

ACT and SAT analysis

DSI-F1 Team 2
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SAT

Problem Statement

As part of the team working in the College Board, we have been tasked by the Board to look at increasing SAT participation rates across the various states.

The Board noticed that lower SAT test participation rates in comparison to our competitor, the ACTs, has impacted our revenue.

Hence, a good starting point would be to look at the current SAT participation rate in comparison to ACTs. As well as, the current demographics and what pain points they are facing.



Datasets Used -

- **The 2017 - 2018 mean ACT Participation Rate & Scores by state.**
 - The data show the breakdown of average ACT scores by year, state, as well as the average in each subject area.
- **The 2017 - 2018 mean SAT Participation Rate & Scores by state.**
 - The data shows the breakdown of average SAT scores by year, state, as well as the average in each subject area.



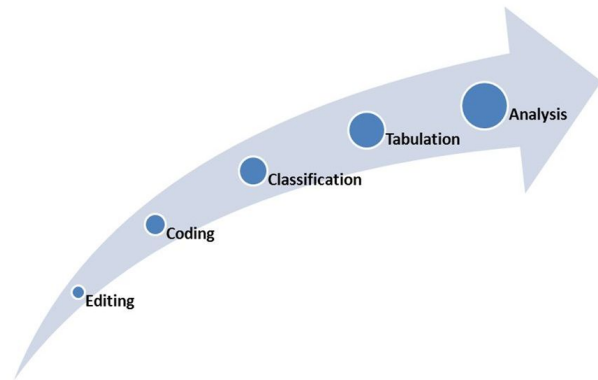
Additional Dataset Used -to determine profile of test takers

- To further understand the factors influencing the SAT and ACT participation for the years 2017-2018 across all 50 US states and the District of Columbia, we'll include **supplementary information** on:
 - SAT or ACT Requirements by State.
 - Median Household Income by State

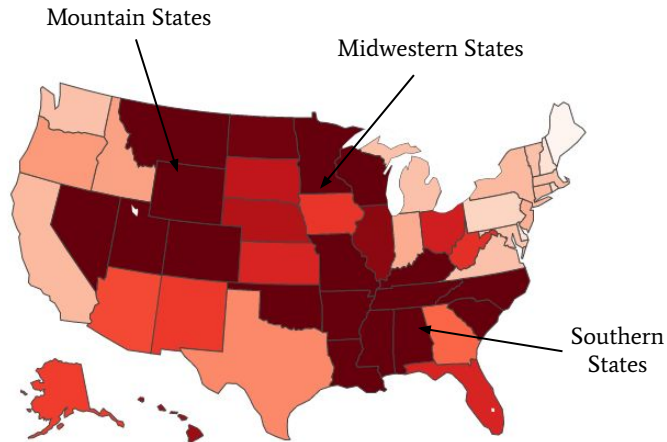


Data Preparation & Pre-processing

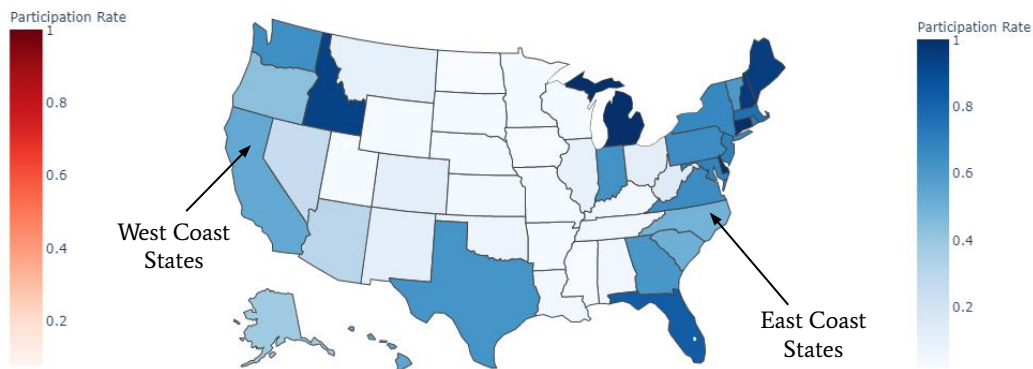
- Dropped national average values in 2017 ACT data
- Found ~ 2% error in data when comparing to main sources. - edited these values to ensure data integrity
- Removed duplicates in 2018 ACT data- original is 52 but is 51 after removing (~1.9%)



