

# SAT vs ACT: Economic bias and how to overcome it

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## → Overview

- SAT and ACT are two nonprofits that entirely dominate the college testing industry.
- They are both highly influential and equally recognized by most universities.

## → Problem:

- Both SAT and ACT are known to have strong economic bias
- Some statistics have show that ACT has shown more of a bias than its rival SAT



# Project objectives:

## ACT vs SAT bias

Focus analysis on one state only - California - to determine if the difference in economic bias persists when modelled in one state with uniform test policies

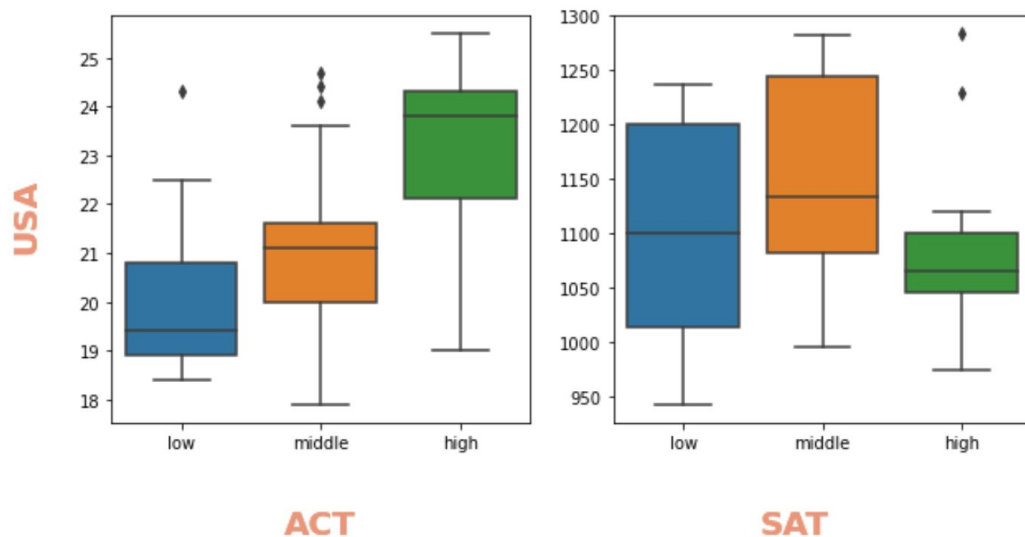
## Sources of the bias

Model and visualize both the national and California data to uncover insights into how income differences affect test scores

## Overcoming the bias

Single out low-income areas with high test scores in order to learn about different ways of overcoming economic bias

# Understanding the problem: scores vs income



## Trend

ACT scores rise with state income rank (left), while the SAT scores do not (right).

## To do:

- Check more granular data
- Check California county data, where no regulatory differences appear

## Lack of SAT economic bias debunked:

- Data showed there is a strong negative correlation between the participation rates and test scores (-0.87 on the scale of -1 to 1)
- On the chart on the right we can see that many high income states (green) have very high participation rates, compared to middle and low income states

## Conclusion:

- The apparent lack of economic bias in national SAT scores is purely a product of different participation rates among high and low income states

