



SAT Student Performance & Benchmarks

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*I work for an independent research organisation in **West Virginia** where SAT has recently become compulsory. I have been contacted by a school in that state to provide them with some advice and guidelines to help improve the SAT performance.*

SCENARIO

The school would like to...

- Know what **SAT performance** is in other States.
- Identify students who are thriving and require **greater challenges**.
- Identify students who require additional academic **support**.
- Ensure students are on track to being able to go to their **desired colleges**.
- Ensure students are on track to doing their **intended majors** at colleges.

PROBLEM STATEMENT

DATASETS

Data Sources

- 1) 2017 SAT Scores by State
- 2) 2018 SAT Scores by State
- 3) 2019 SAT Scores by State
- 4) 2019 SAT Scores by Intended College Major
- 5) Ranges of Accepted ACT & SAT Student Scores by Colleges
- 6) 2019 PSAT/SAT Scores by Grades and GPA
- 7) Benchmark for PSAT/SAT by Grades

} Merged



PrepScholar

 CollegeBoard

 CollegeBoard

2019

SAT Suite of
Assessments
Annual Report

SAT_RESULTS

2017-2019 SAT Total, ERW and Math Scores by State

Feature	Type	Dataset	Description
state	object	sat_results	The name of the State
participation_2017	float	sat_results	The 2017 participation percentage
erw_2017	int	sat_results	The average 2017 SAT score for Evidence-Based Reading and Writing section
math_2017	int	sat_results	The average 2017 SAT score for Math section
total_2017	int	sat_results	The average 2017 SAT score for both sections
participation_2018	float	sat_results	The 2018 participation percentage
erw_2018	int	sat_results	The average 2018 SAT score for Evidence-Based Reading and Writing section
math_2018	int	sat_results	The average 2018 SAT score for Math section
total_2018	int	sat_results	The average 2018 SAT score for both sections
participation_2019	float	sat_results	The 2019 participation percentage
erw_2019	int	sat_results	The average 2019 SAT score for Evidence-Based Reading and Writing section
math_2019	int	sat_results	The average 2019 SAT score for Math section
total_2019	int	sat_results	The average 2019 SAT score for both sections

SAT_COLLEGE_MAJOR

2019 SAT Total, ERW and Math Scores by Intended College major

Feature	Type	Dataset	Description
major	object	sat_college_major	The intended College Major for SAT takers
test_takers	int	sat_college_major	The number of test takers
percent	float	sat_college_major	The percentage of SAT takers choosing the major
total	int	sat_college_major	The average SAT score for both sections combined
erw	int	sat_college_major	The average SAT score for Evidence-Based Reading and Writing section
math	int	sat_college_major	The average SAT score for Math section

SAT_BY_COLLEGE

2019 applicants, acceptance rate and 25th/75th SAT Scores by Colleges

Feature	Type	Dataset	Description
school	object	sat_by_college	The name of the college/university/school
applicants	int	sat_by_college	The number of applicants for the school
accept_rate	float	sat_by_college	The proportion of applicants accepted into the school
sat_25_percentile	float	sat_by_college	The 25th percentile of SAT Scores for accepted applicants
sat_75_percentile	float	sat_by_college	The 75th percentile of SAT Scores for accepted applicants

SAT_GPA_GRADE_2019

2019 SAT Scores and proportion of students who met the benchmark by junior/highschool GPA

Feature	Type	Dataset	Description
gpa	object	sat_gpa_grade_2019	The grade received at junior/high school
academic_grade	int	sat_gpa_grade_2019	The Grade (Year Group) of the student
test_takers	int	sat_gpa_grade_2019	The number of test takers within the GPA category
test_taker_pct	float	sat_gpa_grade_2019	The percentage of students within the GPA category
mean_total	int	sat_gpa_grade_2019	The average SAT Scores for both section
mean_erw	int	sat_gpa_grade_2019	The average SAT score for Evidence-Based Reading and Writing section
mean_math	int	sat_gpa_grade_2019	The average SAT score for Math section
met_both_benchmarks	float	sat_gpa_grade_2019	The proportion of students who met the benchmark scores for both sections
met_erw_benchmarks	float	sat_gpa_grade_2019	The proportion of students who met the specified benchmark scores for ERW section
met_math_benchmarks	float	sat_gpa_grade_2019	The proportion of students who met the specified benchmark scores for Math section

SAT_BENCHMARK

2019 SAT Benchmark Scores by Grade

Feature	Type	Dataset	Description
red_erw	int	sat_benchmark	The red band benchmark score for Evidence-Based Reading and Writing section
red_math	int	sat_benchmark	The red band benchmark score for Math section
total_red	int	sat_benchmark	The combined red band benchmark score for both sections
yellow_erw	int	sat_benchmark	The yellow band benchmark score for Evidence-Based Reading and Writing section
yellow_math	int	sat_benchmark	The yellow band benchmark score for Math section
total_yellow	int	sat_benchmark	The combined yellow band benchmark score for both sections
green_erw	int	sat_benchmark	The green band benchmark score for Evidence-Based Reading and Writing section
green_math	int	sat_benchmark	The green band benchmark score for Math section
green_total	int	sat_benchmark	The combined green band benchmark score for both sections
academic_grade	int	sat_benchmark	The Grade of the students for the benchmark level

