Scholastic Aptitude Test Scores:

An Explanation of Interstate Mean Score Differentials

An Honors Thesis (ID 499)

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Each year academia eagerly awaits its own report card on performance: the College Board's announcement of mean Scholastic Aptitude Test (SAT) scores. The SAT is a standardized academic aptitude test typically administered to high school seniors. National mean scores on this test have come to be a measure of educational quality in the minds of many educators.

For eighteen consecutive years scores on one or both sections of the test (mathematics or verbal) fell. The spell was broken in 1981-82 when the average verbal score rose two points and the average mathematics score rose three points over the preceding year. College Board President George Hanford hailed the rise as a sign that, "serious efforts by the nation's schools and their students to improve the quality of education are taking effect."/1/

Within the spirit of national educational reform, states individually have strived to improve the quality of their educational programs. In response to a desire on the part of states to compare themselves educationally to other states, Secretary of Education Terrence H. Bell released, "State Education Statistics: State Performance Outcomes, Resource

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/1/ "SAT Verbal, Math Scores Up for First Time in 19 Years," Chronicle of Higher Education, 25, September 10, 1982, 1.

Inputs, and Population Characteristics, 1972 and 1982."/2/ This report ranked each state in thirteen areas that might affect education or be an indicator of educational success, including mean SAT or American College Test (ACT) scores. The report was designed so as to allow interstate comparisons of measures of quality, tempered by a recognition of the relative assets and limitations of each state. In particular, the report suggested that correct interpretation of the mean test scores and their rankings included examination of the percent of seniors taking the test, the percent of students living in poverty, the percent of minority students, the percent of handicapped students, as well as many of the other variables included in the data set.

The release generated many theories about correct interpretation of the rankings. Educational representatives echoed the concerns of the Department of Education over the validity of utilizing mean test scores to evaluate educational quality because of great differences in such variables as the percent of seniors taking the exam, the percent of the student population living in poverty or the percent of students who are of a minority race.

The purpose of this research is to shed some quantified light on this matter of interstate comparisons of mean SAT scores. First, let us more closely examine some existing hypotheses about the causes of these differentials.

/2/ U.S. Department of Education, "State Education Statistics: State Performance Outcomes, Resources Inputs, and Population Characteristics, 1972, and 1982," released January 5, 1984.

The College Board, which administers the SAT, generally discourages interstate comparisons simply because of the different proportions of state populations that take the test./3/ In twenty-one states plus the District of Columbia the SAT is more commonly taken. Twenty-eight states have a greater proportion of the population taking the ACT. The state of Washington administers a test different from either of these most frequently.

Data suggests that the smaller the percentage of seniors taking the SAT, the higher the mean score. The explanation for this phenomenon is that in a state such as Iowa, where only three percent of the seniors take the SAT and fifty-four percent take the ACT, a senior who takes the SAT does so because of a distinguishing need. The most plausible reason an Iowan might take the SAT would be to apply for admission to a particular school, probably out-of-state (most educational institutions in Iowa would accept an ACT score). When one considers that fully thirty-two of the thirty-four institutions grouped in Barron's Profiles of American Colleges as "Most Competitive" (in terms of admissions) require the SAT test /4/, it becomes apparent that it may be that only the brightest, most academically talented Iowans have a need to take the SAT. Another reason especially bright students might take the SAT in Iowa would be to compete for

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/3/ "How the States Fared on SAT Scores," Education USA, October 4, 1982, p. 45.

/4/ College Division of Barron's Educational Series, Barron's Profiles of American Colleges (Woodbury, New York and elsewhere, 1980).

National Merit Scholarships. This reasoning is of course applicable to the majority of primarily ACT states.

Another cause of score differentials was suggested by Thomas Shannon, head of the National School Boards Association. He noted that the highest scoring states, "have a very homogeneous population--no immigrants, very strong family settings." He continued, "What possible relationship is there between New Hampshire and the state of New York?"/5/

It is also commonly suggested that expenditures on education are positively related to quality, including expenditures on teachers' salaries./6/

Now that we have examined some current thought on the causes of interstate mean SAT score differentials, let us test some of these rough hypotheses to see if they withstand empirical scrutiny.

