SAT & ACT Analysis (2017-2018)

General Assembly - Data Science Immersive

Problem Statement

The SAT and ACT are two popular college entrance tests in the United States, and the participation rates for both tests are some of the top concerns that educational boards often grapple with.

In this project, we aim to study the 2017 and 2018 data on both tests to have a better understanding of what most affects their participation rates. Based on our analysis and research, we will then provide substantiated recommendations on what educational policies can best improve participation rates in the SAT entrance tests.

Data Cleaning

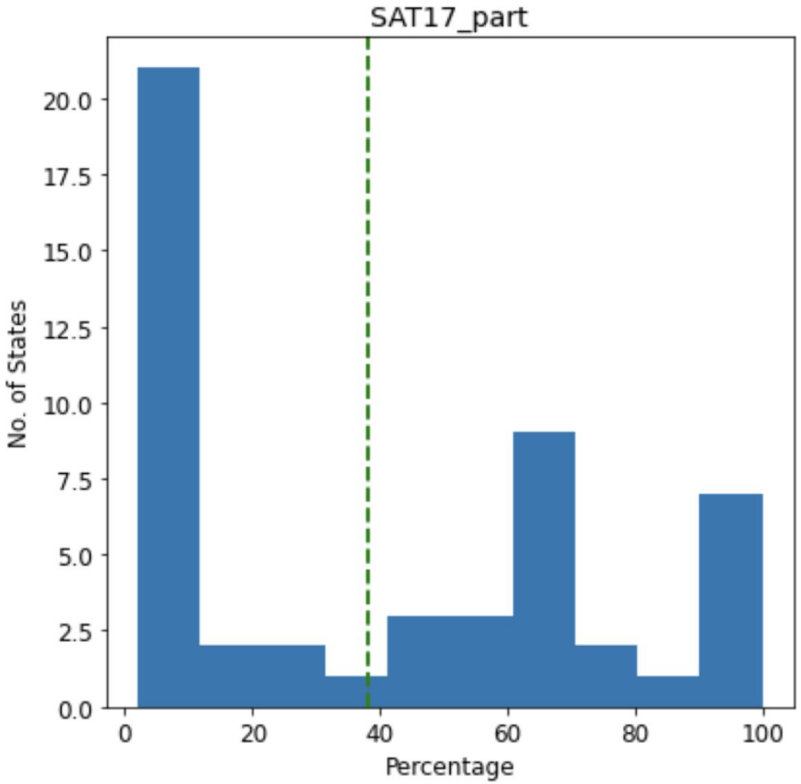
- The data was contained in 4 different datasets within .csv files: SAT 2017, ACT 2017, SAT 2018 and ACT 2018. These were imported into individual pandas DataFrames
- The participation rates were cleaned and converted to be of type *int*
- Extraneous rows were removed, and problematic individual values were cross-referenced with the original source datasets
- The final datasets were then merged into a single DataFrame

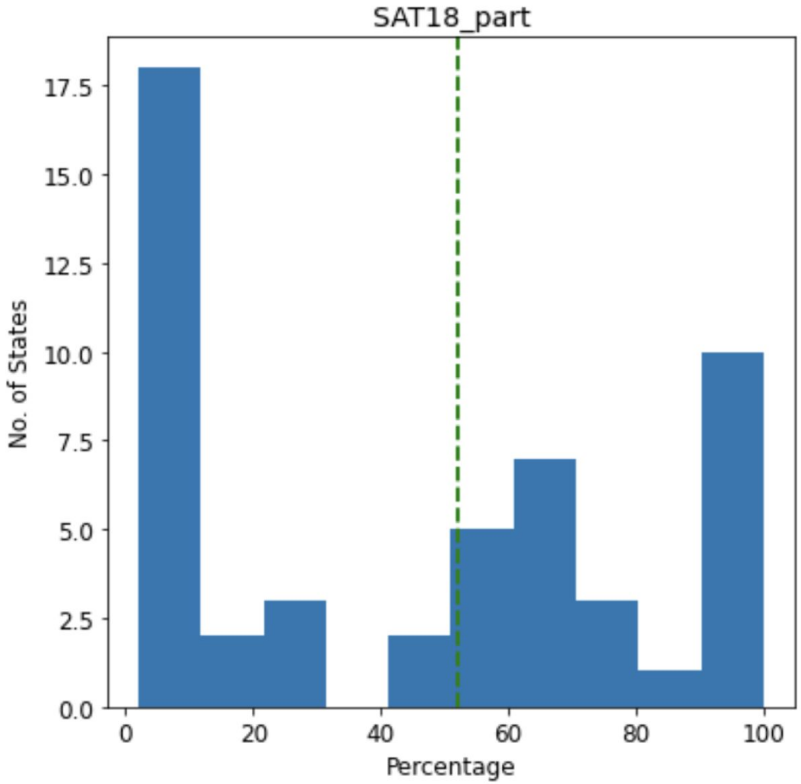
	count	mean	std	min	25%	50%	75%	max
act17_participation	51.0	65.254902	32.140842	8.0	31.00	69.0	100.00	100.0
act17_english	51.0	20.931373	2.353677	16.3	19.00	20.7	23.30	25.5
act17_math	51.0	21.182353	1.981989	18.0	19.40	20.9	23.10	25.3
act17_reading	51.0	22.013725	2.067271	18.1	20.45	21.8	24.15	26.0
act17_science	51.0	21.450980	1.739353	18.2	19.95	21.3	23.20	24.9
act17_composite	51.0	21.519608	2.020695	17.8	19.80	21.4	23.60	25.5
sat17_participation	51.0	39.803922	35.276632	2.0	4.00	38.0	66.00	100.0