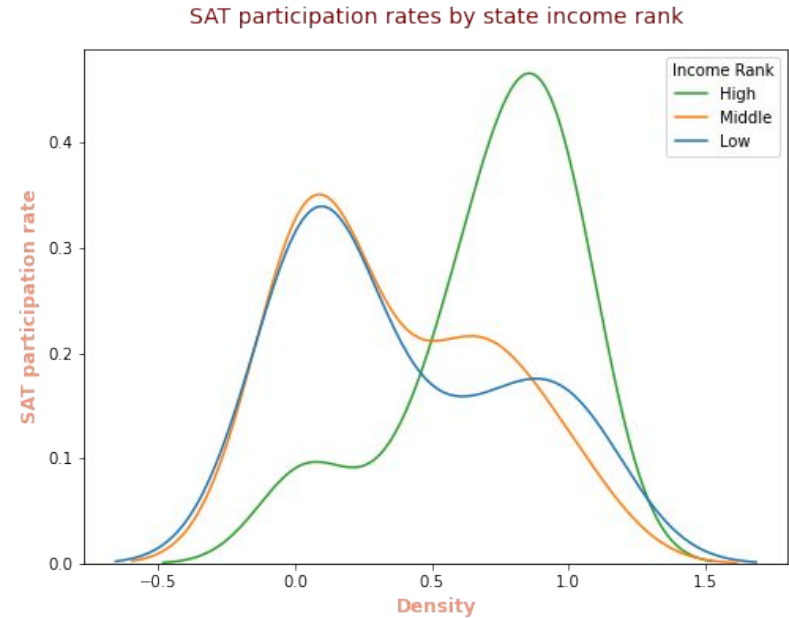
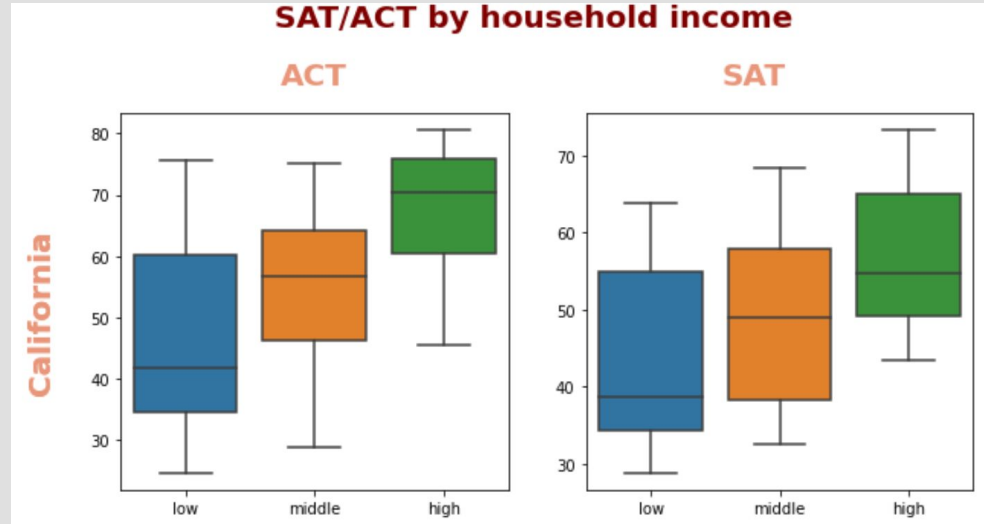


Table of states top 15 US states ranked by SAT participation rate  
*(high income states highlighted in orange)*

state	participation_sat	english_sat	math_sat	total_sat	participation_act	total_act	median_income	med_income_q
Rhode Island	1.000000	503	492	995	0.120000	24.700000	64340	middle
Illinois	1.000000	509	504	1013	0.350000	24.300000	65030	high
Michigan	1.000000	507	496	1003	0.190000	24.400000	56697	middle
Colorado	1.000000	518	506	1024	0.270000	23.800000	71953	high
Connecticut	1.000000	529	516	1046	0.220000	25.500000	76348	high
Delaware	1.000000	499	486	985	0.130000	24.100000	64805	high
Florida	1.000000	516	483	999	0.540000	20.100000	55462	low
Idaho	1.000000	505	488	993	0.310000	22.500000	55583	low
Maine	0.990000	512	502	1013	0.060000	24.300000	55602	low
West Virginia	0.990000	483	460	943	0.490000	20.800000	44097	low
New Hampshire	0.950000	533	526	1059	0.140000	25.000000	74991	high
District of Columbia	0.940000	495	480	975	0.320000	23.500000	88393	high
New Jersey	0.820000	544	545	1090	0.250000	24.200000	81740	high
Maryland	0.820000	535	523	1058	0.280000	22.300000	83242	high
Massachusetts	0.810000	559	561	1120	0.210000	25.500000	79835	high

