SAT/ ACT Participation Rate Analysis

Jefferson
General Assembly DSI20

Problem Statement

To recommend of a way to allocate resources to improve SAT participation rate within the states.

1. Intro

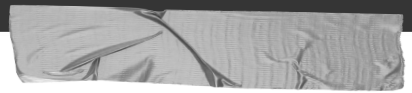
ACT and SAT are the two **most popular** university admission test in the US. They share many **similarities**:

- ➔ **Subject being tested**
  Math, Reading in both tests. ACT has Science and English subjects too.
- ➔ **Similar price point**
  ACT costs $70, SAT costs $68*.
- ➔ **Available in all states**
  All states provide the test with some provides free tests.

What is the distribution of participation rate of the tests?

Which test is more popular?

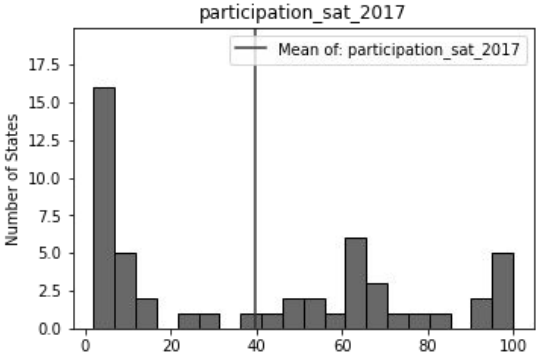
Any trend?

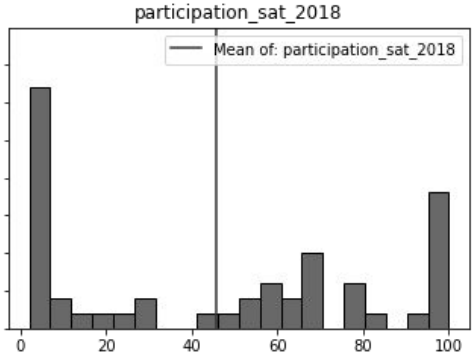


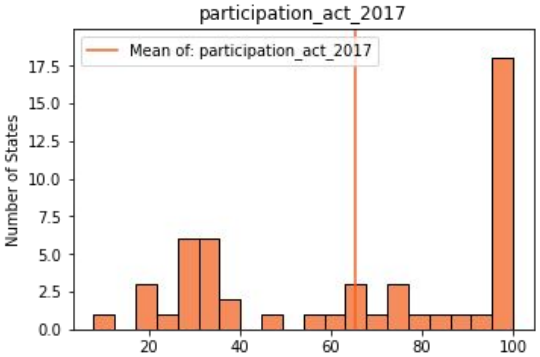
Where is the data from?

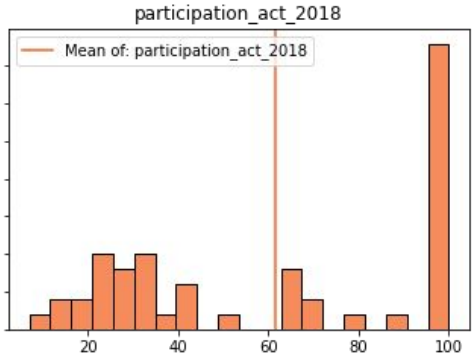
- SAT original data is available to download from *(2017 SAT Suite of Assessments Annual Report)*
- While ACT Data can be obtained from act.org own website

Participation Rate Distribution

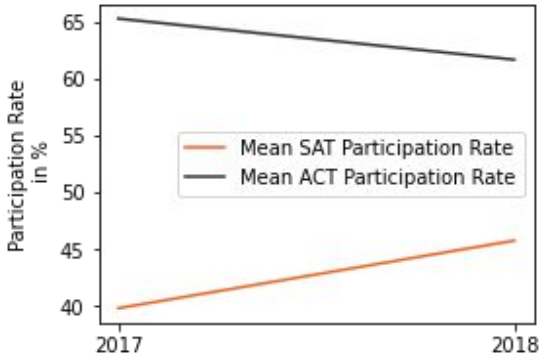








ACT has a higher participation rate than SAT with clear bimodal distribution.



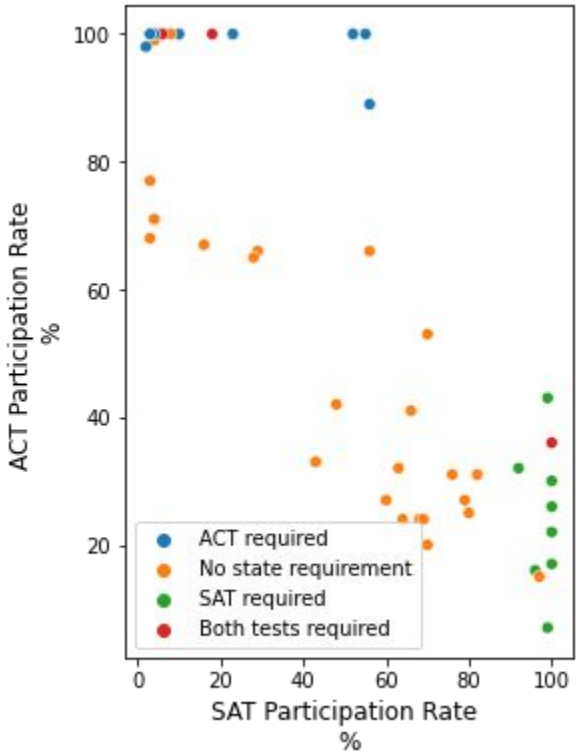
However, there is an improvement of SAT participation rate while opposite is true for ACT.

