Year 2000 Update:
Interpretive Notes for the Academic Performance Index

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This update uses year 2000 data to revisit topics in the original Interpretive Notes ("Interpretive Notes for the Academic Performance Index" 11/2000, located at http://www.cde.ca.gov/psaa). That report used the 1999 API data. The intent is to build on that report by repeating selected tables from the First Pass and Lots More sections using the year 2000 API data. Also, some additional topics are introduced.

This document is best used as a supplement to the prior Interpretive Notes. Both documents attempt to use simple data analysis to explain some of the quantitative information provided by API reporting and to show a bit of what these numbers can tell us about the status and progress of California schools. As with the initial report for the 1999 data, the archive section supplies the school-level files, on which most of this report is based.

As in the Interpretive Notes for 1999 data, there are three main topics:

1. Interpretation of API scores (to better explain the metric).
   E.g., What is an API score of 600 (or 800) telling us?
2. Description of Year-to-Year Improvement in API scores
   What is typical improvement for schools and subgroups? How does Improvement vary?
3. Relation between API scores and demographic characteristics (for schools and individuals). E.g., Do schools that are similar on measured demographic characteristics obtain similar API scores?

Below is a more detailed layout of the three sections, with some brief summary of results. Sections and Items that were not covered in the Interpretive Notes for the 1999 data are shown in blue. The "deja-vu-99" designation indicates that results shown with the 1999 data are replicated here with the year 2000 data.

Section 1. Description and Interpretation of year 2000 API scores
- a. Descriptive statistics, histograms and decile boundaries for year 2000 API school scores.
- b. Interpretation of API scores in terms of PAC measures

deja-vu-99: Correspondences seen for 1999 also hold for year 2000 data.

Section 2. Describing 1999-2000 Improvement for Schools and Subgroups
- a. Describing Improvement for Schools
- b. Describing Improvement for Subgroups

Section 3. Demographic Measures and API Scores
- a. School size and API results
- b. Relation between API and SCI, Range of Similar School scores

deja-vu-99: Large range of API scores for schools with similar demographics

- c. Individual API scores and demographics

deja-vu-99: Large range of API scores for individuals classified as Socioeconomically Disadvantaged.

- d. Explaining Similar School Decile Ranks and Links to State Deciles
- e. A closer Look at Schools in State Decile 1, Similar Schools Decile 1

Section 1. Description and Interpretation of Year 2000 API Scores

Table 1. Descriptive Statistics for year 2000 school API Scores

School	N	Mean	Median	Q1	Q3	Minimum	Maximum
Elem	4776	671.30	674.13	568.53	773.50	346.00	967.00
Middle	1125	655.15	656.25	559.00	749.75	357.94	948.63
High	854	634.04	638.19	556.34	713.16	339.44	969.38

[note: All data analyses incorporate corrected year 2000 data, in particular including the revisions for the Harcourt errors in applying the national norms in Fresno, Monterey, and Stanislaus counties]

A graphical description of the score distributions is given on the next pages in the figures showing API score histograms for Elementary, Middle, High Schools. To quantify some of the features in the histograms, in year 2000 there were 120 Elementary schools scoring at least 900 (2.5%) and 950 Elementary schools scoring at least 800 (19.9%). For Middle Schools in year 2000 there were 19 schools scoring at least 900 (1.7%) and 154 schools scoring at least 800 (13.7%). For High Schools in year 2000 there were 5 schools scoring at least 900 (.6%) and 46 schools scoring at least 800 (5.4%).

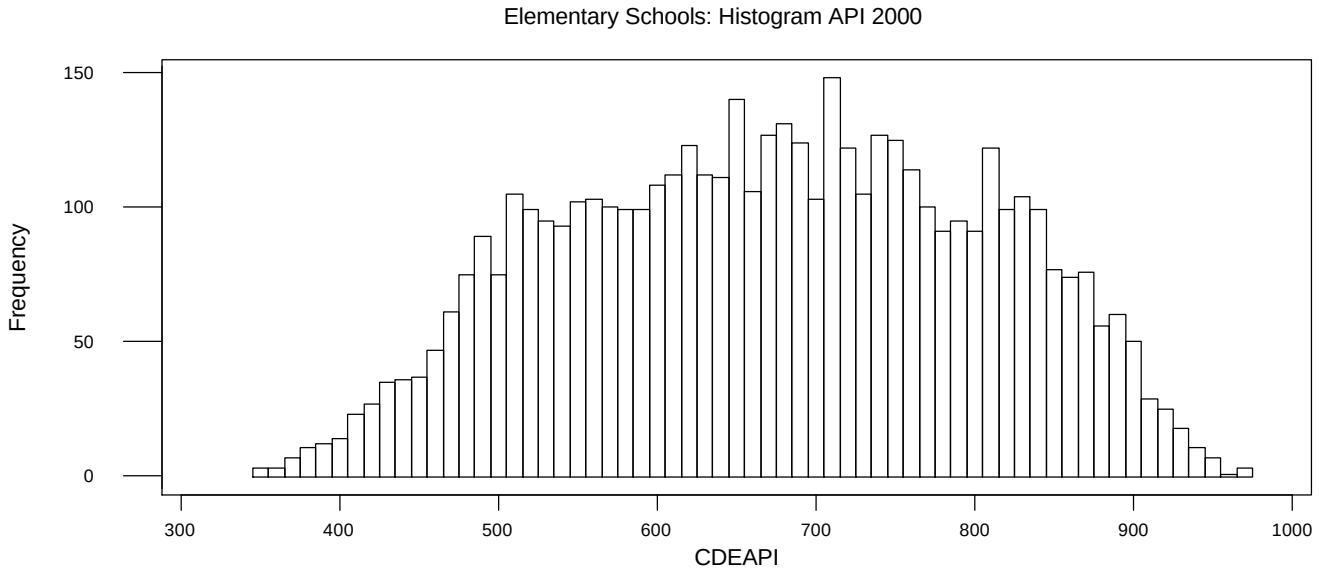
One additional note in defense/explanation of High School APIscores, in regard to the dramatic drop in Stanford 9 Reading scores between grade 8 (and lower) and grade 9 (and higher). Although this drop-off has received considerable attention in the regional and national press and also by CDE, it remains unexplained. The arithmetic for the API shows that just the Reading score anomaly accounts for the difference between median API scores for Middle schools and High schools . In year 2000 this drop-off in Reading scores of 14 points in PAC50 translates into the range of 100 to 120 in the API metric. Because the API weight for Reading is .20, the impact on the school API score is in the range of 20 to 25 points.

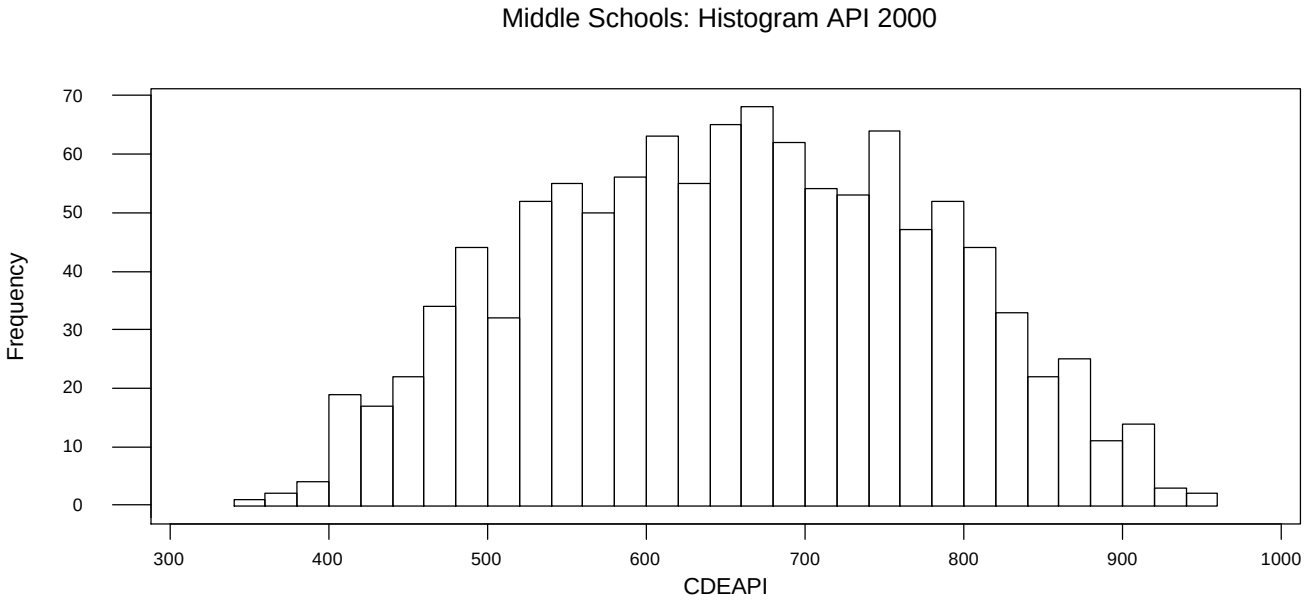
Another useful piece of the description is to have the range of scores in the Statewide Deciles that are reported for the API:

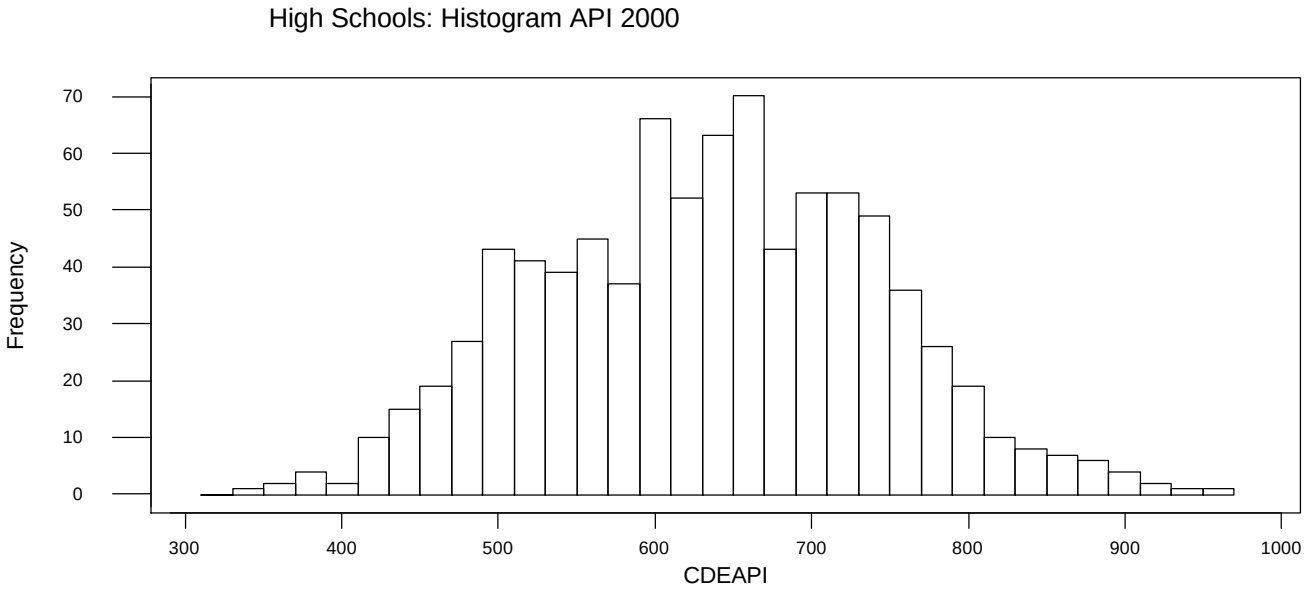
Table 2. Decile Bottom and Top API Values

	Elementary		Middle		High	
CARnk	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
1	346.00	493.00	358.00	483.00	339.00	489.00
2	494.00	544.00	485.00	538.00	491.00	529.00
3	545.00	592.00	539.00	580.00	530.00	571.00
4	593.00	634.00	581.00	618.00	572.00	602.00
5	635.00	674.00	619.00	656.00	603.00	635.00
6	675.00	711.00	657.00	690.00	636.00	659.00
7	712.00	751.00	691.00	728.00	660.00	696.00
8	752.00	798.00	729.00	770.00	697.00	727.00
9	799.00	845.00	771.00	818.00	728.00	768.00
10	846.00	967.00	819.00	949.00	769.00	969.00

For Elementary Schools deciles have median width 46 points, whereas Middle School deciles have median width of 41 points (similar to 1999 results). High Schools deciles are narrower still with median width 37 points.


Elementary Schools: Histogram API 2000
Frequency
0
50
100
150
300
400
500
600
700
800
900
1000
CDEAPI


Middle Schools: Histogram API 2000
Frequency
0
10
20
30
40
50
60
70
300
400
500
600
700
800
900
1000
CDEAPI


High Schools: Histogram API 2000
Frequency
0
10
20
30
40
50
60
70
300
400
500
600
700
800
900
1000
CDEAPI

Interpretation of API scores in terms of PAC measures

In the reporting of Stanford 9 scores in the STAR program, school performance is presented in terms of the percent-at-or-above-cut-off scores for each grade level and content area. In particular, the STAR internet reports use the label "% Scoring At or Above 50th NPR", defined as "The percent scoring at or above the 50th percentile is the percent of students in this school, district, county, or state whose scores would place them in the top half of the students tested nationally." [from CDE website].

For our purposes we are going to use proportion at or above cut-off measures on a 0-to-1 scale rather than percentage on a 0-to-100 scale. Use the abbreviation PAC for these scores, so that PAC50 denotes the proportion of students at or above the 50th percentile in the national norms for the Stanford 9. Similarly, the PAC25 measure is the proportion of students at or above the 25th percentile in the national norms for the Stanford 9; PAC25 provides useful information on lower-scoring schools.

To proceed with the enterprise of interpreting API scores in terms of PAC measures, define for an elementary school

PAC50 = .4*PAC50Math + .3*PAC50Read + .15*PAC50Lang + .15*PAC50Spell,
PAC25 = .4*PAC25Math + .3*PAC25Read + .15*PAC25Lang + .15*PAC25Spell

The PAC measure mimics the content weighting (for Math, Reading, Language, Spelling) used in constructing the API for grade 2-8 students. For each content area, the specific PAC is computed for all API-included students (over grades). That is, for a K-6 elementary school, accumulate all the Math scores from eligible students in grades 2-6 (i.e. those students included in the API) and compute the proportion of those students whose scores meet or exceed the national 50th percentile for their grade-level testing. That proportion is PAC50Math. And similarly compute the PAC50 measures for Reading, Language, Spelling.

For Middle Schools and High Schools separate PAC measures are computed for grade 9-11 students and grade 2-8 students (when both are present), and as in the school-wide API calculation, the school score is a weighted average of these two.

For included students in grade 8 or lower
PAC50 = .4*PAC50Math + .3*PAC50Read + .15*PAC50Lang + .15*PAC50Spell
PAC25 = .4*PAC25Math + .3*PAC25Read + .15*PAC25Lang + .15*PAC25Spell

For students in grades 9-11
PAC50 = .2*PAC50Math + .2*PAC50Read + .2*PAC50Lang +
        .2*PAC50Science + .2*PAC50SocialScience
PAC25 = .2*PAC25Math + .2*PAC25Read + .2*PAC25Lang +
        .2*PAC25Science + .2*PAC25SocialScience

Table 3. Descriptive Statistics: API, PAC25, PAC50

Elementary Schools

Variable	N	Mean	Median	Q1	Q3	Minimum	Maximum
API	4776	671.30	674.13	568.53	773.50	345.88	966.88
PAC50	4776	0.52569	0.52057	0.36246	0.68286	0.09067	0.97937
PAC25	4776	0.74448	0.76660	0.62799	0.87717	0.27515	0.99817

Middle Schools

Variable	N	Mean	Median	Q1	Q3	Minimum	Maximum
API	1125	655.15	656.25	559.00	749.75	357.94	948.63
PAC50	1125	0.49622	0.48993	0.34042	0.64301	0.09651	0.96179
PAC25	1125	0.73411	0.75391	0.62866	0.86035	0.29065	0.99670

High Schools

Variable	N	Mean	Median	Q1	Q3	Minimum	Maximum
API	854	634.04	638.19	556.34	713.16	339.44	969.38
PAC50	854	0.47106	0.47647	0.34358	0.59543	0.08174	0.98145
PAC25	854	0.73211	0.74884	0.64569	0.83017	0.28101	0.99731

Correlations: API, PAC50, PAC25

Elementary

	API	PAC50
PAC50	0.997	
PAC25	0.988	0.978

Middle

	API	PAC50
PAC50	0.998	
PAC25	0.986	0.977

High

	API	PAC50
PAC50	0.998	
PAC25	0.983	0.975

API Scores Corresponding to a Specified PAC value
Schools with PAC50 = .50.

One benchmark that has often been used in the yearly releases of STAR results is whether the statewide PAC50 for each grade level and content area is .50 or better. So one question of interest is, What API score corresponds to PAC50 = .50? A simple answer is obtained by look at the API scores for those schools which have PAC50 scores very near .50. Table 4 below provides a (rough) match of PAC50 = .5 to API around 660. The 74 Elementary Schools have PAC50 values from .495 to 0.505; the 33 Middle and 47 High Schools have PAC50 values from .49 to 0.51. The correspondences are nearly identical to what was seen with 1999 data.

Table 4. API scores for Schools with PAC50 values near .50

Variable	N	Mean	Median	Q1	Q3	Minimum	Maximum
Elem	74	660.61	660.38	654.88	665.53	642.00	682.13
Middle	33	661.34	662.38	656.44	665.56	649.25	676.50
High	47	653.87	652.00	650.38	659.13	640.75	666.63

In somewhat the same spirit of thinking of PAC50 = .50 "matching" the national score distribution, PAC25 = .75 provides another calibration. In Table 5 the 83 Elementary Schools have PAC25 values from .745 to 0.755; the 48 Middle and 53 High Schools have PAC50 values from .74 to 0.76. The selected schools have API scores reasonably similar to the schools with PAC50 = .50.