Data Dictionary

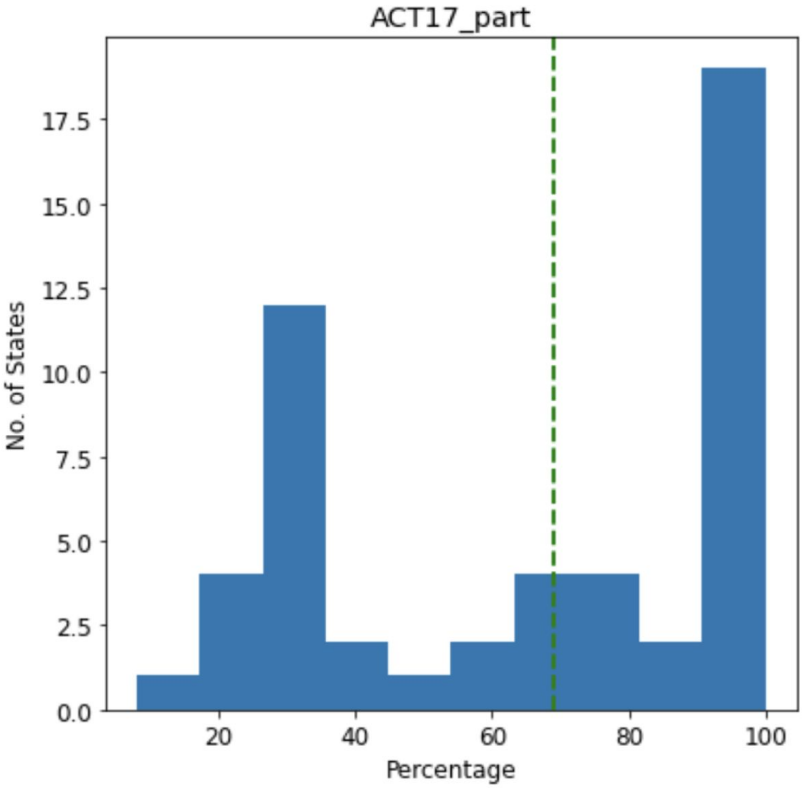
Feature	Type	Dataset	Description
state	object	ACT/SAT	Name of State
act_201X_participation	float	ACT	Participation within the State in year 201X
act_201X_english	float	ACT	English Score for the State in year 201X
act_201X_math	float	ACT	Math Score for the State in year 201X
act_201X_reading	float	ACT	Reading Score for the State in year 201X
act_201X_science	float	ACT	Science Score for the State in year 201X
act_201X_composite	float	ACT	Composite Score for the State in year 201X
sat_201X_participation	float	SAT	Participation within the State in year 201X
sat_201X_readingwriting	int	SAT	Evidence-based Reading and Writing Score for the State in year 201X
sat_201X_math	int	SAT	Math Score for the State in year 201X
sat_201X_total	int	SAT	Total Score for the State in year 201X

