Approved: 3/5
Date

MINUTES OF THE SENATE COMMITTEE ON EDUCATION

The meeting was called to order by Chairperson Barbara Lawrence at 9:00 a.m. on February 17, 1998 in Room 123-S of the Capitol.

All members were present except: Senator Emert
Senator Hensley
Senator Lee

Committee staff present: Ben Barrett, Legislative Research Department
Carolyn Rampey, Legislative Research Department
Avis Swartzman, Revisor of Statutes
Jackie Breymeyer, Committee Secretary

Conferees appearing before the committee: Dr. William Sanders-University of Tennessee

Others attending: See attached list

Chairperson Lawrence called the meeting to order and introduced Dr. William Sanders, a Professor at the University of Tennessee. He has done an extensive study of the value added assessment system.

Dr. Sanders stated that he wanted the Committee to know that he is not an educator, but a statistician. In 1982 Tennessee, like so many states, had begun to address the broad notion of educational improvement. At that time, Dr. Sanders was part of a small group of people with statistical expertise. He was also teaching an advanced class in statistics at the University. One day he was on his way to class when he read a newspaper account where someone had testified in front of one of the legislative committees that you could not use student achievement data as part of an assessment valuation system. The article cited several statistical reasons why this could not be done. When he was through that day, one of his colleagues commented that they should write a letter to the Governor. They wrote a letter to then Governor Alexander. The letter probably got bounced around to many places, but eventually wound up at the Department of Education who contacted them and asked them what they could do. They began a series of studies in the '80s to essentially evaluate the entire concept. They have now constructed the largest longitudinal merged data base in the United States. They are approaching six million longitudinal merged records . They measure each child in each of five subjects from grades 2-8 each year. They have been doing this since 1990. (Attachment 1)

Dr. Sanders stated that the entire notion of value added assessment is based on basic principles. The first being, in his view, that the educational community is not responsible for solving all of societies's problems. One of the important things that the educational community is responsible for is taking each child each year from where the child is academically and allowing each child an opportunity to achieve academic growth each year. Under a value added assessment concept, it doesn't matter at what level a child grows because they are all important. He stated that academic growth opportunities should be supplied regardless of prior achievement. If these notions make sense, then it becomes a question of how to track the progress of kids across. What is needed are scales of measure highly correlated with curricular objectives, but with sufficient stretch to measure the academic growth of the lowest achieving kids or the highest achieving kids.

Dr. Sanders used the example of a parent with three children who were at three academic levels. One child might have lots of ability, one average, and one might be below average. As a parent, you want each kid to have an opportunity to make progress; you don't want all the energy to go to one of the children at the sacrifice of the progress of the other two children.

He reiterated the points of highly correlated curricular objectives; sufficient stretch to measure growth from the lowest achieving kids to the highest achieving kids. Once this is in place, the basis is there for creating a data information system that essentially will supply not only your accountability needs, but a wealth of diagnostic information to go back to the individual classrooms and schools and work all the way from the classrooms to the local boards of education, superintendents offices, state boards of educations to legislative groups, and so forth to feed them all the information.

Dr. Sanders shared with the Committee some of the results that have been obtained up to date to show where the opportunities are and also how much work there is left to do. He went to the computer and asked it to find the first child it could find that had been at that school district since the onset of the testing program. He went through the chart Scores for Students A, B, C and D over grades, pointing out if there was steady growth. He added that there were errors of measurement that could be attributed to many things such as luck, parent problems, sickness and all sorts of things that create disturbance in these patterns.

On the math chart, Dr. Sanders said that the concept being used is the measuring of the 'dimples and bubbles' in each child's curve and aggregating that across kids to get the measure of the district's effectiveness. He continued with the "Cumulative Gains of Tennessee Schools" charts in rewarding, science and social studies, pointing out the percent of national norm down to the lowest percentiles. He stated that a person would not want his or her child to attend these low ranking schools.

In response to a question from one of the Committee, Dr. Sanders stated that a person could not forecast the position anywhere along any graph by knowing the mailing address of the schools; one cannot forecast whether it is an inner city school, suburban school or rural school because what has been done is to measure everything relative to the individual child. What has been filtered out has been the socio economic findings. He read through the graph on page 12, stating that there was a slow, but steady positive shift in the right direction. The fairest, best way he could say of what has happened in his state is that five or six years ago, lots of leaders exerted their energies and efforts to work with faculties to use this kind of information diagnostically and they have seen positive results; others have ignored it and basically those schools have not changed. The chart entitled "State-Wide 8th Grade Averages" showed slow positive trends in three areas - math, science and language arts.

The fact that reading comprehension is going down is raising many questions. A lot of elementary schools have gone from a class period called reading with direct instruction in reading to a library approach. It appears that this approach can be quite effective if closely monitored by teachers to make sure students are reading at their appropriate levels. The problem that comes in with this approach is that students tend to read what they like and tend to choose books under the level at which they need to be reading. In many middle schools, the entire period for reading is gone, the idea being that reading will be incorporated into other subjects.

In reply to a comment about direct instruction being very important, Dr. Sanders replied that he advocates whatever is necessary to have sustained academic growth. He emphasized that the biggest problem in the State of Tennessee is the severe under education of the above average child. What has been found consistently, from the early '80s to the present, with nearly six million records is that the single biggest factor affecting academic growth of populations is not race or poverty - it is the effectiveness of the individual classroom teacher.

The last charts that Dr. Sanders went through showed the variability in effectiveness among math teachers in the different elementary grades. It has been shown that as teachers change assignments, for example, 4th to 6th grade, the effectiveness assessments goes with the teacher.

Dr. Sanders stated that teacher effectiveness is the single largest factor identified. The first kids that begin to benefit as teachers become more effective are the lowest scoring kids. This is wonderful as long as kids are not being held back across the entire spectrum.

One of the assumptions that has always been used is that if a child is started out right he will stay right. This is blatantly untrue. Grade school can be strong, but weaknesses in high school courses will not enable a student to pass college entrance examinations. Dr. Sanders has said he has seen this happen for many years. He stated that he has a rural bias to the max, but has seen so many bright kids come in to the university that are so poorly prepared to go into engineering, pre-med or some other technical field because they cannot compete with kids from other high schools.

Dr. Sanders read his summary and recommendations for consideration and concluded his presentation. He spent some time in dialogue on different aspects of his presentation with several committee members.

The Chairperson thanked Dr. Sanders for his illuminating talk and adjourned the meeting.

The next meeting is scheduled for February 18, 1998.

SENATE EDUCATION COMMITTEE GUEST LIST

DATE: February 17, 1998

NAME	REPRESENTING
William L. Sanders	U. of Tennessee
Stacey Farmer	KASB
Jim Langford	DOB
Cheree Mercer	KSDE
Dorothy Rockefeller	Ky WU
Jacque Oakes	SDE

The Tennessee Value-Added Assessment System

TVAAS:

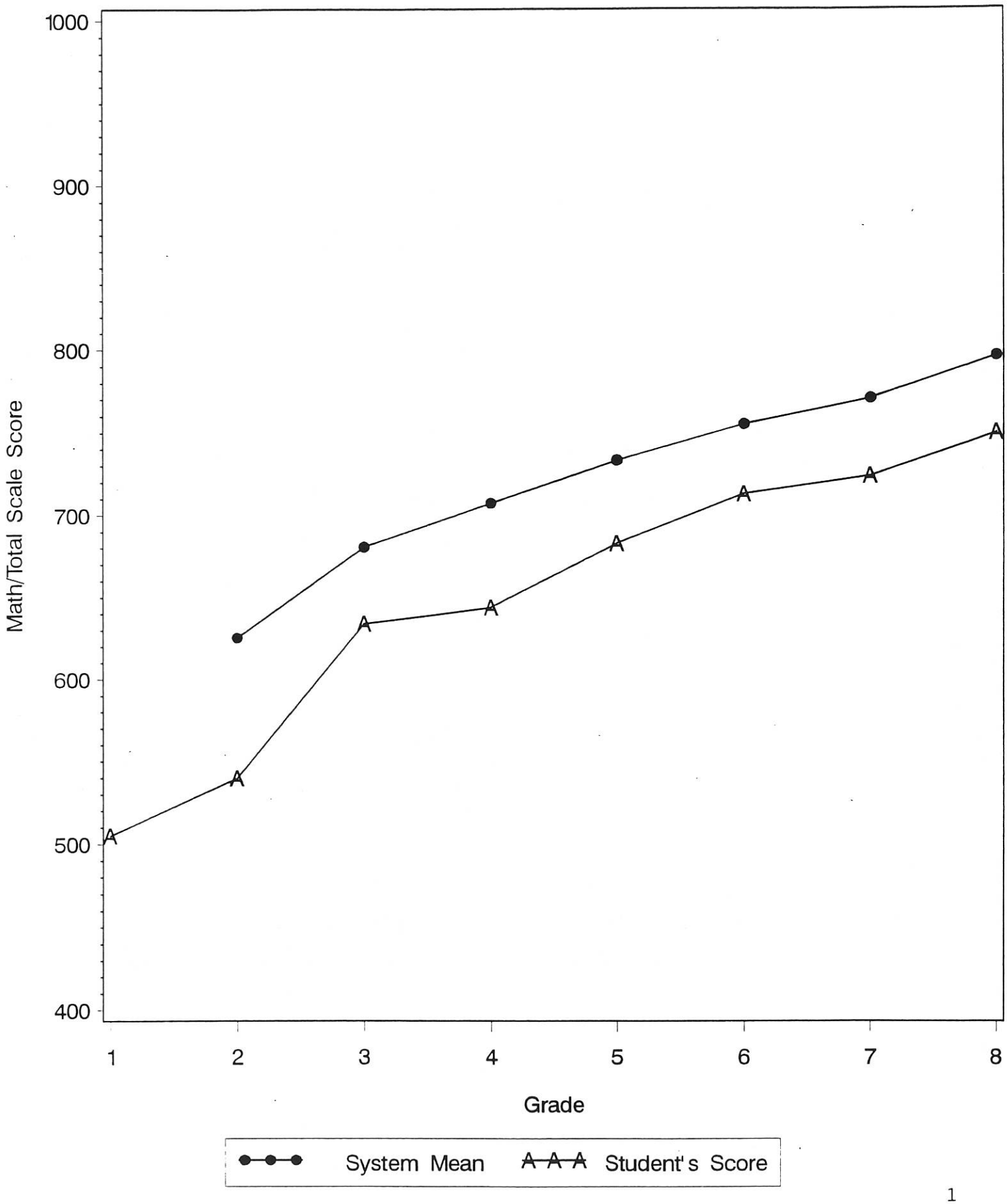
Measurement and Analysis to Facilitate Sustained Academic Growth of Students

William L. Sanders

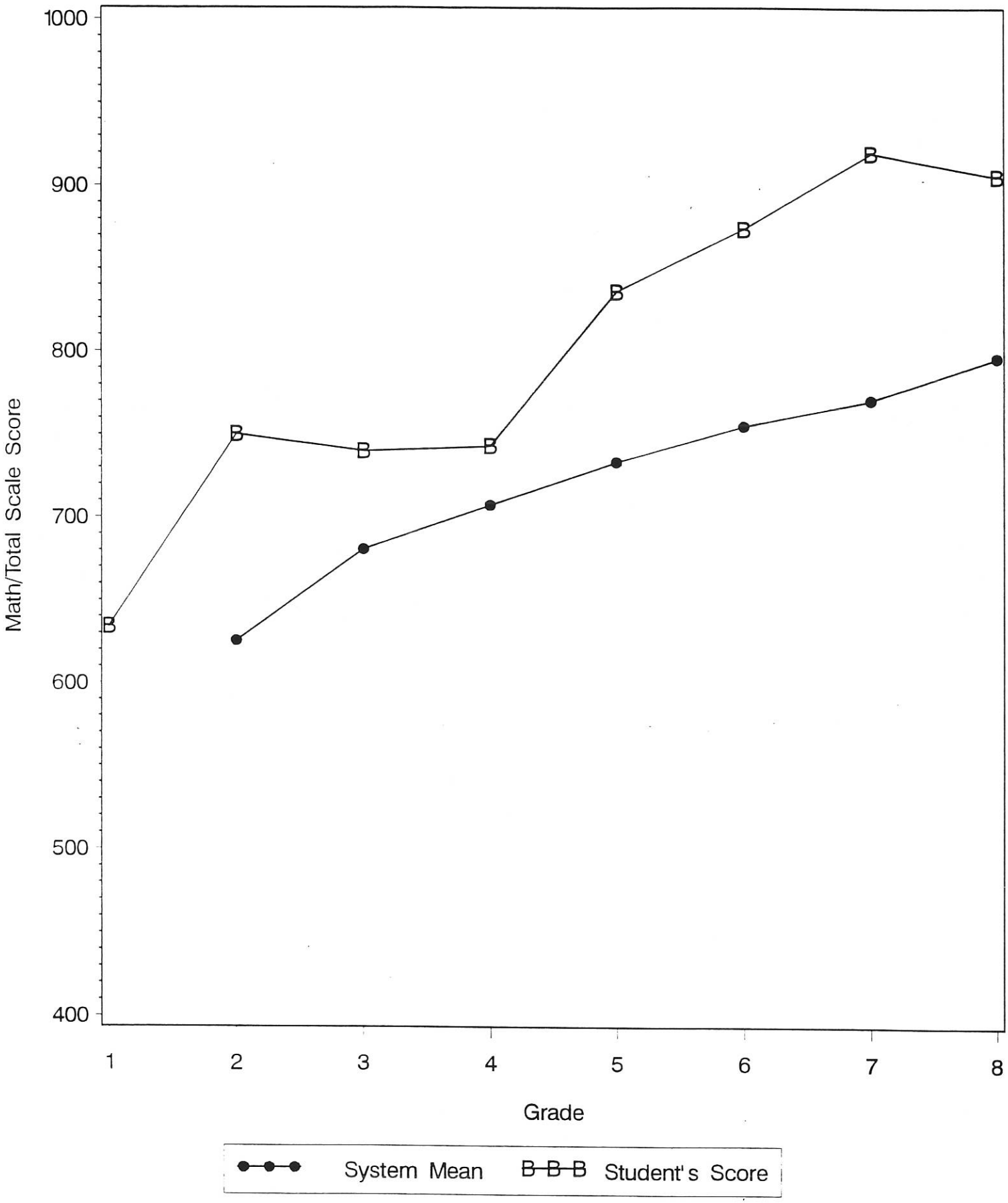
University of Tennessee
Value-Added Research and Assessment Center