Table 5. API scores for Schools with PAC25 values near .75

Variable	N	Mean	Median	Q1	Q3	Minimum	Maximum
Elem	83	661.41	661.88	650.63	669.88	631.38	690.50
Middle	48	656.54	654.31	647.69	665.19	632.88	688.14
High	53	638.33	638.25	628.19	648.38	602.38	664.88

Additional displays using the PAC25 measure.
A calibration for the lower end of the API scale is provided by looking at schools having a PAC25 near .50 (i.e. very loosely speaking, half the students scoring at or above the national 25th percentile). In Table 6 the 44 Elementary Schools have PAC25 values from .495 to 0.505, and the 31 Middle and 7 High Schools have PAC25 values from 0.49 to 0.51.

Table 6. API scores for Schools with PAC25 values near .50

Variable	N	Mean	Median	Q1	Q3	Minimum	Maximum
Elem	44	483.48	483.63	479.63	488.42	463.81	498.88
Middle	31	478.15	478.31	472.06	481.69	459.69	519.00
High	7	459.02	460.13	456.00	461.50	451.56	466.75

PAC50 and PAC25 values that correspond to an API Slice

The Tables on the following pages take a narrow slice on API scores (e.g. 799 through 801) and display the corresponding PAC50 or PAC25 scores (median, quartiles, and min,max).
The first page, Table 7, is PAC50 for Elementary, Middle, and High Schools. The second page, Table 8, repeats that presentation for PAC25 (which may be most relevant for lower API decile schools).

For example, consider the slice near API score 800. The table of PAC50 indicates that API=800 corresponds to a PAC50 of about .725 (also seen in 1999 data). A reasonable interpretation is to say that API of 800 describes a school with 73% of its included students scoring at or above the national 50th percentile on each of the four tests (Math, Reading, Language, Spelling). (Of course raising Math to 76% would offset a drop in Reading to 69% and so forth, but for convenience talk in terms of equal proportions across the tests). So even with an API of 800, a school may be seen as having considerable room to improve if one thinks in terms of the 27% of students below the national 50th percentile. Moreover, the PAC25 table indicates that schools with API of 800 have about 10% of students below the national 25th percentile, reinforcing the message that an 800 score provides ample room for improvement.

Moving down the scale, an API of 600 roughly corresponds to a school having slightly more than 40% of its included students at or above the national 50th percentile on each Stanford 9 test and a little more than two-thirds of students at or above the national 25th percentile (also seen for 1999 data). Also API scores near 500 roughly corresponds to a PAC50 of a little more than one-quarter and to a PAC25 of a little more than one-half.

Table 7. PAC50 data for a slice on API

Describing PAC50 data for a slice on API for Elementary Schools

		PAC50				
API slice	N	Median	Q1	Q3	Minimum	Maximum
399:401.	4	0.14563	0.12392	0.15591	0.11971	0.15631
449:451.	6	0.20590	0.19250	0.21083	0.19165	0.21353
499:501.	15	0.26453	0.25537	0.27045	0.23059	0.28162
549:551.	28	0.33011	0.32382	0.34387	0.31488	0.36475
599:601.	21	0.40430	0.39630	0.41290	0.39172	0.42499
649:651.	38	0.48788	0.47798	0.49405	0.46094	0.50793
699:701.	22	0.56305	0.54913	0.56970	0.53320	0.57715
749:751.	25	0.64294	0.63562	0.64819	0.61743	0.67053
799:801.	22	0.72430	0.71664	0.73294	0.71216	0.75427
849:851.	20	0.80701	0.79935	0.81073	0.78052	0.81873
895:905.	51	0.88525	0.87915	0.89026	0.87109	0.90845

Describing PAC50 data for a slice on API for Middle Schools

		PAC50				
API slice	N	Median	Q1	Q3	Minimum	Maximum
395:405.	7	0.14133	0.13635	0.14871	0.12747	0.15564
445:455.	7	0.18771	0.18274	0.18948	0.17905	0.20016
495:505.	18	0.25241	0.24688	0.26115	0.23859	0.27222
545:555.	29	0.33282	0.32294	0.34009	0.31262	0.35535
595:605.	30	0.40259	0.39316	0.41115	0.37079	0.43011
645:655.	35	0.48181	0.47046	0.48981	0.46167	0.50317
695:705.	22	0.55450	0.55075	0.56375	0.53650	0.57544
745:755.	29	0.64319	0.63843	0.64978	0.62524	0.65979
795:805.	17	0.72290	0.71686	0.73199	0.70496	0.74451
845:855.	15	0.80786	0.79968	0.81604	0.79565	0.81787
895:905.	8	0.88794	0.87985	0.89423	0.87097	0.89685

Describing PAC50 data for a slice on API for High Schools

		PAC50				
API slice	N	Median	Q1	Q3	Minimum	Maximum
495:505.	23	0.25873	0.25214	0.26459	0.23798	0.28101
545:555.	19	0.33368	0.32629	0.34174	0.31488	0.35004
595:605.	39	0.41089	0.40155	0.42053	0.38873	0.42773
645:655.	42	0.49329	0.48866	0.49872	0.46619	0.51477
695:705.	27	0.57471	0.56970	0.57959	0.55005	0.58655
745:755.	21	0.65881	0.65320	0.66083	0.64294	0.66833
795:805.	11	0.73425	0.73193	0.74109	0.73071	0.75342
845:855.	6	0.81897	0.81512	0.82306	0.81458	0.82507

Table 8. PAC25 data for a slice on API

Describing PAC25 data for a slice on API for Elementary Schools

		PAC25				
API slice	N	Median	Q1	Q3	Minimum	Maximum
399:401.	4	0.36194	0.35150	0.38148	0.34912	0.38690
449:451.	6	0.44217	0.43872	0.45099	0.43799	0.45557
499:501.	15	0.53003	0.52258	0.53882	0.50708	0.55908
549:551.	28	0.59772	0.58749	0.61145	0.54651	0.63391
599:601.	21	0.67212	0.65918	0.68237	0.65088	0.70288
649:651.	38	0.73730	0.72861	0.74197	0.70801	0.76440
699:701.	22	0.80200	0.79321	0.81512	0.76978	0.83276
749:751.	25	0.85583	0.84668	0.87390	0.82996	0.88379
799:801.	22	0.90393	0.89645	0.91281	0.88623	0.91931
849:851.	20	0.93890	0.93506	0.94974	0.91724	0.95789
895:905.	51	0.97241	0.96753	0.97681	0.95313	0.98987

Describing PAC25 data for a slice on API for Middle Schools

		PAC25				
API slice	N	Median	Q1	Q3	Minimum	Maximum
395:405.	7	0.36499	0.35913	0.37048	0.35553	0.37988
445:455.	7	0.44830	0.44672	0.45007	0.44147	0.46423
495:505.	18	0.53607	0.52899	0.54233	0.51270	0.56018
545:555.	29	0.61487	0.60852	0.62146	0.59741	0.63391
595:605.	30	0.68127	0.67209	0.68805	0.65405	0.70398
645:655.	35	0.74963	0.73193	0.75623	0.72241	0.76624
695:705.	22	0.80267	0.79156	0.81226	0.77820	0.83252
745:755.	29	0.85962	0.84760	0.87079	0.82178	0.88232
795:805.	17	0.89490	0.88654	0.90717	0.86621	0.92224
845:855.	15	0.93970	0.93262	0.94690	0.93030	0.95605
895:905.	8	0.96332	0.95953	0.97354	0.95789	0.98132

Describing PAC25 data for a slice on API for High Schools

		PAC25				
API slice	N	Median	Q1	Q3	Minimum	Maximum
495:505.	23	0.57446	0.56384	0.57776	0.53638	0.58813
545:555.	19	0.63879	0.63062	0.64478	0.61902	0.65527
595:605.	39	0.70862	0.69897	0.71570	0.67920	0.74121
645:655.	42	0.76410	0.75748	0.77161	0.73328	0.81055
695:705.	27	0.81689	0.80847	0.82520	0.80066	0.84302
745:755.	21	0.86902	0.85284	0.87622	0.84167	0.91138
795:805.	11	0.90955	0.90149	0.91870	0.88745	0.92603
845:855.	6	0.94019	0.92880	0.94818	0.92468	0.95422

END Section 1

Section 2. Describing 1999-2000 Improvement for Schools and Subgroups

In the first subsection, Tables 9-12 are used to describe school-level improvement in 1999 and 2000 API scores. In the second subsection, Tables 13-16 are used to describe improvement of students in subgroups, both for the larger ethnic subgroups and the Socioeconomically Disadvantaged (SD) subgroup.

A. Describing Improvement for Schools

Tables 9,11,12 have identical structure, containing data analysis displays describing school improvement for each of the three school types (Elementary, Middle, High) in turn. The top two portions of each table give the overall description: first separately for the years 1999 and 2000, and secondly for the subset of schools present in both years. Also for the subset of schools present both years, the improvement (denoted as APIimp) for each school is obtained and included in the description. For example, in Table 9, descriptive statistics are given for 4849 Elementary Schools for year 1999 data and 4776 for year 2000 data. Of those 4849 schools, 4696 are present in the year 2000 data, and improvement is computed for those schools. Three-quarters of these Elementary schools improved at least 19 points, and half the Elementary Schools improved at least 36 points. Tables 11 and 12 show smaller overall improvement for Middle Schools and smaller still for High Schools, where a quarter of High Schools had no improvement or decline.

The third item in Tables 9, 11, 12 labeled as, "Descriptive Statistics: APIimp by CARank_99", describes improvement separately for each 1999 statewide decile. This is the most useful display in these tables. For example, in Table 9 there are 443 Elementary Schools that were in the lowest statewide decile in 1999 (and also included in the year 2000 API). Half of those schools showed improvement of at least 45 points. For Elementary schools, the improvement is rather constant (median more than 40 points) for the bottom five 1999 deciles, but the improvement falls off in the upper deciles, most notably for 1999 decile 10. This pattern is repeated for the smaller improvement of Middle and High Schools.

To follow up on those tables the next item is the correlation matrix which gives the correlation between APIimp and API_99, the negative values of which result from the smaller improvement by schools scoring relatively well in 1999. The same is seen in APIimp vs API_99 scatterplots for each school type following Tables 9, 11, 12.

A (relatively unsuccessful) attempt to understand the smaller improvement seen in the higher scoring schools is the motivation for the PAC50 data summaries in the lower part of Tables 9, 11, 12 and of the separate analysis in Table 10. One line of thought is as follows: the construction of the API gives more credit to student progress in the lower portions of the achievement scale than to progress in the upper portions of the scale. E.g., 300 points is given for a move through the national 20th percentile, whereas 125 points of credit are given for a move through the 80th percentile. The question that is pursued here is, Are students in the higher scoring schools making the same improvement in the Stanford 9 tests as students in the lower scoring schools, but the improvement is smaller when expressed in the API-metric? The PAC50 measure, used in Section 1, just gives credit to a move through the national 50th percentile (without the heavier weighting of progress for lower-scoring students). However, for the PAC50 measure, the tables show pretty much the same pattern as for the API--for each school type the top 1999 decile in shows one-half the

improvement of the lower deciles. However, the PAC50 measure is insensitive to improvement above the national 50th percentile (which most of the students in top decile schools exceed), and that provides the motivation for Table 10, which employs yet another "API-like" construct, denoted as PRAPI. PRAPI uses the actual percentile rank score on each Stanford 9 test and applies the API content weights. So for Elementary School students (grades 2-8),
PRAPI = .4*PRmath + .3*PRread + .15*PRlang + .15*PRspell
and these scores are aggregated up to school-level scores. Table 10 gives the results for the set of Elementary Schools, and again the pattern is seen of smaller improvement for schools in the top deciles. The one clear conclusion is that the pattern of smaller improvement by the upper decile schools is not an artifact of the construction of API.

The best explanation may be the simplest: enough students in the higher scoring schools (deciles 9 and 10 schools in 1999) simply don't have much room to improve with standardized test scores reported in a percentile rank metric. Of the students in year 1999 state decile 10 Elementary schools 20.5% had Mathematics scores at or above the 96th percentile (i.e. 96, 97, 98, 99) and 12% have Reading scores at or above the 96th percentile. These high scoring students cannot improve as much as the 4 percentile point average of lower decile schools shown in Table 10. Furthermore, 9.1% of the students in year 1999 state decile 10 Elementary schools have Mathematics scores at the 99th percentile, and therefore have no ability to improve the percentile rank score. (Note a score at the 99th national percentile does necessarily represent a perfect paper, as for example in Grade 5 Mathematics 74 correct out of 78 items is 99th percentile). In terms of the contribution to school API scores in Table 9, any percentile rank of 80 or above affords no opportunity for improvement, and 55.7% of the students in year 1999 state decile 10 Elementary schools have Mathematics scores at the 80th percentile or above. For Reading it's 47.8%. Thus topping out may be a large part of the explanation for the smaller improvement seen for schools in the top deciles.

Table 9. Describing Improvement for Elementary Schools

Descriptive Statistics: API_99, API_2k for all Elementary Schools

Variable	N	Mean	Median	Q1	Q3	Minimum	Maximum
API_99	4849	631.02	629.63	521.63	738.50	301.56	958.13
API_2k	4776	671.30	674.13	568.53	773.50	345.88	966.88

Of the 4849 1999 Elementary Schools, 4696 present both years

Descriptive Statistics: API_99, API_2k, APIimp, for 4696 present both years

Variable	N	Mean	Median	Q1	Q3	Minimum	Maximum
API_99	4696	632.96	631.69	523.75	741.03	311.00	958.13
API_2k	4696	671.24	674.06	568.28	773.22	345.88	966.88
APIimp	4696	38.28	36.06	18.77	55.75	-89.75	188.94

Descriptive Statistics: APIimp by CARank_99

CARank99	N	Mean	Median	Q1	Q3	Minimum	Maximum
1	443	46.98	45.13	25.69	65.69	-73.19	156.06
2	466	45.48	44.75	27.36	65.14	-54.75	168.19
3	465	47.49	46.00	25.72	67.78	-44.31	188.94
4	475	46.19	43.00	23.63	65.88	-60.50	163.00
5	467	44.13	41.88	24.88	63.50	-89.75	142.75
6	470	39.15	38.63	19.66	56.75	-37.50	131.88
7	472	35.61	36.13	19.53	51.59	-80.50	117.00
8	480	33.05	32.44	17.06	49.47	-55.88	99.63
9	473	27.84	28.75	15.75	41.94	-63.25	105.25
10	485	18.32	18.00	9.19	28.06	-68.63	61.38

Correlations: API_99, API_2k, APIimp

	API_99	API_2k
API_2k	0.977	
APIimp	-0.302	-0.093

[see also APIimp vs API_99 scatterplot]

Comparison with PAC50 Measure

Descriptive Statistics: PAC50_99, PAC50_2k, pac50imp

Variable	N	Mean	Median	Q1	Q3	Minimum	Maximum
PAC50_99	4696	0.47094	0.45844	0.30261	0.63217	0.06302	0.96716
PAC50_2k	4696	0.52557	0.52039	0.36221	0.68262	0.09201	0.97937
pac50imp	4696	0.05463	0.05188	0.02557	0.08038	-0.12585	0.28882

Descriptive Statistics: pac50imp by CARank_99

CARank99	N	Mean	Median	Q1	Q3	Minimum	Maximum
1	443	0.05448	0.05038	0.02553	0.08038	-0.08237	0.20193
2	466	0.05864	0.05627	0.03183	0.08388	-0.07635	0.26685
3	465	0.06337	0.06207	0.03308	0.08978	-0.05728	0.28882
4	475	0.06468	0.06311	0.03241	0.09412	-0.10352	0.25623
5	467	0.06461	0.06189	0.03534	0.09430	-0.09387	0.23401
6	470	0.05914	0.05774	0.03070	0.08875	-0.06195	0.19611
7	472	0.05599	0.05719	0.02957	0.08408	-0.12585	0.20361
8	480	0.05304	0.05157	0.02493	0.08029	-0.09229	0.16638
9	473	0.04515	0.04663	0.02319	0.06836	-0.10974	0.17908
10	485	0.02816	0.02930	0.01062	0.04669	-0.08606	0.10461

