



The SAT: Scholastic Aptitude or Student Affluence Test?

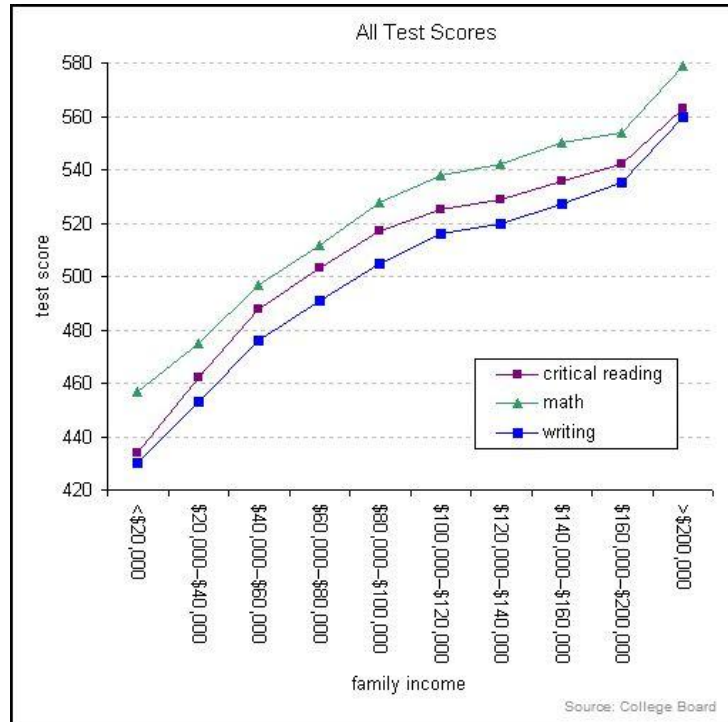
Kelly O'Neill DSIR412





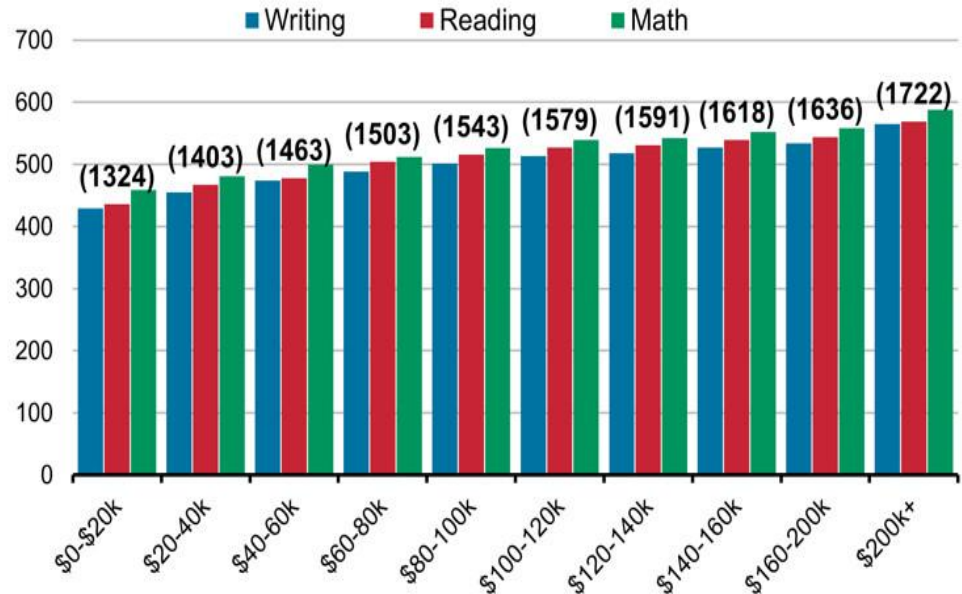
The fairness of the SAT (Scholastic Aptitude Test) has been called into question by some in recent years due to its potential bias toward wealthier students. 'On average, students in 2014 in every income bracket outscored students in a lower bracket on every section of the test, according to calculations from the National Center for Fair & Open Testing.'¹ This purpose of this analysis is to see if statewide median household income and per pupil spending have any notable positive correlation to total SAT scores from 2017 and 2018.

