



How to improve SAT participant

Within 2010 – 2019 by Piyapon Pongsantisuk

Agenda

01 ACT / SAT
Briefly know about ACT and SAT

02 Objective
Why we need to analyze data?

03 What data tell us?
Go through data what will show us? This part will show how to manage and represent data

04 Conclusion
What is takeaway from the data? Any room for improvement?



SAT

VS

ACT

The SATs and the ACTs are the two different tests that students are required to take for admittance to a US university. There was different in subject content, equipment, scoring, time, cost.

And in each state have different number of participant of test and how is going in past 3 year. Let's look through it

ACT V.S. SAT

Test Format		
Structure and Timing	SAT	ACT
Testing time	3 hours + 50-minute essay (optional)	2 hours 55 minutes + 40-minute essay (optional)
Structure	3 tests + optional essay	4 tests + optional writing test
Number of questions	154	215
Time per question	1 minute, 10 seconds	49 seconds
Score range	Composite 400–1600 (SAT Essay: reported in 3 dimensions, each 2–8)	Composite 1–36 (writing domain scores: 2–12)
Test components	Reading Test 65 minutes 52 questions Writing and Language Test 35 minutes 44 questions Math Test 80 minutes 58 questions	Reading Test 35 minutes 40 questions English Test 45 minutes 75 questions Math Test 60 minutes 60 questions Science Test 35 minutes 40 questions
Cost	\$47.50 without essay \$64.50 with essay	\$46.00 without writing \$62.50 with writing

Objective of analyze data



- To analyst data from past 3 years (2017 – 2019) how participation rate is going.
- How to increase the participants rate of SAT in different way.
- Is anything insight of these data that actually impact.



