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# Data Analysis on SAT Participation

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**Business Context**

New format for the SAT was released in March 2016

# Problem Statement

Evaluate our progress so far and determine the steps necessary to increase participation across the United States given that we have just two years' worth of data

# Brief Introduction

To conduct a complete analysis on the SAT, datasets from both the SAT and ACT were used

Each dataset contains state by state average test scores and participation rates, from 2017 and 2018



Analyzing participation rates and test scores between the SAT and ACT allowed for a point of comparison

# Technical Overview

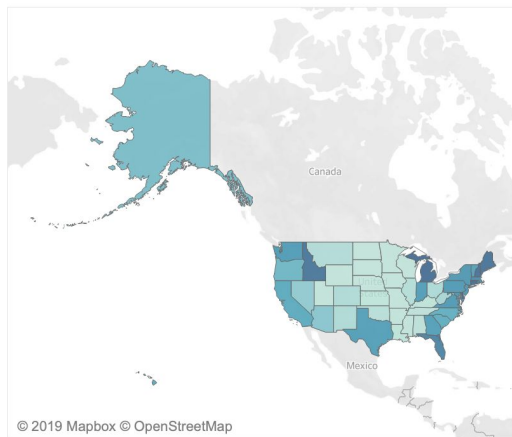
1. Data Collection
2. Cleaning Data
3. Exploratory Data Analysis
  - a. Statistical analysis
4. Visualisation
  - a. Scatter plots
  - b. Boxplots
  - c. Heatmaps
  - d. Tableau
5. Key Findings
  - a. Relationship between Participation Rate and Score
6. Conclusion

# Key Findings

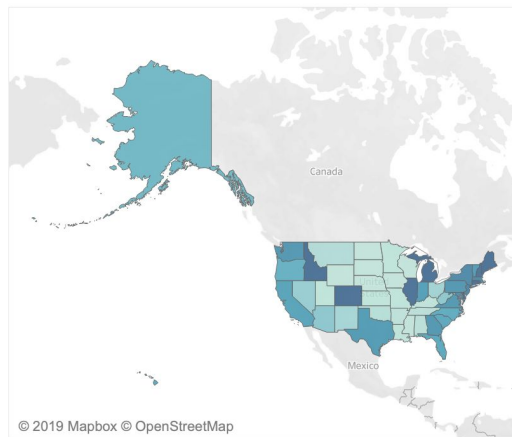
# #1

“States with high SAT participation rates tend to have low ACT participation rates and (vice versa)”