Are students in lower income brackets scoring lower?



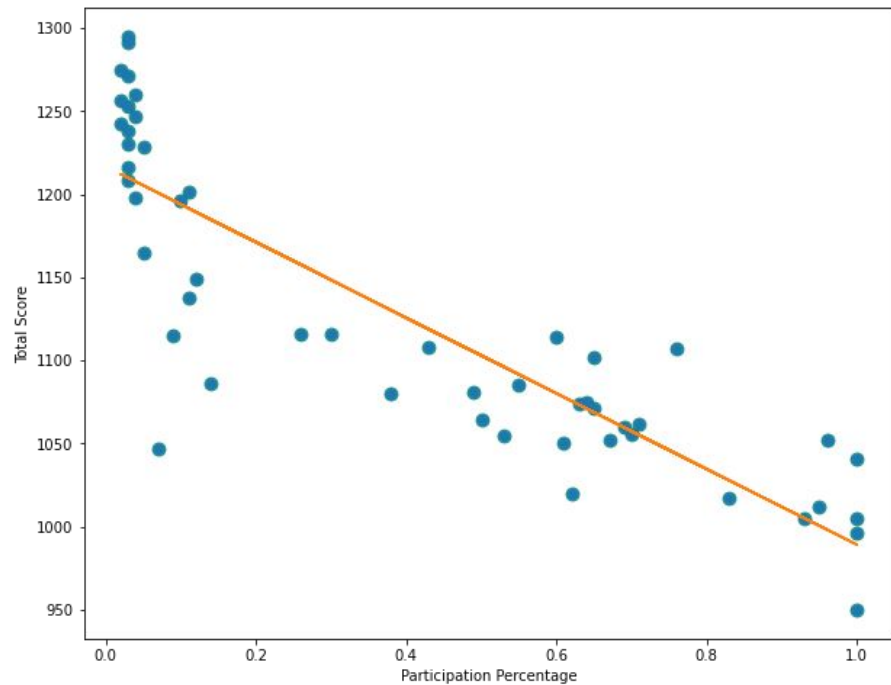
SAT: Student Affluence Test

Average scores on each section of SAT (and combined) by parental income

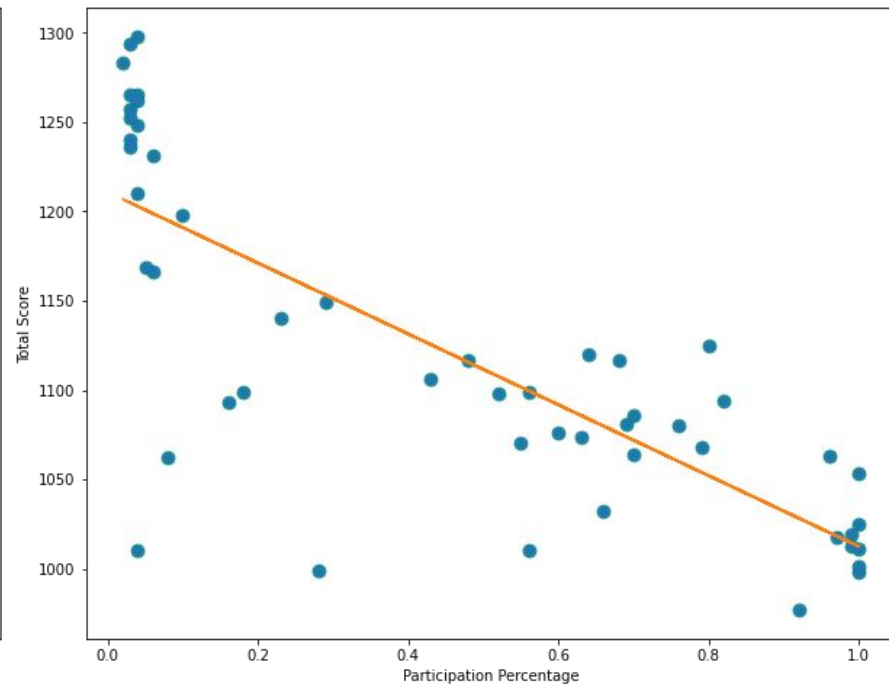


Source: FairTest, College Board | WSJ.com

