

June 2017 Progress Update

Study conducted by the Peabody Research Institute
at Vanderbilt University

PEABODY
research
institute

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Acknowledgements

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We also want to express our appreciation for the contributions of Lisa Swain, who tirelessly checked our student direct assessment data and followed through working with the teacher rating scales.

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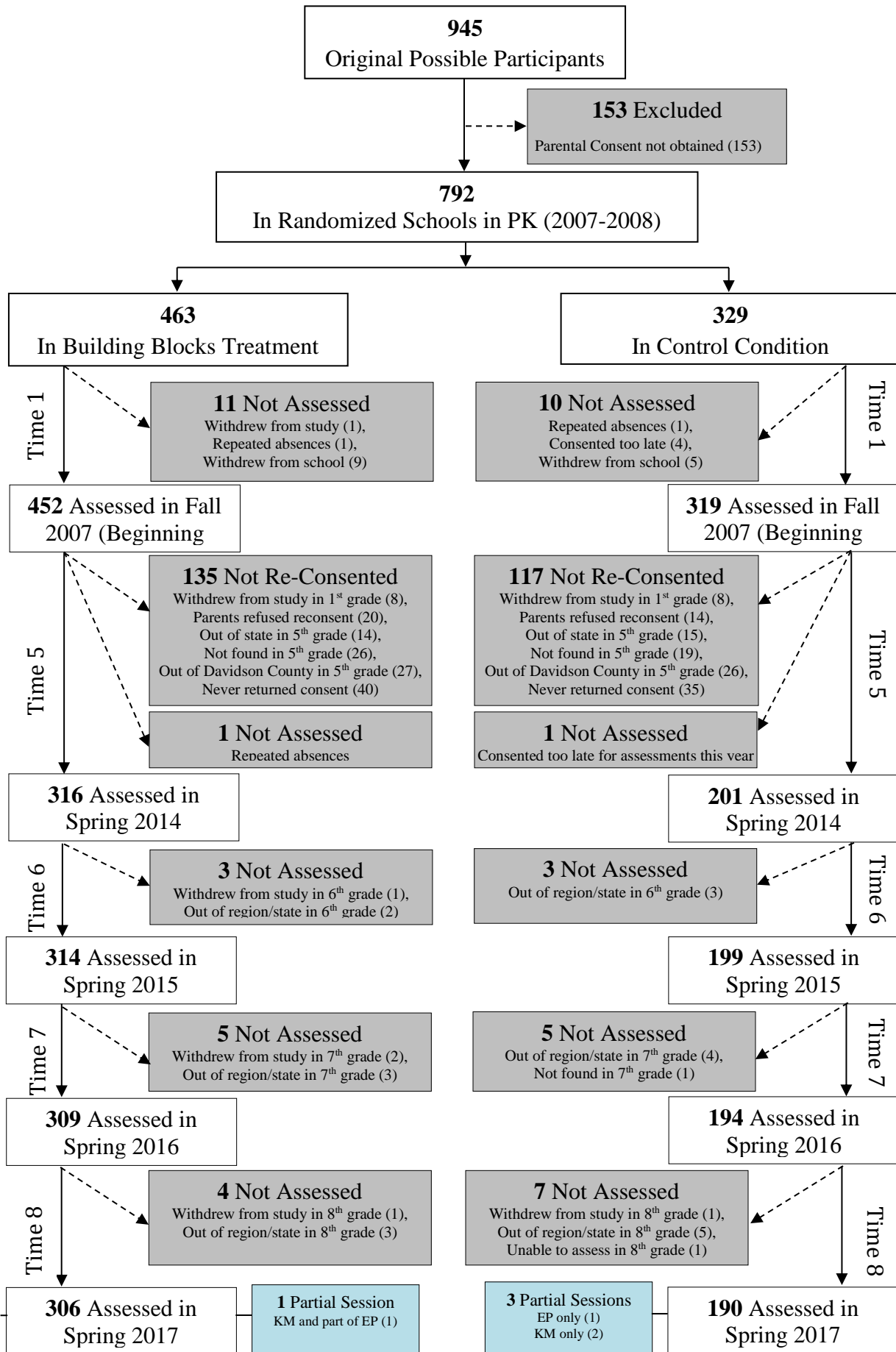
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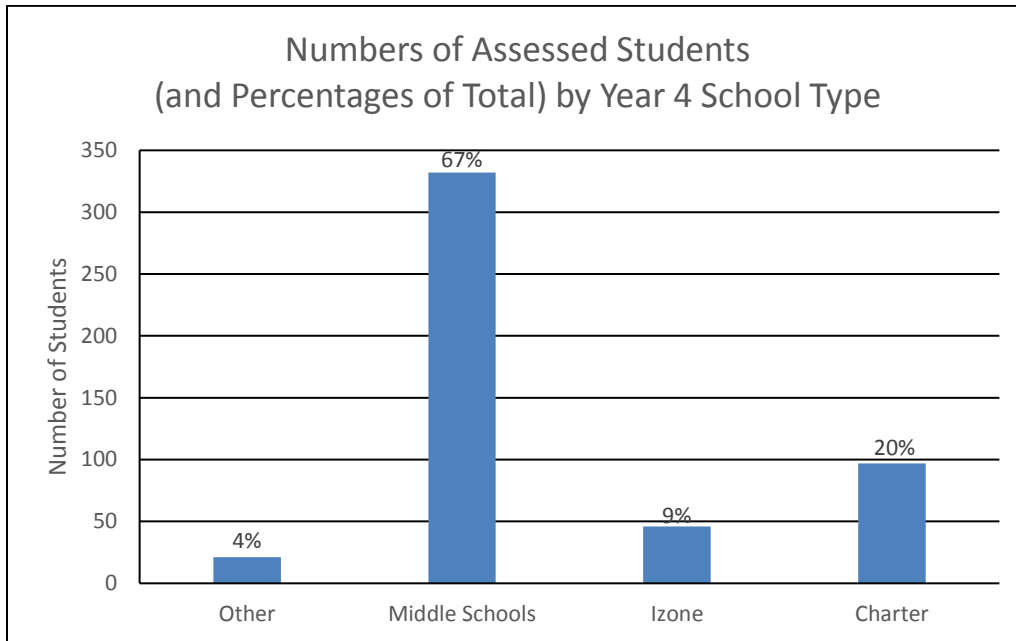
Official Analysis Sample

- There were 771 students in our database from the Pre-K study, and the goal for the newly consented sample, as written in the grant proposal, was 500 students.
 - 16 students withdrew from the study in 1st grade.
 - 29 students are no longer in the state.
 - 53 students are in the state but are not in Davidson County.
 - 45 students have not been located despite all efforts.
 - 34 students' parents declined to participate in the follow-up study (though 16 of those were communicated via the math teacher).
 - 72 students were located in Davidson County, but we could not get parental consent because of lack of response.
 - 3 additional students initially agreed to participate but parents never returned hard copy of consent form
- **THE OFFICIAL ANALYSIS SAMPLE CONSISTS OF 519 STUDENTS (517 assessed in Year 1, 513 assessed in Year 2, 503 assessed in Year 3, and 496 assessed in Year 4).**
 - *Note.* 4 students in Year 4 have partial data. 1 refused to complete any of the E-Prime Session measures, 1 refused portions of two E-Prime measures, 1 refused to complete the KeyMath Session (in addition to refusing to redo Hearts & Flowers), and 1 moved after completing the KeyMath Session and could not be located.

Consort Chart: From Original Early Math Study through Middle School Follow-Up

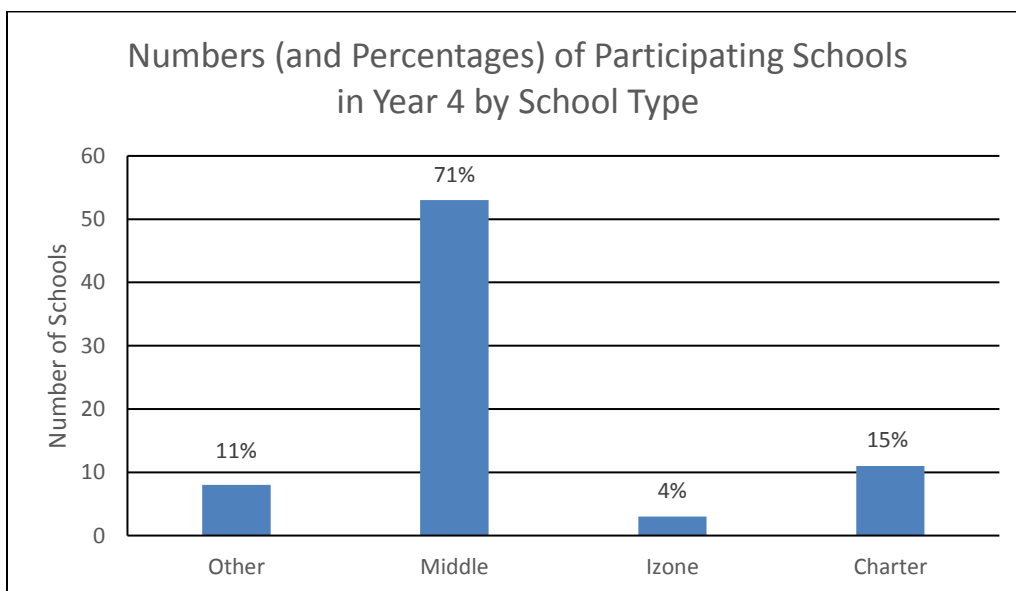


Assessed Students in Year 4



Note. “Other” schools include 1 that only serves students with IEPs, 1 K-12 school, 2 private schools, 1 alternative school, 1 school serving grades 7 – 12, 1 MNPS high school, and 1 student who was homeschooled during Year 4.

Participating Schools in Year 4



Note. “Other” schools include 1 school that only serves students with IEPs, 1 K-12 school, 2 private schools, 1 alternative school, 1 school serving grades 7 – 12, and 1 MNPS high school. 1 student was homeschooled during Year 4 and is also included in the “Other” category.

Mobility of Students between Schools in Year 4

	Frequency	Percent
Attended 1 School	443	89.3
Attended 2 Schools	50	10.1
Attended 3 Schools	3	0.6

Note. 17 of the students assessed during Year 4 (3.4%) attended an alternative school at some point during the year.

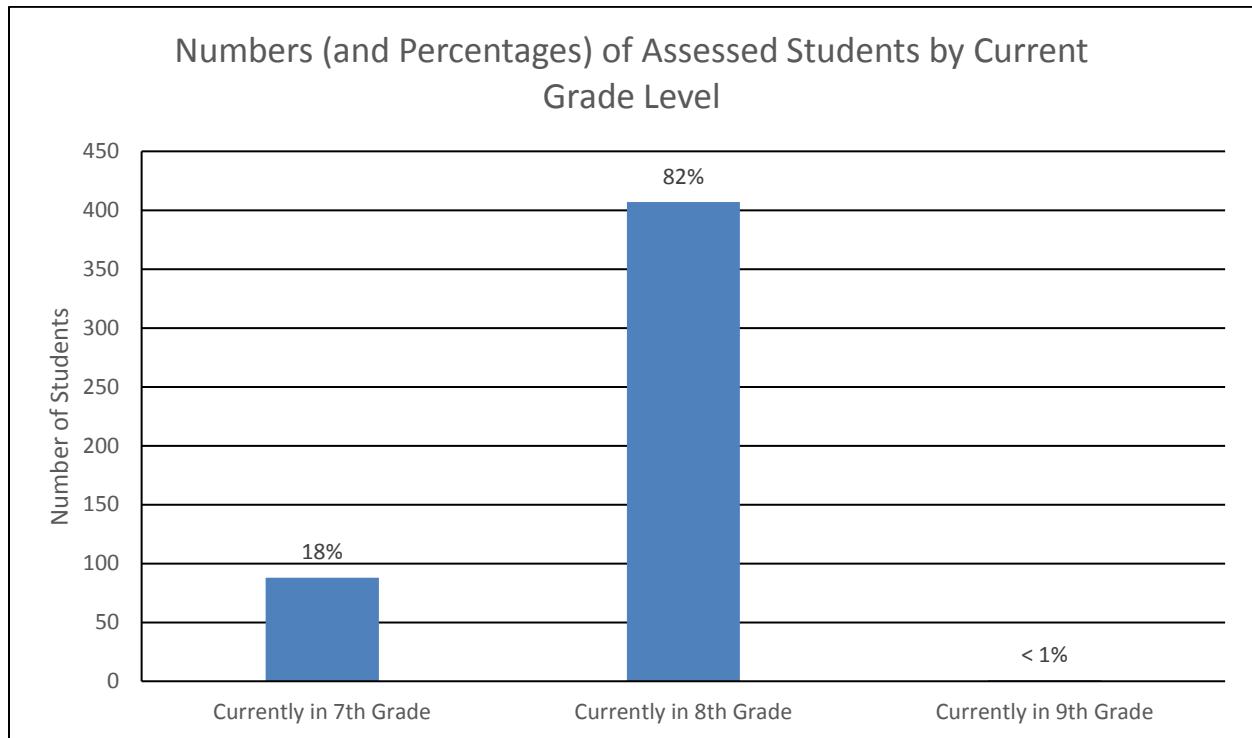
Demographic Information (Assessed Sample for Year 4)

	N	Min	Max	Mean	SD
Age at Time of Testing (in years)	496	13.4	15.6	14.0	.326
PK Building Blocks Treatment	306	13.4	15.6	14.0	.322
PK Control Condition	190	13.5	15.2	14.1	.326

	Overall		PK Building Blocks		PK Control	
	Freq	Pct	Freq	Pct	Freq	Pct
Ethnicity						
Black	392	79.0	249	81.4	143	75.3
White	43	8.7	22	7.2	21	11.1
Hispanic	41	8.3	20	6.5	21	11.1
Other	20	4.0	15	4.9	5	2.6
Gender						
Male	218	44.0	137	44.8	81	42.6
Female	278	56.0	169	55.2	109	57.4
Number of Current Schools*	75	-	64	-	57	-
Pre-K School System						
Head Start (MAC)	199	40.1	147	48.0	52	27.4
MNPS Pre-K	297	59.9	159	52.0	138	72.6

Note. Most students were located in Davidson County, but we also assessed any student who had moved to a contiguous county (1 in Cheatham, 5 in Clarksville-Montgomery, 2 in Lebanon Special, 3 in Robertson, 10 in Rutherford, 9 in Sumner, and 3 in Wilson).