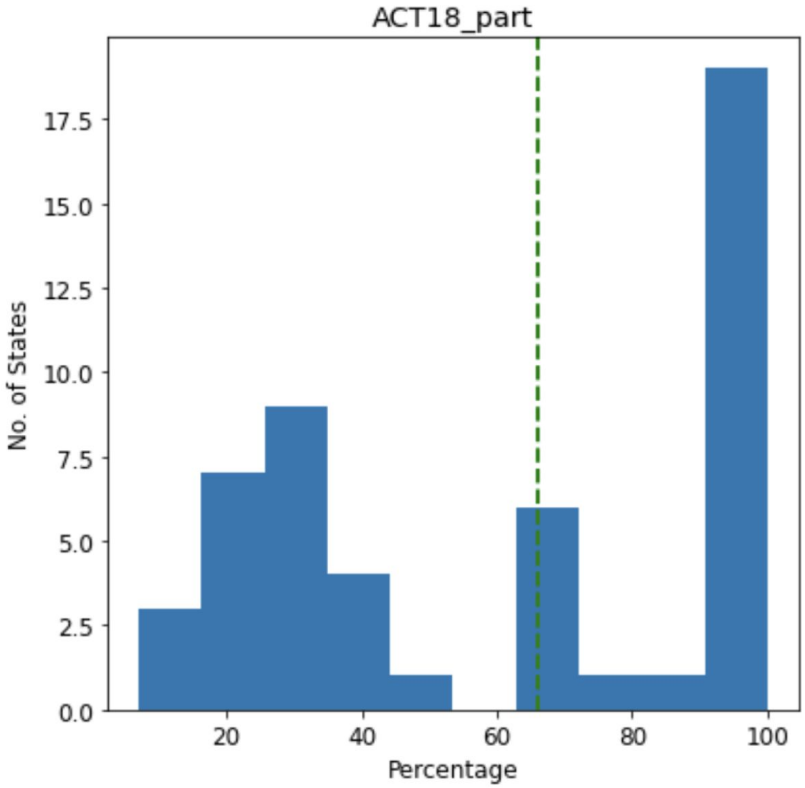
Participation Rates



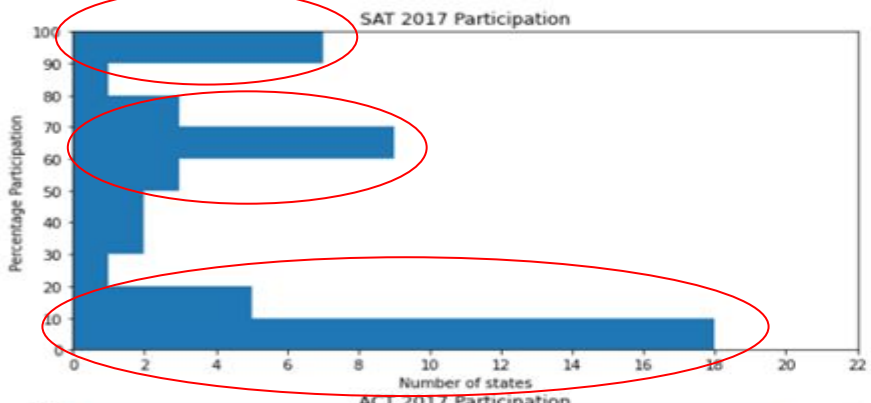


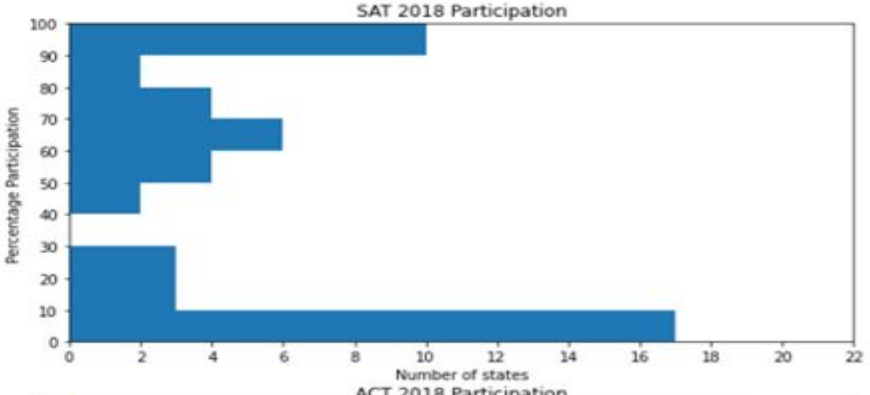
Participation Rates

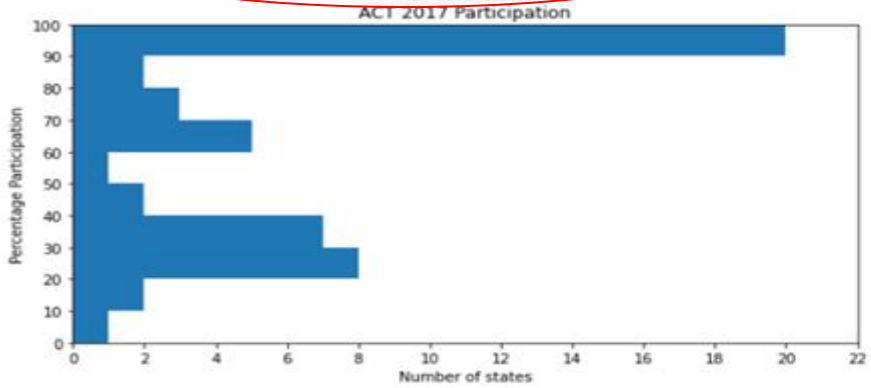