PARTICIPATION RATE

SAT STATES AVERAGE PARTICIPATION RATE

39.8%

2017

45.7%

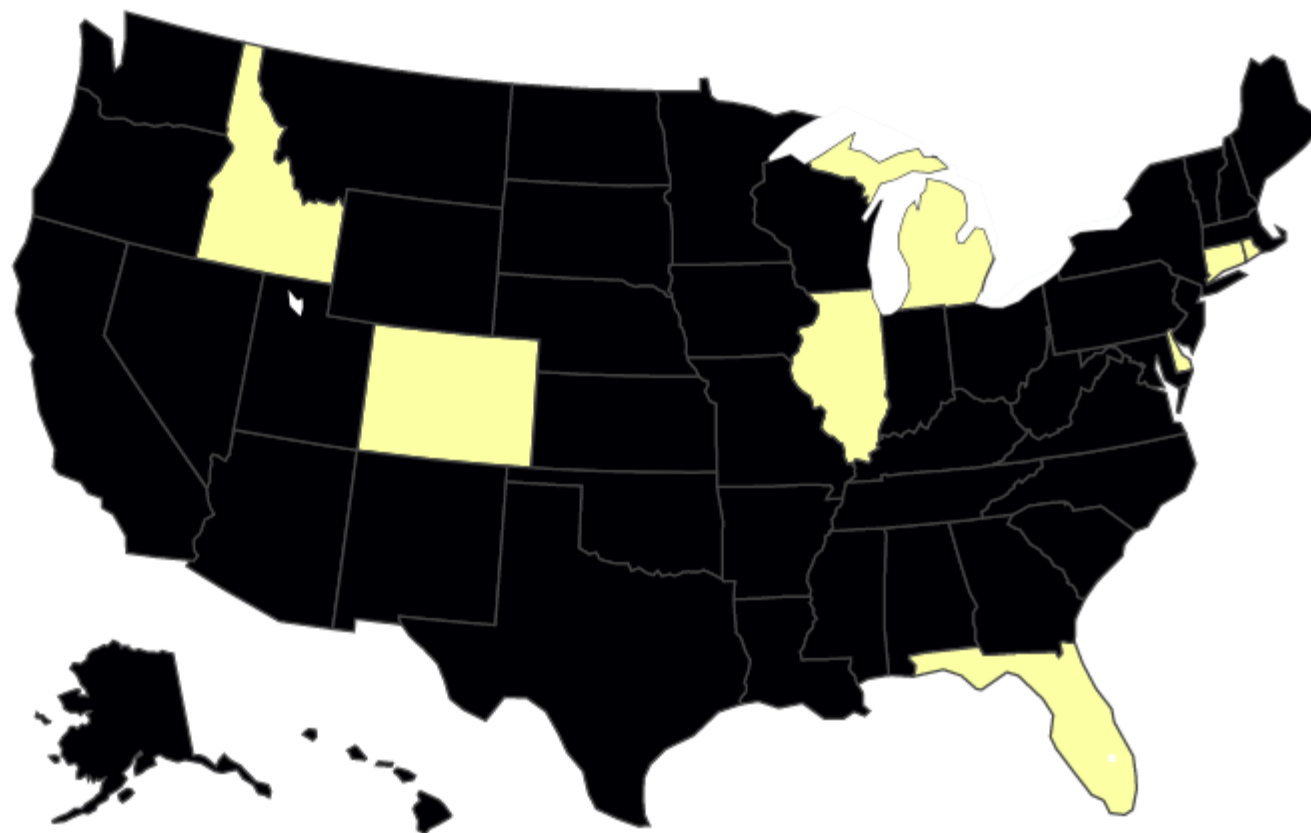
2018

49.5%

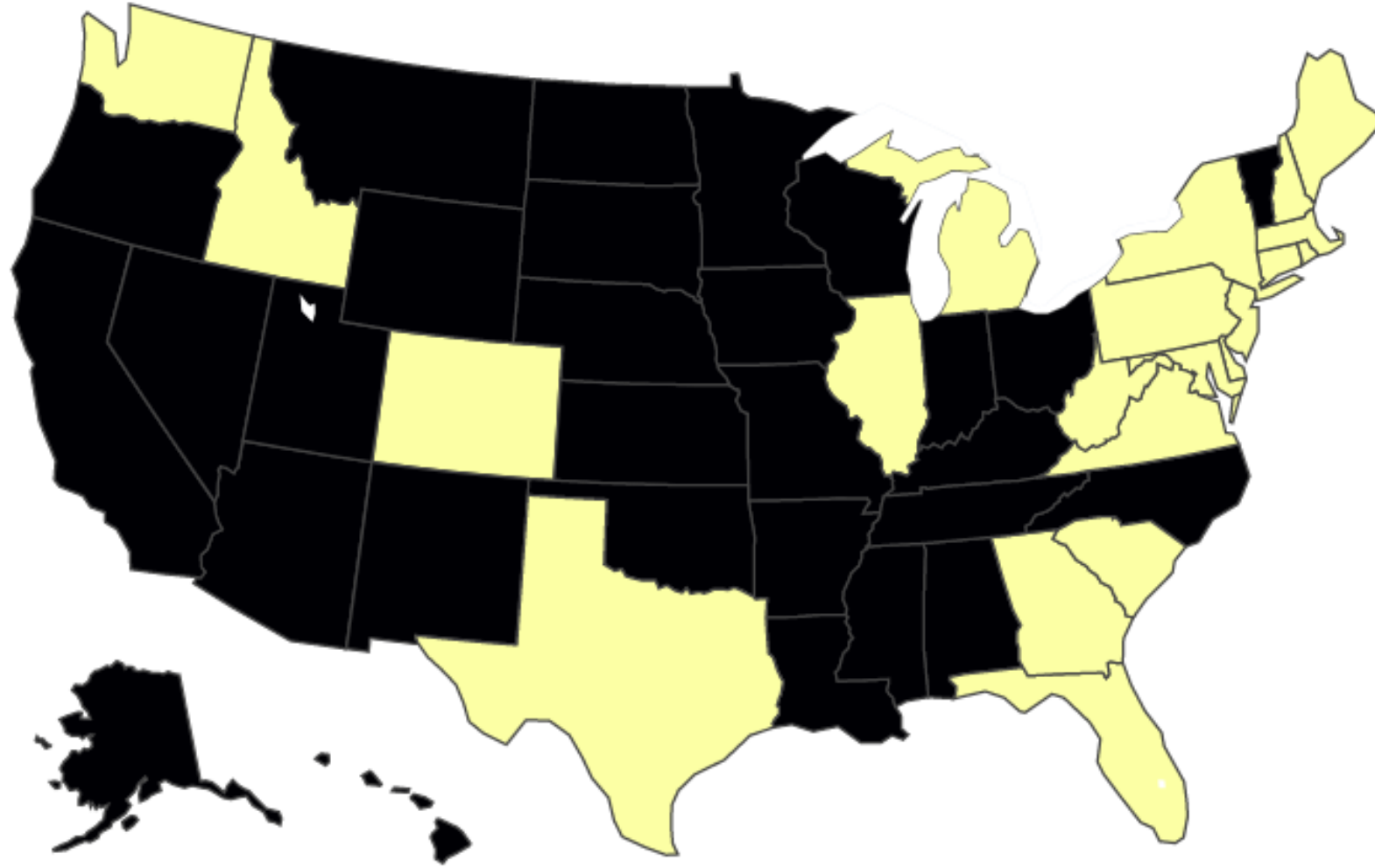
2019

STATES WITH 100% SAT PARTICIPATION 2019

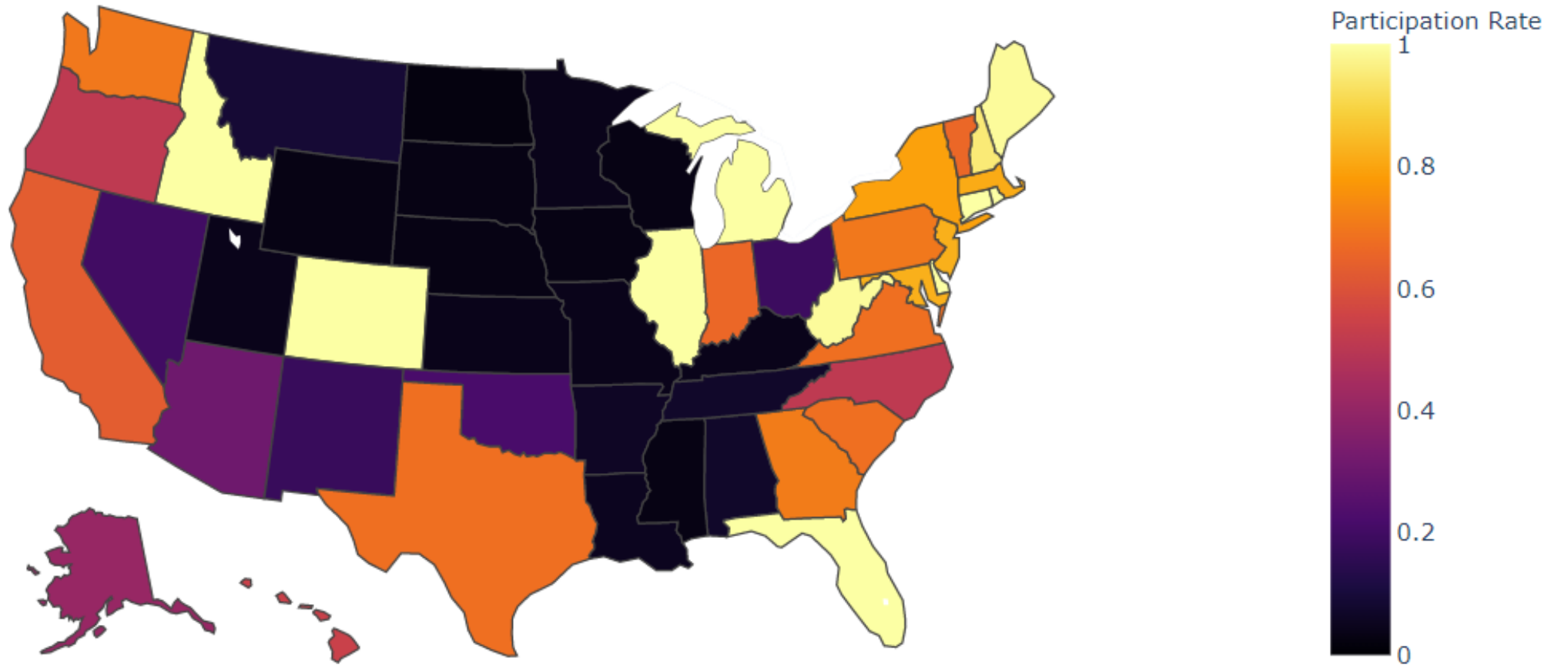
Colorado
Connecticut
Delaware
Florida
Idaho
Rhode Island
Illinois
Michigan



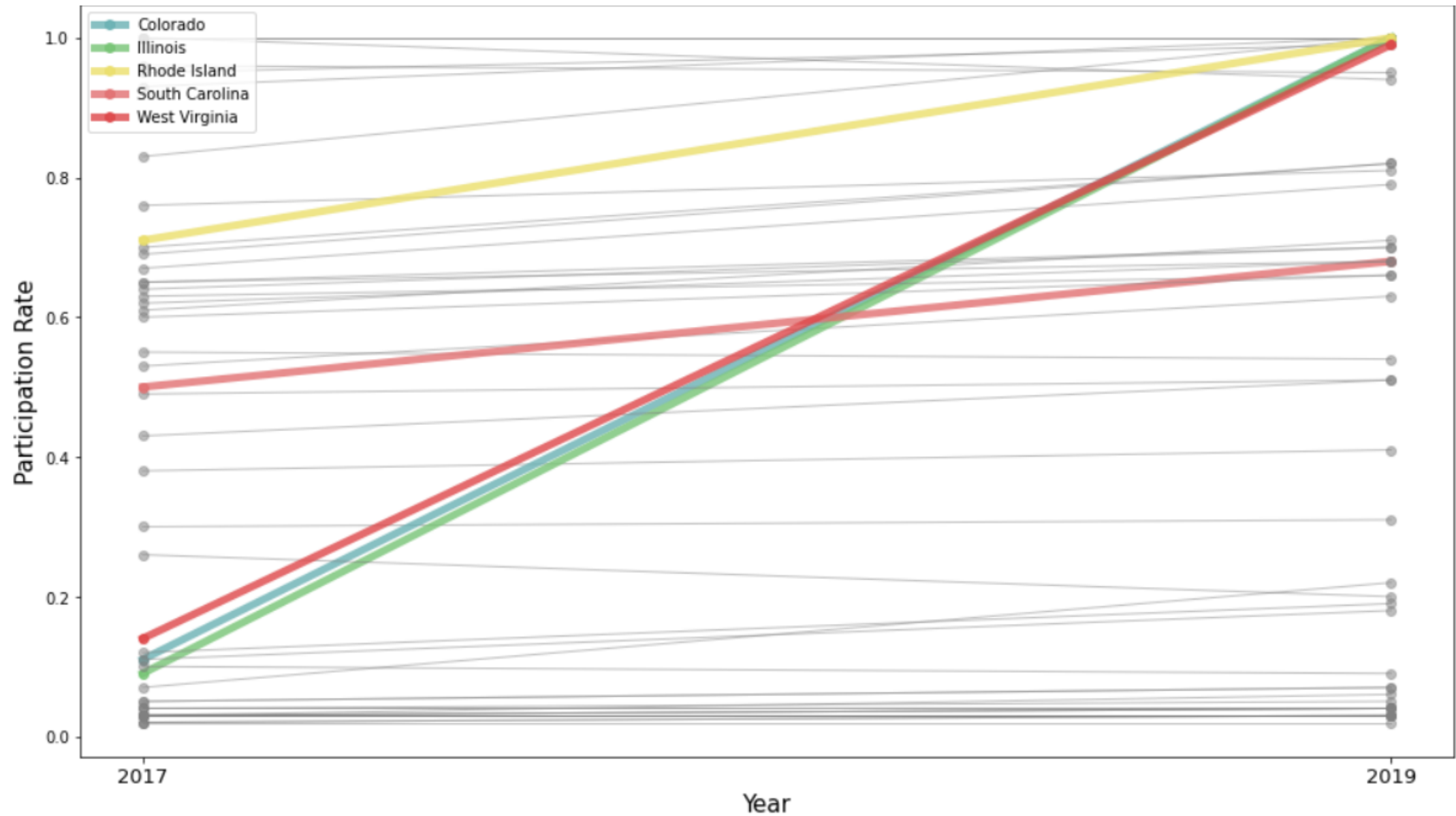
STATES WITH AT LEAST $\frac{2}{3}$ SAT PARTICIPATION