Grade Retention Information in Year 4



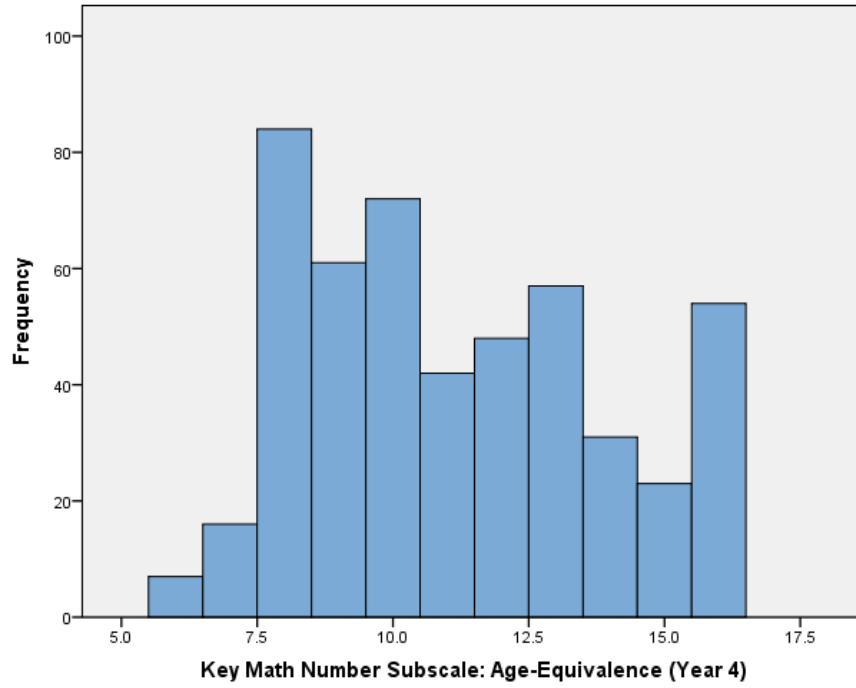
- 406 students have gone through 5th, 6th, 7th, and 8th grade as expected.
- 71 students were in 4th in year 1, 5th in year 2, 6th in year 3, and 7th grade this year.
- 8 students were in 5th grade in year 1, repeated 5th grade in year 2, were in 6th grade in year 3, and were in 7th grade this year.
- 6 students were in 5th grade in year 1, 6th grade in year 2, repeated 6th grade in year 3, and were in 7th grade this year.
- 2 students were in 5th grade in year 1, 6th grade in year 2, 7th grade in year 3, and repeated 7th grade this year.
- 1 student was in 6th grade in year 1, 7th grade in year 2, 8th grade in year 3, and 9th grade this year.
- 1 student was in 4th grade in year 1, 5th grade in year 2, 6th grade in year 3, and 8th grade this year.
- 1 student was in 4th grade in year 1, 5th grade in year 2, started year 3 in 6th grade but was moved up to 7th grade mid-year, and was in 7th grade this year.

Student Outcomes: KeyMath

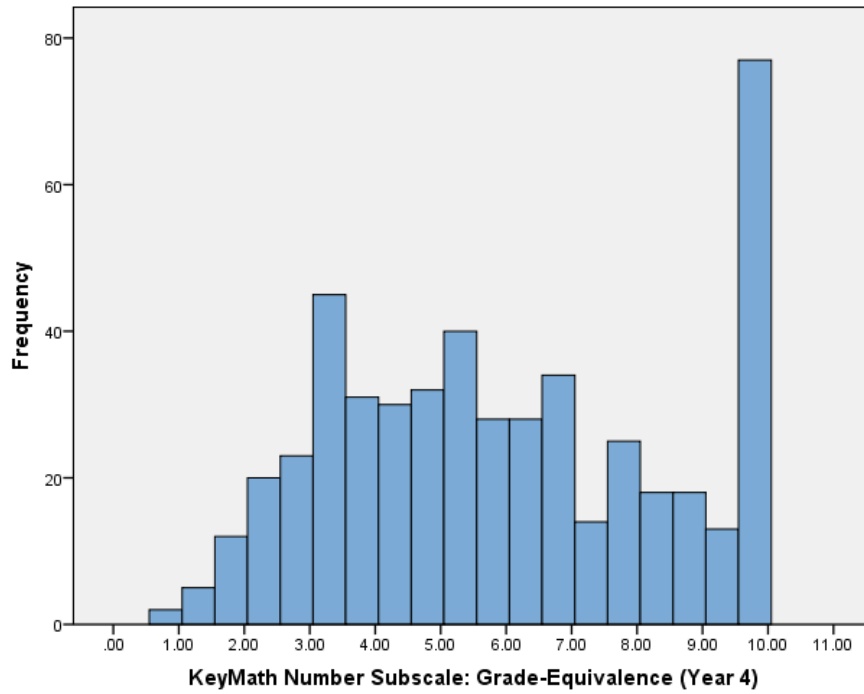
Note. The average age of the students was 14.0 years. The average grade level of the students was 8.83.

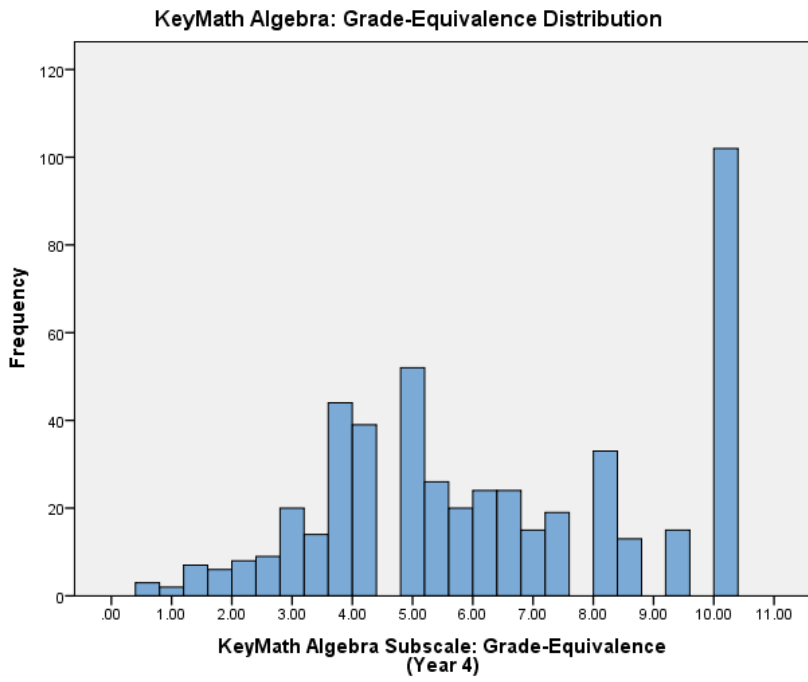
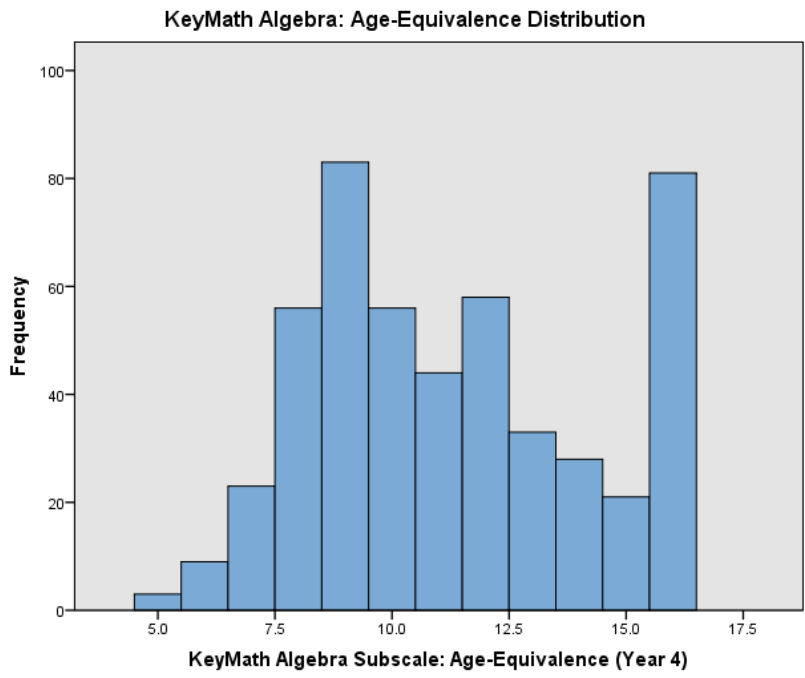
	N	Min	Max	Mean	SD
KeyMath: Numeration					
Raw Score	495	7.00	49.00	27.73	9.39
Age-Scaled Score	495	1.00	19.00	7.63	2.83
Grade-Scaled Score	495	1.00	19.00	7.45	2.98
Age Equivalent	495	6.00	16.00	11.15	2.76
Grade Equivalent	495	0.80	10.00	6.04	2.56
KeyMath: Algebra					
Raw Score	495	3.00	38.00	21.14	7.63
Age-Scaled Score	495	1.00	17.00	8.04	3.15
Grade-Scaled Score	495	1.00	18.00	7.77	3.09
Age Equivalent	495	5.00	16.00	11.31	2.97
Grade Equivalent	495	0.40	10.00	6.25	2.64
KeyMath: Geometry					
Raw Score	495	6.00	36.00	22.26	5.83
Age-Scaled Score	495	1.00	19.00	7.74	2.60
Grade-Scaled Score	495	1.00	19.00	7.51	2.57
Age Equivalent	495	5.00	16.00	10.74	2.71
Grade Equivalent	495	0.00	10.00	5.95	2.50

KeyMath Number: Age-Equivalence Distribution

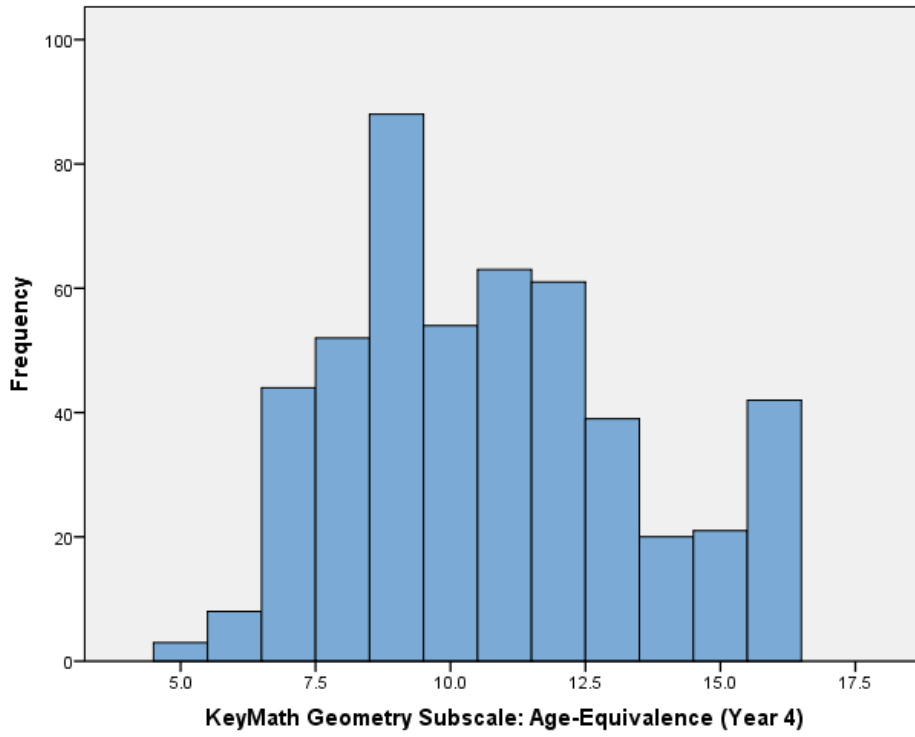


KeyMath Number: Grade Equivalence Distribution

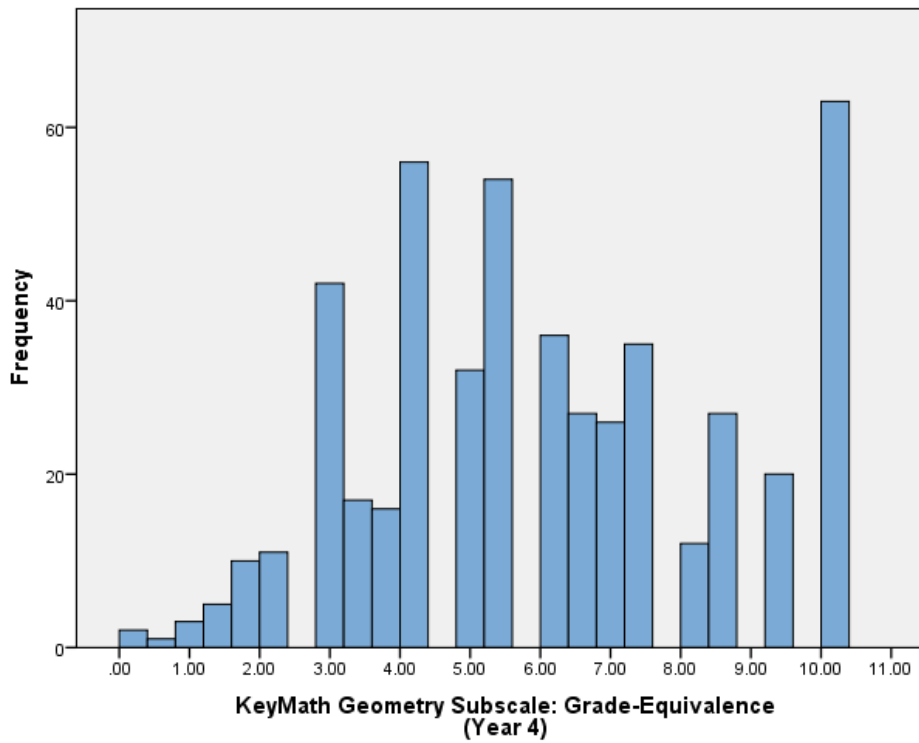




KeyMath Geometry: Age-Equivalence Distribution



KeyMath Geometry: Grade-Equivalence Distribution



Student Outcomes on KeyMath by Retention Status

	N	Min	Max	Mean	SD
Not Retained					
Average Age = 14.06 years, Average Grade = 8.83					
KeyMath: Numeration					
Age-Scaled Score	407	1.00	19.00	8.04	2.78
Grade-Scaled Score	407	1.00	19.00	7.91	2.91
Age Equivalent	407	6.00	16.00	11.55	2.72
Grade Equivalent	407	0.80	10.00	6.43	2.48
KeyMath: Algebra					
Age-Scaled Score	407	1.00	17.00	8.52	3.06
Grade-Scaled Score	407	1.00	18.00	8.24	3.01
Age Equivalent	407	5.00	16.00	11.75	2.91
Grade Equivalent	407	0.40	10.00	6.66	2.56
KeyMath: Geometry					
Age-Scaled Score	407	1.00	19.00	8.06	2.57
Grade-Scaled Score	407	1.00	19.00	7.83	2.55
Age Equivalent	407	5.00	16.00	11.08	2.69
Grade Equivalent	407	0.00	10.00	6.27	2.46

	N	Min	Max	Mean	SD
Retained					
Average Age = 13.95 years, Average Grade = 7.83					
KeyMath: Numeration					
Age-Scaled Score	88	2.00	12.00	5.70	2.20
Grade-Scaled Score	88	2.00	12.00	5.32	2.31
Age Equivalent	88	6.00	16.00	9.26	2.09
Grade Equivalent	88	1.20	10.00	4.24	2.11
KeyMath: Algebra					
Age-Scaled Score	88	1.00	14.00	5.83	2.56
Grade-Scaled Score	88	1.00	14.00	5.60	2.49
Age Equivalent	88	5.00	16.00	9.25	2.31
Grade Equivalent	88	0.40	10.00	4.36	2.14
KeyMath: Geometry					
Age-Scaled Score	88	1.00	12.00	6.26	2.21
Grade-Scaled Score	88	1.00	12.00	6.02	2.14
Age Equivalent	88	5.00	16.00	9.19	2.25
Grade Equivalent	88	0.00	10.00	4.47	2.16

KeyMath Age Equivalence across Years

Year	Mean Age	Test	N	M	SD
Year 1	11.01 years	Number	517	9.21	2.04
		Algebra	517	9.15	1.96
		Geometry	517	8.61	1.99
Year 2	12.01 years	Number	513	10.03	2.23
		Algebra	513	10.10	2.41
		Geometry	513	9.51	2.10
Year 3	13.05 years	Number	503	10.82	2.62
		Algebra	503	11.00	2.76
		Geometry	503	10.17	2.32
Year 4	14.04 years	Number	495	11.15	2.76
		Algebra	495	11.31	2.97
		Geometry	495	10.74	2.71

