

Changing Minds about the Brain

Gina Pera interviews Nora Volkow, MD

IF YOU BELIEVE THAT ADDICTION IS A CHARACTER FLAW, neuroscientist Nora Volkow would like to change your mind. To do that, she will tell you about the brain—specifically about remarkable research that sheds light on the neural circuitry underlying addiction. This research, which largely focuses on dopamine (the brain chemical associated with sensing pleasure and reward), has also led to important breakthroughs in understanding ADHD, obesity, and the aging process.

It's tackling the really big questions that promise the biggest rewards to Volkow. Why can some people try and then walk away from substances that prove tragically addictive to other people? Why are some substances particularly addictive—such as alcohol, nicotine, heroin, and methamphetamine? How is it that even obesity shares traits associated with drug abuse? Most importantly, what happens in the brain when your ability for free will is compromised?

Volkow, now fifty-four years old, has devoted her entire professional life to unraveling these age-old mysteries. Her goal: revolutionizing the way our society views addictions and other brain dysfunctions, viewing them not as moral failings but as medical conditions that deserve treatment.

A leading addiction researcher and the director since 2003 of the National Institute on Drug Abuse (NIDA) at the National Institutes of Health, Volkow first garnered international scientific acclaim by showing how cocaine alters dopamine function in the brain of chronic users—the first indication of the brain changes in people that may underlie the compulsive nature of addiction. In her current role, Volkow directs the government's drug abuse research program with a budget of over a billion dollars.

Some observers speculate that Volkow's urge to help others was sparked, in part, by a tragic family history. She's the great-granddaughter of assassinated Russian revolutionary Leon Trotsky. A right-hand man to Vladimir Lenin until the Bolshevik ruler's death in 1924, Trotsky was expelled by Josef Stalin and most of the family died during the Soviet dictator's purges. With his second wife and orphaned thirteen-year-old grandson (Volkow's father), Trotsky fled to Mexico City, where a Stalinist agent murdered him in his home.

Volkow was born into this house sixteen years later. Her traumatized father never discussed the family's history, including seeing many beloved family members killed when he was a child, until his daughters were almost adults. For Volkow, growing up in these circumstances created what she calls "a sense of responsibility to do something that can help others."

The NIDA chief took time from her demanding schedule to answer a few questions for *Attention* readers.

Today's neuroscientists benefit from cutting-edge scientific tools. These include "brain imaging" techniques such as PET (Positron Emission Tomography) and fMRI (functional Magnetic Resonance imaging). What distinguishes modern imaging methods from other types of research?

The arrival of imaging tools allowed us to catch a glimpse of the inner workings of the living brain, in a noninvasive way. We can study the structure of the brain in unprecedented detail; we can also monitor the function of the living brain and ask very specific questions, for example, about how drug exposure

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alter brain activity or about the status of a particular neurotransmitter system.

Please describe a typical workday in the life of a neuroscientist who is also the director of NIDA.

I usually start with an hour of journal reading before going to the office, usually six to seven o'clock in the morning. When I first arrive at the office, I am diligent about checking email and responding. I meet with my assistant to address correspondence and prioritize meetings of the day.

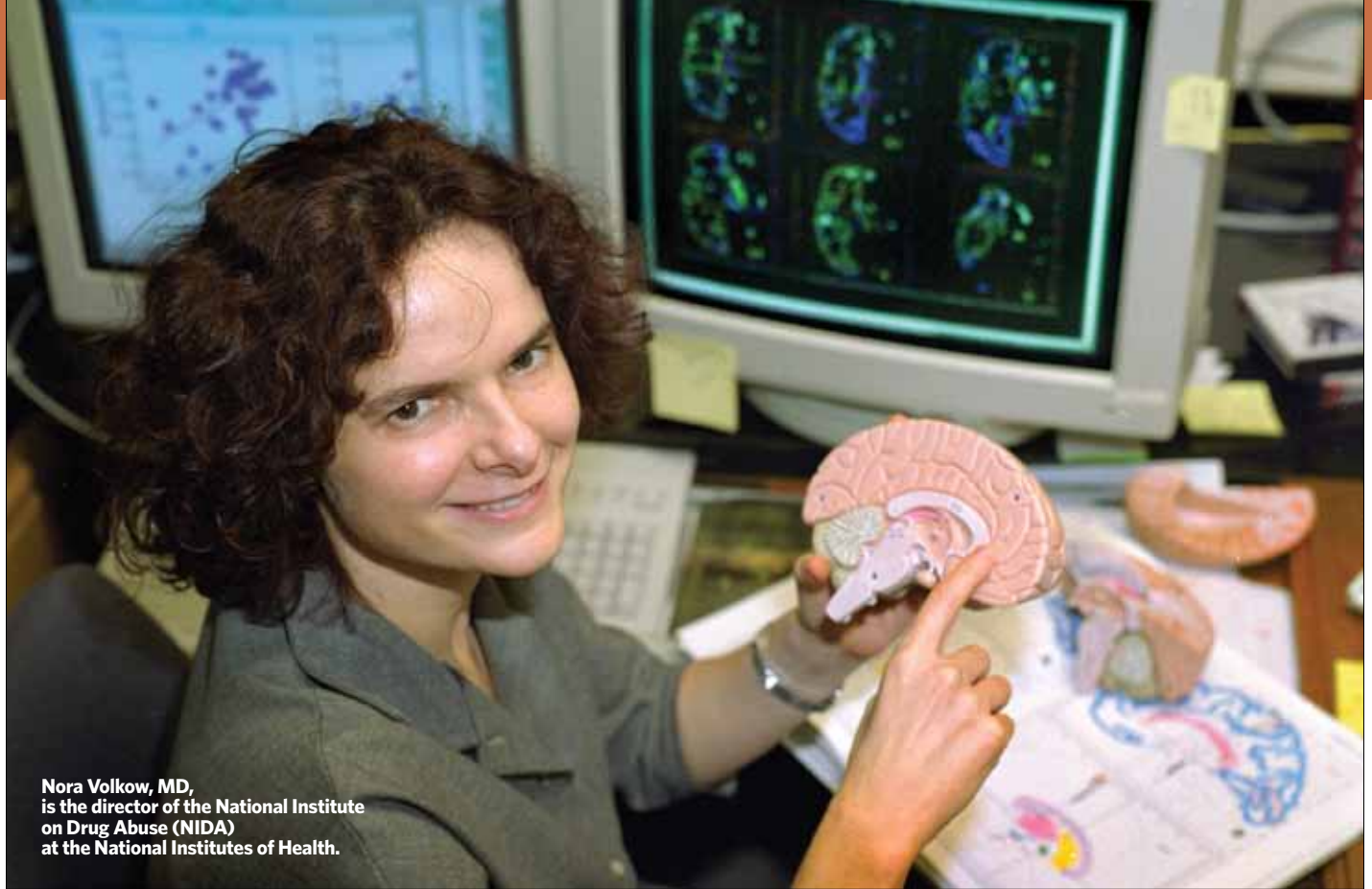
When I am not traveling, my day is filled with meetings. I daily review much of the science that is being funded through our institute, both at NIDA's lab in Baltimore and with our thousands of grantees throughout the world. Managing a scientific institute has a lot of nonscientific responsibilities as well, including budget, staff, and strategic planning decisions.

