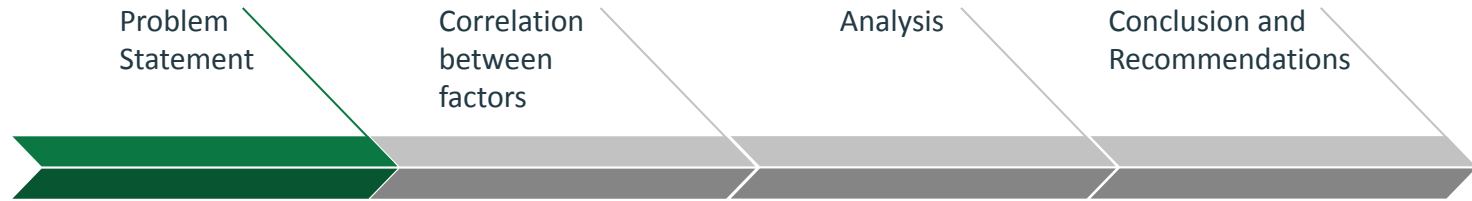


# Project 1: Standardized Test Analysis

Group 2:

Cheryl Leong, Feng Yonghe, Melissa Ng, Marc Tan, Rohazeanti

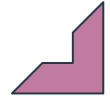
# Agenda



# Problem Statement



We are consultants hired by the U.S Department of Education, researching on which state(s) to assist in improving participation rates and/or scores for SAT and/or ACT so that resources can be allocated appropriately.



# California lawsuit blasts SAT, ACT exams as discriminatory

One student called the standardized tests “flawed,” saying they don’t “account for my experiences.”

Dec. 11, 2019, 8:12 AM +08 / Updated Dec. 14, 2019, 5:56 AM +08

By Erin Einhorn

Students, educators and advocates are suing the University of California over its use of the SAT and ACT in college admissions decisions, accusing the 10-campus system of discriminating against applicants of color from **low-income families** by requiring standardized tests.

Forbes

PERSONAL FINANCE

## How Admissions Tests Discriminate Against **Low-Income** And Minority Student Admissions At Selective Colleges

Mark Kantrowitz Contributor @

Follow

May 21, 2021, 01:51pm EDT

## Does Money Matter in Education? Second Edition

“ NEW SECOND EDITION

**UPDATE** (April 2019): Also see our new **report** and **public database** on state school finance systems in the U.S.

.....

This report presents a comprehensive review of the high-quality empirical evidence on whether and how money matters in education, written by Rutgers Professor Bruce Baker. This is the second edition of the report originally released in 2012. It has been updated by the author.

Baker concludes that, despite recent rhetoric, **“on average, aggregate measures of per-pupil spending are positively associated with improved or higher student outcomes,”** while “schooling resources which cost money ... are positively associated with student outcomes.” Finally, reviewing the high-quality evidence on the effect of school finance reforms, he asserts: “Sustained improvements to the level and distribution of funding across local public school districts can lead to improvements in the level and distribution of student outcomes.”

# Problem Statement

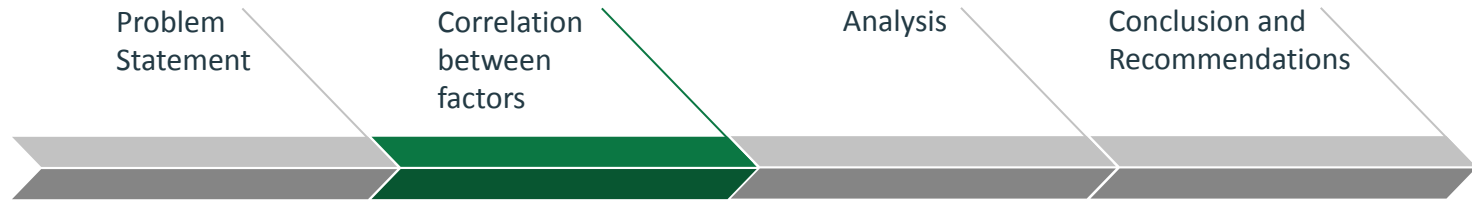


We are consultants hired by the U.S Department of Education, researching on which state(s) to assist in improving participation rates and/or scores for SAT and/or ACT so that resources can be allocated appropriately.