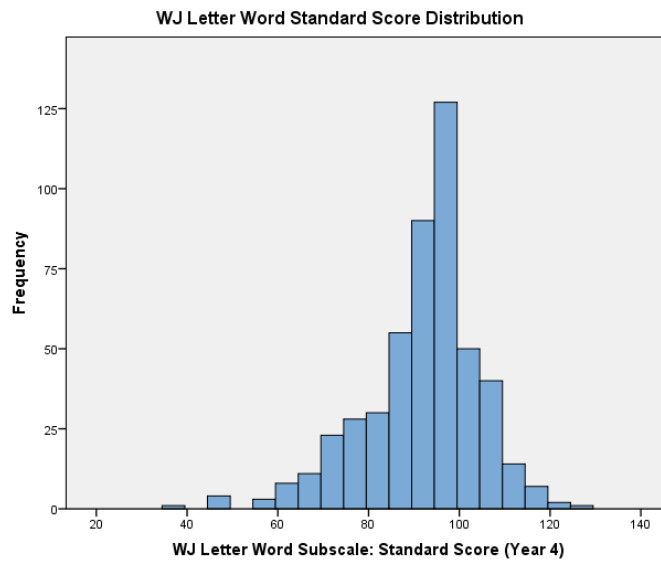
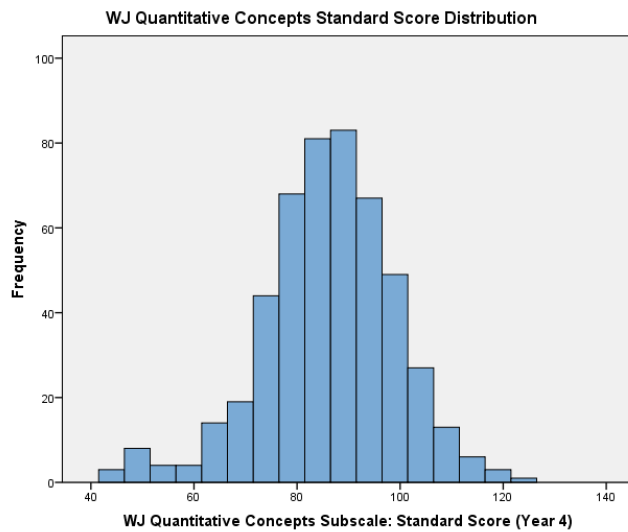
KeyMath Grade Equivalence across Years

Year	Mean Grade	Test	N	M	SD
Year 1	5.83	Number	517	4.20	1.98
		Algebra	517	4.31	1.84
		Geometry	517	3.90	1.97
Year 2	6.84	Number	513	4.98	2.15
		Algebra	513	5.20	2.25
		Geometry	513	4.80	2.06
Year 3	7.84	Number	503	5.38	2.55
		Algebra	503	5.70	2.65
		Geometry	503	5.13	2.31
Year 4	8.83	Number	495	6.04	2.56
		Algebra	495	6.23	2.64
		Geometry	495	5.95	2.50

Student Outcomes: Woodcock-Johnson Subtests

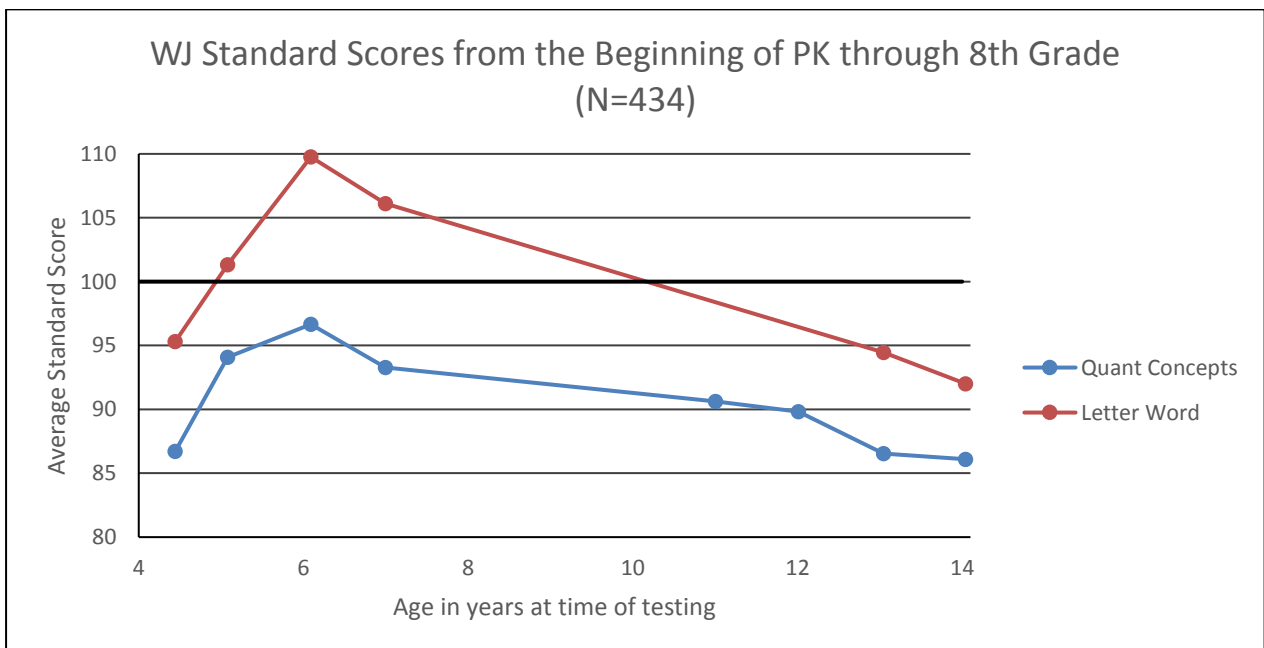
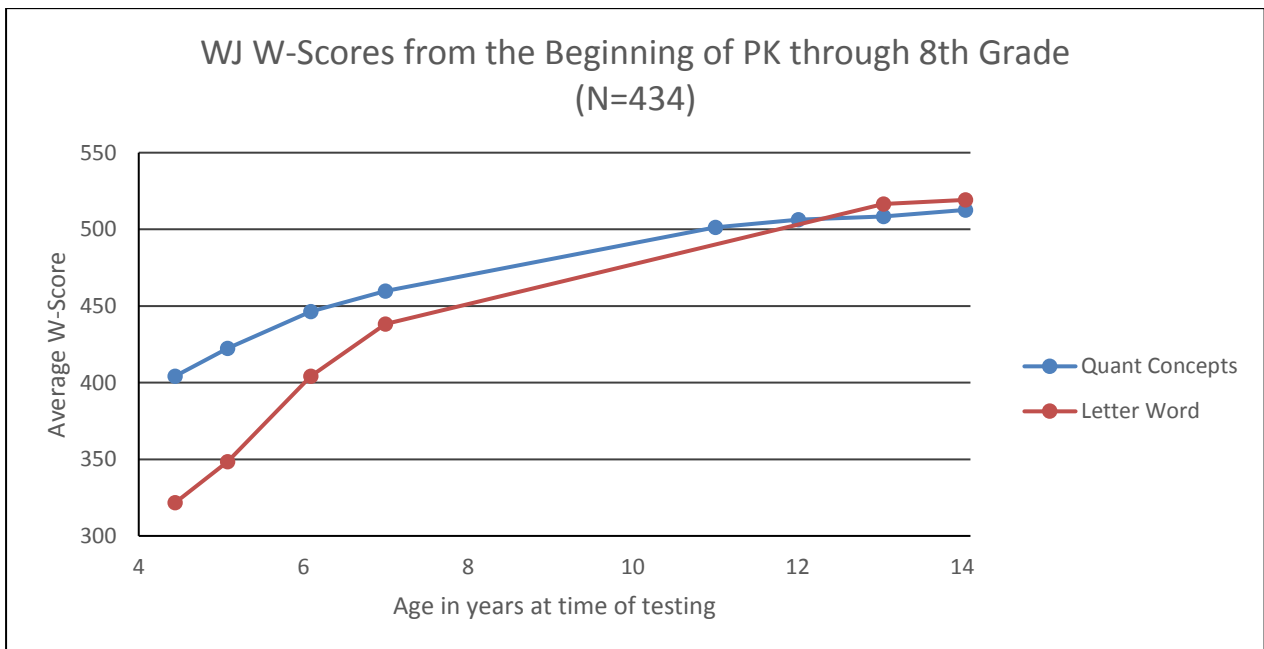
		N	Min	Max	Mean	SD
Quantitative	W-Score	494	467	559	512.56	14.26
Concepts	Standard Score	494	44	126	86.02	12.95
Letter Word	W-Score	494	427	568	519.22	20.62
Identification	Standard Score	494	37	125	92.04	12.54

Note. Letter-Word Identification was only given in Years 3 and 4.



Woodcock-Johnson Scores across Years

- From the original Building Blocks study through this year, there were 8 testing time points. They were: fall of PK, spring of PK, spring of K, spring of 1st grade, spring of 5th grade, spring of 6th grade, spring of 7th grade, and spring of 8th grade.
- Letter-Word Identification was only given in fall of PK, spring of PK, spring of K, spring of 1st grade, spring of 7th grade, and spring of 8th grade.
- The graphs below show the scores over time for those 434 students who were tested at all possible time points.



Student Outcomes on Woodcock-Johnson Subtests by Retention Status

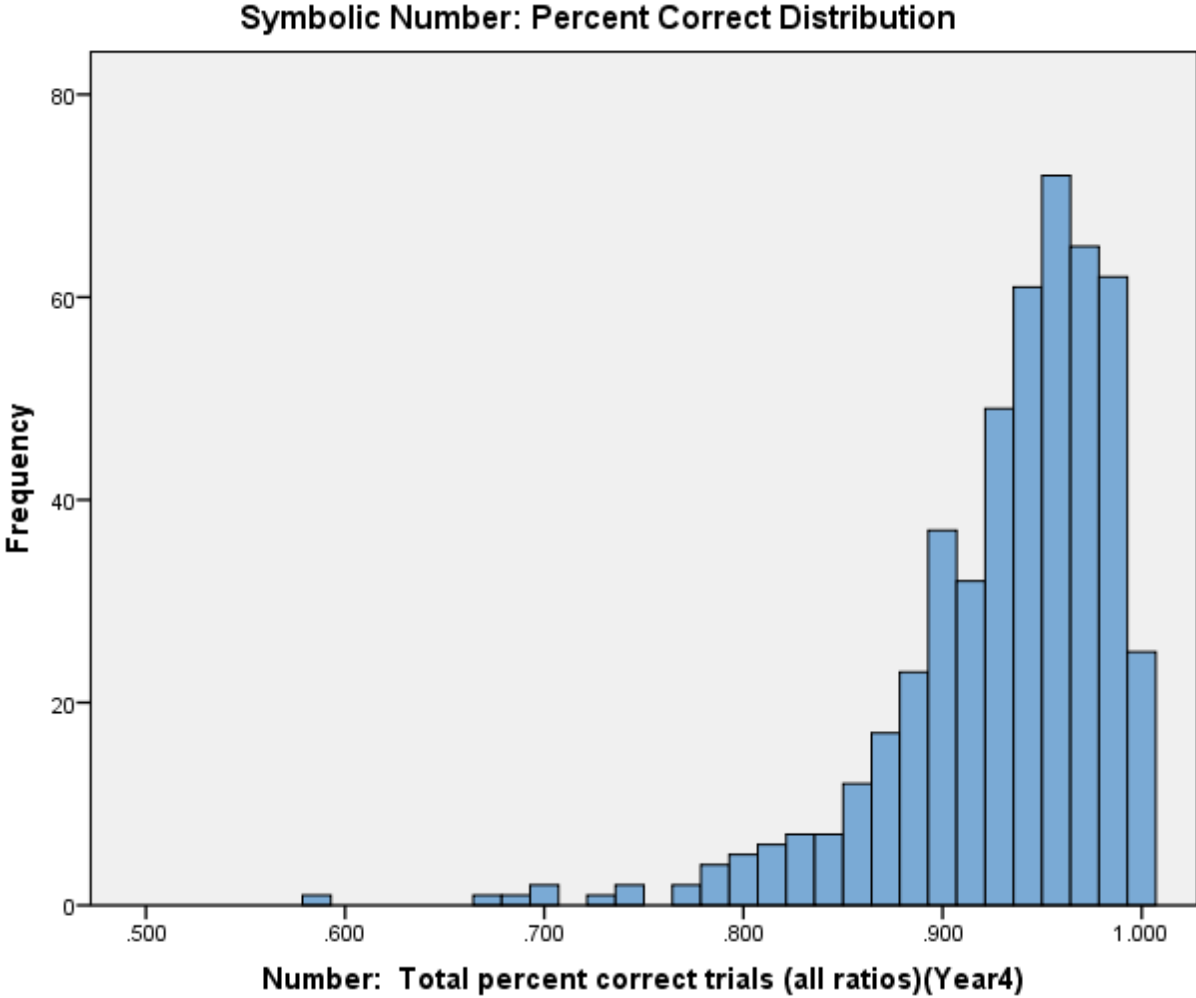
	N	Min	Max	Mean	SD
Not Retained					
Average Age = 14.06 years, Average Grade = 8.83					
Quantitative Concepts					
W-Score	406	467	559	514.96	13.43
Standard Score	406	44	126	88.14	12.25
Letter Word Identification					
W-Score	406	427	568	523.00	18.11
Standard Score	406	37	125	94.19	11.30

	N	Min	Max	Mean	SD
Retained					
Average Age = 13.95 years, Average Grade = 7.83					
Quantitative Concepts					
W-Score	88	470	538	501.51	12.75
Standard Score	88	48	109	76.24	11.58
Letter Word Identification					
W-Score	88	434	549	501.80	22.56
Standard Score	88	46	112	82.08	13.19

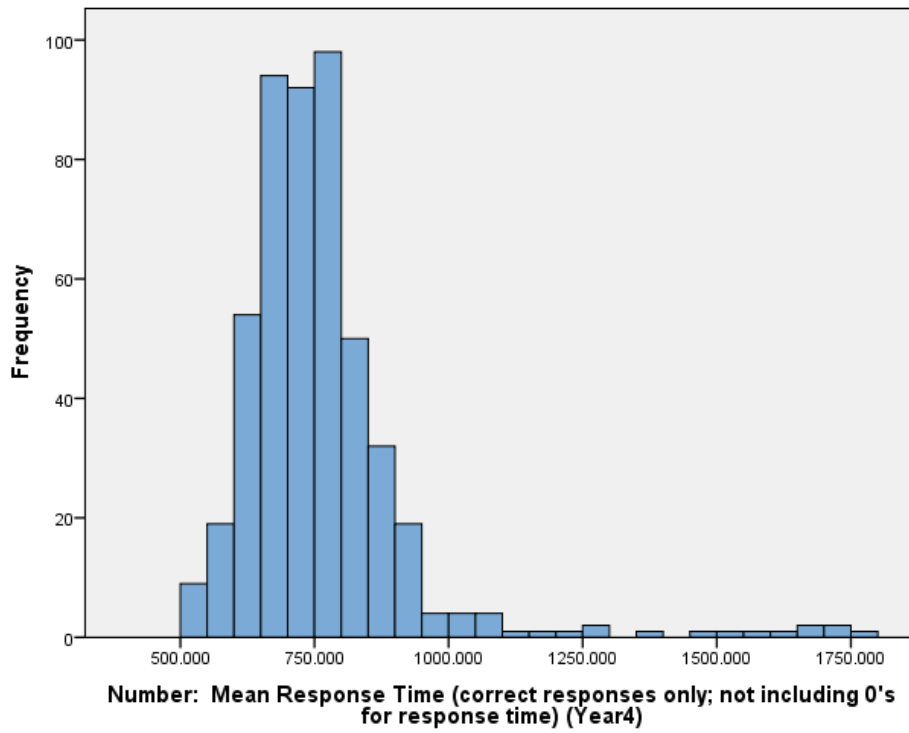
Student Performance on Symbolic Number Comparison (NUM)

	N	Min	Max	Mean	SD
NUM Percent Trials Correct	494	0.59	1.00	0.93	0.06
NUM Mean RT for Correct Trials	494	503.15	1782.629	761.97	165.23
NUM Percent Trials Incorrect	494	0.00	0.41	0.07	0.06
NUM Performance Score	494	546.28	1858.07	865.38	194.47

