Neuroscientific Insight into the Failures of Drug Law

Joseph Gehler
Center for Neuroscience & Society – April 2019

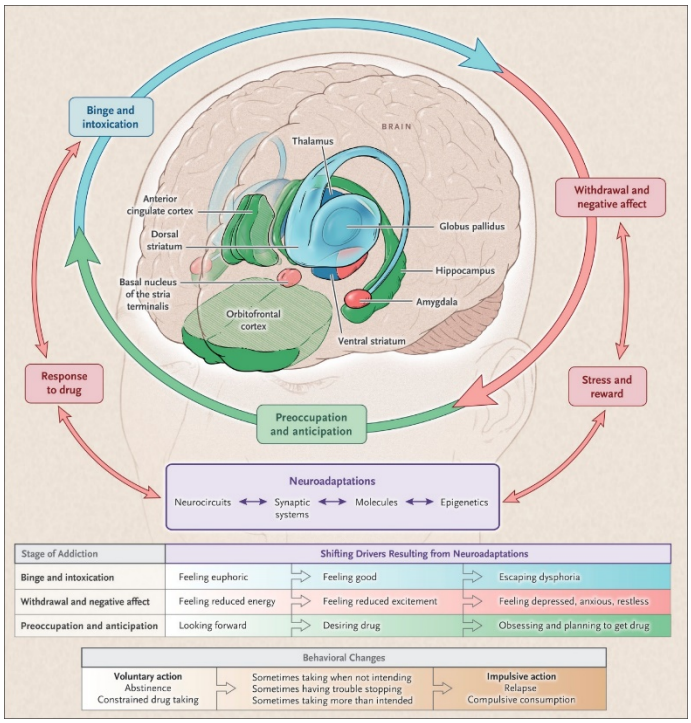
The punitive sentencing model for drug consumption-related crimes- such as possession for personal use- must be eliminated in favor of directing resources towards making drug education and voluntary rehabilitation more widely-available. This change is needed because insight from neuroscience indicates that drug addiction is 1.) an acquirable, biomedical condition, and that drug addiction 2.) effectively imposes a kind of physiological duress and fundamentally impairs decision-making, reduces criminal responsibility, and erodes the capacity for *mens rea,* therefore making the punitive sentencing of those suffering from addiction morally incoherent.

Section 1: Drug Use as a Medical Condition

For several decades, the idea that substance abuse disorders are a disease has been gaining traction within the scientific community as their neurological underpinnings have become elucidated; in 1994, substance abuse disorders were explicitly recognized in the DSM (the international standard for psychiatry) as a brain disease. Since then, this paradigm of drug addiction as a biological condition has become nearly ubiquitous among biomedical professionals (Volkow, et al. 2016). In sharp contrast, the so-called "War on Drugs" fought by politicians and law enforcement has been, since its inception, justified to the public with the work of a "relatively marginal group of researchers" that do not and have never represented the scientific consensus model of drug addiction (Vrecko 2010). As a result, scientific insights that may offer solutions to drug-related public health crises have historically been ignored or distorted. As such, the neurological underpinnings of addiction will be laid out here.

While the neurological effects of substance dependence are relatively variable between specific substances, they generally involve alterations to the brain systems associated with reward and stress. These chemical and structural changes to the brain are what underly the cycle of craving experienced by people with addictions; effectively, the abnormal brain activity of people suffering from addiction applies duress that induces them to seek the substance that they crave.

A common rebuttal to arguments for lessening punishments for drug crimes is that people can choose to simply not expose themselves to addictive substances in the first place; many assume that addiction develops from a choice to break the law and consume an illicit substance. It is important to note, though, that impactful changes to the brain and the associated addictive behavior can begin with purely legal exposure to a drug, such as the prescription of an opioid painkiller to cope with an injury. Exposure to opioids in this way can create a reliance on opioids that persists past the end of a prescription and lead to the unfortunate victim turning to illegally-



The Addiction Cycle in the Brain
A diagram mapping altered parts of the brain to stages of the prototypical addiction cycle. Note the involvement of areas like the orbitofrontal cortex, an area thought to be integral to planning and decision-making. Volkow, 2016.

obtained opioids, such as heroin (Kolodny 2015). As a result, it should not be assumed that someone with addiction acquired the disorder by breaking the law intentionally or otherwise.

The biomedical model of addiction still faces some opposition, however, particularly in the criminal justice system. Some detractors of the model argue that the paradigm has "mistaken some necessary conditions of the disorder [the brain activity underlying addiction] with the condition itself" (Hammer et al. 2013). Essentially, these detractors are arguing that the brain activity underlying behavior- in this case, addiction and drug seeking- is not one and the same thing as that behavior. While the distinction is certainly legitimate, it is irrelevant in this context; such detractors ignore the direction of causality between brain activity and behavior. Brain activity is widely accepted to be able to *cause* behavior, so the brain activity that *causes* disordered behavior can be considered synonymous with the disorder itself. For example, major depressive disorder is widely conceived of as being synonymous with the underlying neurochemical and cognitive abnormalities that cause, or at least perpetuate, the disorder. Similarly, addiction can be conceived as being one and the same with the underlying neural processes.