Senate Education
Attachment 1
2-17-98

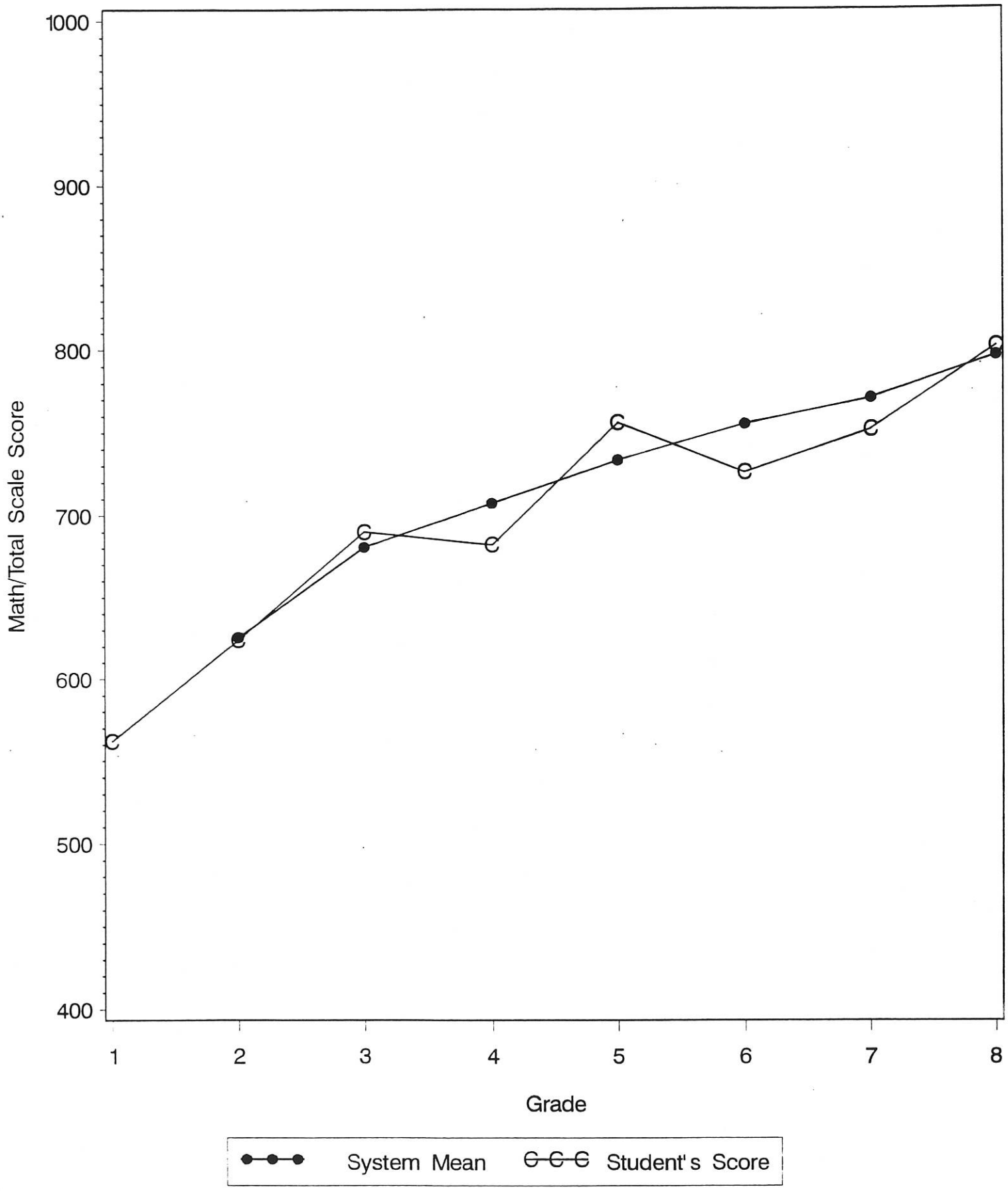
Scores for Student A over Grades



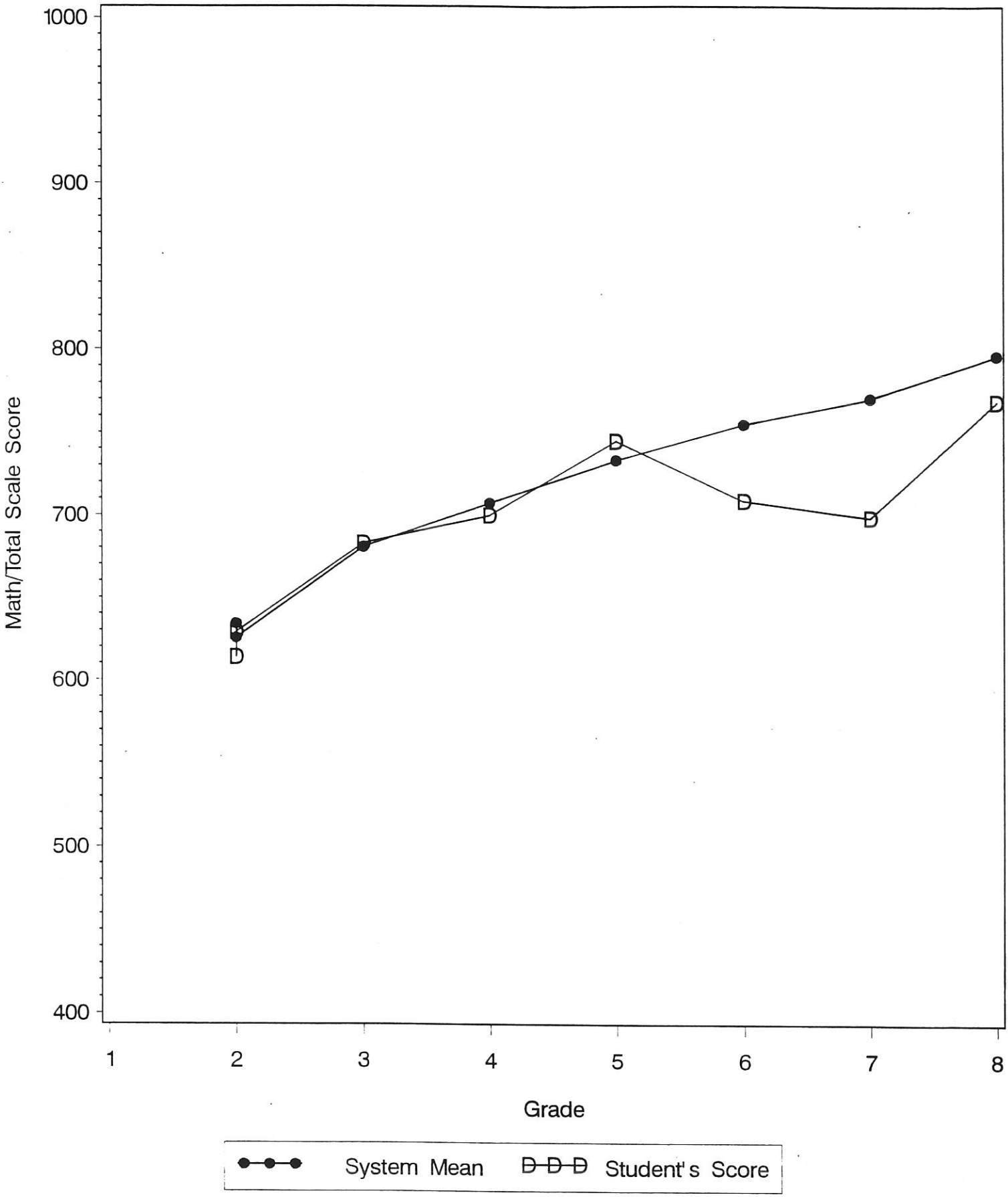
Scores for Student B over Grades



Scores for Student C over Grades

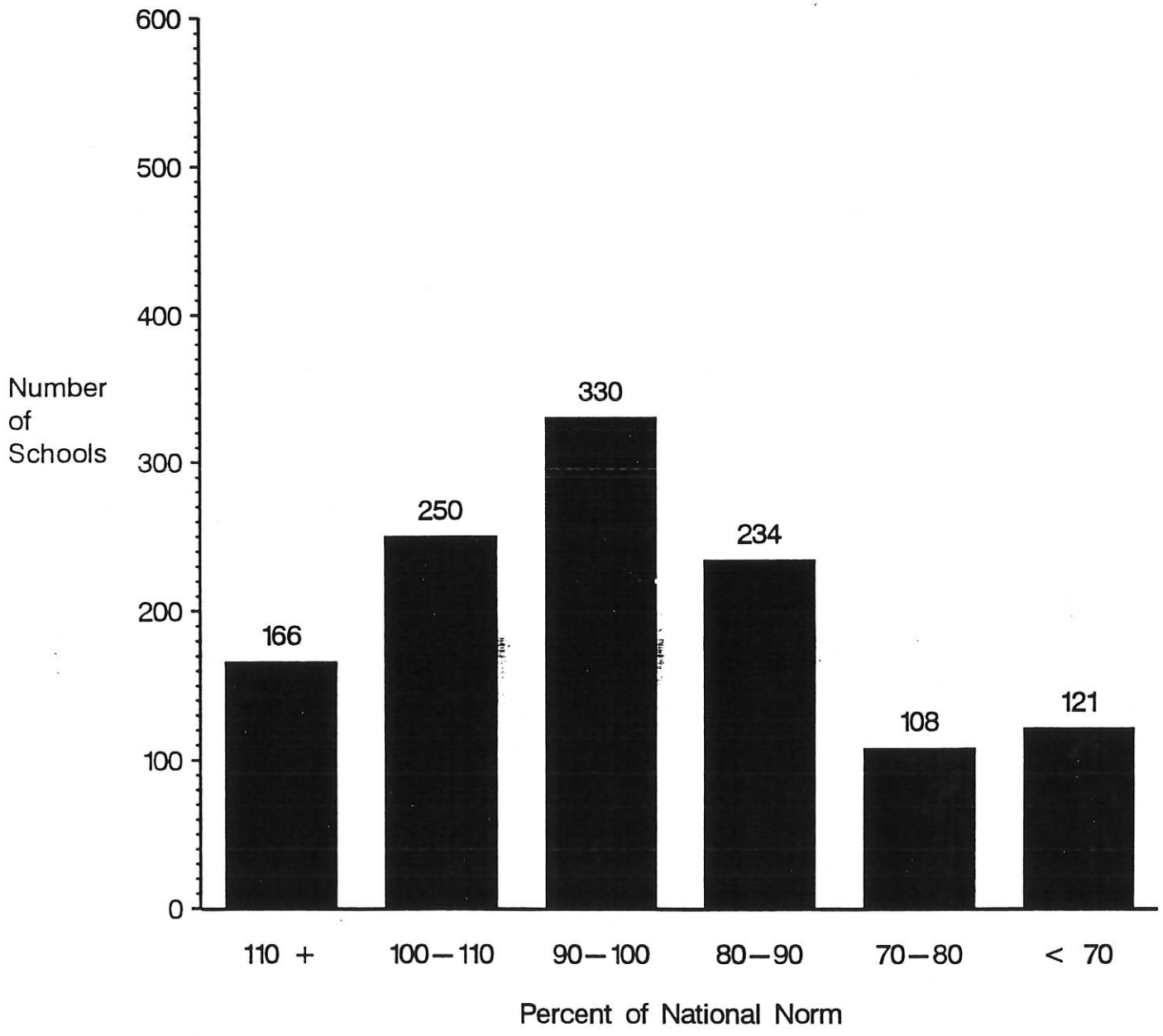


Scores for Student D over Grades



Cumulative Gains of Tennessee Schools Expressed as a Percentage of National Norm

Math



Based on 3—year average.

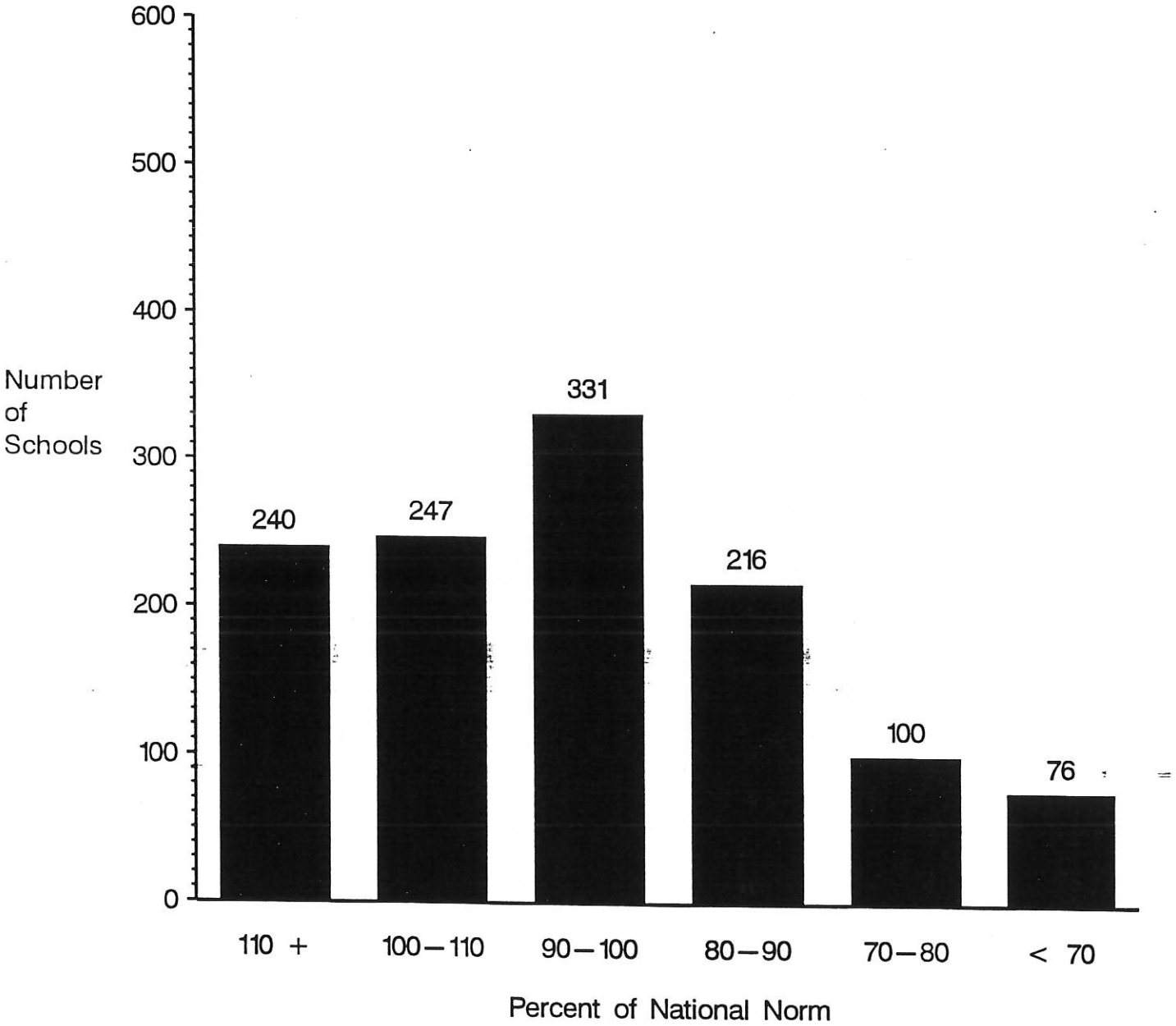
Note: Percent of National Norm = 100*(Cumulative School Gain)/(Cumulative National Norm Gain).

Note: 100% denotes that a school's cumulative gain is equal to the National Norm Cumulative gain.

September 1996

Cumulative Gains of Tennessee Schools Expressed as a Percentage of National Norm

Reading



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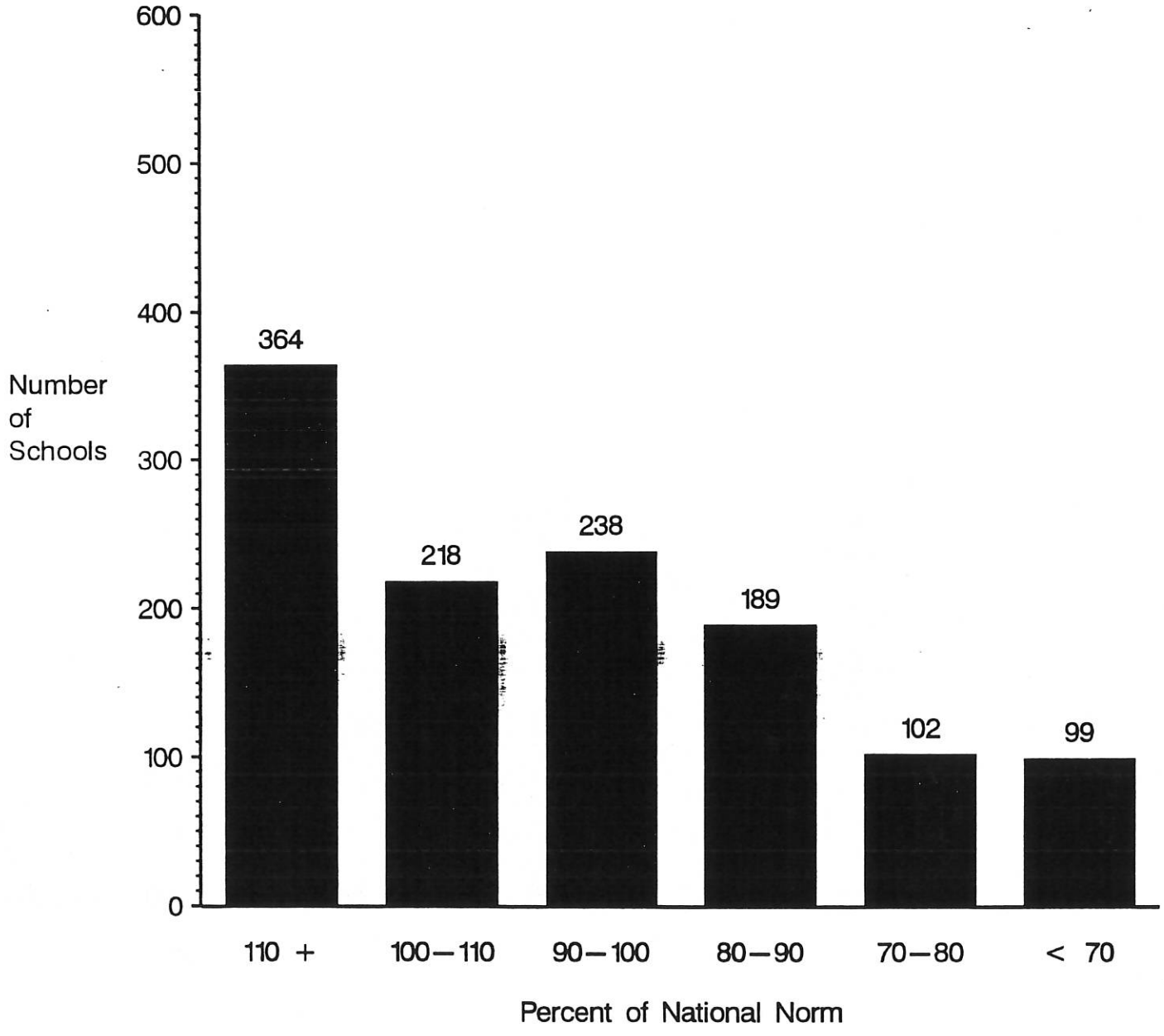
September 1996

Cumulative Gains of Tennessee Schools Expressed as a Percentage of National Norm

Science



Based on 3–year average.

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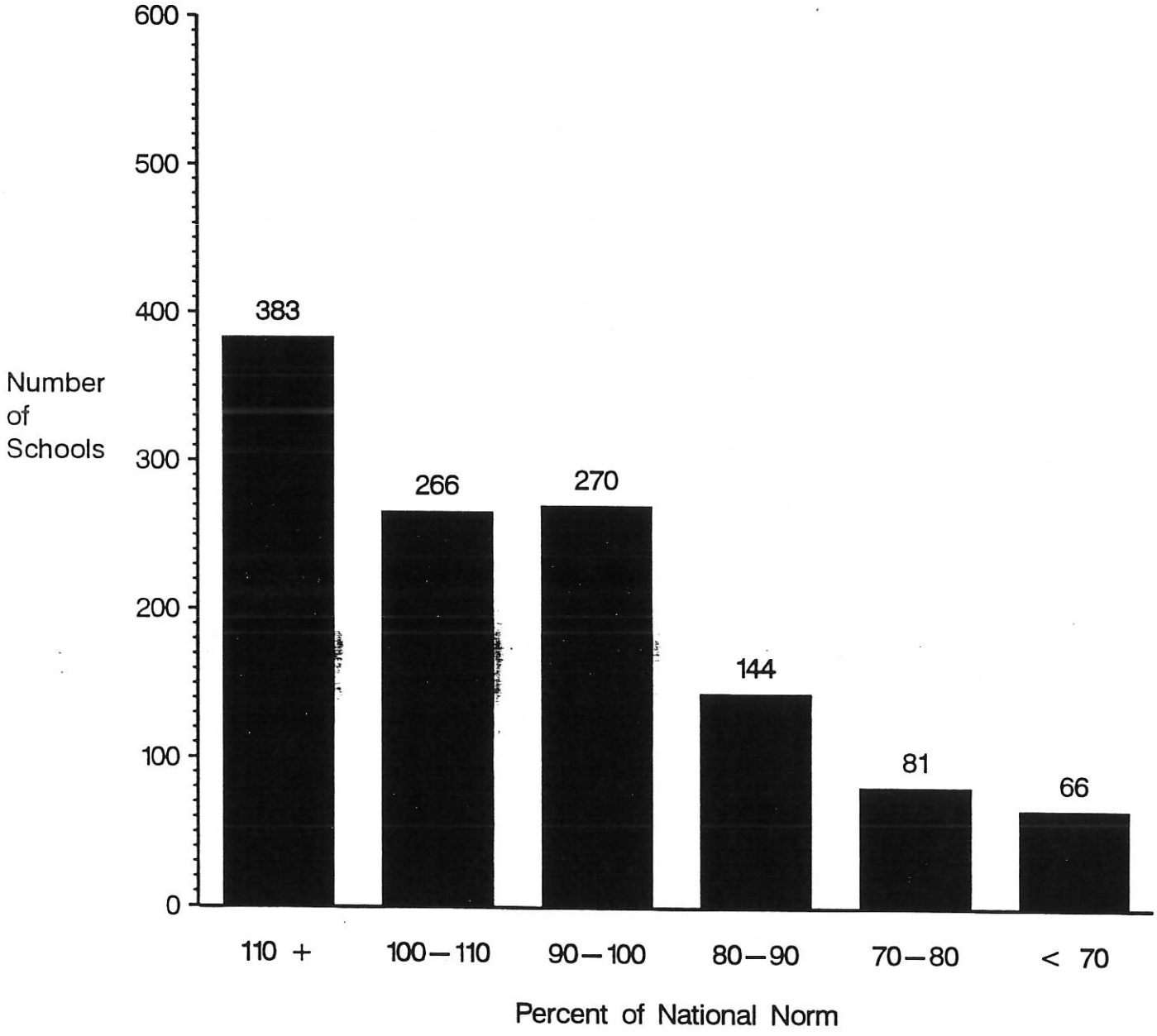
Note: 100% denotes that a school's cumulative gain is equal to the National Norm Cumulative gain.