Data Dictionary

Data dict merge_act

- Combine 3 year of participant and average score of act file together

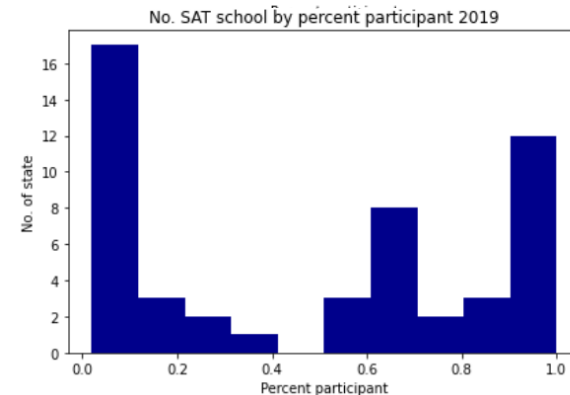
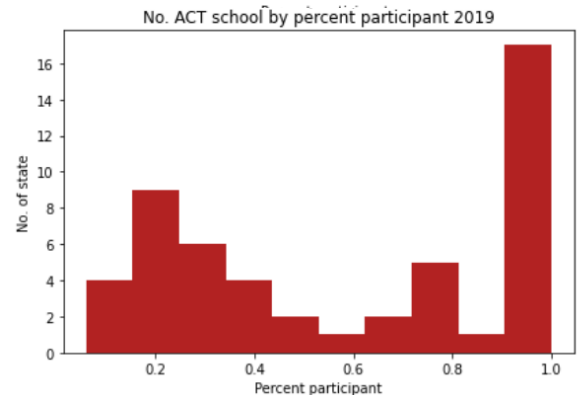
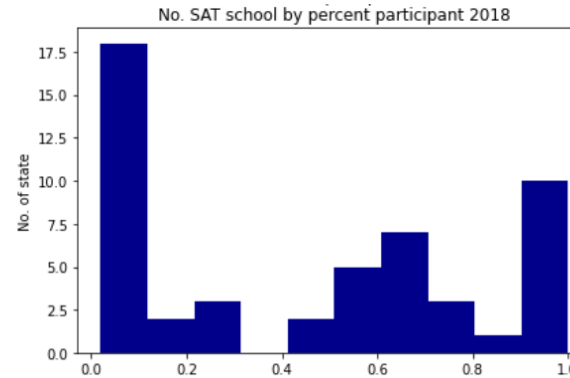
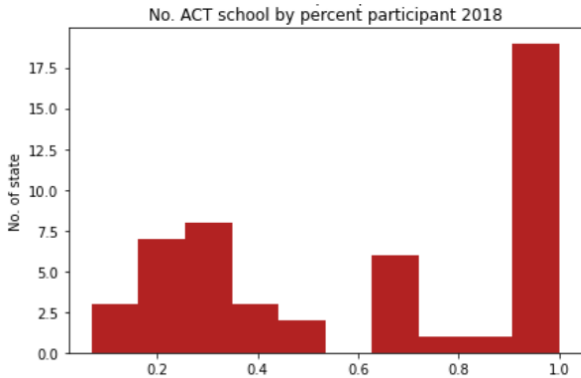
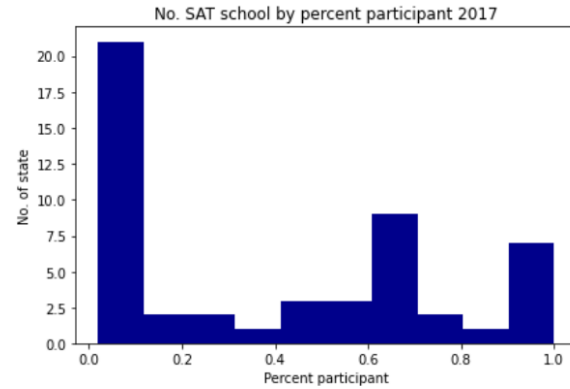
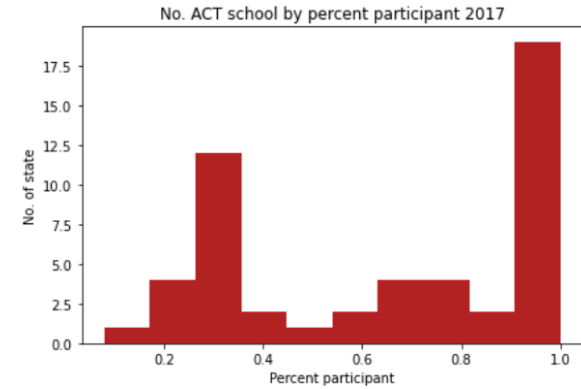
Feature	Type	Dataset	Description
state	object	act_2017.csv	Take name of state
participation_2017	float64	act_2017.csv	Number of participant compare to whole state of 2017
composite_2017	float64	act_2017.csv	Average score of ACT of that state in 2017
participation_2018	float64	act_2018.csv	Number of participant compare to whole state of 2018
composite_2018	float64	act_2018.csv	Average score of ACT of that state in 2017
participation_2019	float64	act_2019.csv	Number of participant compare to whole state of 2019
composite_2019	float64	act_2019.csv	Average score of ACT of that state in 2017

Data dict merge_act

- Combine 3 year of participant and average score of sat file together

Feature	Type	Dataset	Description
state	object	sat_2017.csv	Take name of state
participation_2017	float64	sat_2017.csv	Number of SAT participant compare to whole state of 2017
total_2017	float64	sat_2017.csv	Average score of SAT of that state in 2017
participation_2018	float64	sat_2018.csv	Number of SAT participant compare to whole state of 2018
total_2018	float64	sat_2018.csv	Average score of SAT of that state in 2017
participation_2019	float64	sat_2019.csv	Number of SAT participant compare to whole state of 2019
total_2019	float64	sat_2019.csv	Average score of SAT of that state in 2017