2017 SAT Participation



2018 SAT Participation



2017 SAT Participation



2018 SAT Participation



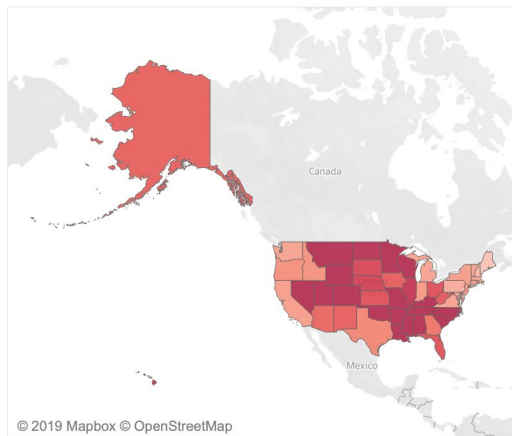
2017 ACT Participation



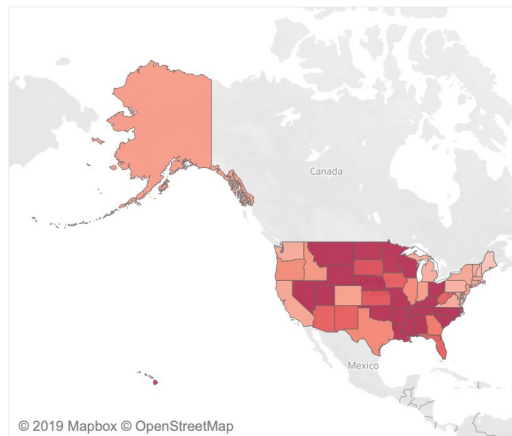
2018 ACT Participation



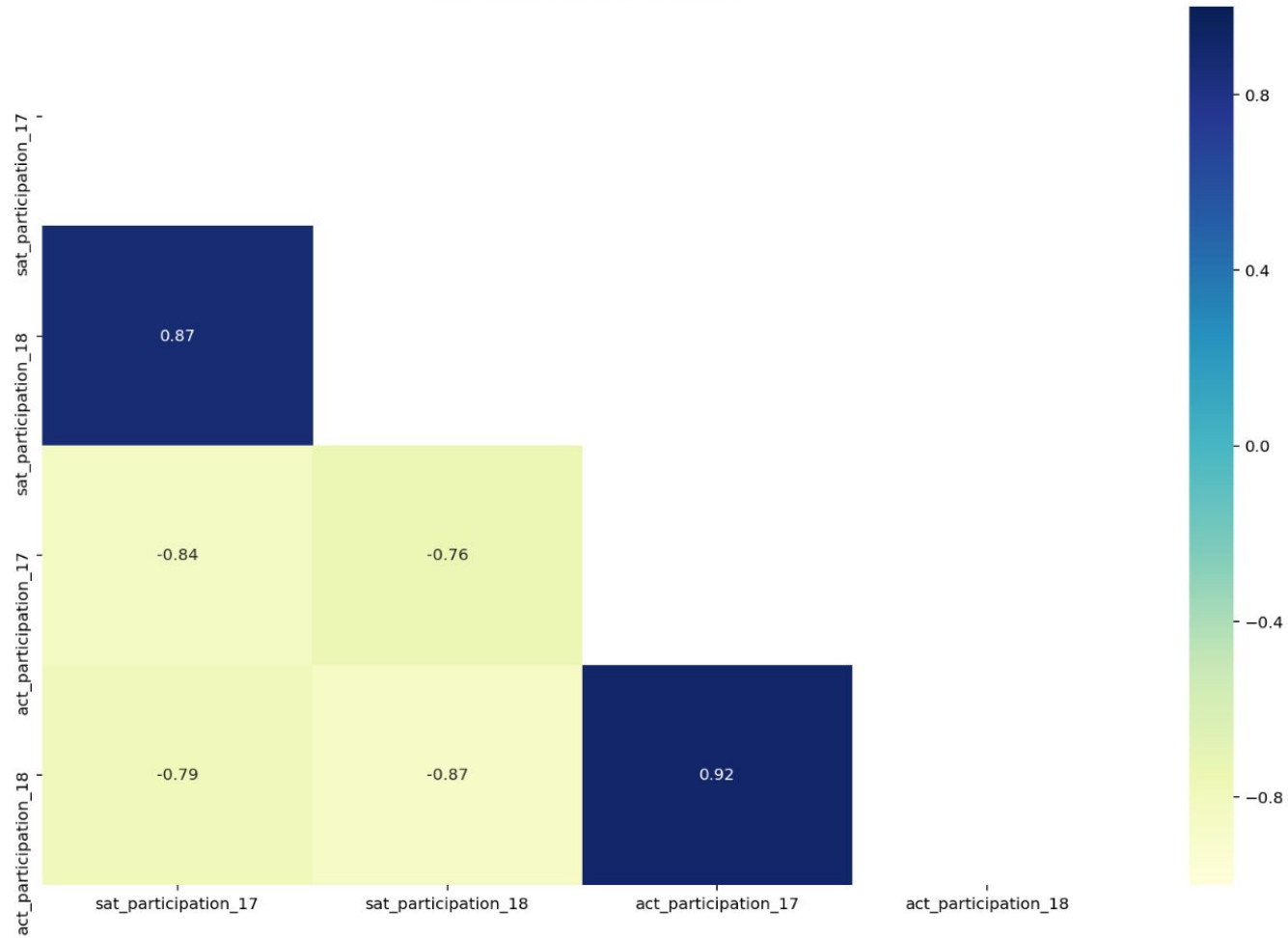
2017 ACT Participation



2018 ACT Participation



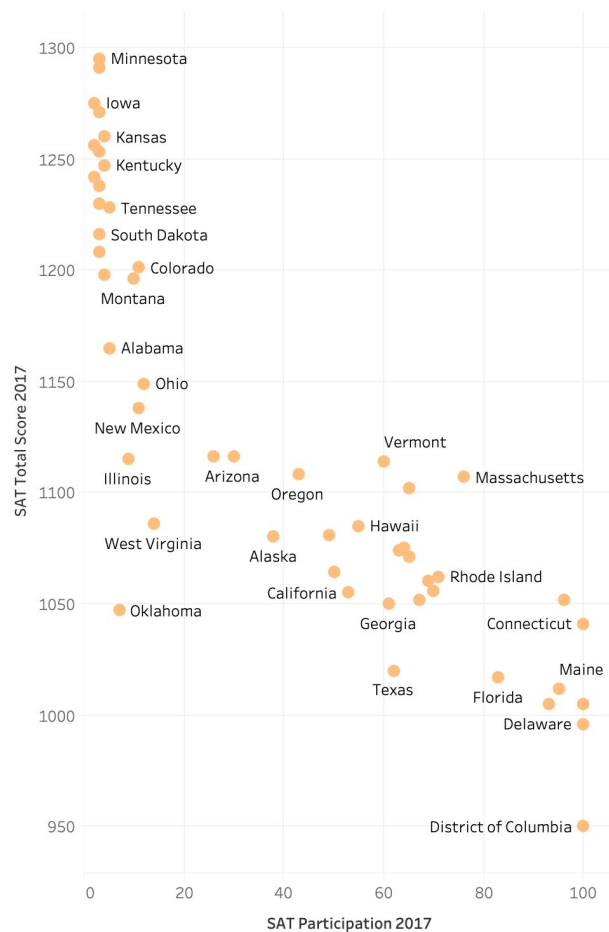
SAT and ACT Correlation



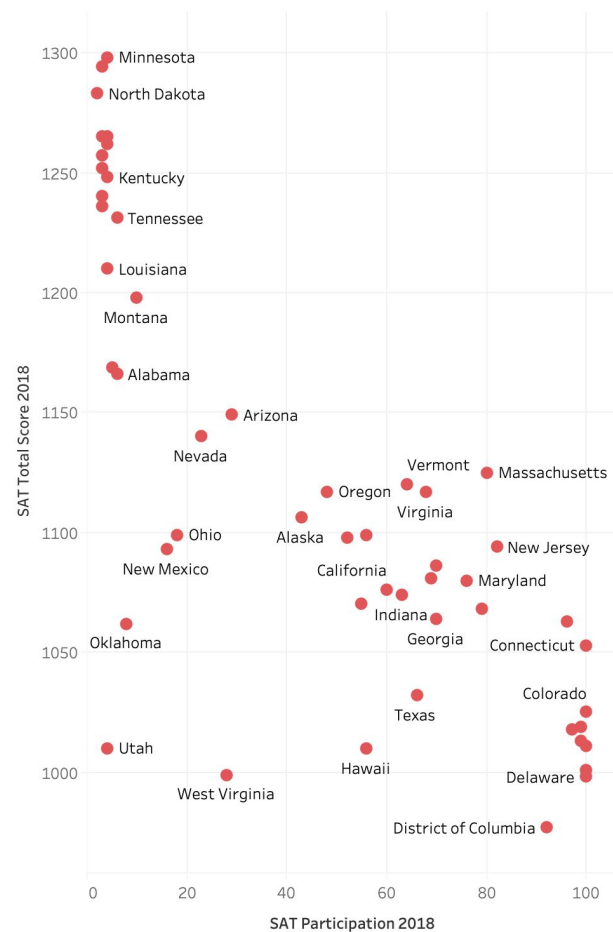
# #2

“There was a strong negative correlation between test scores and participation rates”