Other detractors object to the biomedical model of addiction on utilitarian grounds, arguing that it is "unnecessary" for or even "harmful" to therapeutic outcomes (Levy 2013). As Levy discusses, there is evidence to suggest that patients whose care providers frame their addictions as a disease can be discouraged and struggle on their path to recovery. These detractors, though, are asking us to ignore empirical truth; the issues that they raise do not change the fact that addiction is considered by many experts to be a brain disease. And even while such objections may be valid on an individual scale, the societal benefits of treating addiction as a brain disease, both in the criminal justice system and in common discourse, vastly outweigh the downsides- estimates as of 2015 indicated that roughly 100 out of every 100,000 people in the United States are incarcerated with a drug-related conviction as their highest offense, and the War on Drugs costs the United States upwards of $43 billion dollars annually (Roeder 2015). Changing our society's conception of addiction to be more in line with our scientific understanding of the disorder would not only be morally right, but also utilitarianly useful.

Section 2: Drug Use as Disruptive to Responsibility

Neuroscience also provides insights about addiction that have direct implications about how it should be treated by the justice system, in that the symptoms of drug addiction include elements that, in other contexts, are generally considered to reduce criminal culpability. For example, withdrawal from many addictive substances can inflict permanent bodily damage or even death, meaning people addicted to a drug have a reasonable basis for the belief that consumption of the substance is necessary to preserve their safety (Darke et al. 2017). As mentioned above, the extreme subjective suffering and distress reported by sufferers of withdrawal and corresponding neuroscientific evidence also reinforce the idea that the physiology of drug addicts effectively applies duress; for people with addictions, it is incredibly difficult to make the choice to abstain from illicit substances. In cases in which the source of such duress is external- for example, if a criminal forced someone to steal under threat of bodily harm or death- it is relatively uncontroversial that the victim's responsibility for the theft would be reduced. The same reasoning should be applied to duress applied by the physiology of people with addictions.

Additionally, there is a great deal of evidence that drug addiction interferes with the ability to make decisions in a fundamental and broadly-applicable way; even the neurological processes underlying decisions with no direct connection to an addictive substance are altered. Such alterations have an empirically measurable effect on tasks ranging from working memory to delayed gratification tests- for some substances, such disruptions have even been mapped to specific regions of the brain (Bechara & Damasio 2001, 2004). Use of alcohol or stimulants, for example, has been linked to lasting impairment of the prefrontal cortex, the part of the brain thought to play an integral role in planning and decision making (Bechara et al. 2001). These impairments have, in turn, been linked to a significantly disrupted working memory and decreased performance on a broad range of tasks that involve planning and decision-making (Bechara and Martin 2004).

The combination of duress and an impaired ability to think ahead to the consequences of a decision mean that people with substance abuse disorders fundamentally lack the same capacity to possess *mens rea* as someone without the disorder. To punish someone for fulfilling their addiction, then, is effectively to punish them for having a disease-like condition; to do so is both counterproductive and unjust.

Ultimately, most instances of drug consumption should be treated as a symptom of an illness, not a criminal activity. Reframing the increasingly widespread use of addictive drugs in the United States as a public health crisis, rather than a criminal one, would both allow for more effective solutions and would be more consistent with neuroscientific insights into the physiology of drug use and addiction. While 2018's FIRST STEP Act indicates that Americans are ready and willing to bring the country in the right direction, far more radical change is needed; instead of continuing to direct resources towards imprisoning those with the mental illness that is drug addiction, legislators must take action to instead regulate the distribution of legal addictive substances, educate Americans about the true nature of drugs and addiction, and increase the availability of the medical care that those who suffer from addiction so desperately need.

Sources:

1.) Bechara, Antoine, et al. "Decision-making deficits, linked to a dysfunctional ventromedial prefrontal cortex, revealed in alcohol and stimulant abusers." *Neuropsychologia* 39.4 (2001): 376-389.
2.) Bechara, Antoine, and Eileen M. Martin. "Impaired decision making related to working memory deficits in individuals with substance addictions." *Neuropsychology* 18.1 (2004): 152.
3.) Darke, Shane, Sarah Larney, and Michael Farrell. "Yes, people can die from opiate withdrawal." *Addiction* 112.2 (2017): 199-200.
4.) Hammer, Rachel, et al. "Addiction: Current criticism of the brain disease paradigm." AJOB neuroscience 4.3 (2013): 27-32.
5.) Kolodny, Andrew, et al. "The prescription opioid and heroin crisis: a public health approach to an epidemic of addiction." Annual review of public health 36 (2015): 559-574.
6.) Levy, Neil. "Addiction is not a brain disease (and it matters)." *Frontiers in Psychiatry* 4 (2013): 24.
7.) Roeder, Oliver. "Releasing Drug Offenders Won't End Mass Incarceration." *FiveThirtyEight*, FiveThirtyEight, 17 July 2015, fivethirtyeight.com/features/releasing-drug-offenders-wont-end-mass-incarceration/.
8.) Volkow, Nora D., George F. Koob, and A. Thomas McLellan. "Neurobiologic advances from the brain disease model of addiction." *New England Journal of Medicine* 374.4 (2016): 363-371.
9.) Vrecko, Scott. "Birth of a brain disease: Science, the state and addiction neuropolitics." *History of the Human Sciences* 23.4 (2010): 52-67.