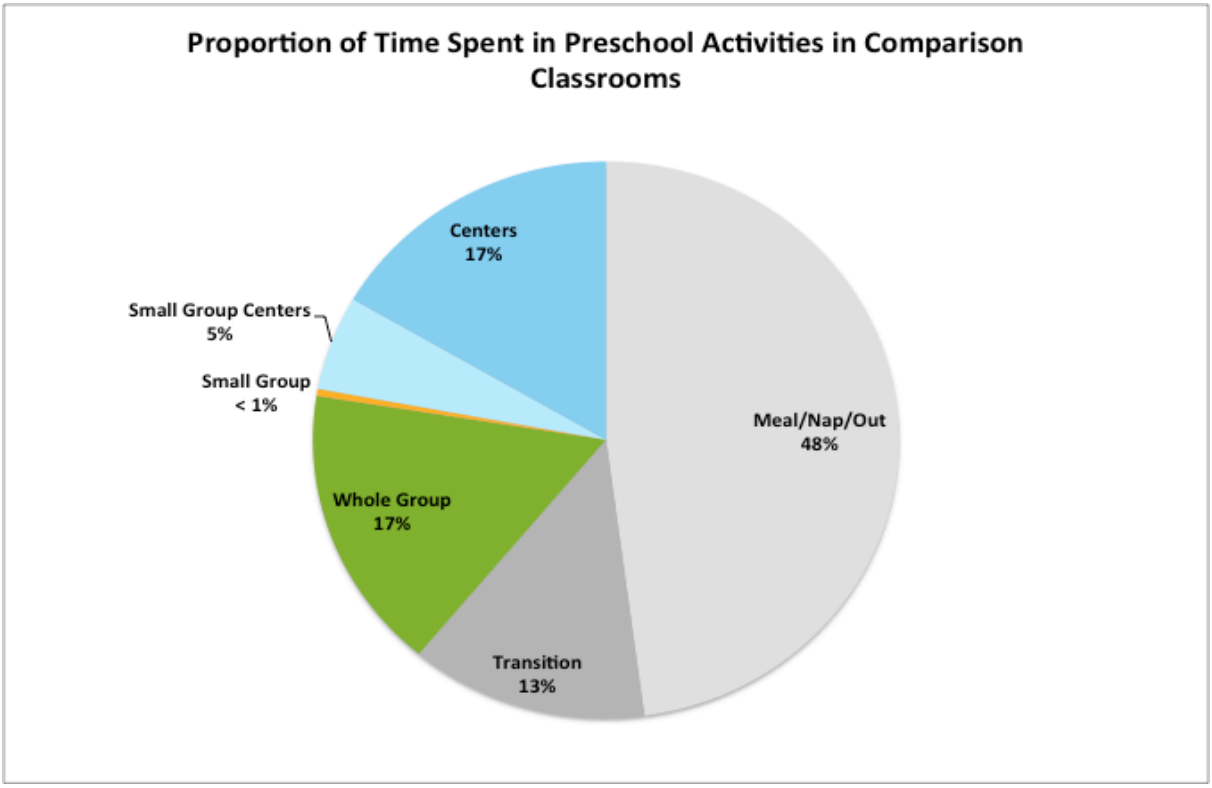
			Total Number of Centers			Number of Make Believe Centers			Number of Free Choice Centers		
Obs.	Condition	n	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range
T1	COMPARISON	28	8.39	1.64	5 - 13	0.04	0.19	0 - 1	8.36	1.66	5 - 12
	TOOLS	32	8.59	3.18	0 - 10	3.19	2.40	0 - 7	5.41	2.56	0 - 10
	Total	60	8.50	2.56	0 - 13	1.72	2.36	0 - 7	6.78	2.63	0 - 12
T2	COMPARISON	28	8.21	2.28	0 - 12	0.11	0.42	0 - 2	8.11	2.33	0 - 11
	TOOLS	32	9.13	2.25	5 - 11	3.38	2.20	0 - 6	5.75	2.50	0 - 11
	Total	60	8.70	2.29	0 - 12	1.85	2.31	0 - 6	6.85	2.68	0 - 11
T3	COMPARISON	28	8.43	2.10	5 - 13	0.04	0.19	0 - 1	8.39	2.08	5 - 12
	TOOLS	32	7.97	3.02	4 - 9	4.06	2.08	0 - 7	3.91	2.94	0 - 9
	Total	60	8.18	2.62	4 - 13	2.18	2.53	0 - 7	6.00	3.41	0 - 12
Overall	COMPARISON	28	8.35	1.51		0.06	0.16		8.29	1.57	
	TOOLS	32	8.56	2.24		3.54	1.66		5.02	2.16	
	Total	60	8.46	1.92		1.92	2.13		6.54	2.50	

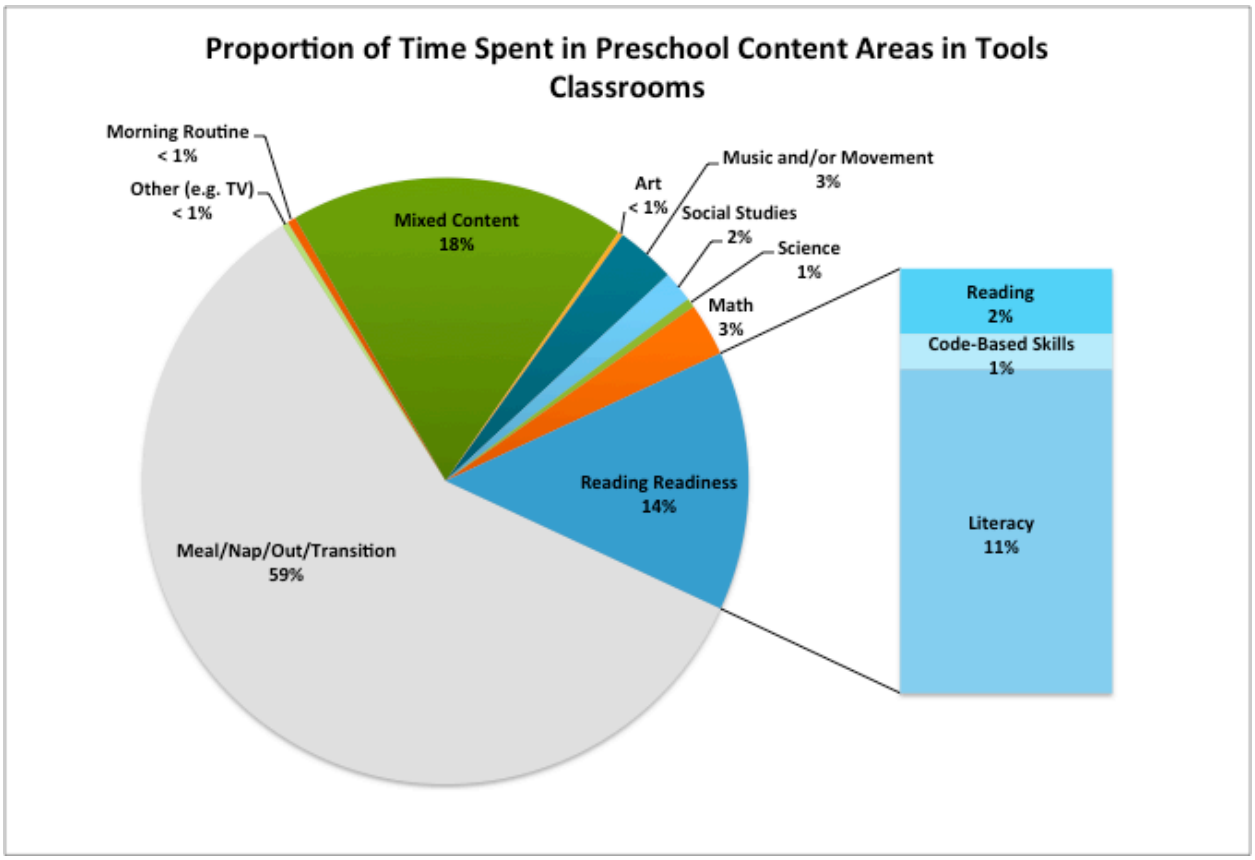
MEAN PROPORTIONS OF MATERIALS BY CATEGORY PRESENT IN TOOLS AND COMPARISON CLASSROOMS

