A Blood Test for PTSD?

When soldiers returned from the Vietnam War with symptoms such as flashbacks, nightmares, and hypervigilance, researchers began calling the condition post-traumatic stress disorder (PTSD), a diagnosis that was viewed by some with skepticism. The doubts and stigma made many veterans hesitant to report their symptoms. Now, decades later, a new blood test shows promise in diagnosing PTSD by spotting genetic and cellular changes that accompany the disorder, suggesting that this condition is not just “all in the head.”

That test reflects nearly a decade’s study of PTSD by more than 75 researchers, including Frank Doyle, Armstrong professor of engineering and applied sciences and dean of the Harvard Paulson School of Engineering and Applied Sciences (SEAS), and graduate student Kelsey Dean. Hailing from institutions including New York University, the University of California, San Francisco, and the U.S. Army, the scientists analyzed blood work and other biological data from men who had served in combat in Afghanistan and Iraq, in an effort to identify indicators strongly linked to the condition.

One focus of Doyle’s lab is systems biology. That field often involves processing giant quantities of diverse data types to identify connections and understand how systems function, so Doyle and Dean oversaw much of the data and systems analysis for this project. In this case, the data included biomarkers such as genes, metabolites, hormones, proteins, cell-aging indicators, and immune-cell counts. Researchers began by collecting blood samples and other readings, such as resting heart rate, from 83 combat veterans with a PTSD diagnosis, and 82 who experienced combat but did not have PTSD. The resulting data yielded more than a million data points to analyze per person.

The consortium of labs then scrutinized the data using a “wisdom of crowds” approach (also employed in economics and finance), which values collective wisdom over individual insight. “We challenged all the labs involved to use their own methodologies, to bring their own insights to the problem,” Doyle explains. “We wanted to really benefit from this massive brain trust that we had assembled and see what the union of all possible biomarkers would be.” Pooling all those findings narrowed the million indicators down to 343. The researchers then used additional statistical techniques to pinpoint a set of 28 indicators highly predictive of PTSD.

When those 28 were tested on a new group of 29 male veterans with PTSD and 29 without, and the results compared to those from the questionnaire clinicians currently use to diagnose PTSD, the researchers found the blood test had accurately diagnosed the disorder 77 percent of the time. The 28 markers include immune signatures, stress signatures, and mark-
Could College Be Free?

GETTING AHEAD—or getting by—is increasingly difficult in the United States without a college degree. The demand for college education is at an all-time high, but so is the price tag. David Deming—professor of public policy at the Kennedy School and professor of education and economics at the Graduate School of Education—wants to ease that tension by reallocating government spending on higher education to make public colleges tuition-free.

Deming’s argument is elegant. Public spending on higher education is unique among social services: it is an investment that pays for itself many times over in higher tax revenue generated by future college graduates, a rare example of an economic “free lunch.” In 2016 (the most recent year for which data are available), the United States spent $91 billion subsidizing access to higher education. According to Deming, that spending isn’t as progressive or effective as it could be. The National Center for Education Statistics indicates that it would cost roughly $79 billion a year to make public colleges and universities tuition-free. So, Deming asks, why not redistribute current funds to make public colleges tuition-free, instead of subsidizing higher education in other, roundabout ways?

Of the estimated $91 billion the nation spends annually on higher education, $37 billion go to tax credits and tax benefits. These tax programs ease the burden of paying for both public and private colleges, but disproportionately benefit middle-class children who are probably going to college anyway. Instead of lowering costs for those students, Deming points out, a progressive public-education assistance program should probably redirect funds to incentivize students to go to college who wouldn’t otherwise consider it.

Another $13 billion in federal spending subsidize interest payments on student loans for currently enrolled undergraduates. And the remaining $41 billion go to programs that benefit low-income students and military veterans, including $328.4 billion for Pell Grants and similar programs. Pell Grants are demand-side subsidies: they provide cash directly to those who pay for a service, i.e., students; supply-side subsidies (see below) channel funds to suppliers, such as colleges. Deming asserts that Pell Grant money, which travels with students, voucher-style, is increasingly gobbled up by low-quality, for-profit colleges. These colleges are often better at marketing their services than at graduating students or improving their graduates’ prospects, despite being highly subsidized by taxpayers. “The rise of for-profit colleges has, in