We will look into the following:

- Are there any correlation between SAT and ACT participation rates and scores and are there any external factors?
- Are there any score or participation rate bias for households with higher or lower median income?
- Does education spending play a part in higher SAT or ACT scores?

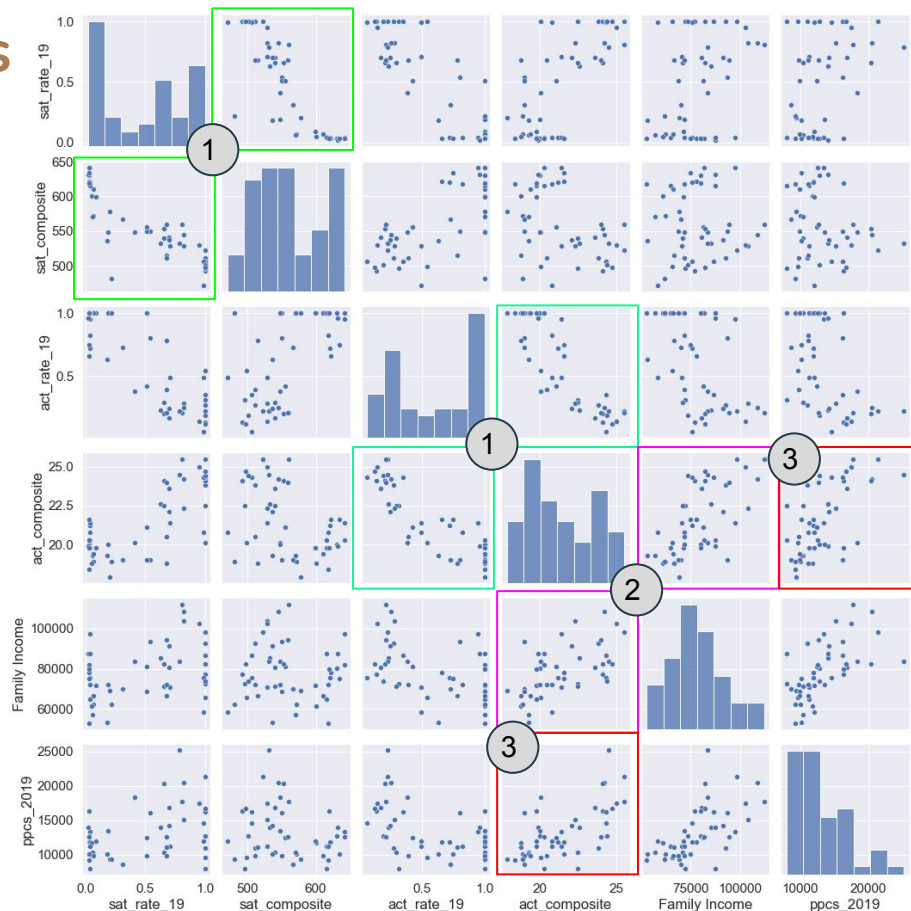


# Correlation between factors

Observations:

1. Participation rates are negatively correlated with test scores.
2. Only ACT composite score is positively correlated with median family income
3. Only ACT composite score is positively correlated with per pupil current spending.

As such, we will skew towards looking on ACT scores instead.