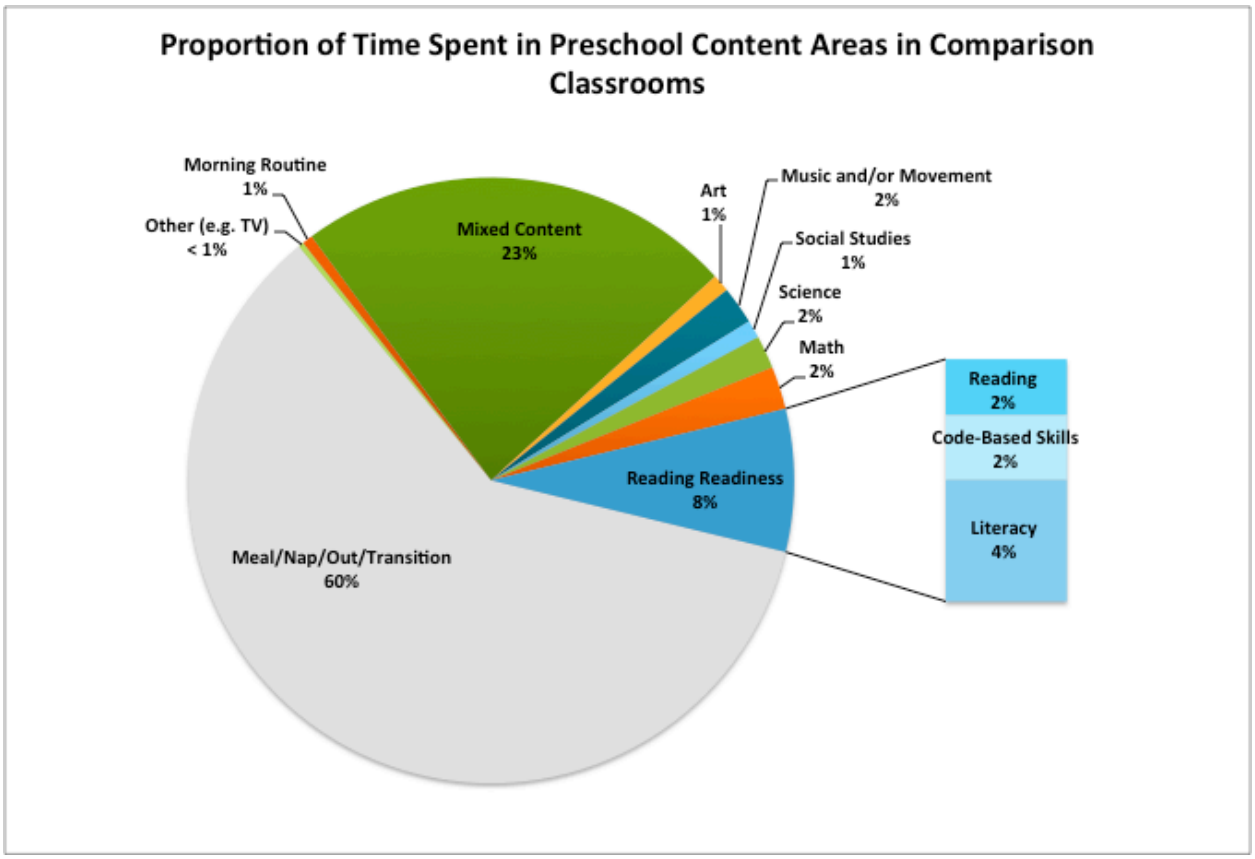


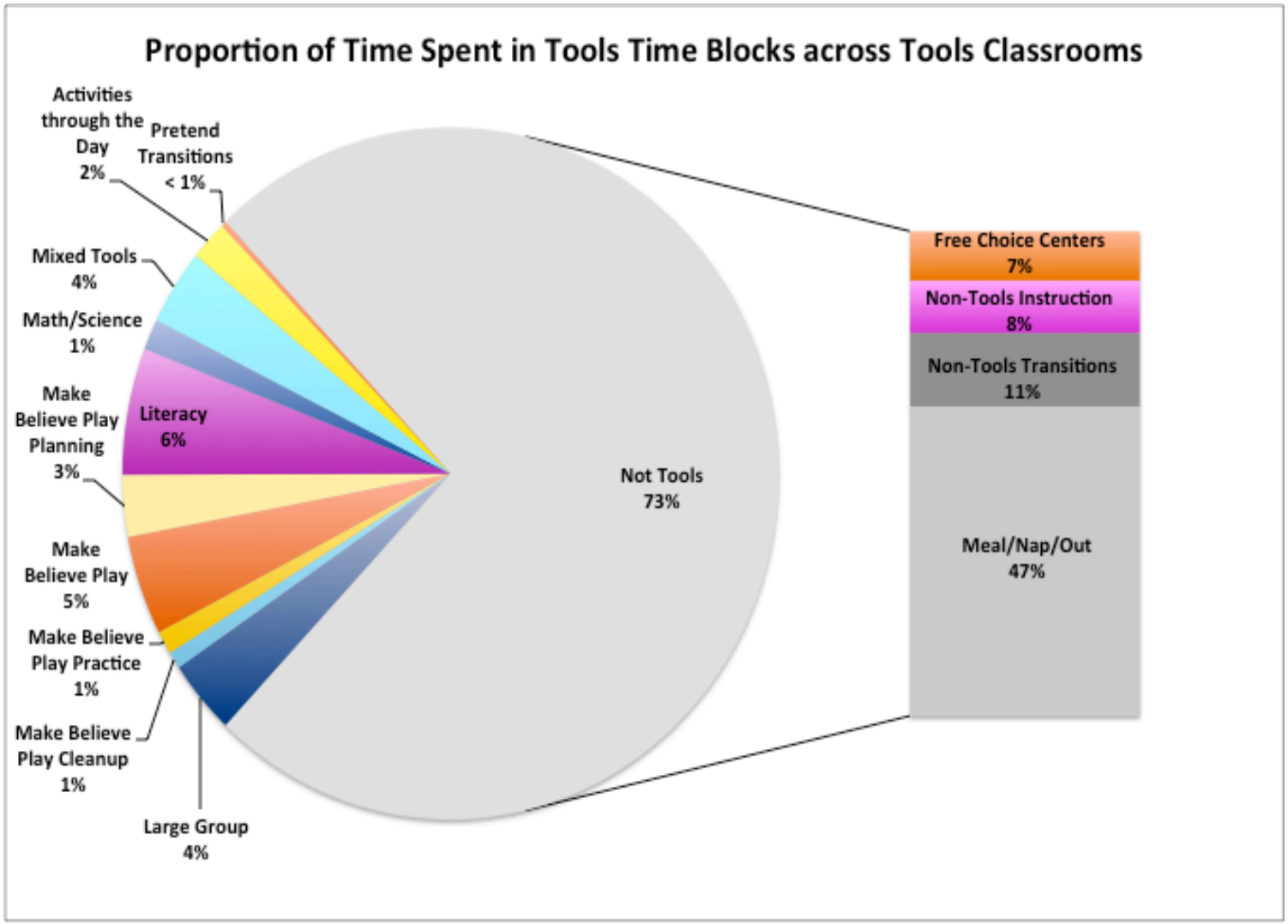
Narrative Record






Proportion of Time Spent in Preschool Content Areas in Tools Classrooms
Morning Routine < 1%
Other (e.g. TV) < 1%
Mixed Content 18%
Art < 1%
Music and/or Movement 3%
Social Studies 2%
Science 1%
Math 3%
Reading Readiness 14%
Meal/Nap/Out/Transition 59%
Reading 2%
Code-Based Skills 1%
Literacy 11%


Proportion of Time Spent in Preschool Content Areas in Comparison Classrooms
Morning Routine 1%
Other (e.g. TV) < 1%
Mixed Content 23%
Art 1%
Music and/or Movement 2%
Social Studies 1%
Science 2%
Math 2%
Reading Readiness 8%
Meal/Nap/Out/Transition 60%
Reading 2%
Code-Based Skills 2%
Literacy 4%



Note: Analyses were conducted using total time in Tools and time in Make Believe Play as predictors of WJ and SR child outcomes in Tools classrooms. These models were tested via multi-level models with students nested within classrooms, schools, and school systems. Covariates in all models included age, testing interval, gender, ELL status, IEP status, ethnicity, and pretest. WJ and SR composites are derived from principal components analyses. Neither of these variables was a significant predictor of WJ and SR child outcomes.

TABLE 34: GROUP DIFFERENCES BETWEEN TOOLS AND COMPARISON CLASSROOMS ON NARRATIVE VARIABLES

Variable	Unstandardized Estimate	Effect Size	F	*p*
Proportion of Observed Time				
Instruction	-0.02	-0.29	0.96	0.336
Whole Group	-0.01	-0.16	0.56	0.460
Small Group	-0.07	-2.30	36.63	0.000
Centers	0.04	0.71	9.77	0.004
Centers/Small Group Centers	0.07	1.09	24.07	0.000
Transition	0.00	-0.03	0.00	0.990
Literacy	-0.06	-1.75	85.52	0.000
Math	0.00	-0.24	0.88	0.356
Average Level of Instruction				
Overall	-0.05	-0.46	2.94	0.098
Centers	-0.16	-0.60	4.52	0.041
Literacy	-0.05	-0.24	0.96	0.333
Math	-0.08	-0.49	5.08	0.028
Average Level of Engagement				
Overall	-0.14	-0.74	9.12	0.004
Centers	-0.07	-0.14	0.55	0.463
Literacy	-0.27	-0.90	11.79	0.001
Math	-0.22	-0.64	7.14	0.010

Note: These models were tested via multi-level models with classrooms nested in schools and school systems. Negative estimates indicate higher scores for Tools classrooms compared to the control classrooms.

TABLE 35: CLASSROOM ORGANIZATION PREDICTORS OF CHILD-LEVEL ACHIEVEMENT AND SELF-REGULATION OUTCOMES

	WJ Composite			SR Composite		
	β	F	*p*	β	F	*p*
Proportion of Observed Time						
Instruction	0.05	5.60	0.02	0.04	1.90	0.18
Whole Group	0.00	0.01	0.91	0.05	2.91	0.09
Small Group	-0.02	0.59	0.45	0.01	0.09	0.77
Centers	0.04	3.09	0.08	-0.02	0.39	0.54
Centers/Small Group Centers	0.07	7.47	0.01	0.00	0.01	0.93
Transition	0.01	0.22	0.65	0.00	0.02	0.90
Literacy	-0.04	2.39	0.13	0.01	0.04	0.85
Math	-0.01	0.10	0.75	0.07	5.00	0.03
Average Level of Instruction						
Overall	0.03	2.05	0.16	0.05	3.26	0.08
Centers	-0.01	0.30	0.59	0.03	1.34	0.25
Literacy	-0.01	0.22	0.65	0.02	0.38	0.54
Math	0.00	0.00	0.98	0.02	0.30	0.59
Average Level of Engagement						
Overall	0.05	5.34	0.03	0.07	4.95	0.03
Centers	0.03	0.94	0.34	0.06	2.75	0.11
Literacy	0.06	9.01	0.00	0.05	2.89	0.09
Math	0.02	0.56	0.46	0.02	0.28	0.60

Note: These models were tested via multi-level models with students nested within classrooms, schools, and school systems. Covariates in all models included age, testing interval, gender, ELL status, IEP status, ethnicity, and pretest. WJ and SR composites are derived from principal components analyses.

TABLE 36: PROPORTION OF NARRATIVE EPISODES IN WHICH TEACHER BEHAVIORS OBSERVED BY CONDITION

Variable	Tools Condition	Comparison Condition
Positive Behavior Reinforcers	33.26%	35.91%
Behavior Reminders	45.12%	48.75%
Choral Responses	19.96%	18.48%
Teacher Paired Activities	6.19%	0.84%**
Teacher Encouraged Private Speech	4.07%	0.21%**
Individual Scaffolding	12.71%	10.16%
Teacher Intentional Mistakes	1.27%	0.75%

**$p < .001$

TABLE 37: TEACHER PRACTICES AS PREDICTORS OF CHILD-LEVEL ACHIEVEMENT AND SELF-REGULATION

	WJ Composite			SR Composite		
	β	F	*p*	β	F	*p*
Positive Behavior Reinforcers	0.02	0.60	0.44	0.05	2.29	0.14
Behavior Reminders	-0.04	4.03	0.05	-0.07	6.56	0.01
Choral Responses	0.05	5.70	0.02	0.10	13.16	0.01
Teacher Paired Activities	-0.02	0.41	0.53	0.01	0.16	0.69
Individual Scaffolding	-0.01	0.02	0.88	-0.02	0.28	0.60
Teacher Encouraged Private Speech	-0.01	0.08	0.77	0.05	2.85	0.10
Teacher Intentional Mistakes	0.01	0.02	0.89	-0.01	0.17	0.68

Note: These models were tested via multi-level models with students nested within classrooms, schools, and school systems. Covariates in all models included age, testing interval, gender, ELL status, IEP status, ethnicity, and pretest. WJ and SR composites are derived from principal components analyses.

MEAN POST SUBSCALE AND TOTAL SCORES BY CONDITION

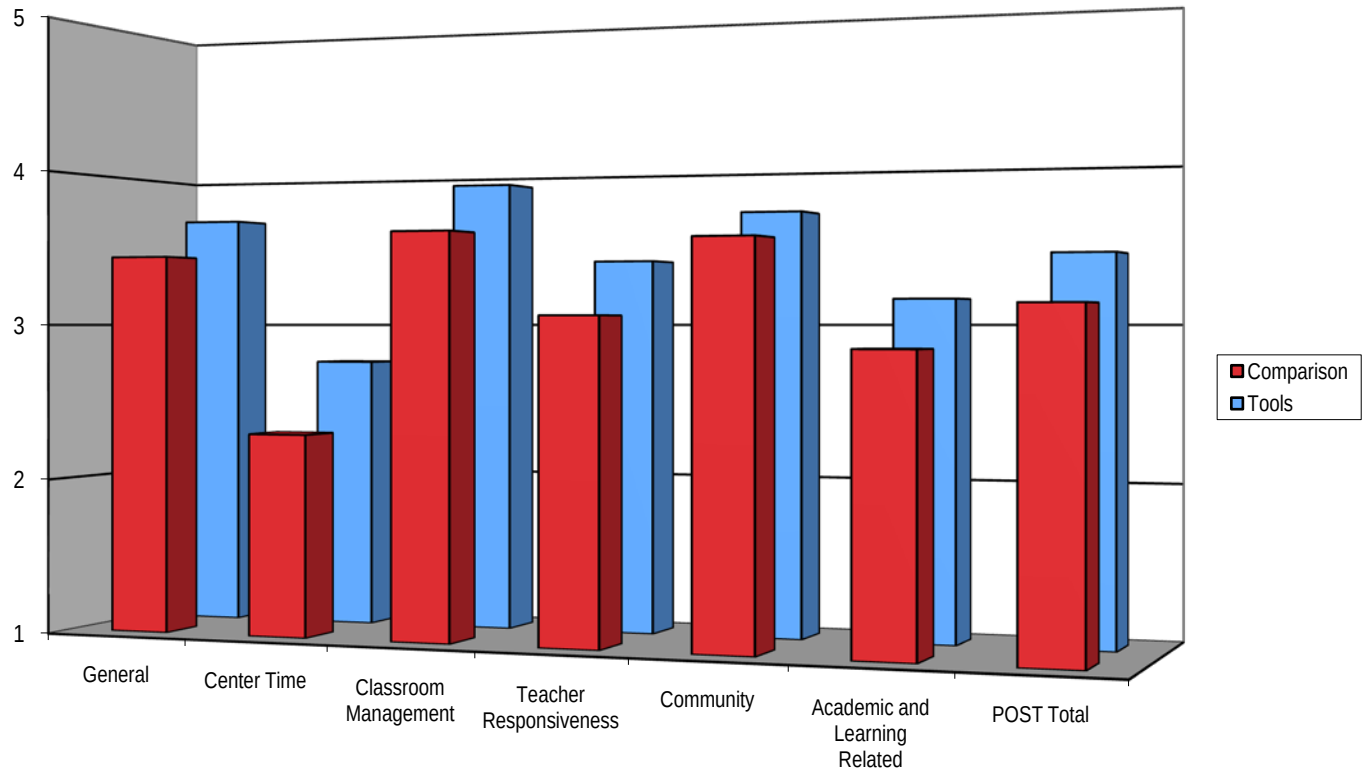


TABLE 38: RELATIONSHIP BETWEEN POST TOTAL SCORES AND ACHIEVEMENT AND SELF-REGULATION FACTOR SCORES

	Woodcock-Johnson			*Self-Regulation*		
	β	F	*p*	β	F	*p*
Tools Curriculum (vs. Comparison)	-0.10	4.43	.044	-0.06	0.97	.330
IEP	-0.10	3.83	.051	-0.15	4.68	.031
Ethnicity=Black	-0.22	9.73	.002	-0.23	5.55	.019
Ethnicity=Hispanic	-0.05	0.45	.501	-0.04	0.15	.699
Ethnicity=White	-0.14	3.83	.051	0.00	0.00	.976
Gender=male	-0.05	2.60	.108	-0.11	4.96	.026
Language background=ELL	0.10	2.35	.125	-0.07	0.53	.465
Pretest score	0.92	1677.30	.000	0.68	633.66	.000
Age at pretest (months)	-0.01	2.69	.101	0.01	2.71	.100
Pretest-posttest interval (months)	0.00	0.00	.976	0.03	0.24	.627
POST Total	0.07	8.00	.007	0.08	6.80	.012

Notes: Multi-level regression models with students nested within classrooms, schools, and system. b – standardized regression coefficient.