September 1996

Cumulative Gains of Tennessee Schools Expressed as a Percentage of National Norm

Social Studies



Based on 3—year average.

Note: Percent of National Norm = 100*(Cumulative School Gain)/(Cumulative National Norm Gain).

Note: 100% denotes that a school's cumulative gain is equal to the National Norm Cumulative gain.

September 1996

Frequency and Percentage of Tennessee Schools by 3-Year Cumulative Percent Gain Categories

1996 vs. 1997

Math

	1997 Cumulative Percent Gain Categories					
1996	**<50**	**50-75**	**75-100**	**100-125**	**>125**	**Total**
<50	30 **73.2%**	8 **19.5%**	3 **7.3%**	0 **0.0%**	0 **0.0%**	41
50-75	3 **2.3%**	62 **48.4%**	58 **45.3%**	5 **3.9%**	0 **0.0%**	128
75-100	0 **0.0%**	36 **5.8%**	443 **71.6%**	137 **22.1%**	3 **.5%**	619
100-125	0 **0.0%**	3 **.8%**	105 **28.3%**	250 **67.4%**	13 **3.5%**	371
>125	0 **0.0%**	0 **0.0%**	1 **2.9%**	14 **41.2%**	19 **55.9%**	34
Total	33	109	610	406	35	1193

Frequency and Percentage of Tennessee Schools by 3-Year Cumulative Percent Gain Categories

1996 vs. 1997

Reading

1997 Cumulative Percent Gain Categories

1996	<50	50-75	75-100	100-125	>125	Total
<50	13 46.4%	8 28.6%	5 17.9%	2 7.1%	0 0.0%	28
50-75	2 2.4%	25 30.1%	54 65.1%	1 1.2%	1 1.2%	83
75-100	0 0.0%	14 2.3%	372 61.0%	221 36.2%	3 .5%	610
100-125	0 0.0%	1 .2%	68 16.0%	310 72.9%	46 10.8%	425
>125	0 0.0%	1 2.1%	0 0.0%	15 31.3%	32 66.7%	48
Total	15	49	499	549	82	1194

Frequency and Percentage of Tennessee Schools by 3-Year Cumulative Percent Gain Categories

1996 vs. 1997

Language Arts

	1997 Cumulative Percent Gain Categories					
1996	**<50**	**50-75**	**75-100**	**100-125**	**>125**	**Total**
<50	20 **55.6%**	7 **19.4%**	8 **22.2%**	0 **0.0%**	1 **2.8%**	36
50-75	7 **5.5%**	40 **31.3%**	77 **60.2%**	4 **3.1%**	0 **0.0%**	128
75-100	0 **0.0%**	27 **5.7%**	252 **53.4%**	175 **37.1%**	18 **3.8%**	472
100-125	0 **0.0%**	2 **0.5%**	52 **12.5%**	270 **65.1%**	91 **21.9%**	415
>125	0 **0.0%**	0 **0.0%**	4 **2.82%**	38 **26.8%**	100 **70.4%**	142
Total	27	76	393	487	210	1193

Frequency and Percentage of Tennessee Schools by 3-Year Cumulative Percent Gain Categories

1996 vs. 1997

Science

	1997 Cumulative Percent Gain Categories					
1996	<50	50-75	75-100	100-125	>125	Total
<50	8 61.5%	4 30.8%	1 7.7%	0 0.0%	0 0.0%	13
50-75	14 12.1%	67 57.8%	29 25.0%	2 1.7%	4 3.5%	116
75-100	2 .4%	102 20.7%	298 60.6%	83 16.9%	7 1.4%	492
100-125	0 0.0%	12 3.0%	149 37.3%	189 47.4%	49 12.3%	399
>125	0 0.0%	0 0.0%	5 2.9%	30 17.3%	138 79.8%	173
Total	24	185	482	304	198	1193

1-12

Frequency and Percentage of Tennessee Schools by 3-Year Cumulative Percent Gain Categories

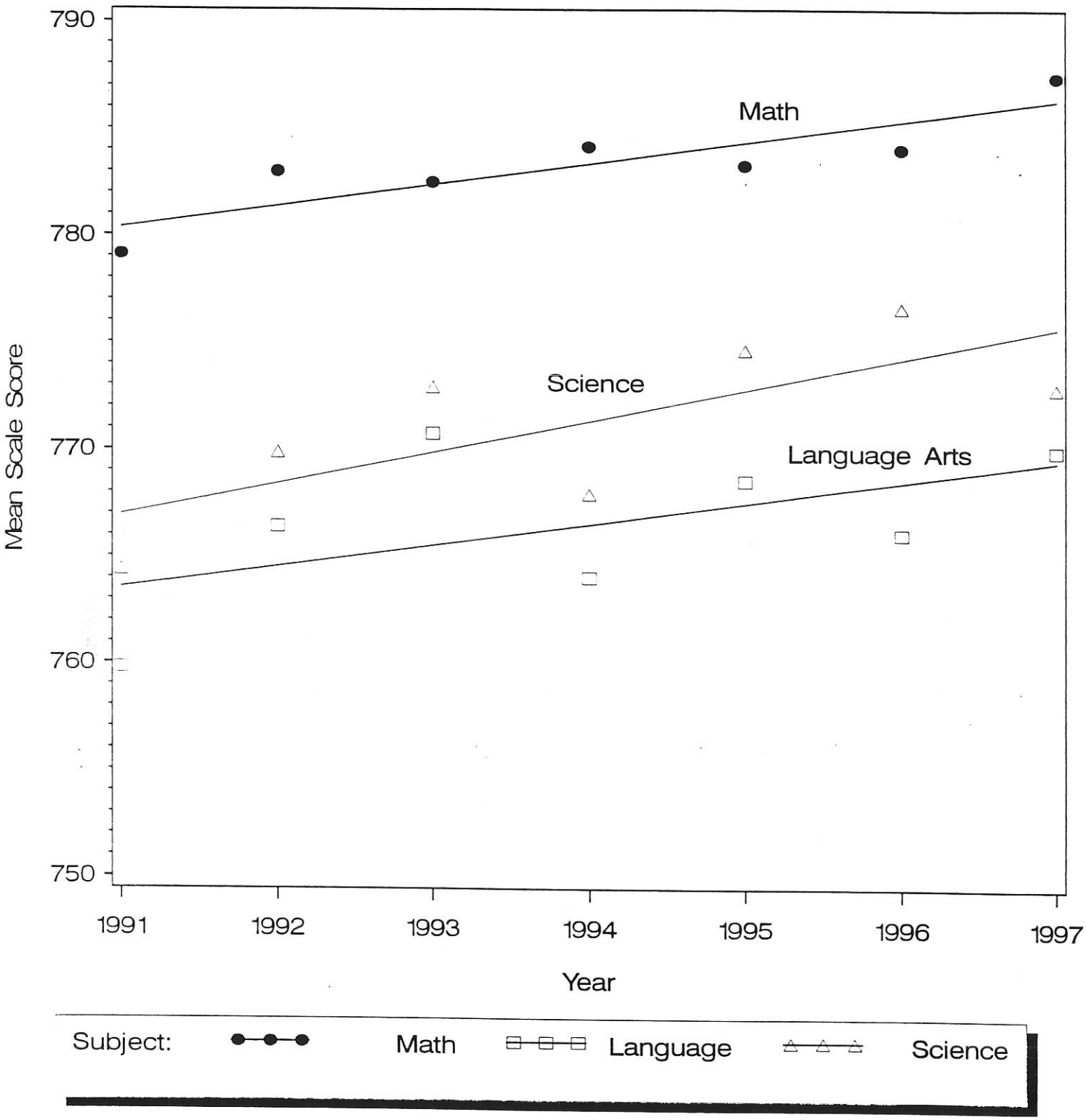
1996 vs. 1997

Social Studies

	1997 Cumulative Percent Gain Categories					
1996	**<50**	**50-75**	**75-100**	**100-125**	**>125**	**Total**
<50	30 **85.7%**	2 **5.7%**	2 **5.7%**	1 **2.9%**	0 **0.0%**	35
50-75	5 **7.4%**	35 **51.5%**	25 **36.8%**	3 **4.4%**	0 **0.0%**	68
75-100	11 **2.4%**	80 **17.7%**	285 **63.2%**	74 **16.4%**	1 **.2%**	451
100-125	6 **1.2%**	37 **7.4%**	198 **39.4%**	242 **48.1%**	20 **4.0%**	503
>125	1 **.7%**	11 **8.1%**	28 **20.6%**	62 **45.6%**	34 **25.0%**	136
Total	53	165	538	382	55	1193

State—Wide 8th Grade Averages

1991 — 1997



Based on arithmetic means.

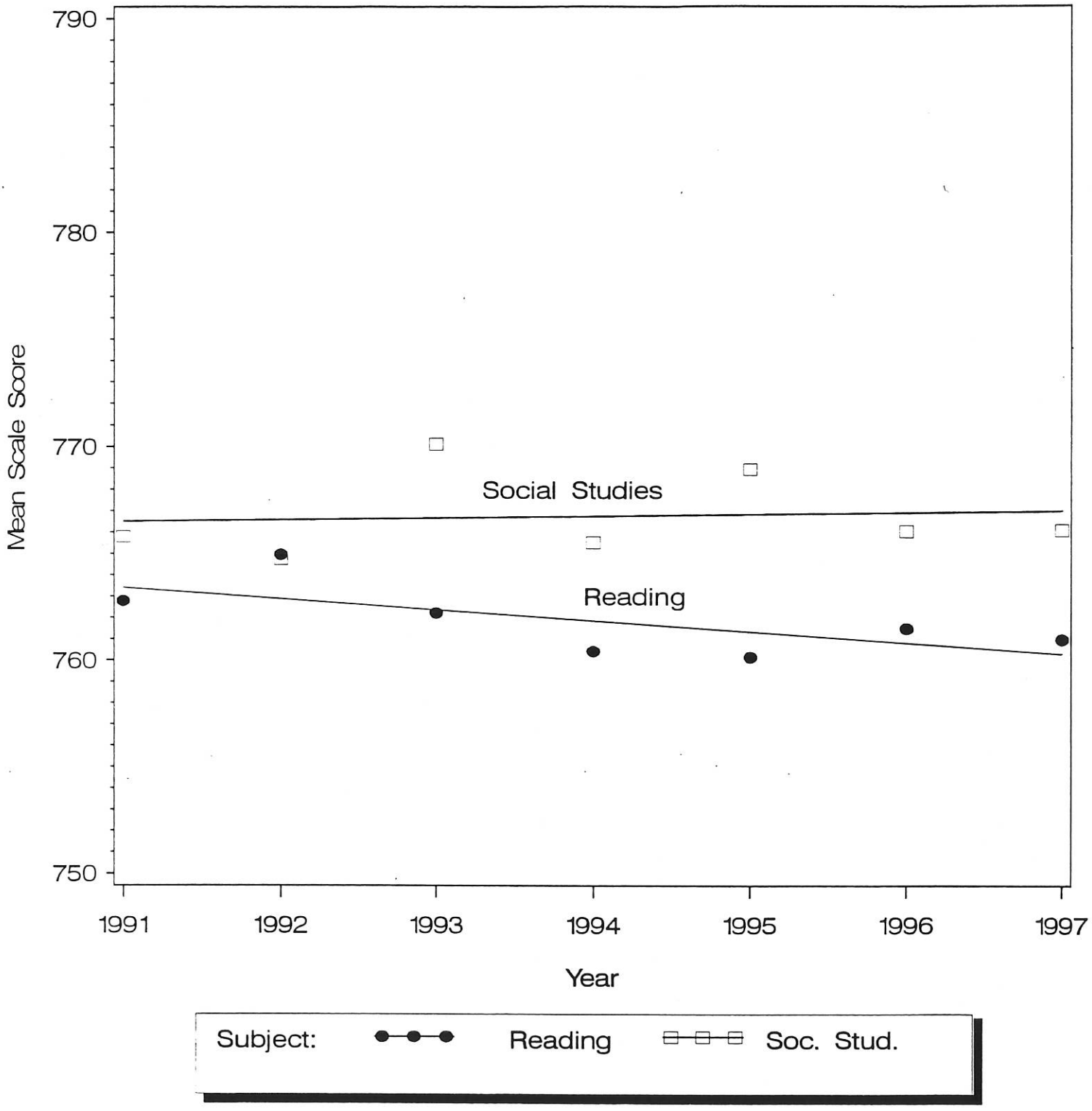
July, 1997

Program: 8th—grade—means.sas

Catalog: /tvaas/programs/reports/1997/graph—summary/gseg.sct01

State—Wide 8th Grade Averages

1991 — 1997



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July, 1997

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Catalog: /tvaas/programs/reports/1997/graph—summary/gseg.sct01

The NAEP 1996 State Assessment in Mathematics

Tennessee vs. Nation
Comparison between 1992 and 1996 Results

Grade 4

	10th %tile	25th %tile	50th %tile	75th %tile	90th %tile
1992					
Tenn.	172	191	212	232	249
Nation	176	197	220	241	259
Tenn.- Nation	-4	-6	-8	-9	-10
1996					
Tenn.	178	199	221	240	258
Nation	180	201	224	244	261
Tenn.- Nation	-2	-2	-3	-4	-3

The NAEP 1996 State Assessment in Mathematics

Tennessee vs. Nation
Comparison between 1992 and 1996 Results

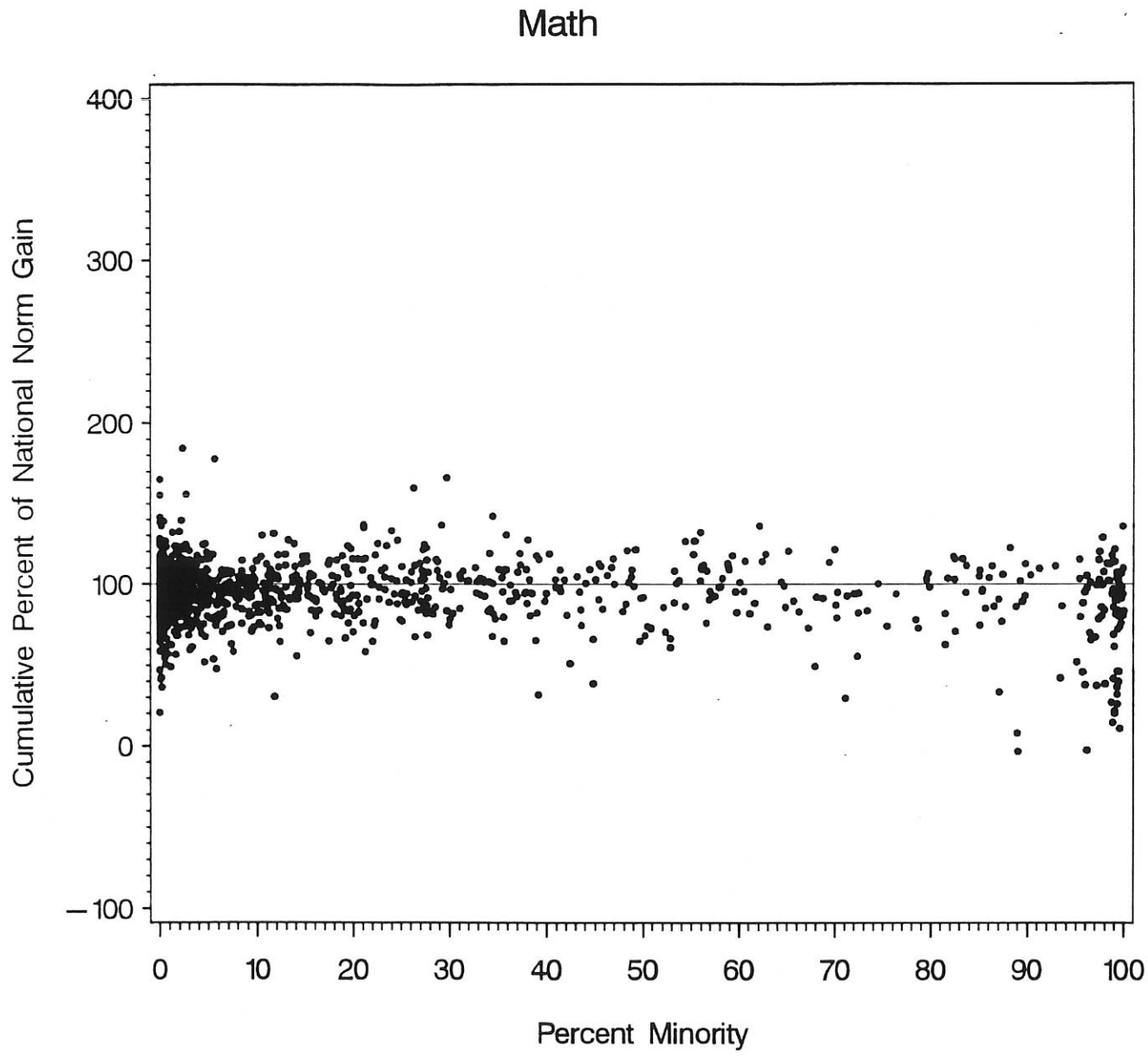
Grade 8

	10th %tile	25th %tile	50th %tile	75th %tile	90th %tile
1992					
Tenn.	215	236	259	283	302
Nation	219	242	268	293	314
Tenn.-Nation	-4	-6	-9	-10	-12
1996					
Tenn.	218	241	265	288	306
Nation	222	247	272	296	316
Tenn.-Nation	-4	-6	-7	-8	-10

Myth:

- Effects of Schooling CAN NOT be measured free of socio-economic confounding.