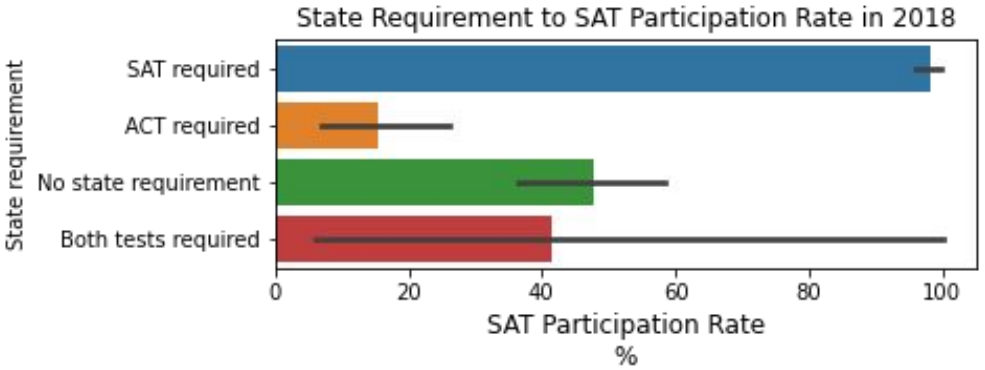
Is there any pattern here?

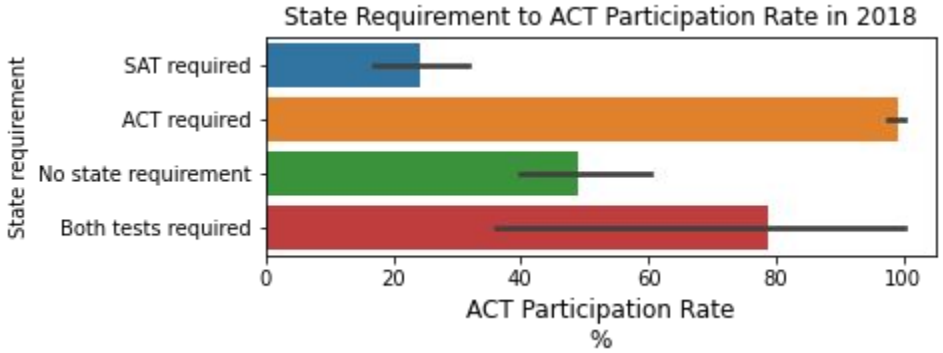
Or test popularity is totally random?

(or dare I say it if there is no pattern ;))

States Requirement and Participation Rate







What factor may relate to the test preference?

Is there any relation between state wealth and test preference?