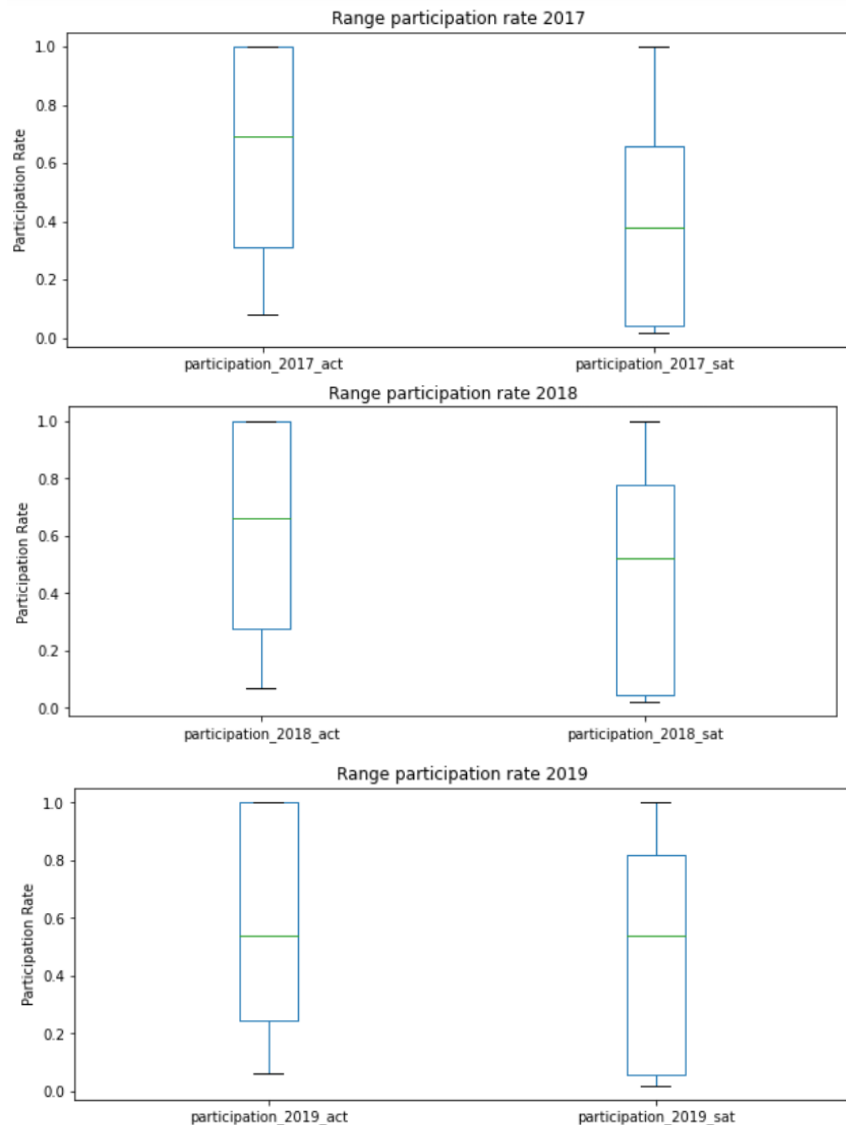
Number of state participant in percent



As the distribution show

- Number of ACT participants higher than SAT
- There is 20 states in USA which participations percent lower than 20% - **why?**
- While ACT participants have lots of state which participant is equal to 100%