SAT P vs TS 2017

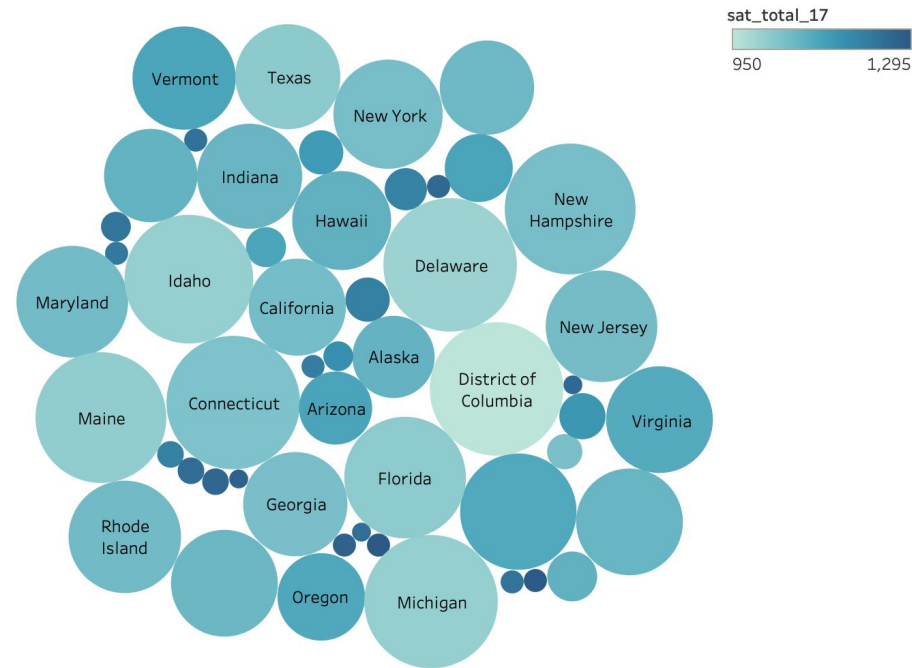


SAT P vs TS 2018

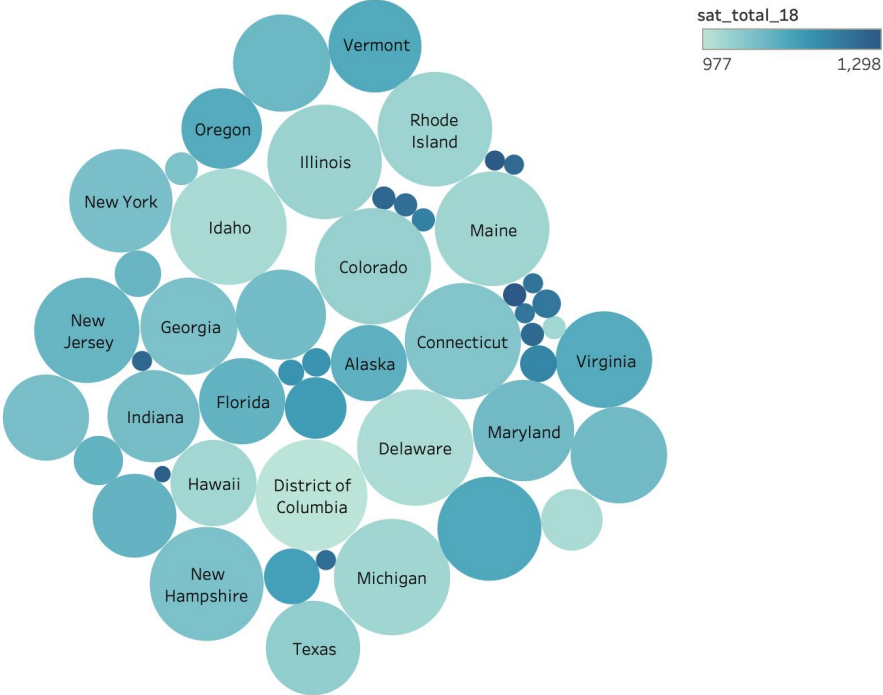




SAT Participation Rate vs Total Score 2017



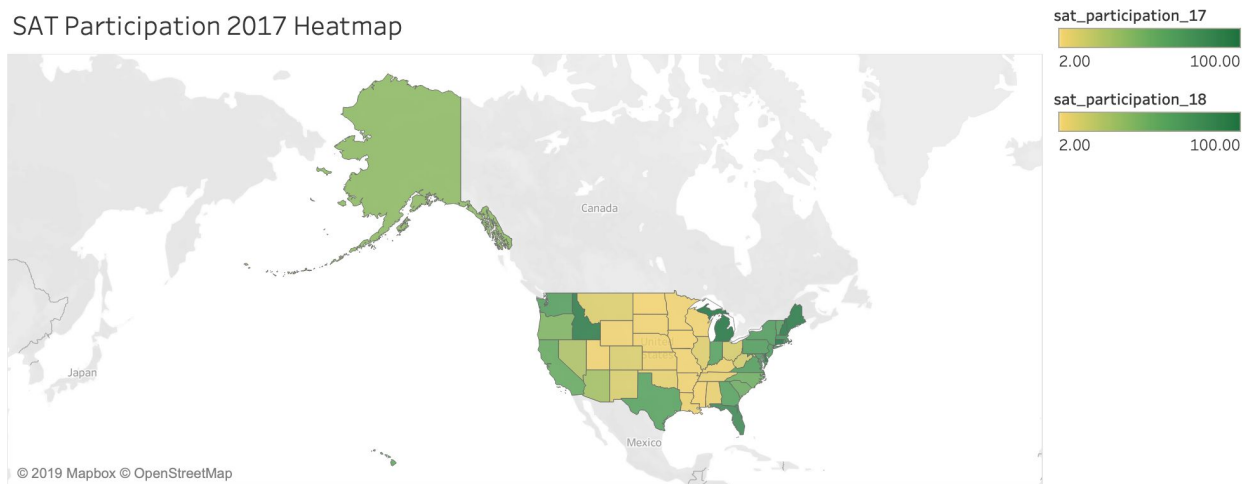
SAT Participation Rate vs Total Score 2018