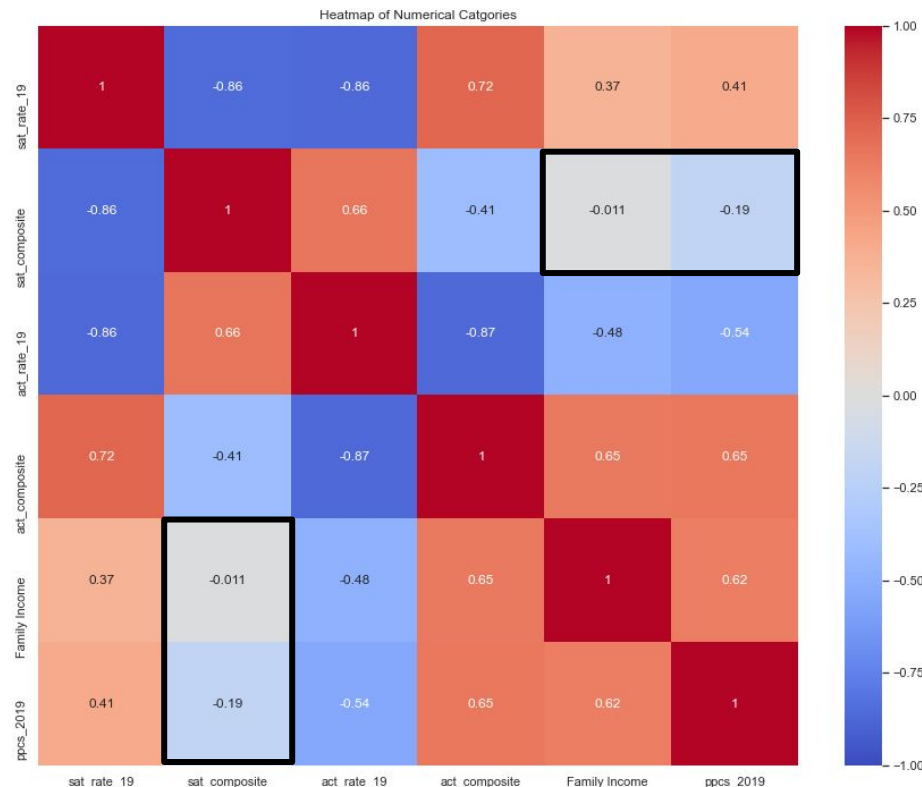


# Correlation between factors

The correlation between SAT composite score and median family income or per pupil education spending is extremely weak at -0.011 and -0.19 respectively.

This means any change to these 2 factors is unlikely to affect SAT composite score.

As such, we would be skewed towards focusing on ACT instead.





## Hypothesis Test:

Is there a score bias for households with higher or lower median income?

Hypothesis test for correlation:

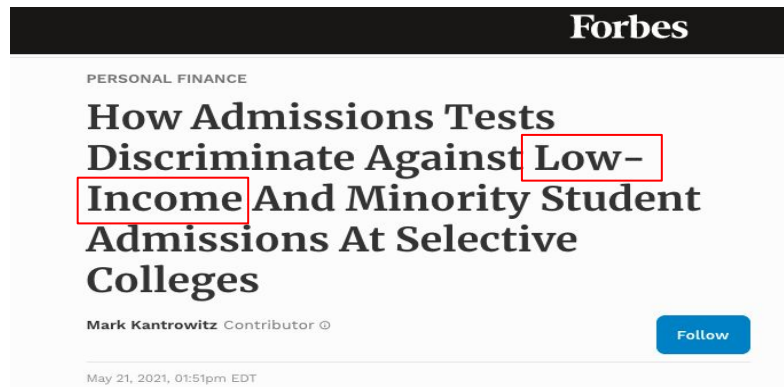
- H0: 'ACT score' and 'Family Income' are independent
- H1: 'ACT score' and 'Family Income' are dependent

Dataset of interest:

- States with ACT participation rate > 90%

Reason:

- We are comparing states with similar participation rate so as to remove participation rate as a variable that could influence the mean score.



## Hypothesis Test:

Is there a score bias for households with higher or lower median income?