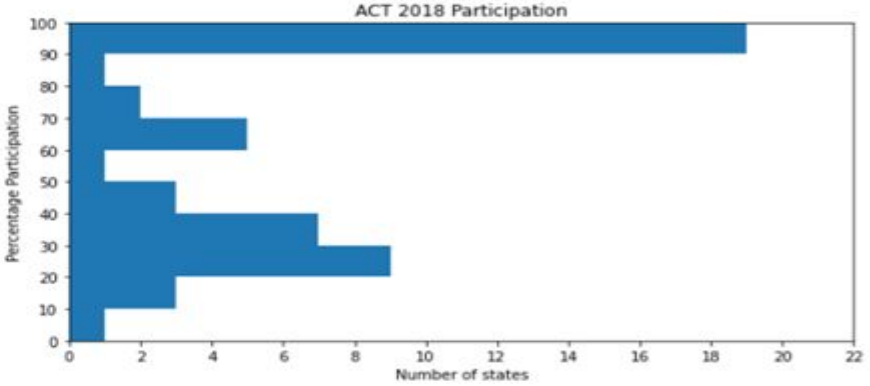


Participation Rates: Three distinct groups



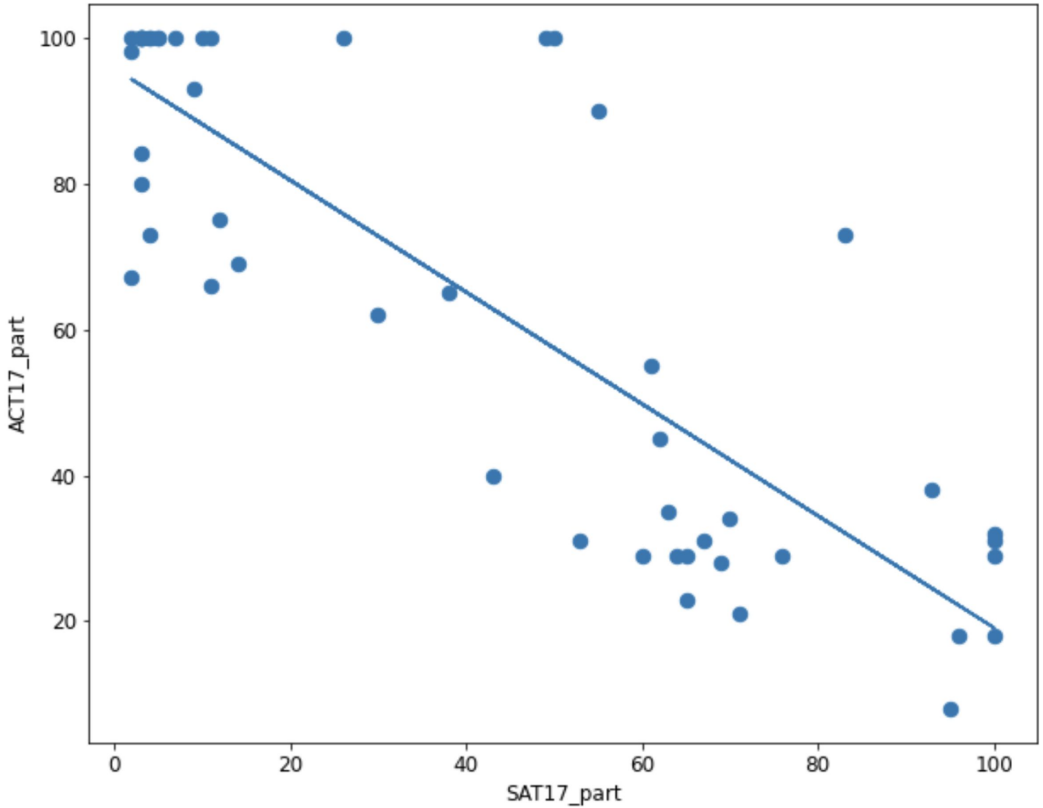


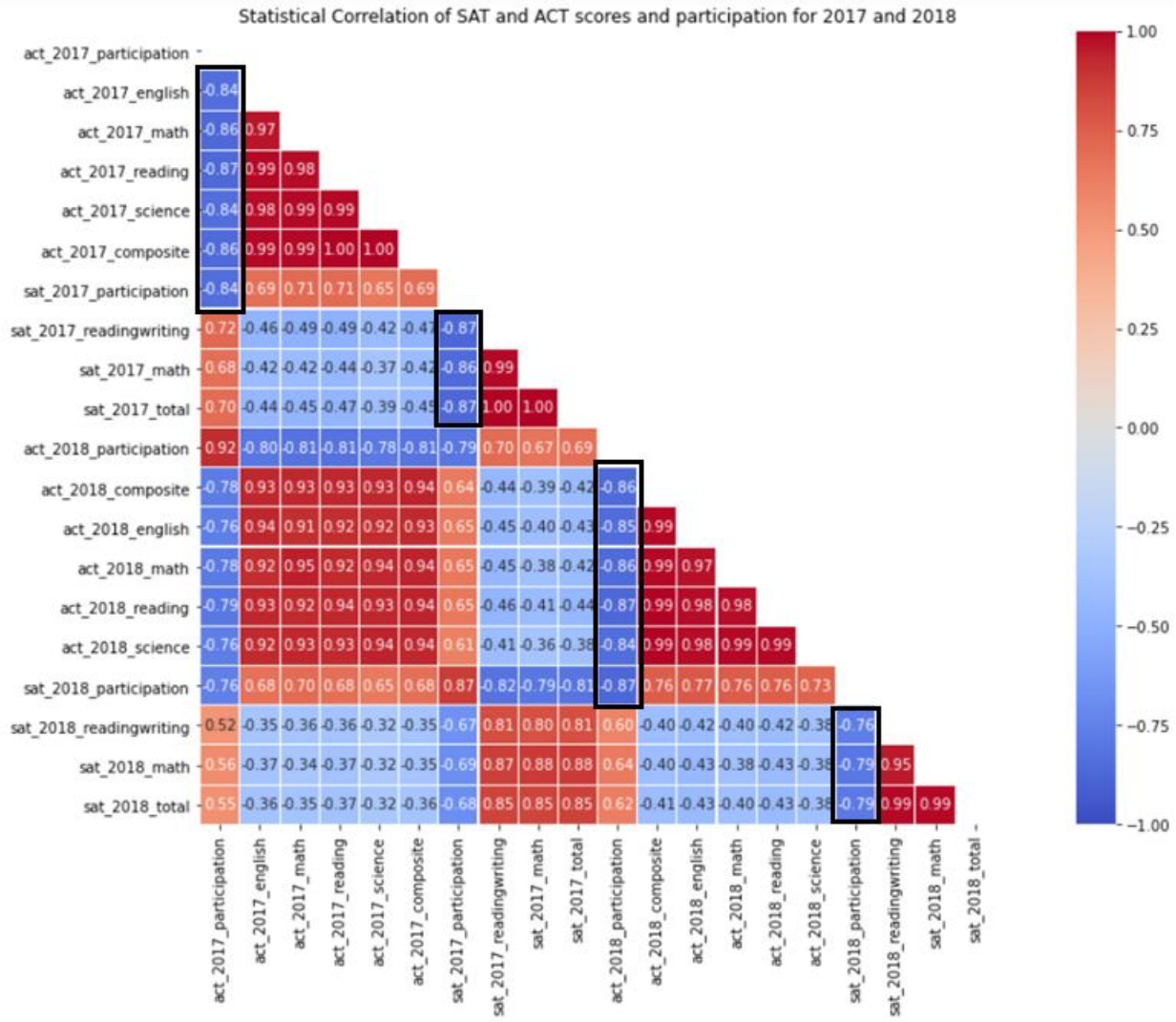




Participation Rates

- We can see a very strong negative correlation between the participation rate for the two tests
- The strong negative correlation suggests that there are strong state factors that affect a student's decision within that state to choose ACT over SAT or vice versa