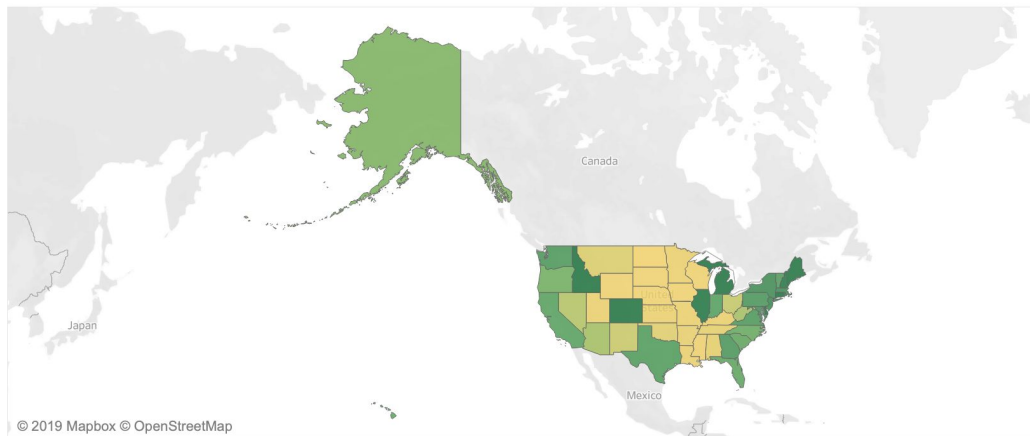
#3

“Higher SAT participation rates in coastal region states as compared to the mid region states”

SAT Participation 2017 Heatmap



SAT Participation 2018 Heatmap



# #4

“Almost 40% of the states (17) have 100% ACT participation rates compared to just 4-5 states for SATs.”

	state	act17_participation%	act18_participation%
0	Alabama	100.0	100
3	Arkansas	100.0	100
5	Colorado	100.0	30
17	Kentucky	100.0	100
18	Louisiana	100.0	100
23	Minnesota	100.0	99
24	Mississippi	100.0	100
25	Missouri	100.0	100
26	Montana	100.0	100
27	Nebraska	84.0	100
28	Nevada	100.0	100
33	North Carolina	100.0	100
35	Ohio	75.0	100
36	Oklahoma	100.0	100
40	South Carolina	100.0	100
42	Tennessee	100.0	100
44	Utah	100.0	100
49	Wisconsin	100.0	100
50	Wyoming	100.0	100

	state	sat17_participation%	sat18_participation%
5	Colorado	11.0	100.0
6	Connecticut	100.0	100.0
7	Delaware	100.0	100.0
8	District of Columbia	100.0	92.0
12	Idaho	93.0	100.0
22	Michigan	100.0	100.0

**#5**

“Colorado’s ACT participation rate dropped drastically from 2017 to 2018. This was accompanied by massive increase in SAT rates.”

	state	sat17_participation%	sat18_participation%
5	Colorado	11.0	100.0
6	Connecticut	100.0	100.0
7	Delaware	100.0	100.0
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26	Montana	100.0	100
27	Nebraska	84.0	100
28	Nevada	100.0	100
33	North Carolina	100.0	100
35	Ohio	75.0	100
36	Oklahoma	100.0	100
40	South Carolina	100.0	100
42	Tennessee	100.0	100
44	Utah	100.0	100
49	Wisconsin	100.0	100
50	Wyoming	100.0	100

# Implications

Finding	Inference
1. Almost 40% of the states (17) have 100% ACT participation rates compared to just 4-5 for SATs.	ACTs are probably mandated in these states as a 100% participation rate is pretty unlikely via organic participation.
2. Of these 17 states, 15 of them had 100% ACT participation rate in both 2017 and 2018	
3. Colorado's ACT rate dropped drastically from 2017 to 2018. This was accompanied by massive increase in SAT participation rates.	Students take either SAT or ACT but seldom both. Rapid shift from SAT to ACT participation rates similarly point to some kind of state level mandate to take either test.



**External Research**

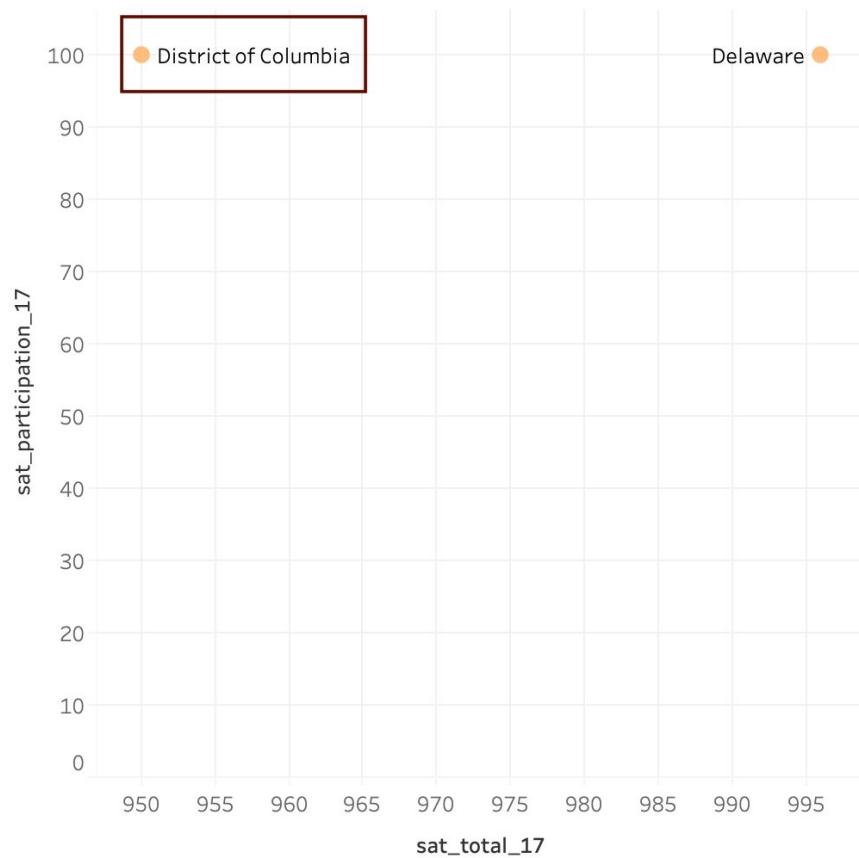
“More than 2.1 million students in the class of 2018 took the redesigned SAT resulting in an increase of 25%”