Participation and Total Score 2017

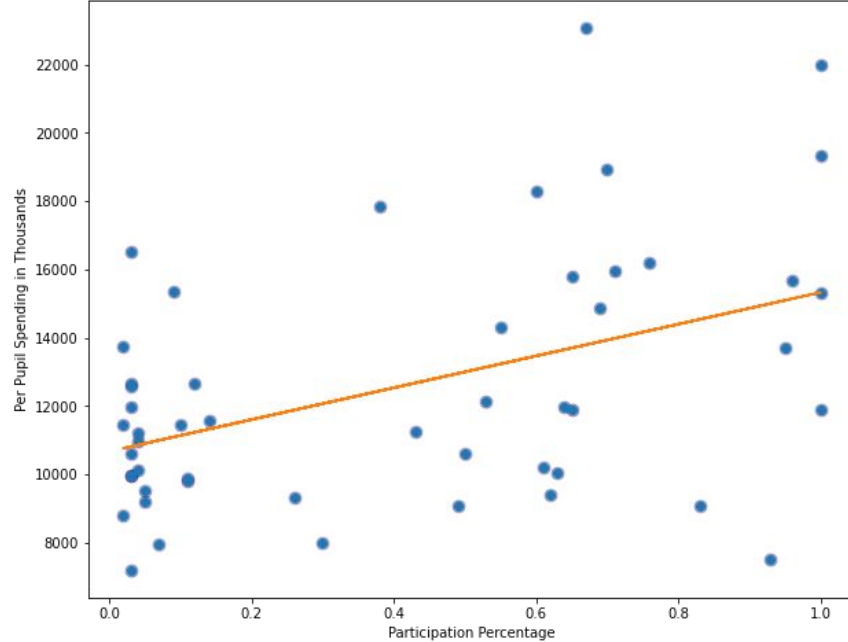


Participation and Total Score 2018

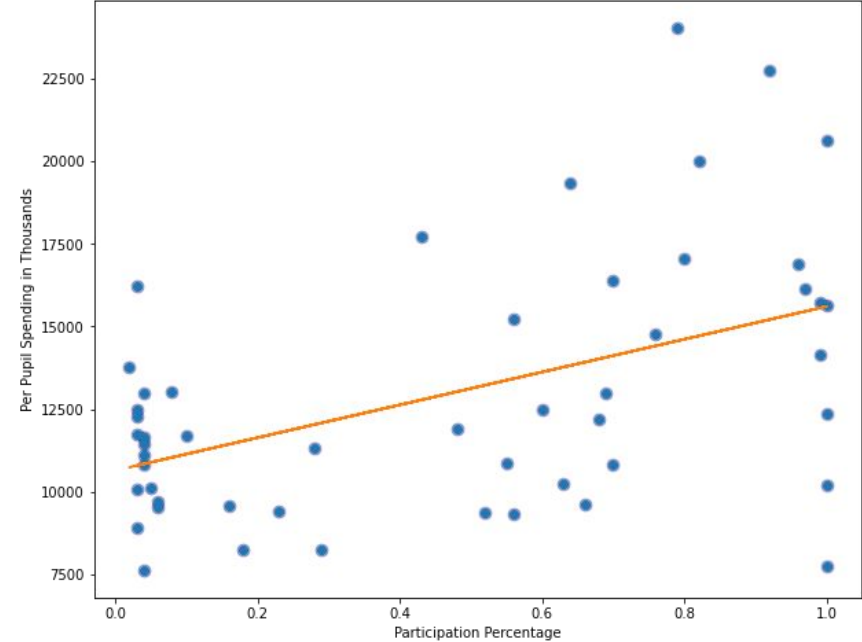


Participation vs per pupil spending

Participation and Per Pupil Spending 2017