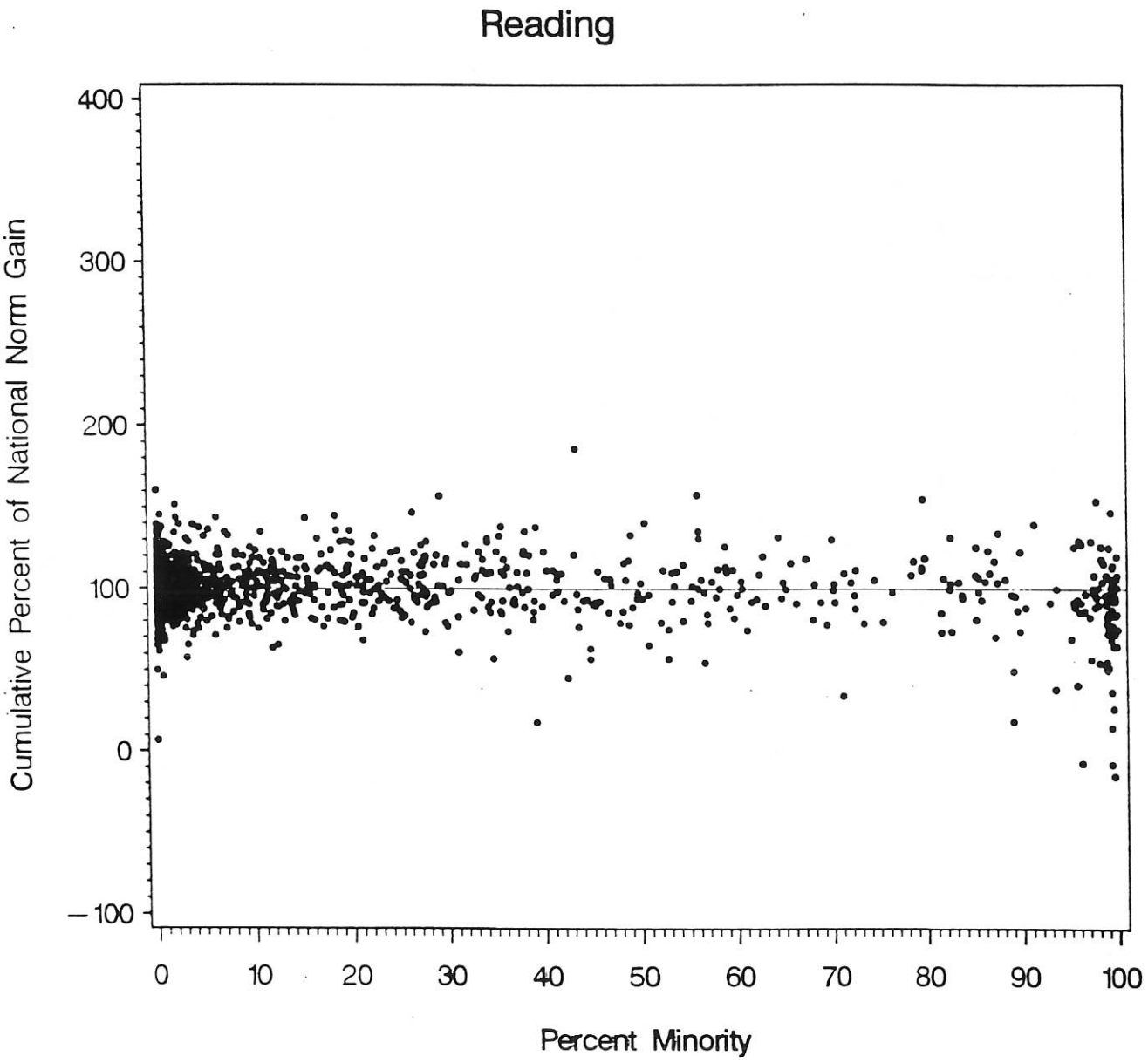
Cumulative Gain of Tennessee Schools Compared with the Percent of Minority Students in the School



Each dot represents 1 school in Tenn.
Horizontal line at 100% represents gain equal to national norm gain.

3 Year Average Gain
July 1997
Program: cum_pct−vs−race−schools.sas

Cumulative Gain of Tennessee Schools Compared with the Percent of Minority Students in the School



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3 Year Average Gain
July 1997
Program cum_pct−vs−race−schools.sas

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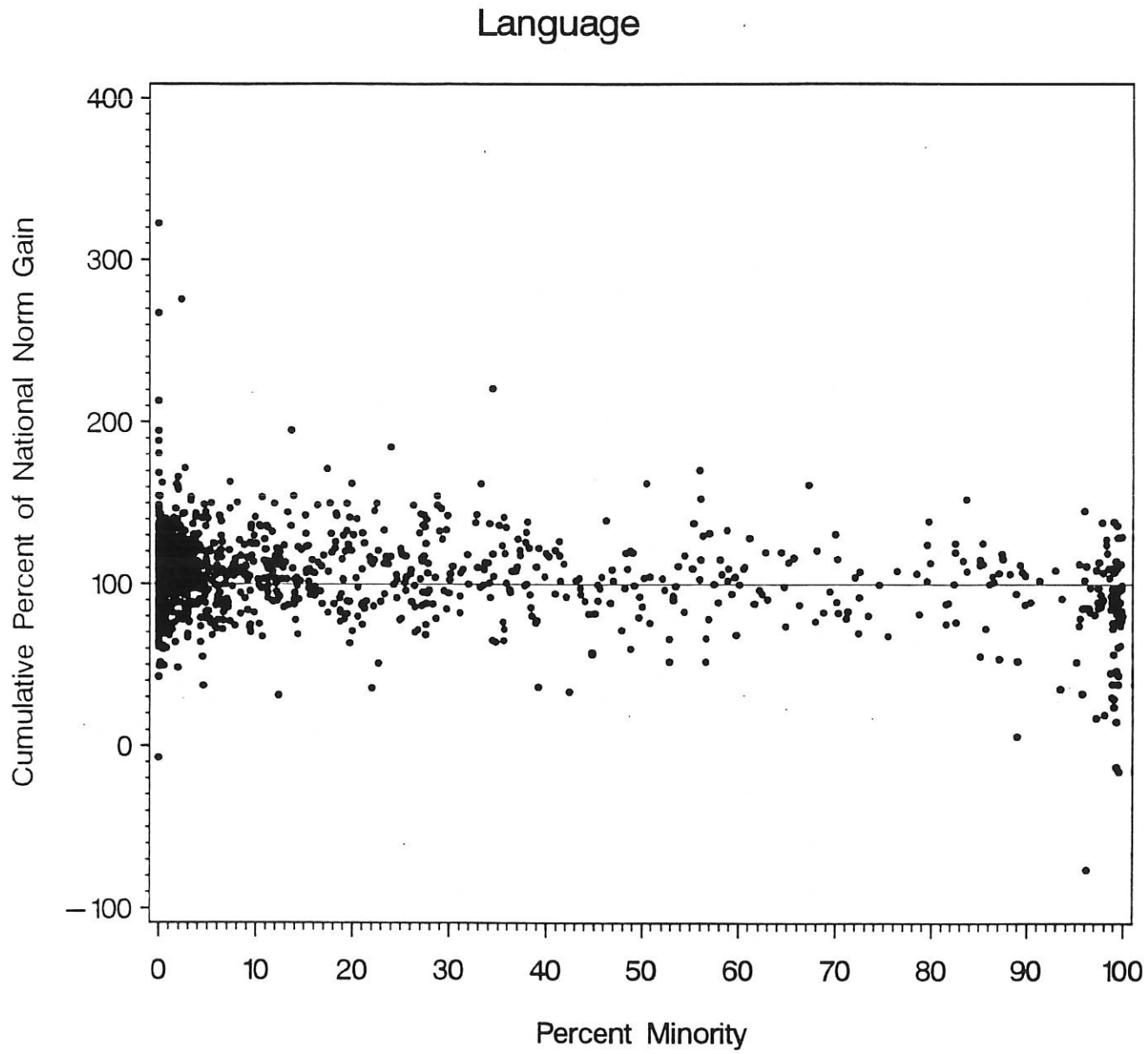


Each dot represents 1 school in Tenn.
Horizontal line at 100% represents gain equal to national norm gain.

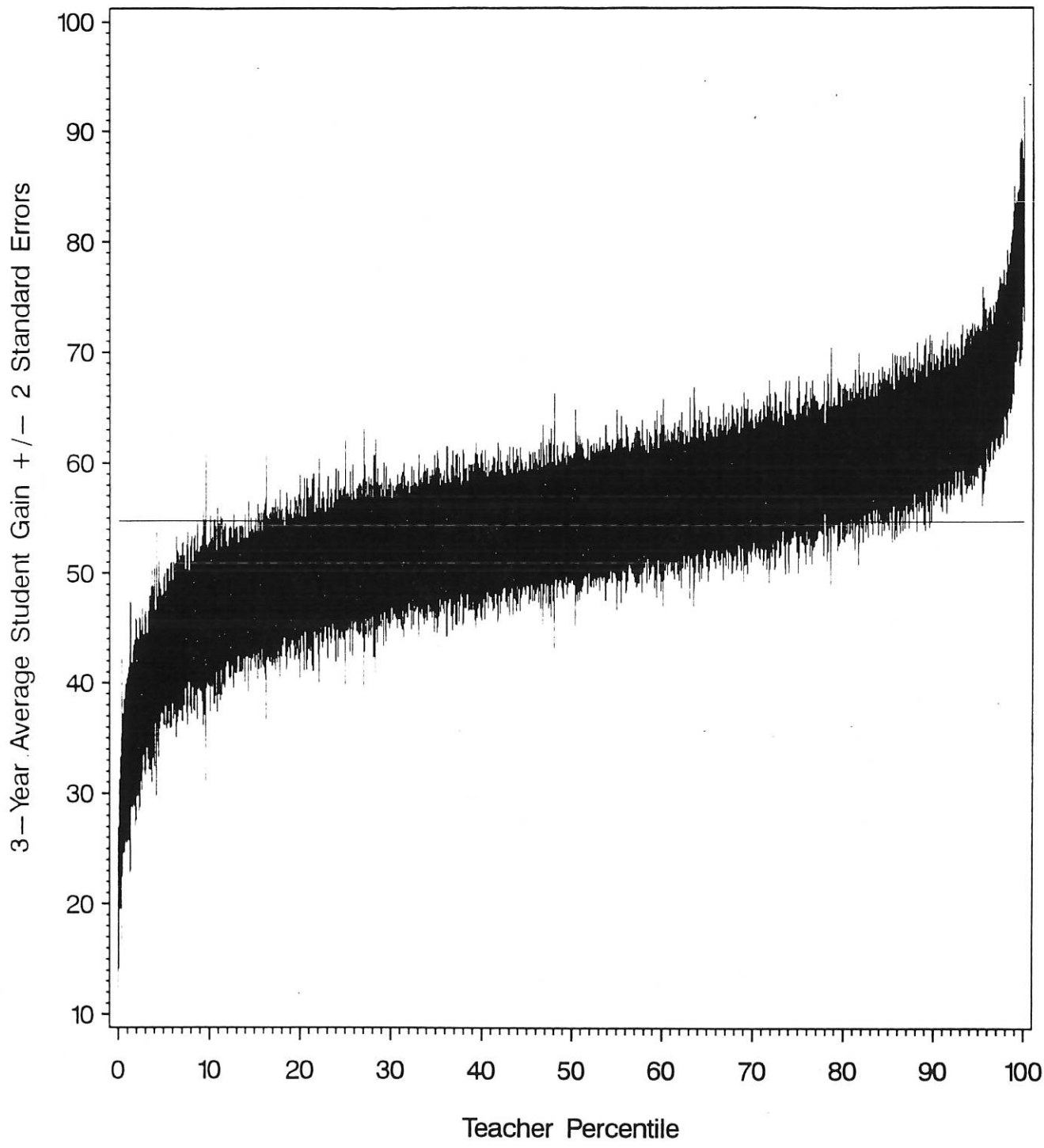
3 Year Average Gain
July 1997
Program: cum_pct−vs−race−schools.sas

Myth:

- What I do in my Classroom has no IMPACT on Standardized Test Scores.

Variability in Effectiveness Among Math Teachers

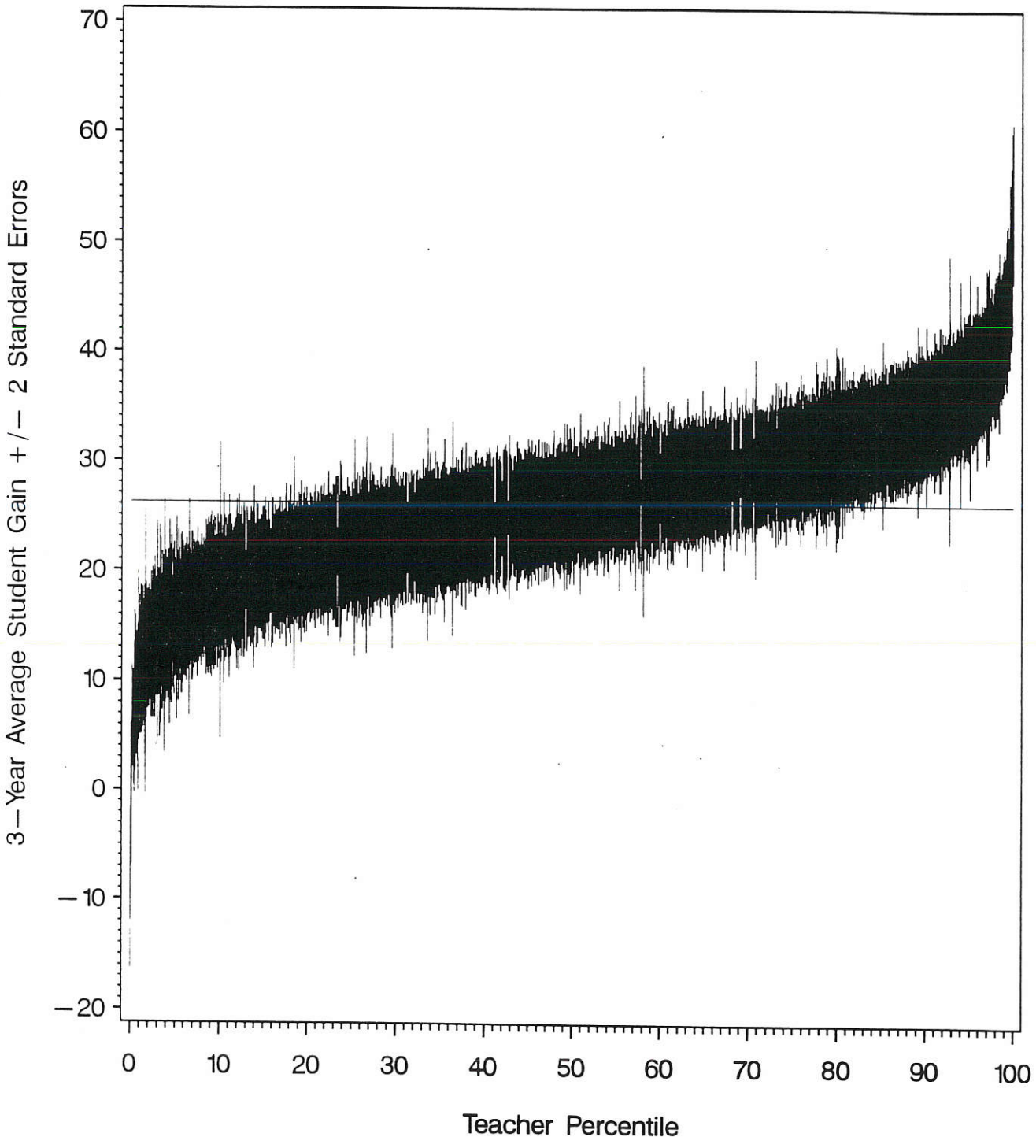
for Grade 3



Note: Horizontal line represents National Norm Gain.
Results from 1996.
July, 1997
Program: tch—dist.sas

Variability in Effectiveness Among Math Teachers

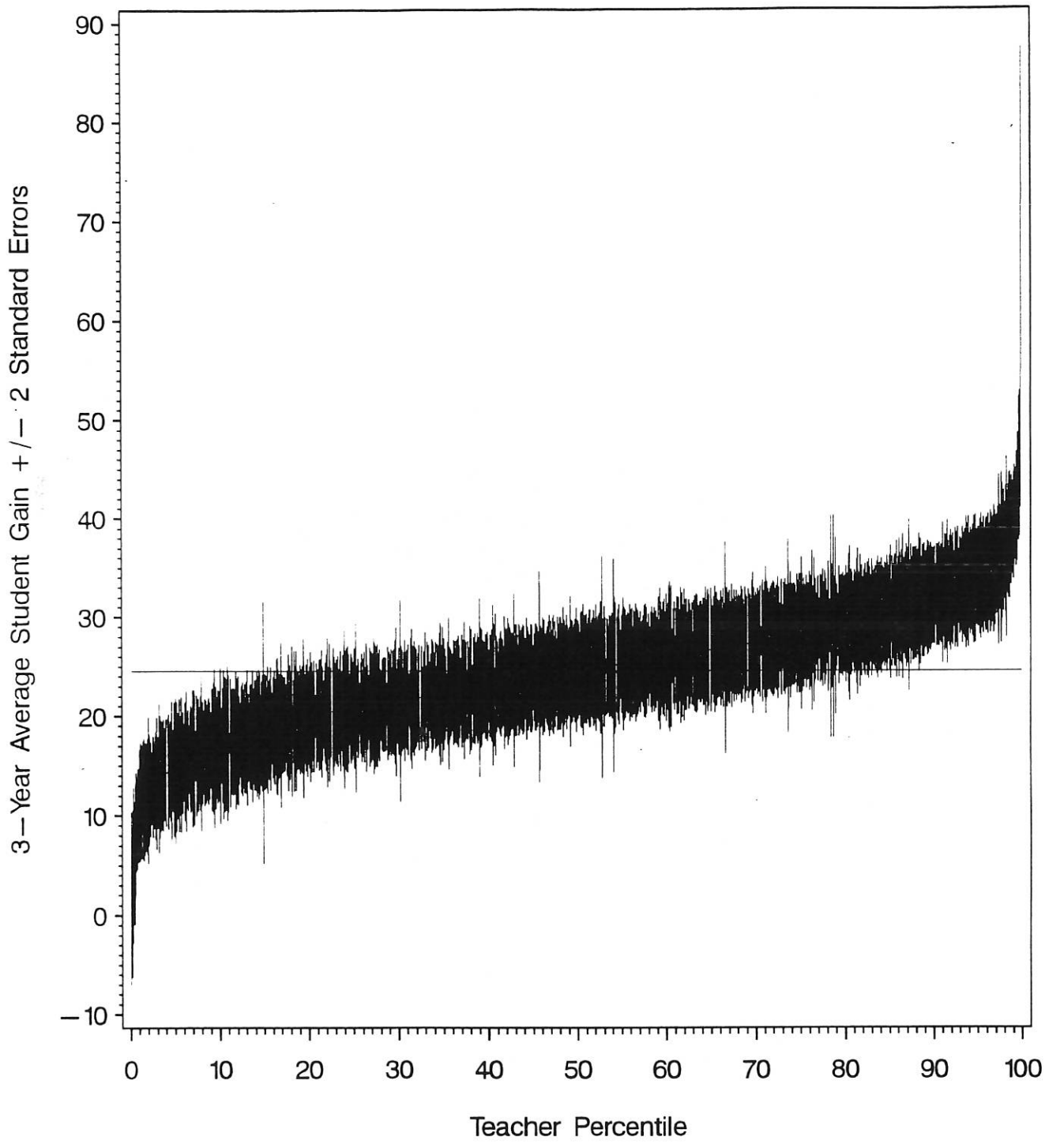
for Grade 4



Note: Horizontal line represents National Norm Gain.
Results from 1996.
July, 1997
Program: tch−dist.sas