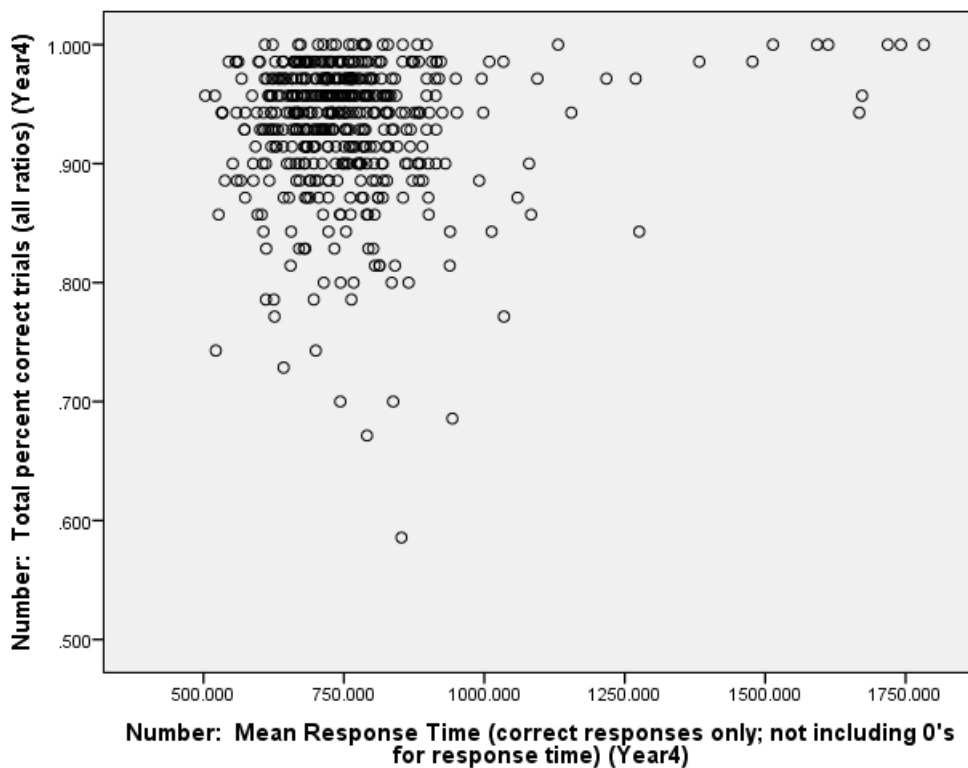
Note. Performance Score = Response Time*(1 + 2*Percent Trials Incorrect).



Symbolic Number: Mean Response Time Distribution



Symbolic Number: Scatterplot of Total Correct and Mean Response Time



Student Performance on Symbolic Number Comparison across Years

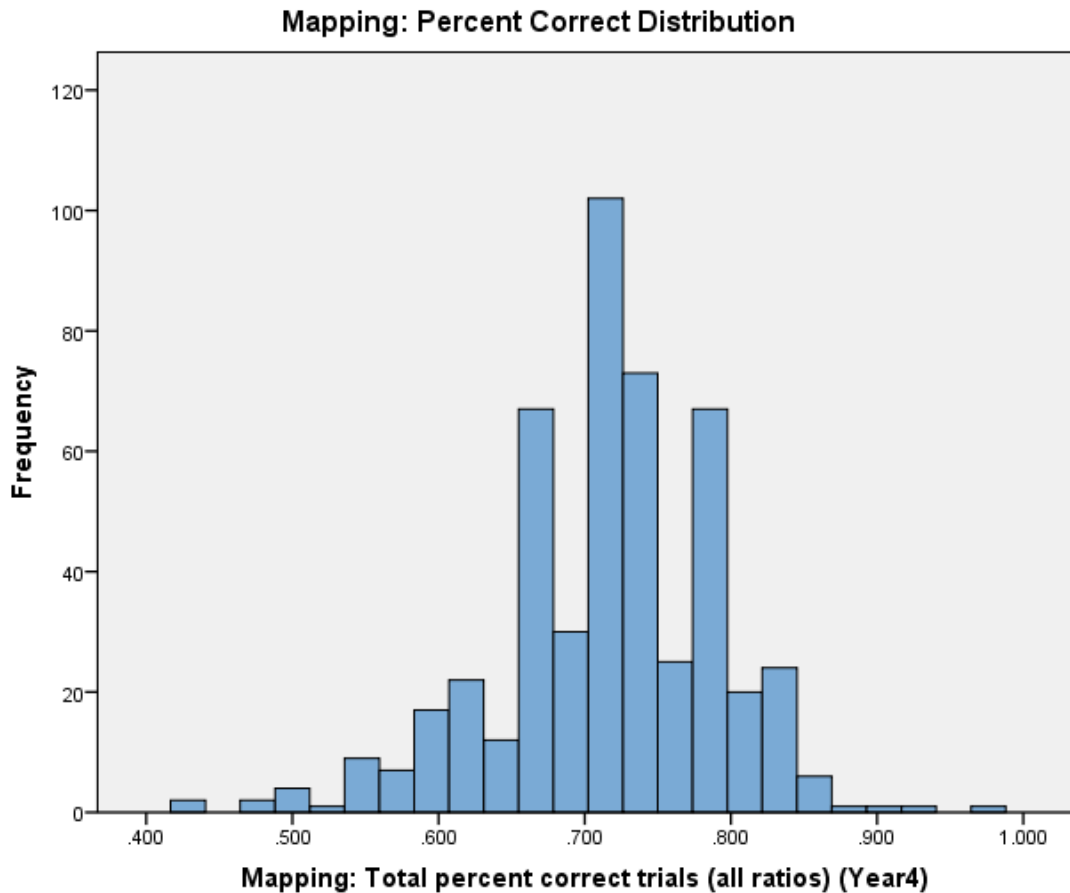
Year	Measure	N	Mean	SD
Year 1	NUM Percent Trials Correct	517	0.95	0.05
	NUM Mean RT for Correct Trials	517	740.72	198.69
	NUM Percent Trials Incorrect	517	0.05	0.05
	NUM Performance Score	517	814.10	232.16
<hr/>				
Year 2	NUM Percent Trials Correct	513	0.91	0.07
	NUM Mean RT for Correct Trials	513	880.65	228.06
	NUM Percent Trials Incorrect	513	0.09	0.07
	NUM Performance Score	513	1037.89	259.45
Year 3	NUM Percent Trials Correct	503	0.92	0.06
	NUM Mean RT for Correct Trials	503	810.81	190.83
	NUM Percent Trials Incorrect	503	0.08	0.06
	NUM Performance Score	503	938.30	221.34
Year 4	NUM Percent Trials Correct	494	0.93	0.06
	NUM Mean RT for Correct Trials	494	761.97	165.23
	NUM Percent Trials Incorrect	494	0.07	0.06
	NUM Performance Score	494	865.38	194.47

Note. The symbolic number task changed from Year 1 to Year 2.

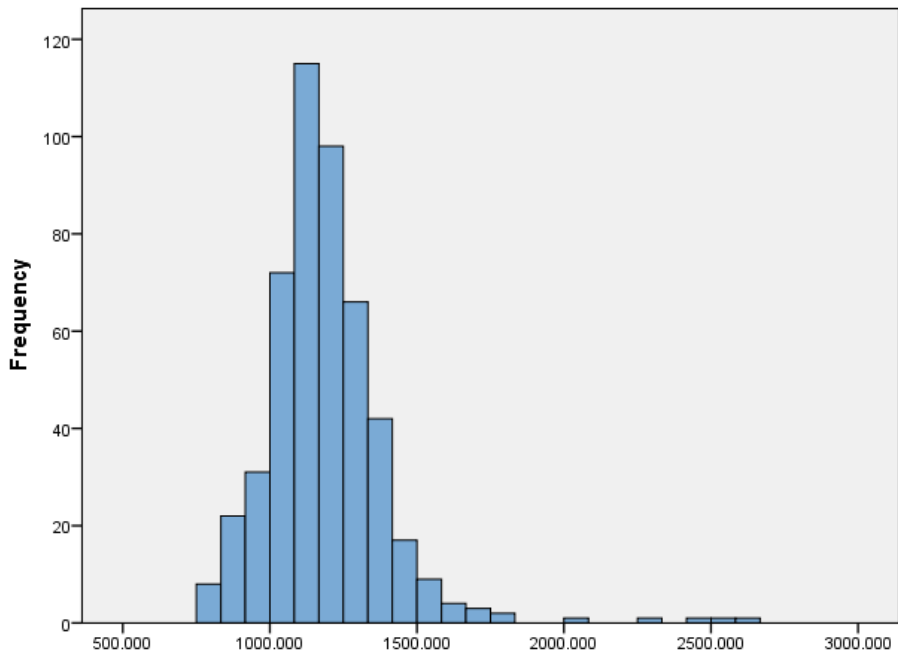
Student Performance on Mapping Task Comparison (MAP)

	N	Min	Max	Mean	SD
MAP Overall Percent Trials Correct	494	0.43	0.99	0.72	0.08
MAP Overall Mean RT for Correct Trials	494	780.58	2585.52	1189.29	206.24
MAP Overall Percent Trials Incorrect	494	0.01	0.57	0.28	0.08
MAP Overall Performance Score	494	1152.28	3561.96	1854.85	322.43
MAP Digits to Dots Percent Trials Correct	494	0.41	0.98	0.70	0.09
MAP Digits to Dots Mean RT for Correct Trials	494	674.76	2584.27	1194.91	221.89
MAP Digits to Dots Performance Score	494	1178.67	3593.98	1902.43	352.12
MAP Dots to Digits Percent Trials Correct	494	0.38	1.00	0.74	0.09
MAP Dots to Digits Mean RT for Correct Trials	494	772.22	2633.21	1184.90	208.82
MAP Dots to Digits Performance Score	494	1043.01	2561.52	1806.34	340.86

Note. Performance Score = Response Time*(1 + 2*Percent Trials Incorrect). 1 student did not pass the practice trials and thus had no non-practice data. New task only given in Year 3 and 4; no earlier comparison data available.

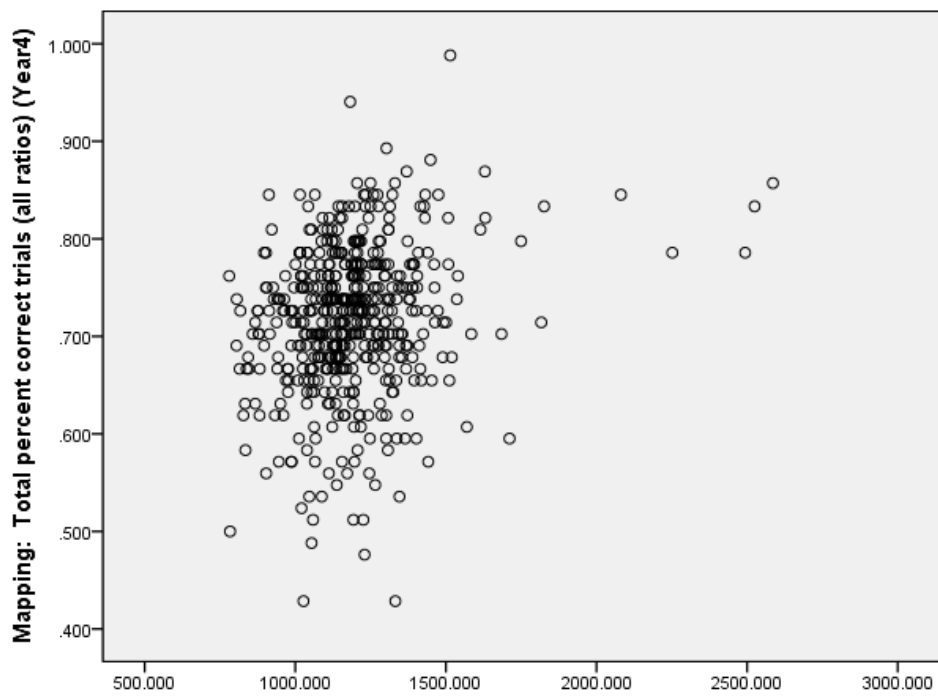


Mapping: Mean Response Time Distribution



Mapping: Mean Response Time (correct responses only; not including 0's for response time) (Year4)

Mapping: Scatterplot of Total Correct and Mean Response Time



Mapping: Mean Response Time (correct responses only; not including 0's for response time) (Year4)

Student Performance on Mapping Task Comparison across Years

Year	Measure	N	Mean	SD
Year 2	MAP Percent Trials Correct	507	0.70	0.08
	MAP Mean RT for Correct Trials	507	870.30	217.81
	MAP Percent Trials Incorrect	507	0.30	0.08
	MAP Performance Score	507	1390.98	329.13
Year 3	MAP Percent Trials Correct	502	0.69	0.08
	MAP Mean RT for Correct Trials	502	1230.14	263.22
	MAP Percent Trials Incorrect	502	0.31	0.08
	MAP Performance Score	502	1982.66	380.59
Year 4	MAP Percent Trials Correct	494	0.72	0.08
	MAP Mean RT for Correct Trials	494	1189.29	206.24
	MAP Percent Trials Incorrect	494	0.28	0.08
	MAP Performance Score	494	1854.85	322.43

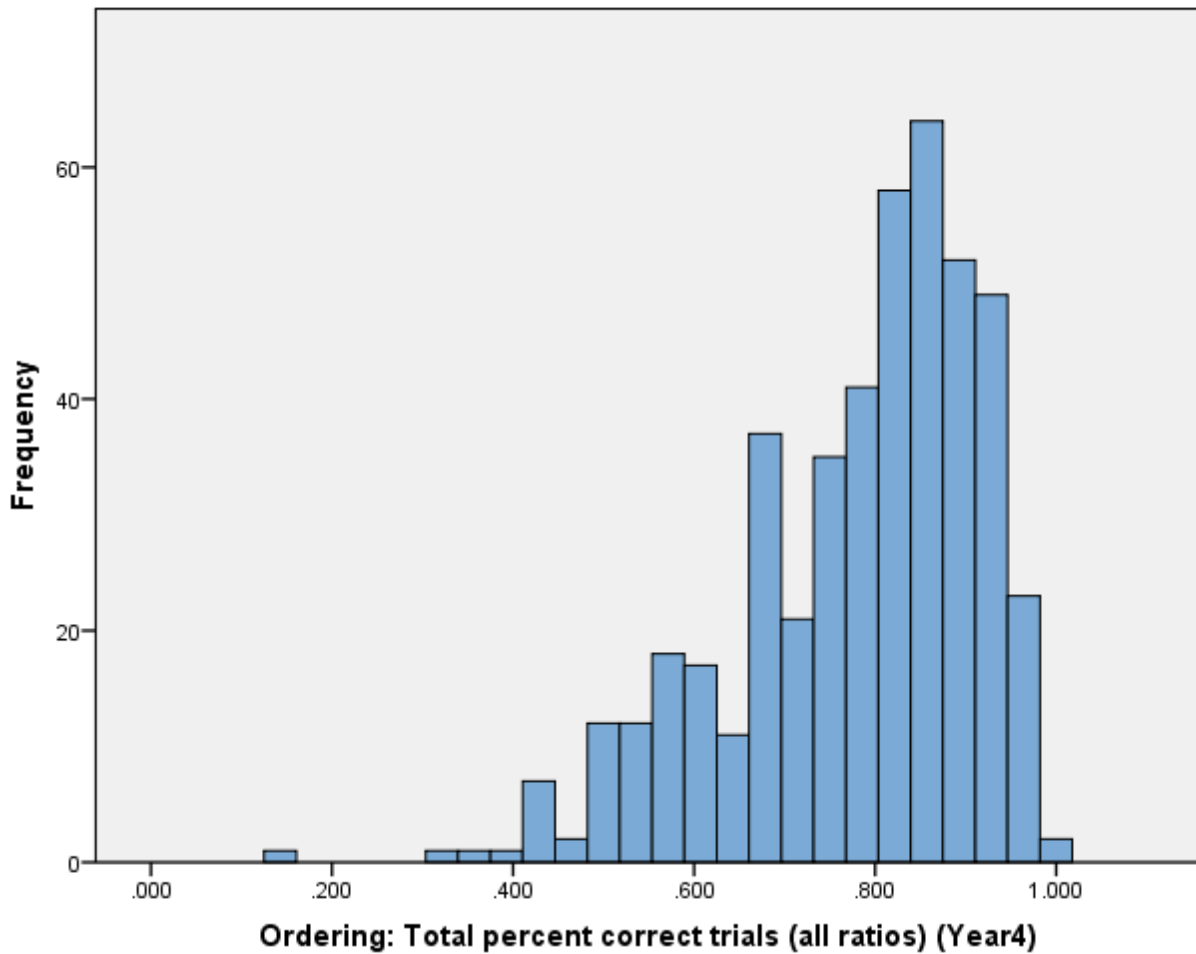
Note. The Mapping Task changed from Year 2 to Year 3.