† $p < .10$; * $p < .05$.

TABLE 39: DIFFERENCES IN POST OUTCOMES FOR TOP 8 IMPLEMENTERS OF THE TOOLS CURRICULUM COMPARED TO OTHER TOOLS CLASSROOMS

POST Outcome Variable	Unstandardized Estimate	Effect Size	F	*p*
POST Total	-0.27	-0.73	3.39	0.08
General	-0.15	-0.40	1.08	0.31
Center Time	-0.36	-0.98	5.92	0.03
Classroom Management	-0.09	-0.19	0.22	0.64
Teacher Responsiveness	-0.52	-1.14	8.57	0.01
Community	-0.23	-0.51	1.50	0.24
Academic-Learning Related	-0.32	-0.66	2.53	0.13

Note: These models were tested via multi-level models with classrooms nested in schools and school systems. Negative estimates indicate higher scores for Top 8 implementers compared to other Tools classrooms.

RESULTS: CHILD AND TEACHER BEHAVIORS OBSERVED ACROSS ALL CLASSROOMS

Does implementing *Tools of the Mind* affect the behaviors of teachers and children compared to control classrooms?

- Do children in *Tools* classrooms differ from children in Control classrooms in the amount they talk in general and to self, in the amount they listen to other children?
- Are children in Tools classrooms more involved in classroom activities than children in Control classrooms?
- Are children in *Tools* classrooms more likely to learn in associative interactions with other children?
- Do teachers in *Tools* classrooms differ from teachers in Control classrooms in the amount they talk to children, in the amount they listen to children, and is the proportion of teacher to child talk more equal?
- Are teachers in *Tools* classrooms more likely to be observed in instructional activities and less likely to be observed managing activities and behavior?
- Are teachers in *Tools* classrooms more responsive and positive toward children?
- What is the relationship of children's and teachers' behaviors to gains in achievement and self-regulation

Child Observation in Preschool (COP)

The COP is a system for observing children's behavior in preschool classrooms across a day's visit. COP is based on a series of snapshots of children's behavior across a period of time. Each snapshot may be by itself an unreliable piece of information but collectively they combine to provide a picture of how children are spending their time in a classroom (as an aggregate) as well as information about individual differences among children in their preferences. A specific child is observed during a 3 second window and then coded across 9 dimensions before the observer moves to the next child. At the end of an observation, 20 sweeps were collected on each child in the classroom. Consented children are indentified by name; all others are identified as "Extra boy" or "Extra girl." The COP measures:

- How much and to whom do the children talk? Listen?
- In which learning settings children are found.
    - Whole Group (with and without teacher)
    - Small Group (with and without teacher)
    - Centers
    - Transitions
    - Other: Nap, Outdoors, Meals
- How often children are engaged in activities with different types of learning focus.
    - Specific Learning Focus: math, literacy, science, social studies
    - Other: art, music, fine motor, drama, etc.
    - No Learning Focus
- How involved children are in various learning settings across the day.

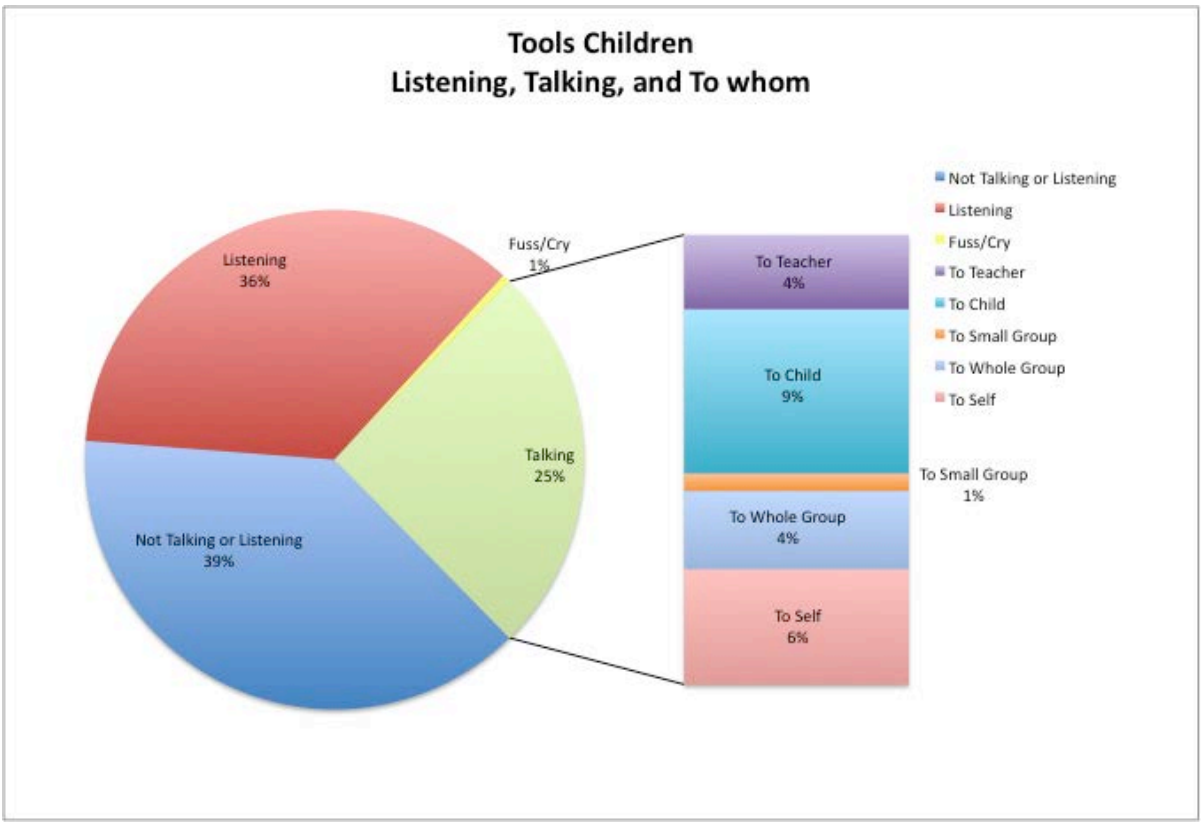
For more information see: Farran, D. et al. (2006), Child Observation in Preschool (2008 revision). Tools of the Mind Adaptation, (2010). Peabody Research Institute.

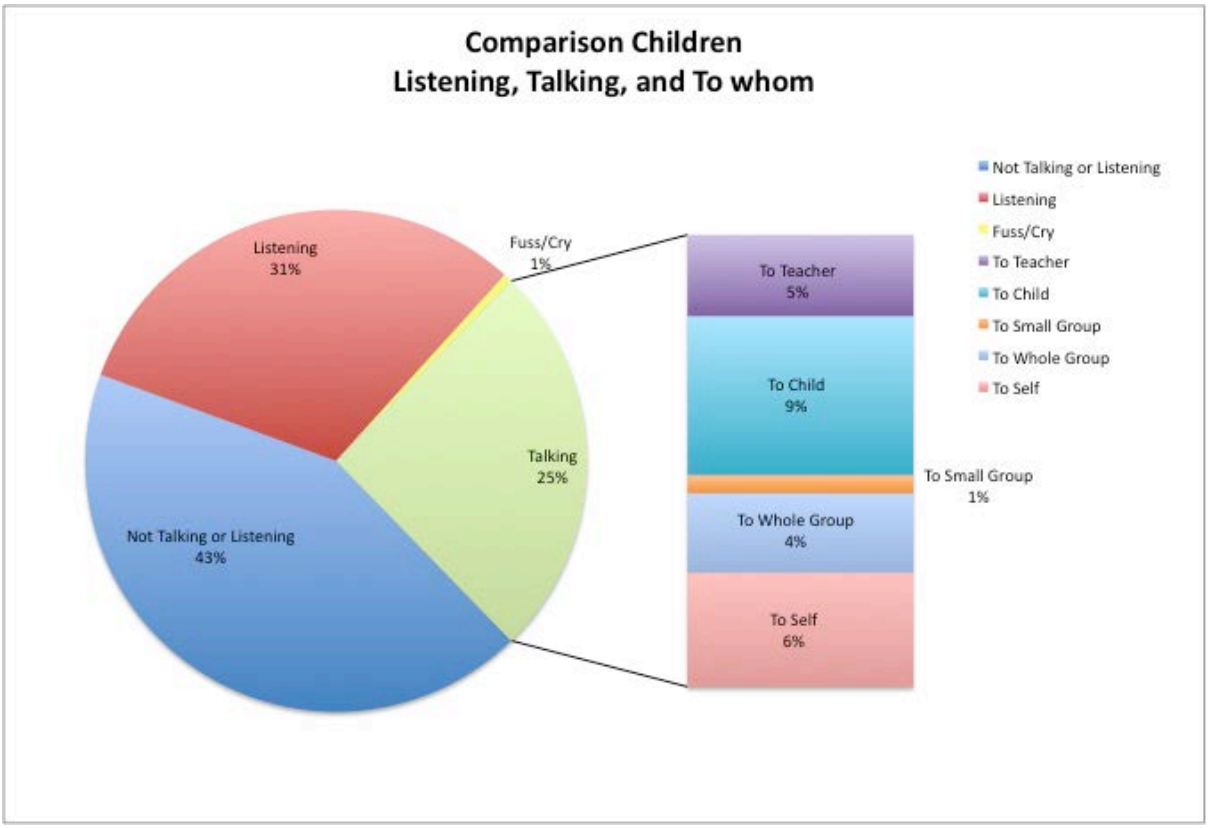
Teacher Observation in Preschools (TOP)

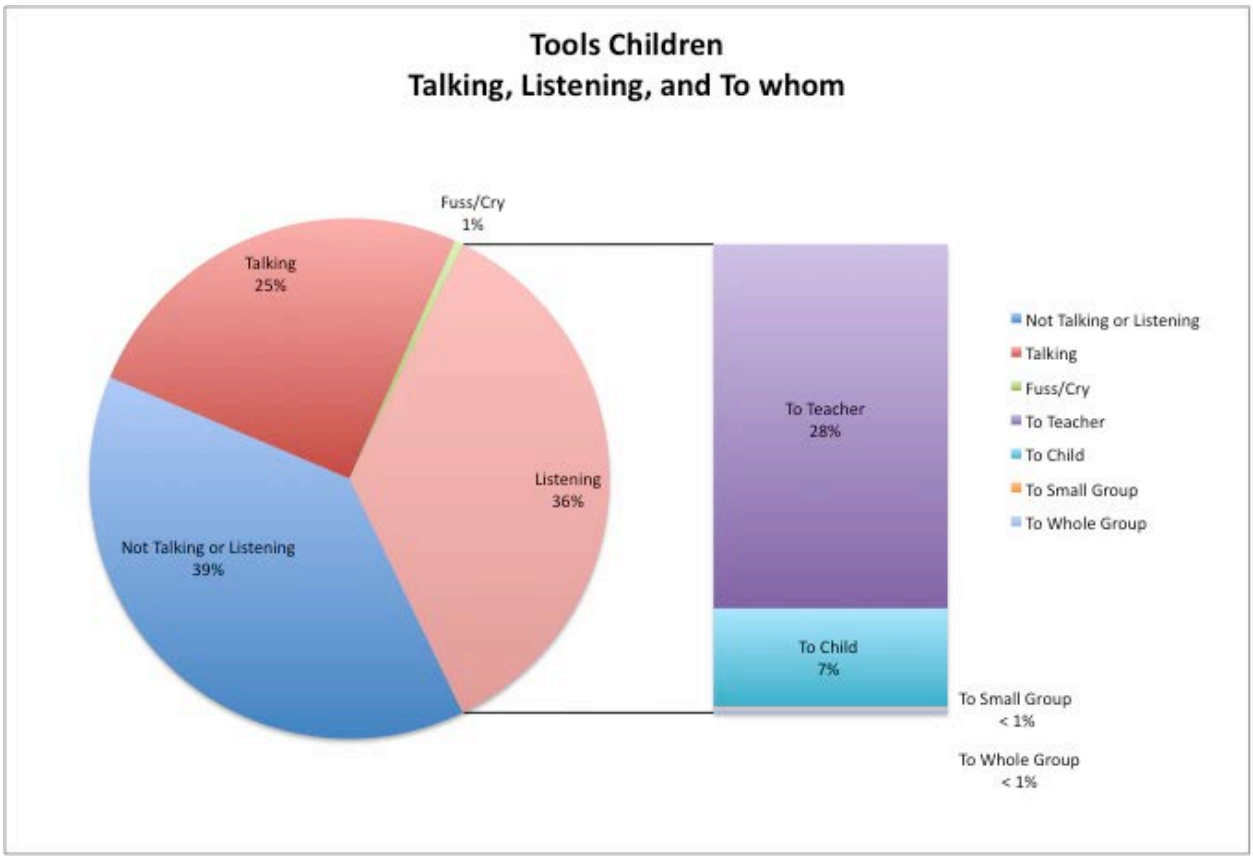
The TOP is a system for observing the teacher and assistant's behaviors in preschool classrooms across a day's visit. TOP is based on a series of snapshots of the teacher's and assistant's behavior across a period of time. Each snapshot may be by itself an unreliable piece of information but collectively they combine to provide a picture of how the teacher and assistant are spending their time in a classroom. The teacher's behavior is observed for a 3 second window before scoring. Once scoring has been completed for the teacher, the same procedure is followed for the assistant in the classroom. Teacher and Assistant are coded at the beginning of a "sweep;" children are coded immediately afterward. At the end of an observation, 20 sweeps were collected on the teacher and the assistant. The TOP measures:

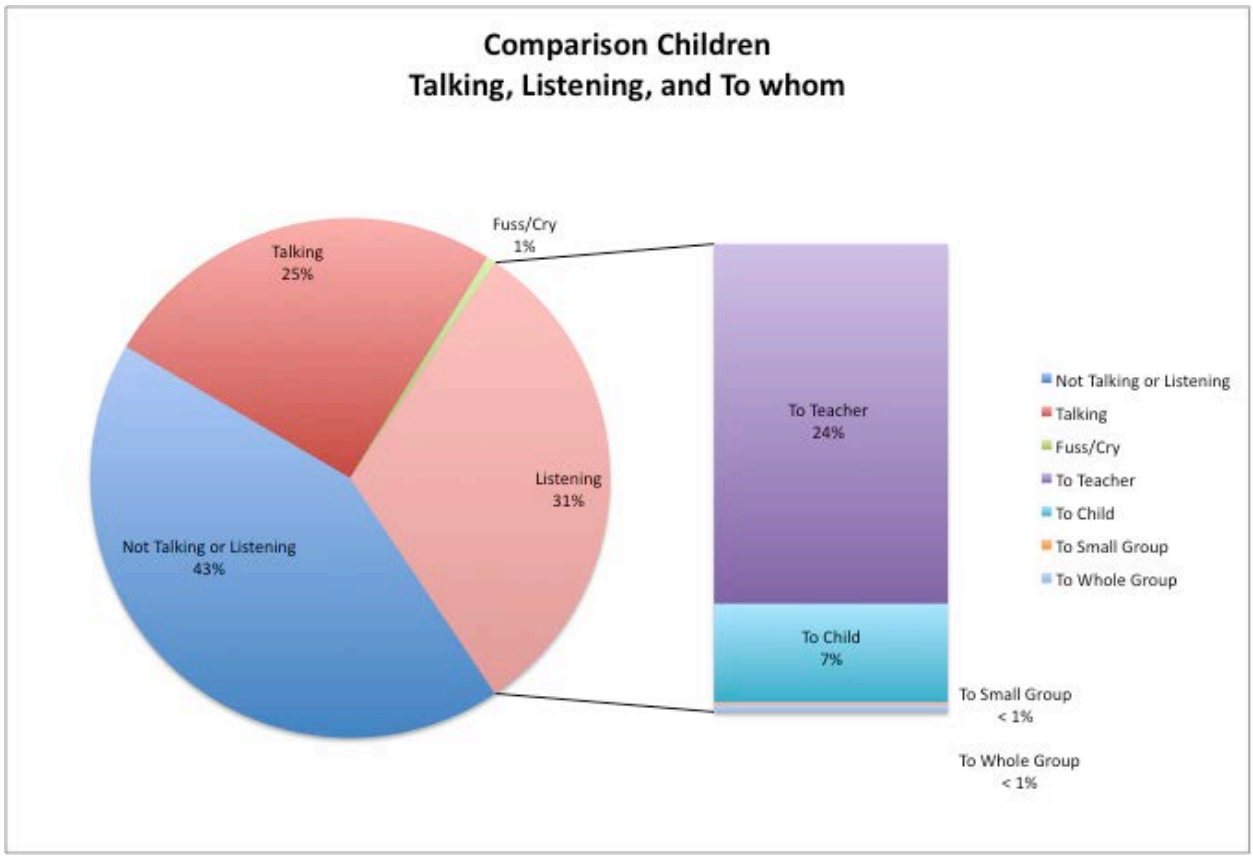
- How much and to whom the teacher talks and listens.
- In what types of tasks the teacher or assistant is engaged.
  - Instruction and Assessment
  - Management including: administration, management, monitoring and personal care
  - Behavior: Approving or Disapproving
  - Social
  - None
- The level of ongoing instruction and assessment
  - Low, Basic Skills, Some Inferential, and Highly Inferential
- What areas of learning the teacher/assistant focuses on
  - Specific Learning Focus: math, literacy, science, social studies
  - Other: art, music, fine motor, drama, etc.
  - No Learning Focus: no instruction or assessment
- The tone of the teacher or assistant's interactions with the class

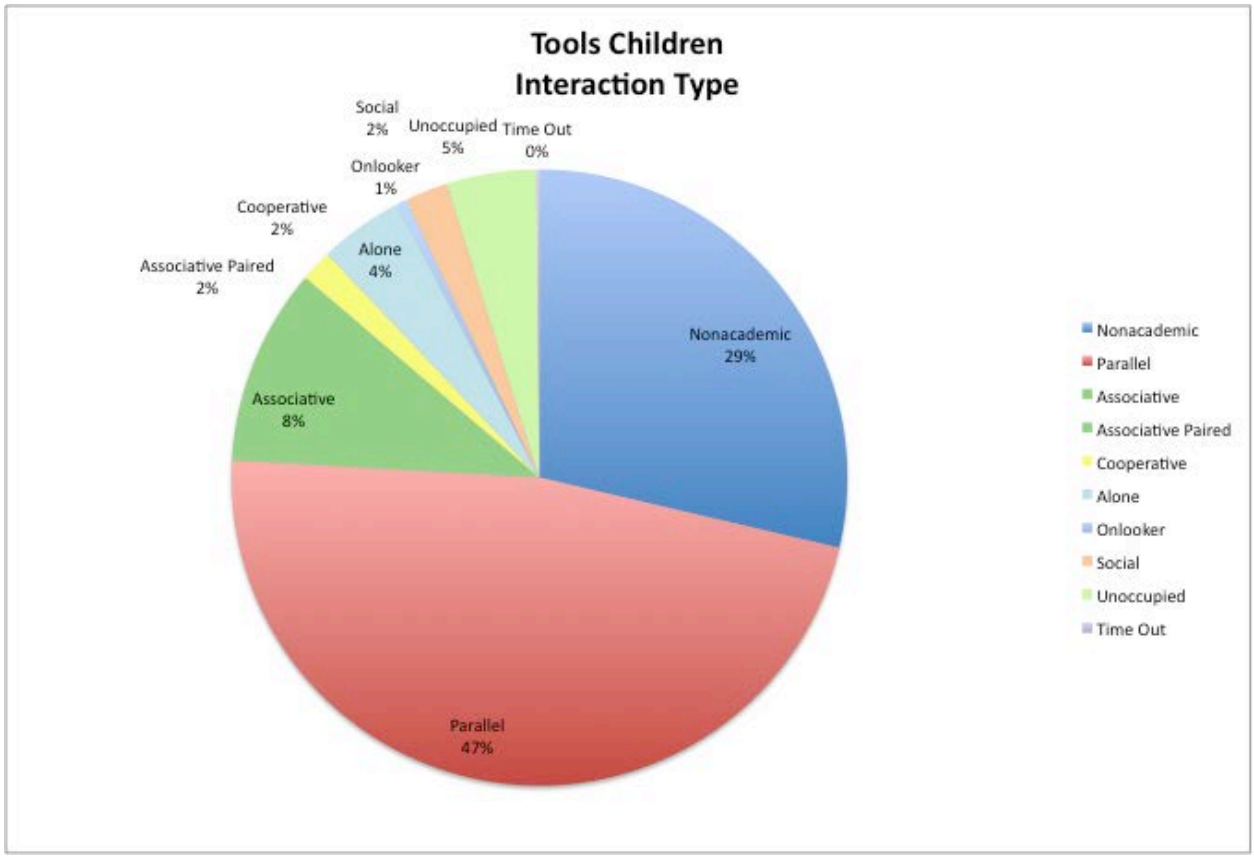
For More Information See: Bilbrey, C., Vorhaus, E., Farran, D. & Shufelt, S. (2007) Teacher Observation in Preschool (2008 revision). Tools of the Mind Adaptation (2010). Peabody Research Institute.

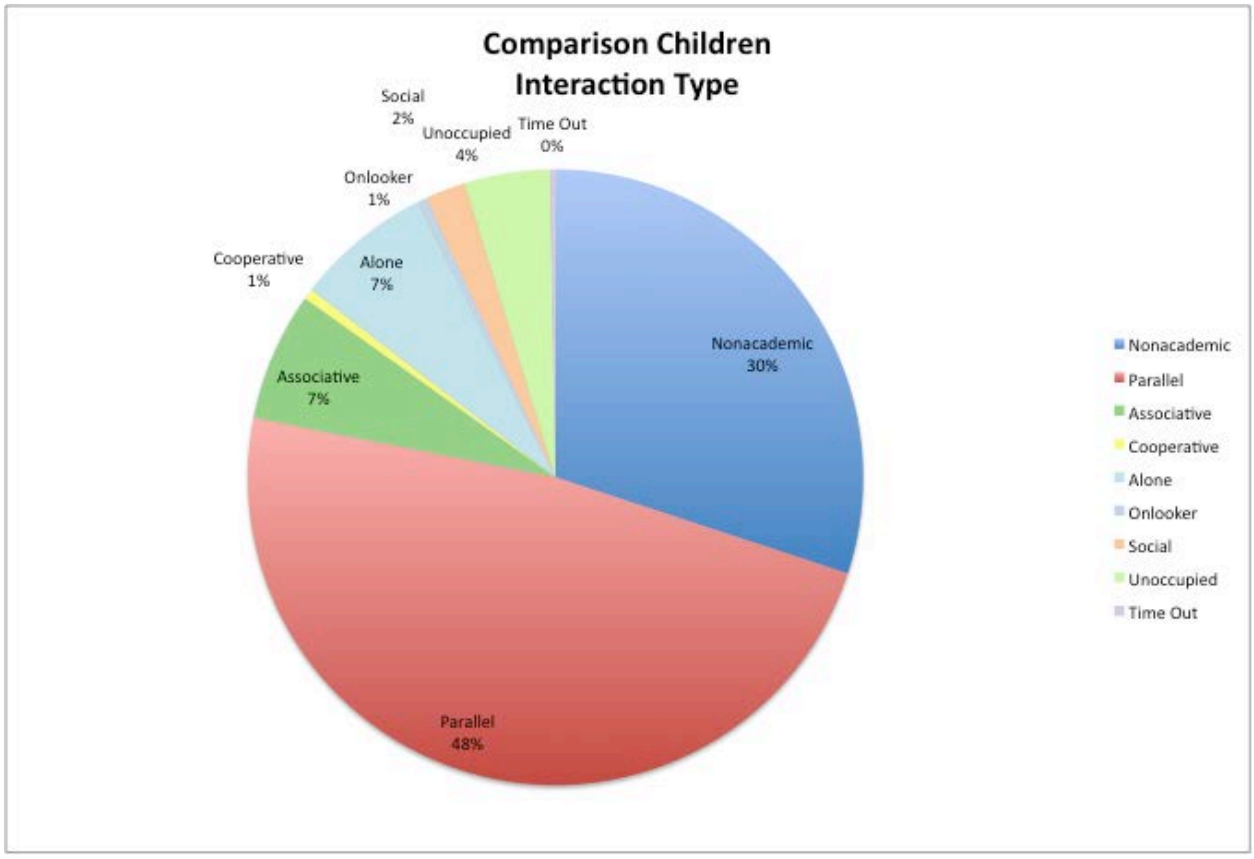

Tools Children
Listening, Talking, and To whom
Listening 36%
Fuss/Cry 1%
Talking 25%
Not Talking or Listening 39%
To Teacher 4%
To Child 9%
To Small Group 1%
To Whole Group 4%
To Self 6%
Not Talking or Listening
Listening
Fuss/Cry
To Teacher
To Child
To Small Group
To Whole Group
To Self