Variability in Effectiveness Among Math Teachers

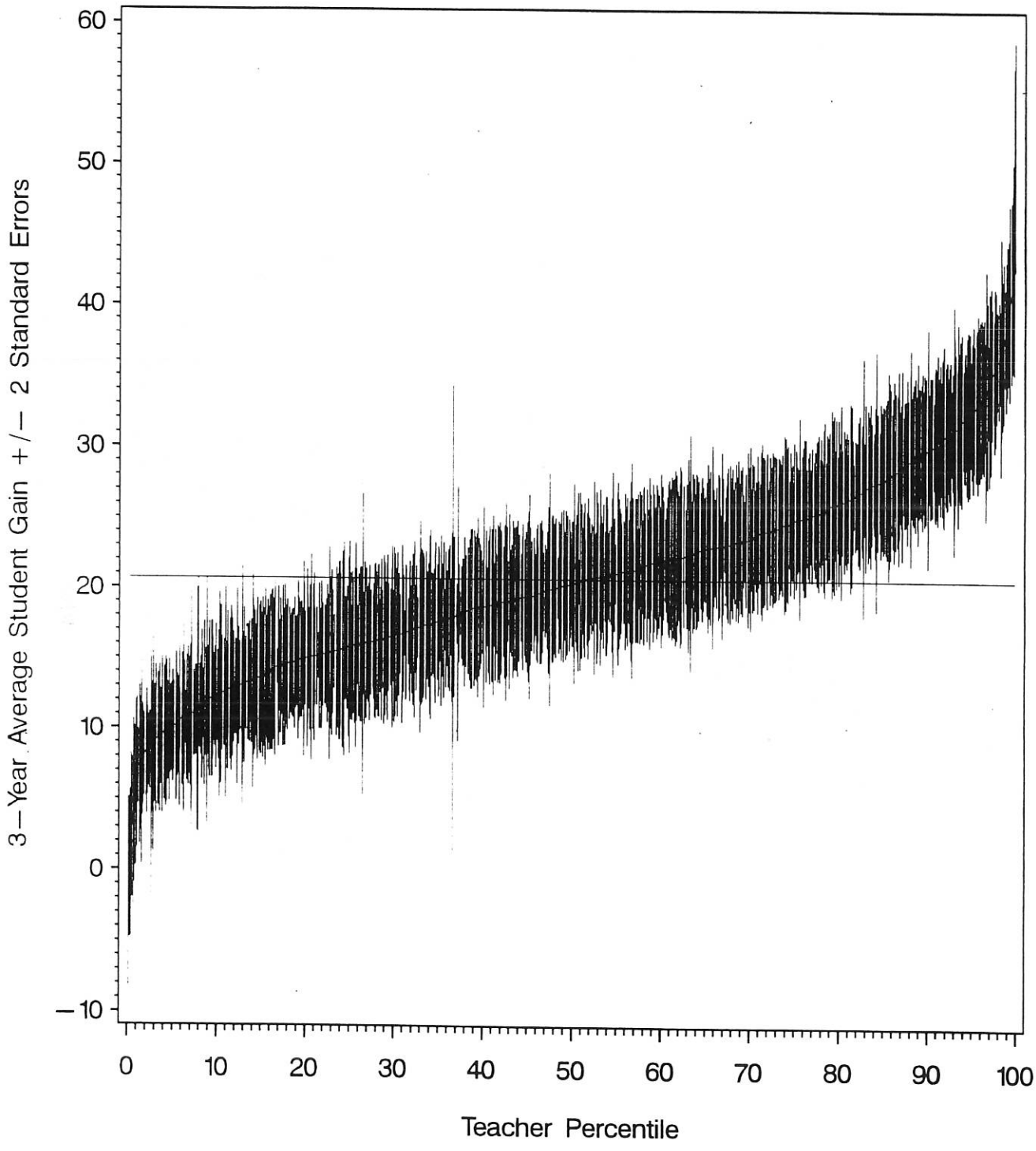
for Grade 5



Note: Horizontal line represents National Norm Gain.
Results from 1996.
July, 1997
Program: tch–dist.sas

Variability in Effectiveness Among Math Teachers

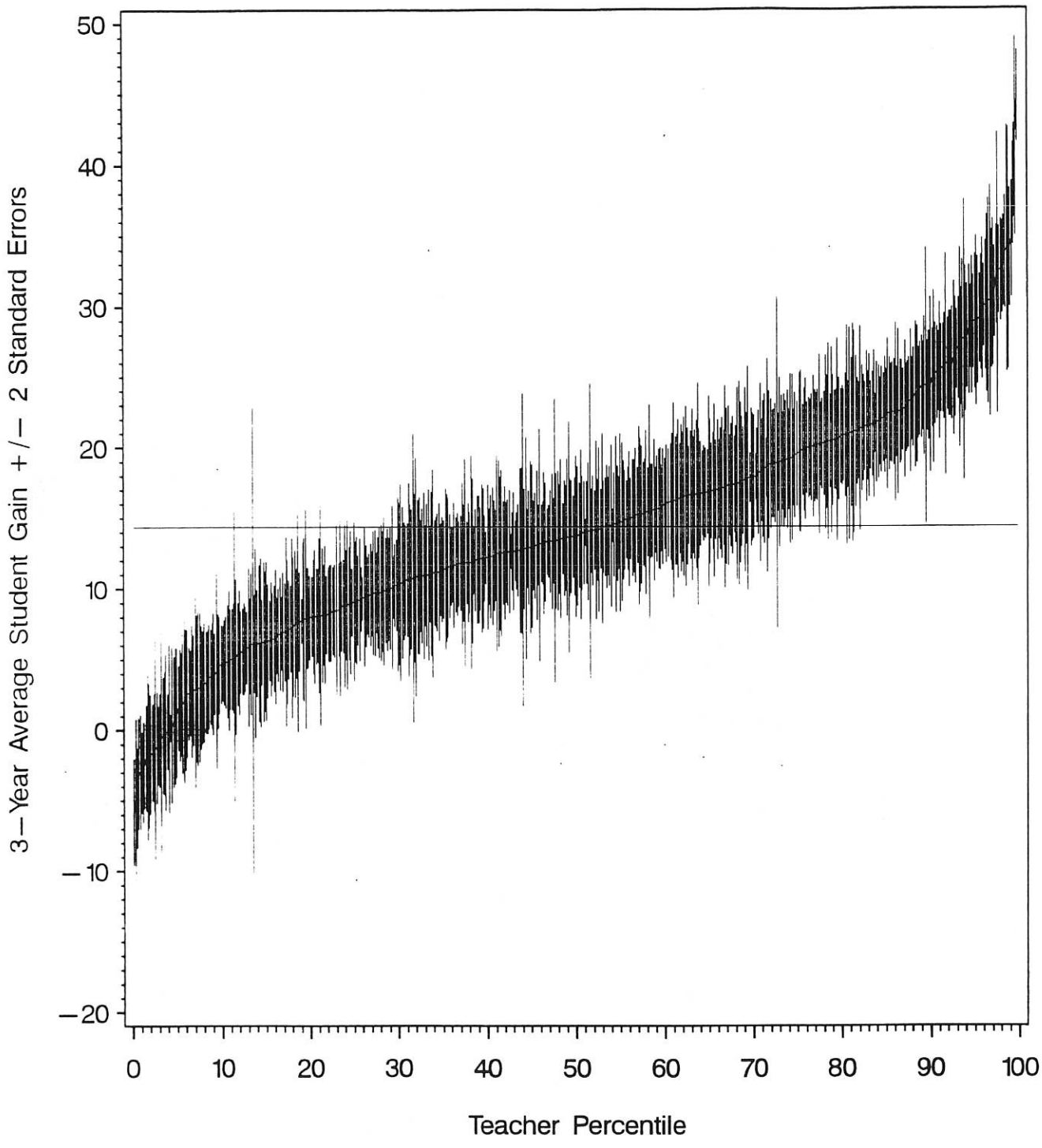
for Grade 6



Note: Horizontal line represents National Norm Gain.
Results from 1996.
July, 1997
Program: tch−dist.sas

Variability in Effectiveness Among Math Teachers

for Grade 7



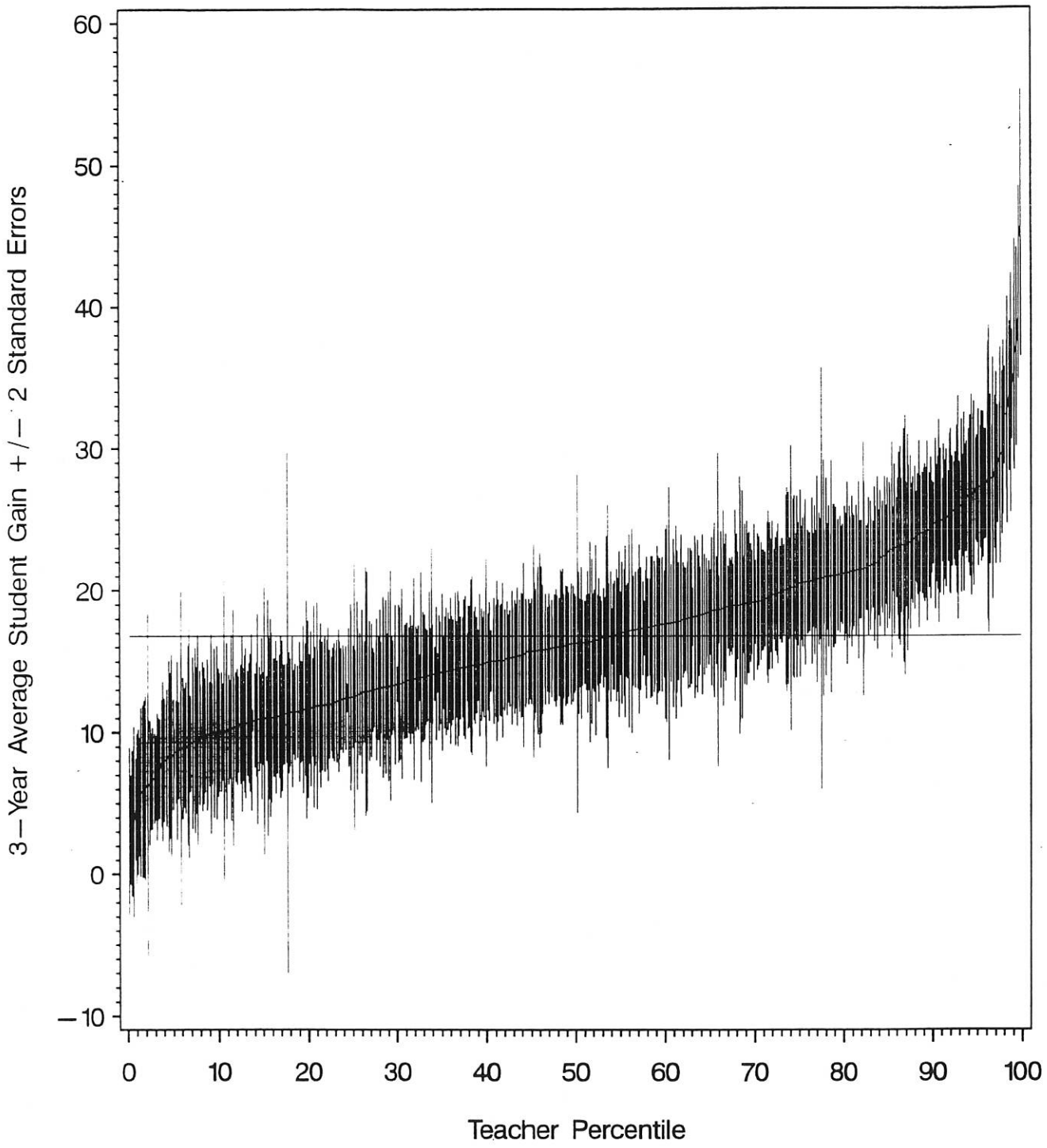
Note: Horizontal line represents National Norm Gain.
Results from 1996.
July, 1997
Program: tch−dist.sas

Myth:

- Current Teacher Effectiveness has little relevance to future measures of student achievement.

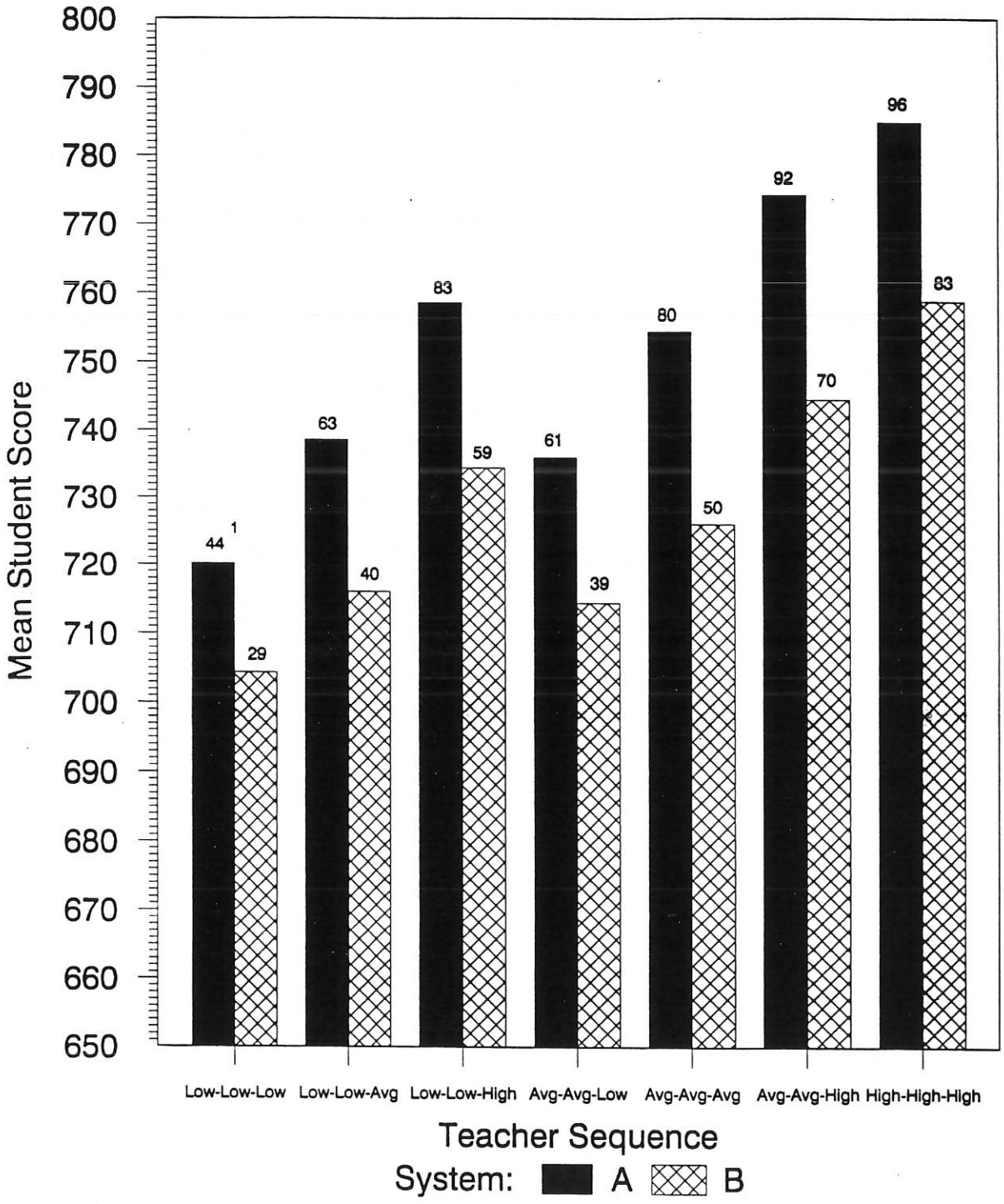
Variability in Effectiveness Among Math Teachers

for Grade 8



Note: Horizontal line represents National Norm Gain.
Results from 1996.
July, 1997
Program: tch−dist.sas

Cumulative Effects of Teacher Sequence on Fifth Grade Math Scores for Two Metropolitan Systems



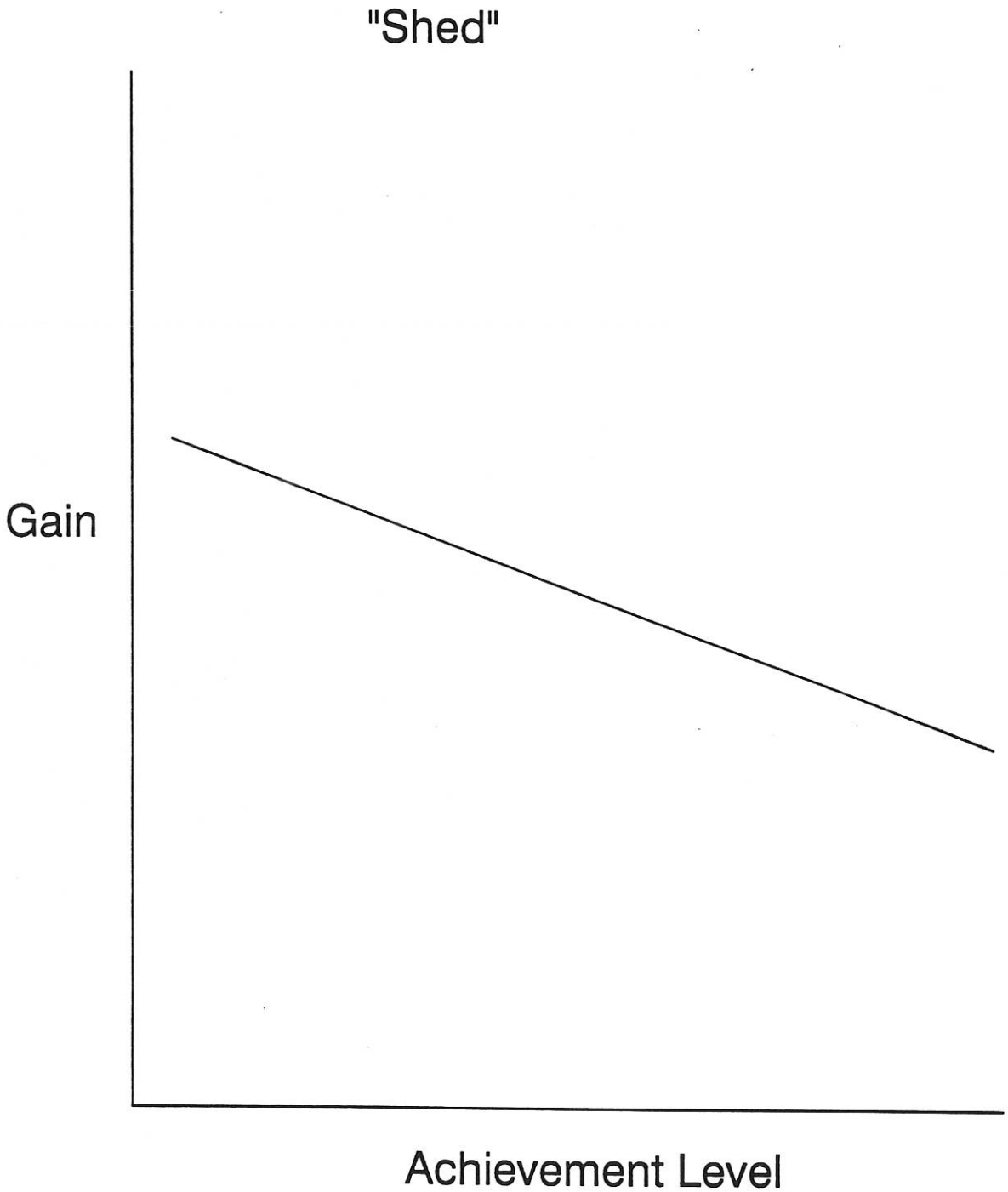
[1] Denotes the corresponding percentile (CTB/McGraw-Hill, 1990, pp. 104-115).