“But higher the participation rate, the lower the average total test score”

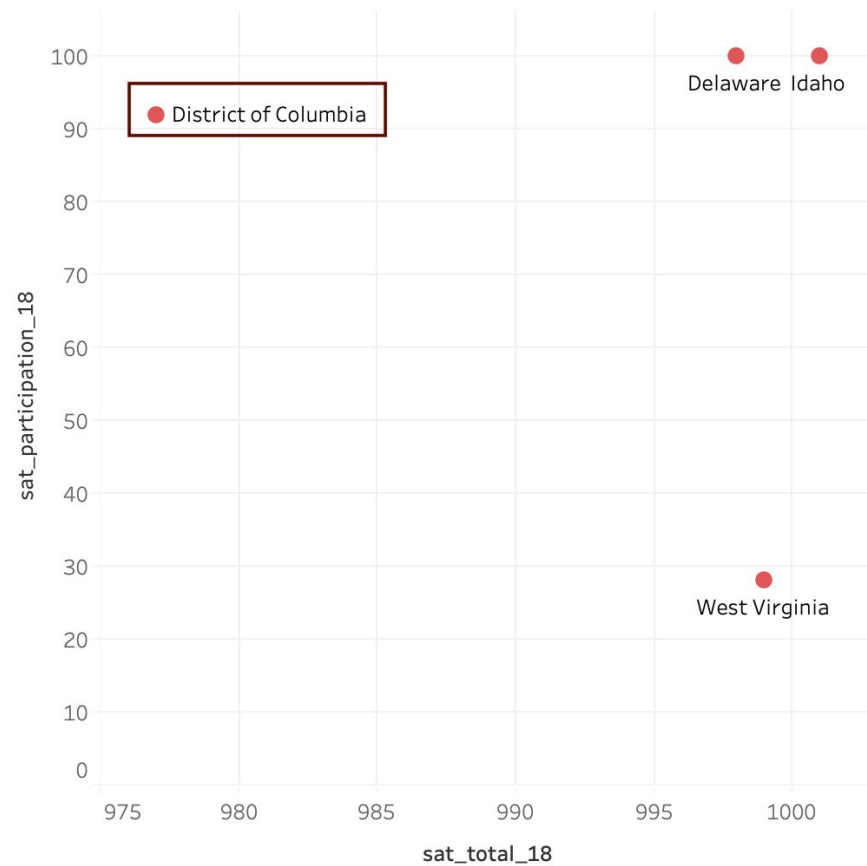
Notable example will be

**District of Columbia**

SAT P vs TS 2017

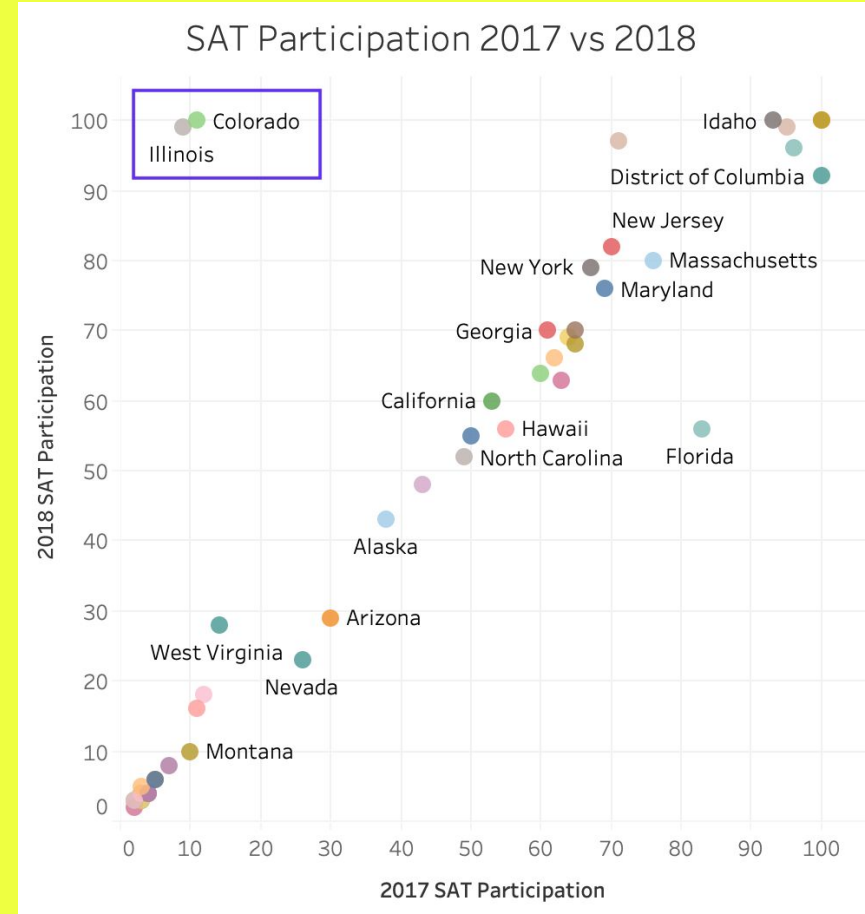


SAT P vs TS 2018



# Colorado & Illinois

experienced a drastic increase in participation rate



“Mandatory testing is part of statewide high school accountability and every student is required to participate”

