

Why American students don't major in science

By Cass R. Sunstein

In recent years, a lot of people have been concerned about the relatively low numbers of science majors among American college students. The percentage of science and engineering graduates in the United States has been far below that in China and Japan. On various math and science tests, the performance of U.S. students has fallen below that of students in South Korea, Singapore, Japan, England, Finland, Israel, Australia and Russia.

This is a real problem, because science majors can contribute to economic growth and because many of them end up with especially good jobs after graduation. In the employment market, students with degrees in STEM (science, technology, engineering and math) can be at a comparative advantage. The relatively low number of American graduates in these fields has created what some people call "the STEM crisis."

In 2007, President George W. Bush signed the American Competitiveness Initiative, designed in part to fund and spur scientific education. In his 2011 State of the Union address, President Barack Obama announced an ambitious goal of adding 100,000 new STEM teachers over the next decade (to be achieved through both private and public efforts).

In 2012, Obama lamented: "Growing industries in science and technology have twice as many openings as we have workers who can do the job. Think about that — openings at a time when millions of Americans are looking for work." But while computer- science enrollments are increasing, the number of science majors remains disappointingly low.

Why is this? Are young Americans uninterested in science?

Some new answers come from research by Todd and Ralph Stinebrickner (an academic father-and-son team).

On the basis of a unique data set, the Stinebrickners find that at the time of college entrance, students think science is an appealing major. In the study's sample, 19.8 percent of students believe they will choose science – a higher percentage than for any other discipline. In the end, however, only 7.4 percent end up majoring in it.

On this count, science stands alone. No other major displays such a large disparity between initial expectations and actual outcomes. It turns out that students who start as majors in science show an unusual propensity to leave the field, and those who don't start in science are unlikely to switch to it.

Is there something wrong with college science teachers? Are students bored by their courses?

The Stinebrickners don't have conclusive answers, but they provide strong hints. They collected data on students' expectations about their grades in specific courses and compared those expectations with their actual grades. Far more than students in other courses, science students turn out to be unrealistically optimistic about their performance. Their unexpectedly low grades appear to discourage them from continuing in science.

The study has limitations. The data come from Berea College, in Kentucky, which provides a full tuition subsidy and has a large number of low-income students. It is possible that low-income students are especially likely to exaggerate their likely performance in science courses. At the same time, the liberal-arts curriculum at Berea is fairly standard, and the Stinebrickners' central findings are consistent

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with those that have come from other, more impressionistic studies of student choices.

If the conclusions generalize, the lessons are clear. College teachers aren't to blame. American students aren't uninterested in science, nor are they ignorant of the professional opportunities that a degree in this field could bring. Many of them would like to major in science and plan to do so. But when they are disappointed by their own performance, they switch. The impediment is a lack of high school preparation.

To solve that problem, the United States needs to improve that preparation. Of course the federal government should play a role (not least by subsidizing teacher preparation programs), but state and local governments have to take the lead. The good news is that the private sector is now doing a great deal to promote science education at early stages.

The U.S. can't tolerate a situation in which its students enter college with real enthusiasm for science, only to discover they aren't up to it. The nation's economy relies on a steady infusion of scientific talent, and many young Americans will find good jobs, and realize their full potential, only if they are equipped with the tools to take science seriously.

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