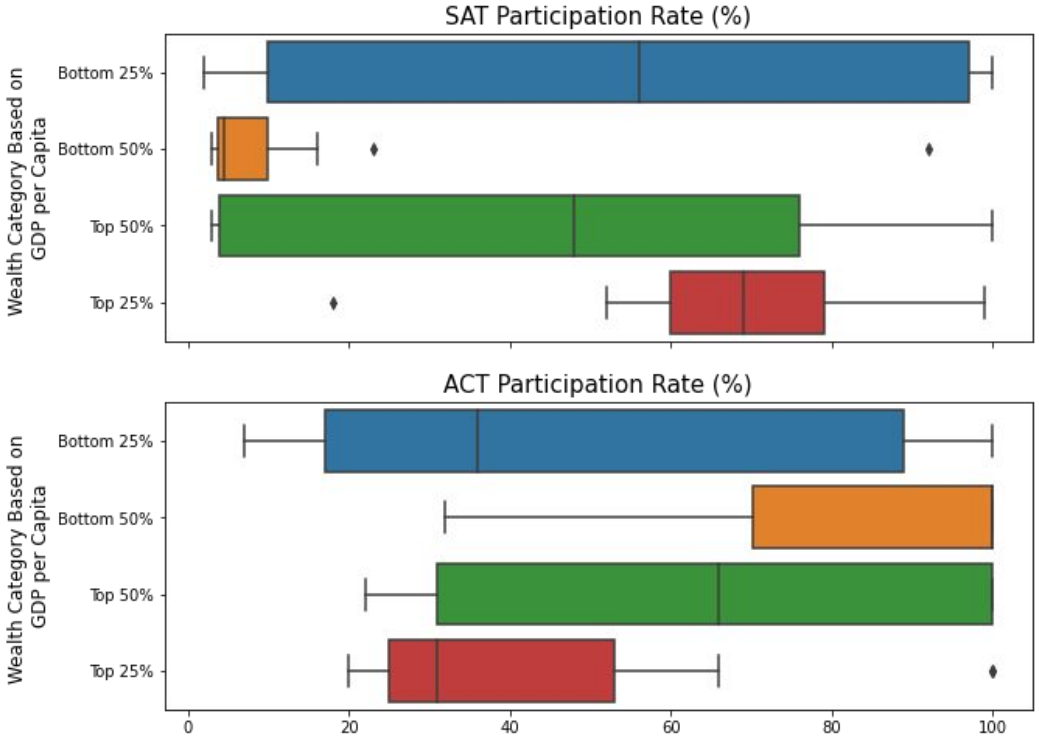
Note

GDP per capita is used as a gauge of states wealth

States are divided into:

- Top 25% (13 states)
- Top 50% (12 states)
- Bottom 50% (13 states)
- Bottom 25% (13 states)

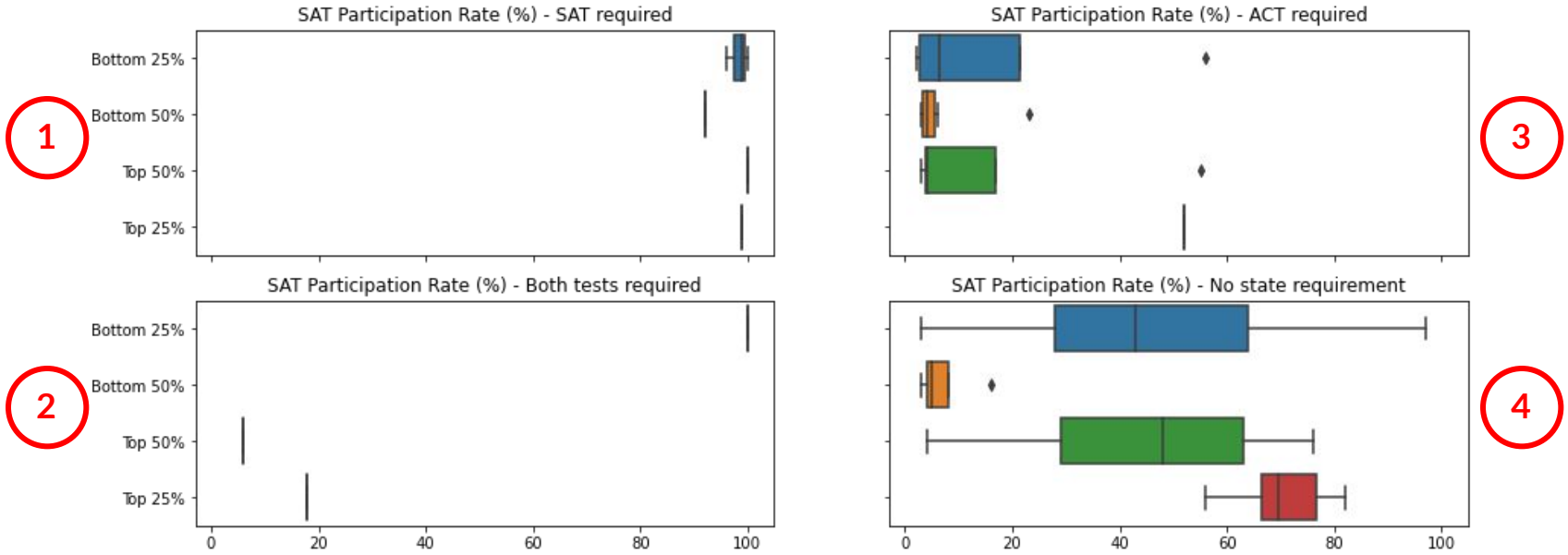
States Wealth and Participation Rates



Despite being equally popular on states within bottom 25% bracket, SAT is significantly less popular on the states within bottom 50% wealth bracket.

What if we include states requirement into the equation?

States Wealth and Requirement Effect



1. For states with only SAT requirement, SAT is the **preferred choice** regardless the wealth status.
2. For states with both SAT and ACT requirement, SAT is only preferred when state is less affluent.
3. For states with ACT requirement, SAT is significantly less popular if state is not at the Top 25%.
4. When there is no state requirement, SAT is **significantly less popular** especially within the **Bottom 50% bracket**

Hmm interesting

What should we do next then?

in case anyone forgets the problem statement:

To recommend of a way to allocate resources to improve SAT participation rate within the states.

