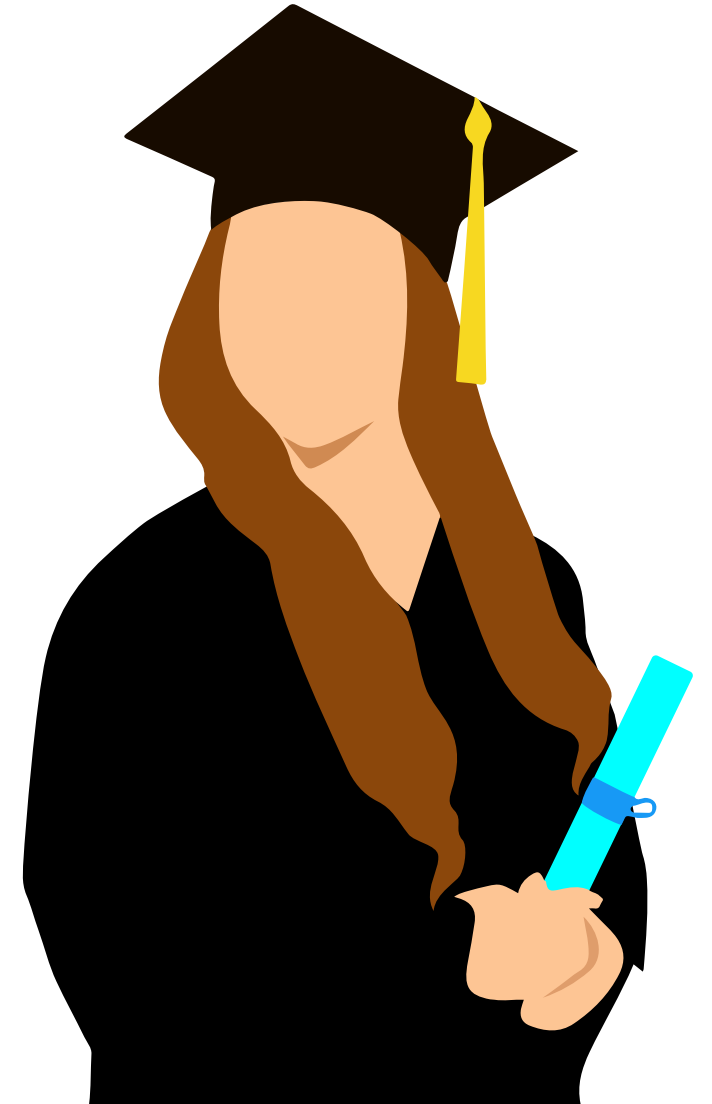


# SAT & ACT Analysis

Riche Ngo

# Problem Statement

Where can we best spend money as the College Board team to improve the SAT participation rates in the United States?





# Methodology

## Exploratory Data Analysis

Performing initial investigations on data to discover patterns, spot anomalies and to check assumptions with the help of summary statistics and graphical representations.

## Lessons from History

Investigate some states with interesting trends in their SAT/ACT participation rates, finding out what are the influential factors.

## Recommendations

Key takeaways and possible strategies for the College Board to increase SAT participation rates.

# What is in the data?

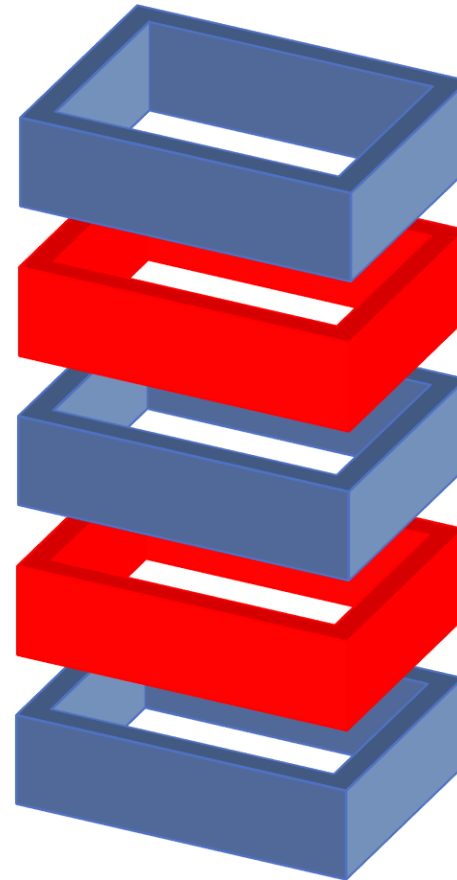
State-by-state data  
samples from the U.S.