PARTICIPATION RATE IN 2019



STATE PARTICIPATION BETWEEN 2017 AND 2019



TOTAL/COMPOSITE SCORES

SAT STATES AVERAGE COMPOSITE SCORES

Max: 1600

1126

2017

1120

2018

1113

2019

STATES WITH HIGHEST SAT COMPOSITE SCORES IN 2019

1284

Minnesota

1283

Wisconsin

1268

South Dakota

STATES WITH LOWEST SAT COMPOSITE SCORES IN 2019

975

District of Columbia

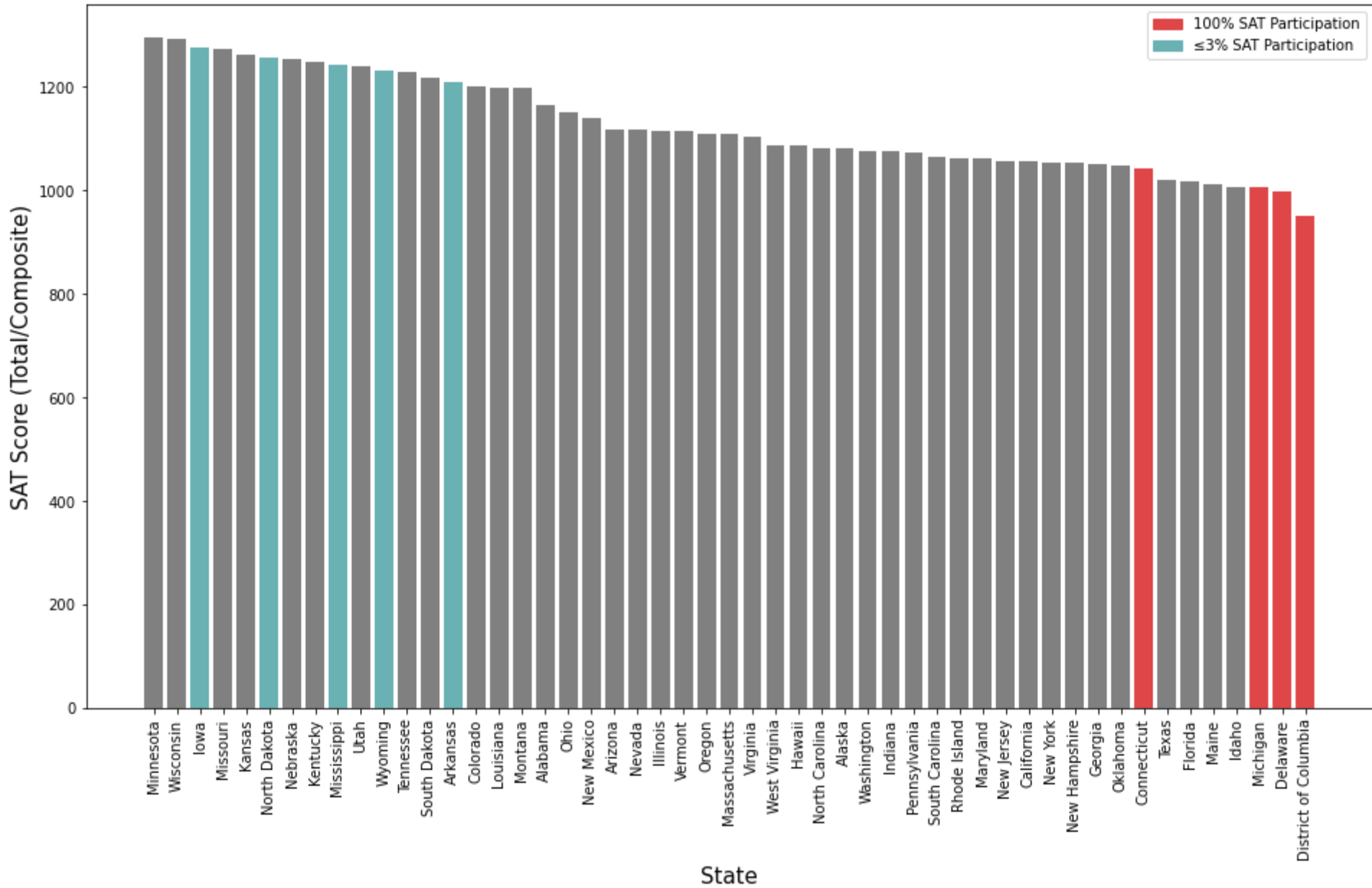
963

Oklahoma

943

West Virginia

SAT COMPOSITE SCORE BY STATE IN 2017

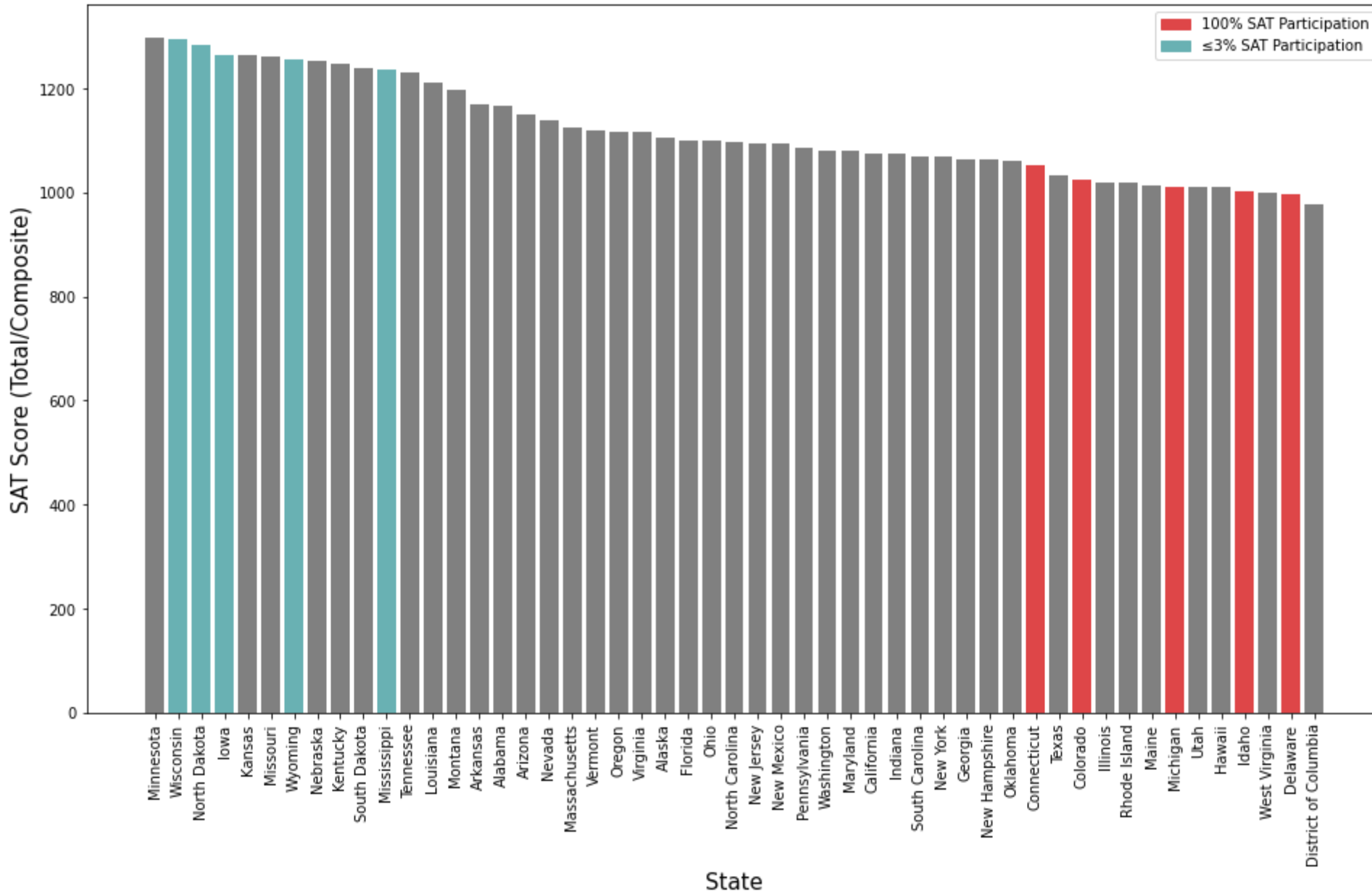