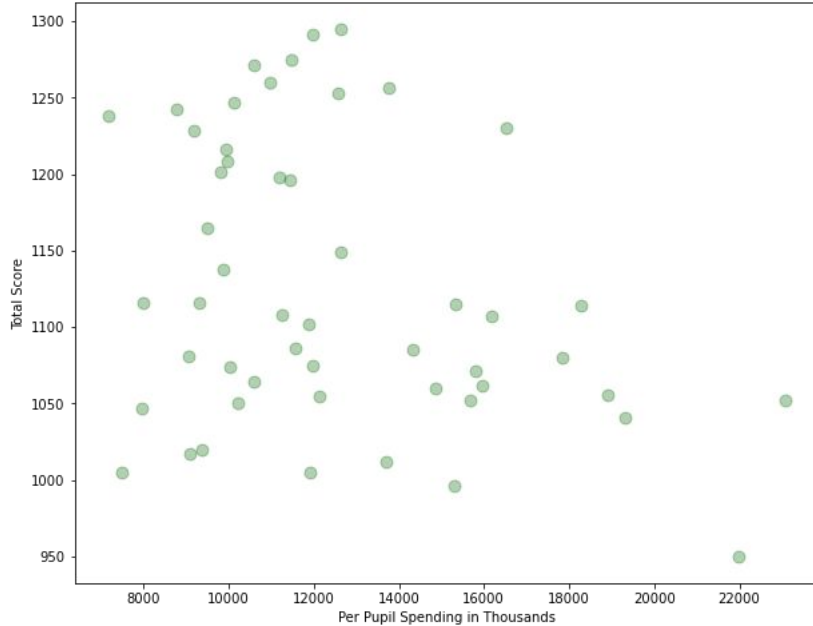


Participation and Per Pupil Spending 2018

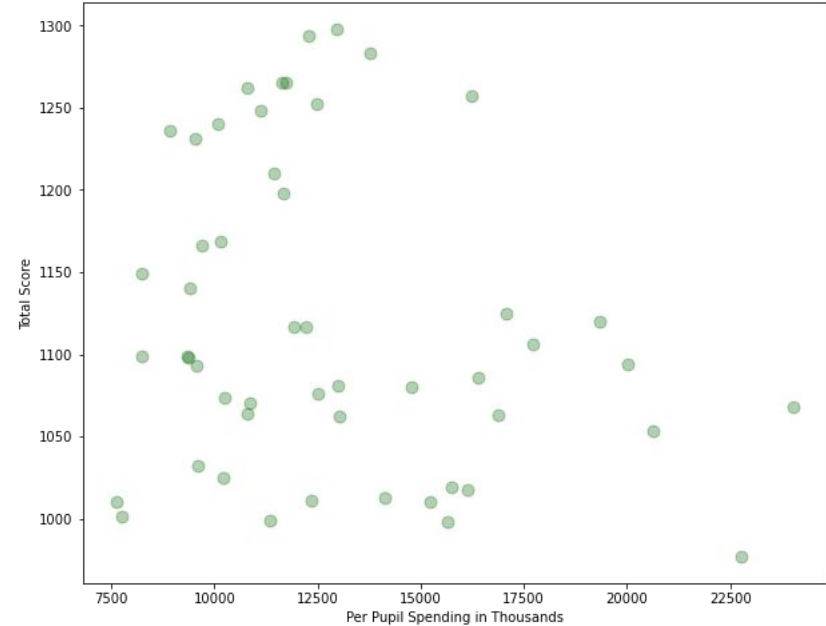


Per pupil spending vs Total Score

Per Pupil Spending and Total Score 2017

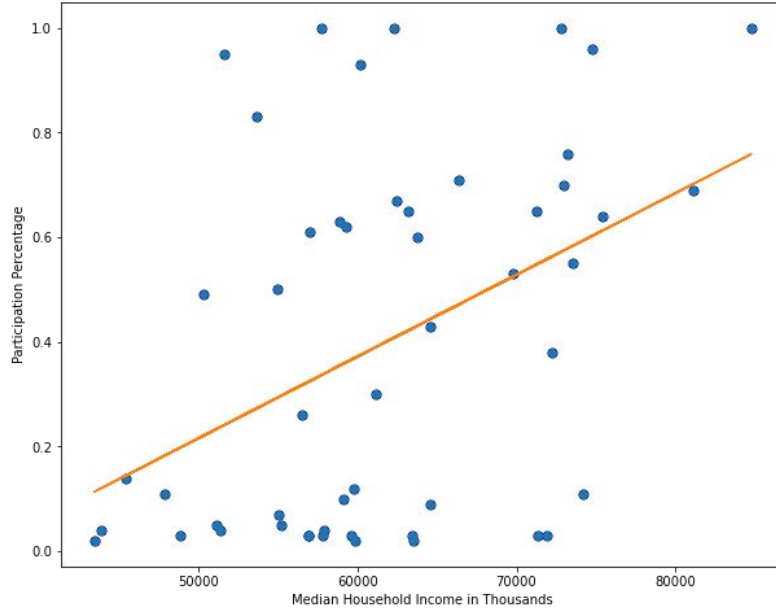


Per Pupil Spending and Total Score 2018