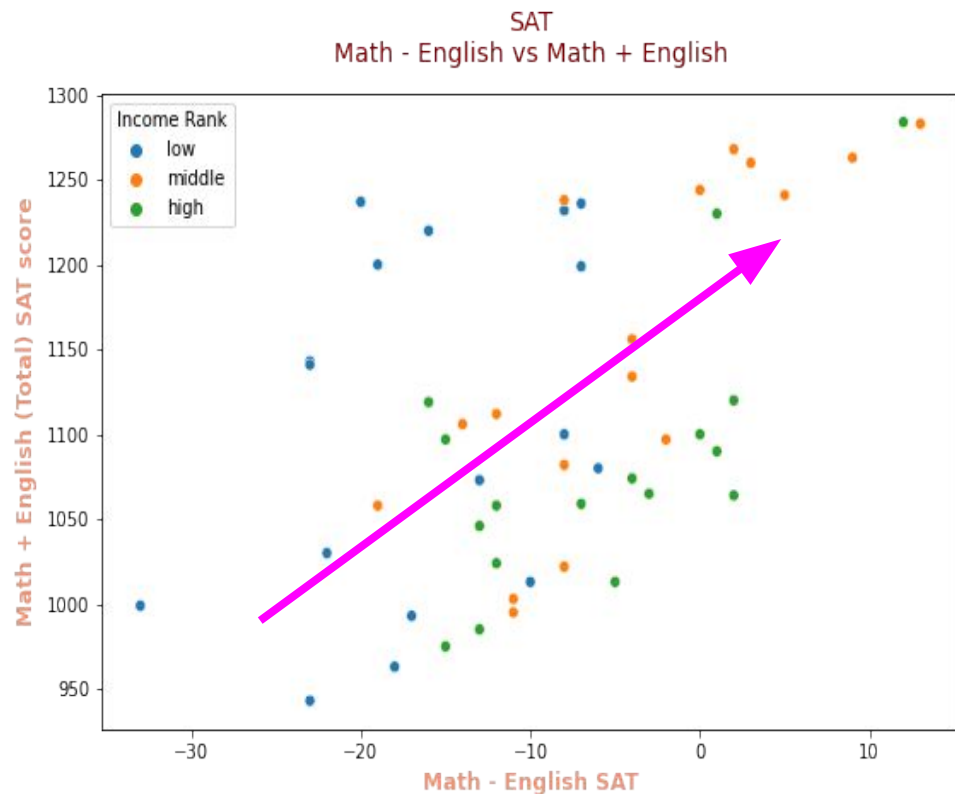
- A vast majority of states with highest SAT participation rates are high income states (orange)

# California SAT scores - a function of income

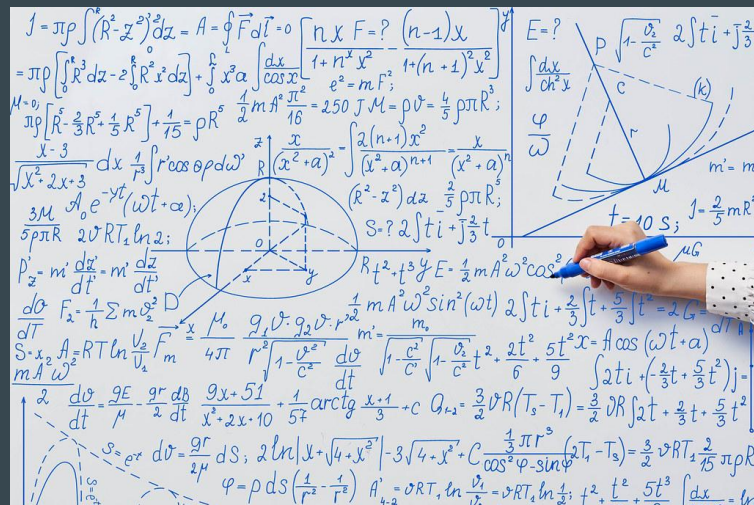


Without the differences in test policies that 50 US states exhibit, both California SAT and ACT scores rise with household income.

