



SAT / ACT exploratory data analysis



DSI - project 1 - Group 3



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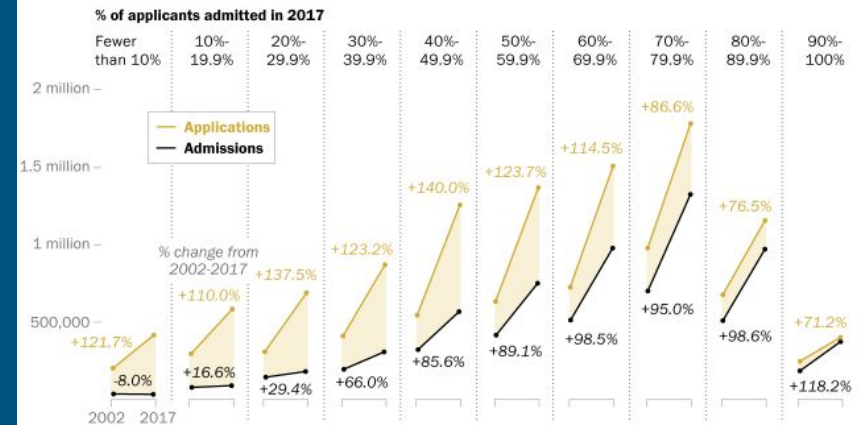
Key Takeaways and
Recommendations

INTRODUCTION

- ❑ Millions of applications are sent to colleges in the U.S. every year
- ❑ SAT and ACT are the two major college admission test widely accepted across the U.S.
- ❑ In 2018, 2 million U.S. students took the SAT, compared with 1.9 million who took the ACT.

U.S. colleges are admitting more students, but not enough to keep pace with soaring number of applications

Number of applications and admissions by 2017 admission rate



Source: Pew Research Center analysis of data from National Center for Education Statistics, Integrated Postsecondary Education Data System.

PEW RESEARCH CENTER

PROBLEM STATEMENT

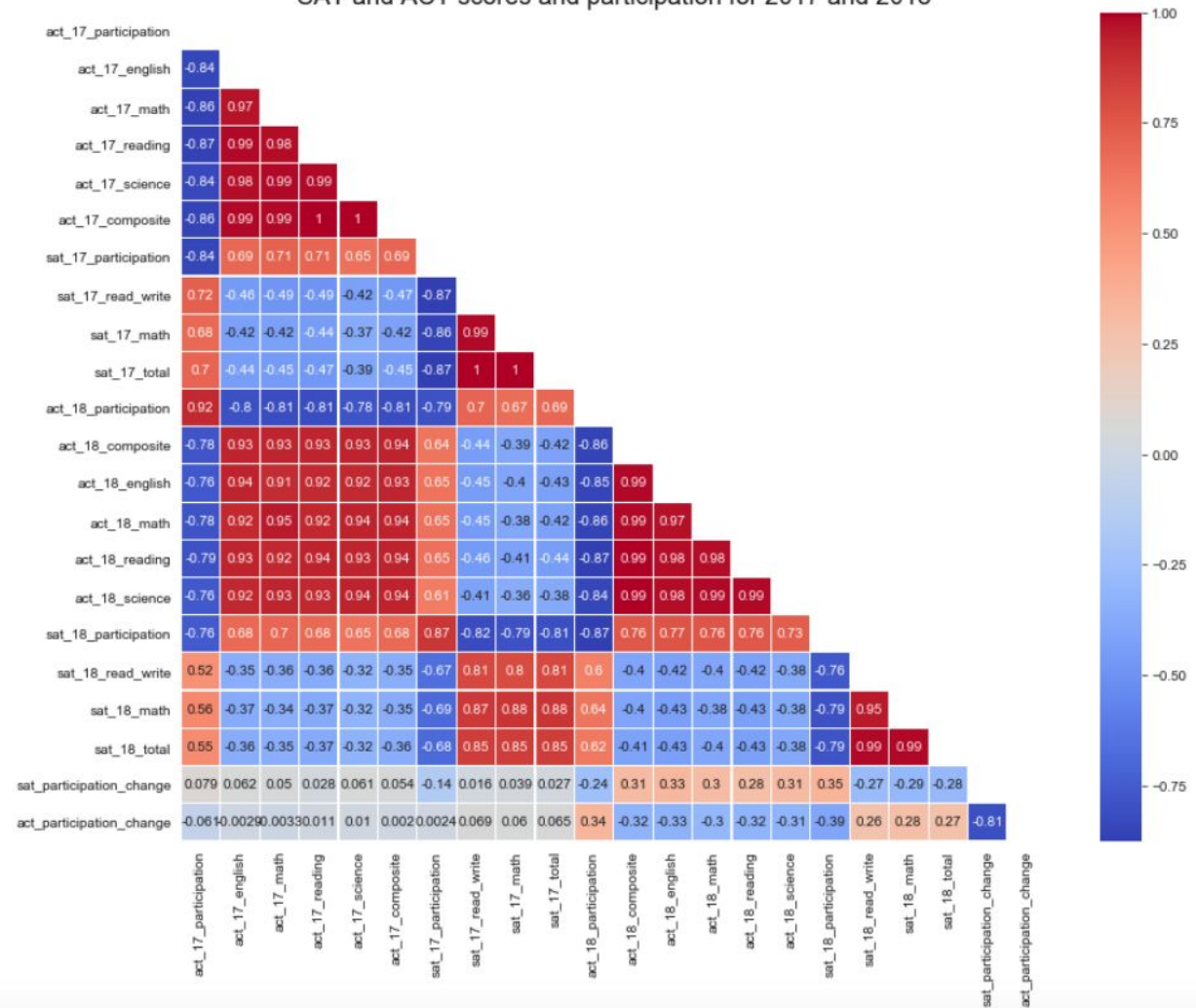
- ❑ College Board (SAT) looks to increase SAT tests nationwide
- ❑ Project Aim: To recommend strategies to increase SAT participation rates by studying SAT and ACT data from 2017 and 2018
- ❑ Identify a State where such strategies will prove effective