Student Performance on Numeral Ordering Task (NUM ORD)

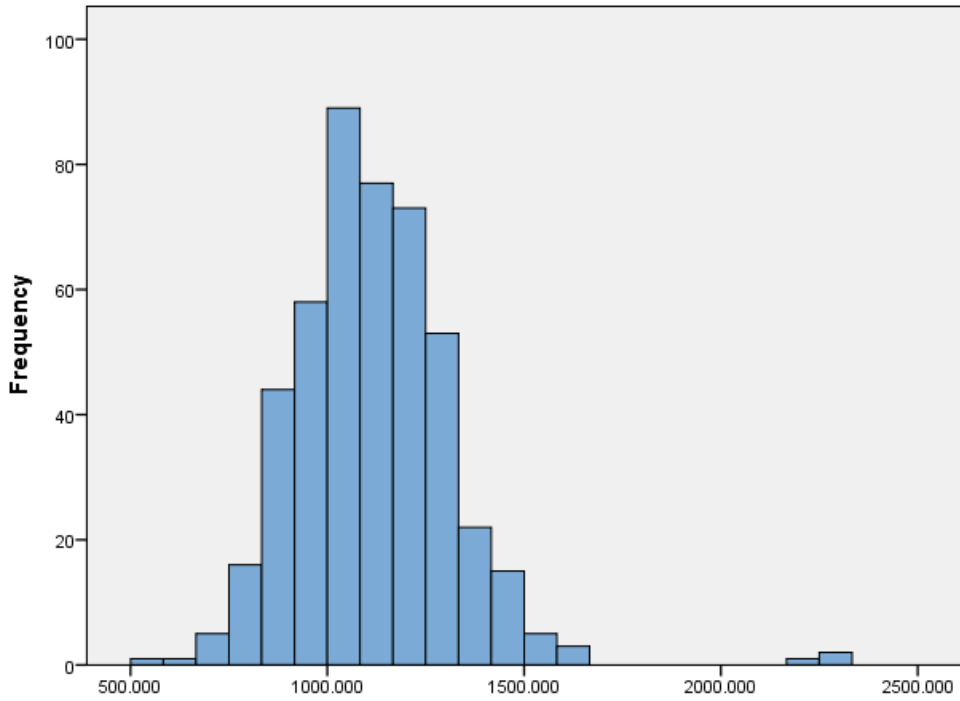
	N	Min	Max	Mean	SD
ORD Overall Percent Trials Correct	465	0.14	1.00	0.79	0.14
ORD Overall Mean RT for Correct Trials	465	544.49	2296.39	1115.80	200.09
ORD Overall Percent Trials Incorrect	465	0.00	0.86	0.21	0.14
ORD Overall Performance Score	465	719.50	3946.81	1596.87	451.04
ORD Overall Percent Trials Correct: 1-digit	465	0.07	1.00	0.81	0.16
ORD Overall Percent Trials Correct: 2-digit	465	0.21	1.00	0.76	0.15
ORD Mean RT for Correct Trials: 1-digit	465	493.42	2302.93	1049.56	212.76
ORD Mean RT for Correct Trials: 2-digit	465	543.08	2382.18	1186.25	219.93

Note. Performance Score = Response Time*(1 + 2*Percent Trials Incorrect). 29 students do not have scores for this task: 28 students did not pass the practice section, and 1 refused to complete the second part of the task.

Numeral Ordering: Percent Correct Distribution

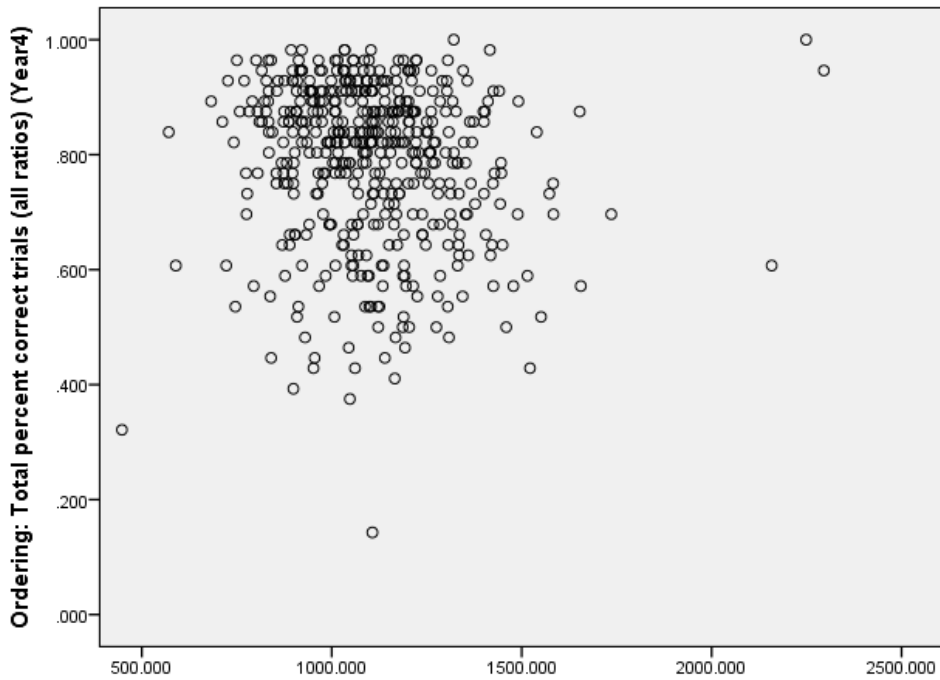


Numeral Ordering: Response Time Distribution



Ordering: Mean Response Time (correct responses only; not including 0's for response time) (Year4)

Numeral Ordering: Scatterplot of Total Correct and Mean Response Time

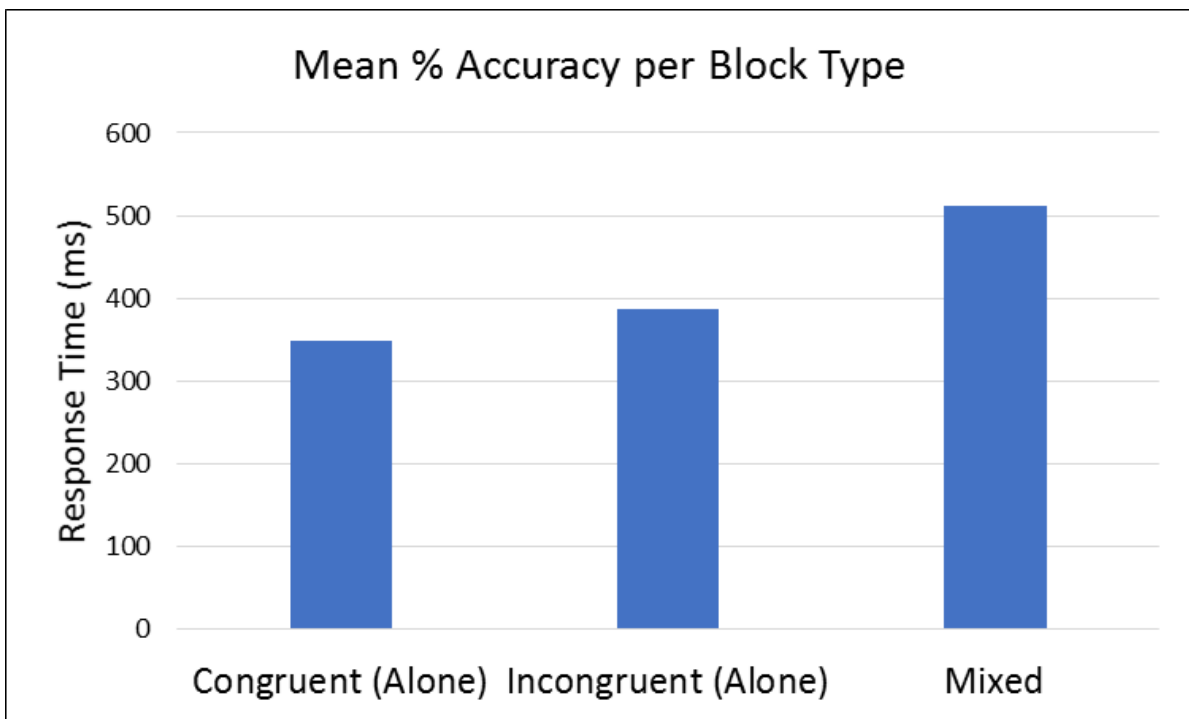
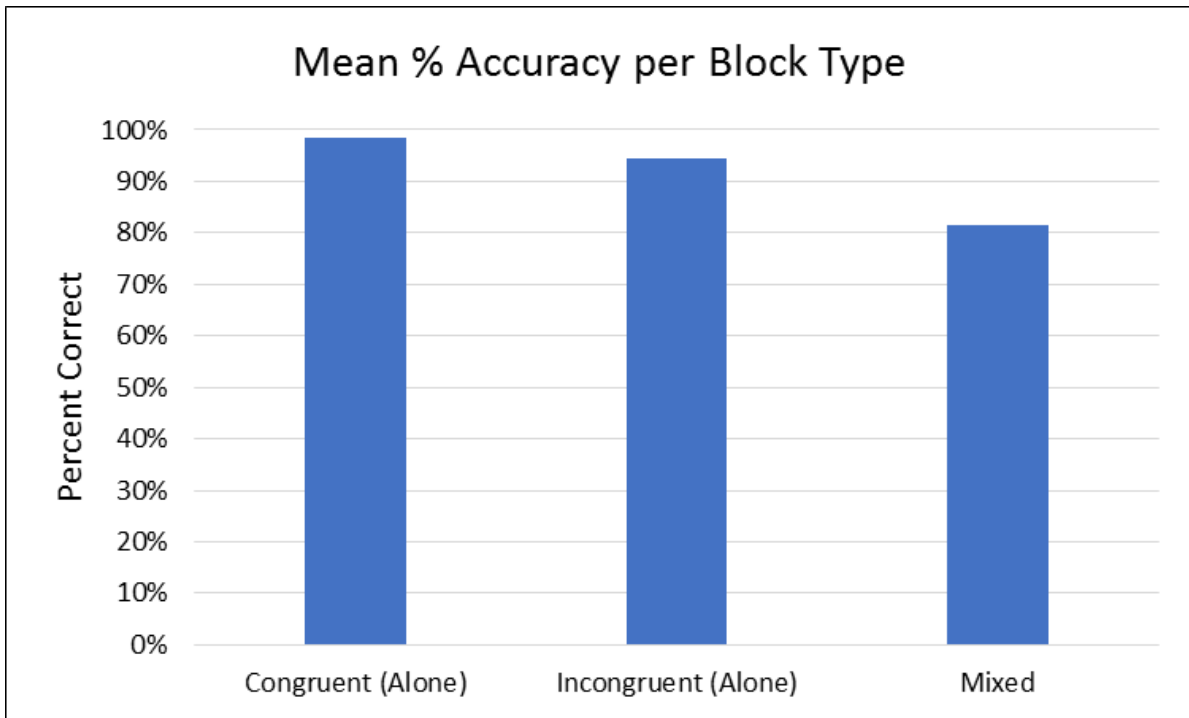


Ordering: Mean Response Time (correct responses only; not including 0's for response time) (Year4)

Student Performance on Directional Stroop Task (Hearts and Flowers)

	N	Min	Max	Mean	SD
Congruent Trials Presented Alone					
Percent trials correct	494	0.75	1.00	0.98	0.04
Mean response time per trial	494	236.33	753.70	348.69	60.07
Incongruent Trials Presented Alone					
Percent trials correct	492	0.00	1.00	0.95	0.13
Mean response time per trial	491	261.67	896.00	386.91	71.14
Mixed Trials					
Percent trials correct	492	0.21	1.00	0.81	0.14
Mean response time per trial	492	332.00	685.69	511.81	62.69

Note. Response time includes both correct and incorrect responses. Two students did not complete hearts and flowers. For the one student who scored zero correct on incongruent trials, mean response time on correct trials was not possible to calculate.



Student Performance on Directional Stroop Task across Years by Block Type

Fixed Congruent Block

Year	Measure	N	Mean	SD
Year 1	HAF Percent Trials Correct	516	0.97	0.07
	HAF Mean RT per Trial	516	383.86	70.52
Year 2	HAF Percent Trials Correct	512	0.97	0.06
	HAF Mean RT per Trial	512	368.17	65.83
Year 3	HAF Percent Trials Correct	503	0.98	0.05
	HAF Mean RT per Trial	503	353.18	59.16
Year 4	HAF Percent Trials Correct	494	0.98	0.04
	HAF Mean RT per Trial	494	348.69	60.07

Fixed Incongruent Block

Year	Measure	N	Mean	SD
Year 1	HAF Percent Trials Correct	485	0.88	0.18
	HAF Mean RT per Trial	481	454.24	92.85
Year 2	HAF Percent Trials Correct	511	0.90	0.16
	HAF Mean RT per Trial	508	428.24	91.02
Year 3	HAF Percent Trials Correct	502	0.93	0.13
	HAF Mean RT per Trial	502	396.45	64.66
Year 4	HAF Percent Trials Correct	492	0.95	0.13
	HAF Mean RT per Trial	491	386.91	71.14

Note. Some students did not pass the practice trials and did not have Incongruent Block data.