**Participation Rates for SAT & ACT  
in Years 2017 & 2018**

**SAT Subtest Scores in  
Years 2017 & 2018**

Subtests include Evidence-based  
Reading & Writing (ERW) and Math.

**SAT Total Scores in  
Years 2017 & 2018**



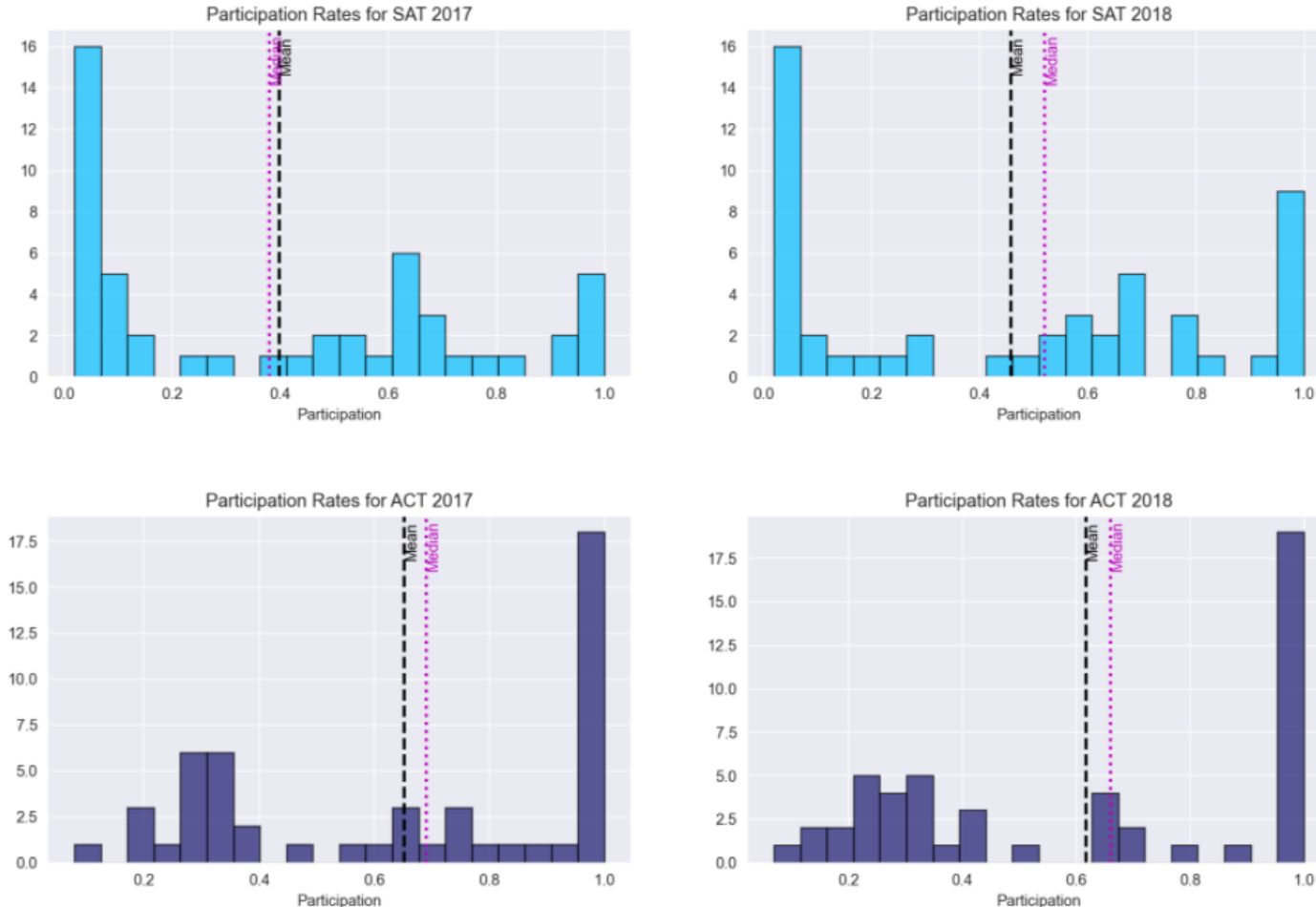
**ACT Subtest Scores in  
Years 2017 & 2018**

Subtests include English, Math,  
Reading, and Science.