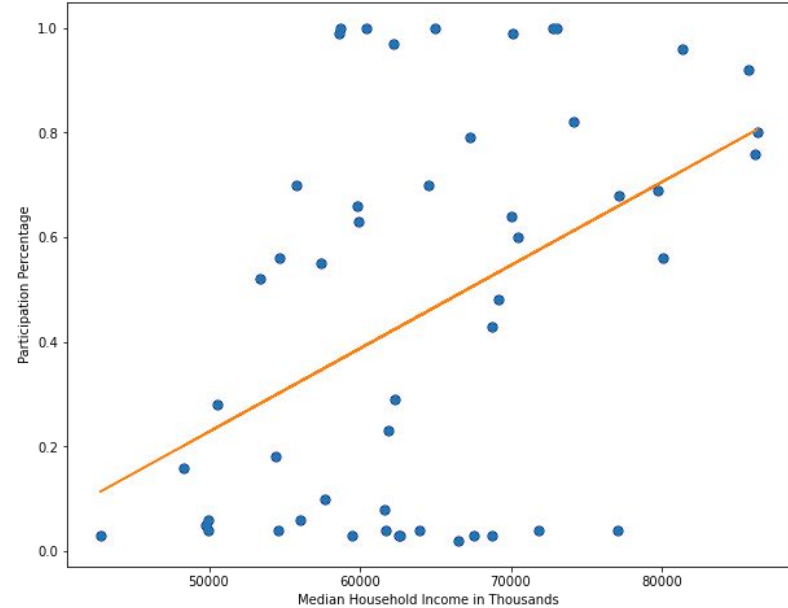


Median Household Income vs Participation

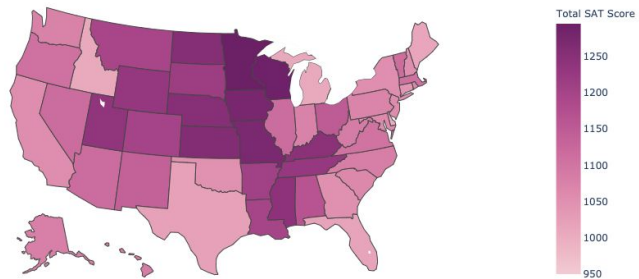
Median Household Income and Participation 2017



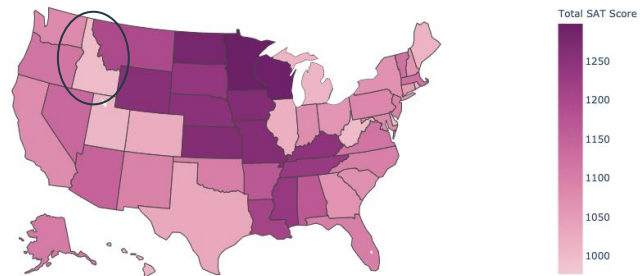
Median Household Income and Participation 2018