2017

2018

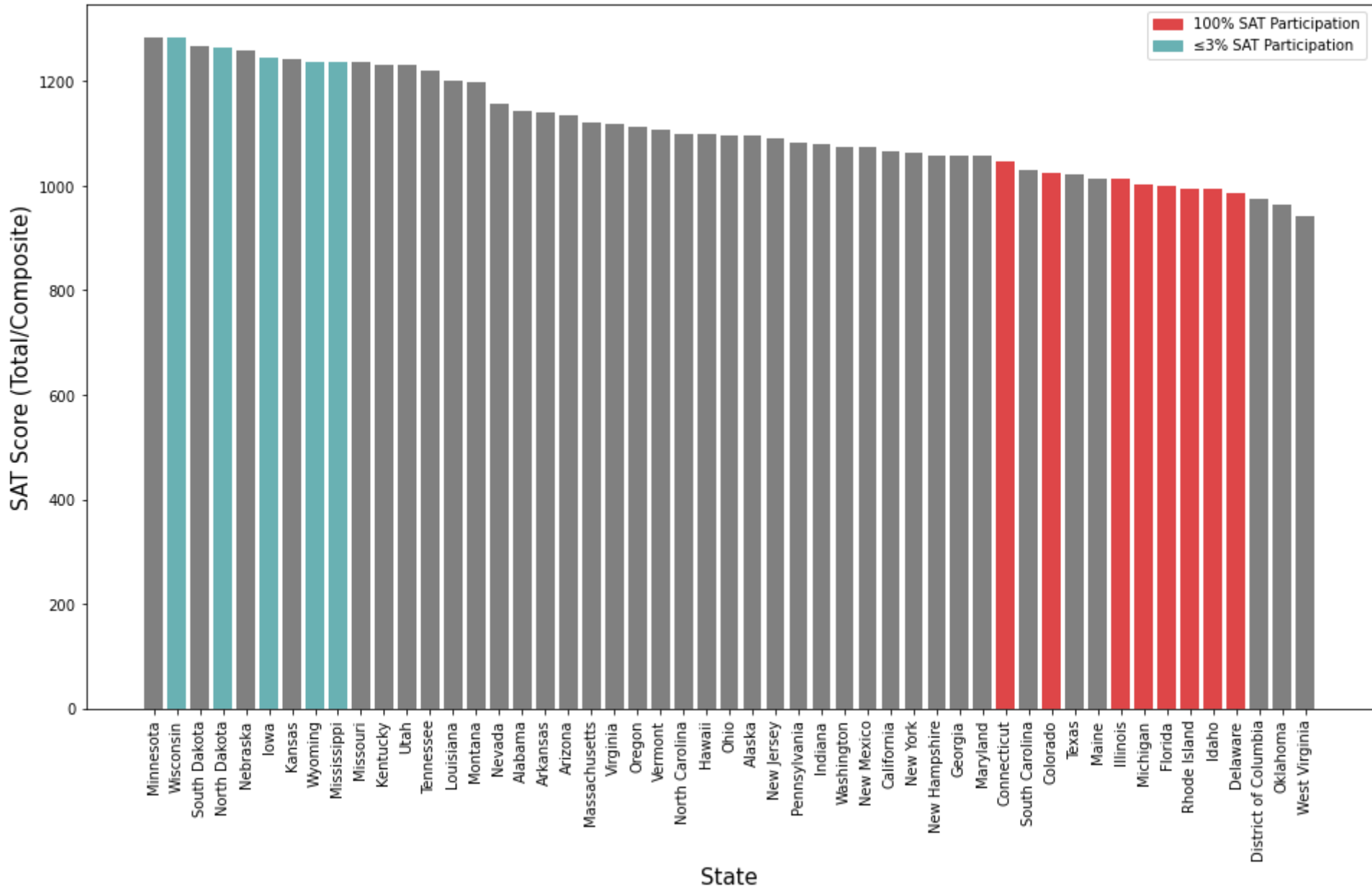
2019

SAT COMPOSITE SCORE BY STATE IN 2018



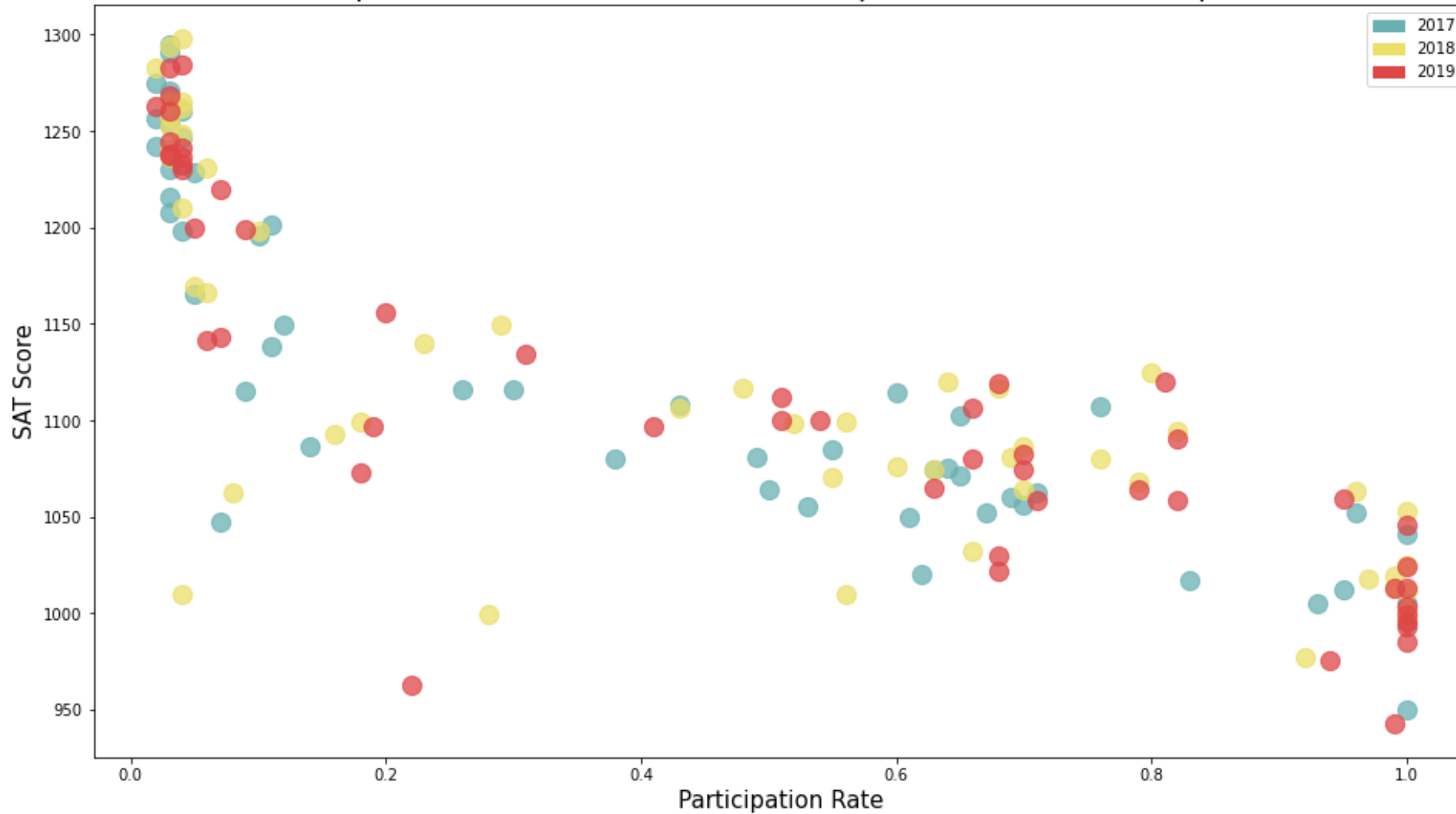
2017
2018
2019

SAT COMPOSITE SCORE BY STATE IN 2019



2017
2018
2019

RELATIONSHIP BETWEEN COMPOSITE SCORE AND PARITICIPATION



CORRELATION ANALYSIS

2017

$$\rho = -0.87$$

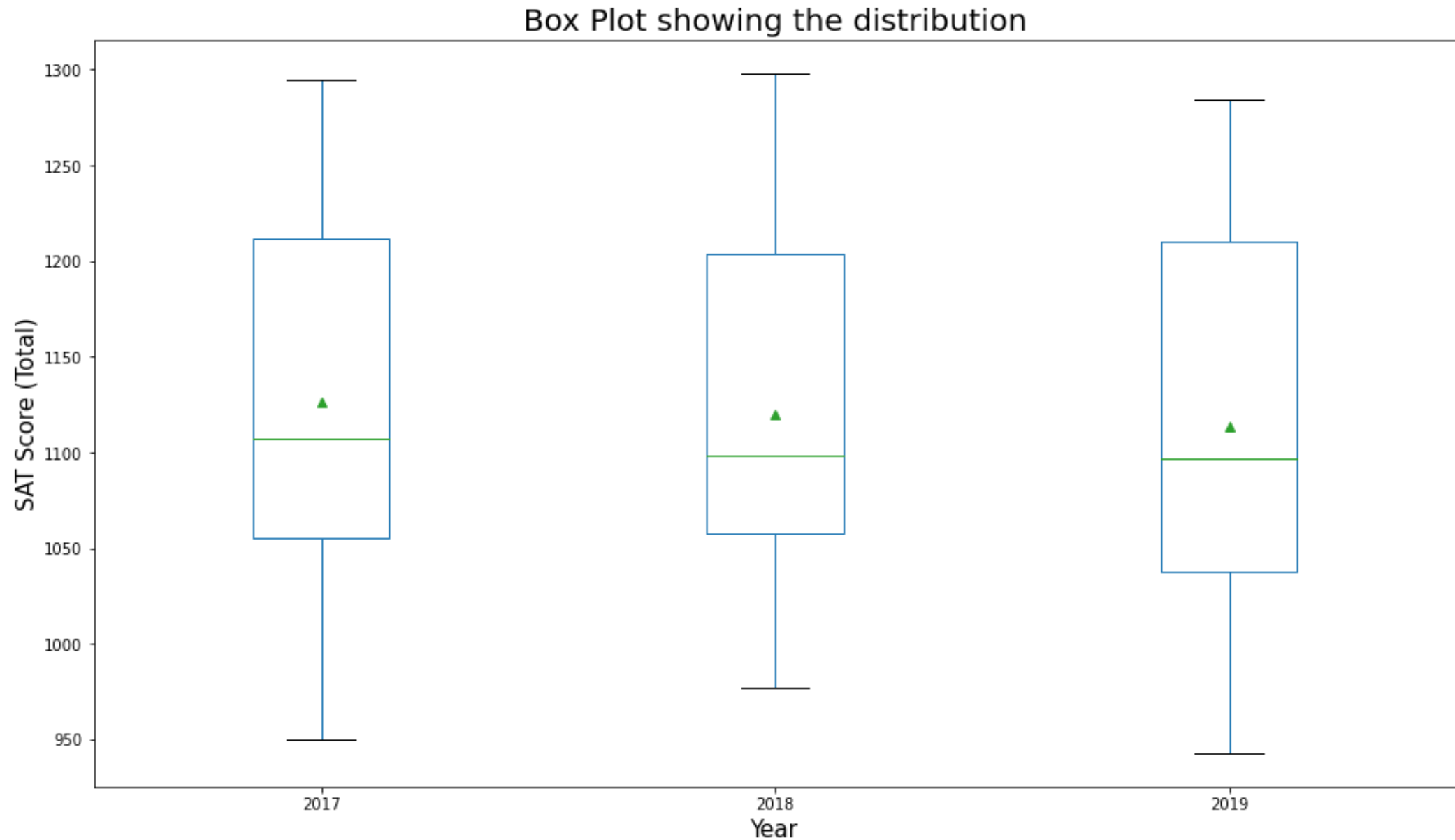
2018

$$\rho = -0.79$$

2019

$$\rho = -0.86$$

BOXPLOT OF COMPOSITE SCORES BY YEAR



SAT SECTION:
EVIDENCE-BASED
READING AND WRITING
(ERW)