**ACT Composite Scores in  
Years 2017 & 2018**

# Exploratory Data Analysis

Histograms of Participation Rates for 2017/2018 SAT & ACT



## Observations

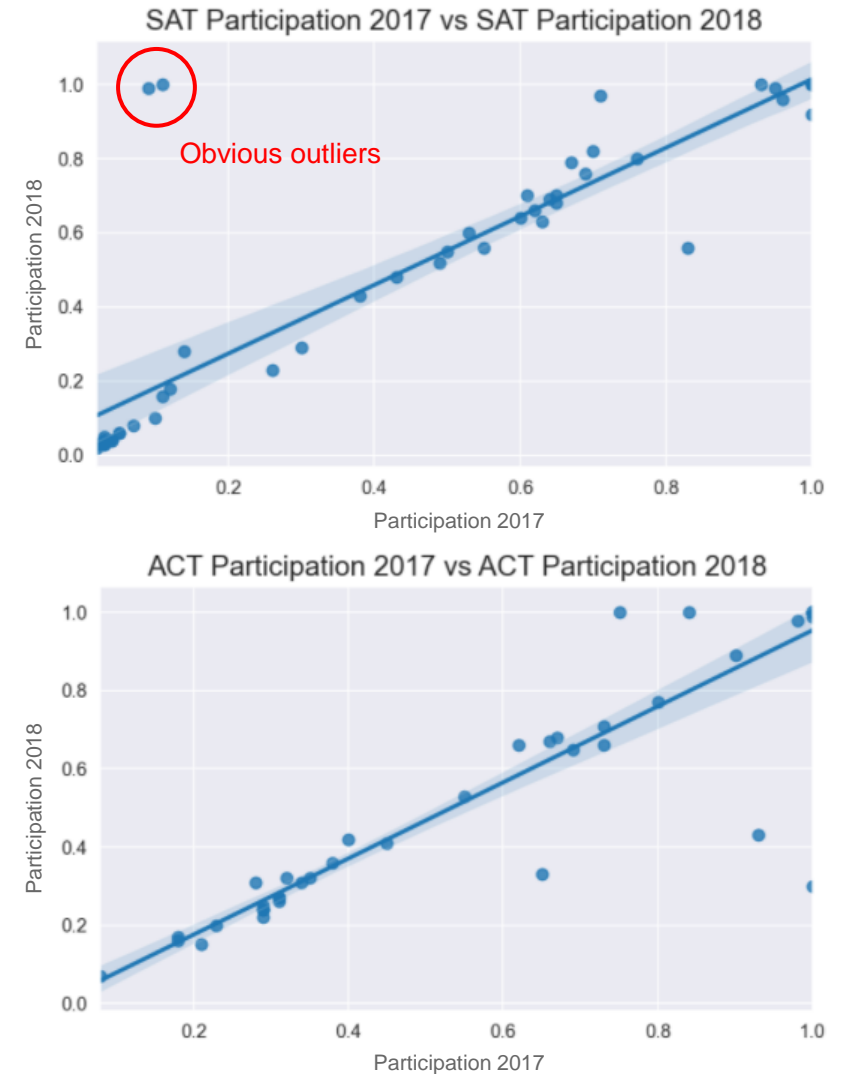
- Distributions of both SAT & ACT participation rates did not change significantly year-to-year.
- For the SAT, there is a large number of states with very low participation rates (<5%), a spread of states in the middle range and a group of states with 100% participation (more so in 2018).
- For the ACT, there is a very small number of states with low participation rate (<20%), a flatter spread of states in the middle range and a large number of states with 100% participation.
- The distribution for SAT 2017 is slightly right-skewed while the distribution for SAT 2018 is left-skewed.
- The distributions for ACT 2017 and 2018 are both left-skewed.
- **Overall, the general sensing is that the SAT participation rates are less consistent as compared to the ACT participation.**