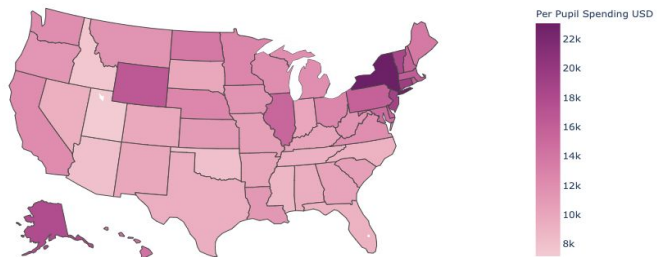
Total SAT Score by State 2017



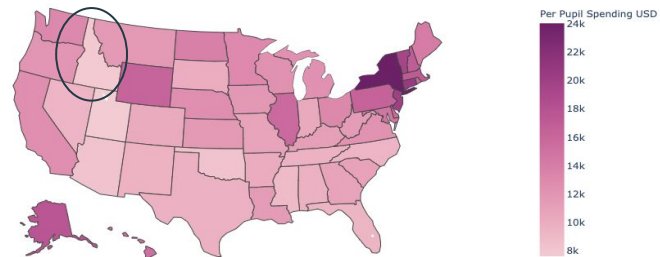
Total SAT Score by State 2018



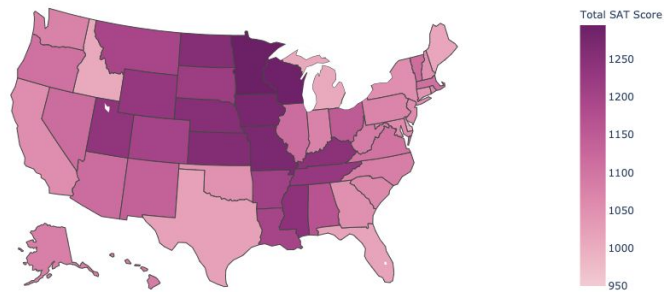
Per Pupil Spending by State 2017



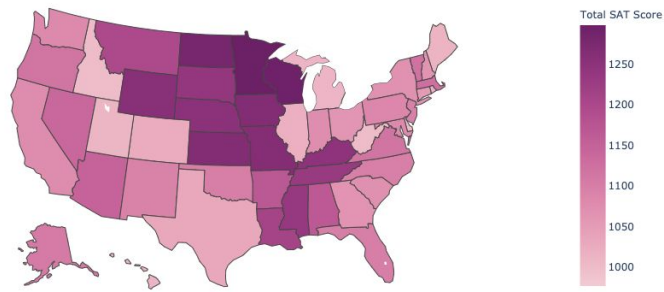
Per Pupil Spending by State 2018



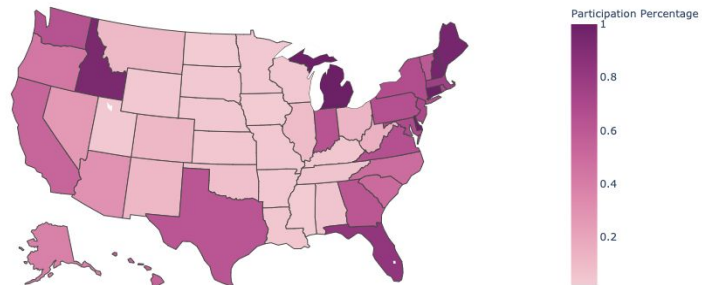
Total SAT Score by State 2017



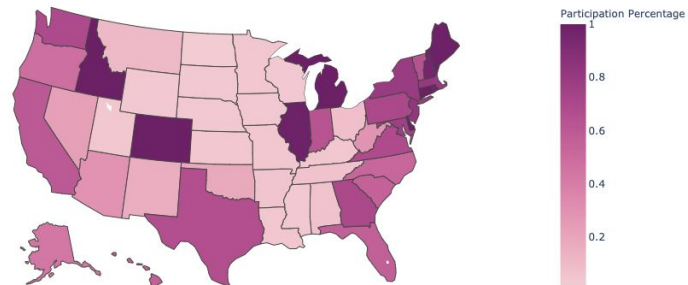
Total SAT Score by State 2018