Conclusion

In short,

➔ **Distribution**
Bimodal.
ACT is more popular, SAT is catching up

➔ **State Requirement Effect**
State requirement plays a huge role in determining test preference

➔ **Wealth Effect**
More affluent states prefers SAT
SAT is significantly less popular in poorer state without SAT requirement

Recommendation

- To focus on resources to less affluent state (bottom 50%) with no SAT requirement.

Case on point: **New Mexico**

- Less affluent (bottom 50%)
- High inequality (gini coefficient)
- No SAT requirement
- 2018 SAT participation rate : 18%

Also,
to adjust SAT format to be more accessible and practical in the times of pandemic.

References

Template of Presentation by:

Made to Stick

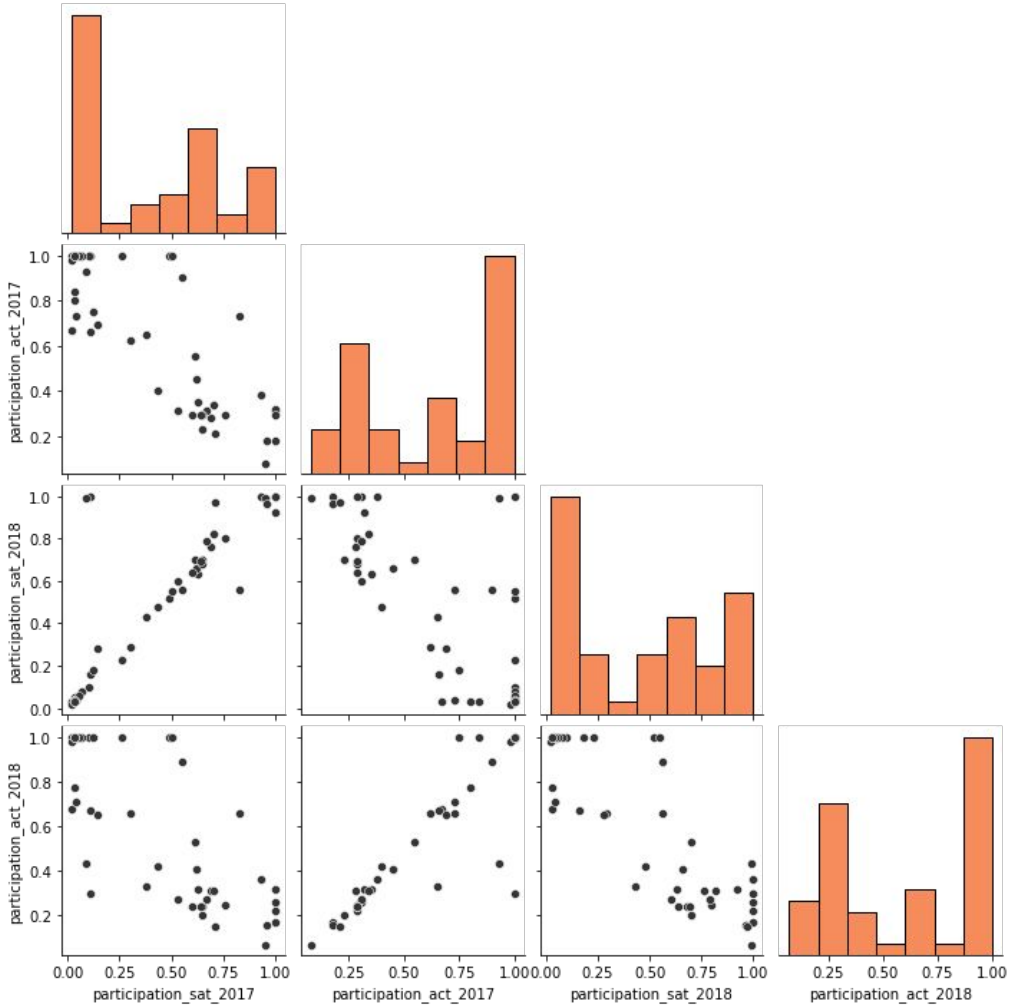
Original Data:

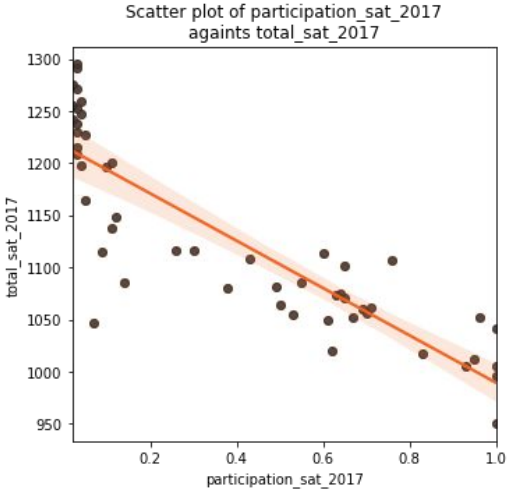
- SAT
- ACT
- GDP

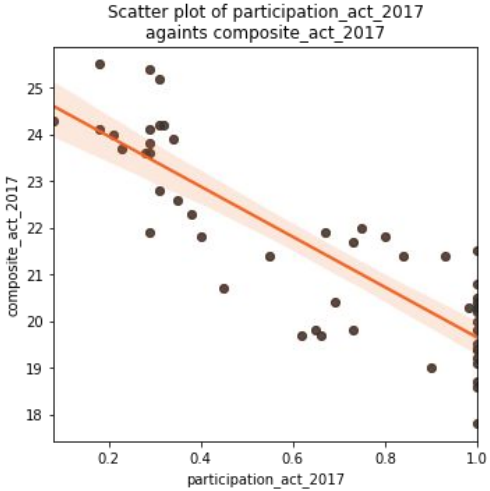
Thanks for the help of mentors:

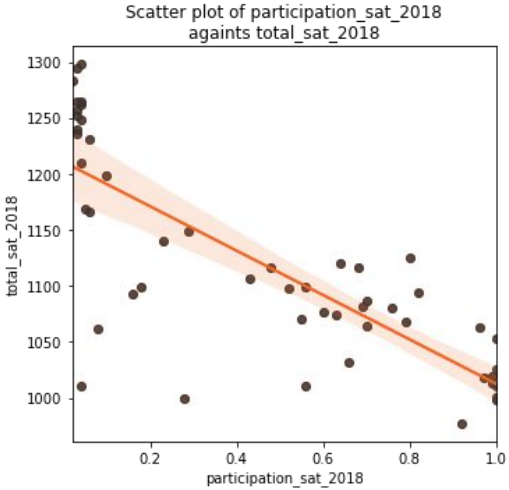
- Jireh Tan
- Ryan Chang
- Zaini Chia

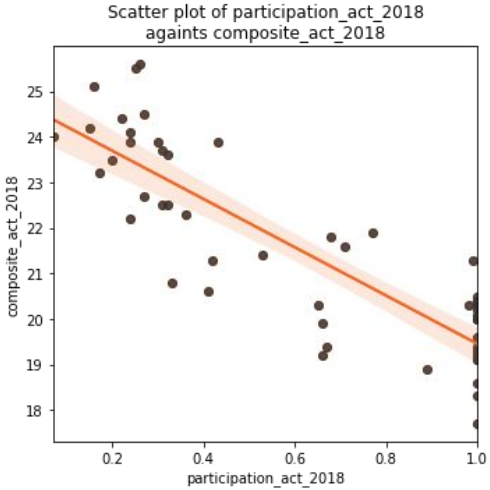
Appendices

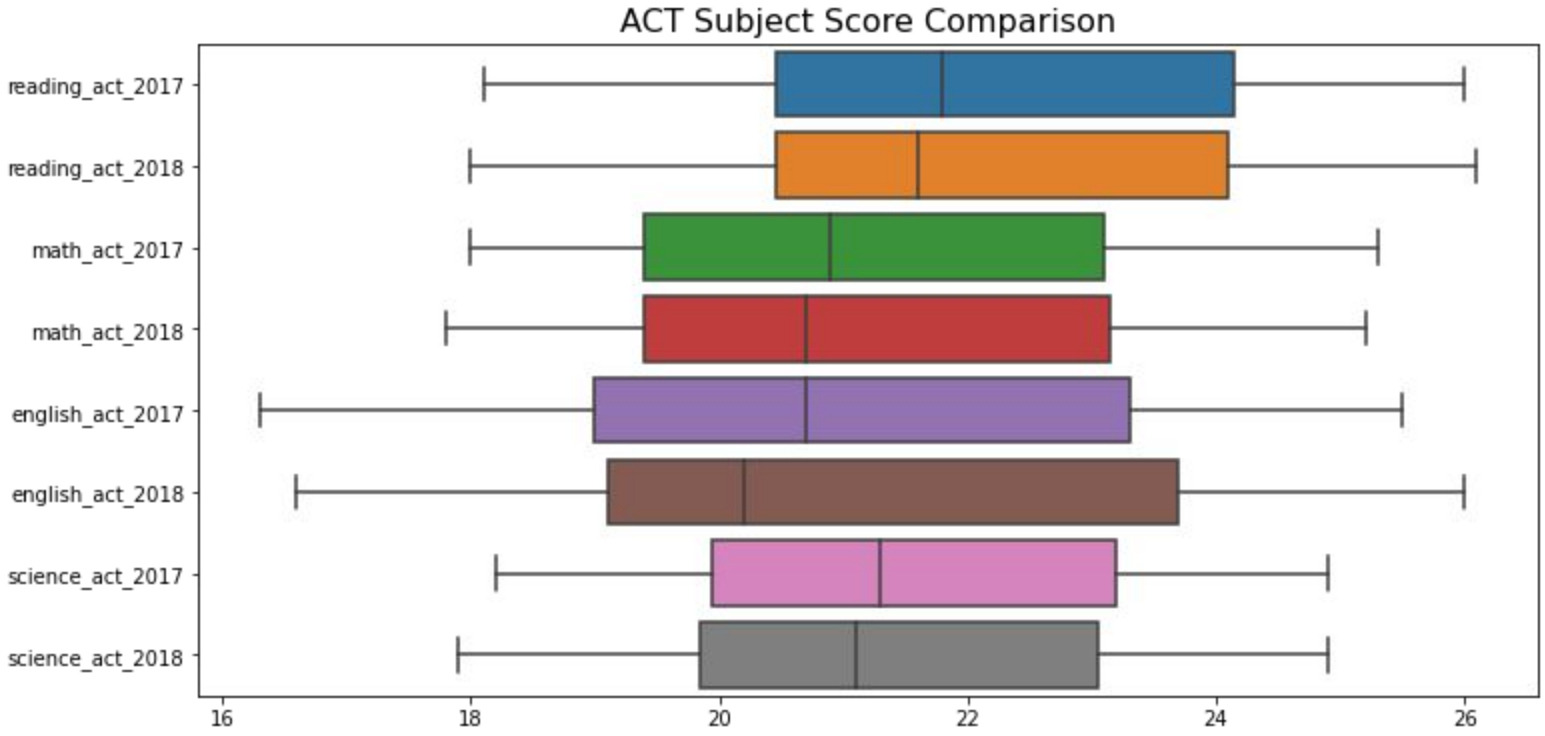

participation_act_2017
participation_sat_2018
participation_act_2018
0.0
0.2
0.4
0.6
0.8
1.0
0.00
0.25
0.50
0.75
1.00
participation_sat_2017
participation_act_2017
participation_sat_2018
participation_act_2018