SAT STATES AVERAGE ERW SCORE

Max: 800

569

2017

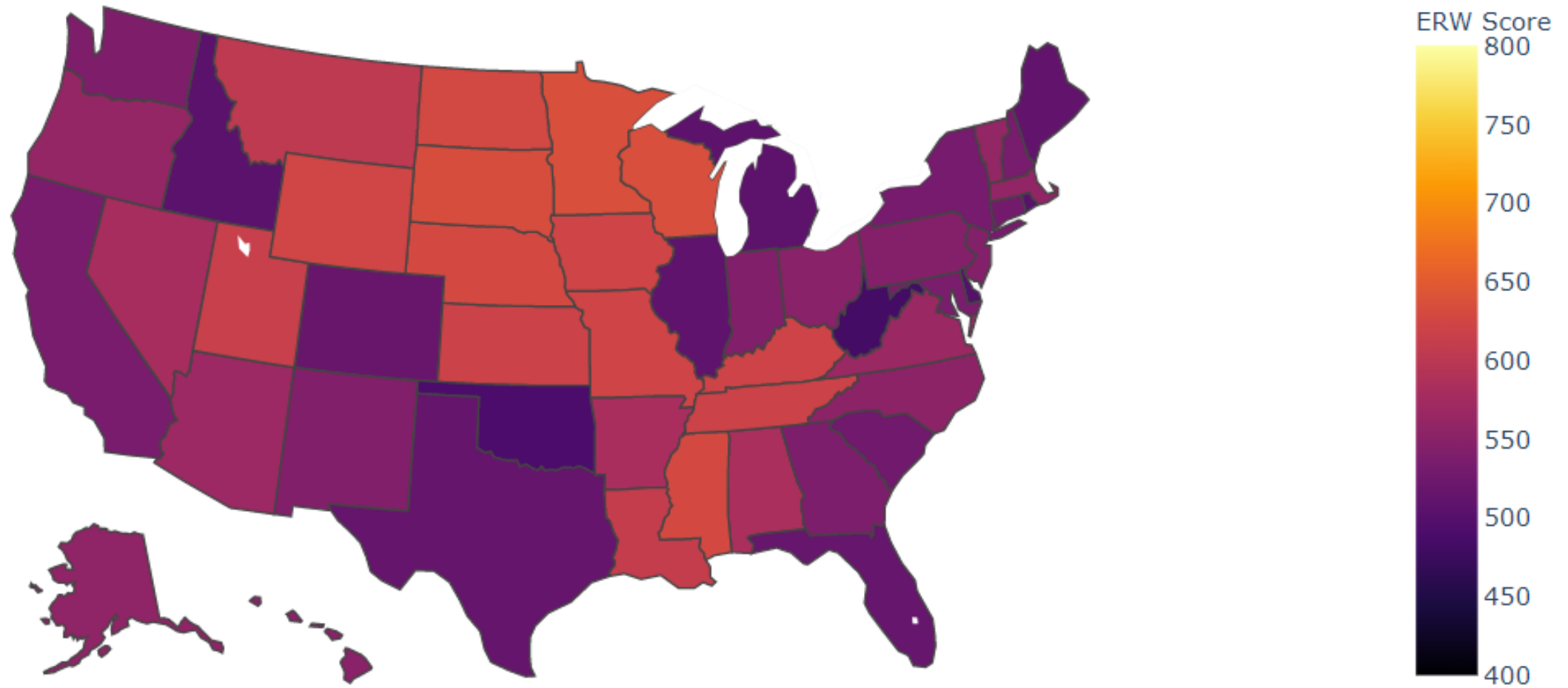
563

2018

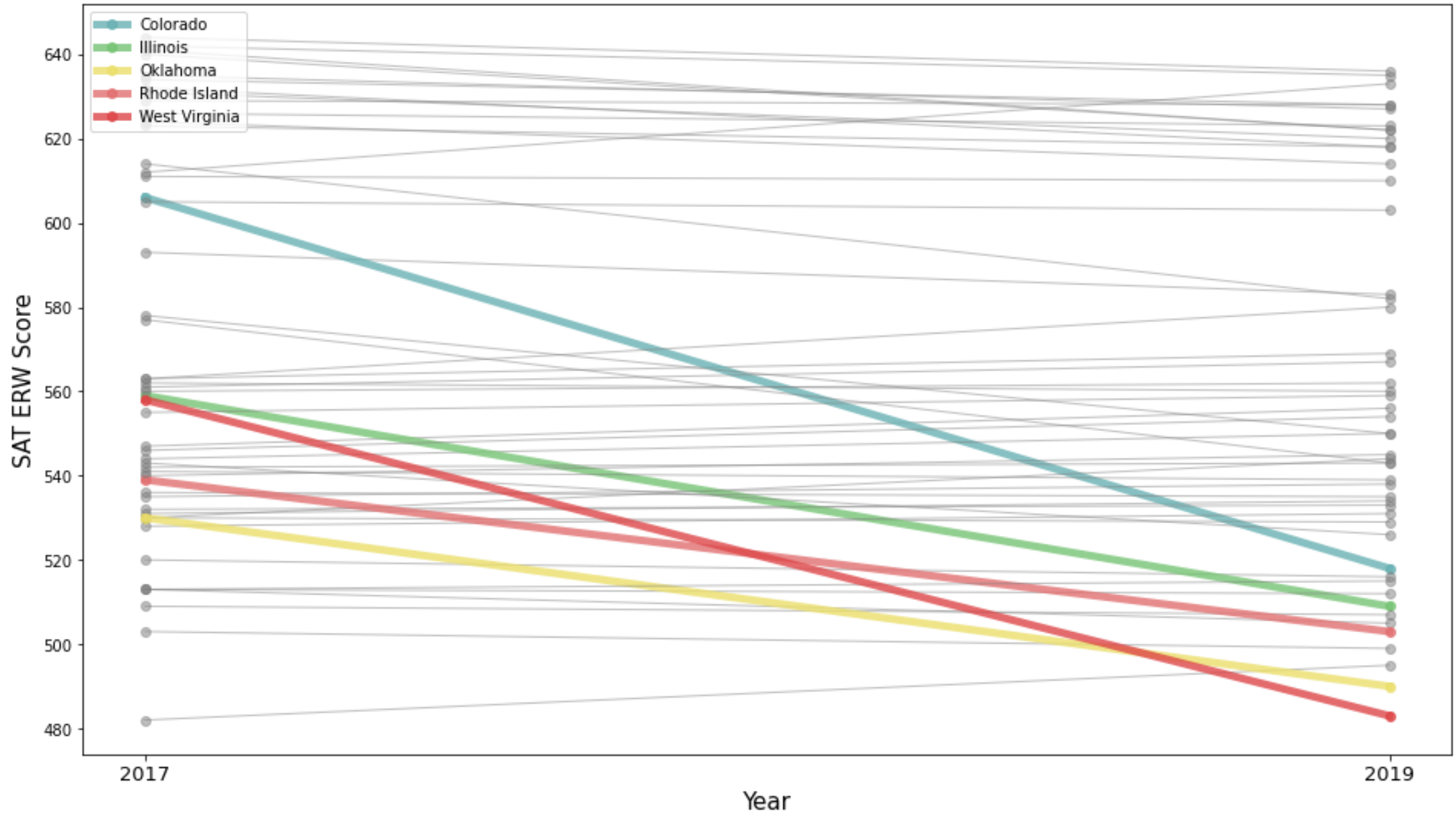
561

2019

EVIDENCE BASED READING AND WRITING SCORES IN 2019



STATE ERW SCORES BETWEEN 2017 AND 2019



ERW KEY FACTS 2017 - 2019

18

*states scored higher in ERW
in 2019 compared to 2017*

South Dakota

improved the most by 3.4%

33

*states scored lower in ERW
in 2019 compared to 2017*

Colorado

scored 15% less

SAT SECTION: MATHEMATIC

SAT STATES AVERAGE MATH SCORE

Max: 800

548

2017

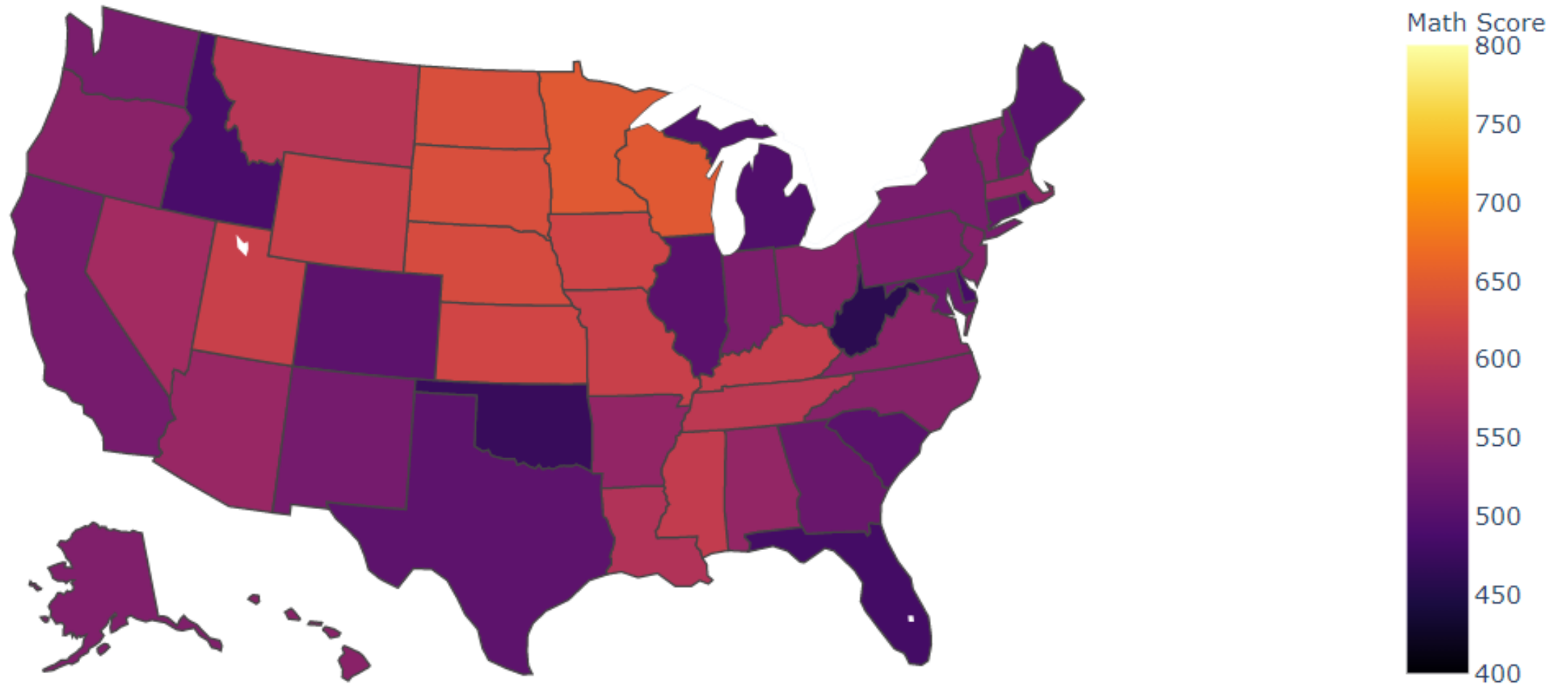
556

2018

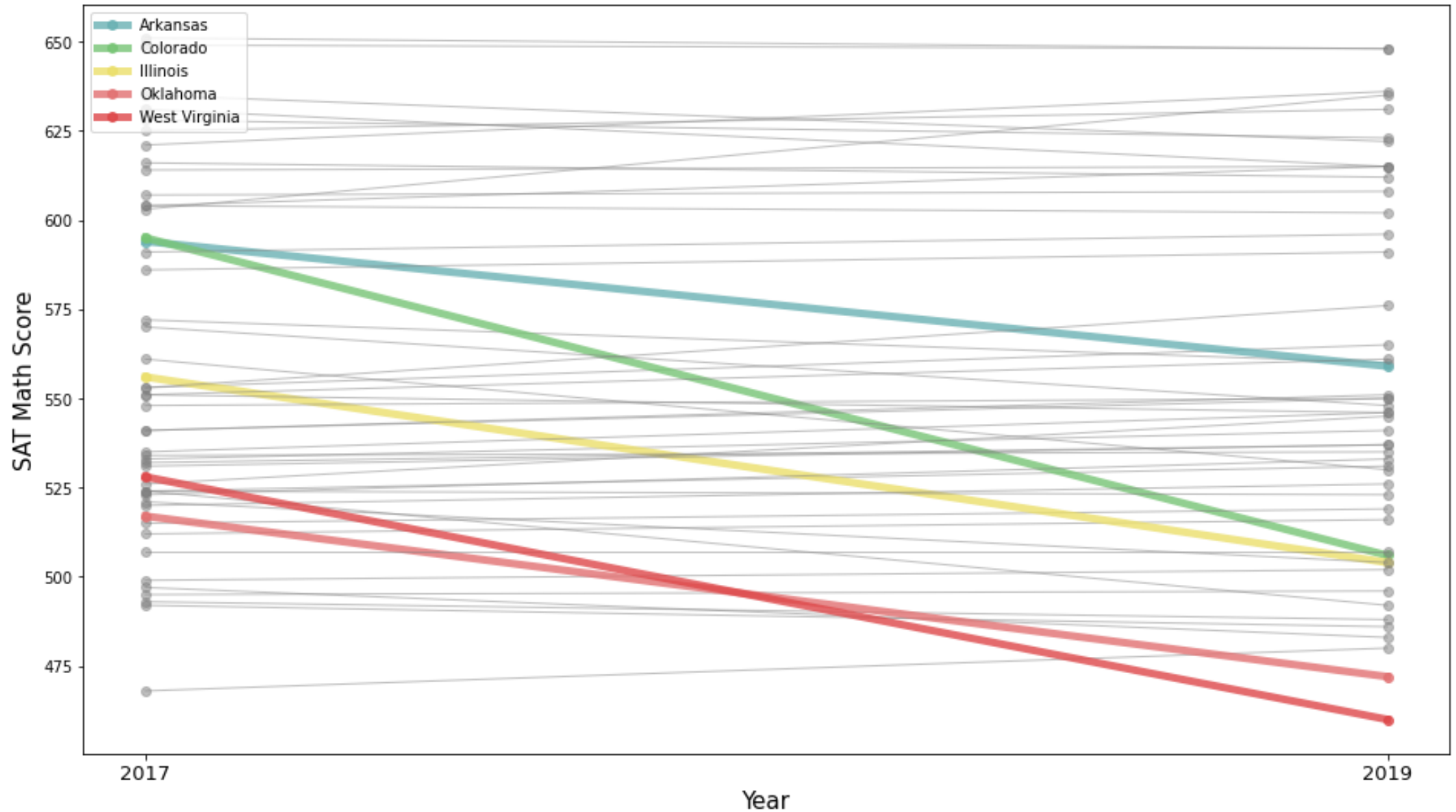
552

2019

MATH SCORES IN 2019

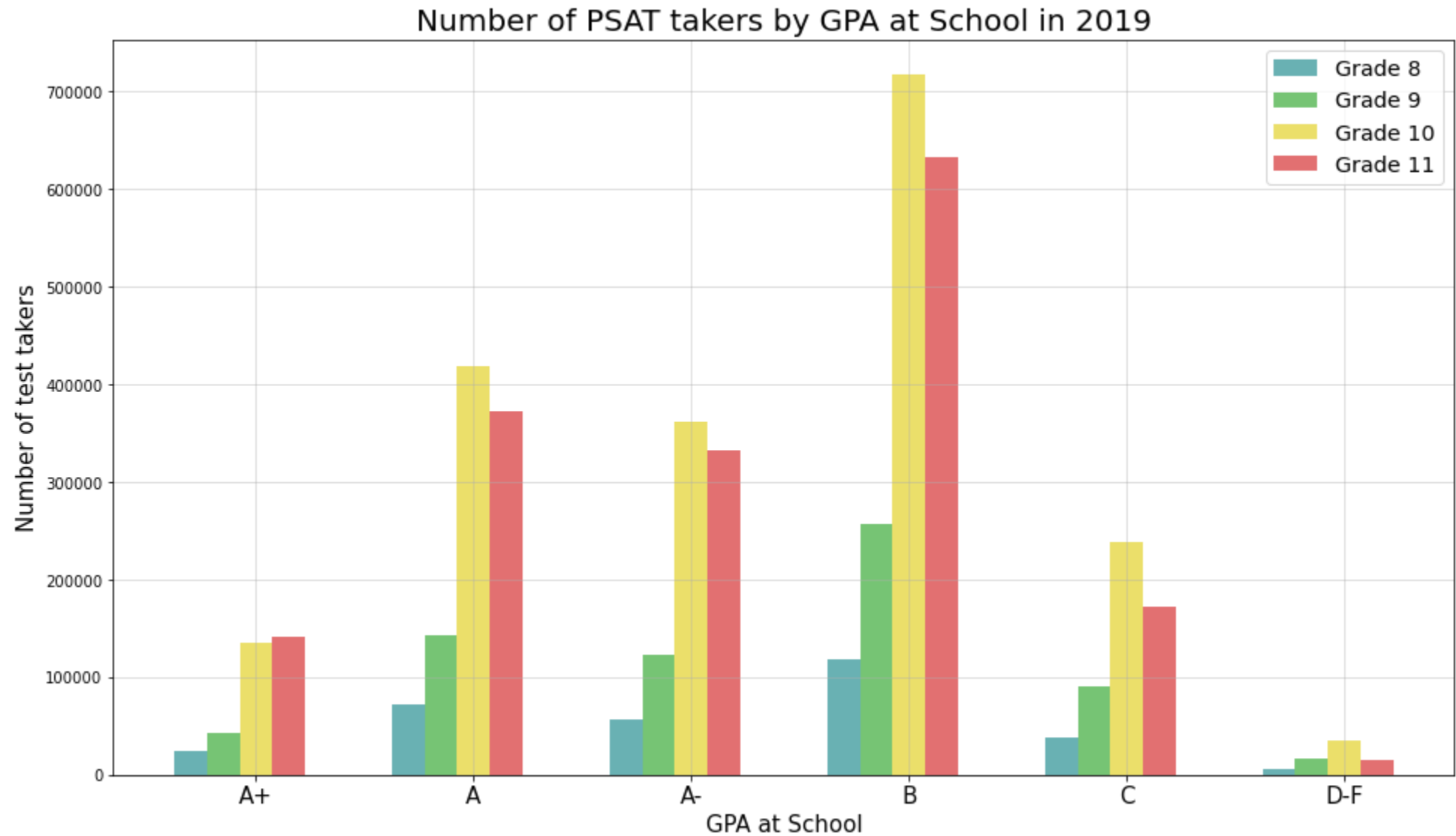


STATE MATH SCORES BETWEEN 2017 AND 2019



2019 PSAT/SAT by Grade

PSAT TEST TAKERS BY GPA AND GRADE



Benchmark Indicators

College Board's benchmark is a tool that helps educators assess student progress toward college readiness from year to year. Students at different Grades will have different benchmarks and the benchmark differs for the ERW and Math section. It can be divided into three bands.