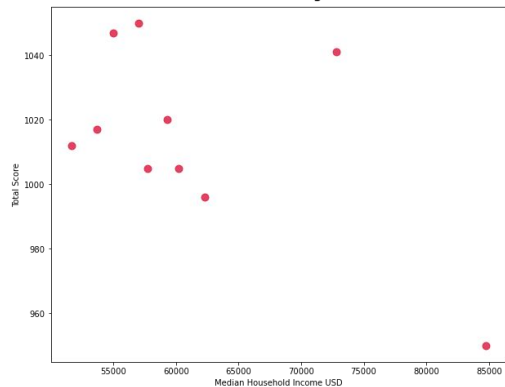
Participation by State 2017



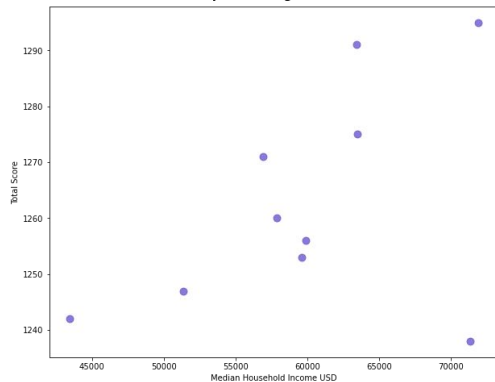
Participation by State 2018



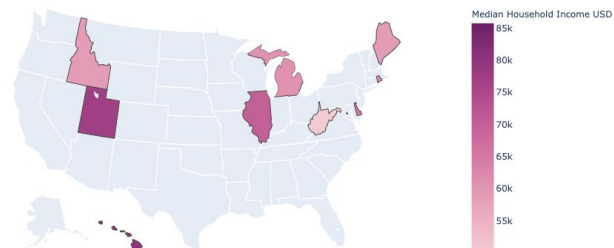
Household Income and Bottom 10 Scoring States 2017



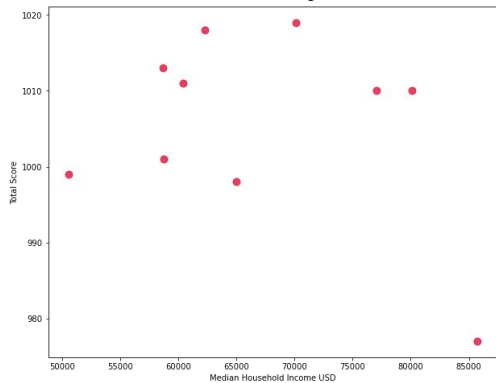
Household Income and Top 10 Scoring States 2017



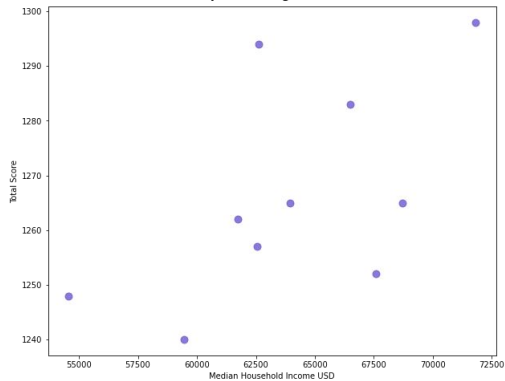
Bottom Ten Scoring States and Household Income 2018



