

Will Neuroscience Radically Transform the Legal System?

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Brain scans may help us read minds and assign responsibility better.



A woman looks at a functional magnetic resonance image (fMRI) Photograph by Miguel Medina/AFP/Getty Images.

This article arises from Future Tense, a partnership of Slate, the New America Foundation, and Arizona State University that explores emerging technologies and their implications for public policy and for society. On Monday, Oct. 22, Future Tense will host “My Brain Made Me Do It,” an event in Washington, D.C., on how the legal system will adapt to changes in neuroscience. For more information and to RSVP, or to watch the live stream, visit the New America Foundation’s website.

they too are subject to today’s ever-hungry machinery of hype. Like people, bands, diets, and everything else, a field gets discovered, plucked from obscurity, thrown into the spotlight, and quickly replaced as it becomes yesterday’s news.

Neuroscience is now the popular plat de jour, or, perhaps better, the prefix de jour, and neurolaw is one of the main beneficiaries—and victims. Neuroscience will have important and even dramatic effects on our society and, as a result, on our laws. But not yet, and not as dramatically as some envision.

First, consider timing. Many of the most interesting neuroscience results come from functional magnetic resonance imaging (fMRI). This technique allows us to see what parts of the brain are working and when, and thus to begin to correlate subjective mental states with physical brain states. The use of fMRI on humans goes back about 15 years, and although about 5,000 peer-reviewed scientific articles involving fMRI will be published this year, we are still trying to figure out how it works—or doesn’t. The fMRI results showing apparently purposeful brain activity in dead salmon are a wonderfully funny example of some of the limits of this technology, and fMRI is one of the oldest of the “new” neuroscience technologies. Half of what neuroscience is teaching us about human brain function will be shown, in the next 20 years, to be wrong—and we will need each of those 20 years to figure out which half.

But, second, we need a sense of proportion. Neuroscience will provide tools that will change the law in some important ways, but those tools will be neither perfect nor used in isolation, and those changes are not likely to strike at the law’s roots.

For example, neuroimaging will be able to read minds—to some extent. A scanner may be able to tell whether I am hungry and even whether I want a burger. Without my cooperation, it will not know that I want a bacon cheeseburger, hold the mayo and mustard, extra ketchup. Similarly, it can never know what I was thinking three months ago or, with certainty, what I will be thinking three months from now.

Plus, neuroscience is likely to be used in conjunction with behavioral evidence. Typically, the best way to know what someone wants to do is to see what she does. Neuroscience will rarely make usable findings about, say, competence to stand trial or insanity, without evidence about the person's actual behavior. Normally, it will provide just one piece of the puzzle and not a magic key.

Finally, law is not going to disappear because of neuroscience. Getting a better handle on what brain machinery causes certain behaviors will change the criminal justice system, but it will not make it dry up and blow away. Neuroscience evidence of mental state may ultimately be admitted in trials, but it will not restrict the roles of judges and juries to reading brain scans. The most extreme outcomes are the most interesting—as science fiction and in the popular media—but they are not the most likely.

After all this talk about what neuroscience will not do, what is left? Quite a lot, I think, in five different categories: prediction, mind-reading, responsibility, “treatment,” and enhancement.

Neuroscience will help us predict future mental states or behaviors, usually not alone and not perfectly, but usefully. And these will lead to legal issues. When we can accurately predict which 60-year-olds are going to be diagnosed with Alzheimer's disease in the next 15 years, those predictions will affect, among other things, employment, insurance, guardianships, financial planning, and Medicaid. If we could tell which roughly one 15-year-old in 100 will be diagnosed with schizophrenia, to what ends would we want, or allow, those predictions to be used? Or what about good predictions of who is going to commit violent crimes, either after conviction or before? We already use psychology, demographics, and personal history to make such predictions—what will we do if neuroscience can greatly improve those predictions?

Neuroscience will help us read minds better. We all read minds constantly, but we aren't very good at it. The subjective feeling of pain depends on the brain; hundreds of thousands of legal claims each year turn on whether a person is feeling pain and, if so, how much. When neuroscience can “see” that pain, the law will change, both in individual cases and in some broad policies. Similarly, if we can ever use neuroscience to help determine whether someone is lying—a use for which substantial controlled experimental evidence already exists—how would we use such a lie detector? At least three courts have already rejected fMRI-based lie detection evidence (properly, I think), but I make no bets about the situation in 2022.

As to responsibility, neuroscience will not turn all criminal law into psychiatry, but there will be cases in which neuroscientific evidence plays a role in deciding whether someone is competent to be tried or to represent himself, really is experiencing aural or visual hallucinations, or, in a few cases, really does seem to deserve a particular verdict or punishment. The case of the child molester whose pedophile impulses were triggered by a tumor is a nice example. One may question whether he should be found guilty of child molestation or, at least, sentenced to prison rather than to surgery. On the other hand, almost no child molesters will be able (credibly) to show a similarly powerful tumor. Neuroscience's effects on responsibility will mainly be retail, not wholesale.

Surgery raises the issue of “treatment.” No scare quotes are needed when willing patients seek treatment for schizophrenia, Alzheimer's disease, Parkinson's disease, or obsessive-compulsive disorders. But what about the unwilling? Should a judge be able to order a defendant to get brain surgery, even if it is proven safe and effective at preventing his future crimes? Or, perhaps, not “order” surgery but give the defendant a “free choice”—life in prison or the knife? Of course, prison also changes your brain—everything, even this article, changes your brain. We know prison is neither safe nor effective. Is it morally different from surgery?

Finally, what about enhancement? We are spending billions of dollars to find treatments to improve the memories of people who have dementia or, perhaps, just age-appropriate memory impairment (afflicting those of us whose memories aren't as good as we remember our memories having been). What if it works—and what if it works for young people, premeds studying for an organic chemistry exam or law grads cramming for the bar? Is that like

using performance-enhancing drugs in sports? Or not? Inevitably, the law must at least draw the borders of the broad social uses of brain-enhancing technologies, as well as decide how it will use those technologies in its own workings.

I have written far more questions than answers because we are just beginning to define the questions, let alone crafting the answers. I am confident that neuroscience, fueled by biomedical research funding and impelled by the moral desire to relieve human suffering, will learn things about the workings of our brains that will spill over from medicine to society, and to law. I am not confident, but I am hopeful, that thinking about some of those dual uses ahead of time will help us manage them wisely—or, at least, less catastrophically. The time to begin—with a proper sense of both timing and proportion—is now.

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