Green

On track for college readiness

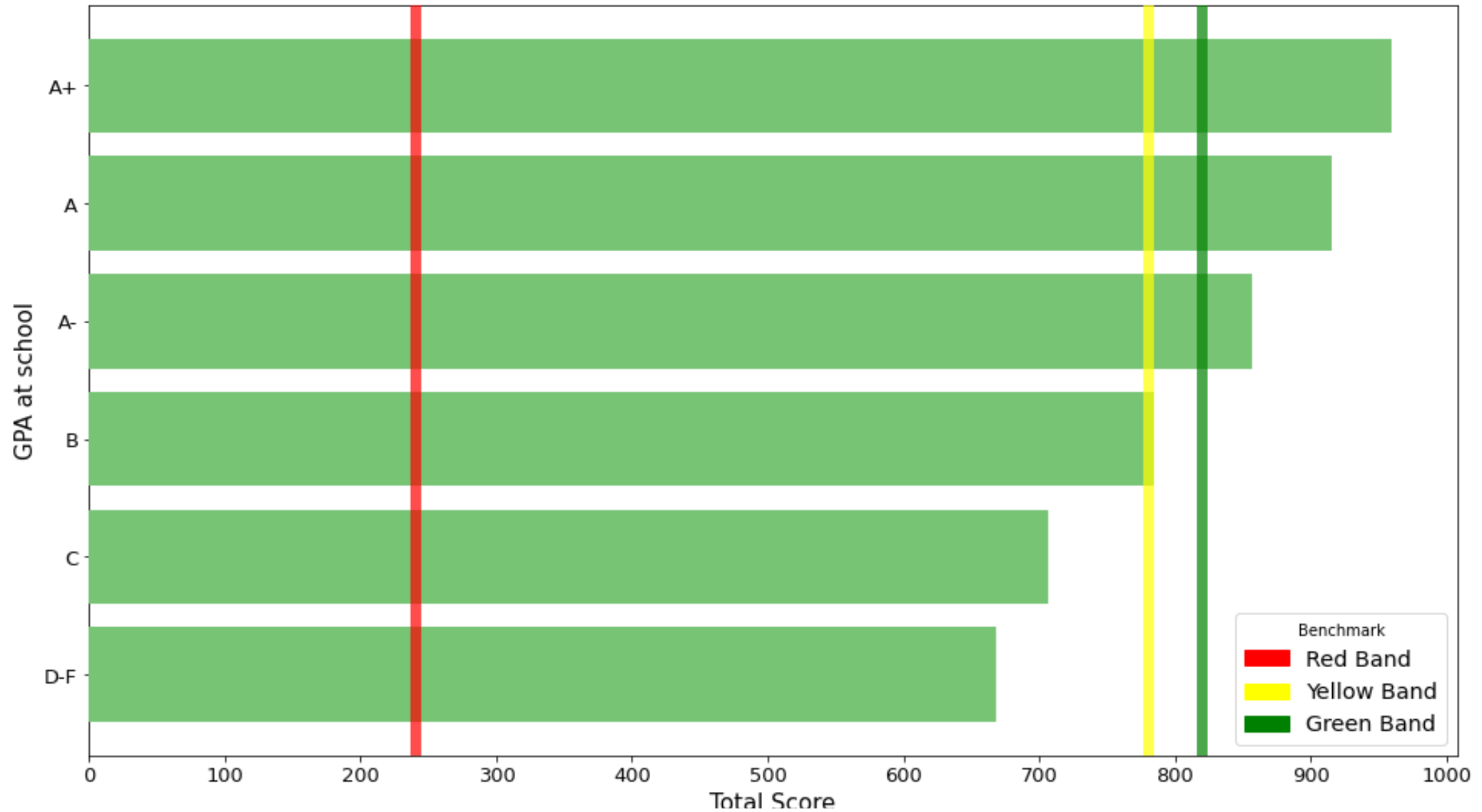
Yellow

Close to being on track for college readiness; continue to strengthen skills

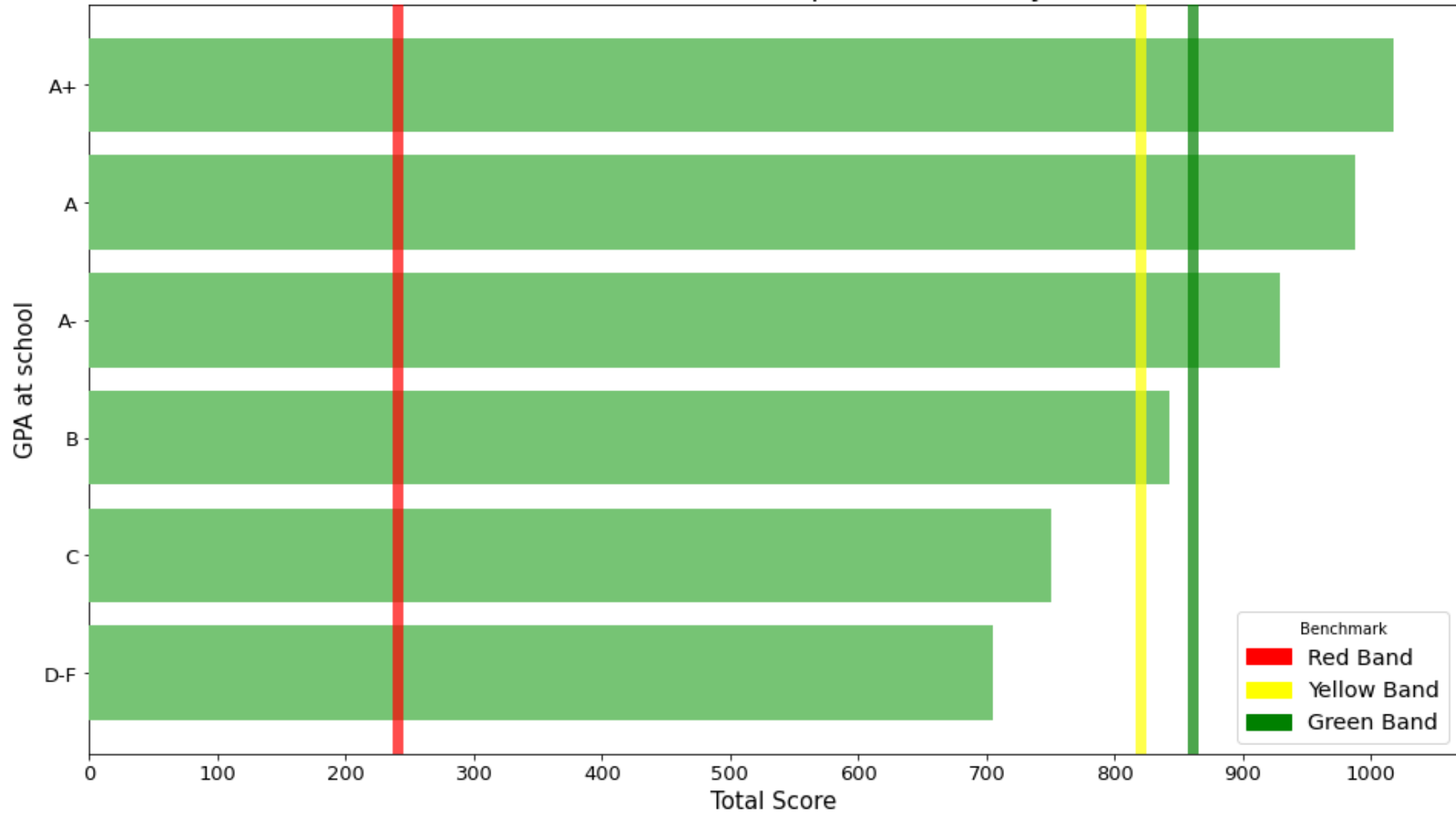
Red

Need to strengthen skills

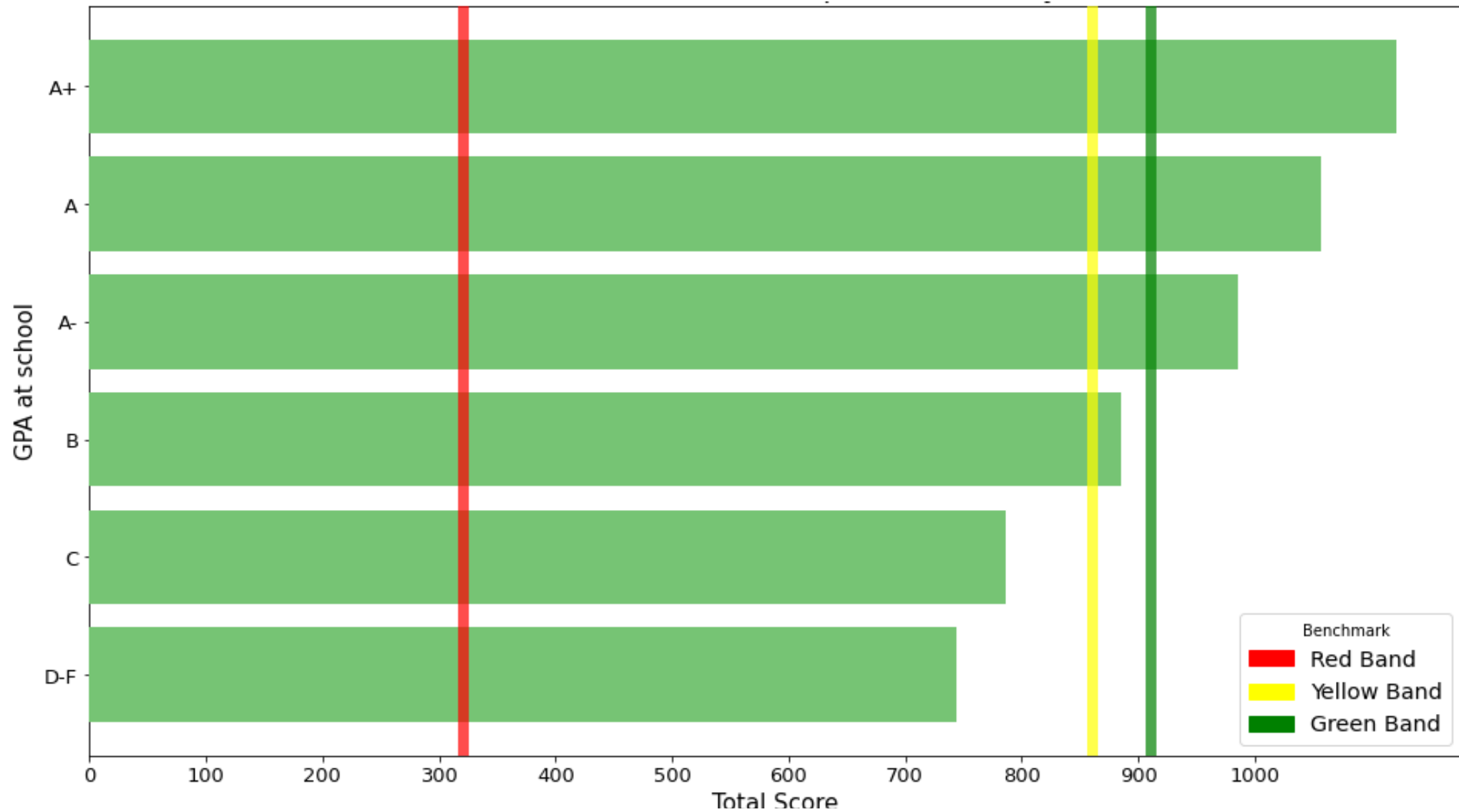
GRADE 8: PSAT COMPOSITE SCORE BY GPA



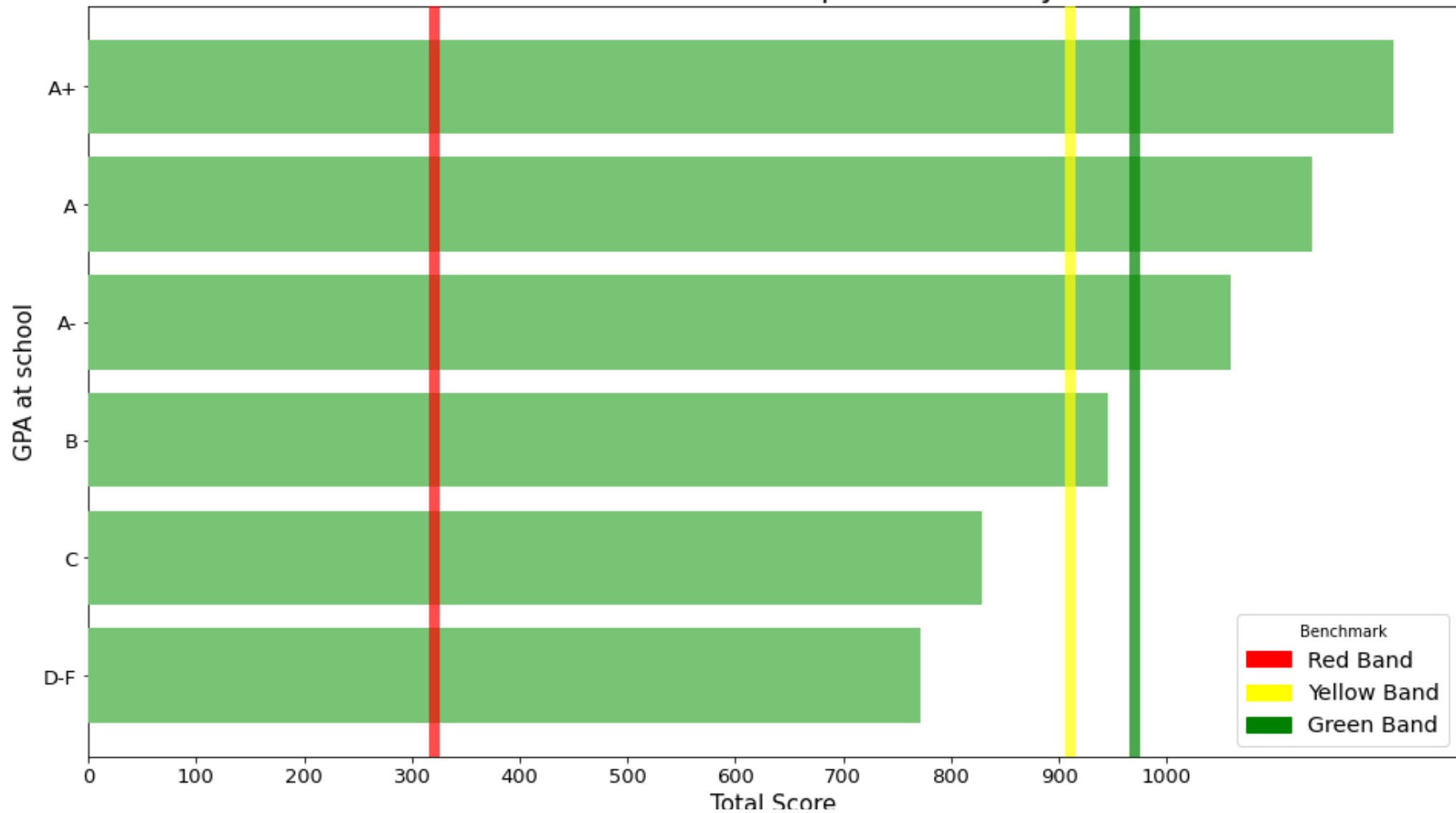
GRADE 9: PSAT COMPOSITE SCORE BY GPA



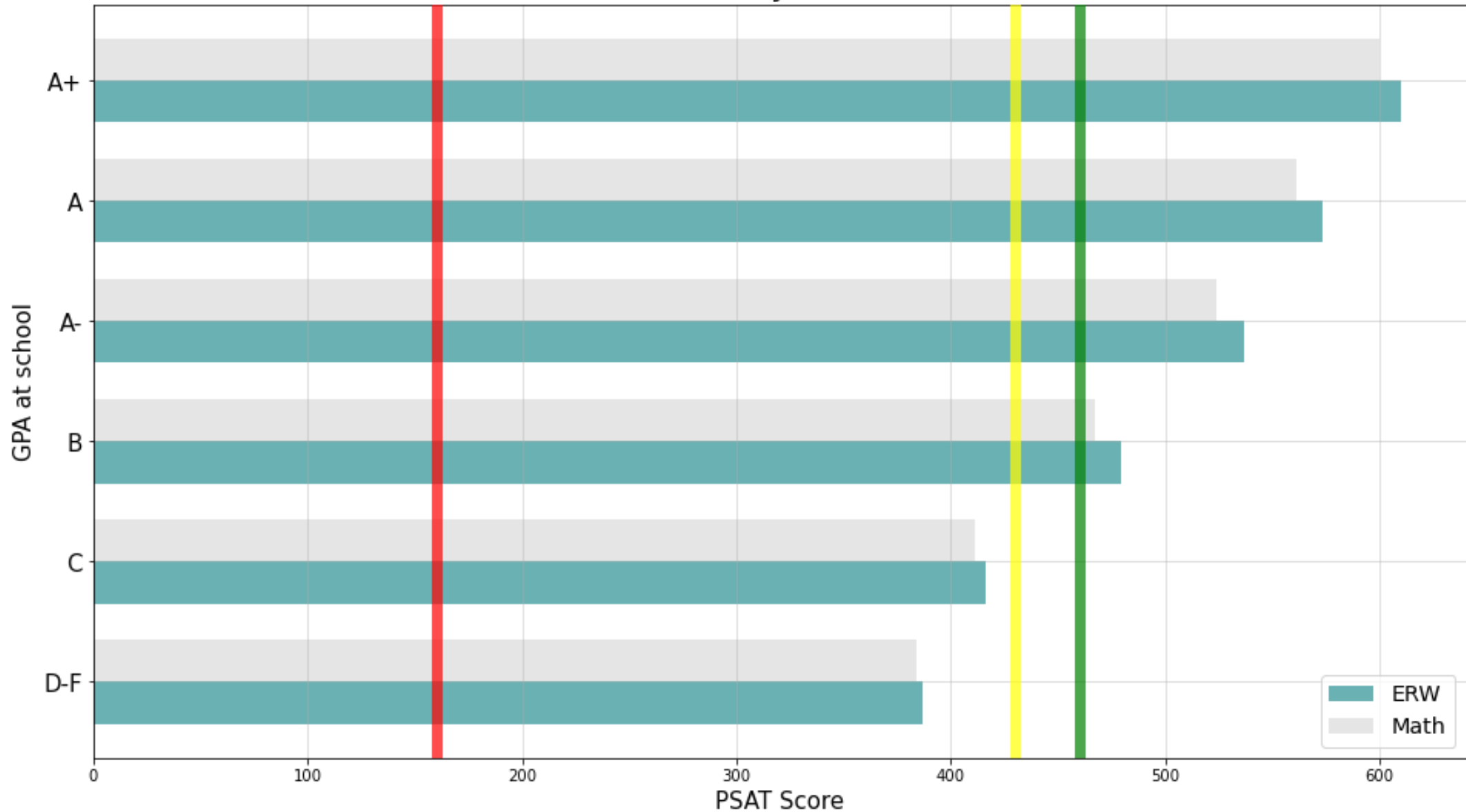
GRADE 10: PSAT COMPOSITE SCORE BY GPA



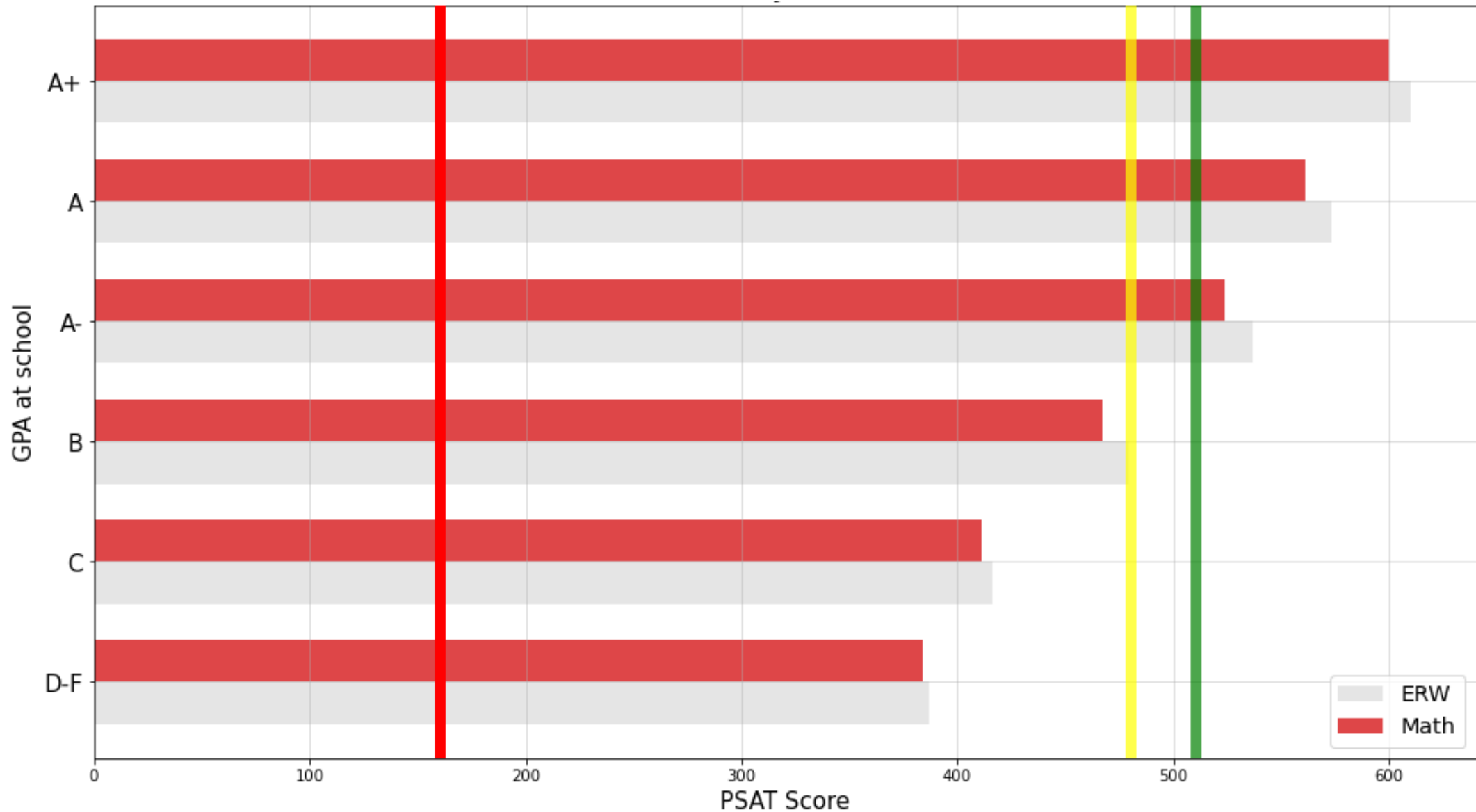
GRADE 11: PSAT COMPOSITE SCORE BY GPA



