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Opinion

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Lost Einsteins: The Innovations We're Missing



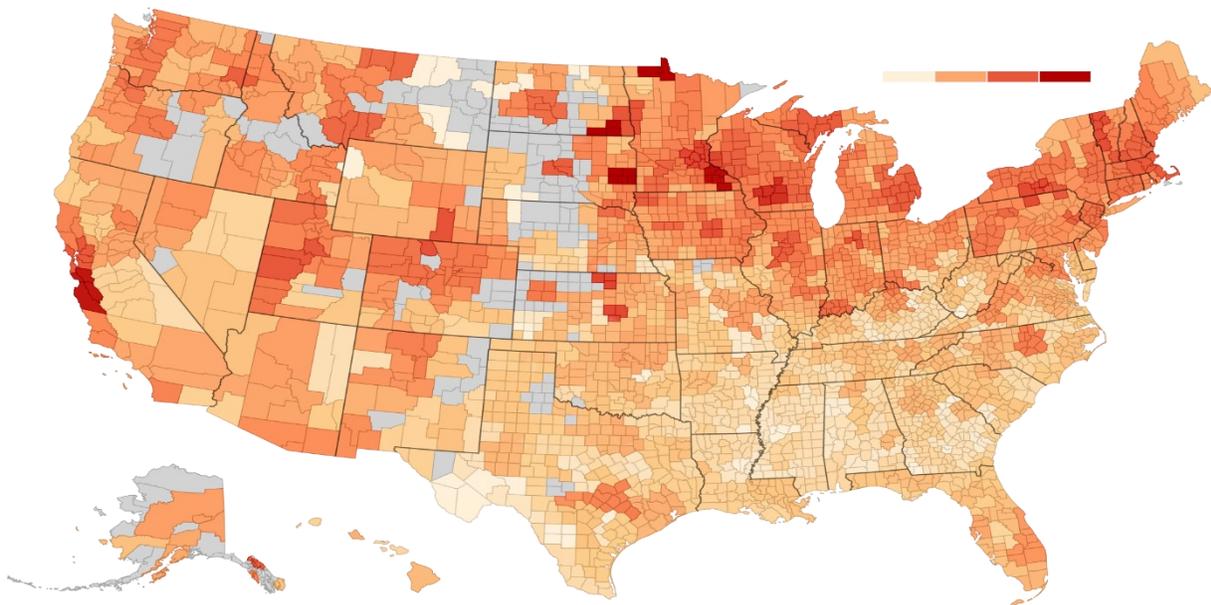
By David Leonhardt

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Where Inventors Grew Up

Patents granted per 1,000 children, by metropolitan area

Patents per 1,000 children



Study analyzed children born between 1980 and 1984.

By The New York Times | Source: Equality of Opportunity Project

Much of human progress depends on innovation. It depends on people coming up with a breakthrough idea to improve life. Think about penicillin or cancer treatments, electricity or the silicon chip.

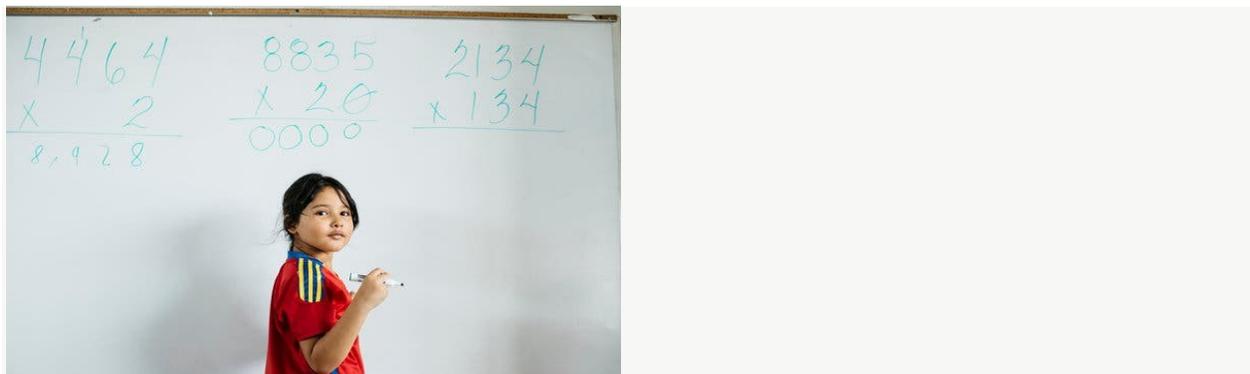
For this reason, societies have a big interest in making sure that as many people as possible have the opportunity to become scientists, inventors and entrepreneurs. It's not only a matter of fairness. Denying opportunities to talented people can end up hurting everyone.

If you're a regular reader of this column, [you may recognize](#) the name Raj Chetty. He is a Stanford professor who helps lead [the Equality of Opportunity Project](#), which I consider the most important research effort in economics today.

Chetty and his colleagues have received access to millions of anonymous tax records and have spent years analyzing them. Before, researchers had to rely on surveys, which are expensive and unreliable. (Do you know how much money your parents made when you were 10 years old?) The tax records allow for a newly detailed understanding of the paths that lives take.