Number of state participant in percent

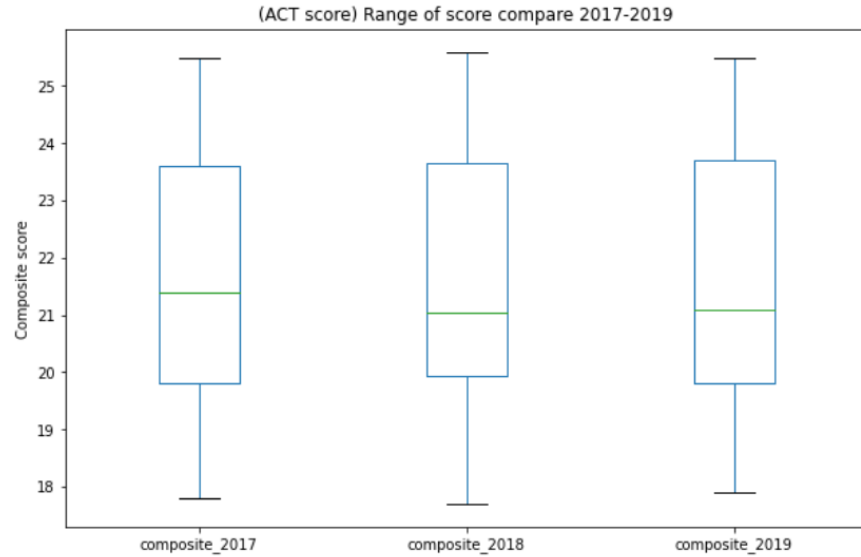


**Percentile of participant percent overall
ACT still higher than SAT in past 3 year**

- ACT leaning to high participation rate
- However, the average of participation rate of ACT still higher than ACT

Score

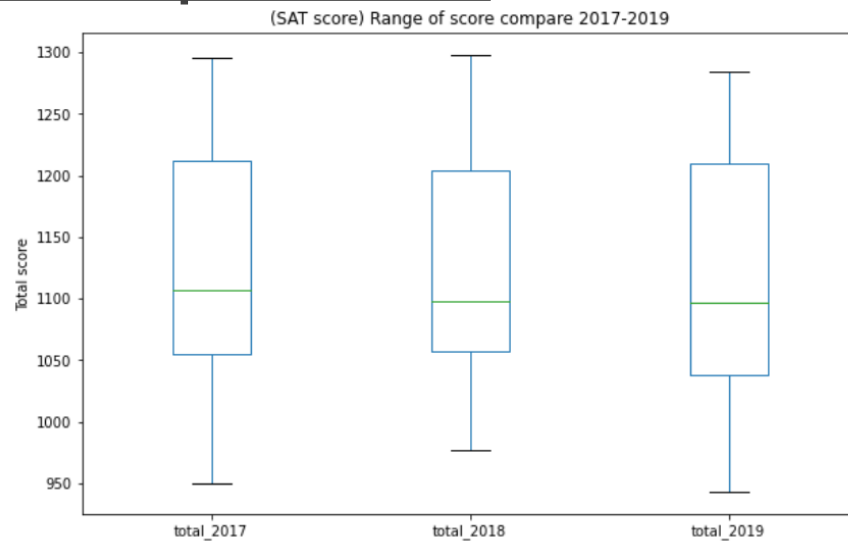
ACT composite score



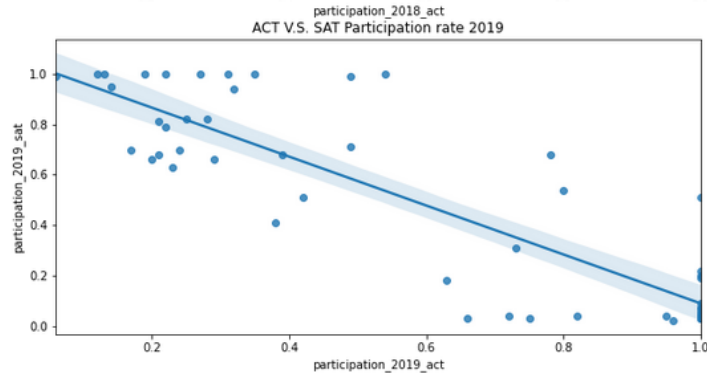
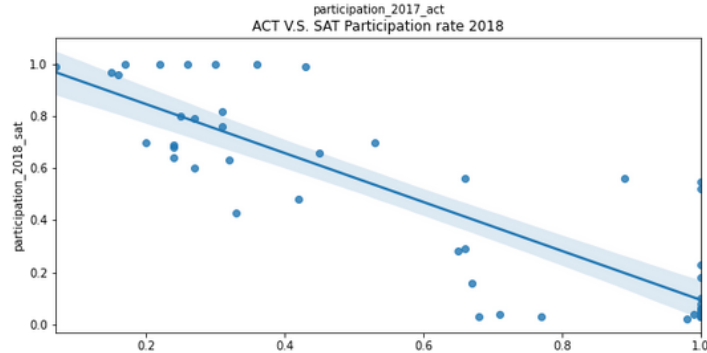
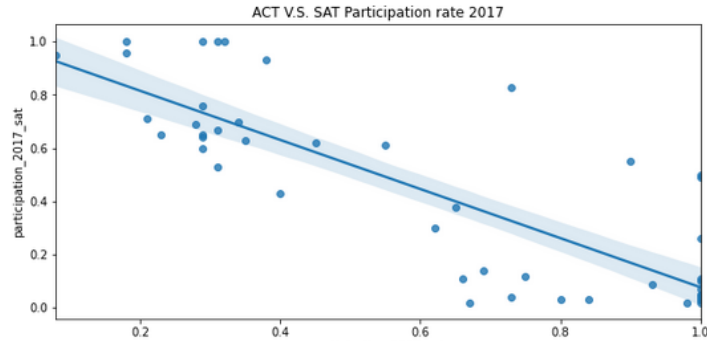
How about the score range in each year is any significantly change?