# Key to success: outperform in math



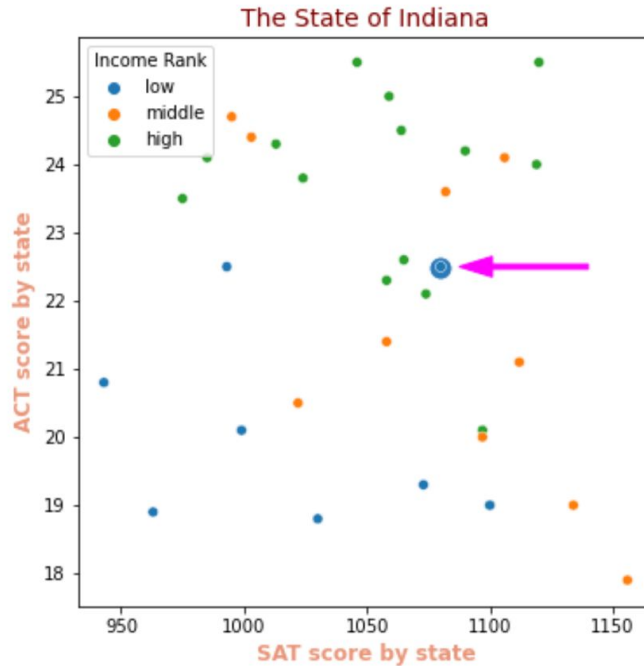
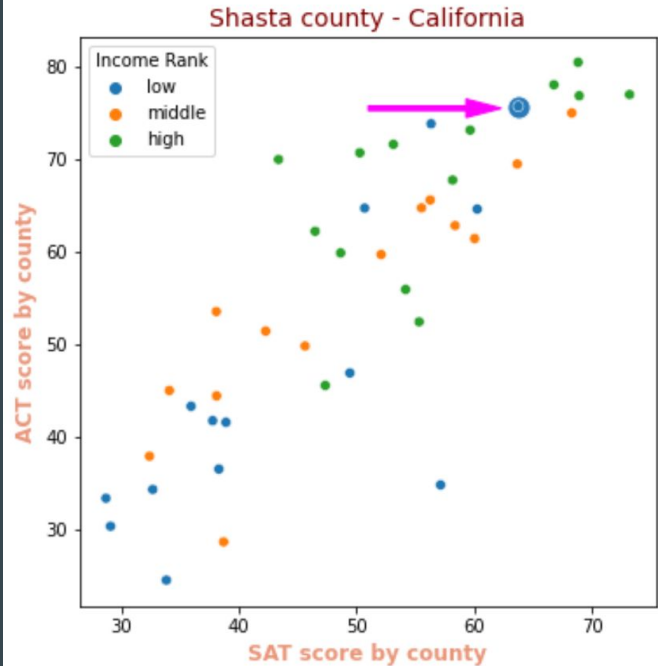
- Outperformance in math over english (x-axis) leads to higher overall scores (y-axis)





# Shasta County and the State of Indiana: a way forward

## Low income but high achievers



The oversized blue dots represent low-income areas with high average ACT and SAT scores.

They both not only perform well among the low-income peers, but also among higher-income competition.

# In conclusion . . .

## Recommendation 1

- As both ACT and SAT exhibit similar levels of economic bias, ACT should look into ways to lower it in order to gain edge over its rival

## Recommendation 2

- Any spare resources that low-income areas have ought to be used to catch up with wealthier areas in math

## Recommendation 3

- One state (Indiana) and one county (Shasta) were spotlighted in this report for scoring higher in 2019 than their income rank would predict

## Recommendation 4

- Learn from the spotlighted areas, and conduct further analysis as next-year's batch of data becomes available

# Further work to be done

Every year new batch of results will be published. We can use it to:

1. Add and merge new data (both test scores and income) to our database
  2. Highlight high achievers from low-income areas and conduct new research into specific programs that helped them attain such high marks.
  3. Go back to previous years' recommended programs and assess which ones were successfully implement across the country
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