

Introduction: In a comparison among school systems belonging to Washington Area Boards of Education, Report 115 showed a strong correlation with ethnic composition. The purpose of this report is to evaluate the performance of Fairfax County high schools as a function of the ethnic composition of the schools.

Summary: The SAT scores of the students in the 24 high schools, Thomas Jefferson not included, are higher with the greater number of Asian and White students. When adjusted for their ethnic composition, all Fairfax County schools perform nearly the same.

The percent Black and the percent Hispanic correlate too closely to the percent White; therefore, adding them to the regression analysis adds nothing to the accuracy of the regression equation. The Asian and White percentages are only weakly correlated; therefore, they are nearly independent. If the regression line is considered the expected performance, then Mount Vernon, with an SAT of 1417, is only slightly below expectations, whereas Centreville, with an SAT of 1593, is significantly below expectations. Thomas Jefferson, with its selection of students and its education program, is far above average, even when allowance is made for its student body that is 60.7% Asian.

The regression equation is:

$$\text{Regression SAT} = 1266.3 + 3.2598 * \text{percent Asian} + 6.5932 * \text{percent White}$$

Discussion: The Fairfax County Public School System (FCPS) reports the ethnic compositions¹ and the SAT scores² for each of its high schools (Table 1).

	% Asian	% Black	% Hispanic	% White	% Other	SAT
ANNANDALE	21.8	18.0	37.3	20.0	2.9	1493
CENTREVILLE	31.6	9.2	15.2	40.1	3.9	1593
CHANTILLY	27.2	6.6	13.2	48.5	4.5	1643
EDISON	13.9	21.4	30.9	29.9	3.9	1534
FAIRFAX	25.1	10.6	19.1	40.4	4.8	1621
FALLS CHURCH	22.6	7.0	45.9	21.5	3.0	1487
HAYFIELD	13.8	27.3	19.6	34.0	5.3	1506
HERNDON	12.8	8.4	31.1	43.2	4.5	1602
JEFFERSON SCI/TECH	60.7	1.2	2.4	30.7	5.0	2194
LAKE BRADDOCK	18.6	6.7	16.9	52.7	5.1	1636
LANGLEY	21.0	1.3	5.1	68.6	4.0	1837
LEE	26.2	14.2	33.9	22.5	3.2	1479
MADISON	12.2	1.7	10.2	70.8	5.1	1753
MARSHALL	16.5	4.8	15.0	58.1	5.6	1718
MCLEAN	20.3	3.0	10.9	61.1	4.7	1781
MOUNT VERNON	6.2	29.4	36.9	22.1	5.4	1417
OAKTON	23.2	4.5	8.8	58.6	4.9	1764
ROBINSON	15.9	5.9	13.2	59.8	5.2	1659
SOUTH COUNTY	17.5	16.4	11.3	49.5	5.3	1593
SOUTH LAKES	12.6	12.8	20.9	47.2	6.5	1630
STUART	15.8	11.4	46.7	24.0	2.1	1529
WEST POTOMAC	7.2	18.6	30.2	39.9	4.1	1562
WEST SPRINGFIELD	15.4	6.0	14.9	58.9	4.8	1665
WESTFIELD	21.1	11.6	18.0	44.8	4.5	1632
WOODSON	22.0	3.5	9.6	60.4	4.5	1792
Overall	20.0	10.3	20.1	45.1	4.5	1663

Table 1: Demographic and SAT Scores for Fairfax County High Schools

¹ <http://www.fcps.edu/it/studentreporting/documents/EthnicRpt13.pdf>

² <http://www.fcps.edu/ccopr/satact/2013/table4.pdf> The SAT scores reported by the College Board are approximately 35 points less than those reported by FCPS. We have chosen to use the College Board listing.

Trends in the data can be seen if the SAT is shown as a function of each of the ethnic groups, one at a time (Figure 1). Notice that Jefferson, with an SAT of almost 2200, is far from the pattern of the other schools. Jefferson differs because its students are all high academic achievers and because its programs are more challenging than those of other schools. For these reasons, it is not included in our analysis of the data. The slopes of the trend lines do differ, of course, when Jefferson is omitted, but the slopes show the same trend (Table 2).

