

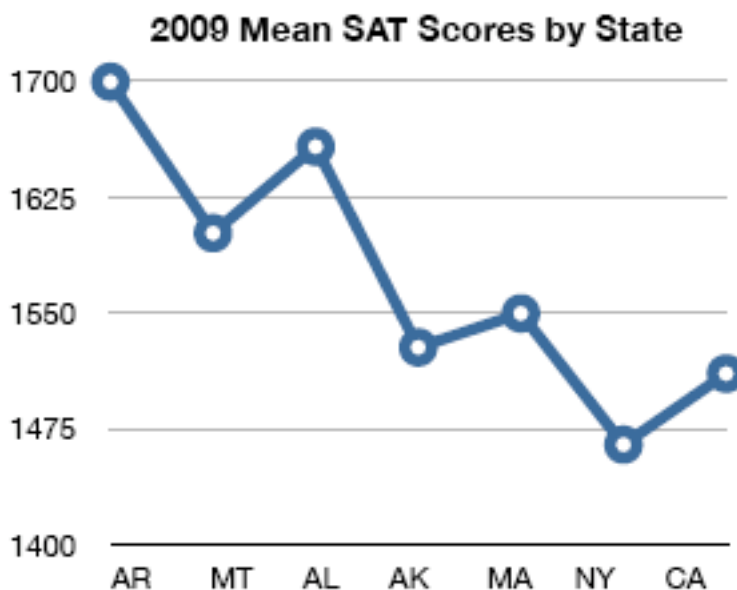
New Research: Taking the SAT in a Crowded Room Means Lower Scores

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Recently, University of Michigan professor Stephen Garcia and Haifa University professor Avishalom Tor published a little noticed but remarkable study in the preeminent journal, *Psychological Science*.

Garcia and Tor took the College Board's 2005 SAT data for all 50 states, and then they compared each state's mean SAT score to what they called "test-taker density." Essentially, test-taker density was the number of kids taking the SAT in each state, divided by the number of locations in that state where kids could take the test. (The researchers considered it a fair approximation of how many kids would be taking the test at a site at a given time.) The researchers discovered that the higher the state's test-taking density, the lower the SAT scores.

In other words, the more kids take the SAT in the same place at the same time, the lower their scores will be. (For stats aficionados out there, the correlation between test venue / student density and SAT scores is a whopping $r = -.68$.) Now, take a look at this chart of several states' mean SAT scores.



The states on the left are more rural and less populated, while those on the right are more urban and centralized.

Now, there are state differences in who takes the SAT; it could be that only the best and the brightest take the SAT in those rural states. But Garcia and Tor included ACT/SAT prevalence (and ACT scores) into their analysis. Even controlling for the ACT, the kids in the low-density states still had higher scores.

Garcia and Tor also addressed other between-state differences. They made statistical adjustments for parental education and the percentage of kids who were a minority. They also included more systemic controls, including the states' rate of SAT score improvement over the past decade and the amount of state and federal funding going into schools.

With all these things taken into account, the kids who were taking the SAT in smaller, less crowded venues still had higher scores. Garcia and Tor wondered if the lower SAT scores were not a mere reflection of the larger pool of test-takers. What if taking the SAT in a more crowded room actually *caused* kids' test scores to drop?

So the researchers pulled out data on short cognitive tests given to University of Michigan students. On these tests, they could analyze the data on a per-classroom basis—the cognitive score of the students compared with how many students were in the room when they took the test.

In those scores, Garcia and Tor found the same pattern as in the SAT data. The more students there were in the exam room at the same time, the poorer the students' scores.

Garcia and Tor now call this phenomenon "the *N*-effect." The larger the "*N*"—the number of participants involved in a task—the worse the outcome for the individuals who are participating.

The researchers have been conducting a series of experiments to better understand the *N*-effect. Again and again, Garcia and Tor have found that people work harder, and do better, when they are up against just a few people. It's not the wisdom of crowds. It's the stupidity of crowds.

In one experiment, the researchers gave students a trivia quiz, saying there was a prize for those who finished the test the fastest. But some students heard that they were competing against 9 students; the others were supposedly competing against 99. The students who believed they were in the smaller pool finished the quiz significantly faster than those who thought they were 1 of 100.

The *N*-effect is still present, regardless how difficult or easy the task. And it isn't a mere fact that people work harder if they believe they have better odds of winning.

Instead, the *N*-effect runs deeper than that. It's about people's motivation to succeed.

According to Garcia, "How we compare ourselves to other individuals is the engine that drives how we compete against others." When there are only a few people in the race, we put our foot on the gas, working harder and harder to outpace our competitors. And the competition becomes very personal. How we compare ourselves to others in the room becomes a referendum on our own ability.

"In contrast, when we are against many many competitors," says Garcia, "we don't care as much about how we stack up against one other competitor."

Once the crowd is large enough that we don't feel the element of personal competition, the result doesn't feel like a personal statement of our worth, so we don't try as hard.

While the researchers are still testing the limits of the *N*-effect, already, the implications of their work are mind-blowing.

For example, the scholars argue that the *N*-effect should be included in discussion of class size. The argument for small classes has always been that smaller classes allow for more teacher-student interaction. But it could be that the real difference is peer to peer: "The motivation to succeed might actually decrease as the number of other students increases."

Then there is the ripple effect of the competition-based motivation. Education reformers keep wondering if teachers' salaries should be linked to performance. Garcia cautions that teachers of smaller classes may appear to be more effective when a higher level of interstudent competition may be the real driver of the children's success.

(And, of course, the *N*-effect doesn't just apply to kids; it's operating in the workplace, at the gym...)

For parents still thinking that the best way to improve their kids' odds at getting into Harvard or MIT is an unlikely move to Arkansas, well, I've lived in Little Rock, and I can tell you that it's lovely. Nice people, gorgeous scenery, and yummy food. But Garcia says that a literal move to a less crowded state is unnecessary.

Instead, the mind-trick of the *N*-effect can be defeated with another mind-trick. When faced with a large group of competitors, it's important to remind yourself that what you are doing is important; your performance

alone is what counts. You are competing against yourself, not the nameless, faceless hordes.

Then the N is reduced back down to an N of 1. And your fate is back in your hands.