- H0: 'ACT score' and 'Family Income' are independent
- H1: 'ACT score' and 'Family Income' are dependent

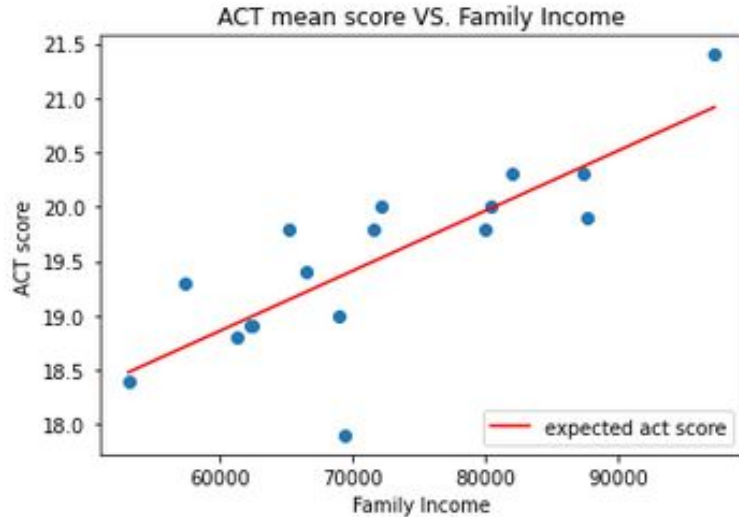
The Pearson's Correlation Coefficient : 0.799

The P-value : 0.000

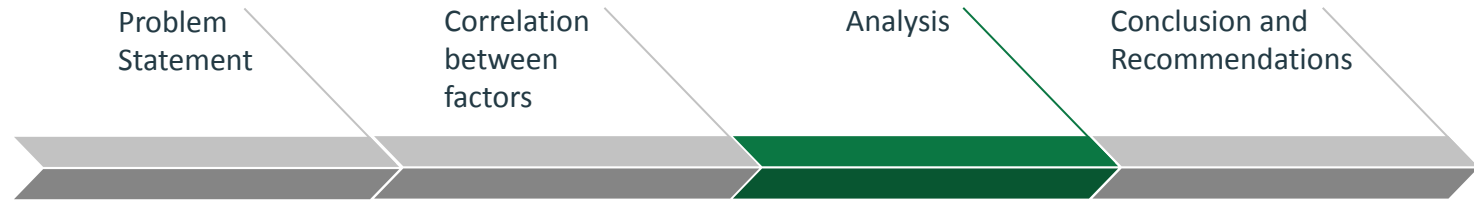
- ❑ Statistically, when the p-value is less than 0.05, we can believe H0 is false and H1 is true at a 95% level of confidence.
- ❑ In other word, our hypothesis test has shown that 'act\_score' and 'family\_income' are dependent.
- ❑ The Pearson's Correlation Coefficient is 0.799, indicating they have a strong positive correlation, i.e., 'act\_score' is expected to increase with an increase in 'family\_income'.

## Linear Regression Model: ACT score VS Family Income

$$\text{act\_score\_prediction} = (0.00005526) * \text{family\_income} + 15.5446$$

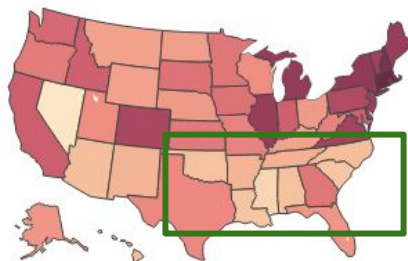


- Statistically, poorer students do tend to get lower scores
- The higher the family income, the higher ACT score the student will get
- Students are expected to score 0.55 higher when their family income increase by \$10,000
- The model violated one of LINE assumptions



# Region of Interest

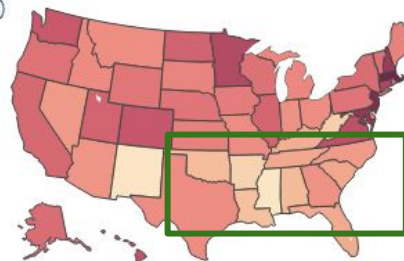
ACT Composite



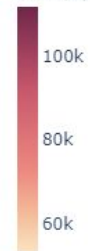
percentage(%)



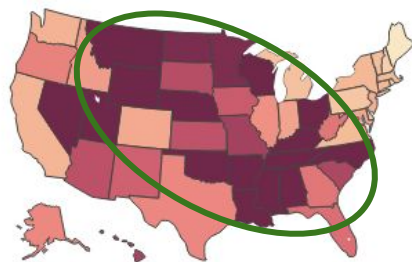
Median Family Income



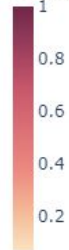
USD(\$)