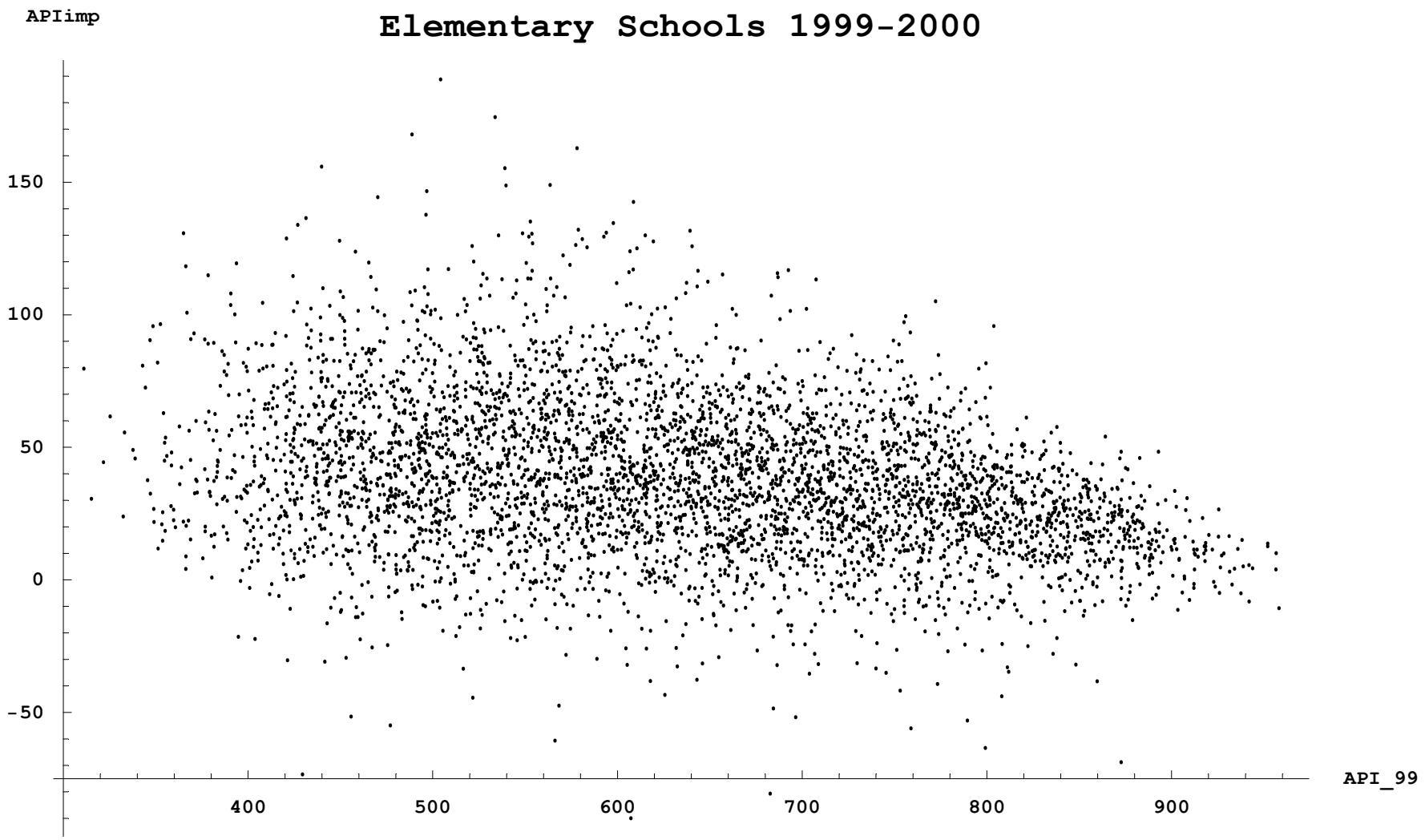

APIimp
Elementary Schools 1999-2000
150
100
50
0
-50
400
500
600
700
800
900
API_99

Table 10. Elementary Schools: Improvement in Percentile Rank Metric

Descriptive Statistics: PRAPI99, PRAPI2k, primp

Variable	N	Mean	Median	Q1	Q3	Minimum	Maximum
PRAPI99	4696	47.776	47.061	36.178	58.706	16.275	87.368
PRAPI2k	4696	51.776	51.398	40.572	62.388	19.582	88.372
primp	4696	4.000	3.809	2.073	5.786	-8.183	19.514

Descriptive Statistics: primp by CARank99

CARank99	N	Mean	Median	Q1	Q3	Minimum	Maximum
1	443	4.445	4.103	2.461	6.211	-6.693	15.142
2	466	4.404	4.235	2.652	6.127	-5.163	17.235
3	465	4.657	4.426	2.532	6.485	-3.794	19.514
4	475	4.618	4.384	2.381	6.477	-5.807	18.478
5	467	4.518	4.198	2.537	6.457	-8.115	15.907
6	470	4.090	4.082	2.045	5.939	-4.045	14.126
7	472	3.875	3.784	2.089	5.755	-8.183	13.890
8	480	3.775	3.667	2.014	5.549	-6.329	11.911
9	473	3.306	3.369	1.847	4.900	-7.163	12.945
10	485	2.405	2.494	1.108	3.586	-8.031	7.6237

Table 11. Describing Improvement for Middle Schools

Descriptive Statistics: API_99, API_2k for all Middle Schools

Variable	N	Mean	Median	Q1	Q3	Minimum	Maximum
API_99	1118	632.23	633.06	534.47	724.63	345.44	949.50
API_2k	1125	655.15	656.25	559.00	749.75	357.94	948.63

Of the 1118 Middle Schools in 1999, 1099 present both years,

Descriptive Statistics: API_99, API_2k, APIimp for 1099 present both years

Variable	N	Mean	Median	Q1	Q3	Minimum	Maximum
API_99	1099	633.11	633.38	537.13	725.25	378.19	965.88
API_2k	1099	654.70	654.75	558.63	748.38	370.31	969.38
APIimp	1099	21.59	19.88	7.50	35.88	-56.50	96.00

Descriptive Statistics: APIimp by CARank_99

CARank99	N	Mean	Median	Q1	Q3	Minimum	Maximum
1	106	24.77	24.38	9.38	38.31	-39.13	126.19
2	109	23.22	21.38	7.34	39.59	-41.56	87.88
3	107	22.00	21.00	6.38	34.38	-42.00	69.88
4	114	25.24	23.88	10.88	38.22	-33.13	99.38
5	110	24.74	24.25	9.91	40.22	-38.00	92.38
6	108	21.51	22.44	7.56	40.94	-49.63	84.88
7	109	21.19	20.13	3.94	37.38	-36.88	80.13
8	113	24.13	23.25	10.44	39.75	-18.88	70.88
9	108	17.57	16.44	6.41	29.00	-40.63	69.63
10	115	11.85	12.00	3.13	20.50	-25.38	50.88

Correlations: API_99, API_2k, APIimp

	API_99	API_2k
API_2k	0.983	
APIimp	-0.138	0.044

[see also APIimp vs API_99 scatterplot]

Comparison with PAC50 Measure

Descriptive Statistics: PAC50_99, PAC50_2k, pac50imp

Variable	N	Mean	Median	Q1	Q3	Minimum	Maximum
PAC50_99	1099	0.46429	0.45569	0.30994	0.60730	0.08516	0.95630
PAC50_2k	1099	0.49556	0.48981	0.34039	0.64246	0.09651	0.96179
pac50imp	1099	0.03127	0.02869	0.00940	0.05261	-0.08362	0.15393

Descriptive Statistics: pac50imp by CARank_99

CARank99	N	Mean	Median	Q1	Q3	Minimum	Maximum
1	106	0.02748	0.02596	0.00652	0.04384	-0.05740	0.15305
2	109	0.03160	0.02783	0.00664	0.05663	-0.05176	0.12842
3	107	0.03103	0.03137	0.00928	0.05157	-0.06604	0.13794
4	114	0.03511	0.03094	0.01286	0.05725	-0.04071	0.12964
5	110	0.03674	0.03387	0.01035	0.05931	-0.06415	0.14392
6	108	0.03261	0.02994	0.01006	0.06094	-0.08362	0.15393
7	109	0.03308	0.03137	0.00885	0.05566	-0.06030	0.14319
8	113	0.03894	0.03760	0.01398	0.06317	-0.05310	0.14856
9	108	0.02738	0.02814	0.00705	0.04489	-0.06421	0.10596
10	115	0.01881	0.01794	-0.00012	0.03540	-0.03406	0.07458

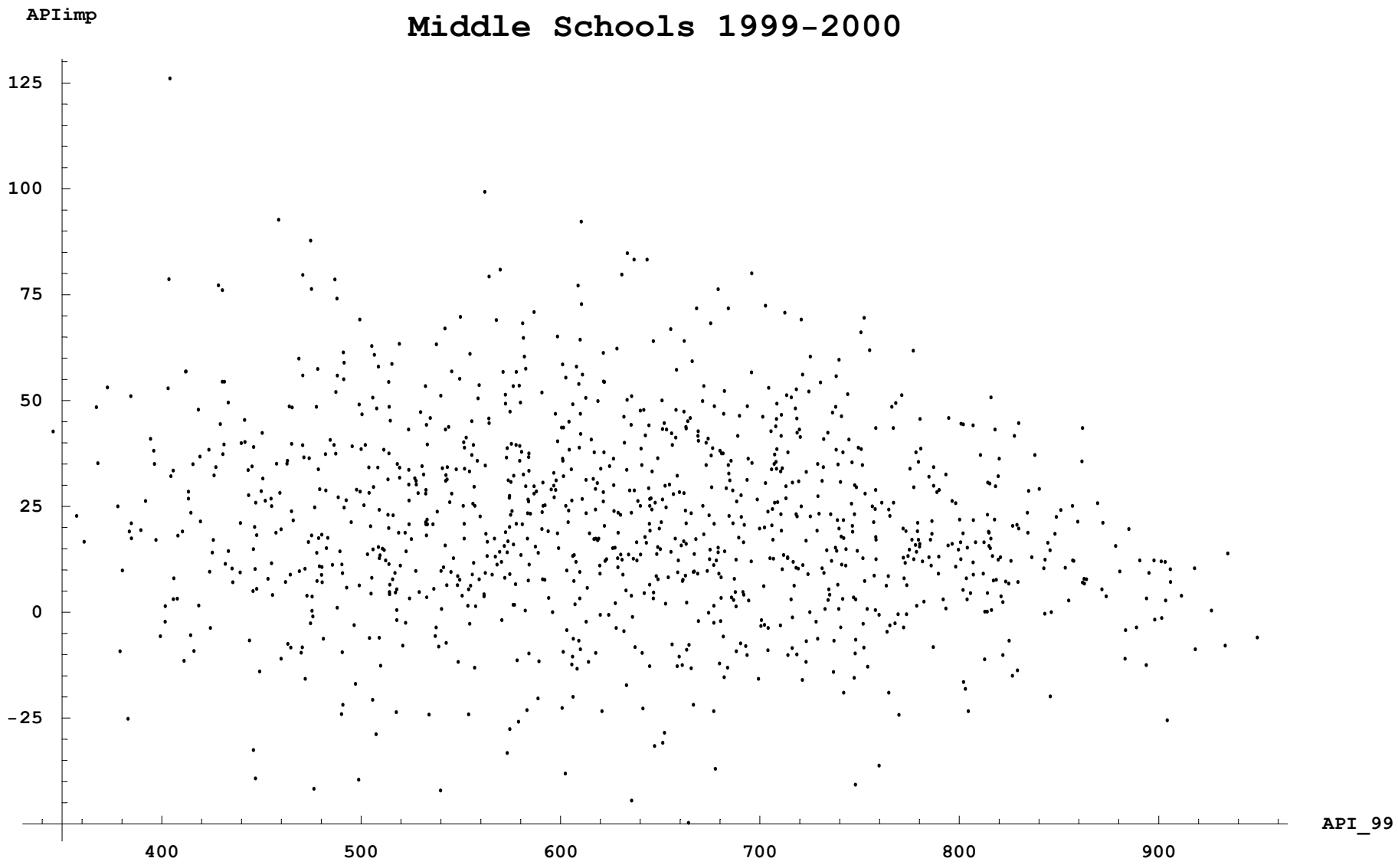

APIimp
Middle Schools 1999-2000
125
100
75
50
25
0
-25
400
500
600
700
800
900
API_99

Table 12. Describing Improvement for High Schools

Descriptive Statistics: API_99, API_2k for all High Schools

Variable	N	Mean	Median	Q1	Q3	Minimum	Maximum
API_99	837	620.32	620.13	540.06	697.19	297.19	965.88
API_2k	854	634.04	638.19	556.34	713.16	339.44	969.38

Of the 837 99 High Schools, 812 present both years.

Descriptive Statistics: API_99, API_2k, APIimp for 812 present both years

Variable	N	Mean	Median	Q1	Q3	Minimum	Maximum
API_99	812	621.70	620.31	542.38	697.81	378.19	965.88
API_2k	812	636.86	638.56	560.41	714.59	370.31	969.38
APIimp	812	15.16	13.25	0.38	27.88	-56.50	96.00

Descriptive Statistics: APIimp by CARank_99

CARank99	N	Mean	Median	Q1	Q3	Minimum	Maximum
1	80	21.15	16.19	5.16	35.23	-15.63	74.63
2	81	15.32	14.75	1.28	26.38	-25.06	86.63
3	81	19.61	17.75	3.00	34.13	-16.88	96.00
4	80	21.30	19.50	7.78	37.34	-36.25	87.00
5	76	15.20	14.75	3.09	29.50	-56.50	60.50
6	87	14.71	12.00	2.50	23.50	-29.63	85.25
7	79	18.18	15.13	-1.63	35.50	-27.50	91.50
8	82	10.01	10.19	-7.34	27.28	-35.38	55.88
9	81	8.78	8.25	-6.38	19.81	-24.75	71.38
10	85	8.00	5.75	-2.63	19.50	-32.63	56.25

Correlations: API_99, API_2k, APIimp

	API_99	API_2k
API_2k	0.978	
APIimp	-0.166	0.041

[see also APIimp vs API_99 scatterplot]

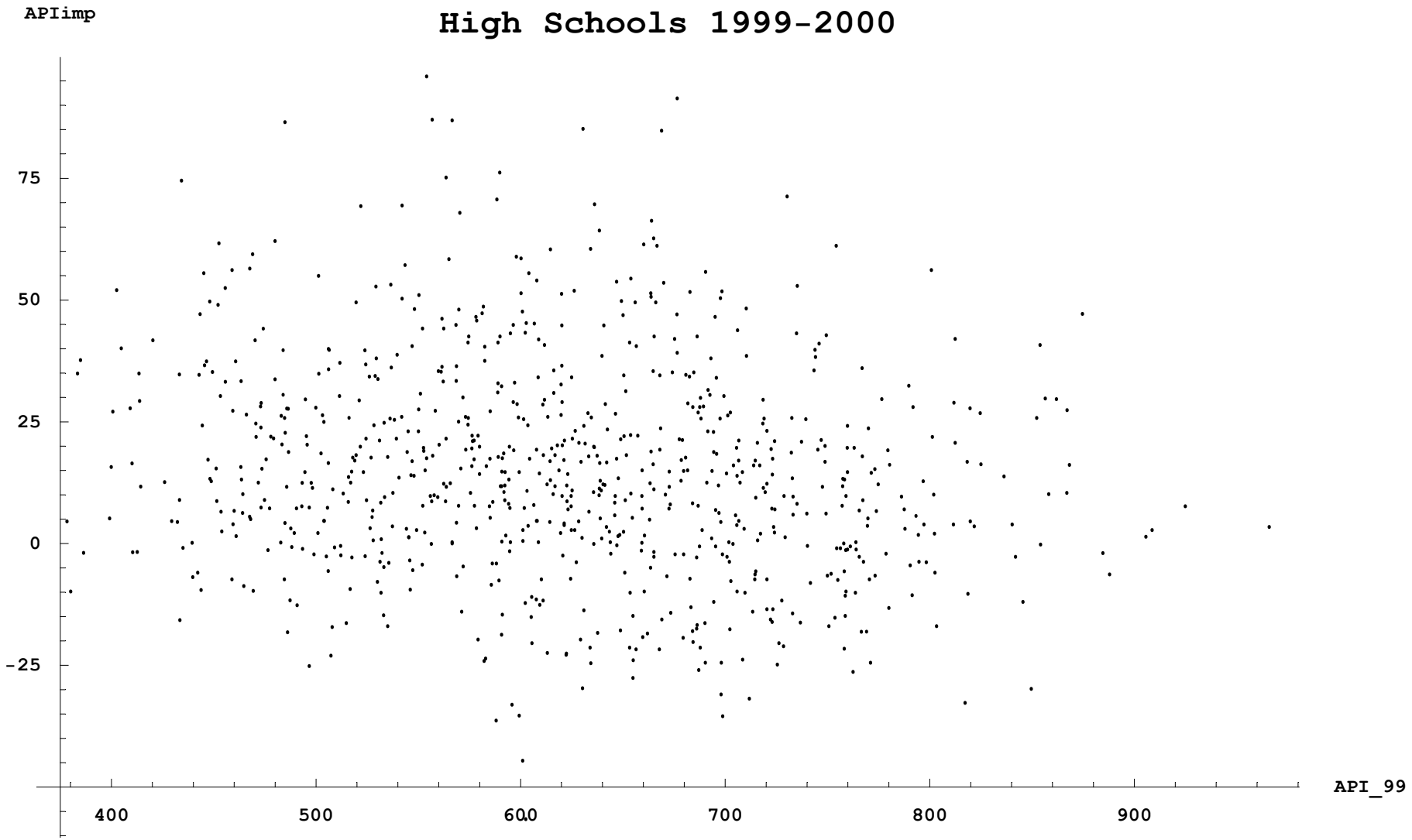
Comparison with PAC50 Measure

Descriptive Statistics: PAC50_99, PAC50_2k, pac50imp

Variable	N	Mean	Median	Q1	Q3	Minimum	Maximum
PAC50_99	812	0.45452	0.44824	0.32710	0.57071	0.10457	0.97986
PAC50_2k	812	0.47516	0.47754	0.34834	0.59772	0.09920	0.98145
pac50imp	812	0.02064	0.01877	-0.00026	0.03938	-0.07318	0.14673

Descriptive Statistics: pac50imp by CARank_99

CARank99	N	Mean	Median	Q1	Q3	Minimum	Maximum
1	80	0.02430	0.01883	0.00729	0.03909	-0.01657	0.09747
2	81	0.01937	0.01825	0.00195	0.03670	-0.05176	0.09995
3	81	0.02444	0.02112	0.00156	0.03961	-0.02686	0.13525
4	80	0.02908	0.02753	0.00821	0.05278	-0.05048	0.13000
5	76	0.02079	0.01981	0.00223	0.04842	-0.07318	0.08691
6	87	0.02144	0.01801	0.00134	0.03601	-0.04443	0.13806
7	79	0.02599	0.02216	-0.00391	0.05566	-0.04376	0.14673
8	82	0.01630	0.01526	-0.01053	0.04181	-0.05725	0.09192
9	81	0.01366	0.01501	-0.00751	0.02997	-0.04431	0.10791
10	85	0.01176	0.00903	-0.00702	0.03278	-0.05652	0.09314


APIimp
High Schools 1999-2000
75
50
25
0
-25
400
500
600
700
800
900
API_99

B. Describing Improvement for Subgroups

In addition to the school API scores, scores for subgroups are of interest both for the award programs and for using the API to provide information on California schools and students. Tables 13,15,16 have identical structure, containing data analysis displays describing school improvement for subgroups for each of the three school types (Elementary, Middle, High) in turn. The subgroups examined are Socioeconomically Disadvantaged (SD), African-American (AfAM), Asian, Hispanic (hisp), and White.