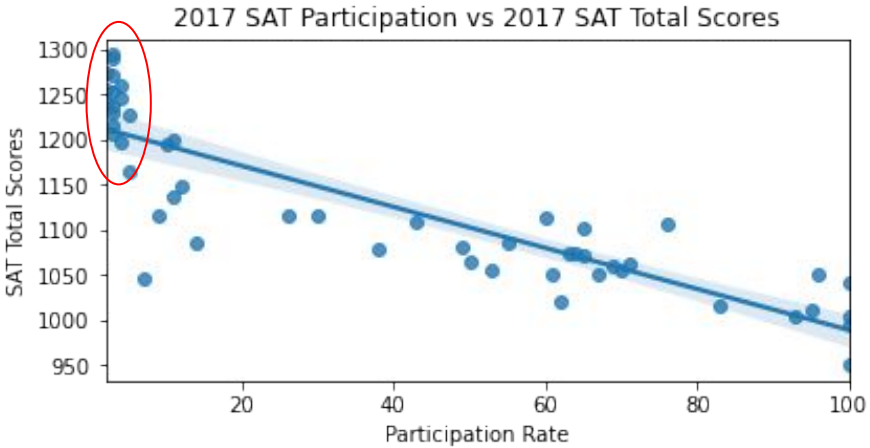


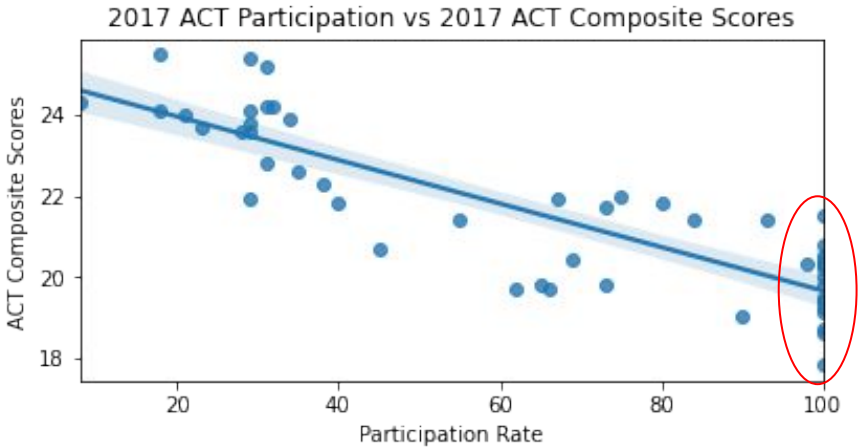

Statistical Correlation of SAT and ACT scores and participation for 2017 and 2018
act_2017_participation
act_2017_english
act_2017_math
act_2017_reading
act_2017_science
act_2017_composite
sat_2017_participation
sat_2017_readingwriting
sat_2017_math
sat_2017_total
act_2018_participation
act_2018_composite
act_2018_english
act_2018_math
act_2018_reading
act_2018_science
sat_2018_participation
sat_2018_readingwriting
sat_2018_math
sat_2018_total
1.00
0.75
0.50
0.25
0.00
−0.25
−0.50
−0.75
−1.00

Scores & Participation Trends

Negative correlation between scores and participation rates

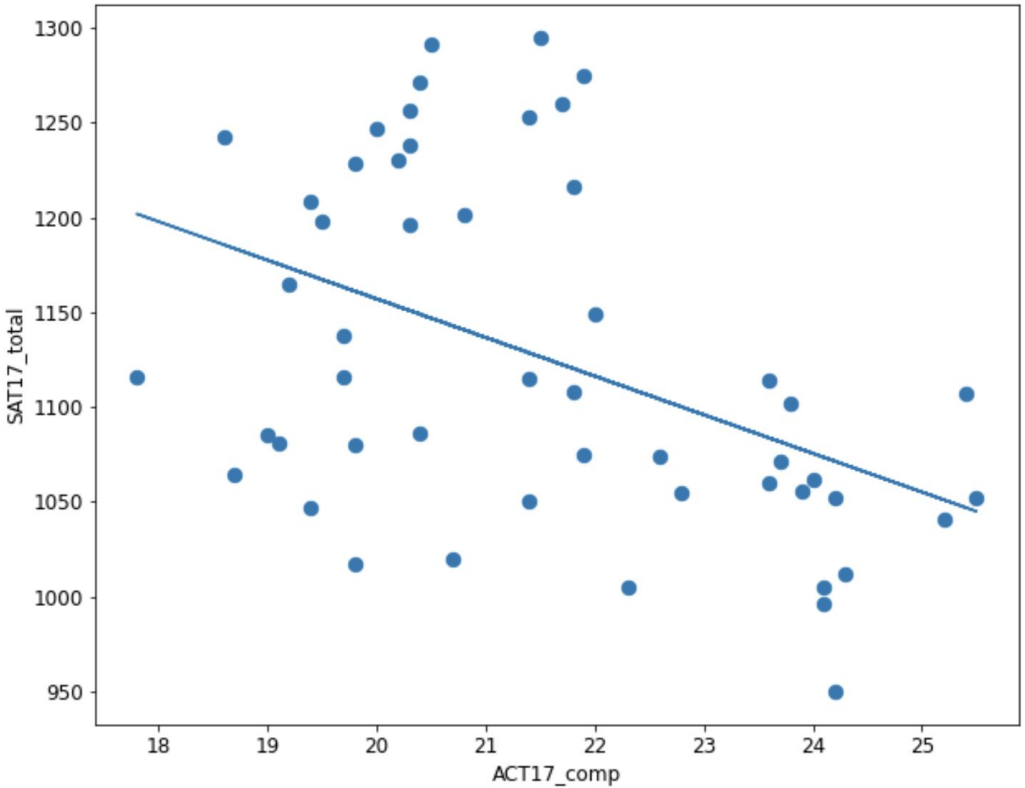
A two-sample t-test of the ACT scores between the states with more than 90% participation and less than 40% participation yields a p-value of 6.54*e-14 further confirming this.