- Range of average score can predict from previous year data

SAT composite score



Participation ACT V.S. SAT



It looks like it counter between ACT / SAT participant

- **As the graph represent if that state have a high SAT participant, ACT participants will be low**
- **Otherwise, low SAT participant, ACT participants will be high**
- **Assume that student in each state focus on either ACT or SAT, not both**

Participation ACT V.S. SAT

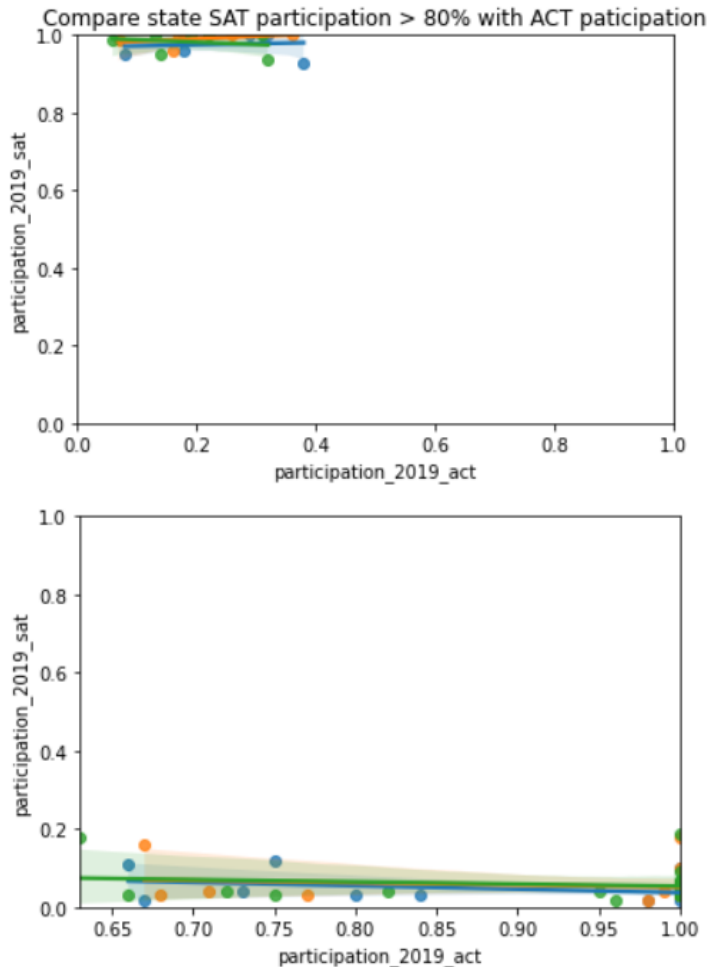
So, I filter out participant in SAT more than 80%

- State that have SAT participation more than 80% are Connecticut, Delaware, District of Columbia, Idaho, Maine, Michigan, New Hampshire
- Overall you can see the data is crowd past 3 years the higher participant of SAT the lower ACT