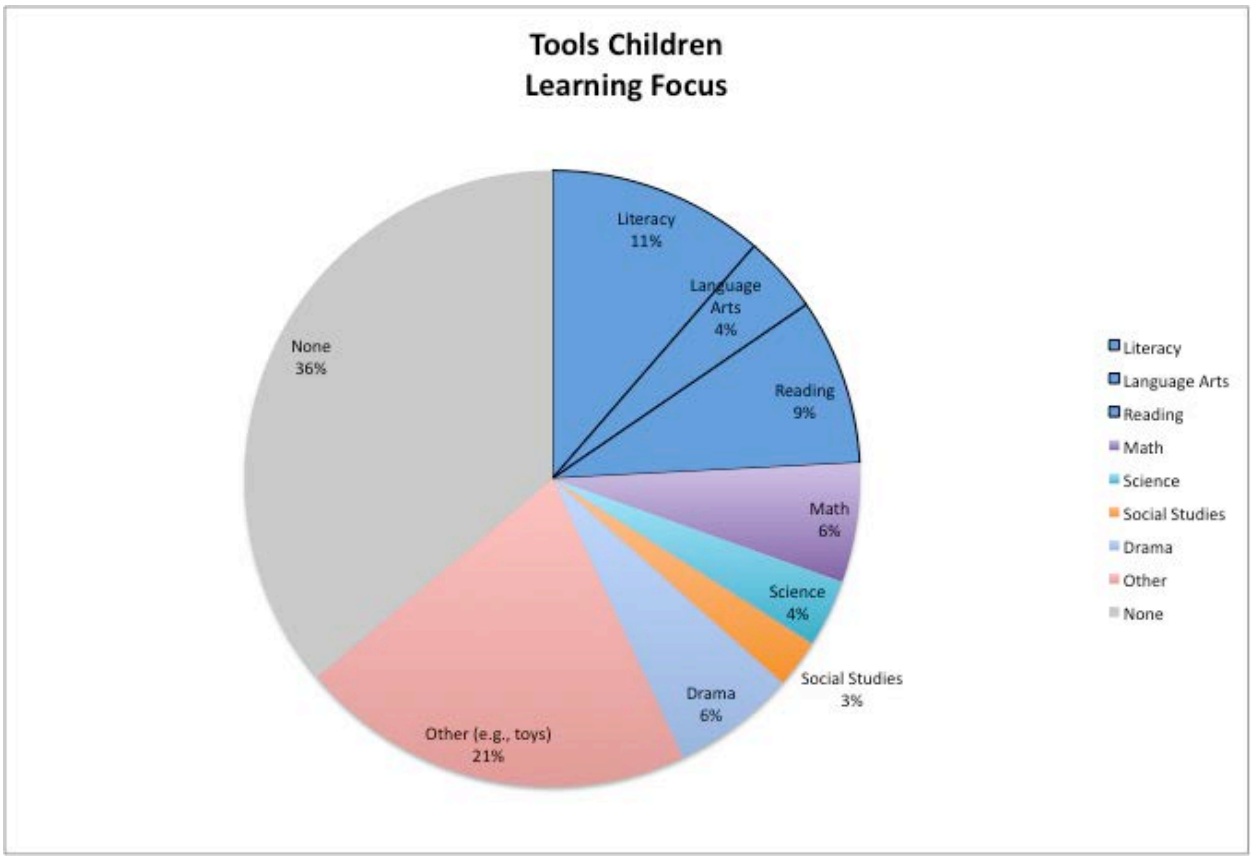

Comparison Children
Listening, Talking, and To whom
Listening 31%
Fuss/Cry 1%
Talking 25%
Not Talking or Listening 43%
To Teacher 5%
To Child 9%
To Small Group 1%
To Whole Group 4%
To Self 6%
Not Talking or Listening
Listening
Fuss/Cry
To Teacher
To Child
To Small Group
To Whole Group
To Self

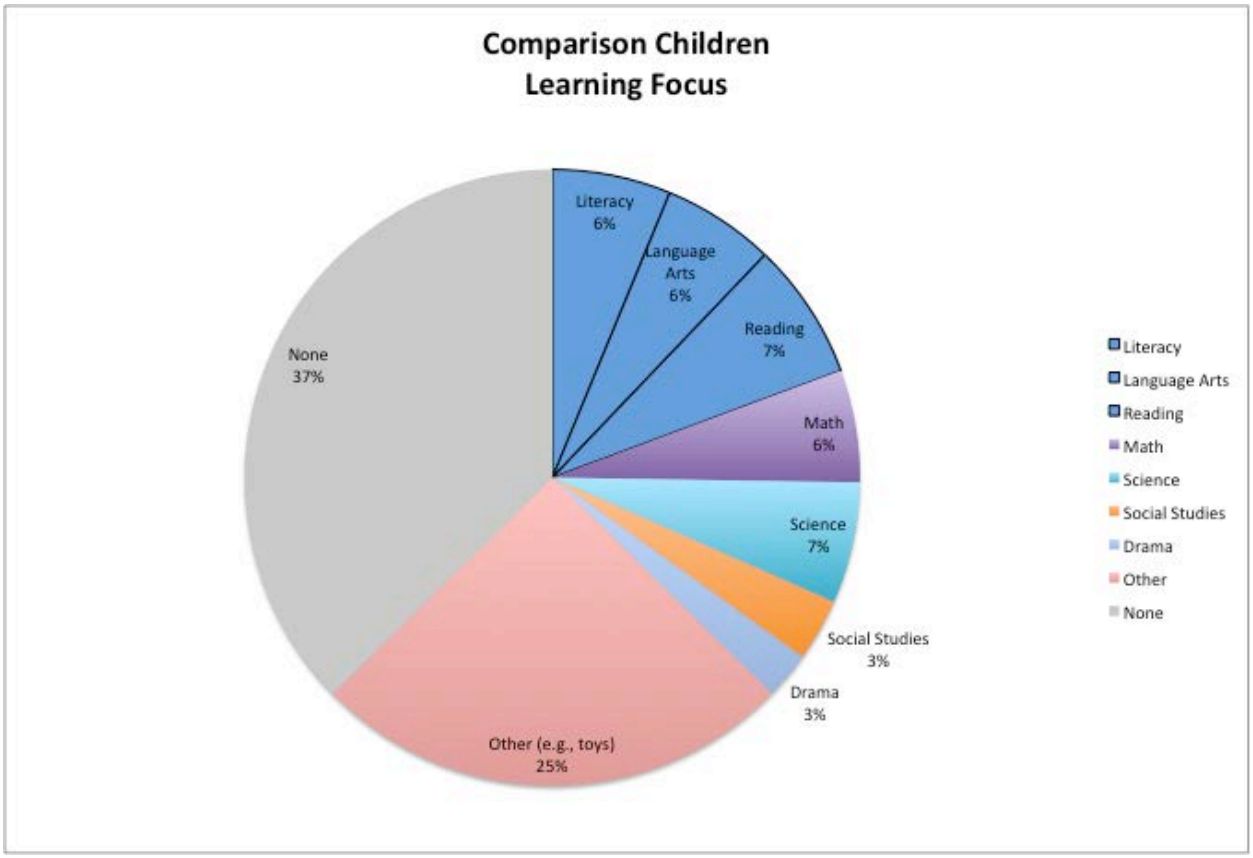

Tools Children
Talking, Listening, and To whom
Fuss/Cry
1%
Talking
25%
Listening
36%
Not Talking or Listening
39%
To Teacher
28%
To Child
7%
To Small Group
< 1%
To Whole Group
< 1%
Not Talking or Listening
Talking
Fuss/Cry
To Teacher
To Child
To Small Group
To Whole Group

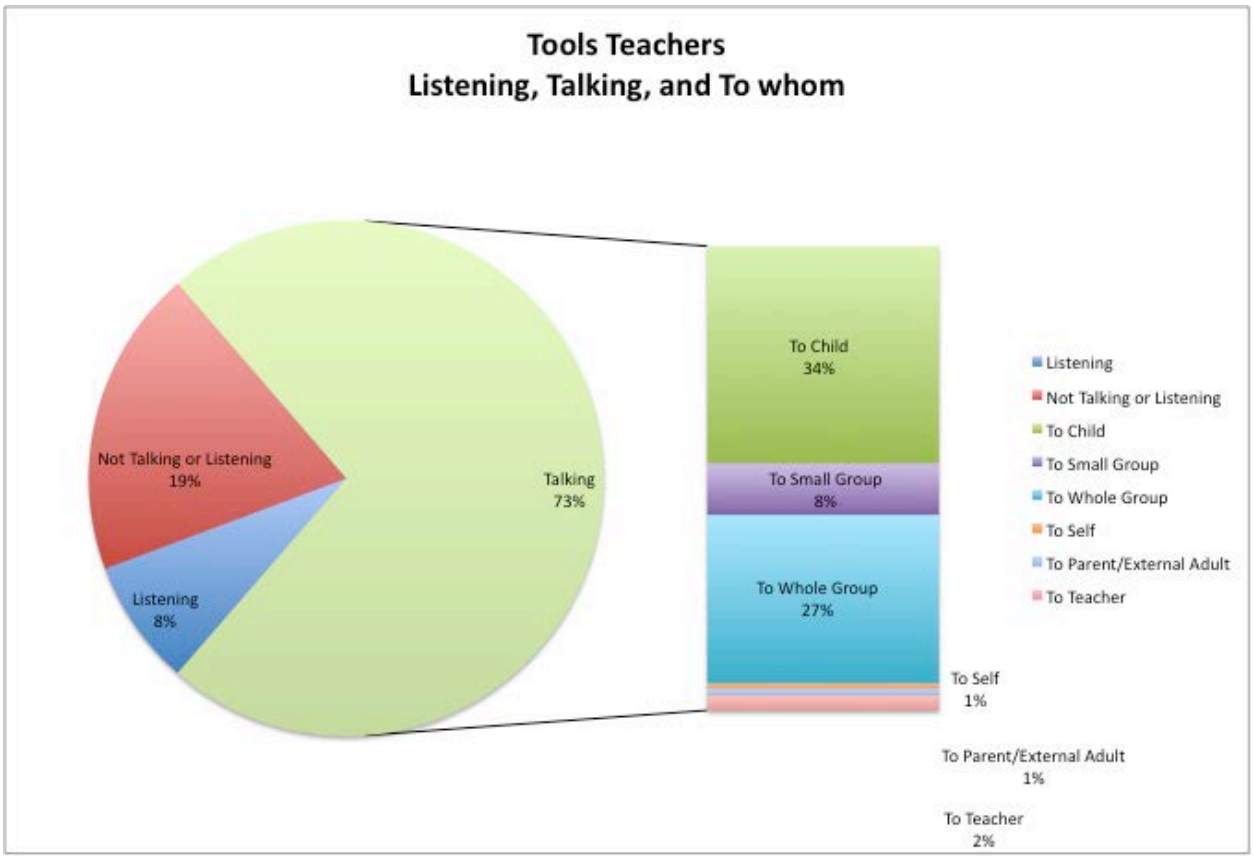

Comparison Children
Talking, Listening, and To whom
Fuss/Cry
1%
Talking
25%
Listening
31%
Not Talking or Listening
43%
To Teacher
24%
To Child
7%
To Small Group
< 1%
To Whole Group
< 1%
Not Talking or Listening
Talking
Fuss/Cry
To Teacher
To Child
To Small Group
To Whole Group

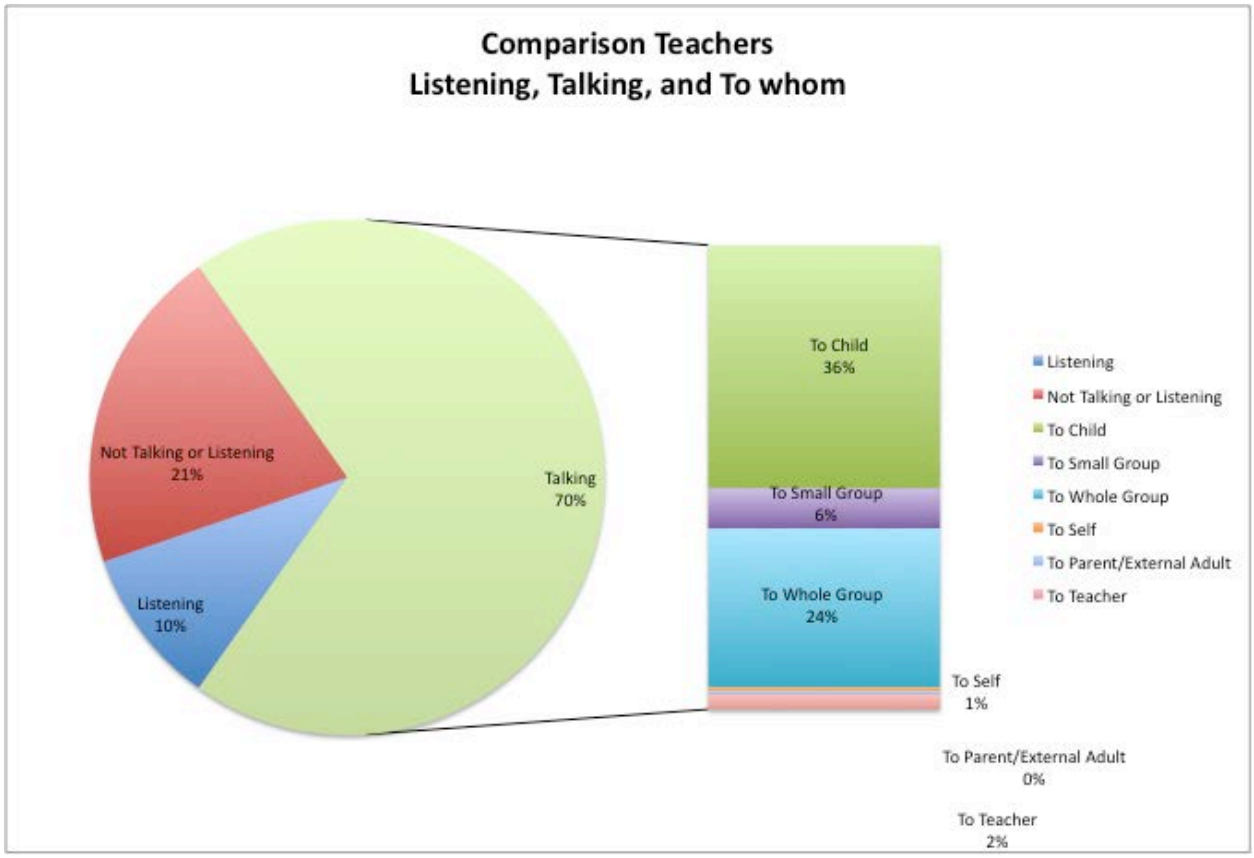

Tools Children
Interaction Type
Social 2%
Unoccupied 5%
Time Out 0%
Onlooker 1%
Cooperative 2%
Alone 4%
Associative Paired 2%
Associative 8%
Nonacademic 29%
Parallel 47%
Nonacademic
Parallel
Associative
Associative Paired
Cooperative
Alone
Onlooker
Social
Unoccupied
Time Out