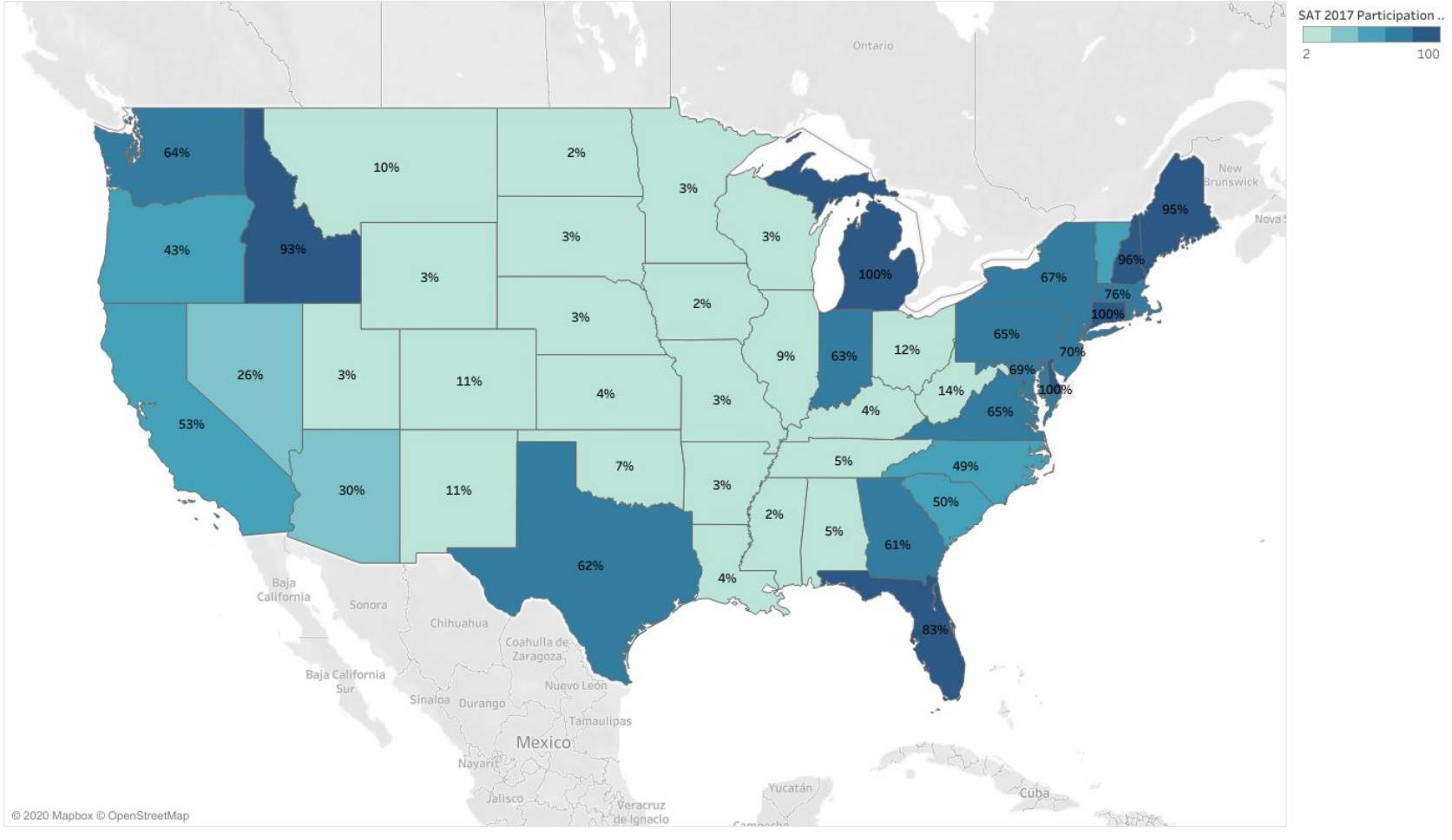


Scores & Participation Trends

- When we cross-referenced the Total/Composite Scores of the SAT and the ACT's, there was a negative correlation.
- This provides further evidence that each state favours only one of the tests, and that most students only did one of the test and not both.