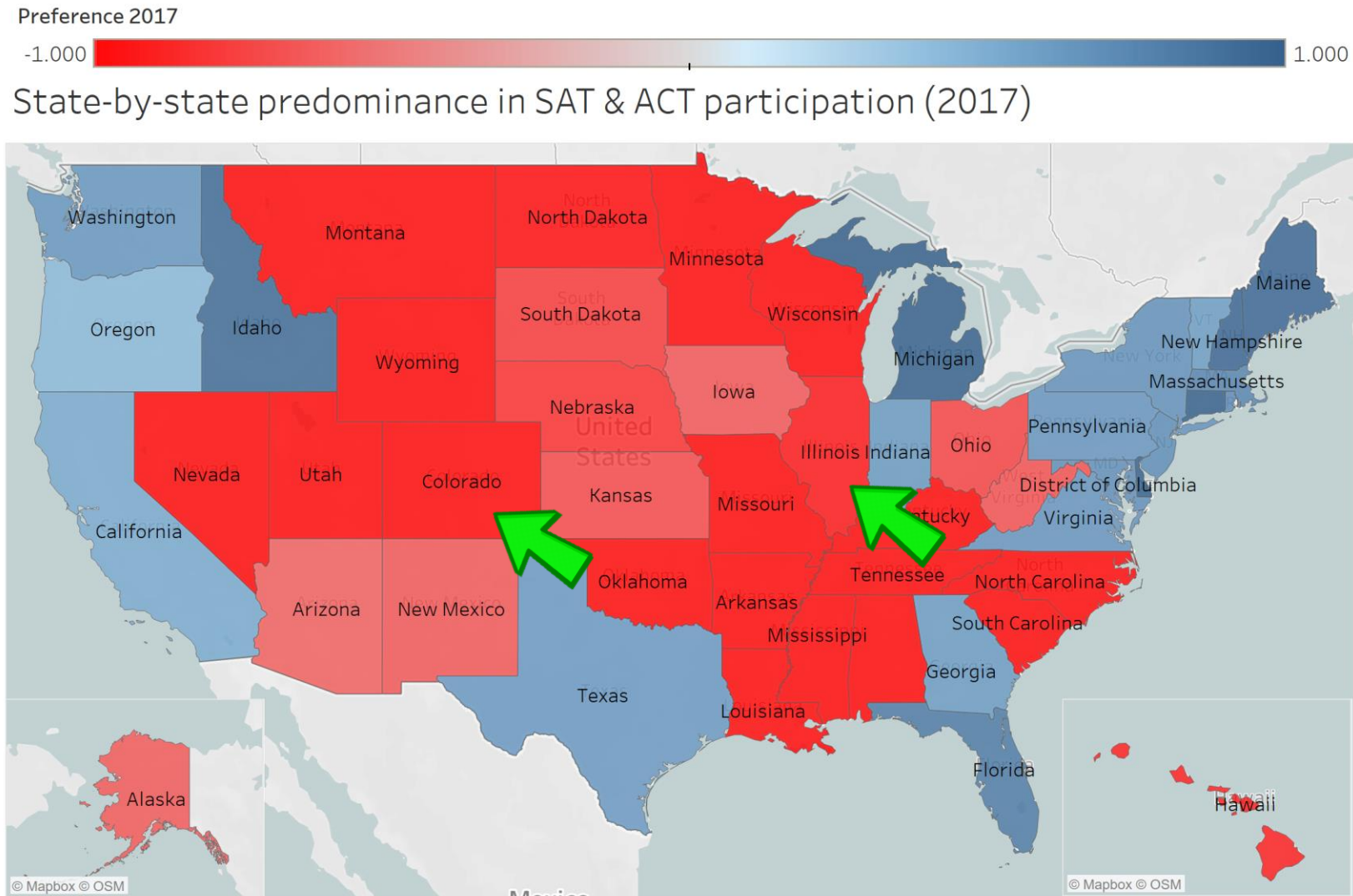
# Exploratory Data Analysis

## Observations

- There was a seemingly high positive correlation ( $r > 0.8$ ) between the participation rate in 2017 and 2018 for both SAT and ACT.
- Able to see that there is a strong trend depicting the positive correlation between the participation rates from 2017 to 2018.
- This is expected since it is likely for each state to have similar year-to-year participation rates.
- However, in the scatterplot of SAT participation 2017 vs 2018, there are two obvious outliers that are far from the best-fit line. It was found that these are the states **Colorado** and **Illinois**.