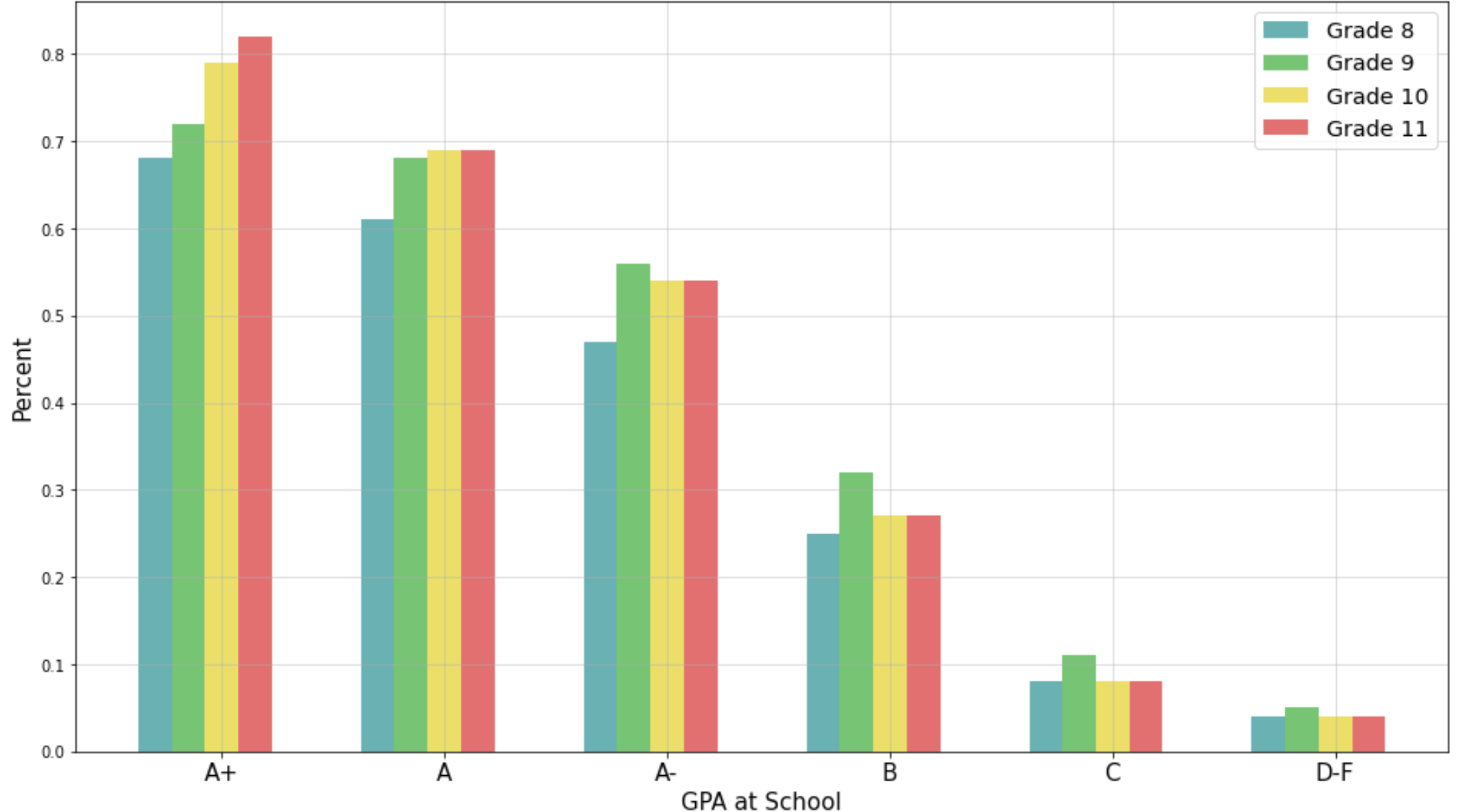
GRADE 11: PSAT SCORE BY GPA WITH ERW BENCHMARK



GRADE 11: PSAT SCORE BY GPA WITH MATH BENCHMARK



PROPORTION OF STUDENTS WHO MET ERW AND MATH BENCHMARK 2019



COLLEGE MAJORS

POPULAR COLLEGE MAJORS IN 2019

18%

Health Professions and related Clinical Sciences

12%

Business, Management, Marketing, and Related Support Services

11%

Engineering

Percentage of test takers

AVERAGE SAT SCORES FOR TOP 3 MOST POPULAR MAJORS

1086

Composite SAT Score

540

ERW Score

545

Math Score

Top four most popular college majors make up...