Within each school type (table) descriptive statistics are shown for each of these five subgroups. Displayed in the top portion are descriptive statistics for 1999 and 2000 statewide data and the improvement overall; below that are shown descriptive statistics for improvement broken down by each 1999 statewide decile. Before turning to the results, some additional details on the construction of these numbers. Take, for example, the SD subgroup in Table 13. For each of the 4696 Elementary Schools having 1999 and 2000 API data, compute for each year an API score for the SD subgroup (in the manner that subgroup scores are computed in the school API reports). Include in the analysis (here Table 13) all scores from schools having at least 10 SD students in the school, which reduces the number of schools to 4180 for SD. The screening on group size is done to mitigate, in part, the distorting effects of very small groups contributing as much in these displays as schools with 100 or 200 SD students. That is, the displays in Tables 13,15,16 are based on school-level scores keeping with the school-level reporting of the API; for more on this see the discussion of Table 14.

Onto the results. One somewhat striking result is obtained by comparing Table 13 and Table 9 for Elementary schools (or Table 15 and Table 11 for Middle schools). The improvement for the SD subgroup matches or exceeds the improvement in school scores, whether looked at overall or by decile. The same goes for the Hispanic and African-American subgroups, (which tend to overlap in membership with SD). Furthermore, it is interesting that the improvements in the three subgroups--SD Hispanic and African-American-- are nearly identical for Elementary Schools and also for Middle Schools. These tables are put there for the scanning, and the reader is encouraged to pursue and peruse according to their own interests.

One side topic is to ask whether the results in Tables 13 15 16 would change if the analysis were restricted to numerically significant subgroups (minimum size 30 instead of 10). For example, 3402 Elementary schools have numerically significant SD both years. Using those schools instead of the 4180 in Table 13 changes the results negligibly: statewide mean median and quartiles become 46.5, 44.0, 22.75, 69.52 respectively.

Table 14 presents results for California elementary school students, computed at the "individual level". The calculations start with the same basic data as used in Table 13, but there is no grouping of the students by school, and therefore Table 14 differs from the style of API reporting. Use the SD subgroup to describe the calculations. In 1999 there were 856145 SD students in schools that were part of the API Elementary Schools reporting. Treating those 856145 SD students as constituting one large school, use their Stanford 9 scores to compute an API score. That's the 507 value labeled as "API99" in Table 14. Repeat that calculation for year 2000 data to obtain a "school" of size 965330 with API2k 553. The improvement sdimp with value 46 is the difference between these scores.

Below the Statewide Results in Table 14, are results broken down by the

1999 school decile. The calculations for each decile rank are similar to the Statewide calculation. For example, start with all students classified as SD who are in Elementary Schools which were classified in the lowest statewide decile (CARank 1) in 1999. That classification produces 189997 students with 1999 Stanford 9 scores and 200058 students with year 2000 Stanford 9 scores. Compute an API score, treating the 189997 students with 1999 Stanford 9 scores as one large school, to produce an API99 for CARank99=1 with value 403.375. Repeat with the year 2000 student scores to produce an API2k for CARank99=1 with value 449.625. The improvement sdimp with value 46.25 is the difference between these scores.

Now it's a useful aside to compare the Statewide values in Table 14, API99 and API2k, with corresponding quantities in Table 13, which are each about 45 points larger. That 45 points represents the effect/distortion of using the mean of school means to represent the mean of individuals. For SD students large numbers tend to be found in lower scoring schools, with some higher scoring schools have small groups of SD students. The mean of school means gives the smaller groups and the larger groups equal weight, and therefore will be larger for SD than the mean of all individuals.

But the main story is improvement, and it's interesting (and reasonable) that the improvement seen from the individual-level data analysis in Table 14 closely matches the school-level analysis in Table 13 for each of the subgroups. Compare improvement values in Table 14 with those in Table 13 on both statewide improvement and improvement broken down by 1999 statewide rank to see that the Table 13 results for improvement are replicated in the "purer" individual level analysis of Table 14. The discussion here just scratches the surface of interesting findings about California schools that these data provide.

Table 13. Improvement for Subgroups: Elementary Schools

Description of School Scores for Subgroups (n > 9)

Socio-economically Disadvantaged

Variable	N	Mean	Median	Q1	Q3	Minimum	Maximum
SD_99	4180	551.12	541.75	472.20	622.22	280.25	934.38
SD_2k	4180	599.43	594.25	526.25	669.00	345.63	955.00
sdimp	4180	48.307	44.875	21.406	73.094	-262.625	336.750

Descriptive Statistics: sdimp by CARank_99

CARank_99	N	Mean	Median	Q1	Q3	Minimum	Maximum
1	432	51.18	48.09	26.25	71.25	-81.44	191.63
2	444	49.70	45.44	27.06	72.00	-81.88	209.00
3	442	51.97	49.28	26.59	73.41	-262.63	263.25
4	450	54.84	48.34	24.98	78.13	-103.38	284.38
5	444	55.13	48.03	28.59	73.81	-130.88	251.69
6	438	50.58	47.63	23.75	71.91	-99.75	336.75
7	437	50.41	43.63	19.63	76.25	-71.00	267.75
8	426	47.48	42.31	12.50	78.56	-122.63	282.63
9	373	37.16	35.88	4.06	69.94	-125.88	237.88
10	294	25.01	26.06	-10.88	57.09	-242.38	180.50

African-American

Variable	N	Mean	Median	Q1	Q3	Minimum	Maximum
AfAm_99	2591	553.21	544.25	473.94	628.63	253.66	932.75
AfAm_2k	2577	600.06	598.13	517.69	680.63	200.00	954.25
afamimp	2577	46.64	46.00	9.63	81.78	-277.94	342.63

Descriptive Statistics: afamimp by CARank_99

CARank_99	N	Mean	Median	Q1	Q3	Minimum	Maximum
1	251	43.19	39.81	10.44	71.38	-277.94	260.81
2	292	48.88	45.16	13.98	79.20	-112.06	342.63
3	303	47.10	49.38	14.13	77.31	-190.00	236.13
4	312	46.63	46.22	8.88	84.78	-237.31	227.25
5	286	51.66	47.41	16.72	86.41	-162.06	332.13
6	279	53.98	51.00	10.88	90.38	-126.63	214.56
7	267	49.07	47.63	6.88	84.75	-125.88	328.50
8	259	39.12	40.88	2.50	78.00	-217.38	340.06
9	190	45.21	49.06	10.75	82.44	-130.25	254.63
10	138	33.39	32.69	-7.69	75.88	-180.13	241.75

Asian

Variable	N	Mean	Median	Q1	Q3	Minimum	Maximum
Asian_99	2586	748.57	769.75	670.25	857.00	264.75	991.25
Asian_2k	2586	781.11	803.94	712.47	881.44	361.44	1000.00
asianimp	2586	32.536	28.875	4.969	56.750	-193.125	321.125

Descriptive Statistics: asianimp by CARank_99

CARank_99	N	Mean	Median	Q1	Q3	Minimum	Maximum
1	134	53.38	44.91	11.67	83.34	-145.06	288.25
2	191	51.16	51.38	26.38	77.75	-109.75	221.63
3	216	46.02	45.13	16.91	81.75	-193.13	222.38
4	244	43.83	42.88	4.22	76.28	-172.63	321.13
5	253	32.20	41.50	4.94	59.56	-177.13	256.25
6	250	34.97	33.56	7.66	59.25	-112.38	196.50
7	258	33.20	30.81	2.75	59.00	-85.25	229.75
8	282	29.36	25.69	4.97	48.22	-131.13	205.75
9	332	21.15	20.38	0.16	39.41	-108.63	166.63
10	426	13.67	13.13	1.00	27.75	-178.50	99.38

Hispanic

Variable	N	Mean	Median	Q1	Q3	Minimum	Maximum
hisp_99	4469	562.27	547.50	476.03	641.63	306.00	926.88
hisp_2k	4468	606.41	595.44	522.50	684.47	297.63	943.75
hispimp	4468	44.131	43.438	18.906	69.922	-171.25	230.25

Descriptive Statistics: hispimp by CARank_99

CARank_99	N	Mean	Median	Q1	Q3	Minimum	Maximum
1	440	45.55	44.41	25.33	66.86	-78.44	156.31
2	458	47.87	47.13	26.09	71.09	-131.63	204.06
3	460	49.39	49.09	25.95	72.94	-142.75	207.69
4	465	49.69	47.50	22.88	71.56	-87.81	186.50
5	455	52.24	50.13	26.38	74.31	-110.75	197.50
6	450	45.25	43.25	20.34	69.50	-128.13	230.25
7	451	44.71	42.88	17.38	72.63	-113.38	190.63
8	457	38.99	38.38	10.06	68.38	-171.25	218.00
9	447	37.14	34.38	8.13	67.38	-120.13	222.13
10	385	27.72	26.00	-2.00	55.94	-161.13	185.88

White

Variable	N	Mean	Median	Q1	Q3	Minimum	Maximum
white_99	4179	704.15	711.38	630.00	786.00	280.31	972.50
white_2k	4179	739.43	747.63	672.38	818.38	295.00	971.00
whiteimp	4179	35.272	32.750	13.250	55.250	-162.750	269.188

Descriptive Statistics: whiteimp by CARank_99

CARank_99	N	Mean	Median	Q1	Q3	Minimum	Maximum
1	219	50.18	51.69	13.38	89.88	-157.50	218.94
2	340	38.99	40.88	7.91	69.66	-162.75	269.19
3	404	46.97	46.50	17.22	78.38	-138.63	199.00
4	441	42.51	42.88	16.19	69.88	-102.25	195.63
5	439	41.04	41.38	16.88	62.50	-65.63	170.63
6	447	35.99	36.50	14.88	55.38	-73.25	167.88
7	459	32.97	34.38	15.13	52.25	-87.75	123.13
8	474	31.85	32.25	14.25	48.69	-101.25	160.25
9	472	26.27	27.00	12.00	41.25	-92.00	99.63
10	484	17.99	17.69	8.50	27.72	-42.75	76.25

Table 14. Individual Level Improvement, Elementary School Students

Socio-economically Disadvantaged

Statewide Results

NAPI99	API99	NAPI2k	API2k	sdimp
856145	507.375	965330	553.375	46.0000

CARank99	NAPI99	API99	NAPI2k	API2k	sdimp
1	189977	403.375	200058	449.625	46.2500
2	147292	457.938	165070	502.563	44.6250
3	124904	491.688	141369	539.875	48.1875
4	104670	521.250	118958	569.875	48.6250
5	86957	550.375	97307	596.125	45.7500
6	70275	580.875	77132	621.375	40.5000
7	55745	607.625	62489	648.625	41.0000
8	39836	647.875	45241	685.625	37.7500
9	24108	680.125	28669	714.375	34.2500
10	12381	744.500	13378	769.375	24.8750

African-American

Statewide Results

NAPI99	API99	NAPI2k	API2k	afamimp
150480	524.000	138540	568.875	44.8750

CARank99	NAPI99	API99	NAPI2k	API2k	afamimp
1	24596	399.438	20938	435.688	36.2500
2	23759	453.938	20490	494.063	40.1250
3	21776	488.313	19722	534.625	46.3125
4	19105	520.375	17031	563.000	42.6250
5	15064	553.000	13717	597.375	44.3750
6	14414	584.000	13249	631.250	47.2500
7	11351	603.250	10920	648.375	45.1250
8	9280	647.500	8612	685.625	38.1250
9	6657	686.875	6346	727.500	40.6250
10	4478	752.375	4278	781.875	29.5000

Asian

Statewide Results

NAPI99	API99	NAPI2k	API2k	asianimp
142498	746.250	141171	780.375	34.125

CARank99	NAPI99	API99	NAPI2k	API2k	asianimp
1	8758	473.375	7967	519.375	46.000
2	10733	544.750	9967	590.625	45.875
3	11718	597.750	11008	637.250	39.500
4	11517	664.250	10697	707.375	43.125
5	12318	713.750	11993	748.250	34.500
6	12512	736.625	12529	770.875	34.250
7	13159	764.250	12899	795.500	31.250
8	14635	804.250	14798	830.750	26.500
9	19654	854.875	20197	875.500	20.625
10	27494	906.625	27792	920.875	14.250

Hispanic

Statewide Results

NAPI99	API99	NAPI2k	API2k	hispimp
743786	499.250	747259	546.000	46.7500

CARank99	NAPI99	API99	NAPI2k	API2k	hispimp
1	179046	401.125	169922	447.375	46.2500
2	135033	454.000	133618	498.938	44.9375
3	109960	486.000	107540	533.750	47.7500
4	87540	515.250	88699	563.250	48.0000
5	69828	538.875	69807	586.250	47.3750
6	53511	571.250	54285	613.500	42.2500
7	41198	600.500	41667	643.000	42.5000
8	30863	648.000	31343	685.375	37.3750
9	23235	687.250	23945	722.000	34.7500
10	13572	765.500	13783	791.875	26.3750

White

Statewide Results

NAPI99	API99	NAPI2k	API2k	whiteimp
671152	743.000	639746	777.875	34.875

CARank99	NAPI99	API99	NAPI2k	API2k	whiteimp
1	9797	502.125	8115	550.875	48.750
2	20514	563.375	17890	607.250	43.875
3	31674	605.125	28422	653.250	48.125
4	50186	632.625	45373	678.875	46.250
5	60818	668.625	55768	710.750	42.125
6	72047	700.125	66150	737.125	37.000
7	89717	731.125	83290	765.125	34.000
8	101497	765.375	96929	797.375	32.000
9	107454	805.125	102654	832.750	27.625
10	127448	863.625	123392	882.125	18.500

Table 15. Improvement for Subgroups: Middle Schools
Description of School Scores for Subgroups (n > 9)

Socio-economically Disadvantaged

Variable	N	Mean	Median	Q1	Q3	Minimum	Maximum
SD_99	1025	536.38	522.88	476.19	594.06	286.38	859.00
SD_2k	1024	567.12	558.69	506.22	622.69	341.19	877.13
sdimp	1024	30.89	26.56	6.70	48.81	-157.00	249.69

Descriptive Statistics: sdimp by CARank_99

CARank_99	N	Mean	Median	Q1	Q3	Minimum	Maximum
1	105	23.98	22.25	10.22	37.00	-42.81	115.69
2	108	28.16	24.09	5.06	41.95	-46.56	220.38
3	105	30.72	28.00	10.81	45.16	-34.06	171.81
4	110	30.15	24.97	12.00	43.38	-26.38	148.13
5	110	35.24	35.00	6.34	55.03	-89.31	176.00
6	102	27.69	25.50	7.09	50.69	-120.75	117.13
7	102	29.06	29.69	3.16	52.44	-122.69	167.13
8	107	42.55	31.50	8.50	67.75	-48.88	196.63
9	94	38.53	31.69	7.19	62.06	-110.13	249.69
10	81	20.87	18.13	-15.25	52.13	-157.00	158.88

African-American

Variable	N	Mean	Median	Q1	Q3	Minimum	Maximum
AfAm_99	783	556.34	549.38	481.00	626.13	309.94	903.50
AfAm_2k	782	584.17	581.44	510.08	653.28	322.75	920.63
afamimp	782	27.75	25.50	-4.20	55.30	-121.13	235.81

Descriptive Statistics: afamimp by CARank_99

CARank_99	N	Mean	Median	Q1	Q3	Minimum	Maximum
1	72	21.35	14.50	-5.98	43.20	-99.31	166.44
2	88	25.36	26.47	0.80	46.09	-102.38	145.88
3	82	34.74	29.41	3.42	59.55	-109.88	235.81
4	91	32.52	25.50	4.25	55.56	-64.13	170.63
5	81	32.38	35.50	-2.19	59.75	-81.88	212.44
6	79	36.24	33.25	-2.75	70.38	-79.13	204.63
7	76	20.93	19.44	-16.44	64.78	-120.38	227.00
8	79	34.37	27.75	0.00	54.50	-78.63	210.75
9	68	28.59	33.06	-15.28	58.94	-97.75	197.75
10	66	5.87	1.88	-25.34	39.84	-121.13	178.75

Asian

Variable	N	Mean	Median	Q1	Q3	Minimum	Maximum
Asian_99	798	744.44	760.19	672.50	839.56	402.88	972.50
Asian_2k	797	761.87	778.63	684.75	858.44	404.25	987.50
asianimp	797	17.30	16.13	-2.97	38.69	-234.63	211.50

Descriptive Statistics: asianimp by CARank_99

CARank_99	N	Mean	Median	Q1	Q3	Minimum	Maximum
1	53	15.00	17.50	-11.31	43.63	-230.50	171.63
2	73	12.71	10.50	-6.38	40.38	-91.88	137.38
3	71	16.32	15.75	-7.63	51.00	-132.50	126.25
4	87	20.20	18.31	-1.00	40.13	-115.88	123.81
5	79	20.27	21.88	-0.38	44.00	-107.00	141.88
6	84	24.61	23.69	2.88	43.53	-234.63	174.00
7	84	19.22	14.81	-6.38	41.59	-80.44	211.50
8	83	20.10	16.63	-2.63	39.88	-105.00	192.25
9	77	13.97	16.13	-7.31	33.88	-78.75	112.63
10	106	10.60	8.50	-0.75	22.56	-45.00	113.75