Methodology

- Exploratory data analysis of results and participation rates by state for ACT and SAT in 2017 and 2018.
- Structure of dataset: each column represents the test results per subtest as well as total and participation rate. Each row represents one state.
- Data cleaning: typos check, removal of unnecessary rows, data type modification and merging of datasets.
- Study of correlation between variables with the help of data visualization tools to draw conclusions and select relevant features.
- With the addition of some external research as well as analyzing the cases of Colorado and Illinois, we focused on how to effectively increase participation rate in the state of Ohio.

SAT and ACT scores and participation for 2017 and 2018

- Inverse correlation between SAT and ACT participation rate.
- Negative correlation between scores and participation rate
- For each test, positive correlation in participation rate between 2017 and 2018.



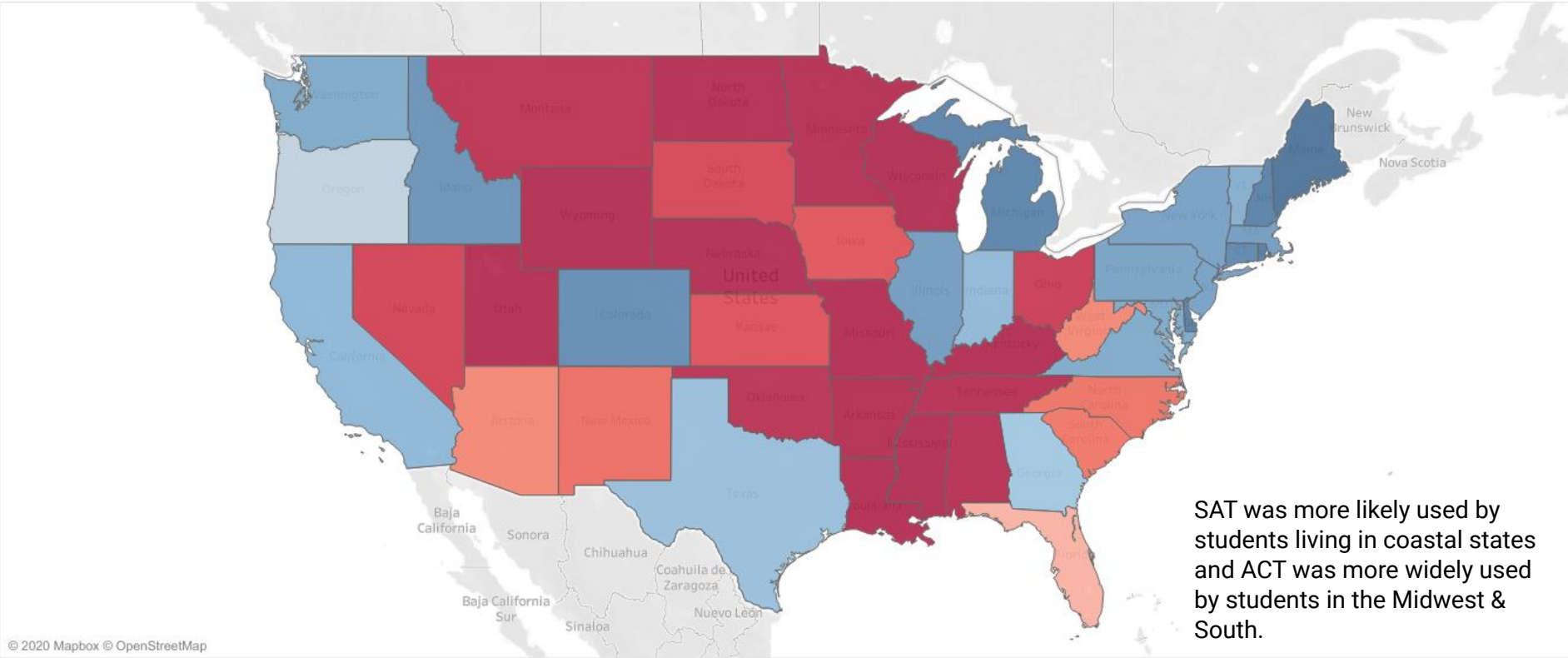
ACT vs. SAT preference in the U.S. by state (2018)

RED indicates ACT preference, BLUE indicates SAT preference

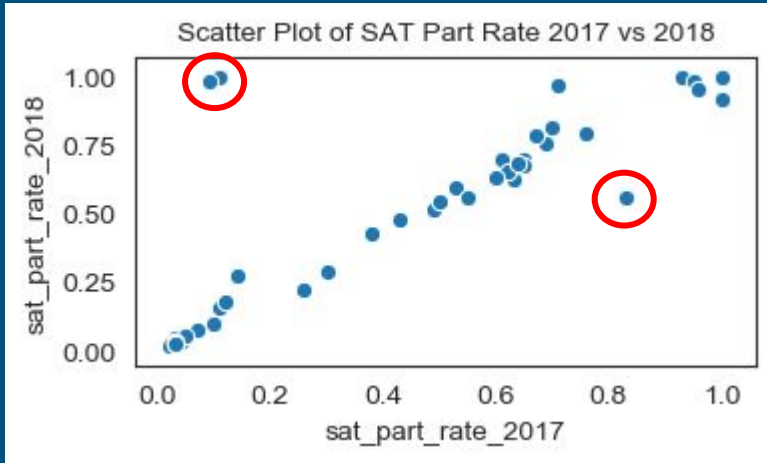


ACT/SAT preference score calculation
= SAT 2018 participation rate - ACT 2018 participation rate

Participation rate ranges from 0 (0% participation) to 1 (100% participation)



Scatter plot of Participation Rate by Year



States have continued to maintain their SAT participation rate year-on-year except for 2 states which are highlighted.

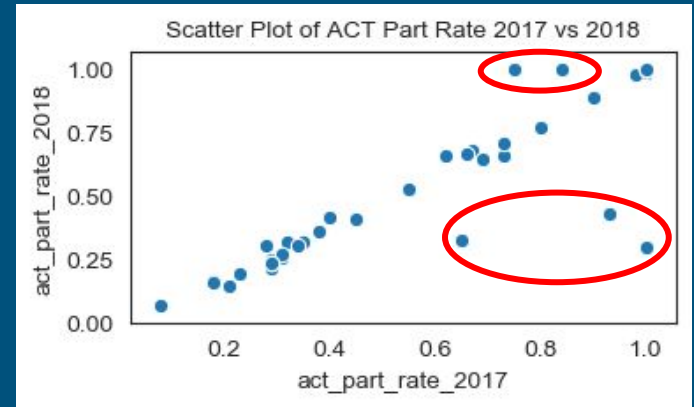
Illinois (89%) & Colorado (90%), which have low participation rate in 2017 have a large jump in participation rate in 2018

Florida shows a drop in participation in 2018 - from 83% to 56%.