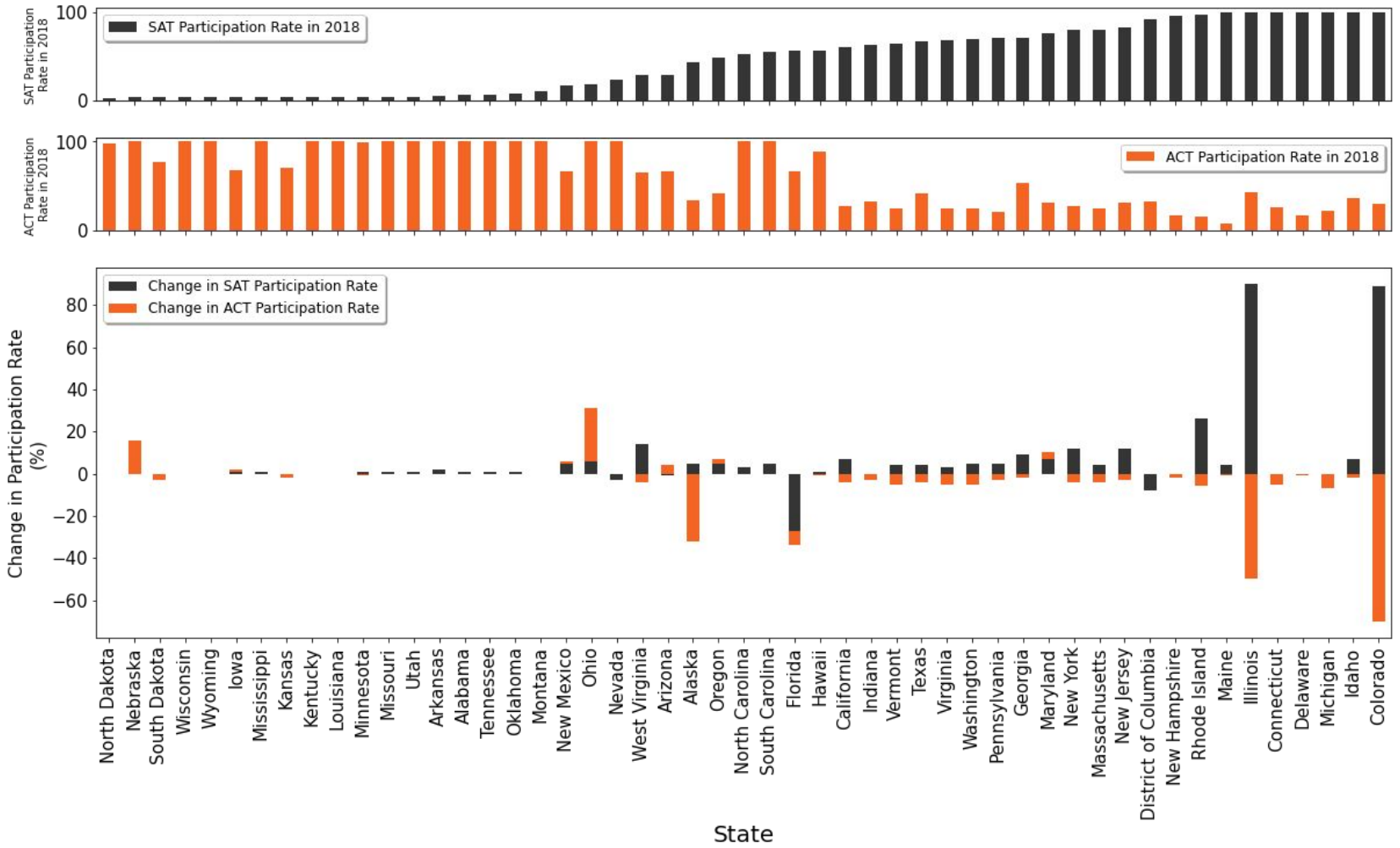

Scatter plot of participation_sat_2017
againts total_sat_2017
total_sat_2017
participation_sat_2017

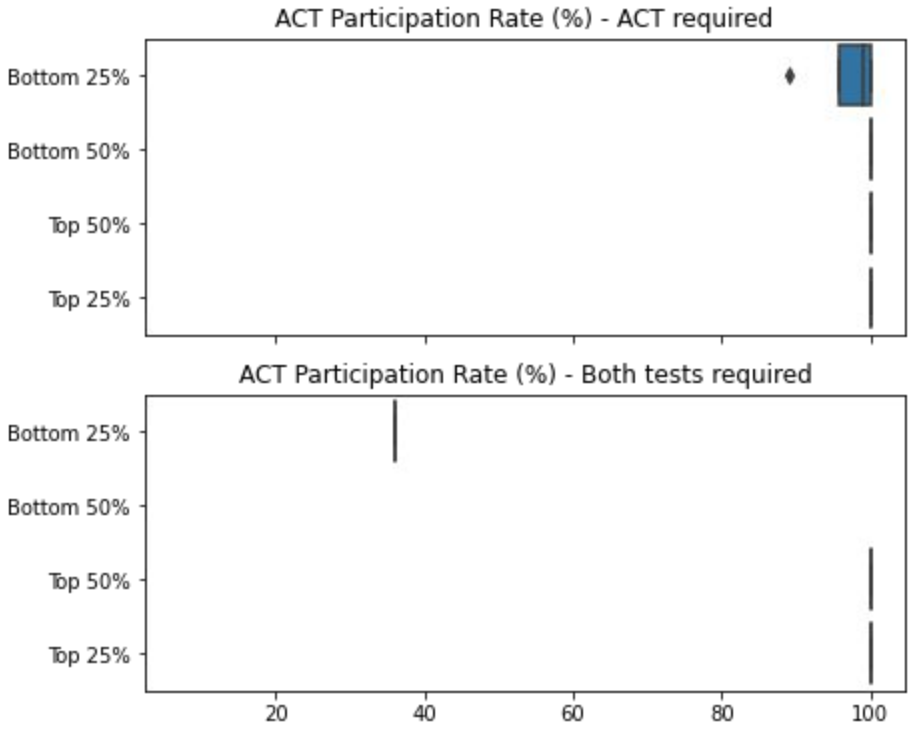

Scatter plot of participation_act_2017
againts composite_act_2017
composite_act_2017
participation_act_2017

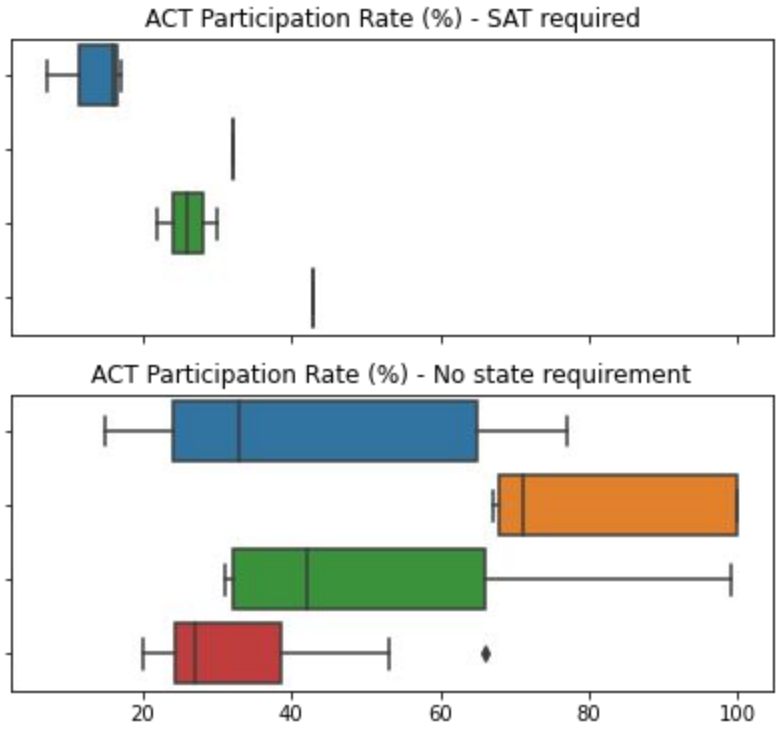

Scatter plot of participation_sat_2018
againts total_sat_2018
total_sat_2018
participation_sat_2018