Mixed Block

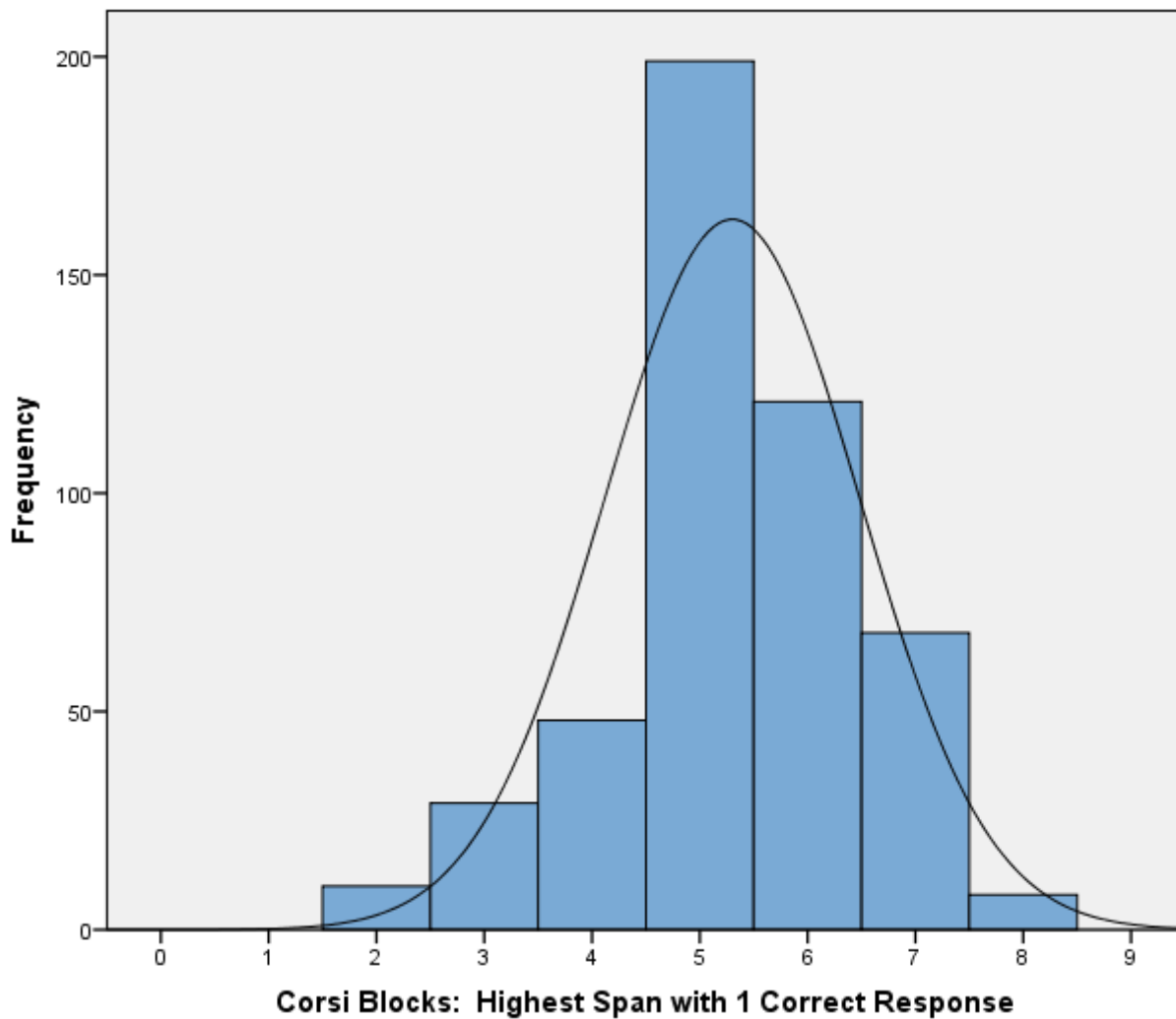
Year	Measure	N	Mean	SD
Year 1	HAF Percent Trials Correct	485	0.66	0.14
	HAF Mean RT per Trial	485	573.32	84.80
Year 2	HAF Percent Trials Correct	511	0.73	0.15
	HAF Mean RT per Trial	511	555.13	75.02
Year 3	HAF Percent Trials Correct	502	0.76	0.14
	HAF Mean RT per Trial	502	521.59	64.23
Year 4	HAF Percent Trials Correct	492	0.81	0.14
	HAF Mean RT per Trial	492	511.81	62.69

Note. Some students did not pass the practice trials and did not have Mixed Block data.

Student Performance on Corsi Blocks Across Years

Year	Measure	N	Min	Max	Mean	SD
Year 1	Corsi Max Span	489	2	8	4.60	1.27
Year 2	Corsi Max Span	485	2	8	4.92	1.19
Year 3	Not Administered	-	-	-	-	-
Year 4	Corsi Max Span	483	2	8	5.30	1.18

Note: In year 4, 11 students are missing Corsi scores: 1 student failed to pass the practice section, and 10 students passed the practice section but did not get any trials correct.



Correlations among 8th Grade Measures

	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	XVI	XVII	XVIII
I. KM Number (Age-Scaled)																		
II. KM Algebra (Age-Scaled)	0.86																	
III. KM Geometry (Age-Scaled)	0.76	0.75																
IV. WJ Quant. Cpts. (Std. Score)	0.79	0.81	0.67															
V. WJ Letter Word (Std. Score)	0.56	0.61	0.53	0.64														
VI. Number: Accuracy	0.31	0.32	0.28	0.32	0.24													
VII. Number: Correct RT	-0.21	-0.24	-0.19	-0.26	-0.21	0.07												
VIII. Mapping All: Accuracy	0.45	0.46	0.41	0.49	0.33	0.48	-0.08											
IX. Mapping All: Correct RT	-0.08	-0.08	-0.05	-0.09	-0.10	0.15	0.52	0.23										
X. Numeral Ordering: Accuracy	0.38	0.39	0.32	0.39	0.26	0.37	-0.06	0.32	0.11									
XI. Numeral Ordering: Correct RT	-0.12	-0.13	-0.05	-0.12	-0.04	0.06	0.51	-0.01	0.58	-0.11								
XII. HAF: Accuracy (Cong.)	0.13	0.16	0.16	0.16	0.10	0.16	-0.02	0.16	0.01	0.12	0.05							
XIII. HAF: RT (Congruent)	-0.14	-0.16	-0.14	-0.17	-0.10	-0.02	0.27	-0.14	0.11	-0.10	0.16	-0.16						
XIV. HAF: Accuracy (Incong.)	0.26	0.28	0.25	0.29	0.18	0.26	-0.14	0.28	-0.01	0.23	-0.01	0.17	-0.09					
XV. HAF: RT (Incong.)	-0.29	-0.28	-0.28	-0.26	-0.24	-0.12	0.30	-0.21	0.16	-0.21	0.19	-0.15	0.48	-0.36				
XVI. HAF: Accuracy (Mixed)	0.37	0.39	0.38	0.42	0.34	0.40	-0.10	0.43	0.07	0.31	0.05	0.18	-0.15	0.34	-0.23			
XVII. HAF: RT (Mixed)	-0.14	-0.13	-0.09	-0.09	-0.06	0.08	0.24	-0.10	0.12	-0.06	0.24	0.02	0.34	-0.01	0.40	-0.01		
XVIII. Corsi Max Span	0.40	0.38	0.39	0.41	0.25	0.19	-0.19	0.26	-0.02	0.22	-0.01	0.15	-0.21	0.19	-0.31	0.35	-0.11	

Note. Red cells indicate correlations greater than .20. Green cells indicate correlations less than -.20.

Correlations among 7th Grade and 8th Grade Measures

		Year 4 (8 th Grade) Outcomes														
Year 3 (7 th Grade) Outcomes		KM NUM	KM ALG	KM GEO	QCS	LWS	NUM Acc	NUM RT	MAP Acc	MAP RT	HAF Acc (cong)	HAF RT (cong)	HAF Acc (incong)	HAF RT (incong)	HAF Acc (mix)	HAF RT (mix)
	KM NUM	.90	.84	.71	.80	.56	.33	-.22	.45	-.07	.13	-.13	.25	-.26	.39	-.12
	KM ALG	.82	.86	.69	.81	.57	.30	-.25	.46	-.08	.16	-.17	.26	-.27	.39	-.12
	KM GEO	.70	.69	.76	.64	.47	.22	-.18	.39	-.07	.14	-.14	.24	-.22	.30	-.09
	QCS	.75	.78	.63	.86	.67	.34	-.23	.48	-.05	.15	-.15	.29	-.24	.41	-.06
	LWS	.54	.58	.49	.62	.90	.23	-.22	.33	-.08	.12	-.11	.17	-.25	.32	-.08
	NUM Acc	.37	.41	.31	.42	.28	.62	-.03	.49	.06	.17	-.13	.31	-.21	.41	-.03
	NUM RT	-.14	-.17	-.13	-.12	-.12	.05	.74	.03	.48	.01	.12	-.10	.21	-.03	.16
	MAP Acc	.43	.44	.36	.44	.30	.49	-.04	.64	.16	.19	-.14	.21	-.16	.40	-.06
	MAP RT	.06	.05	.03	.06	.05	.19	.33	.23	.57	.04	-.01	.02	.03	.14	.10
	HAF Acc (cong)	.17	.18	.18	.22	.11	.22	-.07	.24	-.03	.19	-.03	.20	-.07	.28	.08
	HAF RT (cong)	-.11	-.14	-.10	-.10	-.09	-.11	.12	-.07	.05	.00	.36	-.13	.27	-.10	.20
	HAF Acc (incong)	.31	.30	.26	.35	.25	.42	-.11	.32	-.03	.15	-.10	.33	-.19	.41	.01
	HAF RT (incong)	-.25	-.28	-.20	-.22	-.23	-.15	.15	-.20	.07	-.15	.31	-.19	.44	-.29	.30
	HAF Acc (mix)	.40	.43	.39	.42	.35	.34	-.10	.39	.03	.14	-.19	.31	-.31	.65	-.18
HAF RT (mix)	.00	.00	.02	.06	-.02	.08	.09	.11	.08	.00	.10	.02	.20	.10	.47	

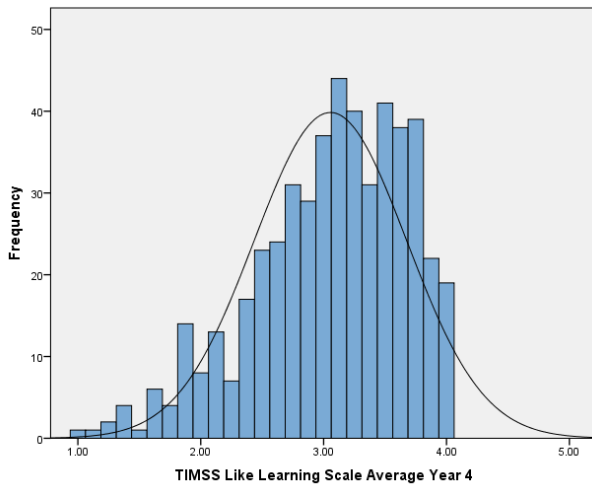
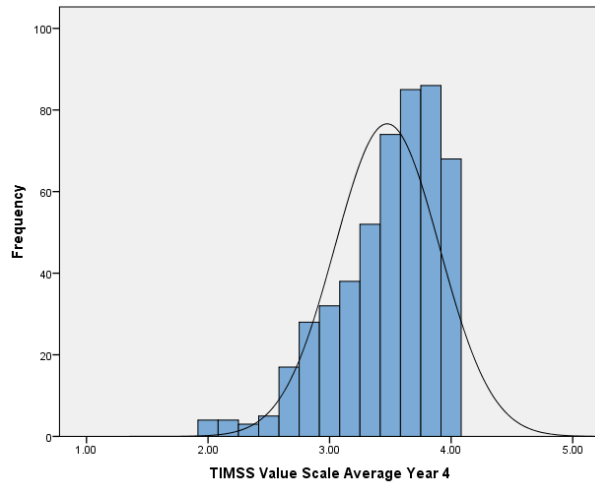
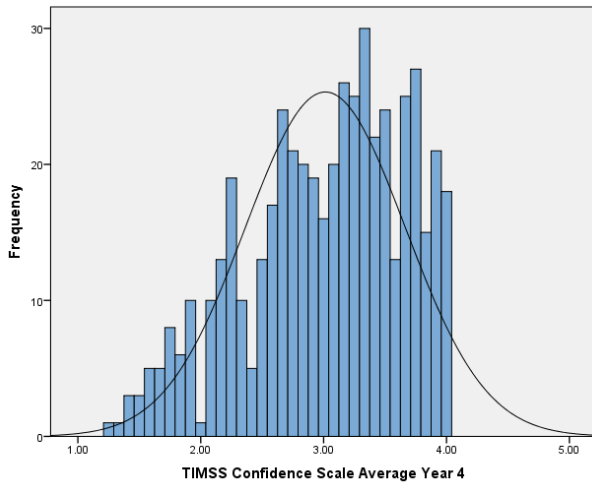
Note. Red cells indicate correlations greater than .20. Green cells indicate correlations less than -.20.

Student Survey Outcomes: TIMSS (*Trends in International Mathematics and Science Study*)

	N	Min	Max	Mean	SD
Confidence Scale Average	496	1.25	4.00	3.01	0.65
I know what my math teacher expects	496	1	4	3.66	0.58
My math teacher is easy to understand	496	1	4	2.98	0.91
I usually do well in math	496	1	4	3.23	0.84
Math is more difficult for me than my classmates (reverse coded)	496	1	4	2.72	1.00
Math is not one of my strengths (reverse coded)	496	1	4	2.73	1.16
I learn quickly in math	496	1	4	2.83	0.94
Math makes me confused and nervous (reverse coded)	496	1	4	2.83	0.98
I am good at working out hard math problems	496	1	4	2.77	0.94
My teacher thinks I am good at working out hard math problems	496	1	4	3.17	0.84
My teacher tells me I am good at math	496	1	4	3.16	0.86
Math is harder for me than other subjects (reverse coded)	496	1	4	2.78	1.16
My family thinks I am good at math	496	1	4	3.30	0.84
Value Scale Average	496	2.00	4.00	3.47	0.43
It is important to do well in math	496	1	4	3.87	0.42
Learning math will help me in daily life	496	1	4	3.72	0.57
I need math to learn other subjects	496	1	4	3.37	0.77
I need to do well in math to get into college	496	1	4	3.74	0.54
I need to do well in math to get the job I want	496	1	4	3.60	0.70
I would like a job that uses math	496	1	4	2.54	1.04
Like Learning Scale Average	496	1.00	4.00	3.06	0.60
I enjoy learning math	496	1	4	3.24	0.80
I wish I did not have to study math (reverse coded)	496	1	4	3.07	0.91
Math is boring (reverse coded)	496	1	4	2.84	0.97
I learn interesting things in math	496	1	4	3.49	0.73
I like math	496	1	4	3.15	0.99
I think of things not related to the lesson (reverse coded)	496	1	4	2.43	0.90
I'm interested in what my math teacher says	496	1	4	3.13	0.82
My math teacher gives me interesting things to do	496	1	4	3.09	0.91

Note. All negative items above were reverse coded (e.g., Math is boring) so that on all items higher scores mean more positive student ratings.