Any model attempting to explain SAT score differentials would at least begin with what is currently the most popular explanation of these state variations: the proportion of students taking the exam. The rationale for the inclusion of this as an explanatory variable was presented above.

If one believes that to a certain extent the SAT captures learning processes and acquired knowledge, one might guess that mean state scores would be affected by any consistent bias a

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/5/ Peter Johnson and Sally Ann Stewart, "The Top-Rated Sytems Credit Involved Parents," USA Today, January 6, 1984, p. 7A.

/6/ Johnson and Stewart; Gerald M. Boyd, "Dropout Rate in Schools Rose Sharply Since '72," New York Times, January 6, 1984, p. 10.

state might have toward enhancing a student's learning. One measure that can be used to explain how these differences could come about would be the ratio of teachers to students. One would expect that teachers with an excess teaching burden might not be as effective as teachers with fewer students, and that students who studied under such overburdened teachers would be affected so as to lower scores achieved on a standardized test such as the SAT.

Another variable likely to affect a state's mean score might be the level of education of the state's population. One might hypothesize that students surrounded by a better educated populous might develop skills useful in attaining higher achievement on the SAT. Likewise, income per capita might be a measure of productive skills present in a state population that could influence students so as to raise their mean SAT scores. While this variable is probably somewhat colinear to the level of education (they have a correlation coefficient of .60), income per capita might capture existing skills within the populace that were not developed through formal education.

The percentage of minority students enrolled in school might affect mean SAT scores. Minority students generally perform at lower levels on the SAT test than do whites./7/ Although there has been much debate about possible race bias within standardized tests of intelligence and aptitude, the truth or falsity of such claims has no relevance in this discussion, since the cause of

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/7/ "White Students Score Highest on SAT Exams: New Report Shows Link to Family-income level," Chronicle of Higher Education, October 13, 1982, p. 1.

poor minority performance does not alter its affect on mean state scores.

The level of urbanization within a state might also affect a state's mean performance, although we have no defined a priori expectations as to whether urbanization increases or decreases scores. This is essentially an empirical question.

In order to test our hypotheses that mean SAT scores are dependent upon the percent taking the test, the teacher-to-pupil ratio, state education levels, income per capita, the percent of minority students, and the degree of urbanization, an ordinary least squares regression was applied to the data, with mean SAT scores as the dependent variable. The regression was performed according to a linear model, assuming an intercept term with a constant coefficient for each variable. The results of this regression are printed in Table One and are reported as regression number seven.

The estimated coefficients for each of the dependent variables appears on row seven under the appropriate variable name (a key to the variable names and the source and nature of the data used can be found on page 16). The reliablity of the coefficients' estimates is reported in the form of a t-statistic, which appears in parentheses directly below the coefficient.

Regression seven supports our hypotheses in part with highly significant results. The percent of seniors taking the test (%SAT) does appear to negatively affect mean scores, as we suspected. Our regression estimates that for each percentage point increase we may expect a decrease of about two and a half points in the mean score. This relationship is extremely reliable, with an alpha error estimate of less than .001. Also highly significant (a = .05) and of the expected sign are the estimated coefficients for the teacher-to-student ratio /8/, the level of education within the state /9/, and the percentage of minority students.

The variable that represents the degree of urbanization (METRO) is not quite significant at the a = .05 level. It has a positive sign, though, which would at least preliminarily provide support for a hypotheses that urbanization has a positive effect on mean SAT scores.

The income per capita variable (Y/CAP) approaches a = .05 significance, but its sign is negative, which is contrary to our hypotheses. This is possibly due to a specification error in the model and certainly warrants further experimentation.

Although we have examined the coefficients of this model individually, we have not yet evaluated the regression as a whole. Table One reports the F-ratio for the entire regression, which indicates that our model is extremely significant overall.

/8/ The reader should note the the data used in what is commonly referred to as a teacher-to-student ratio is actually in this case a pupil per teacher ratio, yielding numbers such as 16 or 24. The expected sign on this coefficient is thus negative. One interprets the estimated coefficient of 3.95 as follows: for each state mean increase of one pupil per teacher it is estimated that the mean SAT score for that state will drop nearly four points.