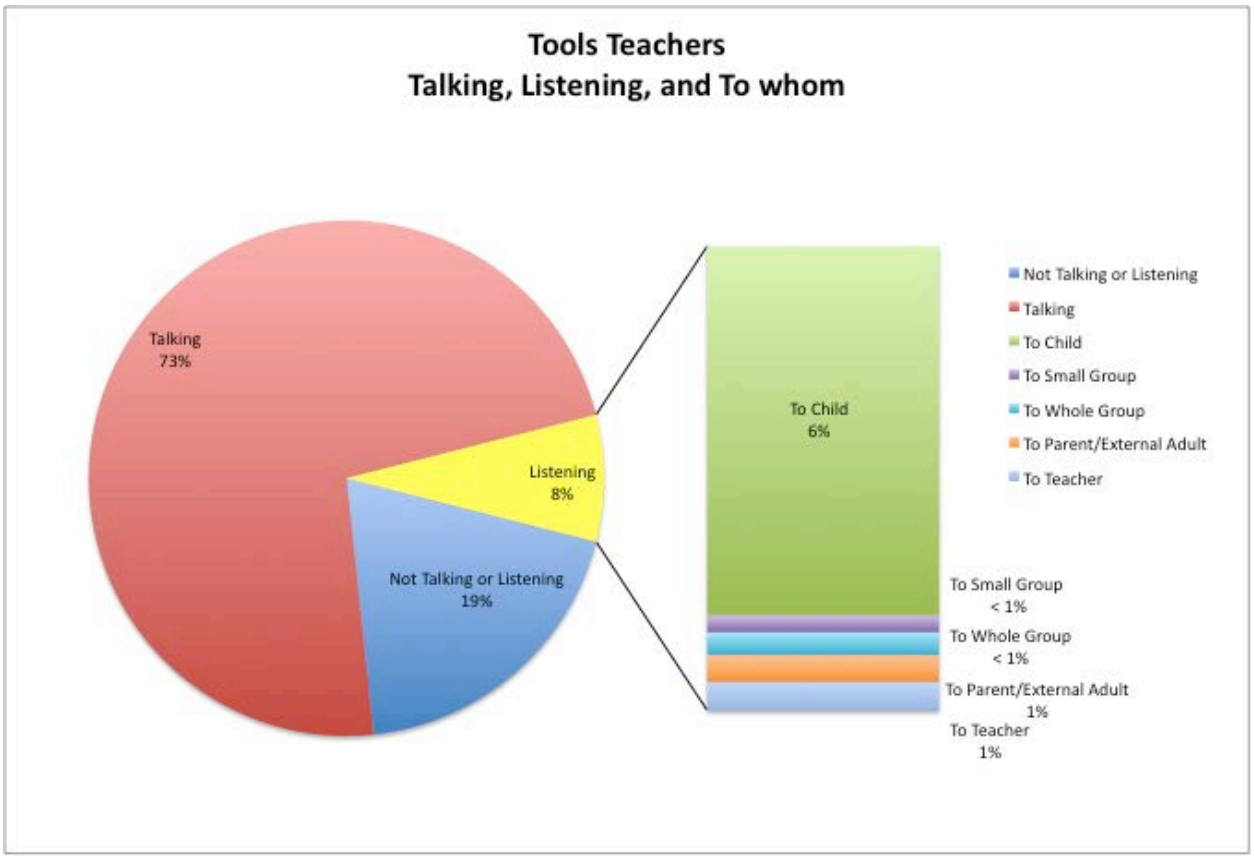

Comparison Children
Interaction Type
Social 2%
Unoccupied 4%
Time Out 0%
Onlooker 1%
Cooperative 1%
Alone 7%
Associative 7%
Nonacademic 30%
Parallel 48%
Nonacademic
Parallel
Associative
Cooperative
Alone
Onlooker
Social
Unoccupied
Time Out

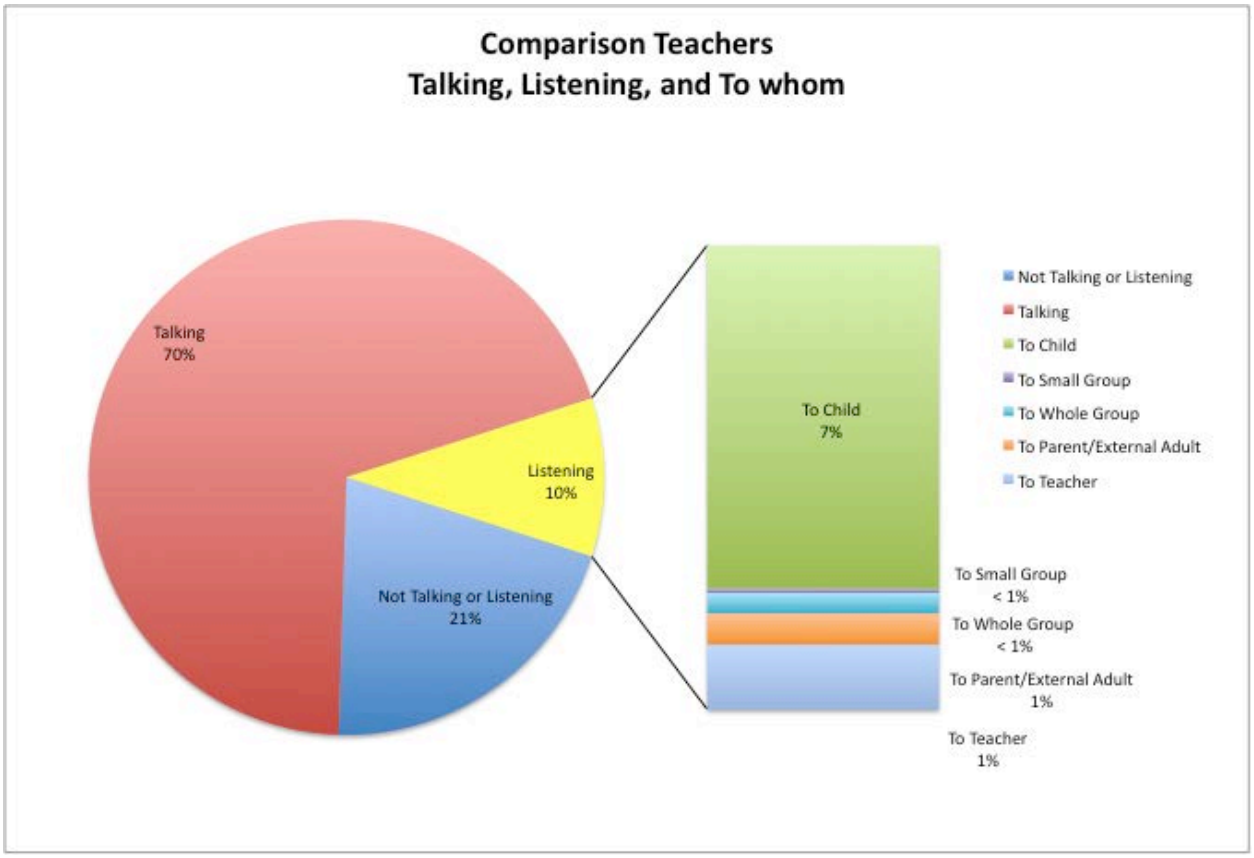

Tools Children
Learning Focus
Literacy
11%
Language
Arts
4%
Reading
9%
Math
6%
Science
4%
Social Studies
3%
Drama
6%
Other (e.g., toys)
21%
None
36%
Literacy
Language Arts
Reading
Math
Science
Social Studies
Drama
Other
None


Comparison Children
Learning Focus
Literacy
6%
Language
Arts
6%
Reading
7%
Math
6%
Science
7%
Social Studies
3%
Drama
3%
Other (e.g., toys)
25%
None
37%
Literacy
Language Arts
Reading
Math
Science
Social Studies
Drama
Other
None

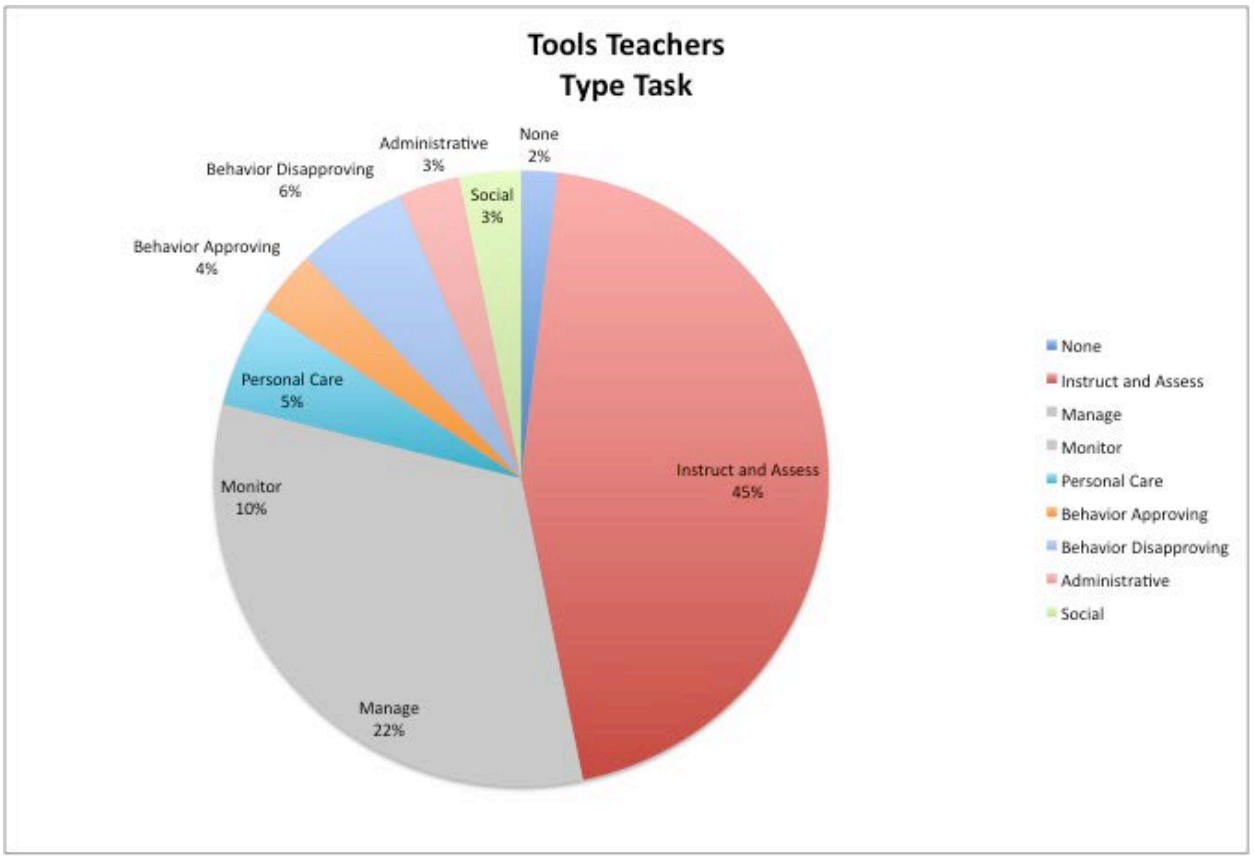

Tools Teachers
Listening, Talking, and To whom
Not Talking or Listening 19%
Listening 8%
Talking 73%
To Child 34%
To Small Group 8%
To Whole Group 27%
To Self 1%
To Parent/External Adult 1%
To Teacher 2%
Listening
Not Talking or Listening
To Child
To Small Group
To Whole Group
To Self
To Parent/External Adult
To Teacher