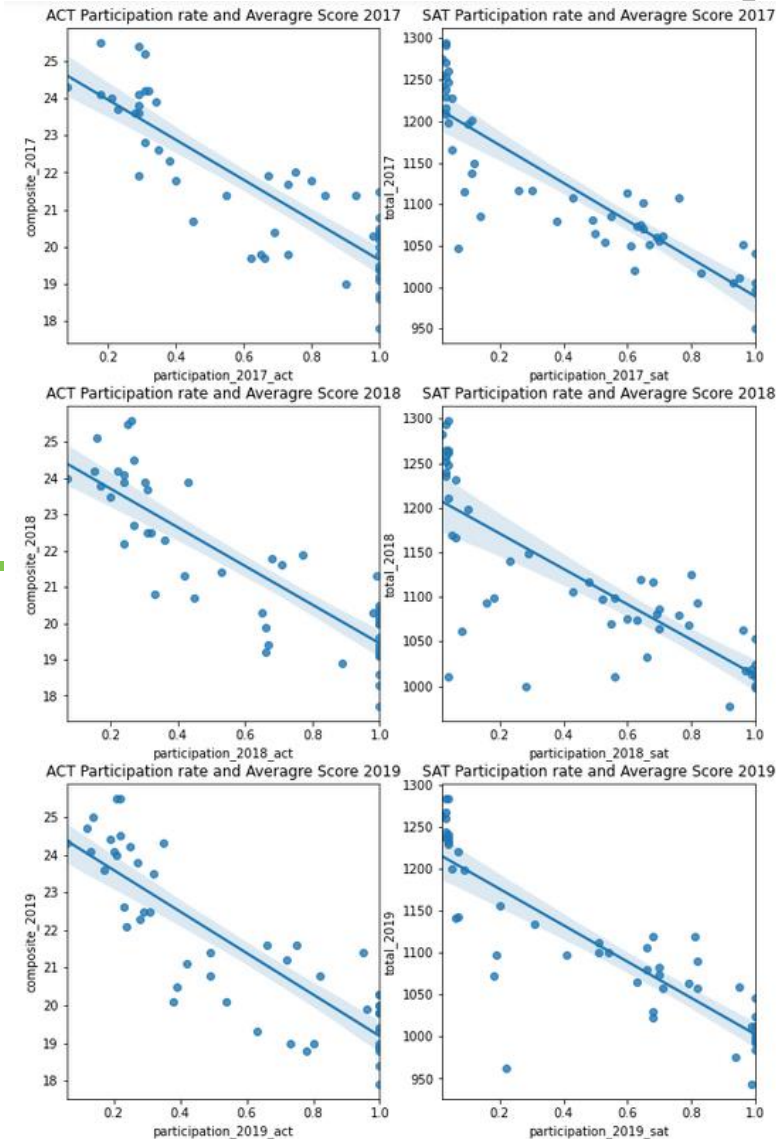
And participant in SAT less than 20%

- State that have SAT participation less than 20% are Alabama , Arkansas, Iowa , Kansas, Kentucky, Louisiana, Minnesota , Mississippi, Missouri, Montana, Nebraska, New Mexico, North Dakota, Ohio, South Dakota, Tennessee, Utah, Wisconsin, Wyoming
- Overall you can see the data is crowd past 3 years the higher participant of SAT the lower ACT

“Therefore, I assume hypothesis that student in each state focus on one test. In case we want to improve SAT participation we need to focus on lower SAT participation”