"The results of this study generally confirm those reported by Sanders and Rivers."

"...analysis of teacher effectiveness efficiently identifies a group of teachers in any one year whose affect on students is detrimental and who are need, as a group, of extensive help. [The analyses] also identify a group of teachers whose affect on students is clearly beneficial. These results have clear implications for teacher appraisal, teachers mentoring, and for individual, school, and district staff development programs."

"Teacher Effects on Longitudinal Student Achievement", Jordan, H.,et al,Presentation at the CREATE Annual Meeting, Indianapolis, Indiana, July 1997.

Prevalent Gain Patterns



Results of Teacher Effectiveness on Student Achievement Gain by Student Achievement Level

Fifth Grade Mathematics
Target Gain = 25

Teacher Quintile Group	School System		Achievement Groups—Lowest to Highest			
			650–699	700–749	750–799	800–849
1	A	Avg. Gain	13.8	14.3	4.8	2.2
		N	109	277	83	9
	B	Avg. Gain	20.0	14.7	6.2	-33.3
		N	343	317	40	4
2	A	Avg. Gain	23.5	20.9	18.5	13.4
		N	95	347	122	9
	B	Avg. Gain	25.9	19.6	10.8	-36.0
		N	242	383	82	3
3	A	Avg. Gain	36.3	26.4	25.4	10.7
		N	82	302	139	15
	B	Avg. Gain	33.0	23.3	20.2	-3.3
		N	201	349	60	4
4	A	Avg. Gain	29.1	29.5	23.7	10.5
		N	46	272	245	38
	B	Avg. Gain	37.9	27.6	23.1	18.0
		N	171	399	73	5
5	A	Avg. Gain	53.0	37.9	33.3	25.0
		N	47	220	247	89
	B	Avg. Gain	46.1	32.9	31.1	14.9
		N	113	425	268	52

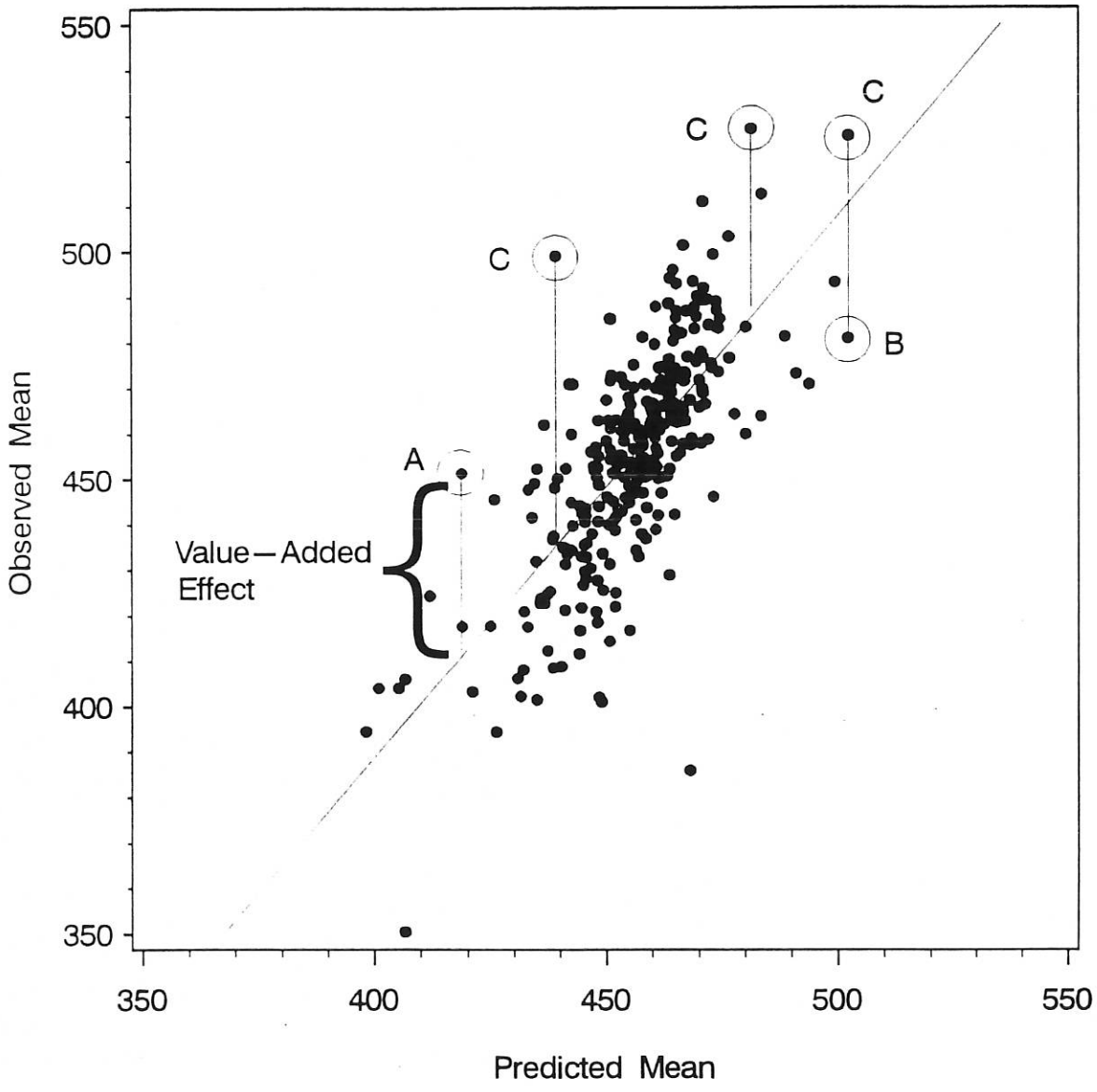
Results of Teacher Effectiveness
on
Third Grade Mathematics Student Achievement Gain
by
Student Achievement Level

Target Gain = 60

Teacher Quintile Group	Ethnicity		Achievement Groups—Lowest to Highest				
			<550	550–599	600–649	650–699	700–749
1	White	Avg. Gain	-16.9	39.6	46.3	28.5	-2.5
		N	9	49	159	139	35
	Black	Avg. Gain	-7.5	38.4	45.3	20.4	11.6
		N	30	78	204	86	10
2	White	Avg. Gain	3.0	53.2	54.8	31.8	16.9
		N	5	34	158	184	66
	Black	Avg. Gain	40.1	52.1	53.3	38.7	8.5
		N	20	67	162	94	8
3	White	Avg. Gain	17.0	71.7	64.6	46.6	27.4
		N	2	15	123	224	64
	Black	Avg. Gain	37.8	69.6	58.9	42.5	27.8
		N	11	32	144	103	14
4	White	Avg. Gain		81.5	73.3	55.0	38.3
		N		16	146	329	155
	Black	Avg. Gain	18.8	83.5	74.7	48.9	21.1
		N	10	32	104	89	11
5	White	Avg. Gain	33.0	81.5	89.4	66.6	54.0
		N	1	11	104	273	164
	Black	Avg. Gain	95.0	83.3	88.5	72.6	41.7
		N	1	25	102	72	21