Distributions of Student Survey Subscales in Year 4



Student Ratings for Subscales by Year

	Year 2		Year 3		Year 4	
	MEAN	SD	MEAN	SD	MEAN	SD
Students' Confidence in Mathematics Avg	3.22	.58	3.07	0.62	3.01	0.65
Students Value Mathematics Avg	3.55	.40	3.52	0.42	3.47	0.43
Students Like Learning Mathematics Avg	3.37	.53	3.21	0.60	3.06	0.62

Student Outcomes and TIMSS Ratings by School Type

Direct Assessment Outcomes by School Type								
	<i>CHARTER</i>		<i>IZONE</i>		<i>MIDDLE</i>		<i>OTHER</i>	
	N	Mean	N	Mean	N	Mean	N	Mean
KM Number (age scaled)	97	8.38	46	7.11	331	7.44	21	8.29
KM Algebra (age scaled)	97	9.00	46	7.70	331	7.78	21	8.52
KM Geometry (age scaled)	97	8.55	46	7.50	331	7.51	21	8.14
WJ Quant. Concepts (standard score)	97	88.77	46	83.17	330	85.56	21	86.67
WJ Letter Word (standard score)	97	92.90	46	89.80	330	92.23	21	89.95
Number: Accuracy	97	0.93	46	0.92	330	0.93	21	0.93
Number: Correct RT	97	771.15	46	776.90	330	755.51	21	788.23
Mapping: Accuracy	97	0.72	46	0.72	330	0.72	21	0.71
Mapping: Correct RT	97	1182.33	46	1193.51	330	1189.23	21	1213.07
Numeral Ordering: Accuracy	95	0.79	37	0.78	313	0.78	20	0.83
Numeral Ordering: Correct RT	95	1157.49	37	1141.96	313	1099.42	20	1125.81
HAF: Accuracy (congruent)	97	0.98	46	0.99	330	0.99	21	0.96
HAF: RT (congruent)	97	351.15	46	361.52	330	346.01	21	351.33
HAF: Accuracy (incongruent)	97	0.96	46	0.91	328	0.95	21	0.90
HAF: RT (incongruent)	97	385.60	46	395.21	327	383.93	21	421.01
HAF: Accuracy (mixed)	97	0.82	46	0.79	328	0.82	21	0.76
HAF: RT (mixed)	97	517.76	46	495.51	328	511.50	21	524.73
Corsi: Highest Span	96	5.26	42	5.14	325	5.35	20	5.00

Student Ratings by School Type								
	<i>CHARTER</i>		<i>IZONE</i>		<i>MIDDLE</i>		<i>OTHER</i>	
	N	Mean	N	Mean	N	Mean	N	Mean
TIMSS: Confidence	97	3.07	46	3.04	332	2.99	21	3.04
TIMSS: Value	97	3.50	46	3.59	332	3.45	21	3.51
TIMSS: Liking	97	3.04	46	3.08	332	3.06	21	2.99
TIMSS: Total	97	82.14	46	82.65	332	81.08	21	81.43

Student Ratings if Attended an Alternative School						
	<i>Attended Alternative School</i>			<i>Didn't Attend Alternative School</i>		
	N	Mean	SD	N	Mean	SD
TIMSS: Confidence	17	2.96	0.63	479	3.02	0.65
TIMSS: Value	17	3.62	0.33	479	3.47	0.43
TIMSS: Liking	17	2.99	0.53	479	3.06	0.62
TIMSS: Total	17	81.06	12.38	479	81.46	13.40

Teacher Survey and Ratings of Students (TSSR)

- The TSSR includes:
 - Section with teacher-specific questions (demographics, education, experience)
 - Section with student-specific questions (each consented student's math abilities, work habits, etc.) and classroom-specific questions (for math classes taught that include consented students, regarding textbook use, enrollment by ethnicity, etc.)
- We sent out 142 TSSRs to teachers with at least 1 consented student.
- **For Year 4, we have 121 fully completed and checked TSSRs (includes 471 students, 91% of consented student sample).**

Teacher Survey Information

Information from the 121 completed teacher surveys

- Gender
 - 91 females (75%), 30 males (25%)
- Grades Taught
 - 35 teach 7th grade (29%), 71 teach 8th grade (59%), 15 teach multiple grades (12%)
- Preferred Grade To Teach
 - 9 teachers (7%) reported that they would prefer to teach younger students than their current grade(s) level
 - 91 teachers (75%) reported that their current grade(s) level is just right
 - 21 teachers (17%) reported that they would prefer to teach older students than their current grade(s) level
- Math Taught
 - 107 teachers (88%) currently only teach math, while 14 teachers (12%) also teach other subjects
- Experience
 - Years as a teacher
 - This is 1st year: 10 (8%)
 - 2-4 years: 32 (26%)
 - 5-10 years: 34 (28%)
 - More than 10 years: 45 (37%)
 - Years at current school
 - This is 1st year: 35 (29%)
 - 2-4 years: 53 (44%)
 - 5-10 years: 22 (18%)
 - More than 10 years: 11 (9%)
 - Years teaching middle grades math
 - This is 1st year: 18 (15%)
 - 2-4 years: 38 (31%)
 - 5-10 years: 36 (30%)
 - More than 10 years: 28 (23%)
 - Missing: 1 (1%)

Note. The 1 teacher coded as missing responded “0 years (does not teach middle school math)” even though he is a middle school math teacher.

- Licensure (categories add up to more than 100%)
 - Early Childhood license (at least): 4 (3%)
 - Elementary license (at least): 34 (28%)
 - Middle Grades license (at least): 68 (56%)
 - Secondary license (at least): 41 (34%)
 - Special Education license (at least): 16 (13%)
 - Transitional license (at least): 3 (3%)
- Education
 - Highest degree earned
 - Bachelor's degree: 50 (41%)
 - Master's degree: 48 (40%)
 - Master's degree + 30: 19 (16%)
 - Doctoral degree: 4 (3%)
 - Majored in math in undergraduate program
 - Yes: 30 (25%)
 - No: 91 (75%)
 - Minored in math in undergraduate program
 - Yes: 10 (8%)
 - No: 88 (73%)
 - No minor (NA): 23 (19%)
 - Majored in math in graduate school
 - Yes: 15 (12%)
 - No: 72 (60%)
 - No grad school (NA): 34 (28%)
- Name of math textbook used
 - Glencoe Math Built to the Common Core: 52 (43%)
 - None: 33 (27%)
 - Carnegie Learning: 7 (6%)
 - Houghton Mifflin Harcourt – Integrated Math I: 7 (6%)
 - College Preparatory Mathematics/Core Connections: 6 (5%)
 - i-Ready: 6 (5%)
 - Other: 8 (7%)
 - Missing or Not Specified: 2 (2%)
- How much you supplement the textbook with other materials
 - Almost never: 6 (5%)
 - A little: 19 (16%)
 - Somewhat: 30 (25%)
 - A lot: 43 (36%)
 - NA (no math textbook used): 23 (19%)
 - Note that 8 teachers who said they had no textbook said they supplemented the textbook a lot, and 2 teachers who said they had no textbook said they supplemented the textbook almost never.

Teacher Ratings of Students

Information from the 471 completed teacher-rated students

- Does student receive individual tutoring in math?
 - Yes: 63 (13%)
 - No: 408 (87%)
- Does student receive pullout small group instruction in math?
 - Yes: 115 (24%)
 - No: 356 (76%)
- Does student participate in gifted/talented programs in math?
 - Yes: 10 (2%)
 - No: 461 (98%)
- Is ability grouping used within this student's grade?
 - Yes: 256 (54%)
 - No: 215 (46%)
- If there is ability grouping, how do the students in this student's class compare to typical students in this grade at this school?
 - Less skilled: 58 (12%)
 - About the same: 134 (29%)
 - More advanced: 64 (14%)
 - Not applicable (no ability grouping): 215 (46%)
- Does the teacher use ability grouping in this student's class?
 - Yes: 142 (30%)
 - No: 328 (70%)

Note. This item was accidentally left blank for 1 student. The teacher completed paper surveys after the school year ended and did not respond to follow-up.
- If there is ability grouping, how does this student compare to others in the class?
 - Less skilled: 45 (10%)
 - About the same: 56 (12%)
 - More advanced: 41 (9%)
 - Not applicable (no ability grouping): 328 (70%)

Note. 1 teacher did not complete the previous item for 1 student. This student is also missing in this question.
- How often does this student work to the best of his/her ability in math?
 - Always: 61 (13%)
 - Usually: 189 (40%)
 - Erratic: 131 (28%)
 - Seldom: 72 (15%)
 - Never: 18 (4%)

- How does this student's math skills compare to others in his/her grade?
 - Far above average: 24 (5%)
 - Above average: 106 (23%)
 - Average: 172 (37%)
 - Below average: 112 (24%)
 - Far below average: 24 (5%)
- How does this student's interest in math compare to others in his/her grade?
 - Far above average: 15 (3%)
 - Above average: 87 (19%)
 - Average: 217 (46%)
 - Below average: 109 (23%)
 - Far below average: 43 (9%)
- How prepared is this student for the next level in math?
 - Highly prepared: 55 (12%)
 - Mostly prepared: 113 (24%)
 - May struggle but is prepared: 142 (30%)
 - Somewhat unlikely to be prepared: 86 (18%)
 - Very unlikely to be prepared: 75 (16%)
- How long has the teacher taught this student math this year?
 - More than 6 months: 363 (77%)
 - 4-6 months: 69 (15%)
 - 1-3 months: 35 (7%)
 - Less than 1 month: 4 (1%)
- This student concentrates well and is not easily distracted when doing a task.
 - Strongly agree: 65 (14%)
 - Agree: 159 (34%)
 - Disagree: 166 (35%)
 - Strongly disagree: 81 (17%)
- This student easily plans and carries out activities that have several steps.
 - Strongly agree: 67 (14%)
 - Agree: 165 (35%)
 - Disagree: 164 (35%)
 - Strongly disagree: 75 (16%)
- This student finishes tasks and activities.
 - Strongly agree: 90 (19%)
 - Agree: 205 (44%)
 - Disagree: 120 (26%)
 - Strongly disagree: 56 (12%)

- This student actively uses resources for help and information.
 - Strongly agree: 73 (16%)
 - Agree: 193 (41%)
 - Disagree: 148 (31%)
 - Strongly disagree: 57 (12%)
- Does this student have math-specific difficulties?
 - Yes: 40 (9%)
 - No: 431 (92%)

▪ Responses (and frequency) if “Yes”:

Functionally delayed/Specific learning disability	15
ADHD/ADD	6
IEP	5
Computation and/or comprehension	4
IEP for math	3
Linguistic or reading disability	2
Receives accommodations for math	2
Emotional disturbance	2
Processing	2
Anxiety/Depression	1
Very low basic math skills	1
Unknown	1

Note. Some students had more than 1 disability.

Teacher Ratings of Students by Year

	Year 1 (N=463)		Year 2 (N=503)		Year 3 (N=481)		Year 4 (N=471)	
	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
Works to best of ability in math	3.68	0.97	3.46	0.99	3.46	1.00	3.43	1.02
Math skills compared to others	2.93	1.05	2.74	1.02	2.83	1.03	2.85	1.06
Interest in math compared to others	2.97	0.87	2.92	0.89	2.90	0.92	2.83	0.94
Prepared for next level in math	3.26	1.18	2.94	1.21	2.89	1.20	2.97	1.24

Note. These ratings were on a scale from 1 to 5, so 3 would be an average rating.

Teacher Ratings of Students by School Type

Ratings of Student Skills

	Range	CHARTER (N=96)	IZONE (N=41)	MIDDLE (N=313)	OTHER (N=21)
Works to best of ability in math	1 to 5	3.60 (0.96)	2.98 (1.11)	3.44 (1.03)	3.43 (0.68)
Math skills compared to others	1 to 5	3.02 (1.07)	2.63 (1.14)	2.82 (1.06)	2.81 (0.93)
Interest in math compared to others	1 to 5	2.94 (0.96)	2.66 (1.04)	2.82 (0.93)	2.86 (0.73)
Prepared for next level in math	1 to 5	3.09 (1.28)	2.61 (1.30)	2.98 (1.22)	3.00 (1.10)
Concentrates well/not easily distracted	1 to 4	2.61 (0.88)	2.12 (0.84)	2.42 (0.96)	2.62 (0.81)
Easily plans and carries out activities that have several steps	1 to 4	2.72 (0.89)	2.22 (0.85)	2.44 (0.94)	2.33 (0.80)
Finishes tasks and activities	1 to 4	2.86 (0.83)	2.49 (0.87)	2.67 (0.94)	2.81 (0.81)
Actively uses resource for help and information	1 to 4	2.74 (0.80)	2.24 (0.94)	2.61 (0.91)	2.43 (0.75)

Note. Green cells indicate the highest overall rating for that item.

Math Textbook Used (Percentages of teachers)

	CHARTER	IZONE	MIDDLE	OTHER
Glencoe Math Built to the Common Core	0.0	87.5	50.0	25.0
None	61.9	12.5	20.5	25.0
Carnegie Learning	0.0	0.0	8.0	0.0
Houghton Mifflin Harcourt - Integrated Math I	0.0	0.0	8.0	0.0
College Preparatory Mathematics/Core Connections	28.6	0.0	0.0	0.0
i-Ready	0.0	0.0	6.8	0.0
Other	4.8	0.0	5.7	50.0
Missing or Not Specified	4.8	0.0	1.1	0.0
Total	100.1	100.0	100.1	100.0

How Much Textbook is Supplemented (Percentages of teachers)

	CHARTER	IZONE	MIDDLE	OTHER
Almost Never	4.8	0.0	5.7	0.0
A Little	14.3	12.5	17.0	0.0
Somewhat	14.3	25.0	26.1	50.0
A Lot	4.8	62.5	39.8	50.0
Not Applicable	61.9	0.0	11.4	0.0
Total	100.1	100.0	100.0	100.0

Correlations among 8th Grade Student Outcomes and Teacher Ratings

Zero-Order Correlations

Direct Assessment	TSSR: Math skills compared to others	TSSR: Interest in math compared to others	TSSR: Prepared for next level in math	TSSR: Self-Reg Items (Mean)
KM Number (Age-Scaled)	.61	.43	.55	.42
KM Algebra (Age-Scaled)	.61	.46	.59	.46
KM Geometry (Age-Scaled)	.49	.39	.44	.36
WJ Quant. Cpts. (Std Score)	.62	.47	.57	.47
WJ Letter Word (Std Score)	.42	.32	.39	.31
TIMSS Confidence Subscale	.44	.43	.49	.39
TIMSS Value of Math Subscale	.03	.09	.08	.05
TIMSS Like Math Subscale	.24	.29	.31	.27
TIMSS Total Score	.36	.38	.42	.34
Number: Accuracy	.25	.16	.25	.19
Number: Correct RT	-.14	-.12	-.17	-.14
Mapping: Accuracy	.37	.30	.40	.32
Mapping: Correct RT	.00	-.03	-.02	-.01
Numeral Ordering: Accuracy	.30	.22	.31	.25
Numeral Ordering: Correct RT	-.10	-.07	-.13	-.06
HAF: Accuracy (Congruent)	.18	.15	.16	.17
HAF: RT (Congruent)	-.14	-.11	-.18	-.14
HAF: Accuracy (Incongruent)	.27	.13	.28	.20
HAF: RT (Incongruent)	-.26	-.16	-.24	-.17
HAF: Accuracy (Mixed)	.30	.22	.31	.24
HAF: RT (Mixed)	-.14	-.06	-.12	-.07
Corsi: Highest Span	.27	.14	.23	.19

Note. Red cells indicate correlations greater than .20. Green cells indicate correlations less than -.20.

Outcomes by Pre-K Curriculum Condition

Student Outcomes in Year 4 by Pre-K Curriculum						
	<i>Building Blocks</i>			<i>Control</i>		
	N	Mean	SD	N	Mean	SD
KM Number (age scaled)	301	7.52	2.97	185	7.79	2.83
KM Algebra (age scaled)	301	7.83	4.01	185	8.23	3.56
KM Geometry (age scaled)	301	7.65	2.81	185	7.88	2.69
WJ Quant. Concepts (standard score)	301	85.02	15.04	184	87.27	13.84
WJ Letter Word (standard score)	301	91.32	16.27	184	92.82	14.41
Number: Accuracy	301	0.93	0.09	184	0.94	0.08
Number: Correct RT	301	757.06	167.91	184	771.05	170.22
Mapping: Accuracy	301	0.71	0.09	184	0.72	0.08
Mapping: Correct RT	301	1192.30	279.67	184	1190.21	251.90
Numeral Ordering: Accuracy	284	0.79	0.15	172	0.78	0.14
Numeral Ordering: Correct RT	284	1120.91	236.27	172	1114.25	224.49
HAF: Accuracy (congruent)	301	0.99	0.05	184	0.98	0.05
HAF: RT (congruent)	301	345.05	70.85	184	354.56	67.88
HAF: Accuracy (incongruent)	301	0.94	0.14	182	0.95	0.13
HAF: RT (incongruent)	301	387.14	72.36	181	385.99	73.04
HAF: Accuracy (mixed)	301	0.81	0.16	182	0.82	0.15
HAF: RT (mixed)	301	516.39	77.20	182	503.68	71.38
Corsi: Highest Span	296	5.29	1.20	179	5.28	1.22

Note. KeyMath and WJ means were covariate-adjusted to account for differences between conditions at the beginning of Pre-K. 9 students were missing at least one covariate.