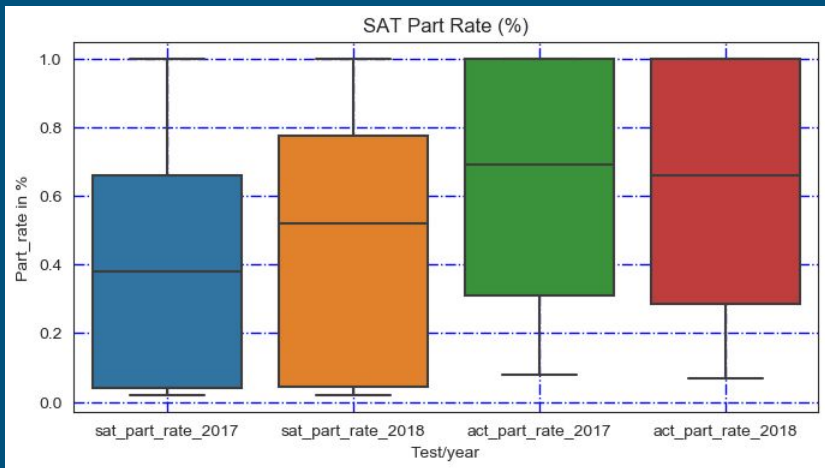
States have continued to maintain their ACT participation rate year-on-year except for 2 states which are highlighted.

Rate of participation year-on-year have improved for 2 states:
-Nebraska (84% -> 100%) & Ohio (75% -> 100%)

Rate of participation year-on-year have dropped for 3 states:
- Alaska (66% -> 33%), Colorado (100% -> 30%), Illinois (93% -> 43%)



Scatter plot of Participation Rate - ACT



SAT

- Median of participation rate increase from 2017 to 2018
- More schools in each state are increasing their participation in SAT

ACT

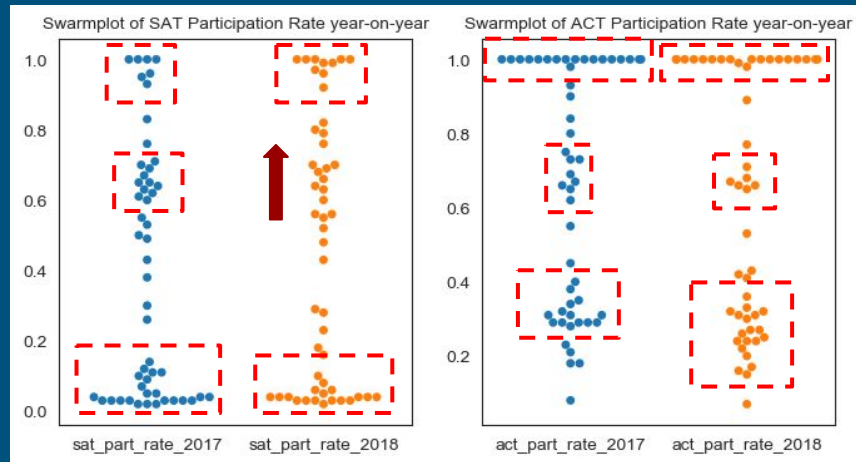
- Median of participation decrease marginally from 2017 to 2018
- More schools in each state are reducing their participation in ACT