# Recommendations



# States that don't have

## a very high ACT participation rate

as it suggests mandatory ACT testing which probably means the efforts to increase SAT will be ineffective as it is unlikely for students to take another test in addition to the mandatory ACT test

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# States that don't have

## a very large student population

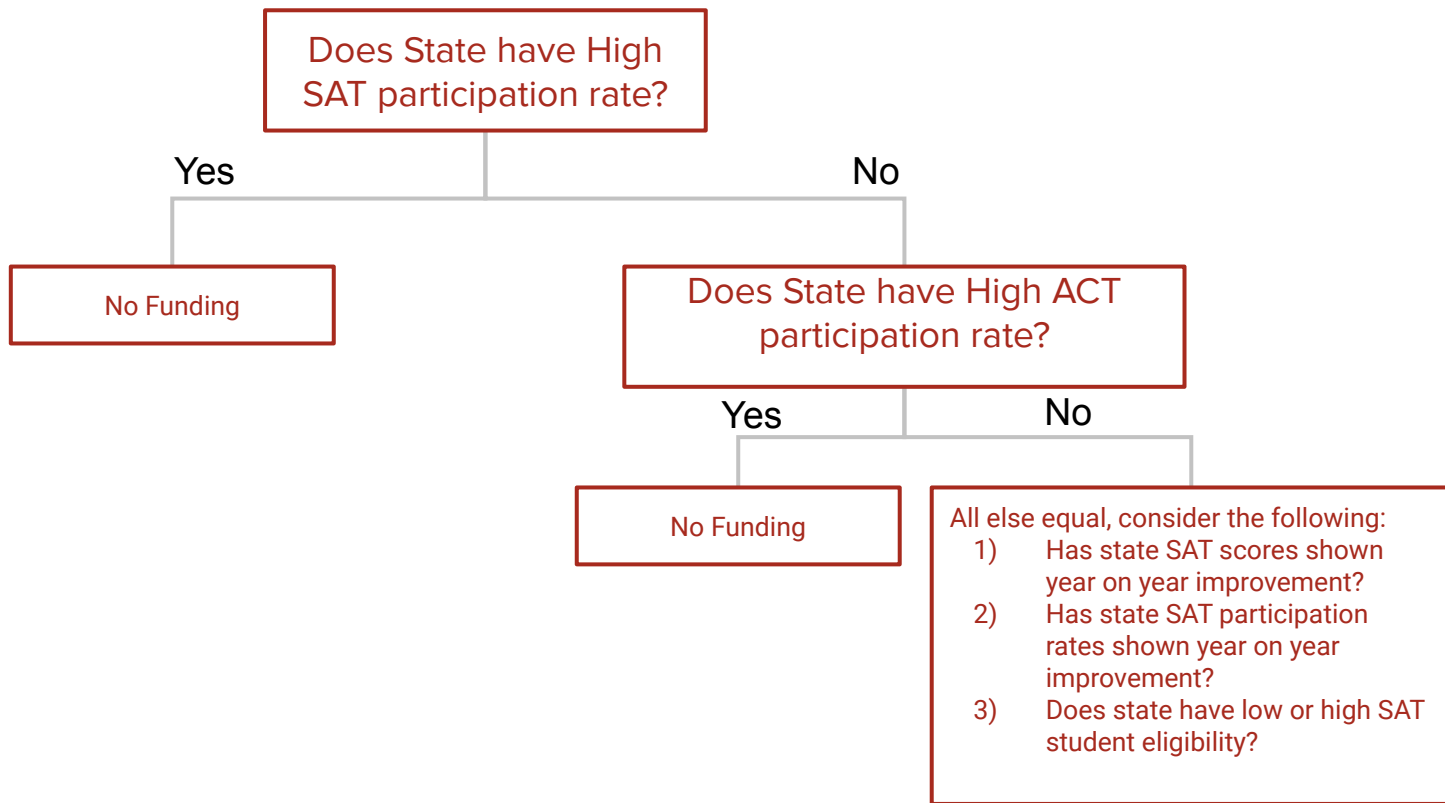
as % growth increase wise would be higher if efforts are directed to states with smaller student population

# States that have

## a significant growth in total score over 2017-2018

as it indicates a potential to be high performing state and the positive receptiveness to changes