Exploratory Data Analysis (EDA) - Participation rates between ACT and SAT



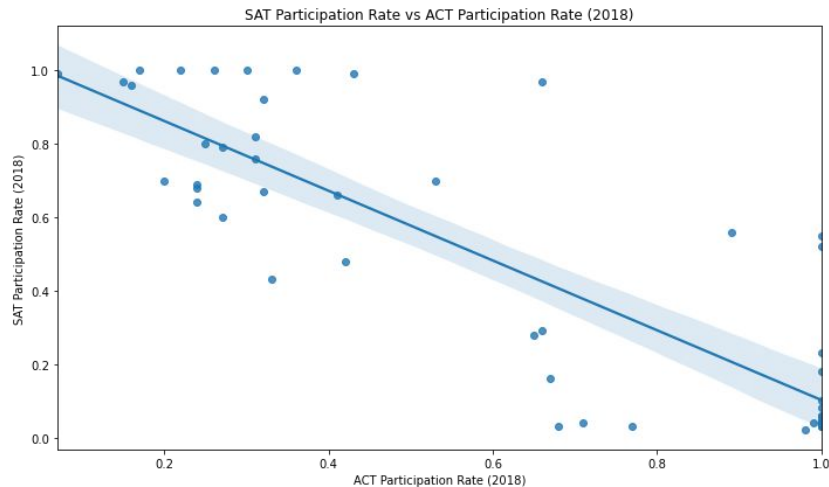
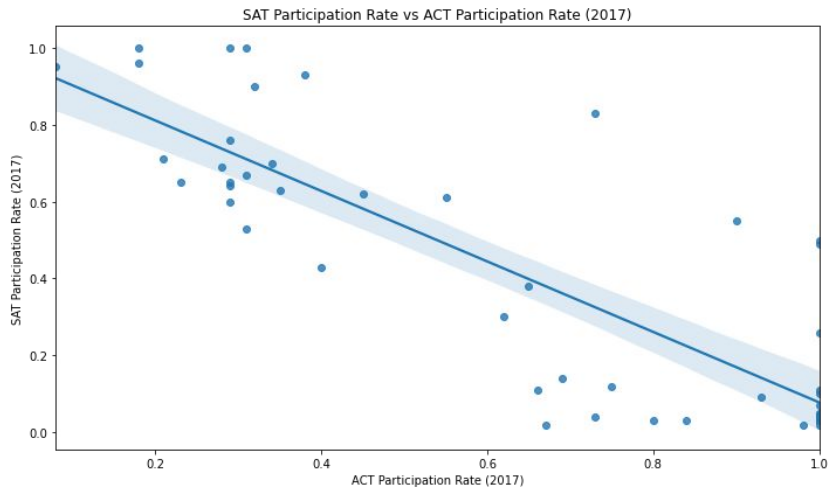
2017 ACT participation rates by state



2017 SAT participation rates by state

ACT is more popular in the Midwestern, Rocky Mountain, and Southern United States, while the SAT predominates on the East and West Coasts.

Exploratory Data Analysis (EDA) - The inverse relationship between ACT and SAT participation rate



SAT participation rate has a strongly negative relationship with ACT participation rate. This suggests that states with higher SAT participation rate tend to have lower ACT participation rate and vice versa.