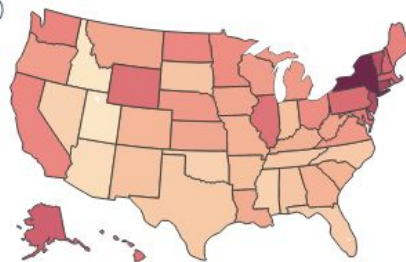
ACT Participation



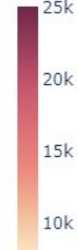
percentage(%)



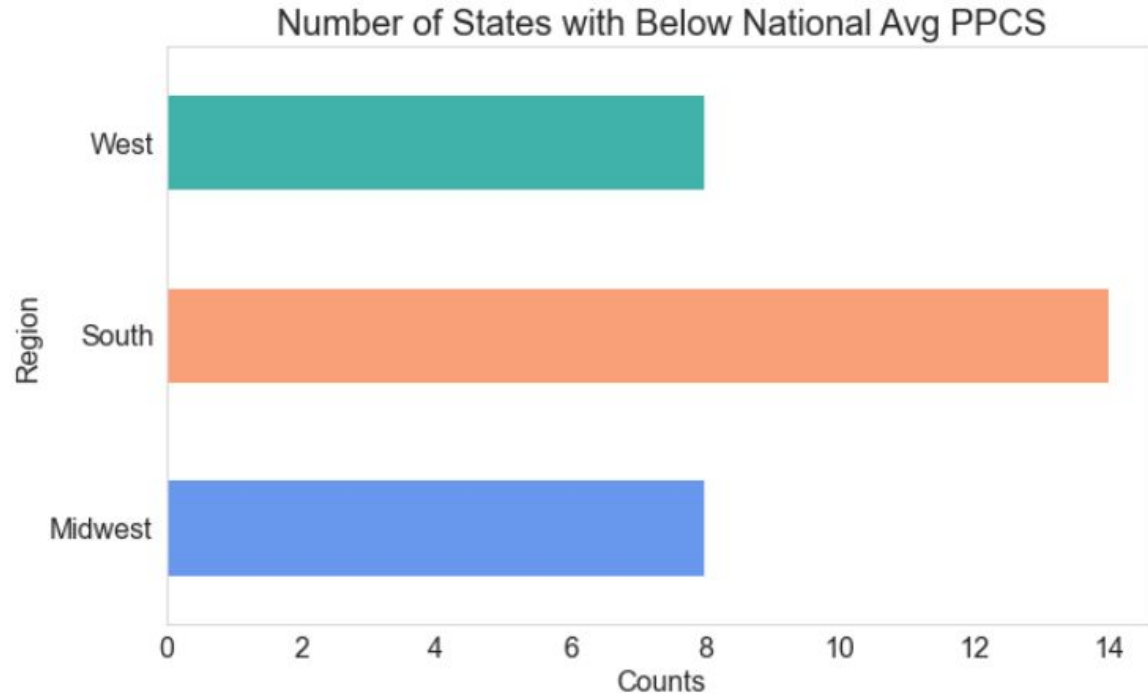
Per Pupil Current Spending



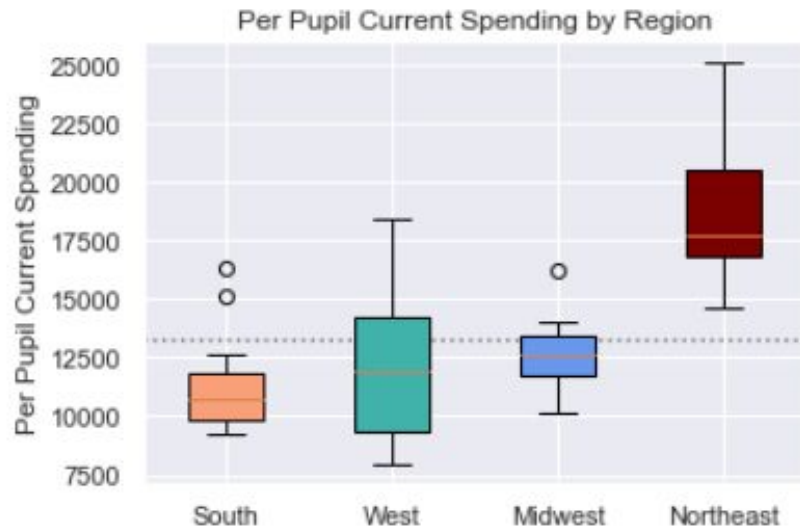
USD(\$)