/9/ While it might seem incredulous at first glance that increasing the mean number of years of education within a state would increase its mean SAT score 107 points, the estimate becomes more realistic in light of the fact that the standard deviation of state means is only slightly over 2 months (the mean is twelve and one-half years).

The R 2 adjusted for degrees of freedom is .875. Because of our adequate sample size (50) and small number of calculated coefficients, the adjusted R 2 is very close in magnitude to the unadjusted R 2. The R 2 indicates the percent of the variance in mean SAT scores explained by our model.

This is, all in all, a credible explanation of SAT mean score variations. However, there are still other factors that might contribute to differences in states' mean scores. One source of information about the make-up of a state's test takers might be its graduation rate. An educational system that fosters learning and creates a respect for education probably would have a high graduation rate and, provided such attitudes are reflected by SAT scores, relatively high mean SAT scores. Another possibly relevant consideration is the percent of educational revenues a state receives from the Federal government. Theory gives us contradictory predictions about the sign of this variable, however. One the one hand, one might reason that only the most disadvantaged educational systems would qualify for Federal aid. On the other hand, it could be that Federal funds are often earmarked for special projects that have unusually high productivity in terms of enhanced student skill. This is once again an empirical question that can be addressed in this data set.

Regression one in Table One utilizes these two additional variables plus the variables significant at the five percent level from regression seven as independent variables. The results of this regression are slightly stronger than those of regression one, as evidenced by the F-ratio and the adjusted R 2.

As anticipated, the graduation rate (GRAD) carries a positive coefficient. The variable describing Federal funds as a percent of educational revenues (FED) has a positive sign. Regression eight contains the same explanatory variables as regression one, with METRO added, which is not significant. Regression eleven adds both METRO and Y/CAP. This regression is especially interesting because in this combination of explanatory variables METRO is significant at the five percent level, unlike any of the previously examined regressions.

An area of particular interest to legislators, taxpayers, and teachers is the subject of monies spent on education. Two variables in this data set attempt to capture this pecuniary flavor. Mean teachers' salaries are expected to vary directly with mean SAT scores because of the market theory. Higher salaries encourage persons with greater opportunity costs (typically more talented individuals) to enter the teaching field and relocation of teachers from other less-generous states. Assuming these persons are better teachers and that better teachers can positively influence standardized test scores such as the SAT, scores are expected to be higher. In a similar manner it is sometimes thought that by increasing expenditures per pupil the quality of education may increase, which might be expected to be reflected in mean SAT scores.

Regressions two, three, nine, and ten use these variables. Although the coefficients of these variables are not significant, the overall regressions are still reliable. All of these estimated coefficients have negative signs, contrary to expected results. In interpreting these coefficients it should be remembered, however, that the SAT is not designed to be a measure the quality of a student's education, but rather his or her aptitude. It is a matter of quite some debate just what it is that the SAT does measure, however, this paper intends only to aid in the interpretation of comparisons between state means.

Other descriptions of the student population to be examined within this paper include the percent who are living in poverty and who are handicapped. A priori one expects both of these conditions to adversely affect a student's performance in school and perhaps on SAT tests. Examination of regressions five, six, twelve, and thirteen, however, shows that these estimated coefficients are positive, although not significant at the five percent level. One possible explanaton for this phenomenon is that the effects of these handicaps are offset by the FED variable, since much of the Federal aid given to schools is particularly distributed and designed to aid the handicapped and those living in poverty. The results of these regressions indicate that Federal funds have not only offset disadvantages, but may have even created advantages.

The results of the regressions in Table One have generally supported hypotheses that the percent taking the SAT, the percent of students graduating, the teacher-student ratio, the percent of revenues received from the Federal government, state educational levels, and the percent of students who are minorities influence state mean scores on the SAT. Some surprises are that teachers' salaries and expenditures-per-pupil do not seem to have influence, as well as income per capita and the percent in poverty or handicapped.

Does the region of the country a state is in somehow affect its mean SAT score? Table Two contains information that will help us clarify our thought on the matter. Dummy variable regressions were run using the South as the ommitted region./10/ Regression fourteen illustrates such as regression. Notice that the Y/CAP variable along with the regional variables northeast and north central are not significant at the five percent level. This tells us that the Northeast and North Central regions are not statistically different in terms of predicted mean SAT scores than the South.