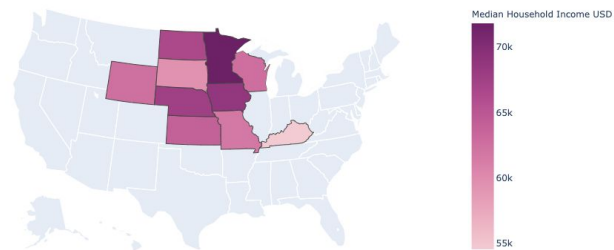
Household Income and Bottom 10 Scoring States 2018



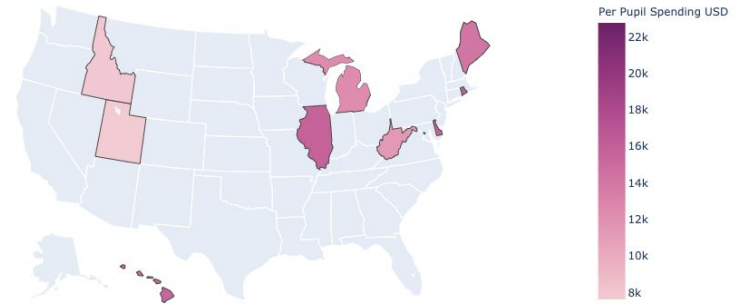
Household Income and Top 10 Scoring States 2018



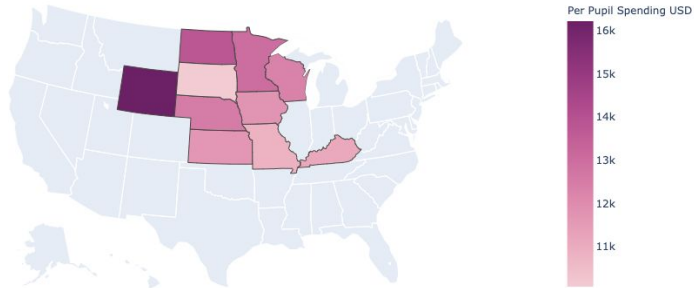
Top Ten Scoring States and Household Income 2018



Bottom Ten Scoring States and Associated Per Pupil Spending 2018



Top Ten Scoring States and Associated Per Pupil Spending 2018



Once again, we find very little correlation.

Final Thoughts

Although we can see a slight correlation between total score and per pupil spending, further study is needed to support the claim that income has any definitive impact on total SAT score. It would appear that per pupil spending and median household income more greatly impact participation rates than SAT scores, and even then the relationship is subtle.

Given the multitudes of income disparities present in any particular state as a whole, it would be more telling to look at individual states and segment by county. A single average score per state does not tell the whole story of what is going on in different school districts where there are different curricula, private schools, public schools, etc. My recommendation would be to isolate states in different regions of the US and from there compare average scores of multiple districts within that state, increasing the number of samples and taking into consideration the diversity of the landscape.

In looking at the data from 2017 to 2018, overall median scores DECREASED from 1107 to 1098, while per pupil spending and income both increased slightly by ~\$400 and ~\$2,653 respectively. In conclusion, if anything this analysis disproved the notion that income plays a part in SAT scores on a national scale, but it would be worth it to perform similar analyses on a more granular scale.

Sources:

Data:

<https://www.census.gov/programs-surveys/school-finances.html>
<https://data.world/garyhoov/household-income-by-state>
<https://reports.collegeboard.org/pdf/2017-maryland-sat-suite-assessments-annual-report.pdf>
<https://www.census.gov/data/tables/2019/demo/income-poverty/p60-266.html>
<https://www.sde.idaho.gov/assessment/college/>
<https://collegereadiness.collegeboard.org/sat>
<https://www.wsj.com/articles/BL-REB-28270>
<https://collegereadiness.collegeboard.org/sat>

Code:

<https://plotly.com/python/choropleth-maps/>
EDA Walkthrough lesson
Data-viz lesson
<https://www.kite.com/python/answers/how-to-plot-a-line-of-best-fit-in-python>
<https://pandas.pydata.org/pandas-docs/stable/reference/api/pandas.DataFrame.dtypes.html>