Around five, I work on data and manuscripts and leave for home around seven-thirty in the evening. On weekends I often work from home on data and image analysis, and about once a month I go to my lab at Brookhaven, which is funded by a different NIH Institute.

Many Americans (especially on the Internet) detect some sort of "Big Pharma" conspiracy behind every neuroscience breakthrough regarding ADHD and other conditions, especially when it comes to medication. As someone who has devoted many years to first studying to become a neuroscientist and then conducting extremely complex research, how do you react to this line of thinking?

The fact that this perception still exists is very disappointing to me. That's why I would very much like to try and dispel the notion of a conspiring "Big Pharma."

Your question reflects the perception that the psychiatry profession is involved in a self-serving and disingenuous behavior; that is, being too quick to catalogue new sets of symptoms as previously unrecognized diseases and conspiring with the pharma-



Nora Volkow, MD, is the director of the National Institute on Drug Abuse (NIDA) at the National Institutes of Health.

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ceutical industry to develop and market medications to treat these diseases.

What would you say to counter the perception that scientists are in league with the pharmaceutical industry to “invent” disorders?

This perception is misplaced, and likely the result of the lingering stigma that envelops all mental illness, including addiction. Most mental disorders (ADHD is a good example) still lack the type of concrete biomarkers (such the elevated sugar in diabetic patients) that would serve as indisputable evidence of the underlying pathology.

In fact, that is another reason why the brain imaging studies are so important—as they demonstrate incontrovertibly the brain changes that are associated with psychiatric disease. Unfortunately, the images are not yet precise enough to serve as a diagnostic tool. This gap, which scientists are working feverishly to close, leaves the door open to those who claim that mental illnesses (such as ADHD) are nothing more than additional variants along an otherwise “normal” behavioral continuum.

Such claims fail to consider the devastating and all-too-real conse-

quences of these disorders, which patients, their families, and doctors must confront daily, and the enormous benefits they derive from effective treatments whenever available.

It is true that pharmaceutical companies (like any other company) are in business to make a profit. But it is equally true that to stay in business they must adhere to the highest scientific and regulatory standards to ensure that their products are both safe and effective. Most neuroscience breakthroughs do happen in academia, but the pharmaceutical industry plays an irreplaceable role in translating those basic findings into new therapeutic compounds.

The simple fact is that the cost of bringing a new medication to market is just staggering—close to a billion dollars. Thus, few if any other organizations, institutions, or agencies have the wherewithal and finances to carry it out.

Finally, whenever the pharmaceutical industry remains disengaged in the broader efforts to develop new pharmacotherapies, the neglected field suffers. The addiction field is a perfect example of this. The perceived disincentives associated with treating addiction, the stigma of the disease, and the belief that the financial gains

would not be sufficiently high have caused us to lag behind in medication development despite the advanced state of the science.

Why did you choose public service with NIDA over a career in academia or industry?

NIDA gave me the opportunity to help change the public’s views of addiction and recognize it as a disease that can benefit from treatment, similar to other mental illnesses. I would not have had the same reach or opportunity to influence attitudes had I stayed in an academic environment or worked for the pharmaceutical industry.

What’s the most profound concept you’d like to communicate to the public about the challenges faced by addicts?

We face the hugely challenging task of educating the public that addiction is a disease of the brain and that can be treated, but that treatment can take a long time to be effective.

What do you love most about your work?

That I can help others through the knowledge derived from science.

What do you like to do for fun?

I love to run, hike, read, explore, and spend time with my friends and family. 🍷



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