SAT Participation 2017



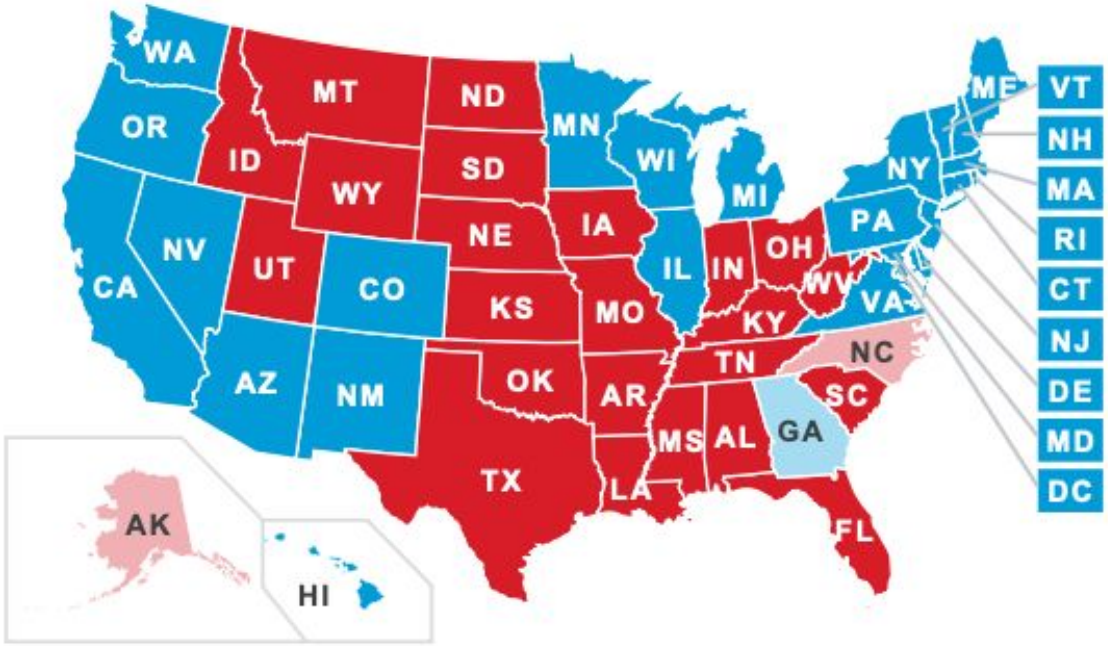
Joe Biden

290

270 to win

Donald Trump

214



Won Leads

Hmmm….

Additional Research

“The 25 percent increase in SAT test-takers can be attributed to the growth of **SAT School Day**, a program in which students **take the SAT in their own school on a weekday,** rather than taking it on a Saturday in a different school than the one they attend.

In 2017-18, 10 states (Colorado, Connecticut, Delaware, Idaho, Illinois, Maine, Michigan, New Hampshire, Rhode Island, and West Virginia) and the District of Columbia **covered the cost of the SAT for all their public school students**. Three years ago, only three states and the District of Columbia did so.”

- Education Week

Additional Research

Minnesota is the "smartest" state:

-Highest ACT score among all states with 100% participation
-Highest SAT scores among all states
-https://bgr.com/2020/09/19/dumbest-states-united-states-ranking/ 😂

The swings in Colorado and Illinois from ACT to SAT were down to state initiatives.

-https://www.denverpost.com/2017/03/06/colorado-juniors-sat-college-exam/
-https://www.chicagotribune.com/news/ct-illinois-chooses-sat-met-20160211-story.html

Conclusions & Recommendations

Our analysis shows that the simplest, most effective way to improve participation rates is t**hrough state funding of exam fees for all students**

This is especially so for the SAT's, where we see huge improvements in the states of **Illinois, Rhode Island and West Virginia**

The second recommendation is to **facilitate the test-taking for the students during school hours and within the same school** that the student normally goes to.

These are **the main financial and logistical barriers** that are preventing students from participating in the entrance tests, especially the SAT.

Conclusions & Recommendations

To lobby authorities in Kentucky to take up the SAT:

- Kentucky has good SAT scores with very low participation
- To “sell” the SAT to the authorities based on the good scores for 2017 and 2018
- Represents the largest potential increase in participation
- Win-win for state and College Board

To study the colleges, universities and scholarships that require the SAT for admission or consideration.