

QUARTZ

COOL HEADS

The economic case for installing air conditioning in every school

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📷 Students learn better when they can cool off. ((AP Photo/Bebeto Matthews)

As anyone who's ever been stuck in a stuffy classroom or office can attest, it's hard to focus when you're hot. A new study finds a link between heat and lower academic achievement—and makes the case that installing air conditioning in schools could make a big difference.

A [working paper](#) (pdf) published by the National Bureau of Economic Research looked at PSAT scores of 10 million US high-school students who took the test at least twice between 2001 and 2014. According to the study, students who took the test after experiencing a hotter year had lower scores compared to their test performance after a cooler year: "Each 1° F increase in school year temperature reduces the amount learned that year by one percent." The study finds that individual hot days have an impact on learning, too: "each additional school day with temperature in the 90s (°F) reduces achievement by one-sixth of a



What's behind the correlation between higher temperatures and lower test scores? The study's authors suspect that heat just makes it harder for students to learn in the classroom. Higher temperatures during the summer and weekends didn't seem to have an impact on academic achievement.

Strikingly, the study also finds that heat has a particularly strong impact on students of color. "We argue that heat effects account for up to 13% of the U.S. racial achievement gap, both because black and Hispanic students live in hotter places than white students and because heat damages minority students' achievement of minority students more than white students' achievement," the study's authors write, noting that the impact of heat on black and Hispanic students is three times that of white students.

Joshua Goodman, one of the authors of the study, speculated that the racial divide may have to do with the fact that black and Hispanic kids in the US are [more likely](#) to attend high-poverty schools, which lack air conditioning, than white children. In addition, well-off parents may be better able to mitigate the harmful effects of heat on their kids' academic performance—both with home air conditioning, and by getting a tutor in the evenings, for example.

The researchers say that air conditioning is a quick fix that erases the nefarious impact of heat on young minds. "School air conditioning appears to offset nearly all of the damaging impacts of cumulative heat exposure on academic achievement," the authors write. "Moving from a school with no air-conditioned classrooms to a school with all air-conditioned classrooms reduces the impact by approximately 78 percent."

If all school districts installed air conditioning and turned it on when temperatures climb, they could avoid brain drain—but that's a big if. The study's authors say that, according to a survey of guidance counselors, a majority of classrooms in the Northeast don't have AC. A separate recent [investigation](#) found that 11 of the 50 biggest school districts in the US don't have enough air conditioning in their schools. In Hawaii, just 40% of classes have air conditioning, while in Milwaukee, only 17% of schools are fully equipped with AC.

Air conditioning comes at a cost—not just in terms of infrastructure, but also for the environment. [In fact](#), American residential air conditioning releases about 100 million tons of carbon dioxide into the atmosphere every year. Goodman tells Quartz, "the fact that we found school air conditioning to be an effective potential intervention does not mean it's the only potential intervention we could take here." Alternatives could include planting more trees around schools and designing eco-friendly school buildings.

But research suggests that AC is a particularly effective way to reduce the harmful impact of extreme summer heat on academic performance. It's a tradeoff that may be necessary if schools want their

students to bring the heat.