Hispanic

Variable	N	Mean	Median	Q1	Q3	Minimum	Maximum
hisp_99	1077	551.85	536.75	477.97	612.06	312.44	929.25
hisp_2k	1077	576.09	563.63	503.78	638.19	331.75	938.13
hispimp	1077	24.24	23.31	5.38	44.81	-156.75	215.38

Descriptive Statistics: hispimp by CARank_99

CARank_99	N	Mean	Median	Q1	Q3	Minimum	Maximum
1	106	23.55	23.09	9.14	38.84	-94.19	117.38
2	109	22.50	21.13	5.38	43.19	-83.50	86.56
3	107	26.40	25.63	9.06	37.25	-45.50	215.38
4	112	27.12	27.28	10.88	45.73	-56.13	107.13
5	109	25.36	22.00	3.69	47.03	-53.63	166.94
6	106	25.06	22.19	8.09	45.97	-83.06	124.25
7	107	26.93	25.88	5.25	46.13	-100.75	150.88
8	111	28.62	32.13	7.38	56.63	-139.75	108.38
9	103	18.47	14.63	-3.25	37.38	-156.75	117.25
10	107	17.91	13.00	-11.13	46.00	-139.38	174.88

White

Variable	N	Mean	Median	Q1	Q3	Minimum	Maximum
white_99	1037	708.34	712.75	649.75	773.81	328.25	950.00
white_2k	1037	726.92	733.75	666.38	799.81	338.56	948.25
whiteimp	1037	18.59	17.38	1.88	35.19	-200.06	239.19

Descriptive Statistics: whiteimp by CARank_99

CARank_99	N	Mean	Median	Q1	Q3	Minimum	Maximum
1	63	25.29	23.25	-1.13	46.63	-187.13	239.19
2	101	16.56	14.25	-12.13	47.75	-109.56	165.38
3	102	16.75	12.69	-1.47	34.34	-102.25	114.63
4	110	23.24	25.19	8.66	45.31	-200.06	107.50
5	109	20.86	20.63	2.13	39.50	-66.13	116.50
6	108	19.13	21.69	4.88	37.19	-63.00	125.75
7	108	17.98	15.69	3.81	30.53	-38.63	104.88
8	113	21.13	21.38	8.31	36.19	-55.00	91.88
9	108	16.54	15.88	4.59	29.09	-42.25	73.63
10	115	11.19	10.38	2.25	19.75	-29.13	58.00

Table 16. Improvement for Subgroups: High Schools
Description of School Scores for Subgroups (n > 9)

Socio-economically Disadvantaged

Variable	N	Mean	Median	Q1	Q3	Minimum	Maximum
SD_99	778	517.05	505.28	459.61	558.66	333.94	926.75
SD_2k	778	541.47	532.06	486.34	585.94	375.56	944.63
sdimp	778	24.42	21.97	2.73	45.06	-185.00	231.75

Descriptive Statistics: sdimp by CARank_99

CARank_99	N	Mean	Median	Q1	Q3	Minimum	Maximum
1	80	22.79	18.28	3.36	38.75	-24.38	105.19
2	79	22.20	19.38	2.81	37.75	-33.38	107.13
3	80	30.90	24.13	13.77	45.14	-34.69	114.50
4	79	27.62	21.94	8.13	48.44	-66.94	186.69
5	75	21.42	24.13	3.13	44.69	-54.13	91.63
6	86	29.17	25.22	3.22	46.45	-67.13	231.75
7	78	30.86	25.28	-3.61	56.44	-154.50	217.13
8	73	25.92	21.44	2.19	52.69	-93.13	133.13
9	75	21.90	16.50	-7.50	49.38	-103.50	162.50
10	73	9.77	12.38	-15.94	39.81	-185.00	188.75

African-American

Variable	N	Mean	Median	Q1	Q3	Minimum	Maximum
AfAm_99	598	542.10	531.63	481.59	594.44	351.13	953.88
AfAm_2k	597	558.83	551.50	503.59	608.88	200.00	953.63
afamimp	597	17.01	14.38	-8.63	42.84	-475.25	177.75

Descriptive Statistics: afamimp by CARank_99

CARank_99	N	Mean	Median	Q1	Q3	Minimum	Maximum
1	57	22.81	13.81	-5.34	43.84	-29.94	138.88
2	61	15.94	12.25	-4.03	41.84	-75.25	165.88
3	63	22.45	23.88	-3.13	41.50	-56.88	116.38
4	64	20.40	22.13	-0.09	37.22	-65.75	106.06
5	57	24.28	12.88	-6.69	46.56	-46.88	177.75
6	62	16.90	13.88	-3.45	34.92	-52.38	167.50
7	54	33.88	24.69	-5.34	72.91	-83.38	171.50
8	64	4.34	13.81	-20.94	44.72	-475.25	165.00
9	55	6.12	-0.63	-20.88	41.13	-159.75	148.38
10	60	4.83	-1.75	-24.13	35.03	-83.38	97.00

Asian

Variable	N	Mean	Median	Q1	Q3	Minimum	Maximum
Asian_99	636	698.67	703.94	622.28	781.31	387.00	972.88
Asian_2k	631	714.20	718.63	642.00	796.88	408.25	981.25
asianimp	631	14.24	13.13	-7.25	34.50	-197.63	380.00

Descriptive Statistics: asianimp by CARank_99

CARank_99	N	Mean	Median	Q1	Q3	Minimum	Maximum
1	45	14.18	16.88	-3.19	41.66	-78.56	71.00
2	63	19.79	14.50	-7.75	39.38	-197.63	380.00
3	67	16.69	14.38	-8.38	40.88	-129.00	279.88
4	64	21.97	19.31	4.97	43.78	-119.00	95.88
5	55	11.43	14.38	-8.88	33.25	-99.75	146.63
6	68	15.58	15.88	-7.06	37.78	-83.00	130.50
7	59	12.19	11.50	-18.88	40.38	-84.13	242.94
8	65	10.49	7.00	-14.88	27.69	-67.13	117.63
9	65	10.68	13.13	-5.38	32.13	-108.88	73.63
10	80	9.89	10.56	-6.47	27.75	-70.50	204.75

Hispanic

Variable	N	Mean	Median	Q1	Q3	Minimum	Maximum
hisp_99	798	535.92	518.13	472.84	585.03	351.38	937.00
hisp_2k	798	552.79	540.06	489.19	598.25	363.00	933.88
hispimp	798	16.86	16.13	-0.02	35.41	-177.63	118.38

Descriptive Statistics: hispimp by CARank_99

CARank_99	N	Mean	Median	Q1	Q3	Minimum	Maximum
1	80	20.18	18.84	5.63	36.34	-41.13	65.38
2	81	17.20	17.06	1.81	31.56	-43.88	118.38
3	81	21.29	19.25	6.50	36.72	-21.69	94.06
4	79	23.08	21.63	4.69	40.25	-62.50	83.31
5	76	16.35	16.41	1.06	34.00	-68.25	89.13
6	85	20.77	16.88	5.00	34.03	-58.38	83.38
7	74	15.87	15.25	-8.09	41.48	-66.88	89.38
8	81	15.23	13.88	-3.13	36.88	-93.31	98.50
9	79	14.79	11.13	-10.25	34.38	-74.75	117.13
10	82	3.88	2.69	-19.56	24.75	-177.63	114.00

White

Variable	N	Mean	Median	Q1	Q3	Minimum	Maximum
white_99	778	695.69	693.69	645.16	747.03	405.31	959.88
white_2k	778	710.18	711.88	662.31	757.66	478.44	964.88
whiteimp	778	14.48	10.88	-4.75	30.13	-76.69	194.69

Descriptive Statistics: whiteimp by CARank_99

CARank_99	N	Mean	Median	Q1	Q3	Minimum	Maximum
1	49	34.07	30.50	0.94	66.81	-63.88	167.75
2	80	10.28	9.38	-11.13	29.75	-76.69	169.00
3	80	18.53	13.69	-0.38	36.78	-69.63	102.63
4	80	20.75	20.56	-2.88	40.00	-42.00	110.88
5	76	16.62	16.19	-1.31	31.91	-56.25	75.13
6	86	13.40	12.00	0.63	24.97	-61.13	82.38
7	79	19.35	12.38	-3.00	38.38	-35.63	194.69
8	82	7.92	6.88	-10.56	25.97	-35.25	55.13
9	81	7.61	6.13	-7.56	22.75	-39.13	66.75
10	85	4.98	6.63	-5.69	16.38	-40.13	72.00

---------- END Section 2 Improvement----------

Section 3. Demographic Measures and API Scores

A. School-size and API Scores

One structural variable of possible interest in understanding API scores is school size. Remember that the API only includes tested students in Grades 2 through 11, and exclusions of students for district mobility and nonstandard test accommodations further reduce the number of students included in the API. Plus small schools (< 100) are not included in the main API. The number of students reported here will be less than total enrollment (although with a little work these summaries could be constructed for total enrollment rather than number of students included in the API).

Start with descriptive statistics for the number of students in the year 2000 API (School Size for API which is denoted by N_API) in Table 17. Looking across school types, Middle Schools have about twice the number of API students as Elementary Schools and High Schools have about three times the number as Elementary Schools. Table 17 also includes correlations between school API and N_API within-each school type for both 1999 and 2000 data. These correlations are negative, but small. Yet these correlations have been cited by some analysts as important: for example, the California Budget Project asserted: "School enrollment was strongly and negatively correlated with API scores, meaning that as school size increases API scores decrease" ("What do the 2000 API results tell us about California's schools?" CPB, March 2001).

Table 17. School Size for API

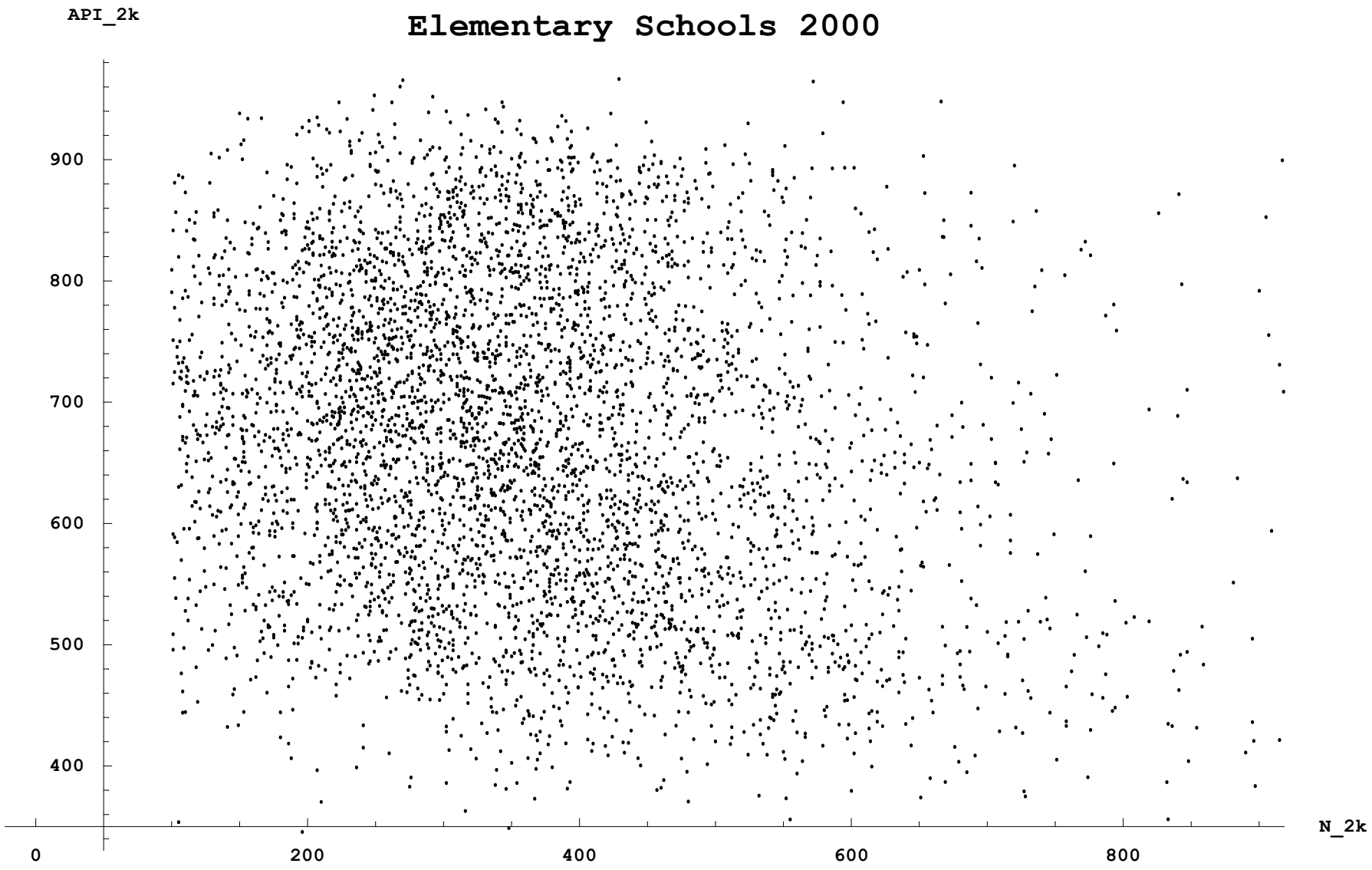
Descriptive Statistics: N_API

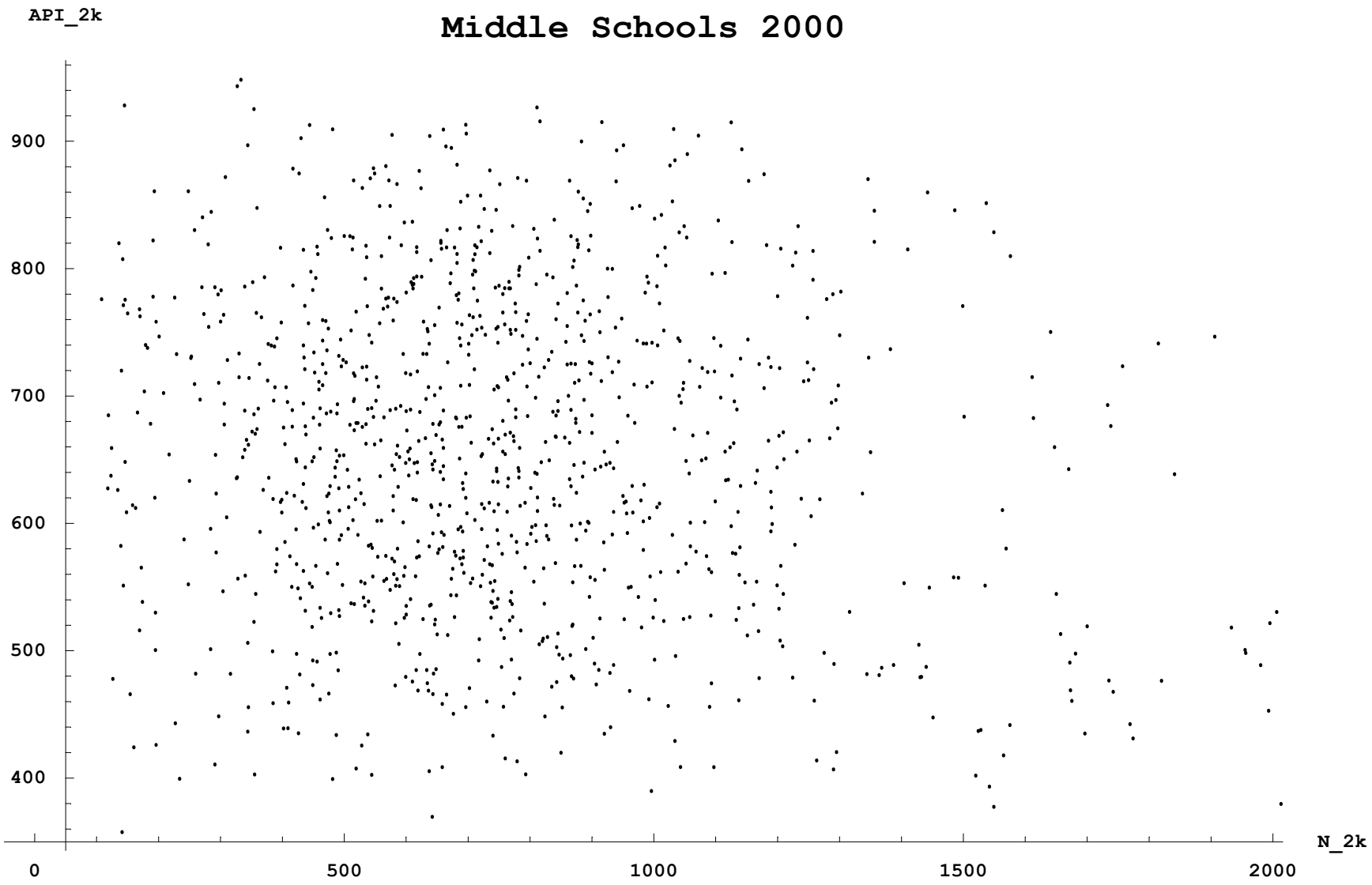
Variable	N	Mean	Median	Q1	Q3	Minimum	Maximum
ELEM_2k	4776	365.92	348.00	256.0	450.0	100	1456
MID_2k	1125	775.1	717.0	519.0	940.5	108	3862
HIGH_2k	854	1117.7	1128.0	657.5	1464.8	101	3126

Correlations: API, N_API

	Elem	Middle	High
1999	-.19	-.175	-.091
2000	-.213	-.178	-.073

In beginning statistics courses students are taught never to interpret a correlation without carefully examining the corresponding scatterplot. These scatterplots (API plotted against N_API for each school type) are provided in the following pages. From these plots one wouldn't conclude a notable relationship between school size and API. The High School plot reveals little dependence. For Elementary Schools, the ten schools with size above 1000 have strong influence on the correlation coefficient. This pattern is seen more vividly for Middle Schools where the six schools of size 2500 and above are very low scoring schools (API 450 and below) with the remaining 1100 schools of size below 2000 showing little dependence of API on school size.


