> The new format for the SAT was released in March 2016. As an employee of the College Board - the organization that administers the SAT - you are a part of a team that tracks statewide participation and recommends where money is best spent to improve SAT participation rates. Your presentation and report should be geared toward \*\*non-technical\*\* executives with the College Board and you will use the provided data and outside research to make recommendations about how the College Board might work to increase the participation rate in a \*\*state of your choice\*\*.

**Problem Statement:**

Should work on states where the participation rate is below 25% and to increase the

Boost SAT reputation thus, with the hope of winning ACT participants over to SAT.

To get a more accurate analytical results, raw average SAT/ ACT scores should be adjusted aka Controlling or Norming.

SAT participation rate is negatively correlated to SAT scores ie, low SAT participation has high SAT scores and vice versa.

The SAT was originally designed as an aptitude test. It tests your reasoning and verbal abilities, not necessarily what you've learned in school. The SAT was supposed to be a test that one could not study for because studying does not change one's aptitude. The [ACT](https://www.thoughtco.com/act-format-4173066), on the other hand, is an achievement test. It is meant to test what you have learned in school. However, this distinction between "aptitude" and "achievement" is dubious. There's concrete evidence showing that you can study for the SAT. As the two tests have evolved, they have come to look more like each other. The new SAT exam, launched in 2016, is much more of an achievement exam than the earlier versions of the SAT.

The highest average SAT scores were found in the states of Minnesota, Wisconsin, and Iowa, where average composite scores were each over 1270. . It’s worth noting that in these states, overall participation was quite low, with only 3% of students taking the test.

Of states with at least 25% participation, Arizona (1116), Nevada (1116), and Vermont (1114) stand out as top scorers.

The lowest average SAT scores were found in the states of Delaware, the District of Columbia, Idaho, and Michigan, where average composite scores were all below 1010. When students do not self select and rather take the test as part of a requirement or as what they view their only option, their scores tend to be lower.

Both the SAT and the ACT test makers have released data on raw average SAT and ACT scores by state. However, you cannot rely on raw average scores because **these averages are biased by participation rates.** The lowest participating states tend to send primarily their best students and have the highest scores. This results in bias. We have used advanced, robust statistical methods to adjust for participation rate to get at the real, underlying, normed average SAT and ACT scores by state.  This adjustment in the technical literature is also known as "controlling" or "norming".  Here are the adjusted scores:

**Explanations on SAT Participation:**

**Why Is Adjusting (aka Controlling, or Norming) Needed?**

**You absolutely cannot rely on raw average SAT / ACT scores to gauge state performance!** This is because raw SAT / ACT scores are terribly confounded with participation rates. The reason is simple. Let's look at the SAT. The best SAT students in any state tend to be the most aggressive about wanting to take the test (after all, it shows them in a good light).

Therefore, if a state’s SAT participation is low, the state will only have the best students taking it, **making the score artificially high.** Likewise, if a state requires the SAT, it will have 100% participation but also include the worst SAT takers, making the score artificially low.

In fact, the highest raw SAT state is North Dakota, which also has the flimsiest participation at 2%. Because the participation rate is so low, that means few, if any, schools in North Dakota require the SAT, so the only people who take it are those who really want to and went out of their way to take the test. These people likely studied for the SAT, are naturally good at the SAT, and can expect to do better than average.

The lowest raw SAT state is Washington DC, which also has the highest participation at 100%.  Likewise, this indicates that the district required everyone to take the SAT, so even students who didn't want to take it at all had to take it -- and this last group probably didn't study much and aren't naturally good at the SAT.

We can see this negative relationship between participation rates and SAT / ACT scores in the two graphs below.  On each X-axis, you see the participation rate expressed as a decimal (for example, .50 means half the people participated.)  On the Y-axis, you see average SAT or ACT score.  **The pattern is stunningly clear: States with higher participation rates in either test almost always have much lower scores.**