

# Predicting the Criminal Before the Crime Scholars Consider the Fusion of Law and Neuroscience

By Joanna Smiley

In the 2002 Stephen Spielberg film *Minority Report*, based on a story by Philip K. Dick, audiences were asked to imagine a world where crime is virtually eliminated thanks to precognitive powers. With the recent flood of interest in neuroscientific testing, some now foresee a future where real life might partially imitate this science fiction.

The fusion of law and neuroscience holds promise for rethinking how the American penal system approaches prosecuting criminals. Many scientists and legal scholars can already envision using brain-imaging scans to help predict the likelihood of deviant activity, but others worry about the repercussions this technology may have on justice and privacy. The potential impact of neuroscience on the legal field has grown so controversial that last month it was the cover story in *The New York Times Magazine*. The 10-page article explored issues ranging from using neuro-imaging detection tests in courtrooms to an eerie future where the government holds citizens responsible for what they “might” do.

The subject first gained prominence in the mid-1990s with the landmark *Roper v. Simmons* Supreme Court decision. According to the *Times*, the case was the “*Brown v. Board of Education of neurolaw*,” as a brief filed by the American Medical Association and other groups argued that because “adolescent brains are not fully developed in the prefrontal regions, adolescents are less able than adults to control their impulses and should not be held fully accountable.” Since this decision, and the subsequent surge of interest in neuroscience, there has been a rush of new lie detection companies; emerging studies about law, decision making, and behavior; expected funding from the MacArthur Foundation for leading neuroscientists and law professors; and the recent formation of the Society for Neuroscience Ethics.

But how far is this disciplinary fusion, and its consequences, from becoming a reality? What types of issues need to be addressed as the technology advances? NYU Research recently sat down with Geoffrey Miller, Stuyvesant P. Comfort Professor of Law, and Liz Phelps, a professor in the Department of Psychology and Neural Science (who was featured in the *Times* story), to explore some of the questions that could shape the future of the field.

**NYU Research:** How close are we to being able to accurately predict the future of criminal behavior using neuroscientific evidence?

**Phelps:** I don’t think we’re there yet. I’m not saying that our understanding of the brain won’t ever advance to that point, but I don’t think we’re even close right now. Individuals that are trying to do this rely on a few studies and it’s always a correlational method, which means you can never tell what causes what, so there’s a lot that we have to do before we get to that point.

**Miller:** I couldn’t say whether we could or couldn’t. But if we could, there would be difficult questions about what we should do about that knowledge — if we know that someone is likely to commit crimes in the future do we incapacitate them, for example.

**NYR:** Can you explain the process of gathering neuroscientific evidence—how foolproof is it?

**Phelps:** There are a lot of techniques we use in neuroscience. When we're studying humans, we're more limited than when we study other species, of course. About five years ago, NYU bought an MRI scanner, housed in the Departments of Psychology and Neural Science for just this type of research. NYU has become, fairly quickly, one of the top programs for the study of the human brain. The primary technique we use is called functional magnetic resonance imaging. To do this, we take a normal individual, put them into an MRI scanner, and ask them to engage in certain behaviors. While they're engaging in those behaviors, we can look at signals in their brain. But there are a number of constraints to this. First of all, your brain is never off, so we always have to compare two behaviors. In addition, as mentioned earlier, it is correlational technique, so you can't determine if a brain region or network is critical for a given behavior without data from other techniques. When you say, how foolproof is it, I think it's a relatively crude technique to look at the brain, but even this crude technique to look at the human brain is much better than what we were doing 15 years ago.

**NYUR:** (To Miller) What is the legal perspective?

**Miller:** Neuroscientists can study some mental states that are important in legal scholarship, theory, and practice. For example, volition — did you intend to do something? Motivation, why did you do something? You can do experiments with decision processes: how do people respond to rewards or punishment, rational choice under uncertainty. Also, addictive behaviors and treatment can be important. Although Liz has pointed out that this field of study is still evolving, there's a potential to get valuable information for legal studies.

Are you aware of any adverse long-term effects on the brain that can result from neuroscientific procedures?

**Phelps:** The kind we do here at NYU use the natural brain physiology to see differences related to brain function, and there are no known side effects of this.