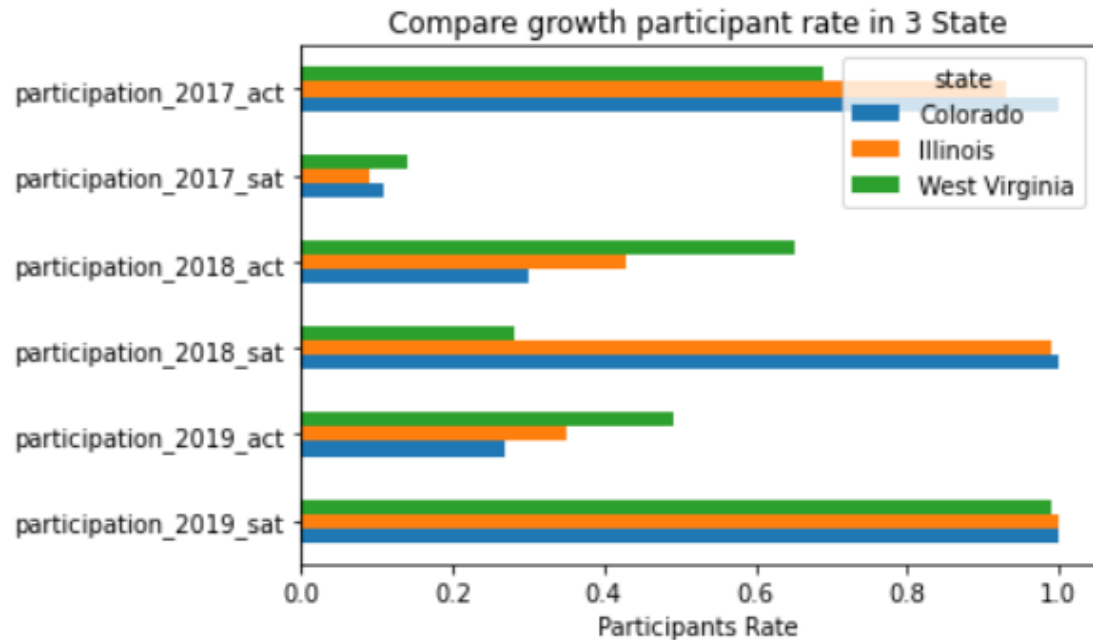
Participation rate V.S. score



One of very interesting is the lower participant, the higher the score

- Both test ACT and SAT when compare the score to participants is show participation rate and score walk by in opposite directions
- So, we can assume that **it's negative co-relate or not?**

Growth rate SAT participant



**State that have SAT participation less than 20% are Alabama , Arkansas, Iowa , Kansas, Kentucky, Louisiana, Minnesota , Mississippi, Missouri, Montana, Nebraska, New Mexico, North Dakota, Ohio, South Dakota, Tennessee, Utah, Wisconsin, Wyoming
- Only Colorado, Illinois, and West Virginia have above 20% in following year while others still have low participant**

3 State which have growth rate in SAT

- Previous page I have show state which has lower than 20%
- Their was 3 state which have growth rate significantly is Colorado, Illinois, and West Virginia
- As you can see from my post hypothesis as the SAT participant in crease, ACT in these 3 state is drop
- But what cause this significantly growth?

From outside research

- Colorado: As of the 2016-17 school year, all Colorado juniors in public schools **will take** SAT
- Illinois: 2016-17 school year, all Illinois juniors **must take** the SAT
- West Virginia: All juniors **must take** the SAT unless taking the West Virginia Alternative Summer Assessment.

“One of our key stakeholder in improve SAT is college board in each state. And also fee that each college help to substitute for student”