50%

of all the intended college majors for the test takers in 2019

COLLEGES

The mean acceptance rate across all the colleges is

55%

with some as low as

4%

and some as high as

99%

COLLEGES WITH LOWEST ACCEPTANCE RATE

4.3%

Stanford University

4.7%

Harvard College

5.5%

Princeton University

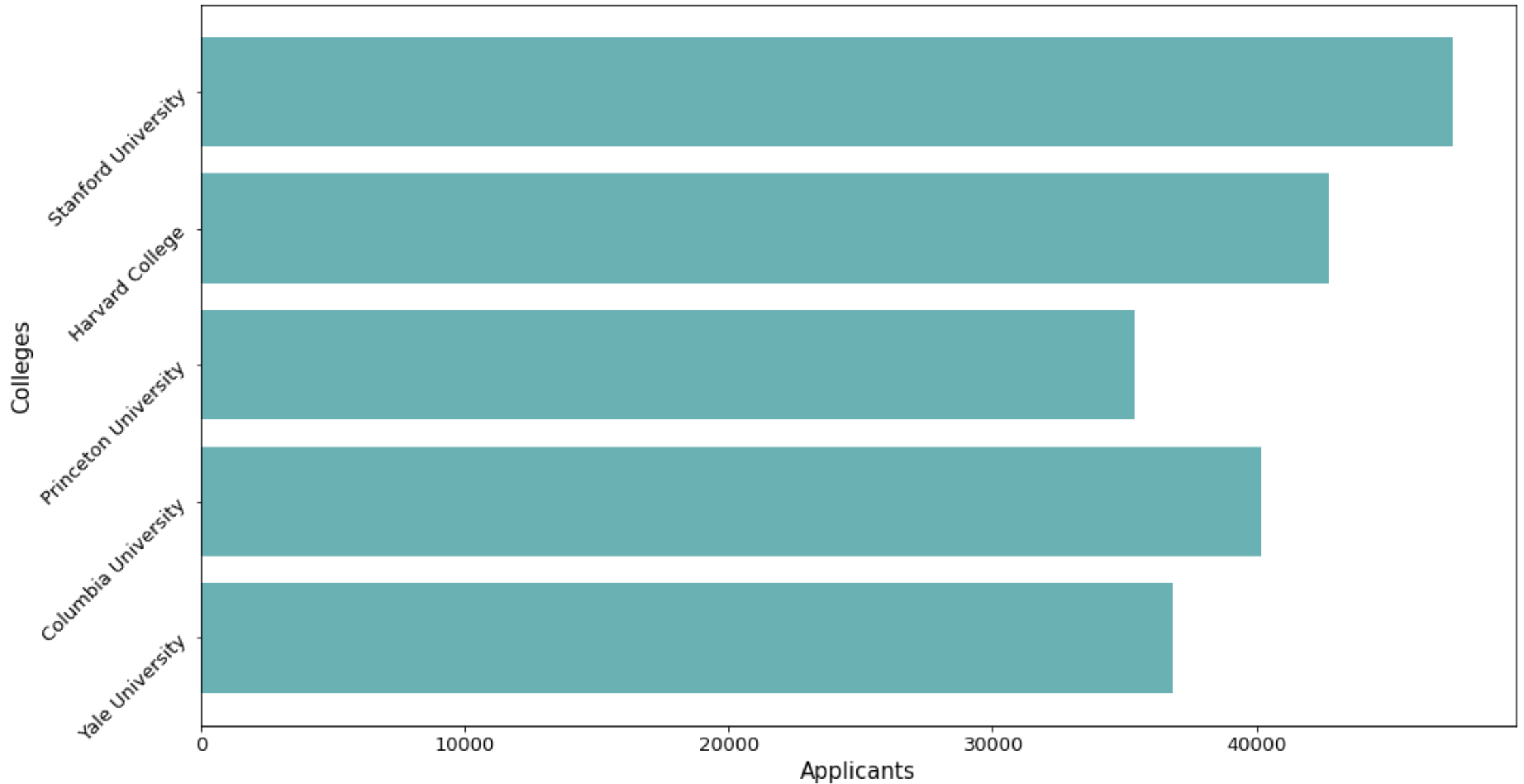
5.5%

Columbia University

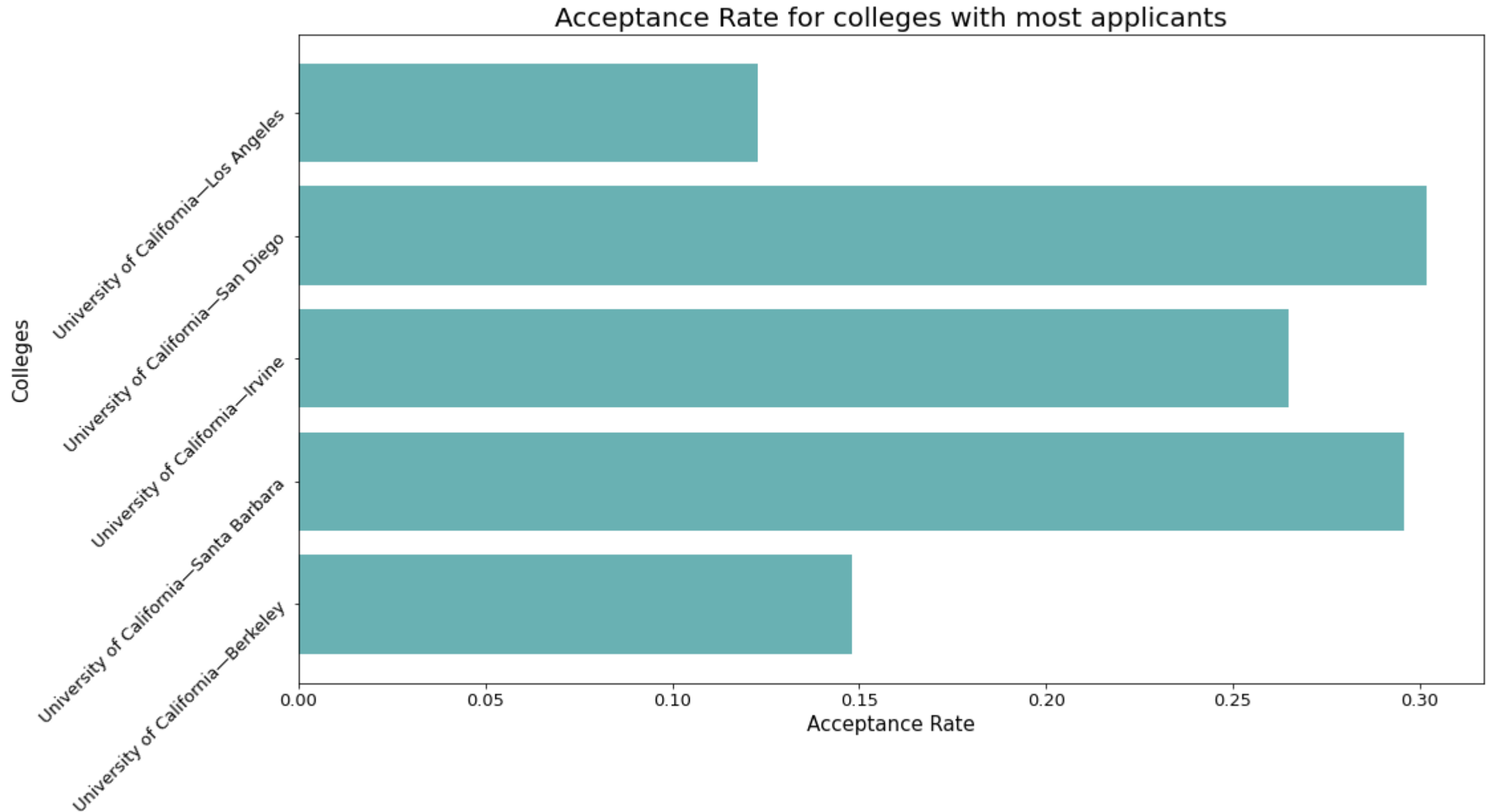
6.1%

Yale University

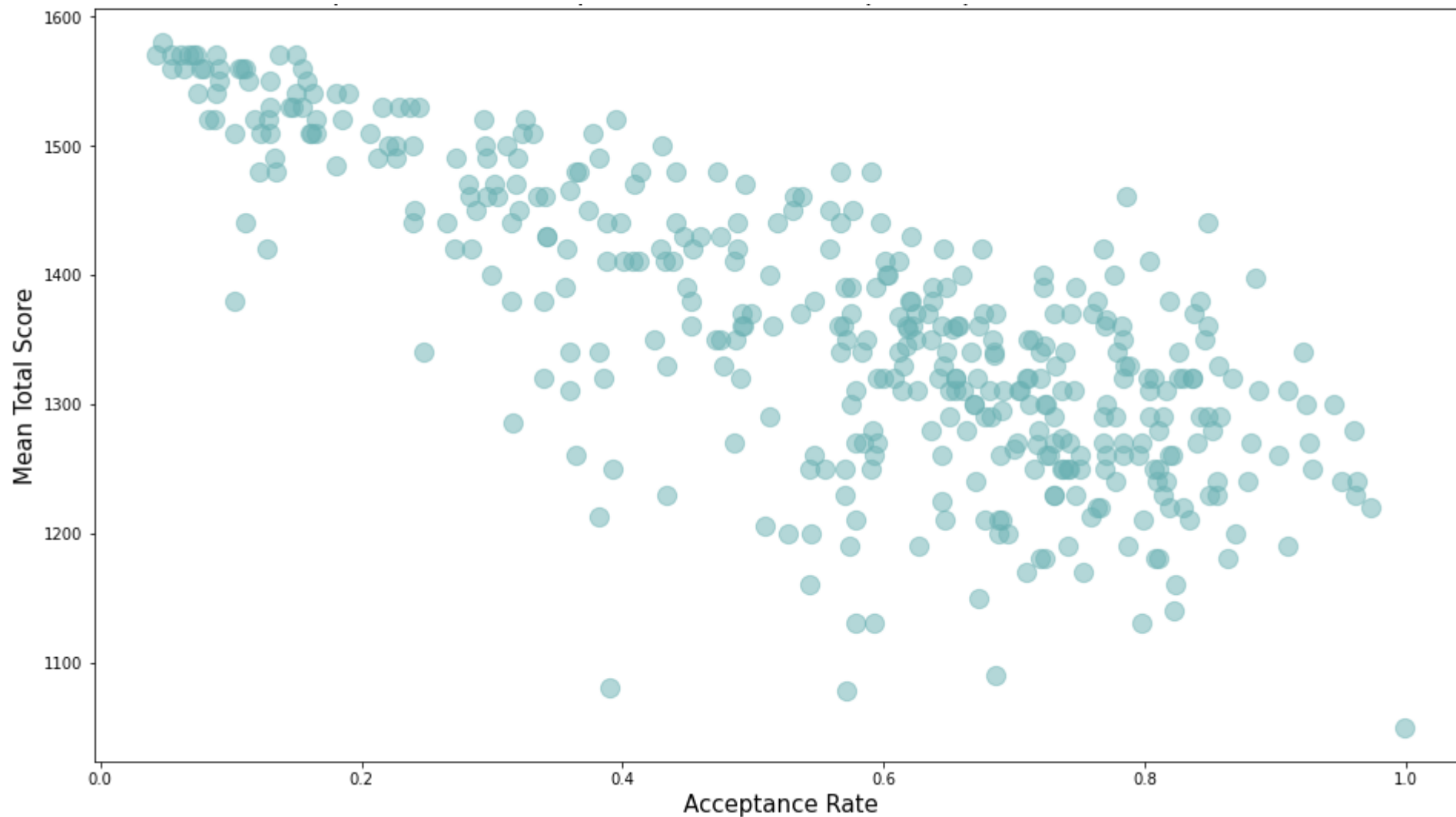
APPLICANTS BY COLLEGES WITH LOWEST ACCEPTANCE RATE



ACCEPTANCE RATE FOR COLLEGES WITH MOST APPLICANTS



RELATIONSHIP BETWEEN ACCEPTANCE RATE AND TOP SAT SCORES (75th PERCENTILE)



CORRELATION
ANALYSIS

$$\rho = -0.77$$

SMARTEST COLLEGES (75th Percentile)

1580

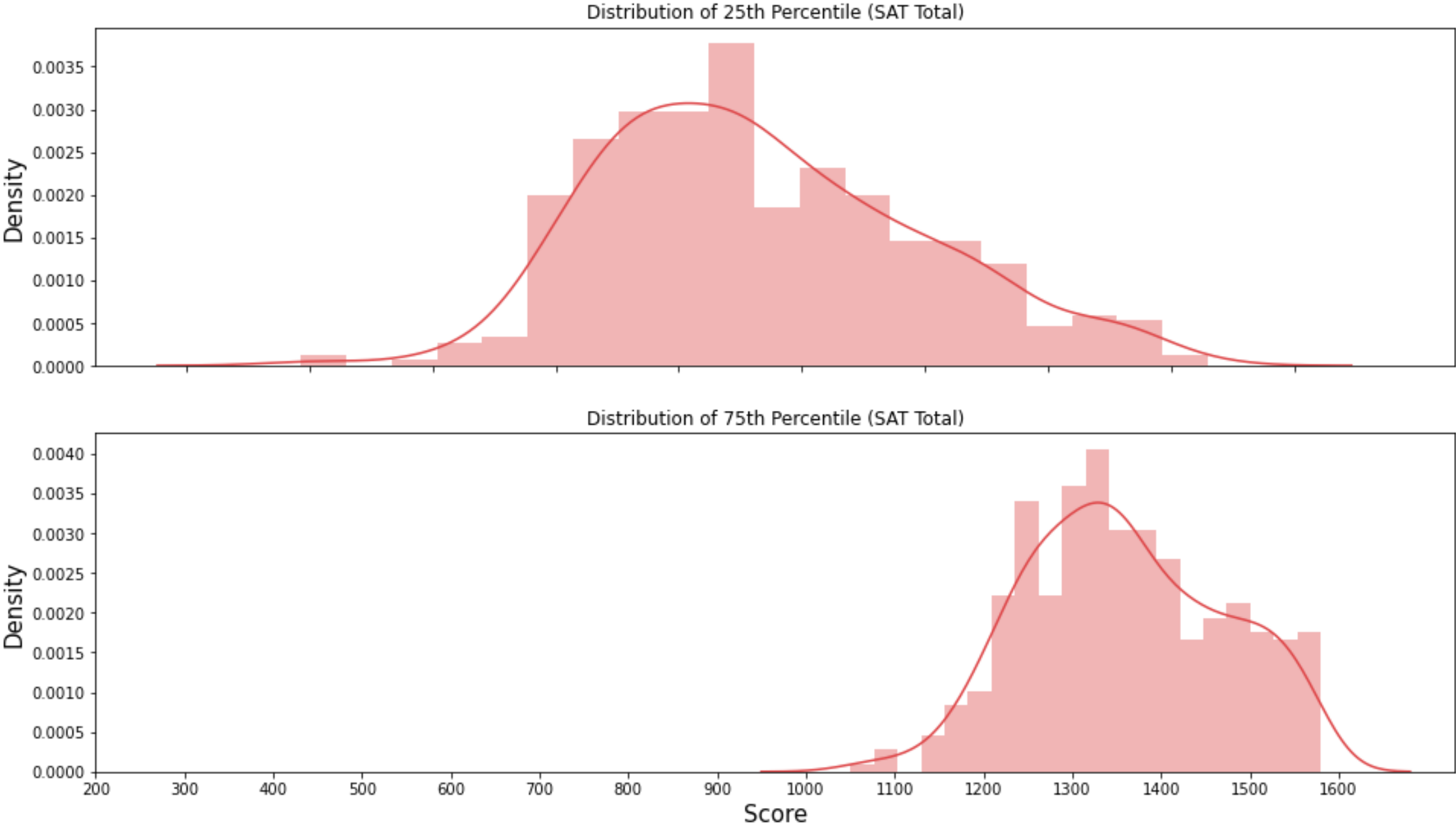
Harvard College

1570

Duke University, Washington University in St. Louis, Harvey Mudd College, University of Chicago, Brown University, MIT, Yale University, Princeton University, Stanford University

SAT Score at 75th Percentile

COLLEGES SAT SCORES DISTRIBUTION AT 25th AND 75th PERCENTILE



KEY TAKEAWAYS

RECOMMENDATIONS

- The sudden State requirement for high school students to SAT in West Virginia has resulted in a sharp decline in the SAT score. As schools in the state become more familiar with the exam, the should be less of a decline in the scores.
- Emphasis should be placed on *Mathematics* to ensure that students meet the benchmark.
- Schools should *adopt PSAT8/9, 10 and PSAT/NMSQT* for Grade 8-11 students as these Preliminary SAT exams will help students get ready for SAT to be taken in Grade 12.
- Using the provided *benchmarks* and guidelines advised will help ensure students stay on track to being ready for college.