# Recommendation Funnel



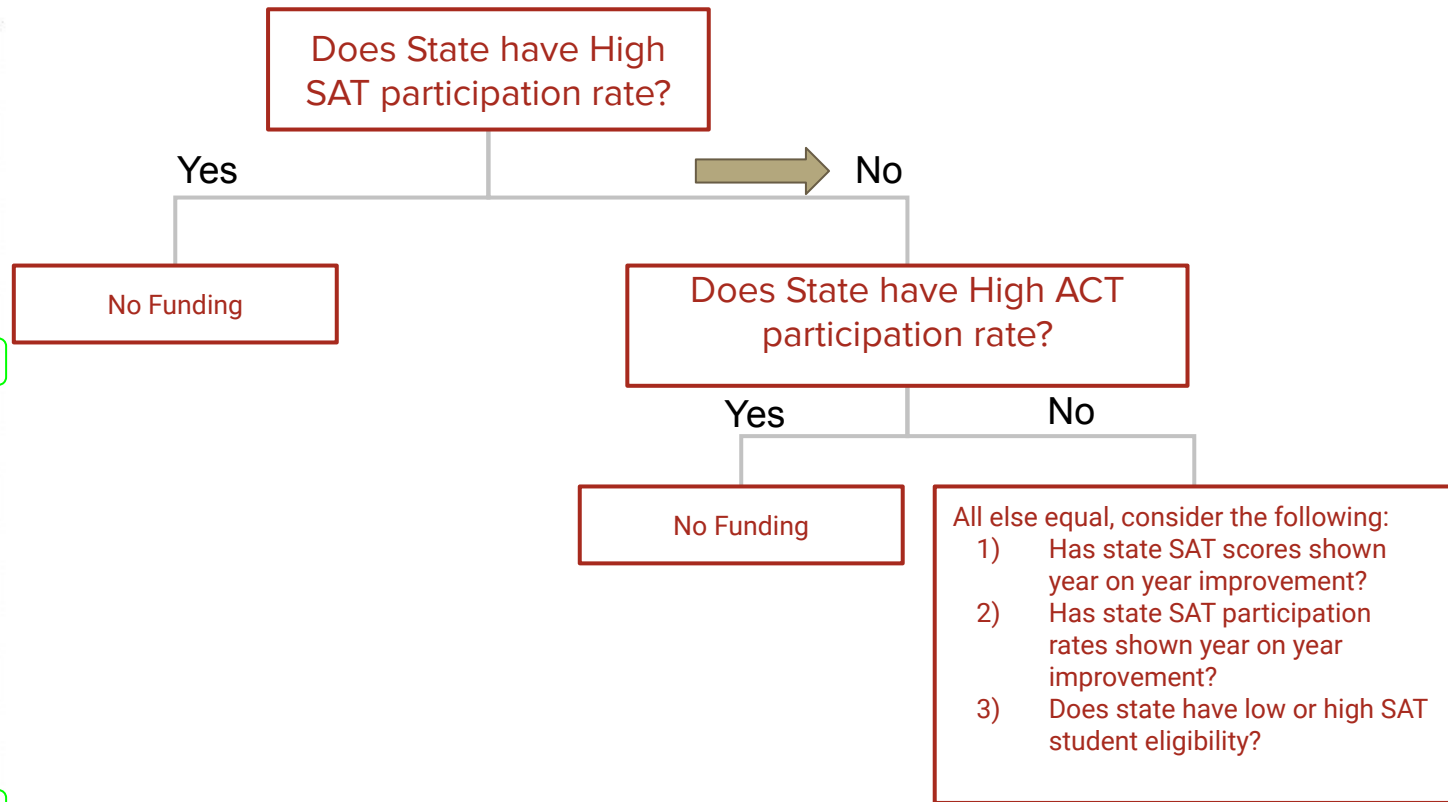
# Alaska and Oregon

our top 2 choices

Upon further deliberation

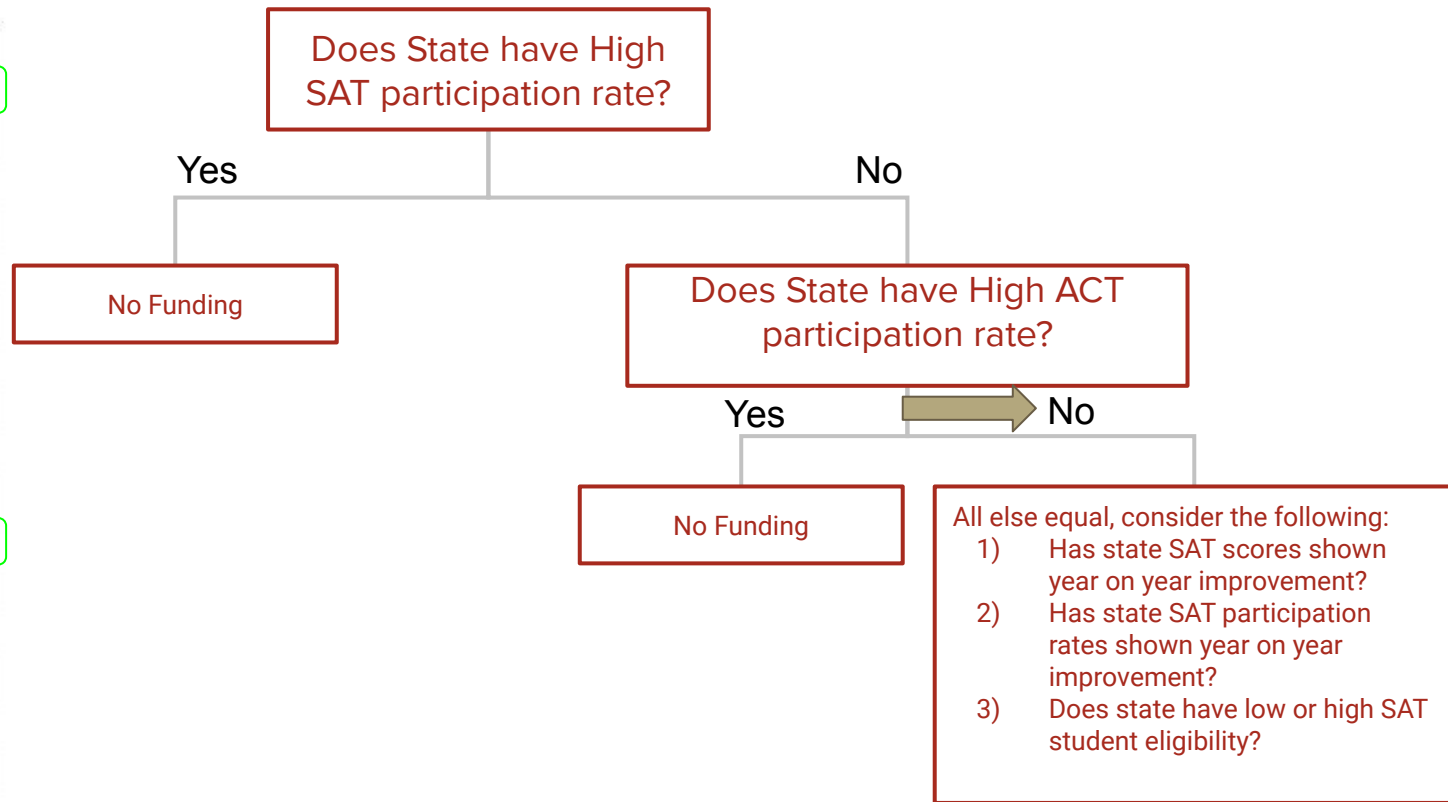
1 37

state	Alaska	Oregon
act17_participation%	65	40
act17_eng	18.7	21.2
act17_math	19.8	21.5
act17_reading	20.4	22.4
act17_sci	19.9	21.7
act17_composite	19.8	21.8
sat17_participation%	38	43
sat17_reading_writing	547	560
sat17_math	533	548
sat17_total	1080	1108
act18_participation%	33	42
act18_composite	20.8	21.3
act18_eng	19.8	20.6
act18_math	20.6	20.9
act18_reading	21.6	21.9
act18_sci	20.7	21.1
sat18_participation%	43	48
sat18_reading_writing	562	564
sat18_math	544	553
sat18_total	1106	1117



1 37

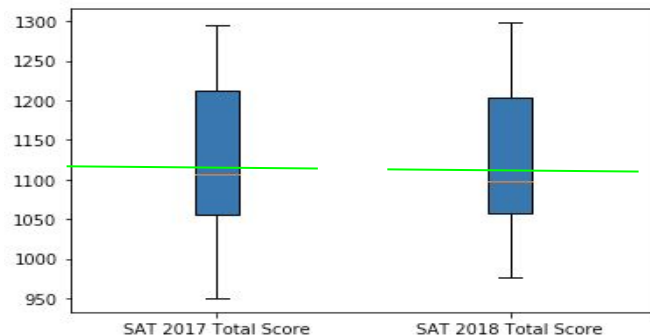
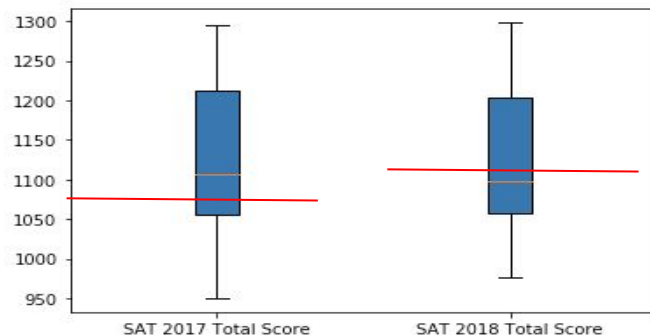
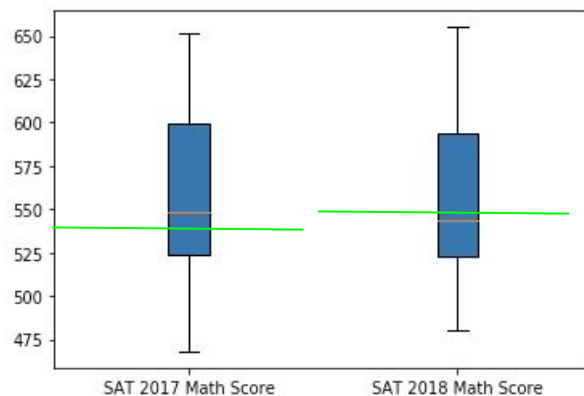
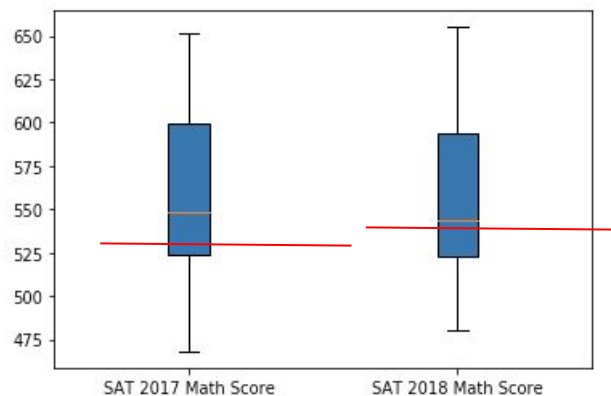
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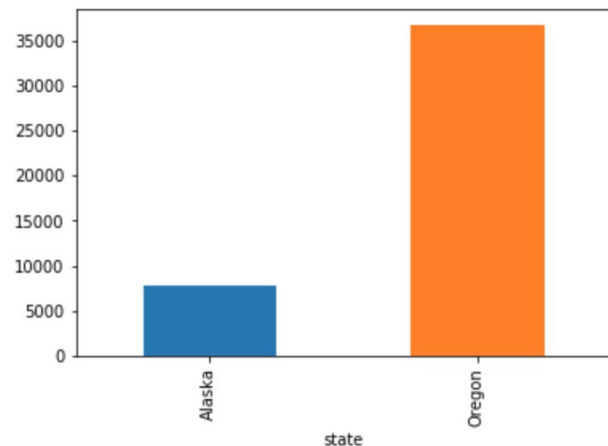
## Potential based on test scores?



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## Other factors:

- Similar increment in 5% of SAT % from 17 to 18
- Alaska has the lower SAT participation % of the two
- ACT rates are declining for Alaska whereas it is increasing for Oregon
- 7,796 VS 36,734 High school graduates



# Alaska

#1 Choice

# Assumptions

**#1** The number of high school graduates will not change drastically every year and it is approximately appropriate for future year projections

**#2** Money allocated by the Central Board will be the same, regardless of which state is recommended to improve SAT participation rates.

**Future Consideration**

“Shift its focus away from participation rate and more towards improving test scores”

“Improve the access to test prep resources and reduce the financial burden to encourage SAT participation”

**Future Consideration (Data Collection)**



“Collecting more granular data such as the participation district, school level and median household income etc in a standardized manner of each state will give a better overall overview of the data collected”

**We will take questions now.**

**Thank you very much for your  
attention.**

# Appendix