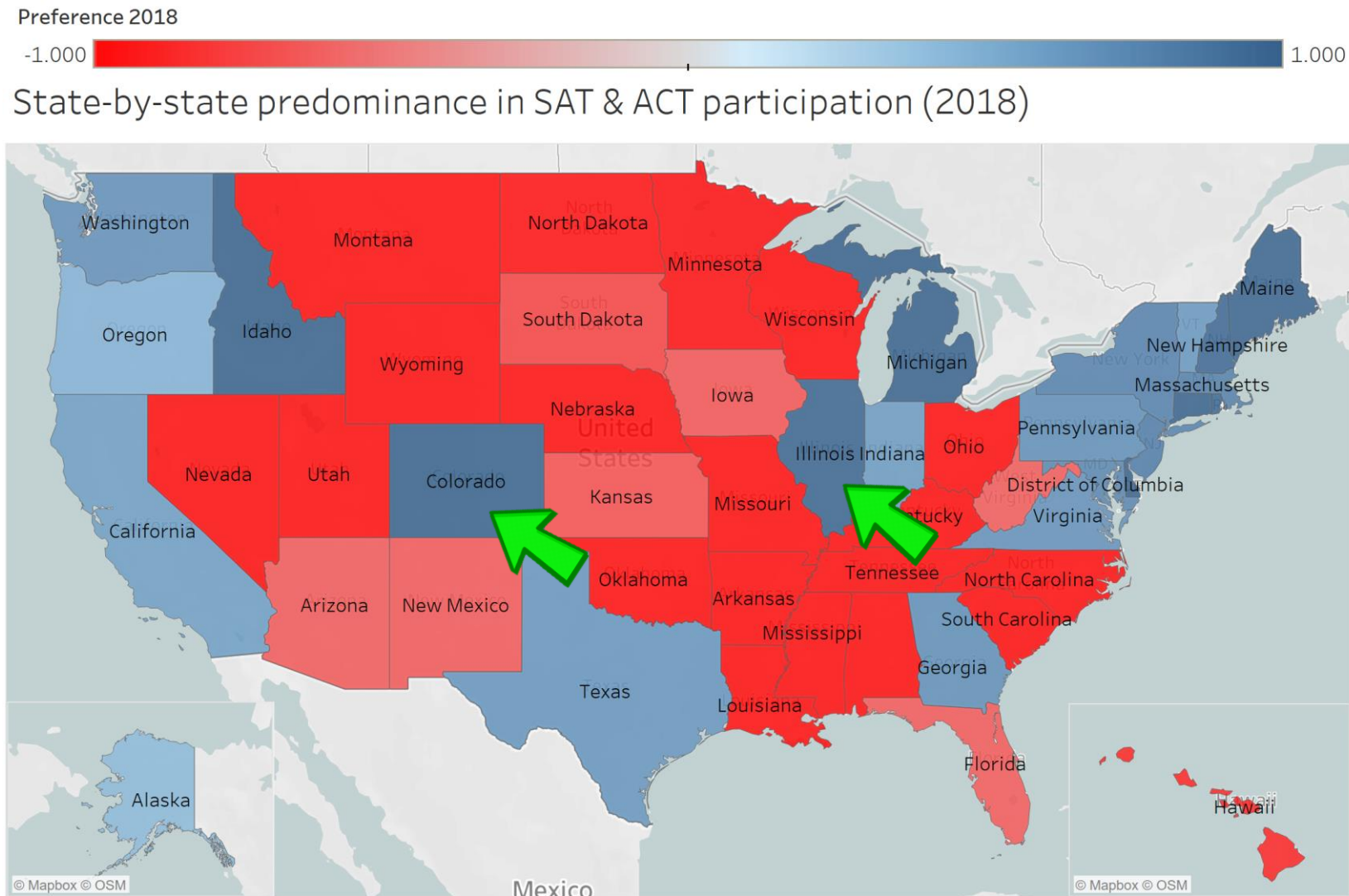


# Exploratory Data Analysis

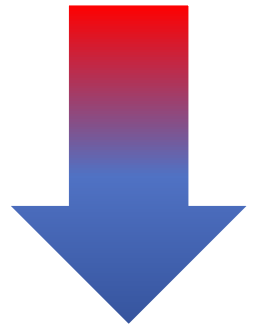


This is a map showing 49 states of the United States with a divergent color scale indicating the predominance of either the SAT or ACT taken by students in that state in the Year 2017. **Blue indicates that students of that state predominantly took up the SAT while red indicates that students of that state predominantly took up the ACT.**

# Exploratory Data Analysis



**2017**  
**Predominance**  
**in ACT**



## 2018 Predominance in SAT

This is a map showing 49 states of the United States with a divergent color scale indicating the predominance of either the SAT or ACT taken by students in that state in the Year 2018. Blue indicates that students of that state predominantly took up the SAT while red indicates that students of that state predominantly took up the ACT.