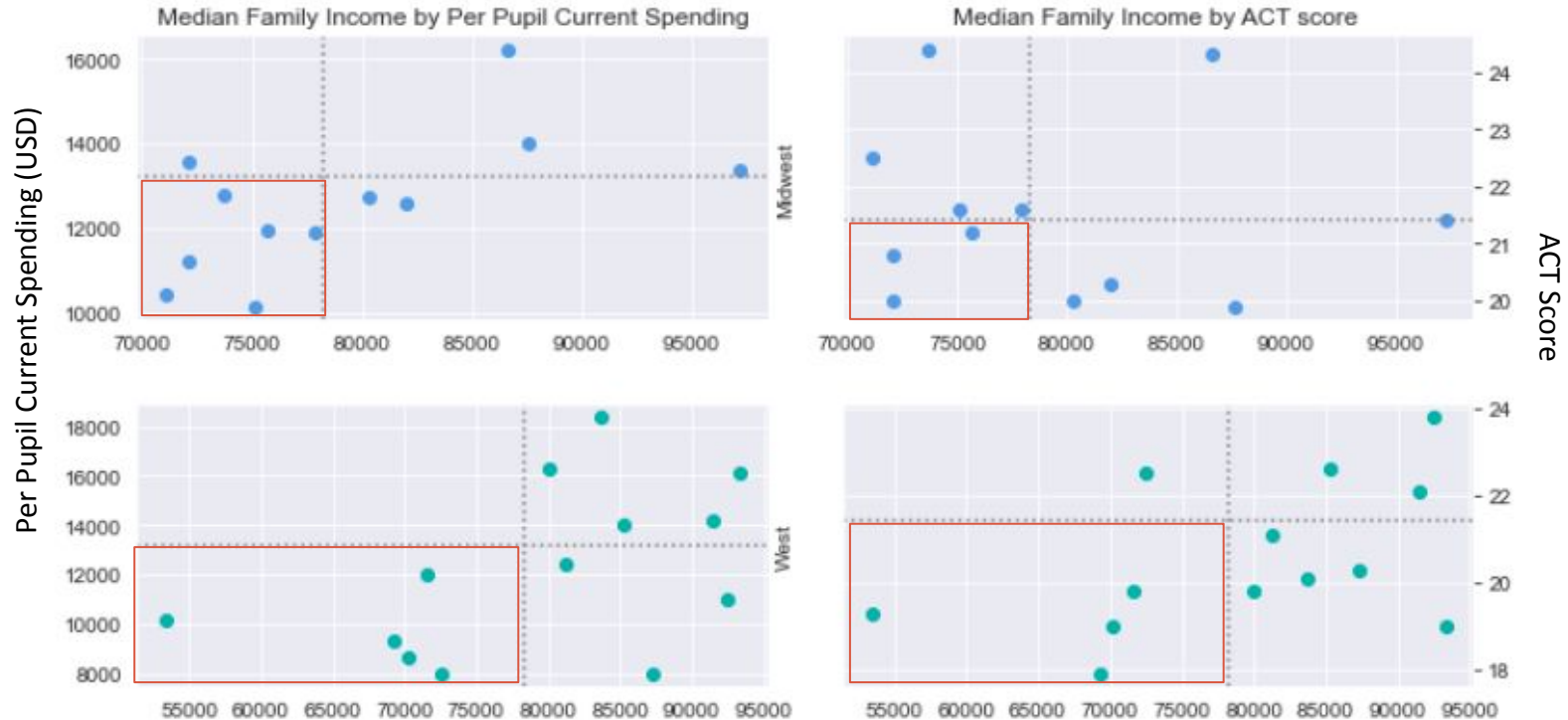
## Region Has The Most No. of States with PPCS < National Average