The remaining regressions in Table Two use a base comprised of the South plus the Northeast and the North Central states. The Southwest and the West are each statistically different from this base.

These regressions in general tend to explain a greater proportion of the variance in mean state SAT scores than those without the regional variables. The reason underlying this

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/10/ Dummy variables are assigned a value of one if the state is in the region, zero otherwise. The region of the South is ommitted to preclude extreme multicollinearity. Interpretation of the model is as follows: a Southern state (the South being the ommitted (base) region) has an estimated mean SAT score equal to the sum of the coefficients times the state's particular corresponding variable values. For a Southern state, therefore, the coefficients for the other regions do not change its score, since it has zero for its value in those regions. States in other regions would estimate their mean score likewise, except that for in the appropriate regional variable the value of one means that the coefficient for that regional variable is added to the score. This model assumes that these regional differences are correctly identified in terms of shifting intercepts, or in other words, that the coefficients of the other variables are constant regionally.

numerical find is as yet unclear. What is it about the southwest and the West that makes states in those regions have lower mean scores? This question undoubtedly deserves further research using variables as yet untested or perhaps using different types of models.

How do the results reported here aid us in using mean SAT scores to evaluate the performance of a particular state's educational system? If there is an element of educational quality distinct from that attached to our explanatory variables, this element would manifest itself in the error term. Let us use regression one from Table One as an illustration. Like all of the other regressions here, regression one explains a great deal of the variance in mean SAT scores and is highly significant. This tells us that we have done a good job of specifying mean SAT scores. Because of this, our error terms can be statistically considered to be normally distributed, or in other words, the differences between actual observed 1982 mean SAT scores and the scores estimated from this regression can be assumed to be caused by random error. Continuing this reasoning, we know that this separate element of educational quality (separate from the already included explanatory variables) cannot be measured within mean SAT scores in a statistically significant form. The only legitimate method of use mean SAT scores to discern quality differentials is to use coefficients for variables that may proxy quality. In regression one these could be the graduation rate, the teacher-per-pupil ratio, the Federal revenues variable, and the mean amount of education in the state population./11/ Using some sort of weighted combination of these variables and the data for a state would be the only way to discern quality of state education from this research.

Having acknowledged that analysis of the residual in search of a quality factor is statistically unsound for these regressions, it nevertheless is interesting to see how such an analysis might be done. The estimated mean SAT scores from regression one for each state appear in Table Three. Assuming that our model correctly specifies the equation, the residual for each state is composed of entirely random noise. If, however, we believe that there is some ommitted variable, we expect that its effect will appear in the residual. If educational quality is hypothesized to exist within the residual, a negative residual would indicate that the state in question has less educational quality than a state with a positive residual.

In the case of regression one, New York and Iowa tie for the largest positive residual: fifty-three points. Alaska has the greatest negative residual: fifty points. Indiana has a negative residual of twenty-two points and Illinois has a positive residual of eleven points. Once again it should be remembered that analysis of this sort is innapropriate for this data. As further evidence of this it will be noted that the largest percentage error of estimate for any state (New York) is only six percent.

/11/ These variables may have different amounts of impact on educational quality.

The quantitative work done in this paper supports many of the hypotheses already expressed by educational commentators about state mean SAT differentials, the most cited and most statistically significant of which is the percentage of seniors taking the test. It has been shown that much of the variance in state mean SAT scores is caused by factors beyond the control of educators, such as the percent of students who are minorities . This research suggests that the SAT does not provide a good medium for making educational quality comparisons between states, perhaps because this is not the purpose of the test.

Further research in this area could include investigation into the cause of some of the unexpected signs on coefficients such as income per capita. The underlying cause of the significant regional variables is also worthy of investigation. Econometric theory leads one to suspect multicollinearity and heteroscedasticity within the data. Additional research should explore these matters.