Scatter plot of participation_act_2018
againts composite_act_2018
composite_act_2018
participation_act_2018


ACT Subject Score Comparison
reading_act_2017
reading_act_2018
math_act_2017
math_act_2018
english_act_2017
english_act_2018
science_act_2017
science_act_2018
16
18
20
22
24
26


SAT Participation Rate in 2018
100
0
SAT Participation Rate in 2018
ACT Participation Rate in 2018
100
0
ACT Participation Rate in 2018
Change in SAT Participation Rate
Change in ACT Participation Rate
80
60
40
20
0
−20
−40
−60
Change in Participation Rate (%)
North Dakota
Nebraska
South Dakota
Wisconsin
Wyoming
Iowa
Mississippi
Kansas
Kentucky
Louisiana
Minnesota
Missouri
Utah
Arkansas
Alabama
Tennessee
Oklahoma
Montana
New Mexico
Ohio
Nevada
West Virginia
Arizona
Alaska
Oregon
North Carolina
South Carolina
Florida
Hawaii
California
Indiana
Vermont
Texas
Virginia
Washington
Pennsylvania
Georgia
Maryland
New York
Massachusetts
New Jersey
District of Columbia
New Hampshire
Rhode Island
Maine
Illinois
Connecticut
Delaware
Michigan
Idaho
Colorado
State


ACT Participation Rate (%) - ACT required
Bottom 25%
Bottom 50%
Top 50%
Top 25%
ACT Participation Rate (%) - Both tests required
Bottom 25%
Bottom 50%
Top 50%
Top 25%
20
40
60
80
100


ACT Participation Rate (%) - SAT required
ACT Participation Rate (%) - No state requirement
20
40
60
80
100

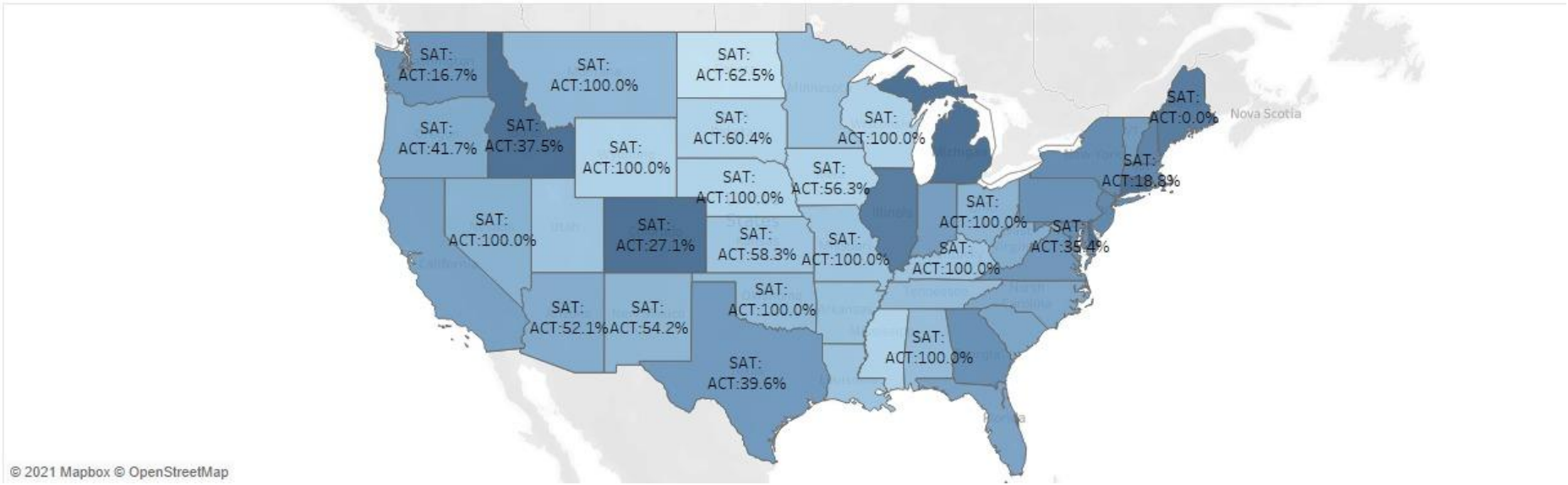
Percentile of Participatio..

0.0% 100.0%

Percentile of Participatio..

0.0% 100.0%

SAT Participation Rate



Percentile of Participatio..

0.0% 100.0%

Percentile of Participatio..

0.0% 100.0%

ACT Participation Rate