# Median Family Income and Per Pupil Current Spending by Region



## Distribution of States based on Median Family Income by Per Pupil Current Spending as well as ACT score for Each Region



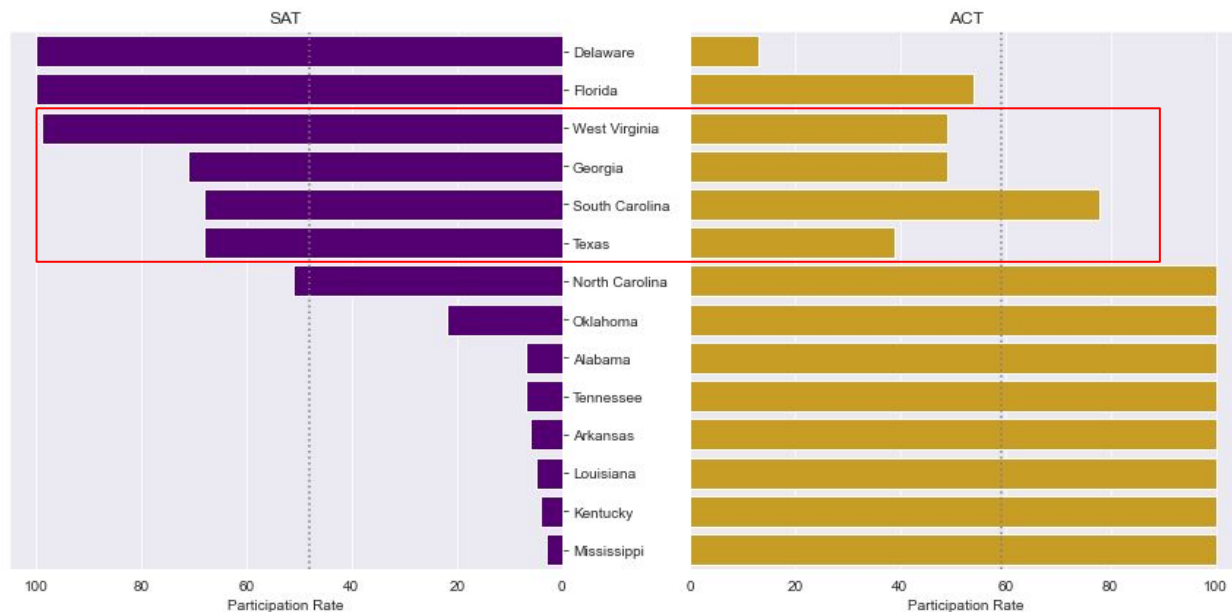


## Distribution of States based on Median Family Income by Per Pupil Current Spending as well as ACT score for Each Region