KEY TO VARIABLES*

SAT	mean = 944.72 std. dev. = 72.91 Mean SAT score. Department of Education and "How the States Fared on SAT Scores," Education Today, October 4, 1982, p. 45.
%SAT	mean = 27.22 std. dev. = 22.65. The percent of high school seniors taking the SAT. Department of Education and Education Today.
GRAD	mean = 73.29 std. dev. = 12.61 Percent of the ninth grade class from 1978 the completed high school.
P/T	mean = 18.48 std. dev. = 2.42 Average number of pupils per teacher.
FED	mean = 9.41 std. dev. = 4.48 Percent of school revenue that comes from the Federal government.
EDUC	mean = 12.48 std. dev. = 0.19 Mean number of years of education for the state population.
%MIN	mean = 25.77 std. dev. = 19.06 Percent of enrolled students who are a minority race.
METRO	mean = 61.76 std. dev. = 23.34 Percent of state population living in a State Metropolitan Statistical Area. Source: U.S. Bureau of the Census
TSAL	mean = 16,578 std. dev. = 3,603 Average teacher salary.
X/PUP	mean = 2,456 std. dev. = 646 Current expenditures per pupil. Does not include capital outlay.
Y/CAP	mean = 10,768 std. dev. = 1,674 Income per capita.
%POV	mean = 15.02 std. dev. = 4.95 Percent of enrolled students living in poverty.
%HAND	mean = 8.86 std. dev. = 1.68 Percent of enrolled handicapped students.
NE	6 states Northeast geographic area, by convention.

NC 13 states
North Central geographic area, by convention.

SW 5 states
Southwest geographic area, by convention.

WEST 9 states
Western geographic area, by convention.

* Unless otherwise noted all data is from the U.S. Department of Education, "State Education Statistics: State Performance Outcomes, Resource Inputs, and Population Characteritics, 1972, and 1982," released January 5, 1984.

TABLE ONE

#	INTER	%SAT	GRAD	P/T	FED	EDUC	%MIN	METRO	TSAL	X/PUP	Y/CAP	%POV	%HAND	F-RATIO	AJD R^2
1	177.73	-2.50 (13.70)	0.81 (2.46)	-5.98 (3.91)	2.29 (2.53)	70.70 (3.50)	-0.68 (3.33)							69.00	.893
2	48.32	-2.54 (13.67)	0.77 (2.34)	-5.93 (3.87)	2.08 (2.25)	82.94 (3.53)	-0.60 (2.68)		-0.001 (1.02)					59.36	.893
3	109.15	-2.48 (13.06)	0.82 (2.47)	-6.36 (3.80)	2.25 (2.46)	77.49 (2.39)	-0.65 (3.06)			-0.004 (0.59)				58.30	.891
4	129.03	-2.49 (13.32)	0.81 (2.42)	-6.22 (3.58)	2.22 (2.38)	75.83 (2.85)	-0.65 (2.81)				-0.001 (0.30)			57.91	.890
5	3.88	-2.46 (12.89)	0.88 (2.56)	-5.77 (3.69)	2.05 (2.13)	83.04 (3.18)	-0.83 (2.95)					1.06 (0.75)		58.63	.892
6	148.75	-2.52 (13.05)	0.80 (2.40)	-5.95 (3.84)	2.23 (2.35)	72.63 (3.32)	-0.66 (2.96)						0.61 (0.24)	57.87	.890
7	-77.21	-2.91 (14.27)		-9.07 (3.95)		106.92 (3.76)	-0.68 (2.91)	0.44 (1.66)			-0.007 (1.62)			58.02	.875
8	194.65	-2.62 (12.90)	0.76 (2.31)	-6.85 (4.11)	2.56 (2.77)	69.90 (3.48)	-0.79 (3.58)	0.26 (1.14)						60.25	.894
9	68.83	-2.65 (12.91)	0.72 (2.16)	-6.78 (4.07)	2.35 (2.48)	81.78 (3.50)	-0.70 (2.97)	0.26 (1.25)	-0.001 (1.00)					52.84	.894
10	94.78	-2.60 (12.64)	0.76 (2.31)	-7.54 (4.08)	2.53 (2.73)	79.90 (3.44)	-0.76 (3.40)	0.30 (1.42)		-0.006 (0.867)				52.50	.894
11	-23.60	-2.65 (13.03)	0.71 (2.14)	-8.50 (3.96)	2.43 (2.62)	93.51 (3.36)	-0.71 (3.10)	0.43 (1.74)			-0.005 (1.21)			53.50	.896
12	-151.09	-2.60 (12.91)	0.87 (2.61)	-6.85 (4.17)	2.20 (2.33)	94.64 (3.60)	-1.13 (3.50)	0.40 (1.77)				2.15 (1.43)		54.30	.900
13	211.43	-2.61 (12.61)	0.76 (2.28)	-6.89 (4.02)	2.60 (2.63)	68.80 (3.13)	-0.81 (3.22)	0.27 (1.24)					-0.34 0.13	51.49	.892