End of Course Testing

Pre—Algebra

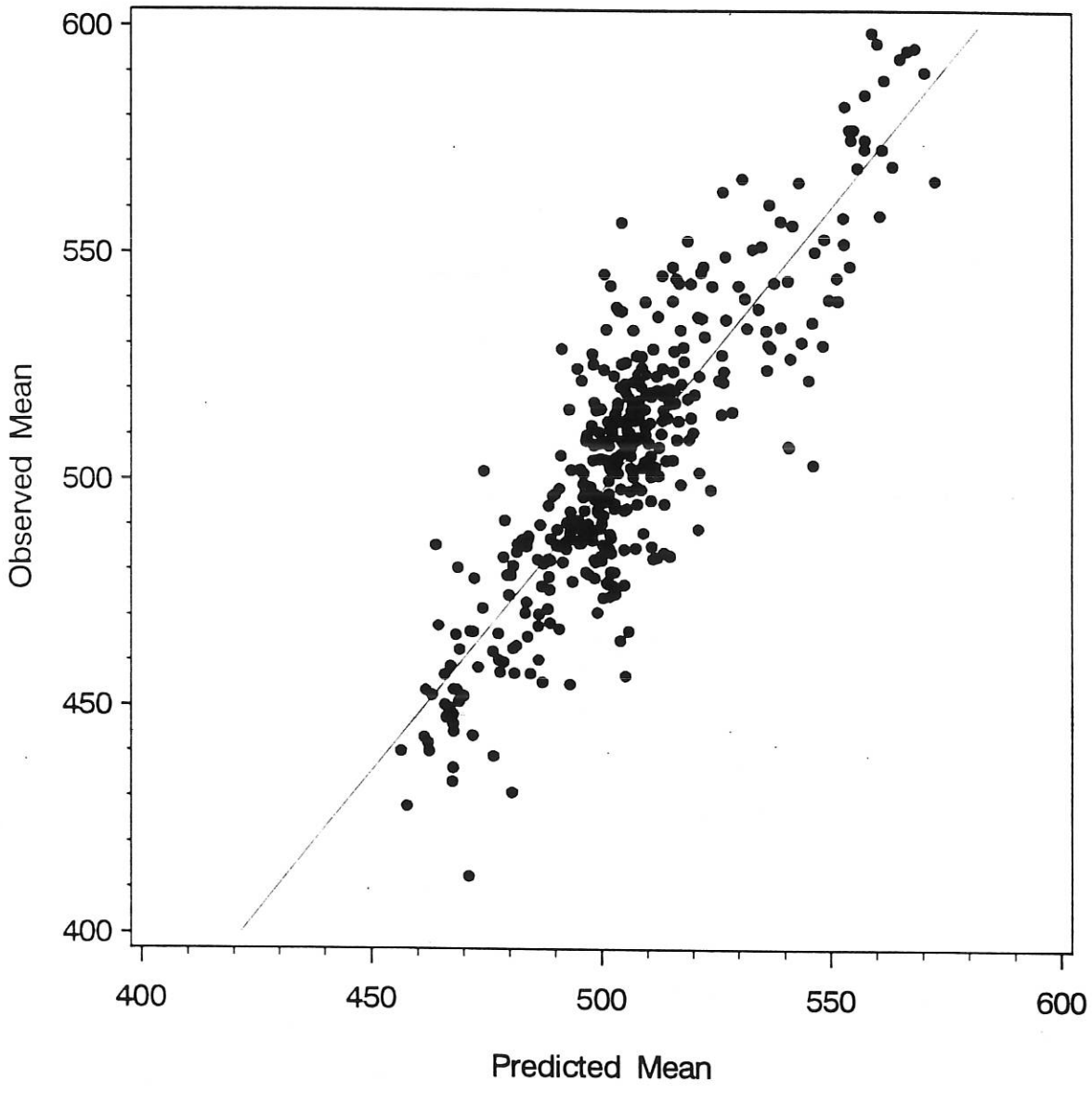


Results from 1996 Testing

Program: ect.sas

End of Course Testing

Algebra I

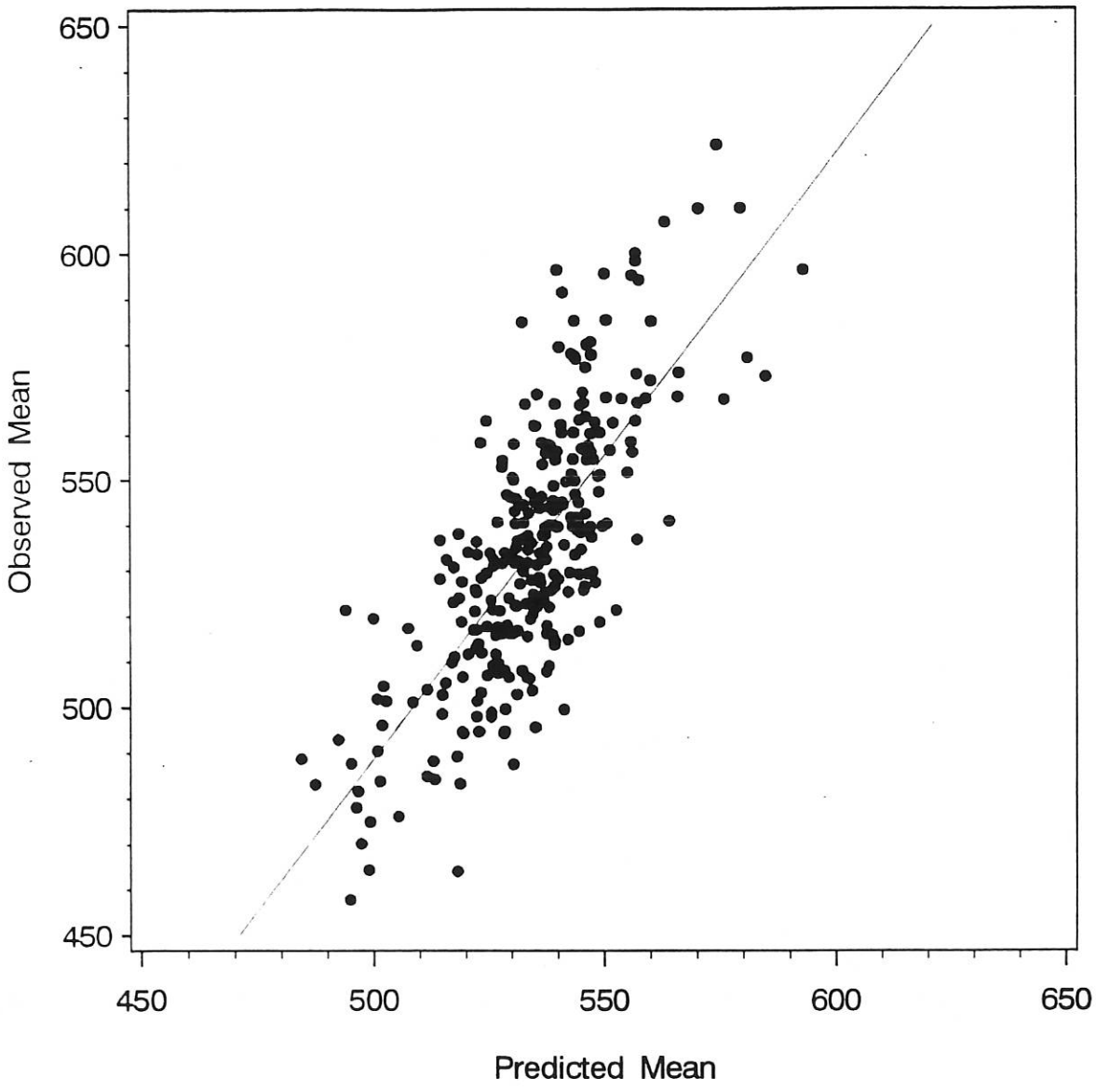


Results from 1996 Testing

Program: ect.sas

End of Course Testing

Algebra II

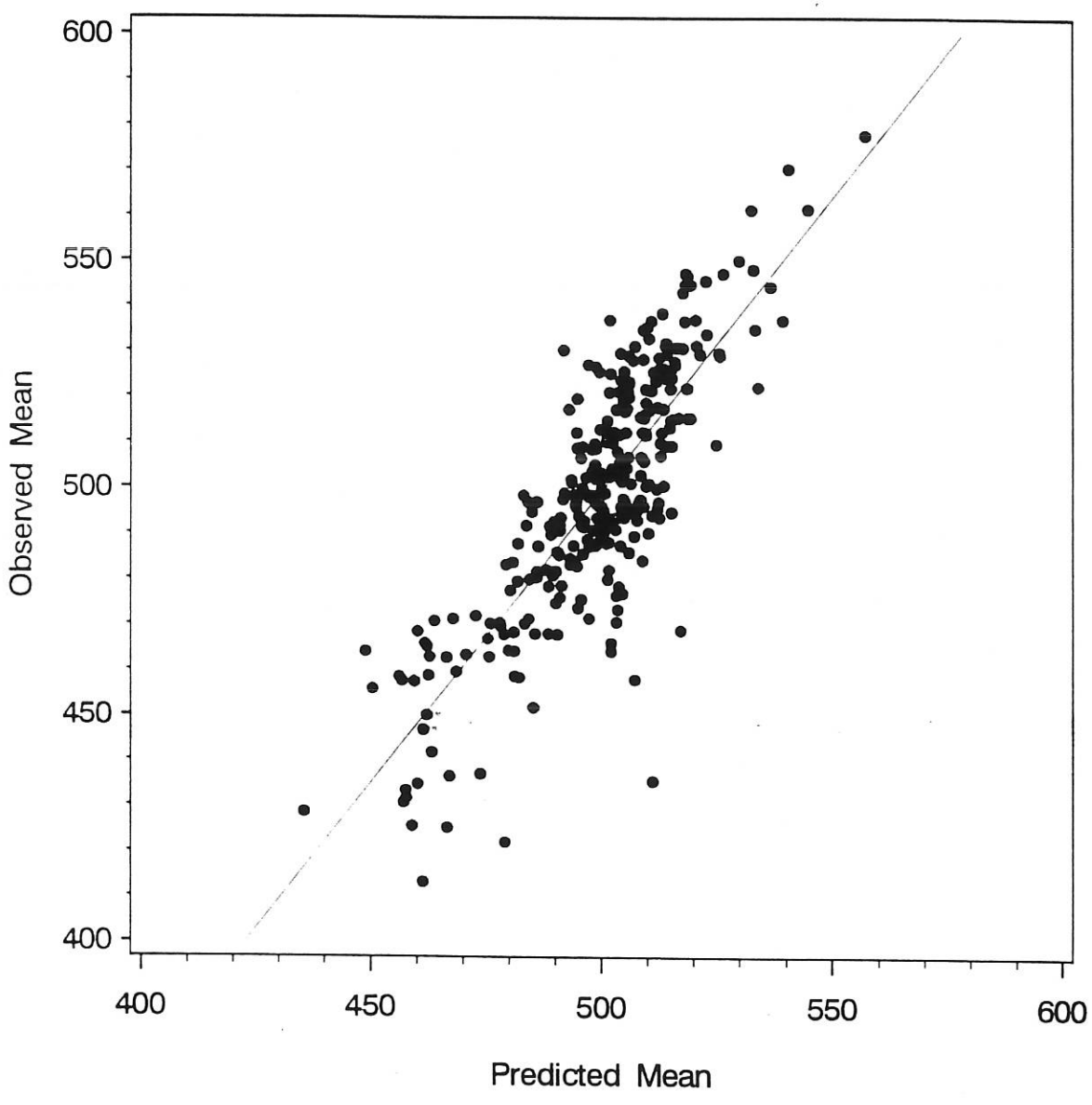


Results from 1996 Testing

Program: ect.sas

End of Course Testing

Geometry

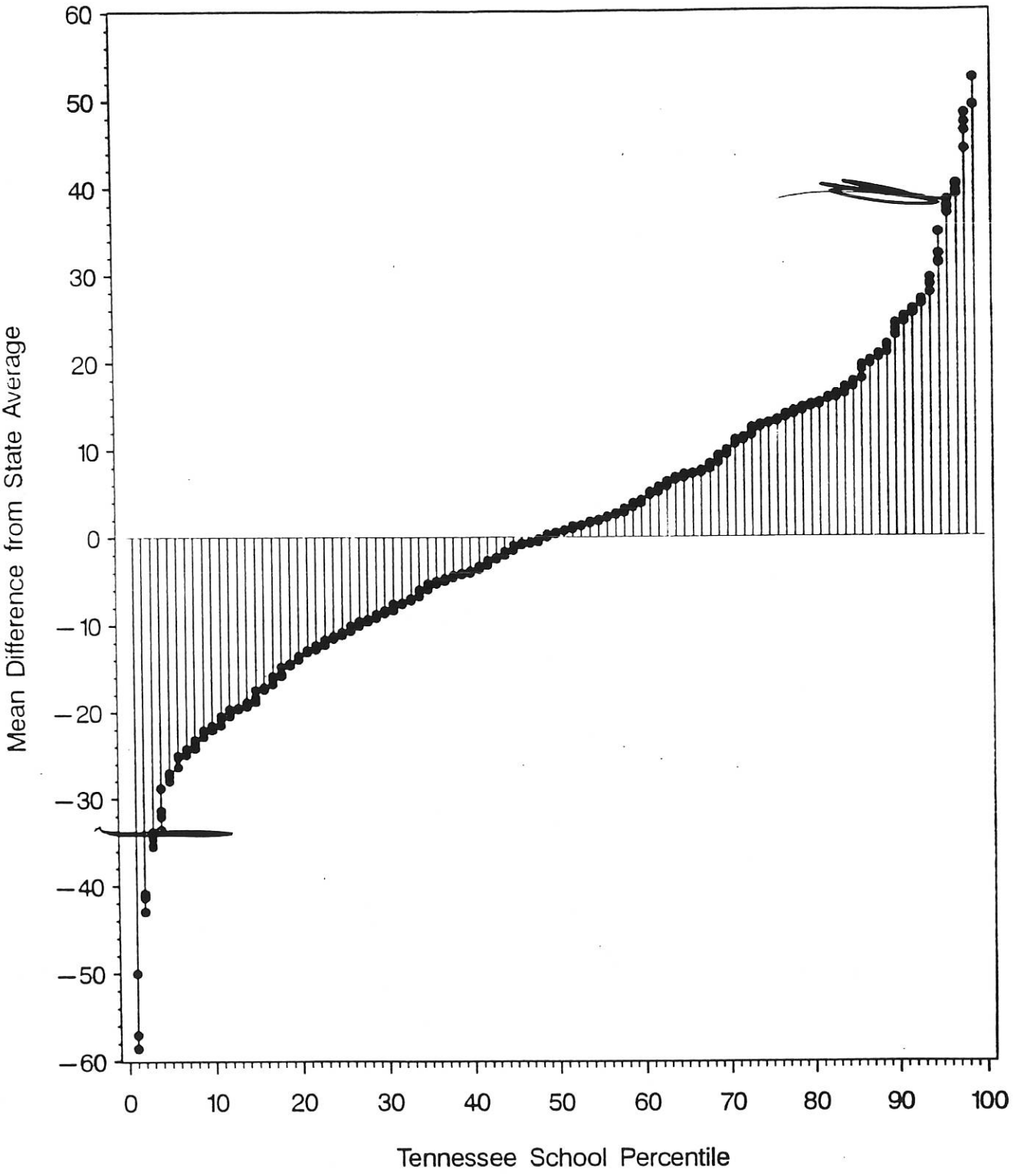


Results from 1996 Testing

Program: ect.sas

Distribution of Tennessee Schools

Algebra I

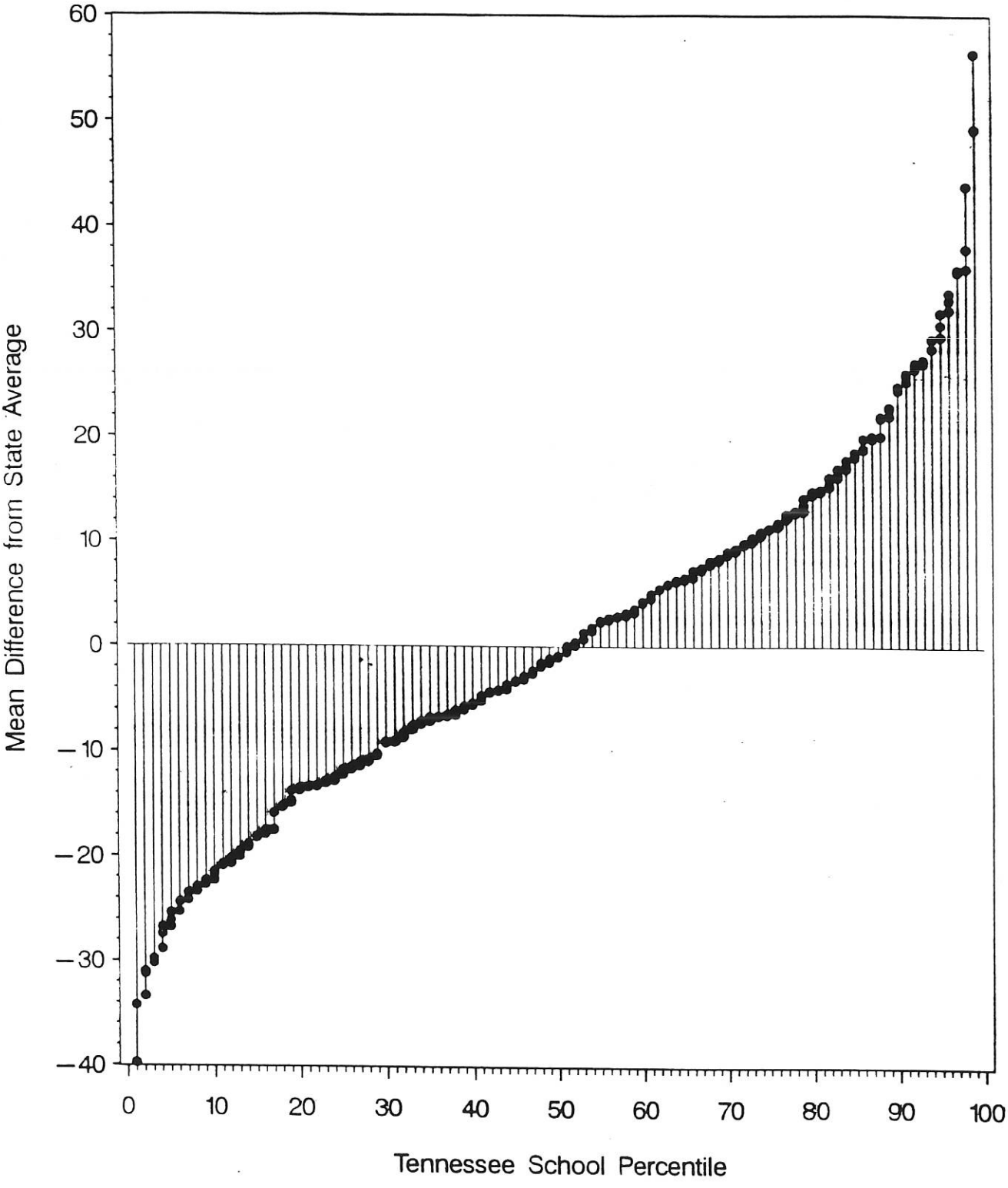


July 1997

Program end-of-course-distribution.sas

Distribution of Tennessee Schools

Algebra II

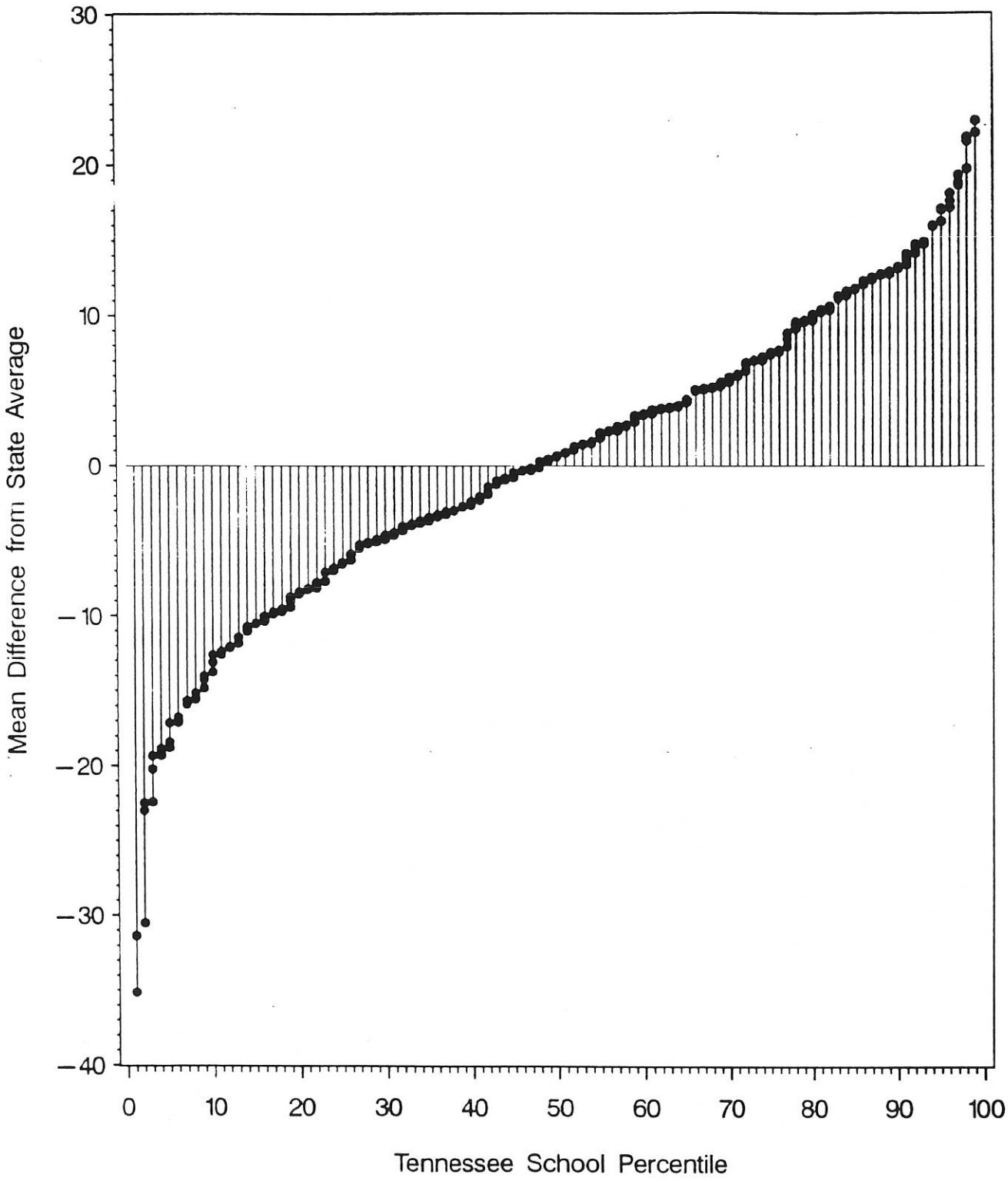


July 1997

Program end−of−course−distribution.sas

Distribution of Tennessee Schools

Geometry

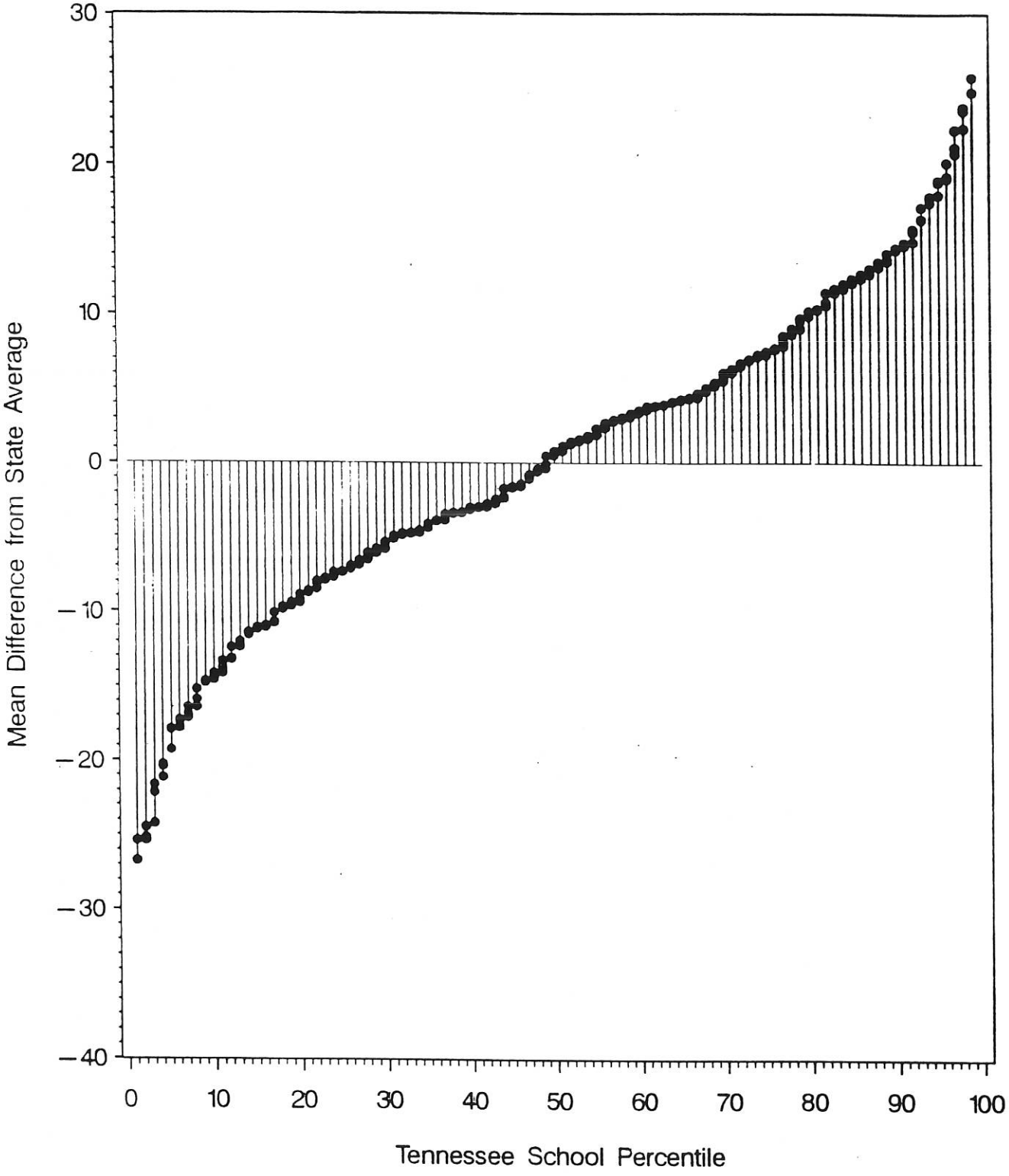


July 1997

Program end-of-course-distribution.sas

Distribution of Tennessee Schools

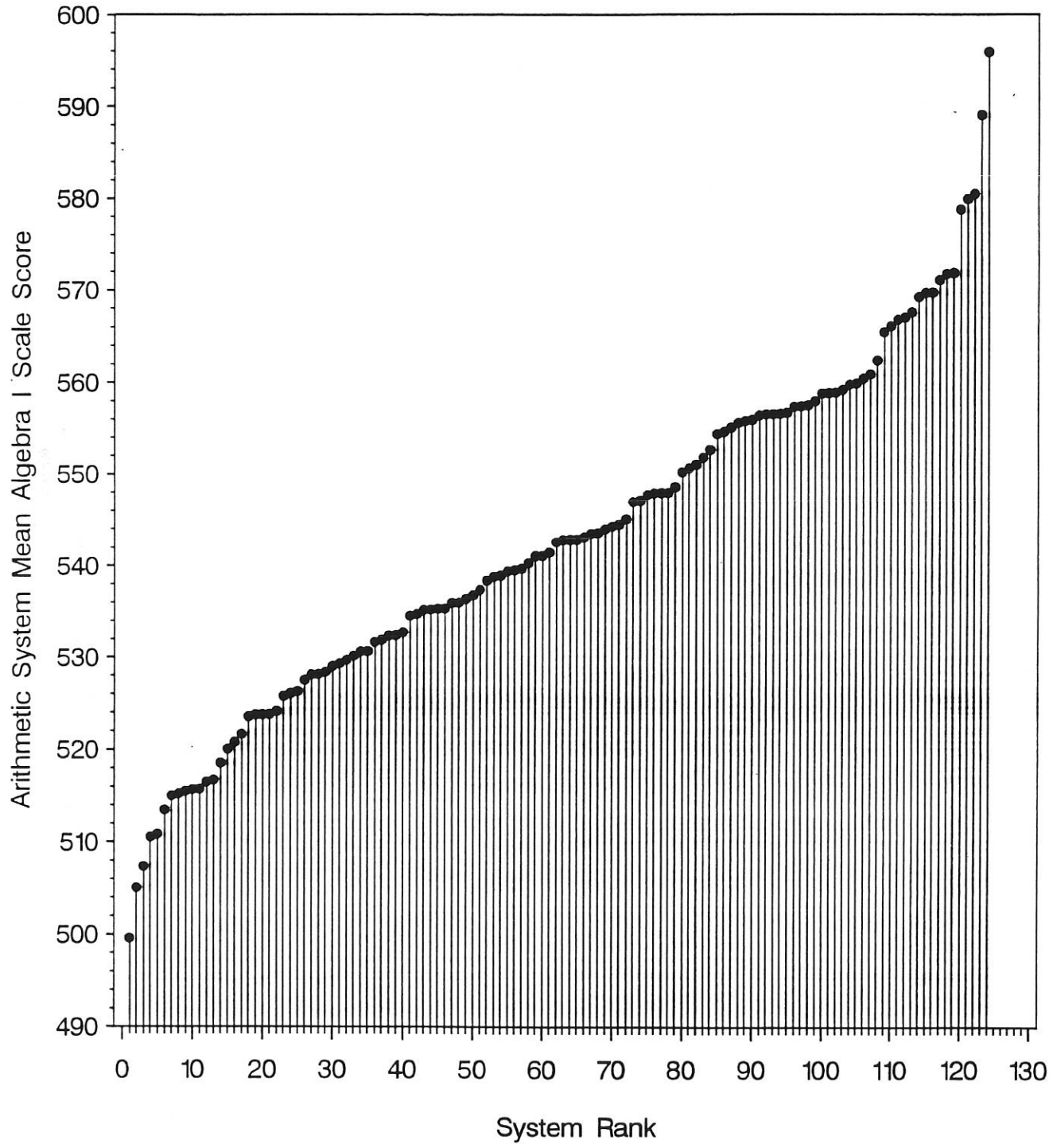
Pre—Algebra



July 1997

Program end—of—course—distribution sas

Mean Algebra I Scale Score of the Top Quartile of 7th Grade Math Students

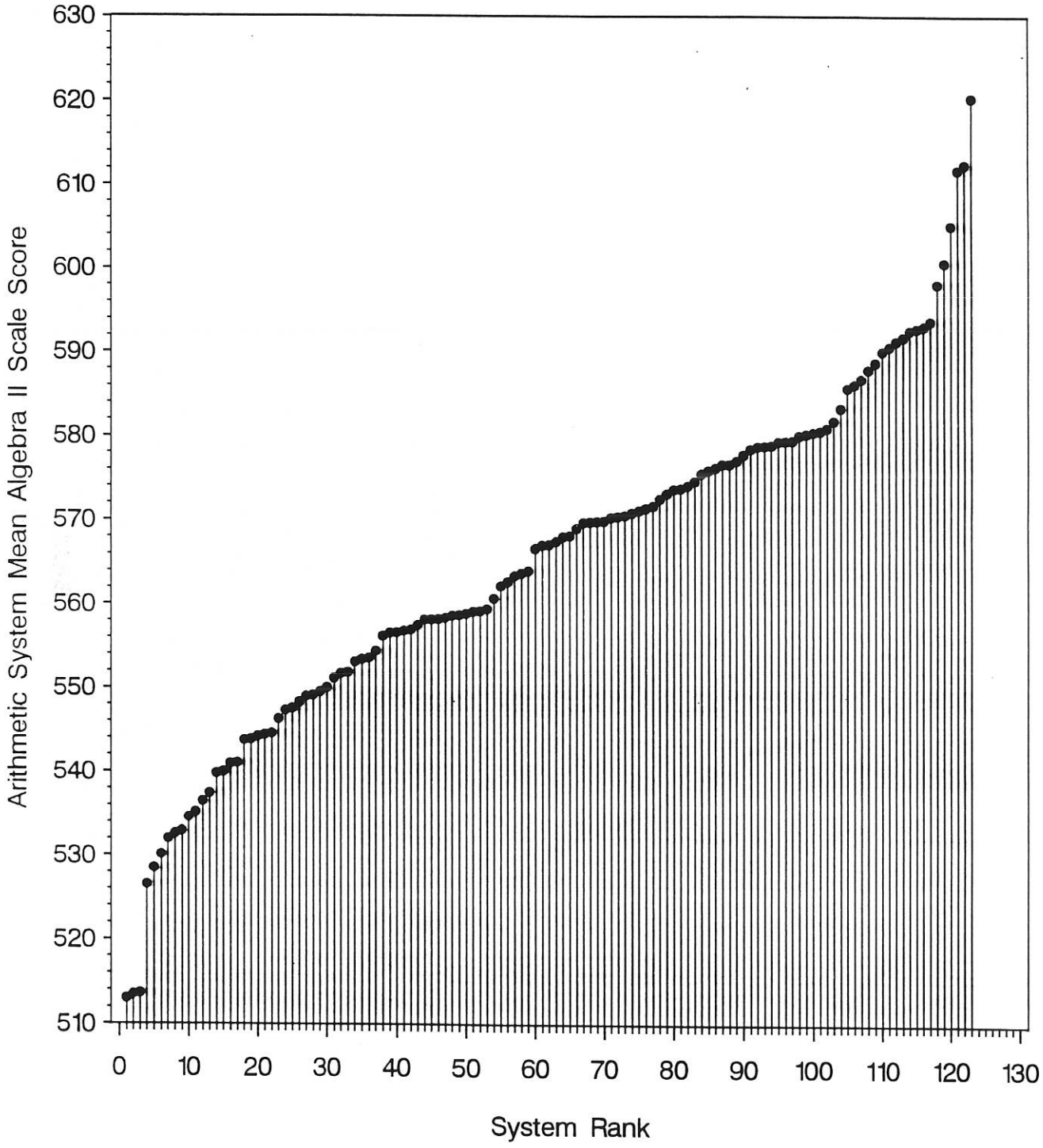


Each dot represents 1 school system in Tenn.

July 1997

Program: alg-1.sas

Mean Algebra II Scale Score of the Top Quartile of 8th Grade Math Students

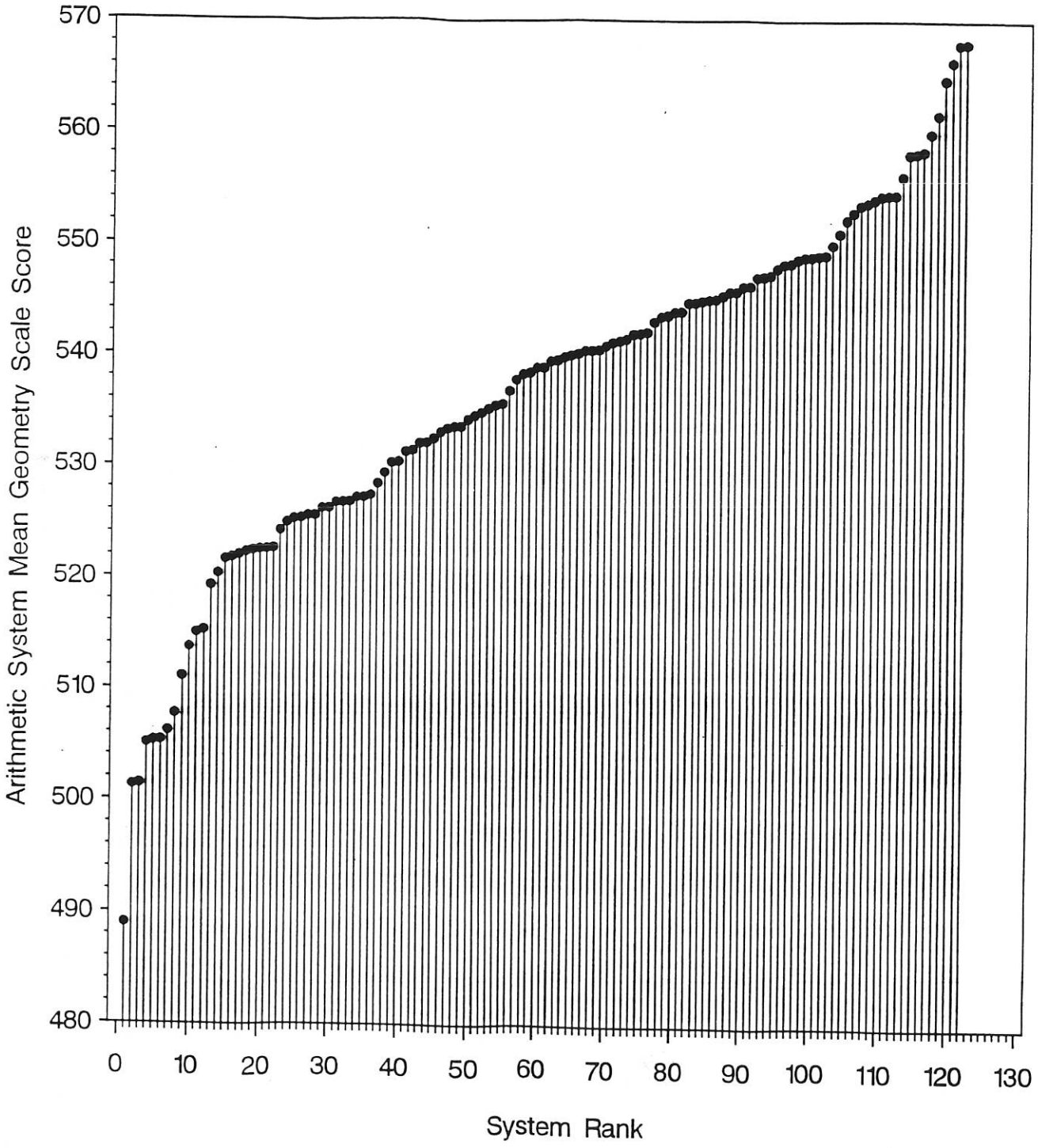


Each dot represents 1 school system in Tenn.

July 1997

Program: alg2—geo.sas

Mean Geometry Scale Score of the Top Quartile of 8th Grade Math Students



Each dot represents 1 school system in Tenn.

July 1997

Program: alg2–geo.sas

1997 TVAAS High School Subject Matter Tests
Supplemental Diagnostics
System: Davidson County (190)

		Observed Score minus Predicted Score by Statewide Predicted Score Quintile				
		Lowest	2nd	3rd	4th	Highest
Subject						
Pre-Algebra	Mean	-4.1	-8.7	-2.9	2.1	1.2
	Nr of Students	168	147	90	62	31
	% of Students	33.7	29.5	18.1	12.4	6.2
Algebra I	Mean	-7.4	-6.5	-4.0	-2.4	-6.1
	Nr of Students	865	621	417	290	109
	% of Students	37.6	27.0	18.1	12.6	4.7
Algebra II	Mean	-9.5	-10.3	-7.9	-2.8	6.9
	Nr of Students	678	430	360	371	383
	% of Students	30.5	19.4	16.2	16.7	17.2
Geometry	Mean	-4.4	-9.0	-1.8	7.3	1.7
	Nr of Students	747	444	367	348	340
	% of Students	33.3	19.8	16.3	15.5	15.1

1997 TVAAS High School Subject Matter Tests
Supplemental Diagnostics

System: Knox County (470) School: Austin East High School (009)

		Observed Score minus Predicted Score by Statewide Predicted Score Quintile				
		Lowest	2nd	3rd	4th	Highest
Subject						
Pre-Algebra	Mean	15.0	18.7	9.7	32.6	
	Nr of Students	29	31	13	9	2
	% of Students	34.5	36.9	15.5	10.7	2.4
Algebra I	Mean	14.3	11.2	14.7		
	Nr of Students	39	18	11	4	3