API_2k
Elementary Schools 2000
900
800
700
600
500
400
0
200
400
600
800
N_2k


Middle Schools 2000
API_2k
900
800
700
600
500
400
0
500
1000
1500
2000
N_2k

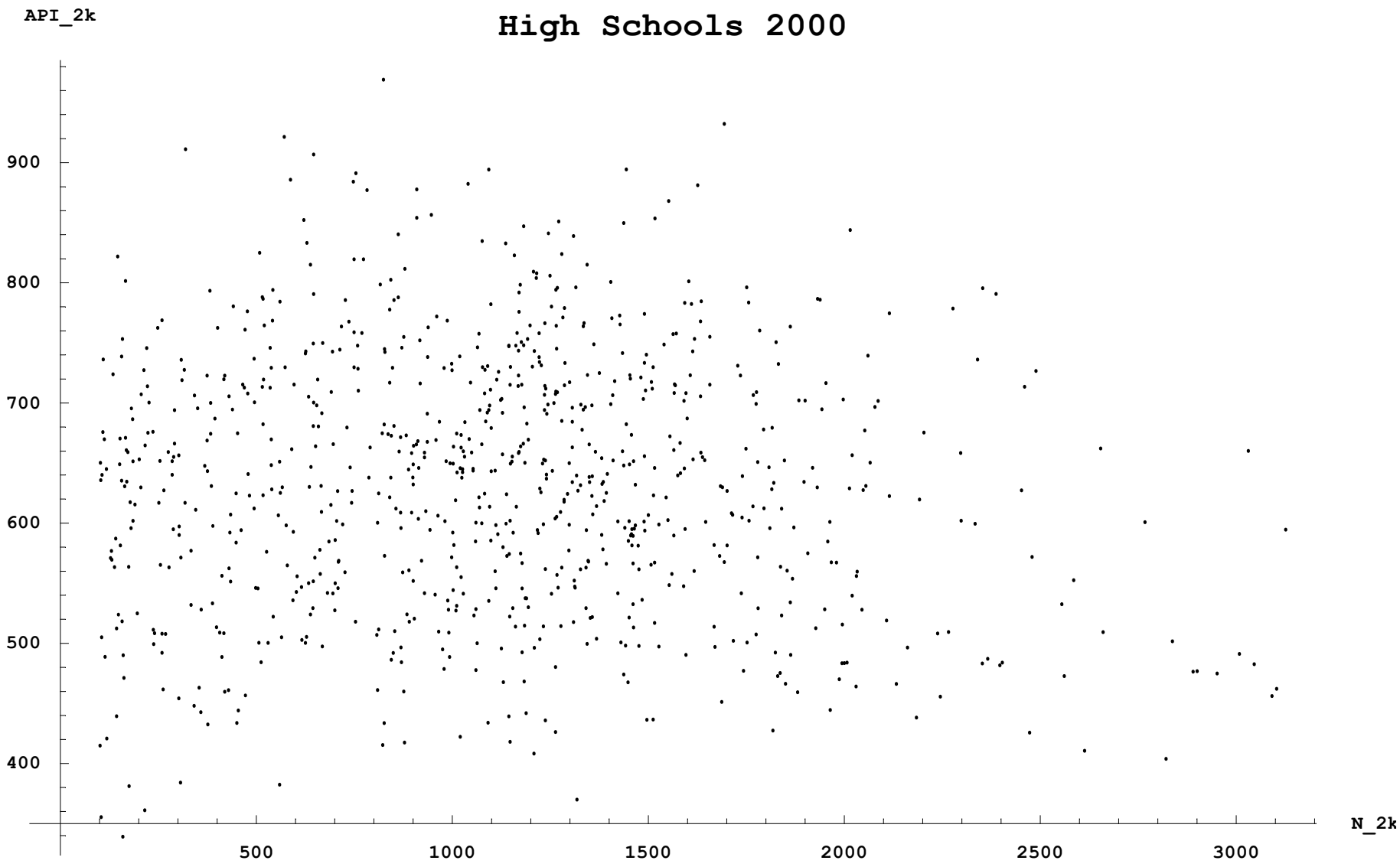

High Schools 2000
API_2k
900
800
700
600
500
400
500
1000
1500
2000
2500
3000
N_2k

Table 18 represents an attempt to give a better description of the relation between scores and school size than is provided by the correlation metric. For each school type, describe the distribution of school sizes at each statewide decile. A meaningful relation between school size and API score would be seen if the size of schools in the lower deciles exceeded (in an educationally significant manner) the size of schools in the higher deciles. Except for the lowest deciles of Elementary Schools, school size appears rather uniform (in median and quartiles) across the statewide deciles. For example, the 87 High Schools scoring in statewide decile 10 (top decile) have median size 1136 which exceeds the median size of High Schools in statewide decile 2 (and is close to that for statewide deciles 1 and 3). Similarly, the median size of Middle Schools top decile exceeds that for deciles 3 and 4.

Table 18. Descriptive Statistics: N_API by CARank_2k

	Elementary			
CARank_2k	N	Median	Q1	Q3
1	472	444.50	339.00	585.25
2	477	395.00	282.00	494.50
3	485	368.00	272.00	461.00
4	477	350.00	248.00	453.00
5	479	334.00	241.00	431.00
6	472	316.50	234.00	415.00
7	478	322.00	236.00	411.25
8	477	307.00	237.00	403.50
9	476	327.50	243.00	423.75
10	483	348.00	277.00	425.00

	Middle			
CARank_2k	N	Median	Q1	Q3
1	110	745.0	508.5	1533.8
2	111	813.0	615.0	1091.0
3	110	715.0	542.5	961.5
4	115	704.0	521.0	925.0
5	111	667.0	475.0	896.0
6	110	664.0	507.8	954.5
7	111	732.0	512.0	976.0
8	115	723.0	530.0	954.0
9	110	678.5	474.5	858.8
10	115	728.0	522.0	1013.0

	High			
CARank_2k	N	Median	Q1	Q3
1	80	1185.5	451.0	1998.5
2	84	1061.5	618.3	1524.3
3	89	1154.0	672.0	1468.5
4	82	1150.0	697.0	1468.8
5	88	1224.5	672.0	1548.8
6	83	1053.0	739.0	1410.0
7	87	967.0	590.0	1279.0
8	87	1238.0	646.0	1508.0
9	87	1083.0	717.0	1334.0
10	87	1136.0	747.0	1407.0

B. Relation between API and SCI, and Range of Similar School scores: It's Not "all zip codes"

The intent here is to provide another year of data on what is often a controversial topic, the relation between student demographic variables and school test scores. The analyses reported in the next two subsections update and replicate the results for the 1999 data described in the previous edition of Interpretive Notes. Both years' results refute the slogan of the California Teachers Association that "It's all zip codes".

The first analyses use school level data: school API scores and the SCI, the "School Characteristics Index". The SCI, computed by CDE for each school, is "a composite of the school's demographic characteristics" [see for example the "Parent Guide to the Similar Schools Ranks based on the Academic Performance Index" on the PSAA web-site]. The subsection following this one contains a second set of analyses at the individual level, using individual scores on two similar demographic measures (Parent Education and the classification of a student into a Socioeconomically Disadvantaged subgroup or not).

School-level Analysis

Each school has an SCI value; for elementary schools these range from 127 to 197 with a median of 159.

Descriptive Statistics: SCI year 2000

SCI	N	Mean	Median	Q1	Q3	Minimum	Maximum
Elem	4775	158.86	158.99	146.35	171.34	126.86	196.98
Middle	1125	156.74	157.49	145.05	168.16	112.87	191.28
High	853	154.34	155.13	145.25	163.06	124.97	186.95

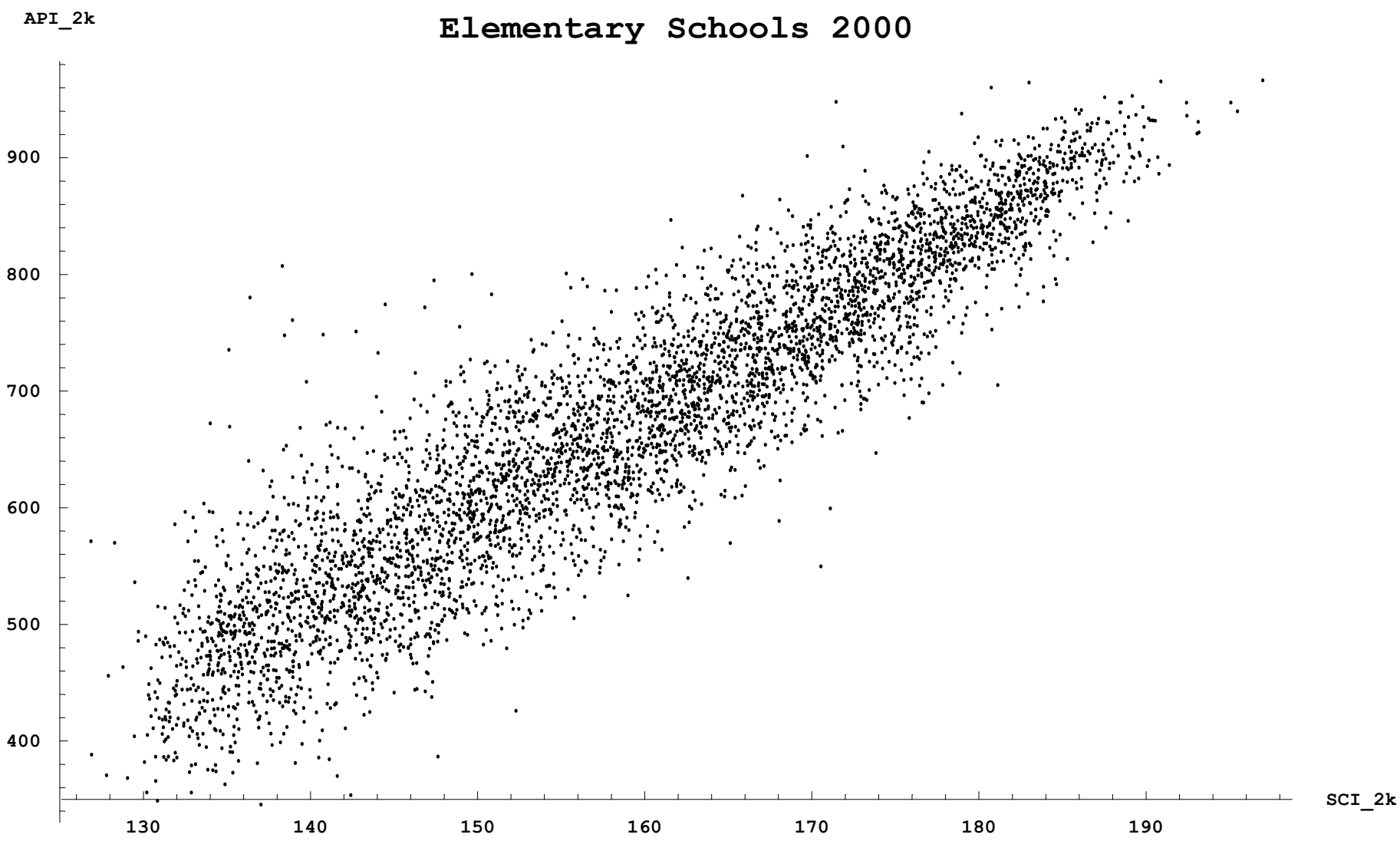
To examine the relation of SCI and API, one common first look is through the correlation coefficients:

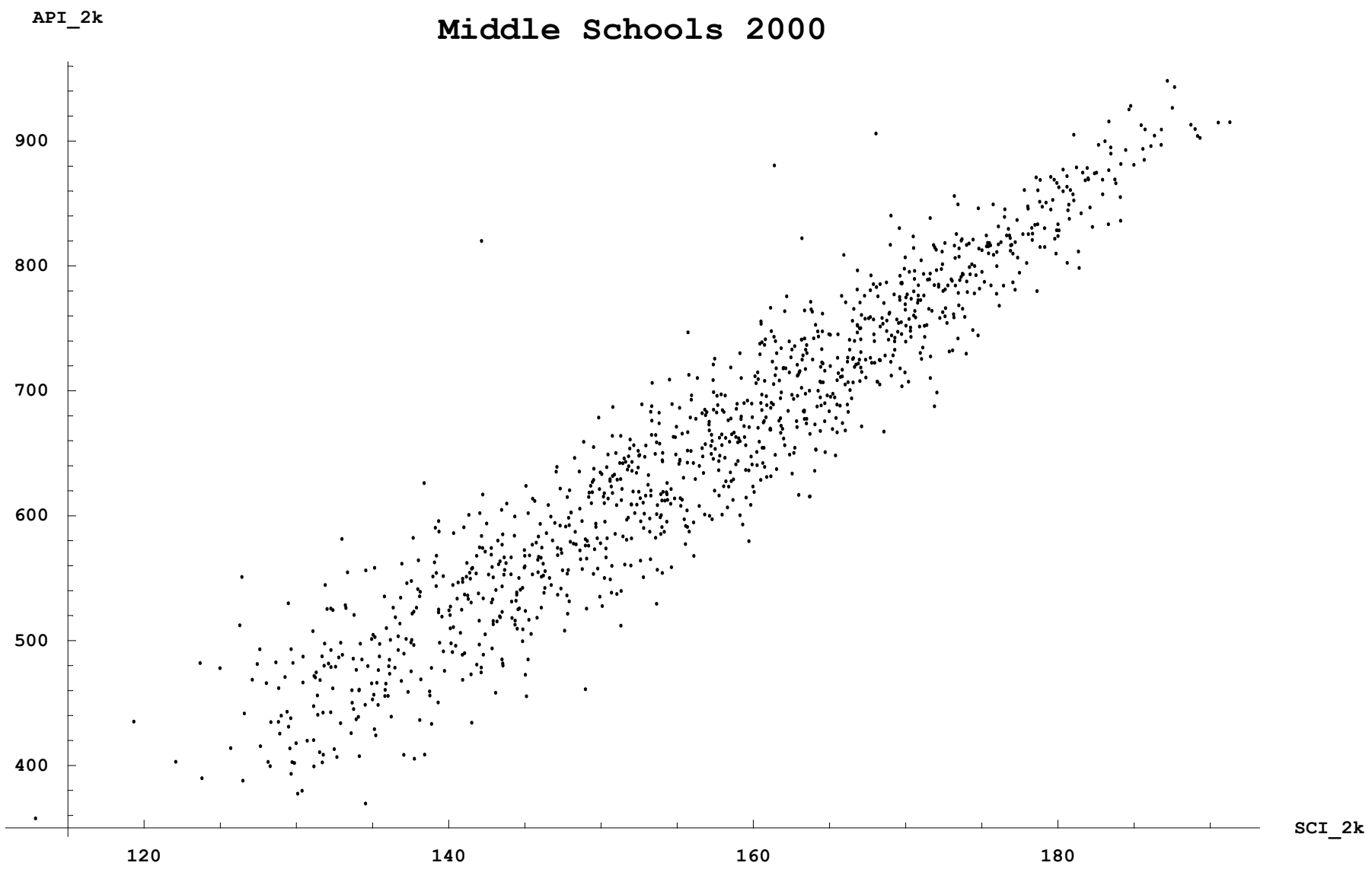
	Elem	Middle	High
Pearson correlation of SCI and API =	0.923	0.951	0.939

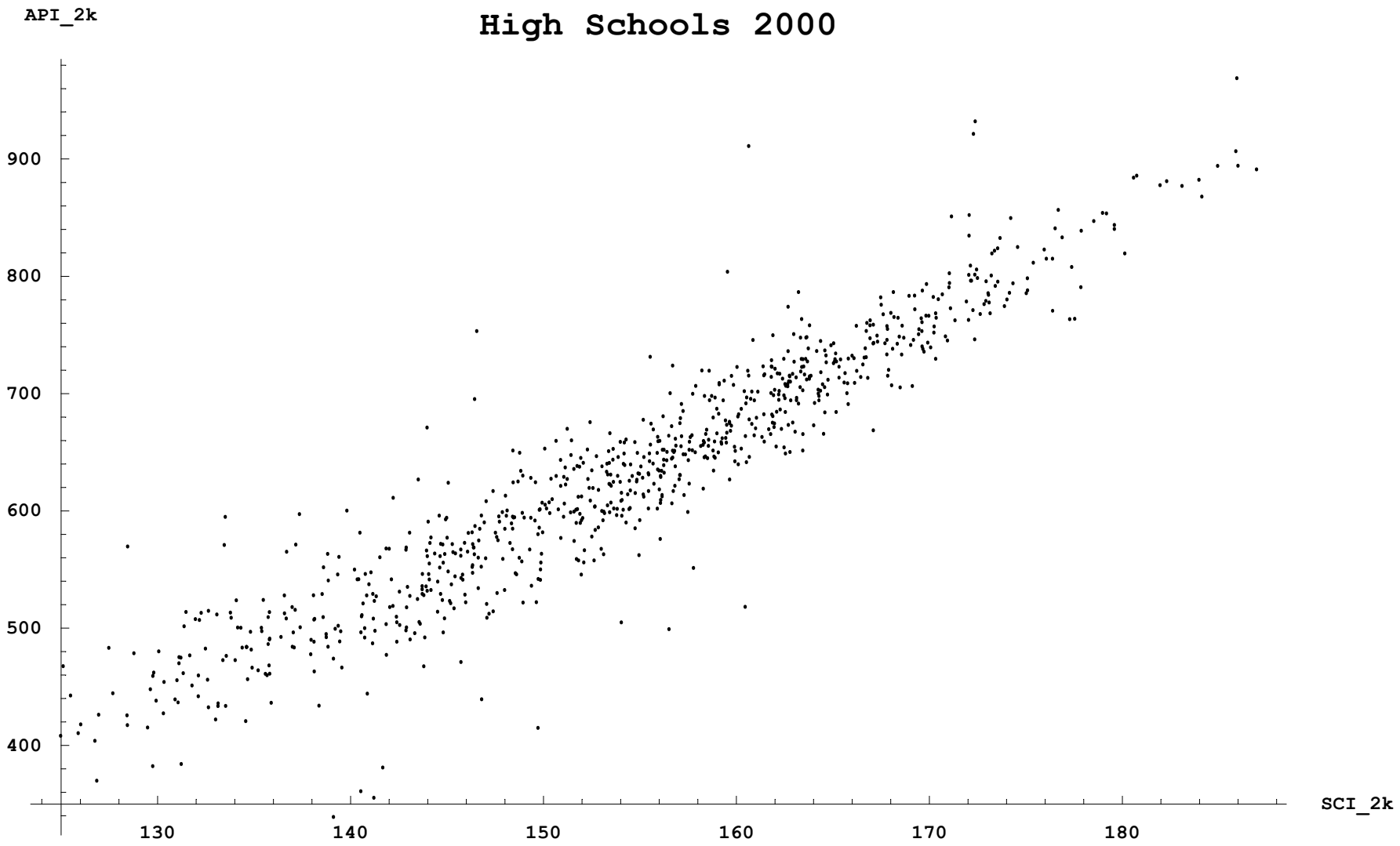
(These correlations are nearly identical to those in the 1999 data.) Many would regard these correlations as quite large, and these would be interpreted by educational researchers and others to indicate a very strong relation between school results and demographic characteristics This dogma appears in many press reports.