TABLE TWO

#	INTER	%SAT	GRAD	P/T	FED	EDUC	%MIN	METRO	TSAL	X/PUP	Y/CAP	%POV	%HAND	NE	NC	SW	WEST	F-ratio	ADJ R^2
14	-636.6	-3.23		-6.33		148.37	-0.66	0.26			-0.005			6.34	-16.29	-29.99	-41.69	39.78	.888
		(11.31)		(2.26)		(4.46)	(2.26)	(2.44)			(1.01)			(0.38)	(1.25)	(2.00)	(2.44)		
15	-403.3	-2.91		-3.99		122.56	-0.75									-16.83	-36.94	66.36	.889
		(16.83)		(2.31)		(5.11)	(3.61)									(1.33)	(2.98)		
16	-489.6	-2.67	0.67	-4.58	3.06	123.12	-0.73	0.10								-27.33	-36.48	60.54	.916
		(14.52)	(2.28)	(2.65)	(3.60)	(5.08)	(3.64)	(0.51)								(2.4)	(3.15)		
17	-528.1	-2.63	0.68	-4.15	2.97	125.92	-0.70									-27.33	-38.25	69.33	.918
		(16.02)	(2.35)	(2.79)	(3.61)	(5.39)	(3.71)									(2.42)	(3.52)		
18	-644.7	-2.67	0.65	-4.20	2.79	137.28	-0.60		-0.001							-29.44	-37.13	62.42	.919
		(16.04)	(2.24)	(2.83)	(3.35)	(5.46)	(2.87)		(1.19)							(2.59)	(3.42)		
19	-548.1	-2.62	0.69	-4.39	2.96	128.17	-0.68			-0.002						-27.92	-37.52	60.27	.916
		(15.33)	(2.34)	(2.58)	(3.55)	(5.17)	(3.37)			(0.30)						(2.41)	(3.33)		
20	-584.4	-2.62	0.68	-4.48	2.91	131.99	-0.66				-0.001					-28.12	-37.95	60.42	.916
		(15.65)	(2.31)	(2.64)	(3.43)	(4.78)	(3.02)				(0.42)					(2.43)	(3.45)		
21	-604.9	-2.61	0.72	-4.08	2.85	131.29	-0.77					0.54				-27.36	-37.57	60.43	.916
		(15.08)	(2.35)	(2.70)	(3.23)	(4.92)	(3.08)					(0.43)				(2.40)	(3.38)		
22	-225.2	-2.83	0.58	-3.87		104.22	-0.64									-16.39	-33.55	60.16	.894
		(16.15)	(1.77)	(2.30)		(4.07)	(2.99)									(1.33)	(2.74)		
23	-429.2	-2.87	0.54	-3.98		123.37	-0.49		-0.002							-20.59	-32.29		
		(16.54)	(1.68)	(2.41)		(4.46)	(2.12)		(1.64)							(1.67)	(2.68)	55.10	.897
24	-561.3	-2.88		-4.84		138.99	-0.64				-0.003					-19.42	-36.42	56.85	.889
		(16.20)		(2.48)		(4.68)	(2.71)				(0.94)					(1.50)	(2.93)		
25	-598.2	-2.87		-3.91		137.04	-0.91					1.03				-17.83	-36.47	56.47	.888
		(15.67)		(2.25)		(4.53)	(3.17)					(0.79)				(1.40)	(2.93)		