	% of Students	52.0	24.0	14.7	5.3	4.0
Algebra II	Mean	44.0		19.6		
	Nr of Students	22	7	9	2	1
	% of Students	53.7	17.1	22.0	4.9	2.4
Geometry	Mean	25.1	19.1			
	Nr of Students	25	9	2		2
	% of Students	65.8	23.7	5.3		5.3

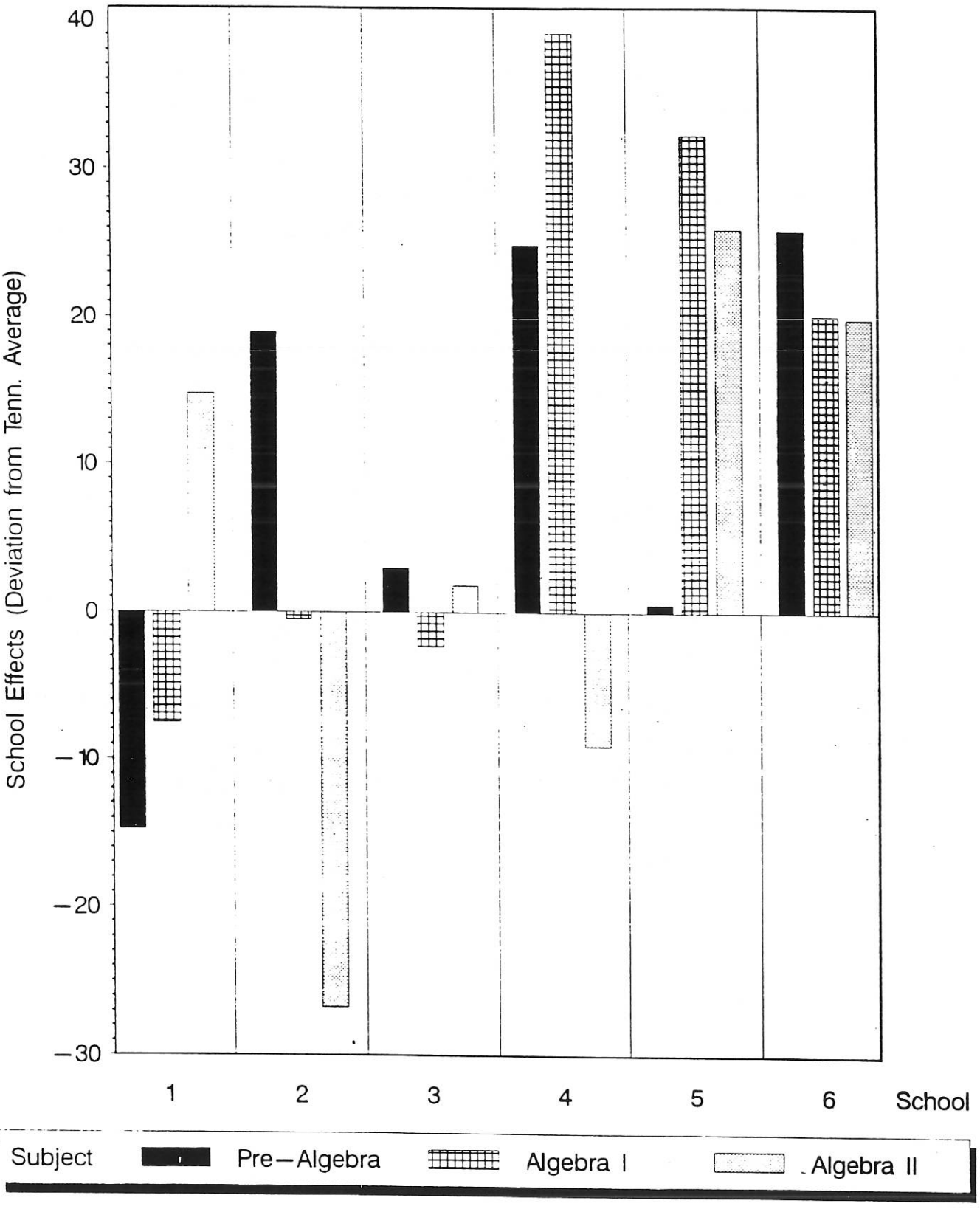
Observed Score: The score achieved by each student on the subject matter test.

Predicted Score: A student's expected score based on performance on previously taken 7th & 8th grade TCAP tests and High School Subject Matter tests, assuming the student is at an average Tennessee school.

Students are grouped into 'quintiles' based on their predicted score. Each quintile contains one-fifth of the students in the state who took the test.

The mean is not reported when there are fewer than 8 students.

Six Examples of Differential Effectiveness
For
Pre—Algebra, Algebra I, and Algebra II



1-47

Summary

++Variation in teaching effectiveness is the single largest factor affecting academic growth of students.

++Teacher effects are cumulative with very little suggestion of compensatory gain.

++Residual effects of teaching effectiveness can be measured at least three years later regardless of the effectiveness of subsequent teachers.

++Many Tennessee schools are not providing the academic growth opportunities for early high achieving students.

++Differences among Tennessee schools for high school math gains are huge.

++Tennessee must sustain a testing program which allows measurement for each student, each year, in order to meet fair, objective accountability requirements, while providing diagnostic information to each district, building and classroom. To do less will insure that thousands of Tennessee students will continue to be permanently academically handicapped.

Recommendations for Consideration

- **Test each student EACH year in all important academic subjects from at least second through eleventh grade**
- **with scales of measure which are highly correlated with curricular objectives.**
- **From the ensuing longitudinal database, provide diagnostic information at the state, district, school, and classroom levels.**
- **Provide fresh, non-redundant, equivalent tests each year.**
- **Report publicly the Value-Added results each year at the State, District and School level.**
- **Move from group administered standardized tests ONLY when the important dimensions need to be measured which do not lend themselves to standardized tests.**
- **Less than 1% of per student annual expenditure can fund this wealth of information for both accountability and diagnostic purposes.**
- **Massive multivariate, longitudinal analyses are necessary to take full advantage of the data and to provide the appropriate sensitivities for the results.**