To see that even a correlation of .93 is rather far from 1.0, simply examine the corresponding scatterplots. The following 3 pages display scatterplots of API vs SCI for each school type. Even though API scores increase as the SCI index increases, the plots also show considerable range on API (perhaps 250-300 pts) for a chosen level of SCI. (The reader is encouraged to take a ruler the these scatterplots.)

The basic problem is that most analysts and interested parties don't have a good understanding of the correlation coefficient. It is undeniable that schools with the highest values on the demographic variables very very rarely score poorly on statewide assessments and also that schools with the lowest values on the demographic variables infrequently score well. That's the reality that drives the value of the correlation coefficient, but it is far far from the whole story.


Elementary Schools 2000
API_2k
900
800
700
600
500
400
130
140
150
160
170
180
190
SCI_2k


Middle Schools 2000
API_2k
900
800
700
600
500
400
120
140
160
180
SCI_2k


High Schools 2000
API_2k
900
800
700
600
500
400
130
140
150
160
170
180
SCI_2k

The range of scores for similar schools--RangeSimSAPI

In the API reporting, the SCI is used to identify the "100 other schools with similar demographic characteristics" that are listed as Similar Schools on the API web-site. For elementary schools, this list, composed of the 50 schools with closest SCI scores above the school and the 50 SCI scores below the school, comprises a (reasonably narrow) 2% slice out of the distribution of elementary schools. For High Schools, this same slice of schools is relatively wider, encompassing 12% of all High Schools.

For those 100 'similar' schools how similar are their API scores? Specifically, obtain the range of the corresponding 100 API scores (maxAPI - minAPI). That's the "Range of Similar Schools API", abbreviated as RangeSimSAPI when necessary. Anyone can do this calculation for a specific individual school using the listing available from the PSAA web-site; the results below are simply the consequence of repeating that calculation 6753 times.

The Statewide results at the top of Table 19 indicate that half the Elementary Schools show a range of their Similar Schools API scores of at least 257 points, and 75 percent of elementary schools have a range of their Similar Schools API scores of at least 222 points. A good way to calibrate these numbers is to note that for elementary schools the statewide decile categories typically span 45 API points. Thus 223 points represents a span of about 5 statewide deciles, and the median range 257 represents a span of 6 statewide deciles. For High Schools where the width of a statewide decile is less, median width 37 points, the results for RangeSimSAPI, median 255 and lower quartile 227, translate into 75 percent of High Schools having similar schools spanning at least six state deciles and half of High Schools having similar schools spanning at least seven state deciles.

The lower part of Table 19 breaks down the Range Similar School API for each year 2000 State Decile. The table shows that indications from the entire state also hold up when examined for each decile. That is, there are 477 elementary schools placed in the second state decile. Half of those schools have Range Similar School API of at least 333 points, and 75 percent of those schools have Range Similar School API of at least 299 points. Furthermore, there are 84 High Schools placed in the second state decile on API scores. Half of those schools have RangeSimSAPI of at least 286 points. Another way of calibrating this value would be to start with a score in the middle of state decile 2, which would be 510. Adding 286 produces a score of 796, a score in the middle of tenth (top) decile schools. (Similar arithmetic using the lower quartile of the similar school ranges, 262, would also produce a score that reaches the top decile.)

I would submit that these rather wide ranges of API scores for schools having quite similar demographic measures (seen both in the year 2000 and tear 1999 data) refute the claims frequently seen in the press that demographic characteristics predominately determine the school performance: e.g., as the monikers "Affluent Performance Index" or "Affluent Parent Index" insinuate. Same goes for the previously mentioned slogan of the CTA: It is not all zip codes.

Table 19. Range Similar School API

Descriptive Statistics: RangeSimSAPI

Variable	N	Mean	Median	Q1	Q3	Minimum	Maximum
Elem	4775	268.88	257.00	222.00	308.00	125.00	435.00
Middle	1125	224.26	212.00	178.00	238.00	131.00	414.00
High	853	258.77	255.00	227.00	314.00	121.00	398.00

Descriptive Statistics: RangeSimSAPI by CARnk

RangeSimSAPI for all Elementary Schools at each State Decile

	RangeSimSAPI						
CA Decile	N	Mean	Median	Q1	Q3	Minimum	Maximum
1	472	332.56	329.00	286.00	379.00	205.00	435.00
2	477	336.78	333.00	299.00	379.00	205.00	435.00
3	485	314.58	309.00	269.00	357.00	204.00	435.00
4	477	283.49	272.00	244.00	309.00	205.00	435.00
5	478	269.87	264.50	241.00	295.00	184.00	426.00
6	472	254.32	246.00	234.00	283.00	156.00	408.00
7	478	249.95	243.00	217.00	276.00	166.00	409.00
8	477	242.20	235.00	204.00	276.00	143.00	398.00
9	476	221.19	215.00	196.00	238.00	138.00	398.00
10	483	184.65	188.00	150.00	210.00	125.00	348.00

RangeSimSAPI for all Middle Schools at each State Decile

	RangeSimSAPI						
CA Decile	N	Mean	Median	Q1	Q3	Minimum	Maximum
1	112	239.65	224.00	212.25	248.75	179.00	414.00
2	111	287.47	257.00	212.00	385.00	158.00	414.00
3	113	263.50	223.00	204.00	385.00	174.00	414.00
4	111	231.03	217.00	195.00	226.00	151.00	414.00
5	116	214.38	204.00	188.00	226.00	158.00	301.00
6	113	214.96	197.00	179.00	257.00	157.00	301.00
7	108	230.99	238.00	193.00	264.75	163.00	301.00
8	113	220.73	238.00	169.50	257.00	131.00	301.00
9	113	178.19	168.00	160.00	173.00	131.00	265.00
10	115	164.69	169.00	160.00	169.00	136.00	265.00

RangeSimSAPI for all High Schools at each State Decile

	RangeSimSAPI						
CA Decile	N	Mean	Median	Q1	Q3	Minimum	Maximum
1	80	250.21	228.00	228.00	262.00	215.00	339.00
2	84	284.74	286.50	262.00	315.00	175.00	372.00
3	89	300.17	314.00	273.00	332.00	171.00	372.00
4	82	277.83	262.00	232.00	339.00	134.00	398.00
5	88	242.15	232.00	227.00	261.00	171.00	393.00
6	83	267.65	232.00	227.00	304.00	138.00	393.00
7	87	299.0	304.0	232.0	393.0	128.0	393.0
8	86	243.2	183.0	138.0	393.0	121.0	393.0
9	87	190.43	138.00	135.00	264.00	121.00	393.00
10	87	233.10	239.00	227.00	239.00	126.00	393.00

Another way to try to calibrate these results for the range of similar school API scores is to think in terms of the difference in API scores between schools with the highest and lowest scores on the SCI index (think of this as the gap between the "richest" and "poorest" schools). Take the top 10 percent of schools on the SCI index and calculate their median API score. Then do the same for the bottom 10 percent of schools on the SCI index and, finally, calculate the difference (shown below).

	Elem	Middle	High
median API, top 10 percent on SCI	873	854	802
median API, bottom 10 percent on SCI	478	462	470
difference	395	392	332

How to use this display to describe range of similar schools API scores? The API gap for Elementary Schools between top and bottom SCI is 395. Half of the Elementary Schools have range of similar schools of at least 257; and as 257/395 =.65, we see that the median range of similar schools scores is almost 2/3 as large as the API gap between top and bottom SCI. Of the 4775 Elementary Schools, 362 (7.6%) have range of similar schools greater than 395, and almost all Elementary schools (4612 or 96.6%) have a range of similar schools greater than half the API gap between top and bottom SCI (395/2 = 197.5). This is another way of trying to show that schools with similar demographics have wide ranges of performance, even when compared to the differences in performance between the most demographically advantaged and disadvantaged schools.

Say it with R-squared

In Spring 2001 considerable press attention was given to an API report released by the California Budget Project (March 2001, previously cited). The part of the report relevant here is the multiple regression analysis that is summarized in the report as:

> "CPB's analysis found that over 80 percent of the variation in schools' 2000 API scores can be explained by the social and economic characteristics of a school's students, the size of the school, and the quality of its teachers. Indeed the share of students who were enrolled in free lunch programs, school size, and the percentage of Latino enrollment can explain 75 percent of the variation in schools test scores" (p.4)

The correct reaction to these findings is a big 'So What'.
The cited over "80 percent" and "75 percent" above refer to the squared multiple correlation (R-squared) expressed in a percentage metric. Should we be at all impressed by those numbers? The R-squared measure, introduced in basic statistics courses, is the square of the correlation between the outcome (API) and fit (combination of predictors). At the beginning of this section the correlation between SCI and API was discussed. Using the SCI demographic index as the regression predictor of API would produce squared multiple correlations of 85.2, 90.4, and 88.2 percent for Elementary, Middle and High Schools respectively (higher values than the CBP regressions). Regardless of whether the correlation is expressed as .923 or as .923*.923 = .852 (the R-squared), neither measure is compelling. The reality is that wide ranges of API scores exist for schools having quite similar demographic measures, seemingly high correlations notwithstanding--to repeat, .92 is a long way from 1.0.

The View from Proportion Socioeconomically Disadvantaged.

A simpler demographic measure than the full SCI index is the proportion of students in a school who are classified as Socioeconomically Disadvantaged in the API reports. Denote this proportion as propSD (number of "Socioeconomically Disadvantaged Tested" divided by "Number of Valid Tests" from the API research files). In the previous Interpretive Notes using the 1999 data descriptive Statistics and displays were given for propSD . For comparison these are repeated with the Elementary Schools using year 2000 data.

Descriptive Statistics: propSD Elementary Schools

N	Mean	Median	Q1	Q3	Minimum	Maximum
4776	0.530	0.544	0.247	0.817	0.0	1.0

Of most interest is the relation between propSD and school performance. The correlation between propSD and API has magnitude 0.894, somewhat less than the .923 API, SCI correlation.

Another repeat from the previous Interpretive Notes for the 1999 data is a boxplot of the propSD for each API decile ("Statewide Rank" labeled as CARank). The plot shows that schools in the lower deciles tend to have higher proportions of students meeting the reporting criteria for SD, but again the relation is far from deterministic. The boxplot serves to provide some balance to the message of the RangeSimSAPI analyses. There's no claim here that school-level demographic factors are unrelated to school-level academic performance. However, it does seem that this relationship is sometimes overstated.

The propSD variable can also be used to provide another version of the range of scores for similar schools analyses. Compute a RangeSimSAPI using propSD to identify 'similar schools' (i.e. take the 50 nearest neighbors in each direction based on propSD instead of SCI). The results show a somewhat larger range of API scores for these 'similar' schools than was seen using the full SCI index.

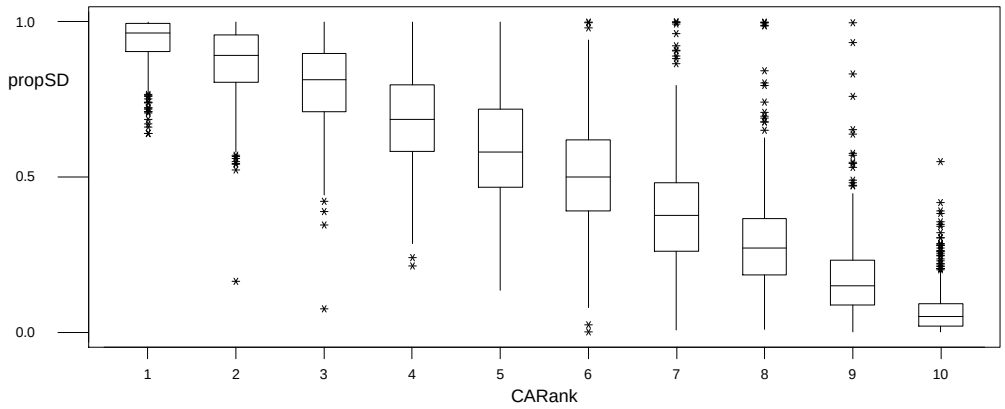
Table 19a. Range Similar School API using propSD

Descriptive Statistics: RangeSimSSDAPI for all Elementary Schools

N	Mean	Median	Q1	Q3	Minimum	Maximum
4776	309.25	292.00	261.00	360.00	153.00	462.00

RangeSimSSDAPI for all Elementary Schools at each State Decile

		RangeSimSSDAPI					
CA Decile	N	Mean	Median	Q1	Q3	Minimum	Maximum
1	472	383.70	385.00	354.00	421.00	246.00	462.00
2	477	358.54	370.00	324.00	394.00	248.00	462.00
3	485	343.36	336.00	299.50	388.00	215.00	462.00
4	477	318.50	307.00	278.50	342.00	205.00	462.00
5	479	298.73	285.00	265.00	330.00	205.00	462.00
6	472	291.00	281.00	263.00	321.00	175.00	462.00
7	478	282.20	277.00	254.75	296.00	166.00	437.00
8	477	278.12	265.00	250.00	292.00	193.00	462.00
9	476	276.89	259.00	232.00	313.00	153.00	437.00
10	483	262.12	254.00	227.00	261.00	153.00	425.00


1.0
propSD
0.5
0.0
1
2
3
4
5
6
7
8
9
10
CARank

C. Individual API scores and demographics

The considerable problems in describing individual processes (e.g. student academic achievement) using group (e.g. school-level data) are well-documented in every area of social science, with terminology like "aggregation bias" or "ecological fallacy". Correlation and regression coefficients are widely known to be badly distorted by aggregation (overall means less so). This subsection provides some individual-level descriptive data to supplement the analysis in the RangeSimSAPI tables (which are constructed from school-level achievement and demographics).

An academic performance score for each individual is constructed by considering each student to be a school of size 1. For an elementary student with complete data on all four tests the measure is obtained by taking the quintile scores (the weighting factors in the API documentation), and applying the content weights to obtain a score in the 200-1000 metric. For example, an elementary student scoring at the national 50th percentile on each of the four tests would have a score of 700. To be explicit, use the transformation for each content area:

Percentile Rank	1-19	20-39	40-59	60-79	80-99
API weighting factor	200	500	700	875	1000

and then use the content area weights to form the average score for the individual. For students with data on all four tests this measure is called APIind. For students with missing data on at least one test, but no more than three tests, a second individual measure, APIindR, is constructed as follows: form the weighted sum for the non-missing content areas and then rescale by dividing by the sum of the content weights for the non-missing data. For example, if a student had scores on Reading, Language, and Spelling, but a missing score on Math, the APIindR score would be the weighted sum for the 3 non-missing tests divided by .6, the sum of the non-missing content weights. For that student the APIind score would be missing. To recap: Variable APIindR is computed for all students in the API; Variable APIind is missing if not all 4 scores are available (e.g. test exclusions).

The first tables use Parental Educational Level, defined as the educational level of the most educated parent:

1. Not a high school graduate
2. High school graduate
3. Some college
4. College graduate
5. Graduate school/post graduate training

In 2000 Parent Education responses, there were 476937 responses missing and 943 responses double-punched that were not included in the tables below.

The tables below illustrate two clear facts which need to be balanced in forming interpretations. Certainly, the individual achievement does increase with increasing reported parental education level. But, even for students having neither parent a high school graduate, a considerable proportion show good academic performance (e.g., a quarter of those students score well above state mean).