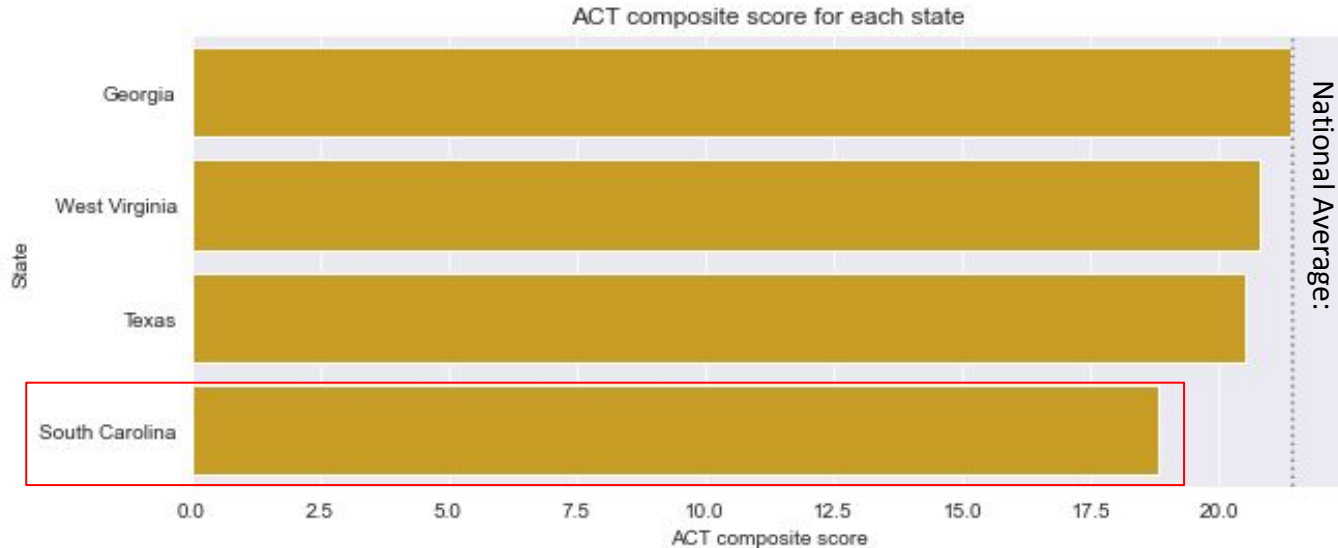
# States that are of interest

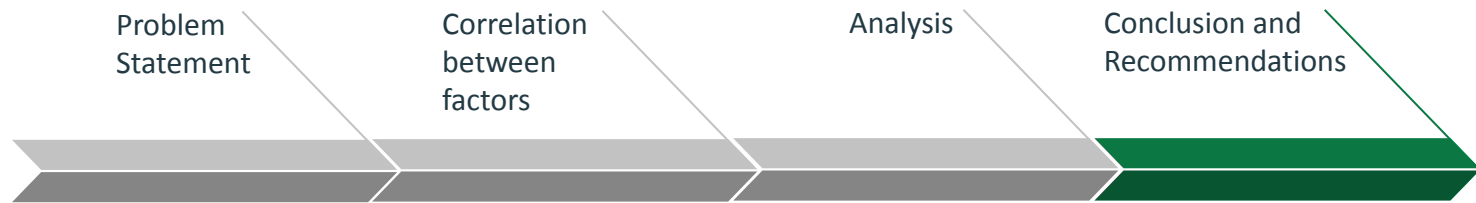
Efforts to improve ACT composite score should not be invested in states currently with mandatory SAT and ACT.



# Focus Area

South Carolina seems to be suitable candidates as ACT composite score is the lowest among the 4 states, which means there would be more room for improvement.





# Conclusion

Efforts to increase ACT composite score be focused on South Carolina.

## No mandatory testing

- Students are not obligated to choose SAT over ACT.
- As compared to states with mandatory SAT participations, efforts to increase ACT scores may be marginal.
- Time could be used to focus on studying/preparing specifically for ACT which would highly likely improve their scores.

## ↑ participation rate

- Despite ACT not being mandatory, the participation rate exceeds the national average.
- Suggest that students that have signed up for ACT test have expressed greater interest hence may be keen in improving their scores
- Emphasized by the fact SAT & ACT participation rates exceeds national average.

# Recommendations

- Making practice resources more readily available (eg: e-learning, online resources, school libraries) for free or at subsidized rates.
- Increase educational funding (better teaching & learning equipment/ learning facilities/ better welfare)
- Raise standards for teachers/professors.
- Incentivize University enrollment / acceptances for students.
- Raise awareness through campaigns.
- Taking family income into consideration to moderate test scores.

## Additional data that would be helpful:

- Absolute number of students that participated in each exam for each state for the score to be adjusted
- State population
- Number of students who worked part-time for each state as this would reduce the time they have to study for the exam(s) which could result in poorer scores
- Average time spent on studies per day
- Social-economic statistics like race and demographics which may have an effect on the scoring amongst states.



# Questions & Answer?