SAT Participation Rate

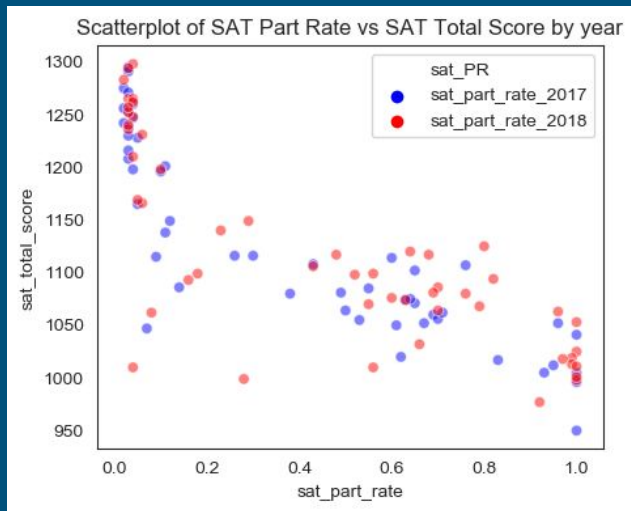
- There are 3 clusters of grouping of states at around 10%, 60% and 100% in 2017
- The 3 clusters seems to be flowing into 2 extreme ends at 10% and 100% in 2018 suggesting more states may have decided to take SAT as the college admission exam.

ACT Participation Rate

- There are 3 clusters of grouping of states at around 30%, 70% and 100% in 2017
- Trend has remain the almost similar in 2018



Scatter plot of Participation Rate vs Total Score by Year



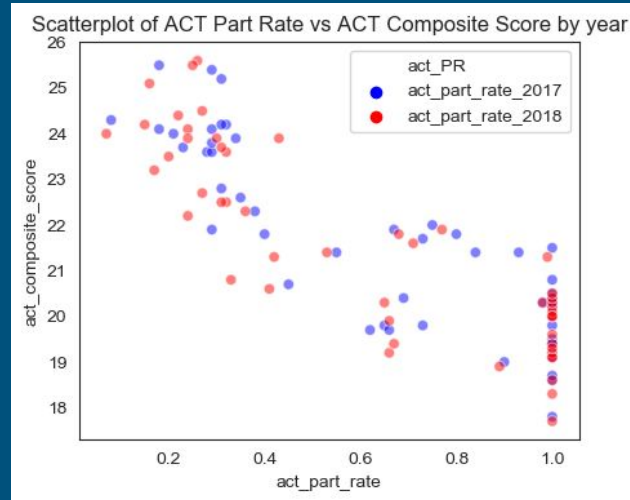
Observed an inverse relationship between participation rate and test score as students are competing within and without states for college admission and scholarship.

Students are less likely to participate if they are not confident in beating the state average.

The trend in SAT has remained almost unchanged but observed that states around the 1100-1050 score range increase in participation rate.

Similarly ACT's trend remained almost unchanged but observed a decrease in participation in 2018 across score range

This may be due to outside factors such as shift in educational policies or political effects



Illinois and Colorado case study

SAT participation rates shot up in Colorado and Illinois after the SAT became a requirement.

The College Board won statewide testing contracts in both states, which were previously longstanding ACT-taking states.

PARTICIPATION RATES

Illinois

- SAT: **9%** in 2017 to **99%** in 2018 (+90%)
- ACT: **93%** in 2017 to **43%** in 2018 (-50%)

Colorado

- SAT: **11%** in 2017 to **100%** in 2018 (+89%)
- ACT: **100%** in 2017 to **30%** in 2018 (-70%)

Summary of key findings

1. There is an inverse relationship between ACT and SAT participation rates.
2. Test scores and participation rates are inversely related for both ACT and SAT.
3. There is a high correlation between participation rate in 2017 and 2018 for each state for both tests.
4. It is possible to convert states that were longstanding ACT states to the SAT, as in the case of Illinois and Colorado.
5. State regulations strongly influence test participation rates.

Recommendation: Target Ohio

- **Large population:** Ohio is the 7th most populous state in the U.S., so there is a sizeable number of new test-takers that the College Board can acquire.
- **Relatively low current SAT participation rates:** From 2017 to 2018, Ohio increased both its ACT and SAT participation after it became compulsory to take either test. However, the increase was larger for the ACT, i.e. from 75% to 100%, whereas for SAT it was from 12% to 18%. Thus, there is still considerable room for growth for the SAT.
- **Free to take the ACT or SAT:** The ACT and SAT are already free for public school students to take. Thus, the main task left for College Board is to explain to the Department of Education why it would be more beneficial for students to take the SAT instead of the ACT.