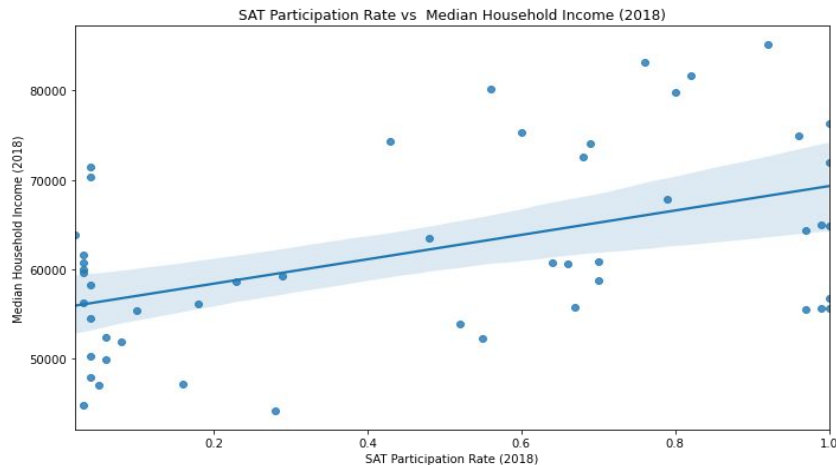
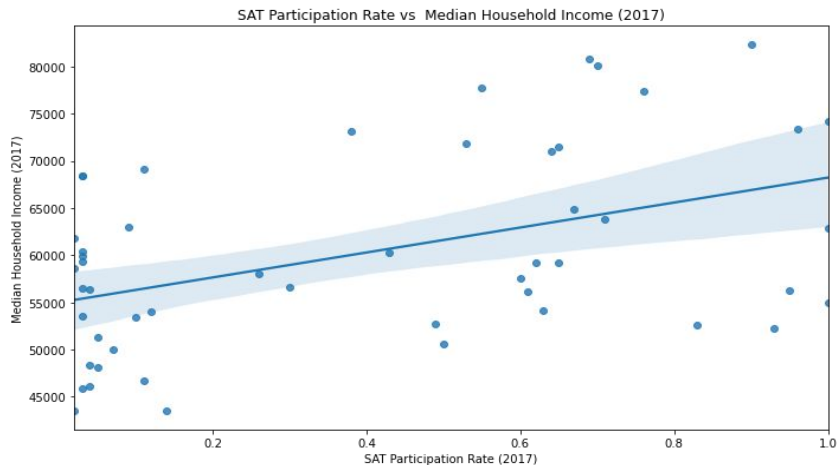
Exploratory Data Analysis (EDA) - Participation rates across time

States with $> \pm 10\%$ change in SAT participation rates

State	2017 ACT Participation Rate	2018 ACT Participation Rate	2017 SAT Participation Rate	2018 SAT Participation Rate	% Change in ACT Participation Rate from 2017	% Change in SAT Participation Rate from 2017
Illinois	0.93	0.43	0.09	0.99	-50	90
Colorado	1	0.3	0.11	1	-70	89
Rhode Island	0.21	0.15	0.71	0.97	-6	26
Florida	0.73	0.66	0.83	0.97	-7	14
West Virginia	0.69	0.65	0.14	0.28	-4	14
New York	0.31	0.27	0.67	0.79	-4	12
New Jersey	0.34	0.31	0.7	0.82	-3	12

Illinois and Colorado experienced the sharpest increased in SAT participation between 2017-2018. As of the 2016-17 school year, all Illinois and Colorado graduating high school seniors must take the SAT. As a result, ACT participation in these state declined drastically from 2017 to 2018. SAT participation is up in **Rhode Island** after the test became a graduation requirement in 2018. In **Florida**, more “SAT school day” programs are offered to students and as a result, the SAT became more popular than the ACT.

Exploratory Data Analysis (EDA) - Relationship between the SAT participation rate and median household income



SAT participation rate has a moderately positive relationship with the median household income. This suggests that states with higher participation rate tend to have higher median household income, and vice versa. From this, we can infer that students from high-income households are more likely to take the SAT, as compared to students from lower-income households.

Recommendations to increase the College Board's Revenue

Price

- Provide free test preparation materials and review lessons..
- Testing fee waivers for low-income students.

Product

- Improve testing convenience by allowing remote arrangements to be made.
- Allow exam candidates to reschedule their examination date

Place

- Target states which have not made the SAT a mandatory high school graduation requirement.
- To collaborate with school districts on offering more SAT School Days.

Promotion

- Team up with the states' education leaders to roll out college- and career- readiness initiatives.
- Provide college entry assistance to students who take the SAT exam.



Success Measures

- Retain SAT test participation in the key states (East and West Coasts).
- Year-over-year growth for SAT participation



Appendix

- Which states require the ACT? (<https://blog.prepscholar.com/which-states-require-the-act-full-list-and-advice>)
- Which states require the SAT? (<https://blog.prepscholar.com/which-states-require-the-act-full-list-and-advice>)
- SAT participation increases, scores decline in RI (<https://apnews.com/article/ef2dbac73823480f88398e775b67e54e>)
- Florida students now favor the SAT over the ACT
(<https://www.orlandosentinel.com/news/education/os-ne-act-sat-florida-scores-20181024-story.html>)
- Income in the past 12 months
(<https://data.census.gov/cedsci/table?q=median%20income&g=0100000US.04000.001&tid=ACSS1Y2019.S1901&tp=true&hidePreview=true>)