# Lessons from History - Colorado

**89%**  
**increase in  
participation**



- Colorado has seen one of the largest increases in SAT participation rates from 2017 to 2018.
- State policies were changed during the period where it became mandatory for all Colorado high school juniors to take the SAT test.
- No additional cost for students to participate in mandatory SAT testing.
- SAT was replacing the ACT, which had been given to juniors since 2001. Resulted in a large 70% decrease in ACT participation rates.
- Lingering 30% ACT participation rate in 2018 attributed to students who wanted to take both tests to increase their chances of college admission, and have more test dates to choose from.

## **HOWEVER...**

- Switch to SAT was postponed from 2015 to 2017 due to complains by the school district superintendents.
- Notice period was not long enough for school systems to adjust.
- Students were not prepared to sit for the SAT in 2015.

# Lessons from History - Illinois

- Illinois has seen the largest increases in SAT participation rates from 2017 to 2018.
- State policies were changed during the period where it became mandatory for all Illinois high school juniors to take the SAT test.
- SAT testing given to students free-of-charge.
- SAT was replacing the ACT.
- Resulted in a large 50% decrease in ACT participation rates.
- Lingering 43% ACT participation rate in 2018 attributed to students who wanted to take both tests have added advantages for college admission, and students who were high achievers and just wanted a morale boost.

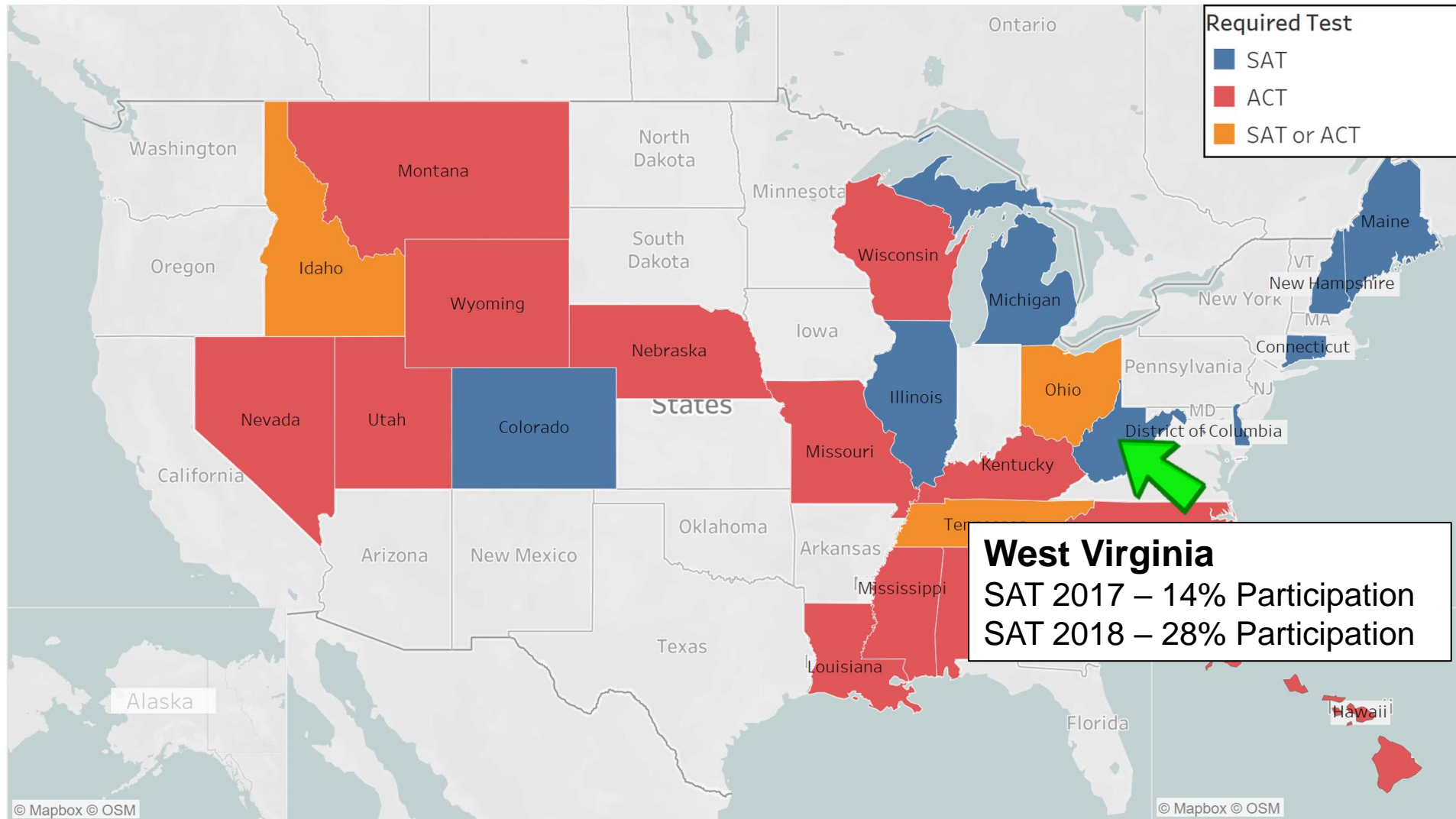
## HOWEVER...