[The project's latest paper](#), out Sunday, looks at who becomes an inventor — and who doesn't. The results are disturbing. They have left me stewing over how many breakthrough innovations we have missed because of extreme inequality. The findings also make me even more frustrated by new tax legislation that [will worsen inequality](#). This Congress is solving economic problems that don't exist and aggravating those that do.

The key phrase in the research paper is “lost Einsteins.” It's a reference to people who could “have had highly impactful innovations” if they had been able to pursue the opportunities they deserved, the authors write. Nobody knows precisely who the lost Einsteins are, of course, but there is little doubt that they exist.



Image

A fourth-grade student listened to her teacher during a math class at Dr. Hiram González School in Bayamón, P.R., in May. Credit...Erika P. Rodriguez for The New York Times

The researchers worked with the Treasury Department to link the tax records with patent records. Doing so allowed them to study the backgrounds of patent holders (and the study focused on the most highly cited, significant patents). The researchers — Chetty, Alex Bell, Xavier Jaravel, Neviana Petkova and John Van Reenen — were also able to link these records to elementary-school test scores for some patent holders.

Not surprisingly, children who excelled in math were far more likely to become inventors. But being a math standout wasn't enough. Only the top students who also came from high-income families had a decent chance to become an inventor.

This fact may be the starkest: Low-income students who are among the very best math students — those who score in the top 5 percent of all third graders — are no more likely to become inventors than below-average math students from affluent families:

Lost Einsteins

Low-income children who excel at math rarely become patent holders. They are less likely to hold patents than high-income students who do substantially worse in school.

Patents per 1,000 children, by family income and 3rd-grade math performance

	TOP MATH SCORES	LOW MATH SCORES
Lowest fifth of family income	1.2	0.1
Second-lowest fifth	2.3	0.1
Middle fifth	2.5	0.1
Second-highest fifth	3.4	0.6
Top fifth of family income	6.5	1.2

Top math scores are those in the highest 5 percent of all students; low math scores are in the bottom 25 percent. Study analyzed children born from 1980 to 1984.

By The New York Times | Source: Equality of Opportunity Project

The contrast here is a betrayal of American ideals. (If anything, the chart understates the problem, because disadvantage already exacts a big toll by third grade.)

“There are great differences in innovation rates,” Chetty said. “Those differences don’t seem to be due to innate ability to innovate.” Or as [Steve Case](#) — the entrepreneur [who’s now investing](#) in regions that venture capital tends to ignore — told me when I called him to discuss the findings: “Creativity is broadly distributed. Opportunity is not.”

The gap between rich and poor is just one of the worrisome findings. Middle-class students have innovation rates closer to that of the poor than the affluent, as you can see in the chart above. And as the map at the top of this column shows, children from the

southeastern United States are notably unlikely to become inventors. Even after controlling for income, innovation rates across much of the South are low.

They're also low for African-Americans and Latinos:

Lost Einsteins: Race

Patents per 1,000 children, by race and 3rd-grade math performance

	TOP MATH SCORES	LOW MATH SCORES
Asian	8.2	0.3
Black	1.0	0.4
Hispanic	0.6	0.2
White	3.6	0.7

Top math scores are those in the highest 10 percent of all students; low math scores are in the bottom 50 percent. Study analyzed children born from 1980 to 1984.

By The New York Times | Source: Equality of Opportunity Project

And innovation rates are low for women:

Lost Einsteins: Gender

Patents per 1,000 children, by sex and 3rd-grade math performance

	TOP MATH SCORES	LOW MATH SCORES
Women	2.4	0.1
Men	6.0	0.5

Top math scores are those in the highest 5 percent of all students; low math scores are in the bottom 25 percent. Study analyzed children born from 1980 to 1984.

By The New York Times | Source: Equality of Opportunity Project

I encourage you to take a moment to absorb the size of these gaps. Women, African-Americans, Latinos, Southerners, and low- and middle-income children are far less likely to grow up to become patent holders and inventors. Our society appears to be missing out on *most* potential inventors from these groups. And these groups together make up most of the American population.

The groups also span the political left and right — a reminder that Americans of different tribes have a common interest in attacking inequality.

How can we do so? We can stop showering huge tax breaks on the affluent and reinvest the money where it's needed. We can work to narrow educational inequities. Yet the new research also suggests there is one simpler approach to try.

Chetty thinks it's one of the most striking patterns in the data. Children who grow up exposed to a particular type of invention or inventor are far more likely to follow that path. Growing up around patent holders for, say, amplifiers makes someone far more likely to become an amplifier-related inventor. Similarly, girls who grow up in areas with a lot of female patent holders — like central New Jersey (a biotech hub) or Honolulu — are more likely to become inventors.

Recreating these social networks and role models elsewhere won't be easy, but it is surely worth trying, given the stakes. There is an opportunity for foundations, universities and companies to cultivate lost Einsteins and help turn them into potential innovators.

“We do a pretty good job at identifying the kids who are good at throwing a football or playing a trumpet,” Case said. “But we don't do a particularly good job of identifying the kids who have the potential of creating a phenomenal new product or service or invention.” We all suffer for that failure.

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