**NYUR:** How expensive is it to conduct brain imaging?

**Phelps:** I'd say for a single study that I might do, it's maybe \$15,000 to \$30,000. There isn't an organization that's currently providing significant funding for basic research on law and neuroscience. The MacArthur Foundation is considering funding a network on this topic.

**Miller:** Most of the funding for forensic neuroscience research comes out of particular cases. So the research may be biased by the fact that the people that are funding it want a particular result. Even if litigation-related research isn't biased, it might be perceived that way. That's why foundation or government support for this kind of research is important.

**NYUR:** What happens if the media jumps on the neuroscience bandwagon and blows it out of proportion too soon?

**Phelps:** Sometimes reporters want to say a whole lot more than I'm comfortable with when talking about my research. The best thing that I can do is try to educate the reporter and make it clear that I'm not comfortable with some of the claims as the scientist who did this study. Although I might be tempted to ignore the reporters who would like to misrepresent my data, I know that more people are reading that reporter's article than are reading my scientific article. So I think it's important for the scientists who do the research to get involved and say reasonable things. We need to be good critics of ourselves.

There is not any formal organization that attempts to evaluate brain science for the media or law. A few organizations, such as the National Academy of Sciences, have put together a document and/or meetings on polygraphs, MRI, and lie detection, but we don't have a formal procedure or governing

body for saying ‘this is reliable science, scientists agree’ for neuroscience at this point. It’s been suggested by one lawyer and by some neuroethicists that we should have something equivalent to the FDA for evaluating neuroscience data that is relevant to law. We aren’t there yet, though.

**NYUR:** Let’s say that brain imaging tracks the minds of two criminals: one is a criminal born with some sort of brain defect that makes him or her more likely to commit a certain crime; the other is somebody who develops a similar brain defect as the result of an accident or an experience he or she witnessed. Should they be treated equally in the legal system?

**Miller:** It looks like they should be treated the same because in both cases the person wasn’t responsible for the brain defect. But the example points to a challenge that neuroscience can pose for law. You might think that someone is not culpable if their actions are due to a brain defect. But regardless of the cause, the behavior isn’t something we want to allow. On the other hand if we abandon culpability as a principle of punishment, we might conclude that all that matters is a person’s propensity to commit crime, which might be evaluated at some point in the future by means of brain imaging. But this leads us down a road that I am not sure we want to follow.

**Phelps:** But, I’m assuming this is not a new legal question, right? These issues have already been raised. I guess the point I’m trying to make here is that I think a lot of these debates that come from brain science are debates that, just exactly as you said, have been going on for a long time.

**Miller:** True, but brain imaging takes it to a new level. When somebody has committed a crime, and then you use that as a basis for incapacitating him or her, at least the basis is prior criminal behavior. When the basis for incapacitation is simply that they have some condition of the brain, that raises a different and more difficult question.

**Phelps:** Yes, but I’m not sure we’re ever going to want to get to that point, and we certainly aren’t there now. For instance, there is data suggesting frontal cortex impairment is involved in criminal behavior. But, there are tons of people with damage to the frontal cortex who don’t show any criminal behavior. So unless we can somehow differentiate those two groups of people based on their brain anatomy, the behavior should still underlie the decision about incapacitation, as opposed to the brain data.

**NYUR:** Looking ahead to the future of neuroscience, could a situation arise in which people feel that their right to privacy is jeopardized by having to agree to a brain scan?

**Miller:** It’s conceivable that employers will, at some point in the future, start to give brain scans to potential employees in order to screen for future behavior. That would raise all kinds of legal issues, including questions about privacy, employment discrimination, labor law, and so on.

**NYUR:** But a candidate could decide not to work for the company if that testing is mandatory?

**Miller:** Sure.

**Phelps:** Yes, but not everybody has that flexibility.

**NYUR:** How do you both see this fusion of law and neuroscience evolving?

**Miller:** I think it’s a wide-open field with lots of great people working in it, such as Liz, and we’ll just have to see what happens.

**Phelps:** I think it’s going to progress. I focus on basic research of the human brain, so I haven’t traditionally examined issues of law. This field has brought in a whole different world for me to consider in the research that I do. I think neuroscientists need to engage in the debates about what’s going to emerge from their science.