TABLE THREE

	OBSERVED	CALCULATED	RESIDUAL
Alabama	964.000	968.548	-4.548
Alaska	923.000	973.331	-50.331
Arizona	981.000	990.439	-9.439
Arkansas	999.000	996.914	2.086
California	899.000	888.955	10.045
Colorado	983.000	990.349	-7.349
Conneticut	896.000	862.349	33.651
Delaware	897.000	903.988	-6.988
District of Columbia	821.000	810.625	10.375
Florida	889.000	903.336	-14.336
Georgia	823.000	811.678	11.322
Hawaii	857.000	874.474	-17.474
Idaho	995.000	1007.431	-12.431
Illinois	977.000	965.446	11.554
Indiana	860.000	882.330	-22.330
Iowa	1088.000	1034.669	53.331
Kansas	1045.000	1030.118	14.882
Kentucky	985.000	976.313	8.687
Louisiana	975.000	961.802	13.198
Maine	890.000	915.699	-25.699
Maryland	889.000	882.031	6.969
Massachusetts	888.000	873.194	14.806
Michigan	973.000	954.538	18.462
Minnesota	1028.000	1031.863	-3.863
Mississippi	988.000	988.553	-0.553
Missouri	975.000	994.843	-19.843
Montana	1033.000	1030.482	2.518
Nebraska	1045.000	1041.384	3.616
Nevada	917.000	961.760	-44.760
New Hampshire	925.000	901.805	23.195
New Jersey	869.000	855.954	13.046
New Mexico	997.000	989.339	7.661
New York	896.000	842.726	53.274
North Carolina	827.000	837.911	-10.911
North Dakota	1068.000	1046.344	21.656
Ohio	958.000	963.565	-5.565
Oklahoma	1001.000	1023.504	-22.504
Oregon	908.000	920.856	-12.856
Pennsylvania	885.000	891.310	-6.310
Rhode Island	877.000	870.165	6.835
South Carolina	790.000	819.828	-29.828
South Dakota	1075.000	1051.934	23.066
Tennessee	999.000	967.014	31.986
Texas	868.000	911.147	-43.147
Utah	1022.000	988.129	33.871
Vermont	904.000	920.333	-16.333
Virginia	888.000	885.416	2.584
West Virginia	968.000	991.235	-23.235
Wisconsin	1011.000	1006.561	4.439
Wyoming	1017.000	1043.481	-26.481

Bibliography

"18-Year Decline in Aptitude-Test Scores Halted This Year, College Board Reports," Chronicle of Higher Education, October 7, 1981, p. 1.

Boyd, Gerald M. "Dropout Rate in Schools Rose Sharply Since '72," New York Times, January 6, 1984, p. 10.

"Education Chief Releases Ranking of School Quality," Indianapolis Star, January 6, 1984, p. 3B.

Fienberg, Lawrence. "Schools and the Scoring Game," New York Times, Education Review, November 20, 1983, p. 1.

"Hoosiers Score Below US Average on SAT," Ball State University Daily News, January 6, 1984.

"How the States Fared on SAT Scores," Education USA, October 4, 1982, p. 45.

Humm, William L. "Warming the SAT Scores That Came Out of the Cold," Phi Delta Kappan, 64, December, 1982, p. 287.

Johnson, Peter and Sally Ann Stewart, "The Top-Rated Systems Credit Involved Parents," USA Today, January 6, 1984, p. 7A.

"The Limits of Testing," New York Times, Education Review, November 20, 1983, p. 1.

Owen, David. "Do the SATs Measure Up?," New York Times, Education Review, November 20, 1983, p. 1.

Pederson, Jacquelin K. and Daniel J. DeGuire. "SATs: The Scores That Came Out of the Cold," Phi Delta Dappan, 64, September 1982, pp. 68-9.

"SAT Verbal, Math Scores Up for First Time in 19 Years," Chronicle of Higher Education, September 10, 1982, p. 1.

U.S. Bureau of the Census. State Metropolitan Area Data Book, 1982, U.S. Government Printing Office: 1982.

U.S. Department of Education. "State Education Statistics: State Performance Outcomes, Resource Inputs, and Population Characteristics, 1972, and 1982," released January 5, 1984.

"Verbal Average Falls to 424, Math to 466 as Decline in SAT Scores Persists for 13th Year," Chronicle of Higher Education, October 6, 1980, p. 4.

"White Students Score Highest on SAT Exams: New Report Shows Link to Family-income Level," Chronicle of Higher Education, October 13, 1982, p. 1.