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Abstract

Andrew Hacker. *The Math Myth, and Other STEM Delusions* (New York, NY: The New Press). 256 pp. ISBN 978-1-62097-068-3 (also available as an e-book).

The political scientist Andrew Hacker argues that calls for increasing proficiency in algebra and other higher mathematics are misguided, in that most occupations do not require higher math, even as math requirements account for the largest share of students failing to complete high school and college. He advocates numeracy instruction for improving students' ability to calculate and interpret numbers they will encounter in their lives.

Keywords

algebra, numeracy, STEM

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Cover Page Footnote

Joel Best is Professor of Sociology and Criminal Justice at the University of Delaware. Author of *Damned Lies and Statistics*, Best is an Associate Editor and frequent contributor to *Numeracy*. His most recent book is *Social Problems*, 3rd ed. (Norton).

This book review is available in Numeracy: https://scholarcommons.usf.edu/numeracy/vol9/iss2/art10

A few months ago, I confronted a practical problem that required a bit of algebraic reasoning. I no longer recall just what the problem was, but I knew a couple of relevant figures and I wanted to figure out some third number. I do remember thinking to myself, "Okay, this is just a basic algebra problem—I should be able to figure this out." And after a little fiddling around on a piece of scrap paper, I succeeded in finding the answer. The bad news was that I could not simply glance at the problem and figure out the formula I needed to use, which I probably could have done 55 years ago, when I was taking Algebra I. But the good news is that I still retained the basic sense that algebraic thinking would allow me to solve the problem, as well as some idea for how I might go about that.

When was the most recent previous occasion when I drew upon my algebraic training? I have no idea—certainly this doesn't happen very often. I do—not quite as rarely—find myself using knowledge I picked up in geometry, but I don't think that I have ever applied anything I learned in trigonometry. I got good scores on the quantitative sections of the SAT and the GRE, but at the time that didn't require much more than a basic understanding of the Pythagorean and binomial theorems.

So, is mine a shameful confession? Andrew Hacker doesn't think so. He notes that only a tiny proportion of people actually have much occasion to use even basic algebra in real life, even though all sorts of cultural authorities insist that mastering algebra is a vital skill. What's going on?

Hacker is a political scientist with a long list of publications. He is the go-to social scientist for *The New York Review of Books*, where he publishes thoughtful review essays every few months. Often, these incorporate telling uses of quantitative data to support his arguments. He is not some sort of qualitative social scientist; he understands and uses sophisticated statistical methods in his own research. And yet, *The Math Myth* challenges assumptions that American students are sadly deficient in their mathematical training, and argues that instead we should shift from emphasizing math to promoting numeracy.

Hacker's thesis flies in the face of well-publicized calls by all sorts of educators and political leaders for increasing the mathematics requirements for high school graduation and college admissions. We are bombarded by warnings that American students' math scores lag well behind those of students in other countries. Prognosticators warn that, if we don't watch out, those other countries will eat our lunch. Disturbing warnings about our threatened lunch have a surprisingly long history. These days, we worry about the mathematically talented students in China and India; a generation ago, we worried about the studious Japanese; two generations ago, we feared the Sputnik-launching Russians; and a couple generations further back, we were convinced that English and German kids were getting better educations. I once tracked claims that American schools weren't performing as well as they used to all the way back to the 1840s—right

around the time states instituted compulsory education (Best 2011).

Hacker identifies two problems with requiring more and more students to take more and more math. The first is that most people who fulfill those requirements will acquire—and soon go on to forget—a lot of knowledge they'll never use. Most people are like me: they use arithmetic a lot, geometry infrequently, algebra quite rarely, and higher math never. To be sure, our lives are filled with everyday objects—think of smartphones—that were designed by people who knew lots of mathematics. Our society depends upon a relatively small number of people knowing higher mathematics, but most people don't need these skills.

While prognosticators claim that the jobs of the future will demand more mathematical knowledge, and that people with these talents are already in short supply, Hacker points out that there is actually a surplus of people with STEM training. The problem is not—as many commentators insist—that the United States lacks trained people, but that Americans do not find the jobs that are available attractive. For instance, data from the Bureau of Labor Statistics show that there will be far more engineering graduates than new engineering jobs:

> "the vast majority of those who do get engineering jobs will not be hired to fill newly created positions, but rather will be replacing individuals who are leaving the profession. . . . All this attrition could be solved by improving engineering salaries . . . but employers see no need to do that [given the healthy supply of qualified people]" (p. 33).

The situation is akin to claims that there is a nursing shortage. Nursing is hard work, nurses' schedules are inconvenient, and the pay is not that terrific: the result is that many trained nurses don't want to take available nursing jobs. Computer programming involves an analogous situation. Companies like Microsoft lobby to be allowed to hire foreign programmers on H-1B temporary visas, not because we lack trained programmers, but because the employers can pay those workers less than American programmers would expect.

The second major problem with raising math requirements is that it causes social wreckage. Being unable to successfully complete requirements for algebra or other higher math courses accounts for the largest share of students who drop out of high school, community college, and college. These are consequential failures. There is a very clear correlation between amount of education completed and lifetime income; on average, high school dropouts earn vastly less than college graduates. Many jobs require some sort of educational credential. Does it make sense to block people's access to jobs simply because they cannot master algebra, even when those jobs do not actually require algebraic skills?

It turns out that the people who call for increasing math requirements already know all this. But, they argue, mathematical training builds character and mental discipline. In this view, three—or four—years of high school math is like eating spinach; we ought to make young people do it because it is good for them. Alas,

Hacker notes that many scholars have searched in vain for evidence that learning math improves general reasoning skills. Obviously, familiarity with mathematical reasoning is valuable and ought to be encouraged, but encouragement is very different from compelling all students to complete courses in higher math. Hacker notes that several countries now have higher percentages of young people receiving college degrees than the United States: "Many of these countries require mathematics only for fields where it is rationally warranted" (p. 22).

While he questions the value of requiring algebra and higher math, Hacker acknowledges that numeracy is important, yet receives too little attention in our educational institutions. His final chapter describes a course on numeracy that he teaches for his university's math department; he provides a number of examples he uses in teaching this course, although he does not really explain the sequence of topics used to structure what he teaches. This journal's readers will find in *The Math Myth* plenty of ammunition for promoting numeracy education.

References

Best, Joel. 2011. *The stupidity epidemic: Worrying about students, schools, and America's future*. New York: Routledge.