- School systems took a big shock many things were aligned to the ACT before the switch to SAT was announced.
- School systems had to adjust quickly to better prepare students for the SAT.
- ACT team filed a protest with the Illinois State Board of Education for awarding the multi-year contract to the College Board, may have resulted in rise of distress in students.

**90%**  
**increase in  
participation**



## States that Require the SAT or ACT (2018)



# Lessons from History – West Virginia

**14%**  
**participation**  
**in 2017**

**28%**  
**participation**  
**in 2018**

- West Virginia has seen low SAT participation rates despite state policy in 2017 where the West Virginia Department of Education chose SAT as the new statewide standardized test.
- Mandatory requirement for all high school juniors to take the SAT at no cost, unless taking the ACT at their own expense.
- Predominance in ACT participation rates instead.

## **BECAUSE...**

- Educators of West Virginia assumed that the ACT contract was going to be renewed.
- Decision to choose the SAT was a shock to educators.
- Lack of anticipation resulted in longer adjustment period for school systems.
- School systems have to change their school syllabus and learn how to prepare students better for the SAT.
- Likely that students still take up the ACT during adjustment period.



Where can we best spend money as the College Board team to improve the SAT participation rates in the United States?

## Revisit Problem Statement

# Recommendations

## Learn from History

State policies mandating SAT participation has a big influence on participation rates. However, school systems may take a shock if switching from ACT testing with little to no notice period, causing delays in transition.



# Target State - Oregon

- Currently no requirement on taking either of the tests.
- Students of Oregon already favours taking the SAT by a slight margin.
- Surrounded by other states with a preference for the SAT in 2017/2018 (i.e. Washington, California, and Idaho). Possibly create positive influence on efforts to increase SAT's recognition.
- Potential to expand investments into neighbouring states Washington and California if successful.



## SAT Participation Rates



## ACT Participation Rates

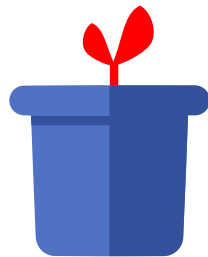


# Strategies Moving Forward

## 01 New contract with Oregon

Mandate SAT testing in the state and make it free for high school juniors.

01



## 02 SAT School Day

Provide for schools in Oregon to make the test easily accessible.

02



## 03 Invest in marketing

Marketing campaigns so that it will be well-received and people are well-informed.

03



## 04 Share free resources

Notify students of free online resources, such as Khan Academy, which help with test preparation.

04







# References

- Required tests ( [source](#) )
- Colorado research ( [source 1](#) | [source 2](#) | [source 3](#) | [source 4](#) )
- Illinois research ( [source 1](#) | [source 2](#) | [source 3](#) | [source 4](#) )
- West Virginia research ( [source 1](#) | [source 2](#) )