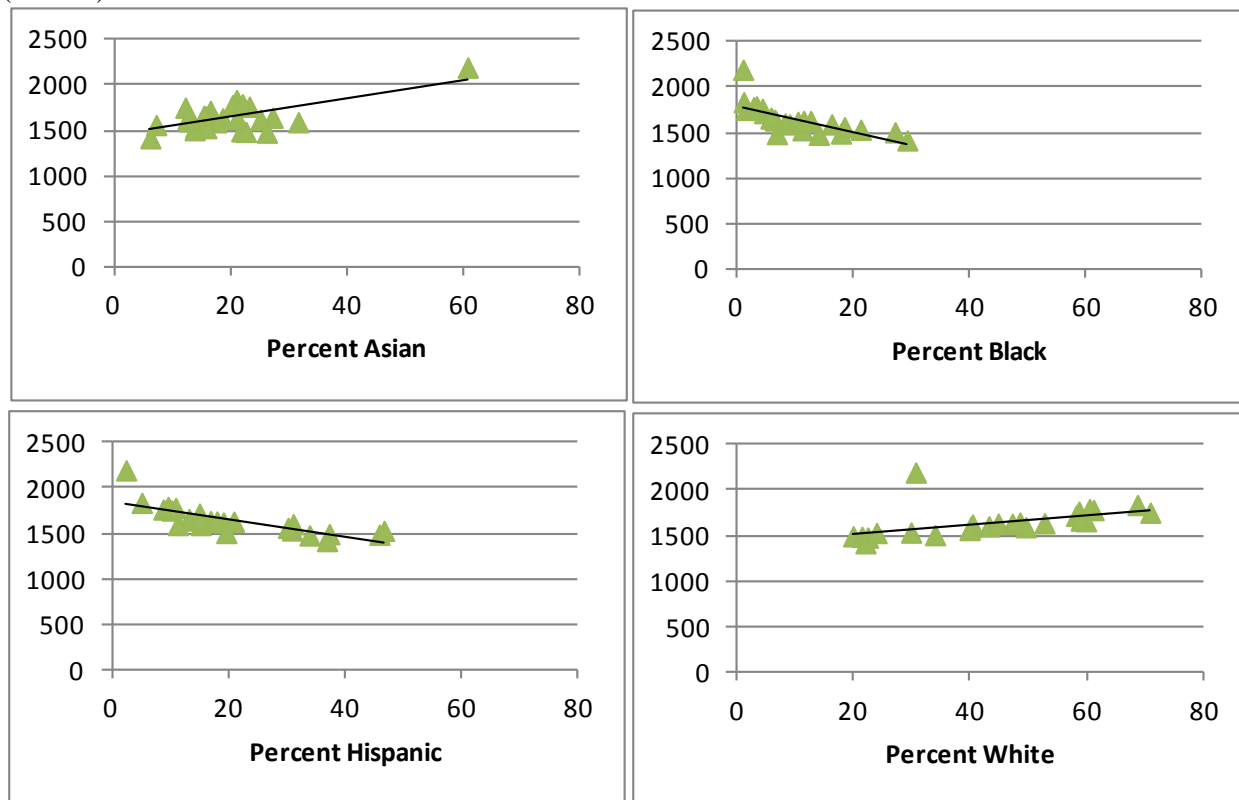


Figure 1: Individual Trends in SAT Scores as a Function of Percent of Student Ethnic Composition

	With Jefferson	Without Jefferson
Asian	10.10	3.48
Black	-14.61	-11.67
Hispanic	-9.71	-7.60
White	5.06	6.61

Table 2: Slopes of the Trend Line with and without Jefferson

Because the sum of the percentage is 100%, only four of the five ethnic divisions are independent. In our analyses, we omit “Other”.

Even beyond the sum being one, only the correlation coefficient between Asian and White shows the two to be independent (Table 3). Our first gambit, then, is to consider these two independent variables alone. The results are quite favorable, with the regression explaining 90% of the variance between schools – other than Jefferson (Figure 2). Asian alone accounts for only 44% of the variance, so both Asian and White are necessary. The line in Figure 2 is the average performance of the schools; points to the right of the line correspond to schools performing better than average. Jefferson obviously performs much better than all of the other schools. It is not a typical school!

Including all four ethnic groups would increase the amount of explanation to 92%; however, the coefficients of the independent variables are then all positive, contrary to what is evident in Figure 1. The cross correlations

between independent variables (Table 3) causes confusion among the dependencies of the SAT on the ethnic groups.

	Asian	Black	Hispanic	White	Other
Asian	1	-0.4259	-0.2316	0.0129	-0.3467
Black		1	0.5160	-0.7184	-0.0032
Hispanic			1	-0.8928	-0.6042
White				1	0.5409
Other					1

Table 3: Cross-Correlation Coefficients between Independent Variables

That 90% of the variance between schools is explained by the regression equation is evident in graph of the SAT computed from the regression equation as a function of the actual SAT (Figure 2). The lone point at Actual SAT = 2200 is Thomas Jefferson High School, which far exceeds what the regression equation yields. It performs far above average, even as adjusted for a student body that is 60% Asian.

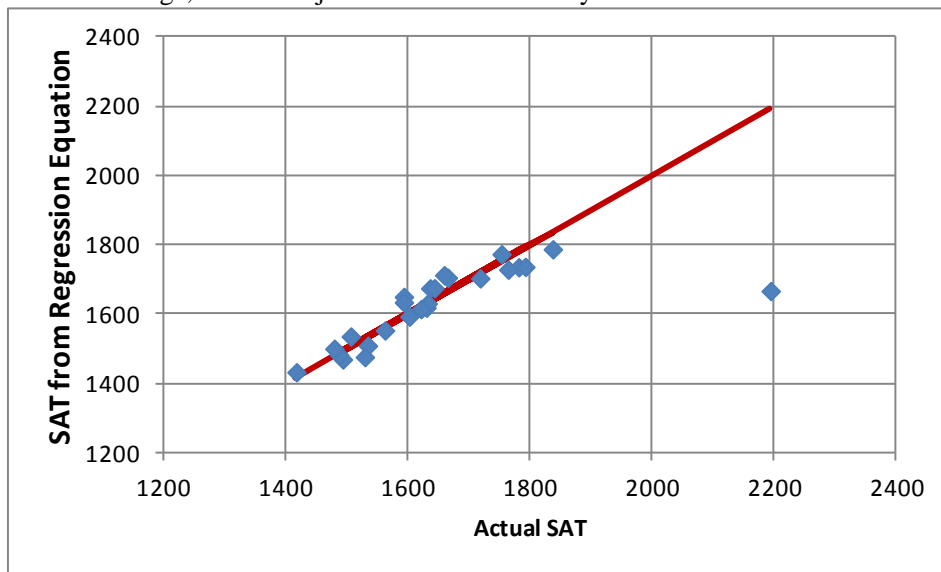


Figure 2: Asian and White Percentages Explain 90% of Variance – except Jefferson