Table 20. Elementary Individual API's by ParentED

Elementary Individual API's by ParentED: APIind

Quantile	ParentEd=1	ParentEd=2	ParentEd=3	ParentEd=4	ParentEd=5
100% Max	1000.00	1000.00	1000.00	1000.00	1000.00
99%	1000.00	1000.00	1000.00	1000.00	1000.00
95%	917.50	981.25	1000.00	1000.00	1000.00
90%	848.75	943.75	981.25	1000.00	1000.00
75% Q3	696.25	841.25	912.50	962.50	1000.00
50% Median	490.00	647.50	771.25	875.00	943.75
25% Q1	301.25	425.00	565.00	700.00	816.25
10%	200.00	245.00	365.00	485.00	616.25
5%	200.00	200.00	245.00	346.25	470.00
1%	200.00	200.00	200.00	200.00	245.00
0% Min	200.00	200.00	200.00	200.00	200.00
	n=239154	n=304362	n=300322	n=245705	n=131397

Elementary Individual API's by ParentED: APIindR

Quantile	ParentEd=1	ParentEd=2	ParentEd=3	ParentEd=4	ParentEd=5
100% Max	1000.00	1000.00	1000.00	1000.00	1000.00
99%	1000.00	1000.00	1000.00	1000.00	1000.00
95%	917.50	981.25	1000.00	1000.00	1000.00
90%	846.25	943.75	981.25	1000.00	1000.00
75% Q3	691.25	823.75	912.50	962.50	1000.00
50% Median	475.00	640.00	770.00	872.50	943.75
25% Q1	290.00	410.00	560.00	696.25	815.00
10%	200.00	245.00	350.00	470.00	610.00
5%	200.00	200.00	245.00	335.00	455.00
1%	200.00	200.00	200.00	200.00	200.00
0% Min	200.00	200.00	200.00	200.00	200.00
	n=254759	n=319071	n=310402	n=251705	n=133807

A second, somewhat redundant table, uses the individual student's classification into the Socioeconomically Disadvantaged (SD) subgroup. (It's interesting that over half of the Elementary School students are classified as SD). Clearly, there is a large difference between the distribution of scores for the SD subgroup and those who are not in that subgroup. But, also, more than a quarter of the students classified as SD have scores above 760 on either measure. A further analysis might investigate school membership (e.g. their school's API decile) associations for those students.

Table 21. Elementary Individual API's by Socially Disadvantaged or not

APIind measure

SocDis=N	APIind	SocDis=Y	
Quantile		Quantile	
100% Max	1000.0	100% Max	1000.00
99%	1000.0	99%	1000.00
95%	1000.0	95%	962.50
90%	1000.0	90%	906.25
75% Q3	962.5	75% Q3	767.50
50% Median	867.5	50% Median	560.00
25% Q1	680.0	25% Q1	335.00
10%	470.0	10%	200.00
5%	335.0	5%	200.00
1%	200.0	1%	200.00
0% Min	200.0	0% Min	200.00
n = 761571		n = 910582	

APIindR measure

SocDis=N	APIindR	SocDis=Y	
Quantile		Quantile	
100% Max	1000.00	100% Max	1000.00
99%	1000.00	99%	1000.00
95%	1000.00	95%	955.00
90%	1000.00	90%	898.75
75% Q3	962.50	75% Q3	762.50
50% Median	861.25	50% Median	545.00
25% Q1	670.00	25% Q1	320.00
10%	455.00	10%	200.00
5%	320.00	5%	200.00
1%	200.00	1%	200.00
0% Min	200.00	0% Min	200.00
n = 782294		n = 965330	

note: total 1747624, elementary school students included in 2000 API

D. Explaining Similar School Decile Ranks and Links to State Deciles

The Similar Schools Rank in the API reports is obtained by comparing the target schools's API score with the scores of the target school's 100 nearest neighbors on the SCI index: the "100 other schools with similar demographic characteristics" that are listed as Similar Schools on the API web-site. Those 100 schools can grouped into bins of ten schools based on their API scores, and the Similar School Rank is assigned based on what bin the target school's API falls into. Table 22 shows that overall Similar school ranks approximately even out, with relatively equal proportions in each category.

Table 22. Distribution of Similar schools ranks, Year 2000 Data

	Elem		Middle		High	
SimRank	Count	Percent	Count	Percent	Count	Percent
1	467	9.79	104	9.26	68	8.02
2	481	10.08	102	9.08	82	9.67
3	490	10.27	115	10.24	88	10.38
4	464	9.72	110	9.80	85	10.02
5	477	10.00	117	10.42	95	11.20
6	468	9.81	120	10.69	116	13.68
7	489	10.25	128	11.40	75	8.84
8	449	9.41	114	10.15	74	8.73
9	492	10.31	106	9.44	90	10.61
10	495	10.37	107	9.53	75	8.84
	N=4772		N=1123		N=848	

However it has been the subject of some concern that a cross-tabulation of each school's statewide decile rank and Similar Schools rank reveals uneven distributions of Similar Schools ranks in the lowest and highest deciles. In Table 23 each cell gives the number of schools and the row percent for that count.

For example, of the 472 Elementary Schools in the lowest state decile (Statewide Rank 1) 139 also have the lowest Similar Schools rank (Rank 1), and 139 represents 29.45 percent of the Statewide decile 1 schools. Over half (53.2 percent) of Statewide decile 1 Elementary Schools have Similar Schools ranks of 1 or 2 (68% 1, 2 or 3). And only 2 percent of the Statewide decile 1 Elementary Schools have Similar Schools ranks of 8, 9 or 10. Similarly, for High Schools 69% of Statewide decile 1 schools have Similar Schools ranks of 1, 2 or 3, and none of the Statewide decile 1 schools have Similar Schools ranks above 6.

At the other end of the scale, 42 percent of Statewide decile 10 Elementary schools have Similar Schools ranks of 9 or 10, and only 11 percent of those Statewide decile 10 schools have Similar Schools ranks of 1,2 or 3.

A little bit of thought can reconcile this pattern (also seen in the 1999 data). When a school scores poorly enough to be a member of decile 1, that school will also compare unfavorably to most of its 100 Similar Schools, as not all those schools will score in statewide decile 1. When a school scores well enough to be in statewide decile 10, that school will also compare favorably to most of its 100 Similar Schools, as not all those schools will score in statewide decile 10.

Actually, this perceived imbalance is simply another manifestation of

"It's not all zip codes". If demographics were (just about) perfectly linked with outcomes, then the Similar Schools distribution would consist of values 5 and 6 at each statewide decile (except at the very endpoints where the bottom 50 schools on SCI are at a disadvantage and would have low 1,2,3,4 Similar Schools Ranks and where the top 50 schools on SCI are advantaged and would have high 7,8,9,10 Similar Schools Ranks). The observed range of Similar Schools ranks speaks to how far reality is from the slogans of the CTA.

The propSD measure described in part B can also be used to determine an alternative similar schools rank (i.e. take the 50 nearest neighbors in each direction based on propSD instead of SCI to construct a comparison group). Results are similar, but not identical, to the results using the SCI. Table 23a repeats the display in Table 23 with the similar schools rank based on propSD rather than SCI. The same pattern in the lower and upper deciles is seen.

Table 23. Cross-tabulation of Statewide Decile and Similar Schools Rank

Elementary Schools

Rows: CARank Columns: SimRank

	1	2	3	4	5	6	7	8	9	10	All
1	139	112	69	58	40	28	15	10	1	0	472
	29.45	23.73	14.62	12.29	8.47	5.93	3.18	2.12	0.21	--	100.00
2	61	41	69	68	58	61	43	36	35	5	477
	12.79	8.60	14.47	14.26	12.16	12.79	9.01	7.55	7.34	1.05	100.00
3	49	62	42	42	45	43	68	55	48	30	484
	10.12	12.81	8.68	8.68	9.30	8.88	14.05	11.36	9.92	6.20	100.00
4	39	45	63	59	50	60	41	34	48	36	475
	8.21	9.47	13.26	12.42	10.53	12.63	8.63	7.16	10.11	7.58	100.00
5	52	47	48	39	54	50	63	40	39	46	478
	10.88	9.83	10.04	8.16	11.30	10.46	13.18	8.37	8.16	9.62	100.00
6	44	32	40	46	49	39	39	59	75	49	472
	9.32	6.78	8.47	9.75	10.38	8.26	8.26	12.50	15.89	10.38	100.00
7	30	59	41	42	46	46	54	47	45	68	478
	6.28	12.34	8.58	8.79	9.62	9.62	11.30	9.83	9.41	14.23	100.00
8	25	23	49	44	55	44	60	53	58	66	477
	5.24	4.82	10.27	9.22	11.53	9.22	12.58	11.11	12.16	13.84	100.00
9	22	39	43	35	44	49	51	57	60	76	476
	4.62	8.19	9.03	7.35	9.24	10.29	10.71	11.97	12.61	15.97	100.00
10	6	21	26	31	36	48	55	58	83	119	483
	1.24	4.35	5.38	6.42	7.45	9.94	11.39	12.01	17.18	24.64	100.00
All	467	481	490	464	477	468	489	449	492	495	4772
	9.79	10.08	10.27	9.72	10.00	9.81	10.25	9.41	10.31	10.37	100.00

Middle Schools

Tabulated Statistics: CARank_2k, SimRank_2k

Rows: CARank Columns: SimRank

	1	2	3	4	5	6	7	8	9	10	All
1	31	18	19	19	6	9	9	1	0	0	112
	27.68	16.07	16.96	16.96	5.36	8.04	8.04	0.89	--	--	100.00
2	12	16	13	10	13	13	11	10	8	5	111
	10.81	14.41	11.71	9.01	11.71	11.71	9.91	9.01	7.21	4.50	100.00
3	10	10	8	13	13	11	20	10	10	8	113
	8.85	8.85	7.08	11.50	11.50	9.73	17.70	8.85	8.85	7.08	100.00
4	14	14	10	17	10	6	11	5	8	15	110
	12.73	12.73	9.09	15.45	9.09	5.45	10.00	4.55	7.27	13.64	100.00
5	10	13	13	6	12	14	15	17	9	7	116
	8.62	11.21	11.21	5.17	10.34	12.07	12.93	14.66	7.76	6.03	100.00
6	5	12	13	11	12	14	7	17	11	11	113
	4.42	10.62	11.50	9.73	10.62	12.39	6.19	15.04	9.73	9.73	100.00
7	10	5	10	11	16	15	16	8	6	11	108
	9.26	4.63	9.26	10.19	14.81	13.89	14.81	7.41	5.56	10.19	100.00
8	7	7	16	10	10	6	11	16	15	15	113
	6.19	6.19	14.16	8.85	8.85	5.31	9.73	14.16	13.27	13.27	100.00
9	5	7	8	6	16	18	10	13	18	12	113
	4.42	6.19	7.08	5.31	14.16	15.93	8.85	11.50	15.93	10.62	100.00
10	0	0	5	7	9	14	18	17	21	23	114
	--	--	4.39	6.14	7.89	12.28	15.79	14.91	18.42	20.18	100.00
All	104	102	115	110	117	120	128	114	106	107	1123
	9.26	9.08	10.24	9.80	10.42	10.69	11.40	10.15	9.44	9.53	100.00

High Schools

Rows: CARank Columns: SimRank

	1	2	3	4	5	6	7	8	9	10	All
1	21	17	17	8	13	4	0	0	0	0	80
	26.25	21.25	21.25	10.00	16.25	5.00	--	--	--	--	100.00
2	10	9	9	11	11	11	5	10	8	0	84
	11.90	10.71	10.71	13.10	13.10	13.10	5.95	11.90	9.52	--	100.00
3	8	11	5	14	6	16	7	8	9	4	88
	9.09	12.50	5.68	15.91	6.82	18.18	7.95	9.09	10.23	4.55	100.00
4	5	10	11	4	9	12	8	9	4	10	82
	6.10	12.20	13.41	4.88	10.98	14.63	9.76	10.98	4.88	12.20	100.00
5	4	10	8	14	9	17	8	6	9	3	88
	4.55	11.36	9.09	15.91	10.23	19.32	9.09	6.82	10.23	3.41	100.00
6	8	4	6	7	11	10	5	6	16	8	81
	9.88	4.94	7.41	8.64	13.58	12.35	6.17	7.41	19.75	9.88	100.00
7	8	7	11	6	9	11	8	5	10	11	86
	9.30	8.14	12.79	6.98	10.47	12.79	9.30	5.81	11.63	12.79	100.00
8	3	5	13	6	8	15	10	5	13	8	86
	3.49	5.81	15.12	6.98	9.30	17.44	11.63	5.81	15.12	9.30	100.00
9	1	9	6	8	10	14	8	11	9	11	87
	1.15	10.34	6.90	9.20	11.49	16.09	9.20	12.64	10.34	12.64	100.00
10	0	0	2	7	9	6	16	14	12	20	86
	--	--	2.33	8.14	10.47	6.98	18.60	16.28	13.95	23.26	100.00
All	68	82	88	85	95	116	75	74	90	75	848
	8.02	9.67	10.38	10.02	11.20	13.68	8.84	8.73	10.61	8.84	100.00

Cell Contents -- Count
% of Row

Table 23a. Cross-tabulation of Statewide Decile and Similar Schools Rank using propSD

Elementary Schools

Rows: CARank Columns: SimRankSD

	1	2	3	4	5	6	7	8	9	10	All
1	161	99	89	65	42	16	0	0	0	0	472
	34.11	20.97	18.86	13.77	8.90	3.39	--	--	--	--	100.00
2	58	61	54	62	50	79	59	46	8	0	477
	12.16	12.79	11.32	13.00	10.48	16.56	12.37	9.64	1.68	--	100.00
3	57	48	47	40	55	49	53	58	67	11	485
	11.75	9.90	9.69	8.25	11.34	10.10	10.93	11.96	13.81	2.27	100.00
4	47	55	55	56	52	52	43	35	46	36	477
	9.85	11.53	11.53	11.74	10.90	10.90	9.01	7.34	9.64	7.55	100.00
5	51	49	40	50	58	49	49	51	37	45	479
	10.65	10.23	8.35	10.44	12.11	10.23	10.23	10.65	7.72	9.39	100.00
6	47	35	43	32	40	50	49	65	57	54	472
	9.96	7.42	9.11	6.78	8.47	10.59	10.38	13.77	12.08	11.44	100.00
7	36	56	51	47	23	48	43	60	51	63	478
	7.53	11.72	10.67	9.83	4.81	10.04	9.00	12.55	10.67	13.18	100.00
8	16	23	47	48	62	59	49	43	64	66	477
	3.35	4.82	9.85	10.06	13.00	12.37	10.27	9.01	13.42	13.84	100.00
9	26	37	35	26	48	40	65	60	64	75	476
	5.46	7.77	7.35	5.46	10.08	8.40	13.66	12.61	13.45	15.76	100.00
10	1	15	12	34	39	56	45	69	85	127	483
	0.21	3.11	2.48	7.04	8.07	11.59	9.32	14.29	17.60	26.29	100.00
All	500	478	473	460	469	498	455	487	479	477	4776
	10.47	10.01	9.90	9.63	9.82	10.43	9.53	10.20	10.03	9.99	100.00

E. A closer look at Schools in State Decile 1, Similar Schools Decile 1

After the release of the Year 2000 API reports, there was some attention given to Schools classified in State Decile 1, Similar Schools Decile 1, in particular comments singling out these schools by the State Superintendent of Public Instruction. So in part to demonstrate the value of looking at data, a brief look at these "1,1" schools is undertaken.

Of the 144 Elementary Schools classified in State Decile 1, Similar Schools Decile 1 (1,1) in 1999 , 12 are not present in the year 2000 API, and 72 (more than half of the 132 that are present) repeat as 1,1 in year 2000. Table 24 shows a cross-tabulation of year 2000 results (State Decile by Similar Schools Rank) for these 132 Elementary Schools whose 1999 scores placed them in State Decile 1, Similar Schools Decile 1. Of these 132 schools, 117 remain in statewide decile 1 in year 2000, 98 of those schools being in the two lowest Similar Schools deciles.

Is the story uniformly bleak for these schools? Each cell of Table 24 includes two numbers: the count of schools in the cross-tab and the median of the 1999 to 2000 improvement in API score. That is, the median improvement for the 72 schools repeating as 1,1 is 31 API points; the median improvement for the 26 schools which were 1,1 in 1999 and then state decile 1, similar schools decile 2 in year 2000 is 47 points. Compare with median improvement of 36 points for all Elementary Schools, and median improvement of 45 for 1999 state decile 1 Elementary Schools (see Section 2).

Table 25 gives a more detailed look at the improvement for the 72 1,1 repeats. Only three of the 72 schools declined, a total of eight gained less than 10 pts, and 14 of the 72 schools gained more than 50 points. Yet even those gainers repeated as 1,1 schools (the unkindest decile of all).

Table 25
Descriptive Statistics: API Improvement for 72 Elementary schools
State Decile 1, Similar Schools Decile 1
in both 1999 and 2000.

Variable	N	Mean	Median	Q1	Q3	Minimum	Maximum
APIimp	72	32.11	30.72	16.88	45.77	-22.13	91.00

Table 24. Year 2000 Cross-tabulation for Elementary Schools in 1999 State Decile 1, Similar Schools Decile 1

Rows: CARank_2k Columns: SimRank_2k

	1	2	3	4	5	6	7	8	All
1	72	26	8	3	4	2	1	1	117
	30.719	47.063	59.938	58.063	86.344	71.688	115.063	118.500	--
2	5	3	1	3	1	0	1	0	14
	88.750	75.000	81.750	92.188	94.313	--	130.938	--	--
3	0	0	1	0	0	0	0	0	1
	--	--	129.000	--	--	--	--	--	--
All	77	29	10	6	5	2	2	1	132

Cell Contents --
Count
APIimp:Median improvement

Archive of Calculations

Following distribution of this document, a collection of files used in these calculations will be made available. A .zip achive will include a set of files in SAS System Viewer version 8 format (.sas7bdat) along with a readme file for documentation. The Zip Archive will be available as file apinotes2karchive.zip at URL

http://www-stat.stanford.edu/~rag/api/apinotes2karchive.zip