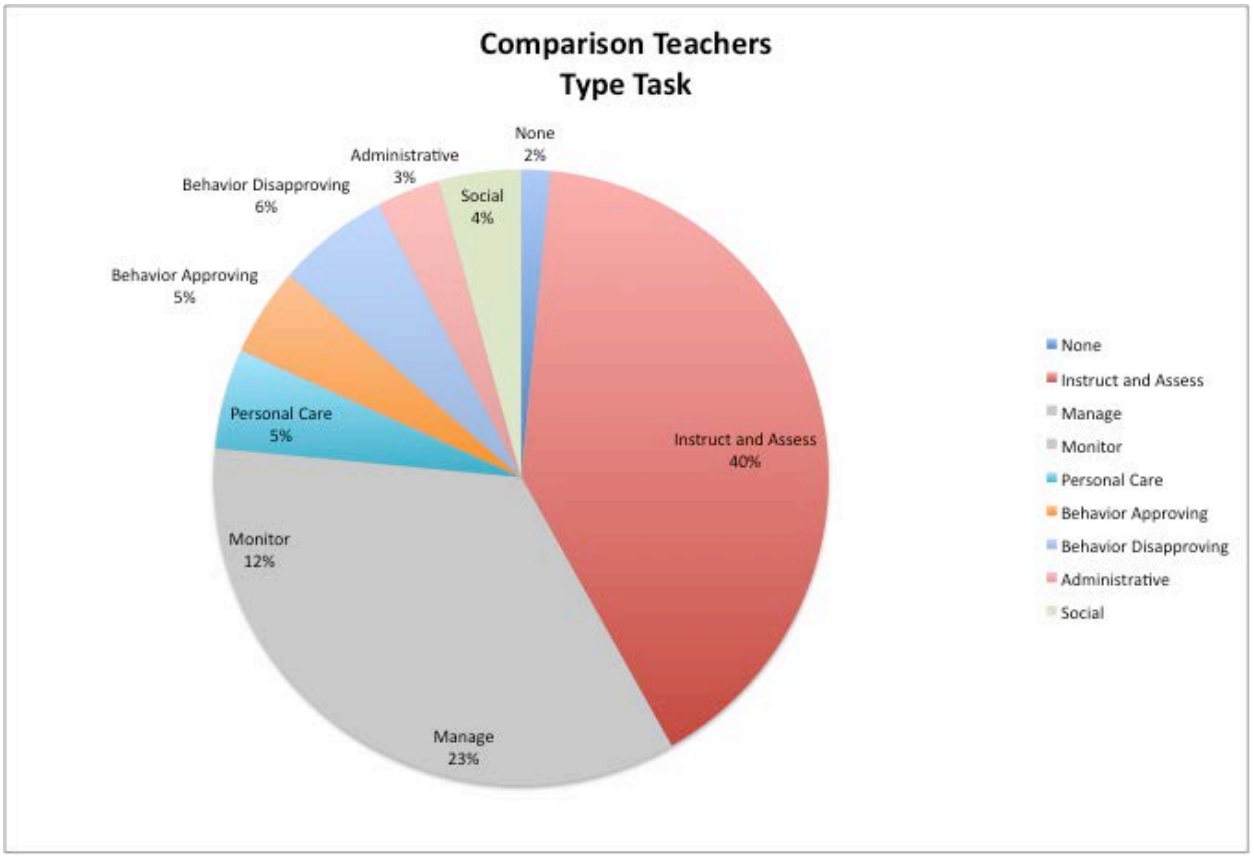

Comparison Teachers
Listening, Talking, and To whom
Not Talking or Listening 21%
Listening 10%
Talking 70%
To Child 36%
To Small Group 6%
To Whole Group 24%
To Self 1%
To Parent/External Adult 0%
To Teacher 2%
Listening
Not Talking or Listening
To Child
To Small Group
To Whole Group
To Self
To Parent/External Adult
To Teacher

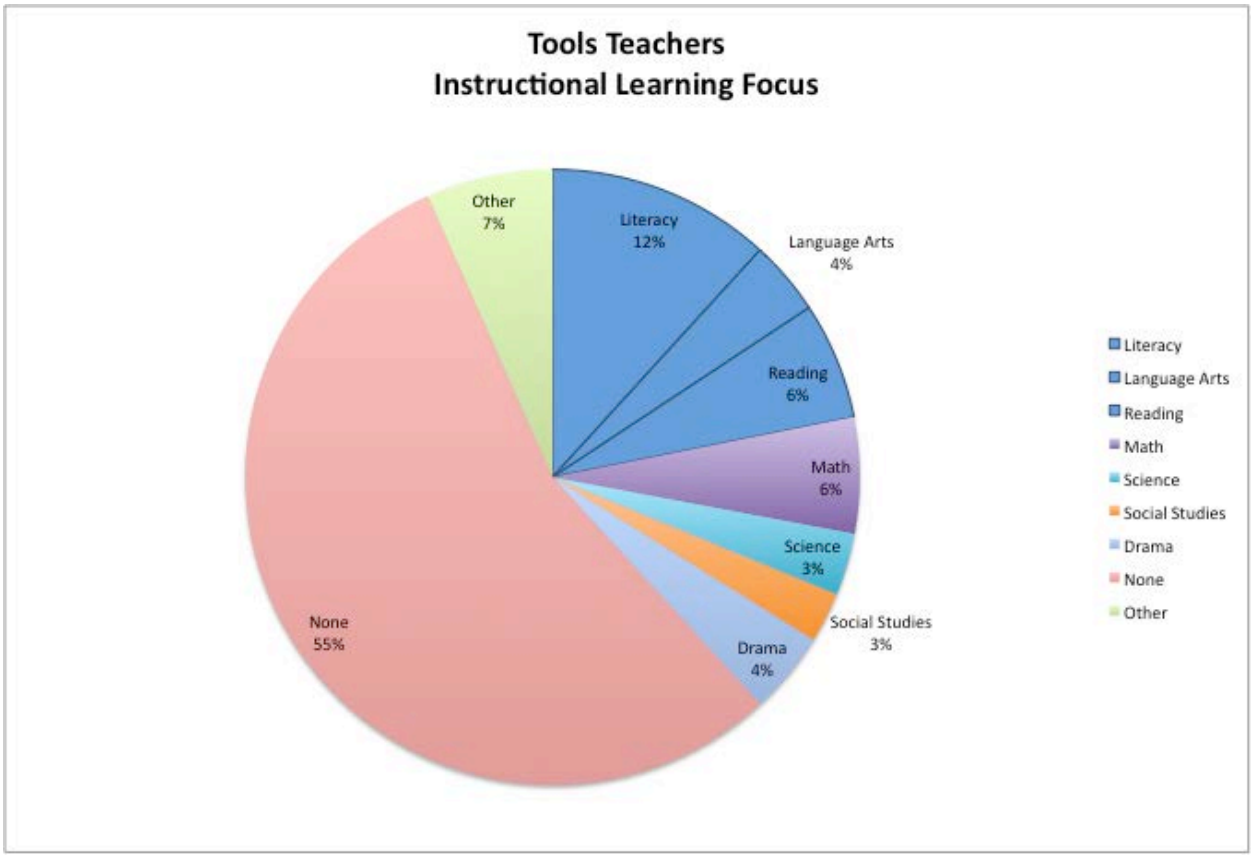


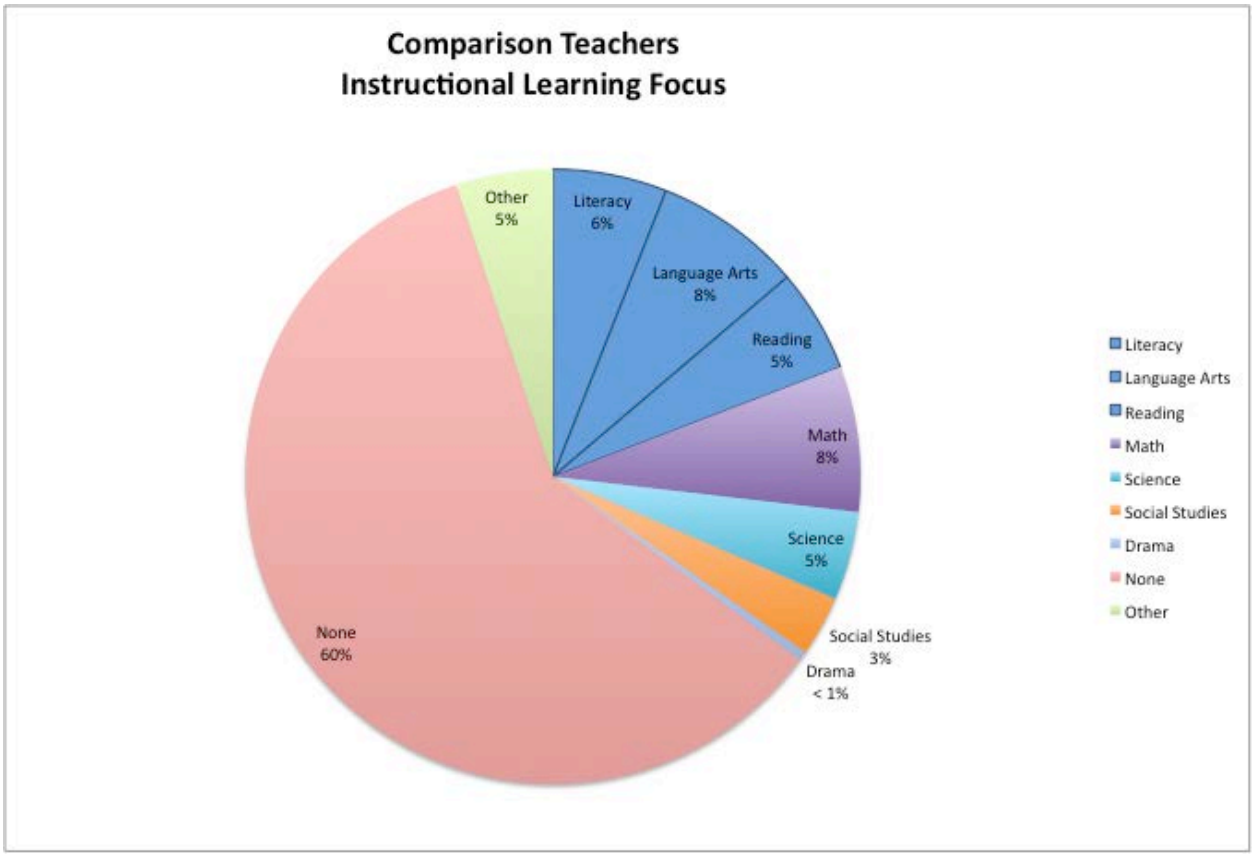


PEABODY research institute

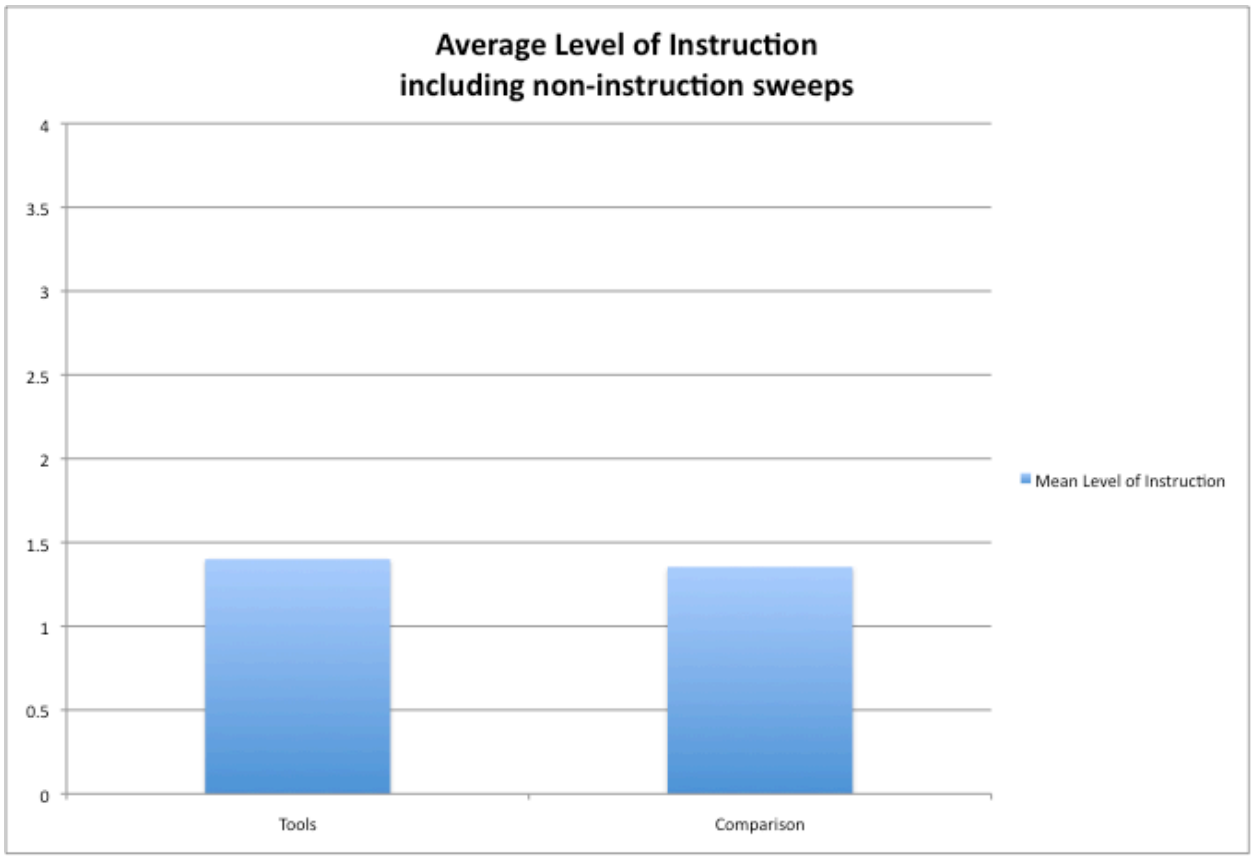

Tools Teachers
Type Task
None 2%
Instruct and Assess 45%
Manage 22%
Monitor 10%
Personal Care 5%
Behavior Approving 4%
Behavior Disapproving 6%
Administrative 3%
Social 3%
None
Instruct and Assess
Manage
Monitor
Personal Care
Behavior Approving
Behavior Disapproving
Administrative
Social