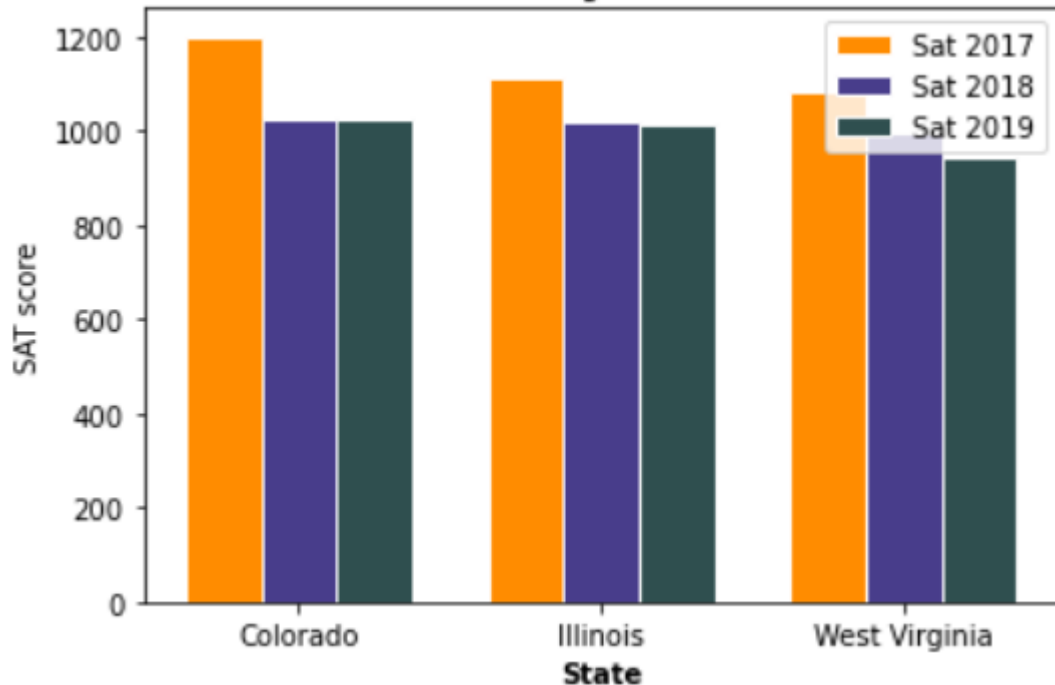
Participation rate V.S. score

total_2017 total_2018 total_2019

state

Colorado	1201.0	1025.0	1024.0
Illinois	1115.0	1019.0	1013.0
West Virginia	1086.0	999.0	943.0

3 State change in SAT score



So, we can assume that it's negative co-relate or not?

- Previously, we see the negative co-relation is that True?
- As you can see from 3 state we mentioned before. Although SAT participation percent grow significantly but average score is nearly same the year before (which have low SAT participant rate)
- Furthermore, I do outside research, The lowest participating states tend to send primarily their best students and have the highest scores. This results in bias
- Accordingly, **Participation rate and score is BIAS!!** Need to look through another factor too.

Conclusion



Conclusion

1. If you need to improve the participation, do focus on state that have participation lower than 20% they growth with significantly like Colorado, Illinois, West Virginia.

- Colorado, Illinois, West Virginia state starting force juniors must take sat that's why it was increasing significantly(reference - <https://blog.prepscholar.com/which-states-require-the-sat>)
- From data comparison you can see that state which has 100% participant is state that ***require*** SAT for junior year

2. Negative co-relation between participant ACT and SAT is exactly true (relevant with negative co-relation)

- Most of student focus on testing either ACT or SAT. You can see from graph above if their is high participant in SAT, ACT will be lower
- Recommendation: focus on low state to improve participant of SAT percentage

3. Negative co-relation between percent of participant and score is “BIAS!!”

- Firstly I have look through 3 years dataset of participant both ACT and SAT, it seems that the more participant rate, the lower the score.
- However, I look through Colorado, Illinois, West Virginia which change from above the participant rate change differently but average score drop just a little.
- Therefore, I do outside research and found out that ***these averages score are biased by participation rates***. The lowest participating states tend to send primarily their best students and get highest scores.

Recommendation



Recommendation for increasing SAT participation rate

1. **Fee of test:** Make a contracted with the college board to administer the SAT to administer the SAT to high school for free. And also fee waivers condition
2. **Provide free material:** provide the material test of the previous year, so student can have more source to study and make interest in SAT test
3. **Provide the knowledge:** visiting high school to provide the advantage and give knowledge to high school student. It's much easier to convince them directly in face-to-face conversation. And we can also collecting data from student/teacher to improve the way we can communicate to them back.
4. **Focus on low participant first!:** As we can see from data if we focus by state we can improve this efficiency



Ask more data for deeper insight!

1. Number of school in each state
2. The fee substitute for ACT / SAT in each state

A photograph of a city skyline, likely New York City, viewed through the opening of a dark cave. The cave's interior is dark and rocky, with the city lights and buildings visible through the bright opening. The text "Thank You" is overlaid in the center.

Thank You

For being a great audience!