Student Ratings in Year 4 by Pre-K Curriculum						
	<i>Building Blocks</i>			<i>Control</i>		
	N	Mean	SD	N	Mean	SD
TIMSS: Confidence	306	3.00	0.66	190	3.03	0.63
TIMSS: Value	306	3.44	0.46	190	3.53	0.38
TIMSS: Liking	306	3.03	0.63	190	3.10	0.60
TIMSS: Total	306	80.89	13.69	190	82.35	12.78

Teacher Ratings in Year 4 by Pre-K Curriculum						
	<i>Building Blocks</i>			<i>Control</i>		
	N	Mean	SD	N	Mean	SD
Works to best of ability in math	288	3.45	1.05	183	3.40	0.98
Math skills compared to others	288	2.90	1.08	183	2.76	1.04
Interest in math compared to others	288	2.88	0.95	183	2.76	0.92
Prepared for next level in math	288	3.03	1.23	183	2.87	1.25
Concentrates well/not easily distracted	288	2.47	0.94	183	2.40	0.91
Easily plans and carries out activities that have several steps	288	2.53	0.93	183	2.39	0.91
Finishes tasks and activities	288	2.75	0.92	183	2.62	0.90
Actively uses resources for help and information	288	2.63	0.91	183	2.55	0.86

Outcomes by Pre-K System

Student Outcomes in Year 4 by Pre-K System						
	Head Start			MNPS Pre-K		
	N	Mean	SD	N	Mean	SD
KM Number (age scaled)	194	7.37	2.95	292	7.79	2.85
KM Algebra (age scaled)	194	7.70	4.37	292	8.17	3.50
KM Geometry (age scaled)	194	7.62	2.73	292	7.81	2.77
WJ Quant. Concepts (standard score)	194	85.05	15.89	291	86.43	13.66
WJ Letter Word (standard score)	194	91.29	17.98	291	92.29	14.02
Number: Accuracy	194	0.93	0.11	291	0.93	0.09
Number: Correct RT	194	759.92	167.28	291	764.00	166.27
Mapping: Accuracy	194	0.72	0.08	291	0.72	0.09
Mapping: Correct RT	194	1184.35	305.45	291	1196.28	245.49
Numeral Ordering: Accuracy	181	0.78	0.15	275	0.79	0.15
Numeral Ordering: Correct RT	181	1107.58	249.19	275	1125.52	218.67
HAF: Accuracy (congruent)	194	0.98	0.06	291	0.99	0.05
HAF: RT (congruent)	194	352.89	71.87	291	345.84	67.55
HAF: Accuracy (incongruent)	194	0.94	0.14	289	0.95	0.14
HAF: RT (incongruent)	194	379.09	72.40	288	391.84	71.38
HAF: Accuracy (mixed)	194	0.81	0.15	289	0.81	0.14
HAF: RT (mixed)	194	504.98	82.73	289	516.04	69.68
Corsi: Highest Span	191	5.23	1.20	284	5.33	1.20

Note. KeyMath and WJ means were covariate-adjusted to account for differences between systems at the beginning of Pre-K. 9 students were missing at least one covariate.

Student Ratings in Year 4 by Pre-K System						
	Head Start			MNPS Pre-K		
	N	Mean	SD	N	Mean	SD
TIMSS: Confidence	199	2.99	0.65	297	3.03	0.65
TIMSS: Value	199	3.48	0.43	297	3.47	0.43
TIMSS: Liking	199	3.03	0.66	297	3.07	0.59
TIMSS: Total	199	81.02	13.62	297	81.73	13.18

Teacher Ratings in Year 4 by Pre-K System						
	Head Start			MNPS Pre-K		
	N	Mean	SD	N	Mean	SD
Works to best of ability in math	191	3.29	1.04	280	3.53	1.00
Math skills compared to others	191	2.81	1.09	280	2.87	1.05
Interest in math compared to others	191	2.81	1.00	280	2.85	0.90
Prepared for next level in math	191	2.84	1.26	280	3.06	1.21
Concentrates well/not easily distracted	191	2.38	0.95	280	2.48	0.92
Easily plans and carries out activities that have several steps	191	2.41	0.94	280	2.52	0.91
Finishes tasks and activities	191	2.61	0.93	280	2.76	0.90
Actively uses resources for help and information	191	2.47	0.93	280	2.69	0.85

Low-Scoring Students

- Students were selected who were below a sixth-grade level this past year on all 3 KeyMath subscales. This group ended up including 173 students, which is about 35% of the current sample.
 - *Note.* 1 student did not complete KeyMath measures in Spring 2017 and could not be classified.
 - *Note.* 2 students completed the KeyMath measures but did not complete the E-Prime measures in Spring 2017.

Descriptive Statistics										
	At or Above 6th-grade level on KeyMath					Below 6th-grade level on 3 KeyMath scales				
	N	Min	Max	Mean	SD	N	Min	Max	Mean	SD
WJ Quant. Cpts. (Std Score)	322	59.00	126.00	91.58	10.30	171	44.00	95.00	75.53	10.82
WJ Letter Word (Std Score)	322	48.00	125.00	96.20	9.91	171	37.00	111.00	84.23	13.27
TIMSS (Total)	322	41.00	104.00	83.40	12.80	173	45.00	104.00	77.72	13.59
Number: Accuracy	322	0.77	1.00	0.94	0.04	171	0.59	1.00	0.91	0.07
Number: Correct RT	322	503.15	1741.57	738.59	155.41	171	521.94	1782.63	806.74	174.40
Mapping: Accuracy	322	0.51	0.99	0.74	0.07	171	0.43	0.88	0.68	0.08
Mapping: Correct RT	322	780.58	2524.81	1174.36	198.73	171	783.30	2585.52	1216.87	218.03
Numerical Ordering: Accuracy	312	0.14	1.00	0.81	0.13	152	0.32	0.98	0.73	0.15
Numerical Ordering: Correct RT	312	670.92	2296.39	1105.37	187.32	152	544.49	2210.21	1138.14	223.36
HAF: Accuracy (Congruent)	322	0.83	1.00	0.99	0.03	171	0.75	1.00	0.98	0.05
HAF: RT (Congruent)	322	236.33	753.70	342.63	53.34	171	260.17	694.60	360.38	69.80
HAF: Accuracy (Incong.)	322	0.58	1.00	0.97	0.06	170	0.00	1.00	0.90	0.19
HAF: RT (Incongruent)	322	261.67	534.11	370.08	52.03	169	273.50	896.00	418.97	89.51
HAF: Accuracy (Mixed)	322	0.48	1.00	0.85	0.11	170	0.21	1.00	0.74	0.15
HAF: RT (Mixed)	322	354.69	662.57	505.16	56.84	170	332.00	685.69	524.40	70.97
Corsi: Highest Span	319	2.00	8.00	5.58	1.06	163	2.00	7.00	4.75	1.22

Characteristics of Low-Scoring Students

	Low-Scoring		Not Low-Scoring	
	Freq	Pct	Freq	Pct
Ethnicity				
Black	149	86.1	242	75.2
White	12	6.9	31	9.6
Hispanic	10	5.8	31	9.6
Other	2	1.2	18	5.6
Gender				
Male	73	42.2	144	44.7
Female	100	57.8	178	55.3
ELL in Pre-K Year				
ELL	8	4.6	37	11.5
Not ELL	165	95.4	284	88.2
Pre-K Curriculum Condition				
Building Blocks	95	54.9	211	65.5
Control	78	45.1	111	34.5
Pre-K School System				
Head Start	73	42.2	126	39.1
MNPS Pre-K	100	57.8	196	60.9
Year 1 School Type				
Charter	26	15.0	79	24.5
Izone	29	16.8	44	13.7
Middle	75	43.4	174	54.0
Other	0	0.0	1	0.3
Elementary	43	24.9	24	7.5
Year 2 School Type				
Charter	31	17.9	87	27.0
Izone	27	15.6	43	13.4
Middle	113	65.3	189	58.7
Other	1	0.6	3	0.9
Year 3 School Type				
Charter	28	16.2	81	25.2
Izone	26	15.0	35	10.9
Middle	116	67.1	202	62.7
Other	0	0.0	3	0.9
Year 4 School Type				
Charter	23	13.3	74	23.0
Izone	21	12.1	25	7.8
Middle	122	70.5	209	64.9
Other	7	4.0	14	4.3

Note. 4 students were out-of-region in Year 2 and/or Year 3 but returned in Year 4. 1 student is missing a pre-k year ELL designation.

High-Scoring Students

- Students were selected who were above an eighth-grade level this past year on all 3 KeyMath subscales. This ended up including 51 students, which is about 10% of the current sample.
 - Note.* 1 student did not complete KeyMath measures in Spring 2017 and could not be classified.
 - Note.* 2 students completed the KeyMath measures but did not complete the E-Prime measures in Spring 2017.

Descriptive Statistics										
	At or Below 8th-grade level on KeyMath					Above 8th-grade level on KeyMath				
	N	Min	Max	Mean	SD	N	Min	Max	Mean	SD
WJ Quant. Cpts. (Std Score)	442	44.00	119.00	84.08	12.02	51	88.00	126.00	102.78	7.67
WJ Letter Word (Std Score)	442	37.00	122.00	90.84	12.24	51	79.00	125.00	102.57	10.10
TIMSS (Total)	444	41.00	104.00	80.64	13.40	51	62.00	102.00	88.16	10.83
Number: Accuracy	442	0.59	1.00	0.93	0.06	51	0.83	1.00	0.95	0.04
Number: Correct RT	442	520.45	1782.63	768.65	167.22	51	503.15	1513.78	706.59	136.70
Mapping: Accuracy	442	0.43	0.89	0.71	0.07	51	0.62	0.99	0.78	0.06
Mapping: Correct RT	442	783.30	2585.52	1188.94	206.44	51	780.58	2080.89	1190.53	208.10
Numerical Ordering: Accuracy	413	0.14	1.00	0.78	0.14	51	0.63	1.00	0.87	0.09
Numerical Ordering: Correct RT	413	544.49	2296.39	1119.88	203.40	51	670.92	1609.82	1085.57	170.74
HAF: Accuracy (Congruent)	442	0.75	1.00	0.98	0.04	51	0.92	1.00	0.99	0.03
HAF: RT (Congruent)	442	236.33	753.70	349.82	61.87	51	269.50	499.33	339.78	41.03
HAF: Accuracy (Incong.)	441	0.00	1.00	0.94	0.13	51	0.83	1.00	0.98	0.04
HAF: RT (Incongruent)	440	261.67	896.00	388.63	73.07	51	290.75	519.82	372.00	49.73
HAF: Accuracy (Mixed)	441	0.21	1.00	0.81	0.14	51	0.56	1.00	0.88	0.10
HAF: RT (Mixed)	441	332.00	685.69	513.54	63.14	51	409.45	662.57	496.78	57.04
Corsi: Highest Span	431	2.00	8.00	5.22	1.16	51	3.00	8.00	6.00	1.12

Characteristics of High-Scoring Students

	High-Scoring		Not High-Scoring	
	Freq	Pct	Freq	Pct
Ethnicity				
Black	28	54.9	363	81.8
White	9	17.6	34	7.7
Hispanic	6	11.8	35	7.9
Other	8	15.7	12	2.7
Gender				
Male	25	49.0	192	43.2
Female	26	51.0	252	56.8
ELL in Pre-K Year				
ELL	8	15.7	37	8.3
Not ELL	43	84.3	406	91.4
Pre-K Curriculum Condition				
Building Blocks	30	58.8	276	62.2
Control	21	41.2	168	37.8
Pre-K School System				
Head Start	15	29.4	184	41.4
MNPS Pre-K	36	70.6	260	58.6
Year 1 School Type				
Charter	16	31.4	89	20.0
Izone	6	11.8	67	15.1
Middle	28	54.9	221	49.8
Other	0	0.0	1	0.2
Elementary	1	2.0	66	14.9
Year 2 School Type				
Charter	17	33.3	101	22.7
Izone	4	7.8	66	14.9
Middle	29	56.9	273	61.5
Other	1	2.0	3	0.7
Year 3 School Type				
Charter	18	35.3	91	20.5
Izone	3	5.9	58	13.1
Middle	29	56.9	289	65.1
Other	1	2.0	2	0.5
Year 4 School Type				
Charter	17	33.3	80	18.0
Izone	3	5.9	43	9.7
Middle	25	49.0	306	68.9
Other	6	11.8	15	3.4

Note. 4 students were out-of-region in Year 2 and/or Year 3 but returned in Year 4. 1 student is missing a pre-k year ELL designation.

Early Correlates of Later Skills

Zero-Order Correlations: All Students																
	Fall PK QC	Spring PK QC	Spring K QC	Spring G1 QC	Fall PK AP	Spring PK AP	Spring K AP	Spring G1 AP	Fall PK REMA NUM	Spring PK REMA NUM	Spring K REMA NUM	Spring G1 REMA NUM	Fall PK REMA GEO	Spring PK REMA GEO	Spring K REMA GEO	Spring G1 REMA GEO
KM Number (Age-Scaled)	.44	.55	.51	.55	.36	.50	.54	.63	.40	.52	.61	.59	.32	.48	.42	.46
KM Algebra (Age-Scaled)	.42	.55	.52	.56	.33	.46	.49	.58	.37	.48	.57	.59	.30	.43	.40	.39
KM Geometry (Age-Scaled)	.45	.49	.46	.48	.34	.48	.48	.54	.40	.43	.53	.51	.37	.45	.45	.45
WJ Quant. Cpts. (Std Score)	.41	.53	.55	.54	.36	.46	.55	.58	.35	.46	.58	.61	.29	.42	.37	.40
WJ Letter Word (Std Score)	.40	.46	.50	.51	.37	.44	.43	.49	.27	.35	.44	.53	.27	.36	.31	.34
TIMSS (Total)	.04	.05	.07	.12	.04	.06	.15	.12	.08	.10	.15	.12	.04	.06	.08	.07
Number: Accuracy	.13	.19	.24	.26	.12	.19	.25	.27	.15	.21	.26	.31	.13	.16	.17	.17
Number: Correct RT	-.15	-.14	-.15	-.17	-.14	-.19	-.19	-.20	.17	-.20	-.19	-.24	-.13	-.15	-.13	-.07
Mapping: Accuracy	.28	.31	.30	.36	.21	.28	.32	.41	.28	.30	.39	.41	.26	.30	.26	.28
Mapping: Correct RT	-.03	-.03	-.06	-.07	-.05	-.06	-.08	-.08	-.07	-.09	-.05	-.09	-.04	-.03	-.07	-.01
Num Ordering: Accuracy	.16	.24	.16	.25	.14	.19	.21	.25	.17	.27	.30	.26	.13	.24	.15	.18
Num Ordering: Correct RT	-.05	-.05	-.05	-.09	-.07	-.06	-.05	-.05	-.15	-.14	-.07	-.11	-.05	-.04	-.04	.02
HAF: Accuracy (Congruent)	.12	.06	.06	.09	.07	.06	.12	.07	.10	.10	.09	.06	.08	.16	.07	.02
HAF: RT (Congruent)	-.10	-.14	-.11	-.10	-.03	-.06	-.11	-.15	-.11	-.09	-.12	-.16	-.11	-.13	-.10	.01
HAF: Accuracy (Incong.)	.15	.19	.21	.19	.18	.22	.23	.23	.13	.18	.23	.27	.14	.19	.18	.18
HAF: RT (Incongruent)	-.10	-.17	-.21	-.16	-.08	-.18	-.23	-.22	-.12	-.16	-.22	-.26	-.12	-.18	-.22	-.11
HAF: Accuracy (Mixed)	.23	.26	.30	.31	.25	.24	.30	.37	.24	.27	.37	.39	.16	.24	.22	.25
HAF: RT (Mixed)	-.06	-.04	.04	-.02	.00	.03	.01	-.01	-.09	-.03	-.07	-.09	-.07	-.05	-.06	-.01
Corsi: Highest Span	.21	.29	.32	.34	.19	.23	.31	.31	.20	.28	.34	.34	.17	.22	.24	.21

Note. Red cells indicate correlations > .20. Green cells indicate correlations < -.20.