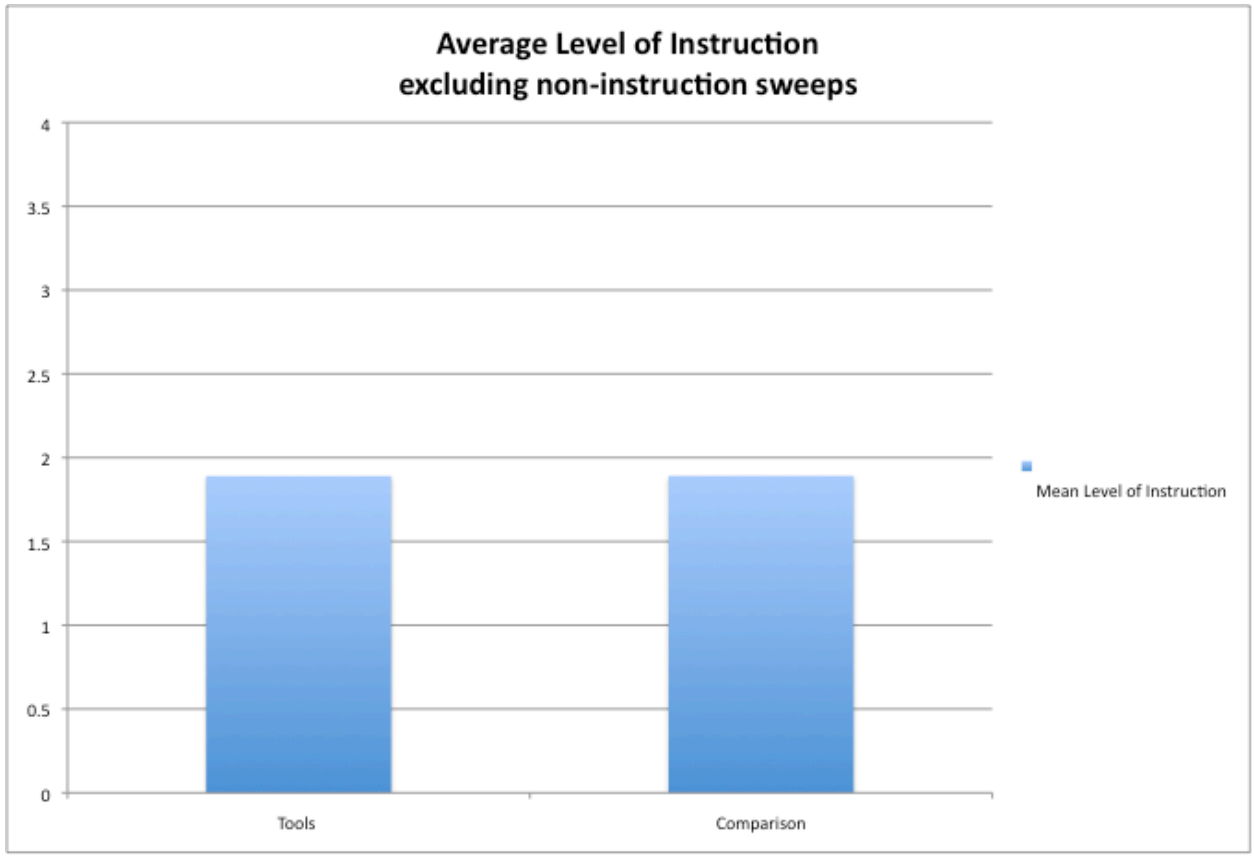

Comparison Teachers
Type Task
None 2%
Instruct and Assess 40%
Manage 23%
Monitor 12%
Personal Care 5%
Behavior Approving 5%
Behavior Disapproving 6%
Administrative 3%
Social 4%
None
Instruct and Assess
Manage
Monitor
Personal Care
Behavior Approving
Behavior Disapproving
Administrative
Social





PEABODY research institute


Average Level of Instruction
including non-instruction sweeps
4
3.5
3
2.5
2
1.5
1
0.5
0
Tools
Comparison
Mean Level of Instruction


Average Level of Instruction
excluding non-instruction sweeps
4
3.5
3
2.5
2
1.5
1
0.5
0
Tools
Comparison
Mean Level of Instruction

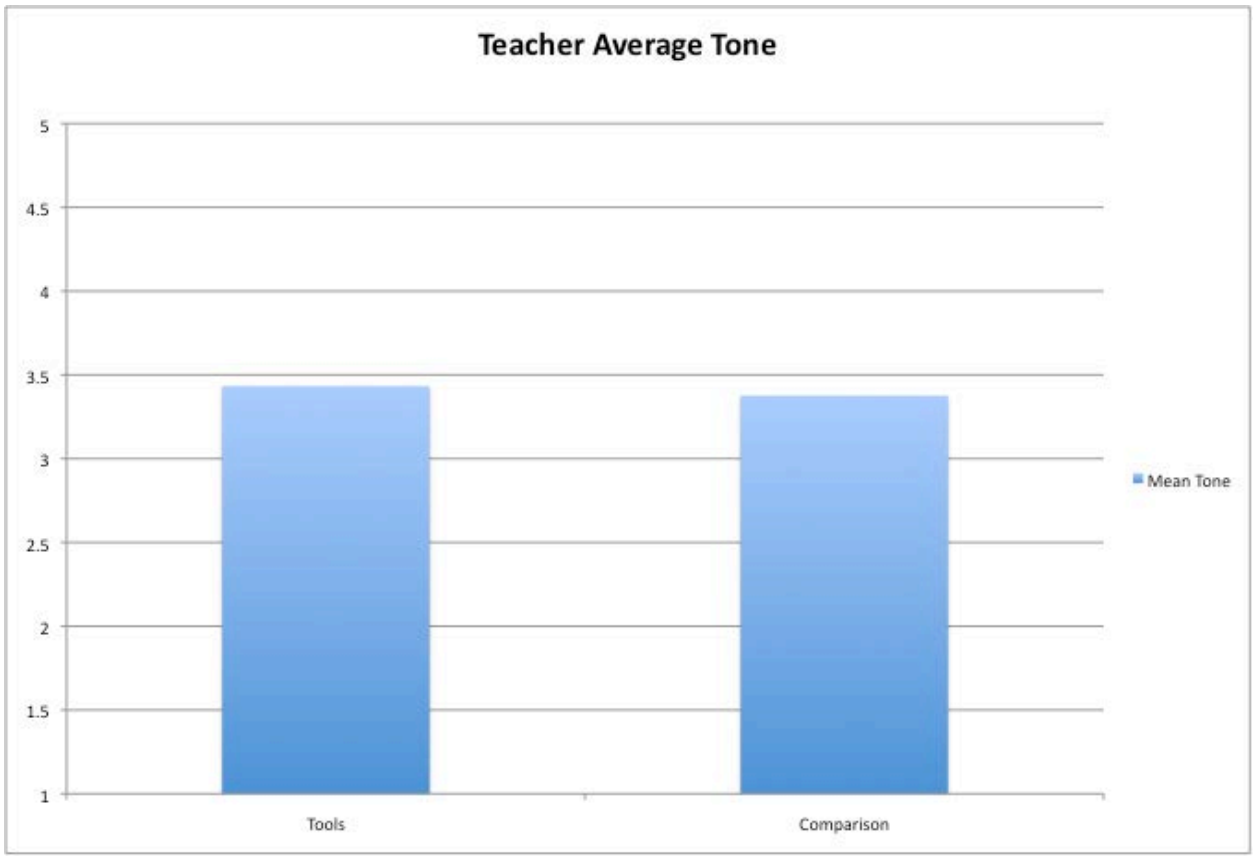

Teacher Average Tone
5
4.5
4
3.5
3
2.5
2
1.5
1
Tools
Comparison
Mean Tone

TABLE 40: CHILD AND TEACHER BEHAVIORS AS PREDICTORS OF CHILD-LEVEL ACHIEVEMENT AND SELF-REGULATION OUTCOMES

	WJ Composite			SR composite		
	β	F	*p*	β	F	*p*
Teacher Types of Tasks						
Instruction and Assessment	0.01	0.07	0.80	0.06	3.49	0.07
Management and Monitoring	0.05	4.69	0.04	-0.05	2.99	0.09
Teacher Emotional Tone						
Behavior Approving	0.02	0.56	0.46	0.06	4.12	0.05
Behavior Disapproving	-0.07	10.76	0.01	-0.05	2.87	0.10
Children and Teachers Talk and Listen						
Children Talking Overall	-0.01	0.11	0.74	-0.01	0.06	0.80
Children Talking to Self	-0.04	2.96	0.09	-0.06	3.89	0.05
Children Listening to Teacher	0.02	0.60	0.44	0.09	10.40	0.01
Children Listen to Children	0.02	0.94	0.34	0.02	0.24	0.63
Teacher Talking to Children	0.01	0.36	0.55	0.06	3.93	0.05
Teacher Listening to Children	0.01	0.40	0.53	-0.04	1.43	0.24
Children Involvement						
Mean Level of Involvement	0.03	2.00	0.16	0.03	0.63	0.43
Time Unoccupied	-0.03	1.81	0.19	-0.05	2.81	0.10
Down Time	-0.03	1.65	0.21	-0.04	1.87	0.18

Note: These models were tested via multi-level models with students nested within classrooms, schools, and school systems. Covariates in all models included age, testing interval, gender, ELL status, IEP status, ethnicity, and pretest. WJ and SR composites are derived from principal components analyses. Significant negative relationships are italicized.

SUMMARY

Overall, we found no significant effects of the *Tools of the Mind* curriculum on literacy, language or mathematics achievement when compared to business as usual classrooms whose teachers used a variety of curricular approaches.

Similarly, we found no effects on Self-Regulation. Gains in achievement and self-regulation were correlated, $r = .35$.

The few significant interactions obtained in the analyses did not provide a consistent picture of the curriculum being more or less effective for subgroups of children.

According to observations of curriculum fidelity, there was variation among the teachers in the degree to which they implemented the curriculum. Virtually all of the *Tools* teachers implemented substantial portions of the curriculum. Mostly teachers implemented the activities at the appropriate times and chose a variety of easy, medium and difficult types of activities. Ambiguity about what constitutes full implementation makes it difficult to accurately appraise the level of implementation actually attained.

Observational measures of fidelity were consistent with ratings of high implementation provided by *Tools* trainers, coaches, project classroom observers, and the teachers themselves.

Variations in fidelity of implementation measures across the full group of 32 *Tools* teachers were not associated with greater gains in achievement or self-regulation. Comparisons between the 8 classrooms with the highest fidelity and the remaining 24 *Tools* classrooms revealed positive effects on some achievement and self-regulation outcomes, as well as teacher ratings.

Tools classrooms and Control classrooms were similar in the amount of time on task. Differences were found between Tools and Control classrooms on some aspects of classroom organization. *Tools* classrooms spent more time in small group instruction and more time focused on literacy; they spent less time in centers and small-group centers.

Teachers and children spent more time on drama as a learning focus in *Tools* classrooms compared to Control classrooms. *Tools* spent half as much time on Language Arts as Control classrooms and twice as much time on Literacy as learning foci.

Classrooms were similar in the frequency of teacher and child talk, in the frequency children were observed listening and in the rate of private speech. They were similar in

the frequencies of behavior approving and disapproving and in the ratio between the two.

Across all classrooms, time on task and time spent in centers were related to achievement outcomes while the frequency of children's private speech was negatively related to both achievement and self-regulation outcomes.

Across all classrooms, frequency of behavior disapproving was negatively related to achievement and self-regulation outcomes, while the frequency of behavior approving was positively related to self-regulation outcomes. *Tools* and Control classrooms did not differ on behavior approving or disapproving.