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Science Is Revolutionizing Our View of Addiction—and What to Do About It

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Advances in science are rapidly dispelling both popular and clinical myths about drug abuse and addiction and what to do about them. Some concepts that have made their way into the drug abuse lexicon, such as the fact that initial drug use is a voluntary and therefore preventable behavior, do remain intact. However, other long-standing concepts are being considerably revised. For example, research is showing that although addiction does come about as a result of significant amounts of drug use, there is in fact much more to addiction than just a lot of drug use. Addicts experience true compulsion to use drugs, even in the face of severe negative consequences, and we are gaining substantial insight into the mechanisms which produce that compulsion. Moreover, drug use and addiction are not simply poles of a single gradient along which one slides in either direction over time. Once addicted, one appears to have moved into a different state (1). Also, there is now broad agreement in the clinical research community that addiction is best characterized as a chronic disease that for most people includes occasional relapses (2).

This new understanding of addiction has clear implications for clinical practice. It is also beginning to affect public policy in significant ways. Scientific understanding has not yet totally displaced the moralizing that continues to shadow any discussions on this topic, even among health professionals. However, a science-based view is beginning to gain prominence. Scientific data are slowly but clearly eroding such stigmatizing distinctions as “no-fault” versus “fault” illnesses and what to do about them. It does not matter how someone develops a disorder; once he or she has it, treatment is required.

There is an increased understanding that drug treatment is of great benefit to the individual, to his or her family, and to society. In the last case,

more and more people are recognizing that even if one does not think addicts deserve to be treated, great benefits accrue to society through reducing both the public health and the public safety consequences of the drug problem. Numerous studies (3–5) have established that drug treatment reduces crime, reduces the spread of infectious diseases, and restores the ability of addicted individuals to be functional, contributing members of society rather than a drain on public resources.

The science of addiction is also helping overcome primitive dualist views of mind and body. For example, modern imaging technologies are enabling scientists to see how drug experiences are reflected in and/or generated by specific patterns of brain activation in studies of awake, behaving, and experiencing individuals. Those studies are showing consistent, closely correlated relationships between specific patterns of brain activation and various drug experiences (6–8).

Studies of brain and behavior have shown addiction to be the quintessential biobehavioral disorder. It comes about because of the effects of prolonged drug use on brain structure and function, but addiction also involves truly imbedded, critical behavioral and social context components. It follows, then, that if addiction is truly biobehavioral in nature, the best treatments will include biological, behavioral, and social context aspects. Importantly, there is a growing database to support that conclusion (9).

Four articles in this issue [the January 1999 issue of *The American Journal of Psychiatry*] clearly illustrate many of these scientific advances and their implications. The article by Prescott and Kendler (10) adds to our understanding of the central role that genetics plays in determining one’s vulnerability to becoming addicted. In the first study of a U.S. population-based twin sample, Prescott and

Kendler estimate that 50% or more of the variation in susceptibility to developing alcoholism is due to genetic factors and suggest that environmental factors shared by family members are not nearly as important as commonly presumed. The observed high heritability is consistent with findings from studies of archival registers and clinically ascertained samples. Similar levels of genetic loading have been suggested for addiction to virtually all other abusable substances as well (11).

The articles by Childress and her colleagues (8) and Volkow and her colleagues (12) beautifully illustrate the application of neuroimaging techniques to understanding the brain circuitry underlying drug experiences. Childress et al. identify brain structures which are activated during drug craving experiences that have been elicited by simple exposure to cues initially associated with drug use, in the absence of any drug or the promise of a drug. This study shows the significant involvement of brain regions known to be involved in higher-order processes, including memory, cognition, and emotion. As Childress et al. point out, it appears that the "brain signature of cue-induced craving is thus consistent with its clinical phenomenology: the drug user is gripped by a visceral emotional state, experiences a highly focused incentive to act, and is remarkably unencumbered by the memory of negative consequences of drug taking." In addition, this study confirms what is being found in other neurobiological studies, i.e., that it is time to go beyond the traditionally studied reward circuits in the base of the brain and begin looking at a much broader range of areas.

The elegant imaging study by Volkow et al. combines measures of metabolic activity with those of receptor density, which also suggests that there are additional brain areas and biochemical mechanisms critically involved in drug-related experiences. Like the Childress et al. report, this study emphasizes the need to look beyond the base of the brain to higher-order brain structures and functions. It also strengthens the view that experiential and neurobiological phenomena are truly unified.

The article by Avants et al. in this issue (13) showcases the great utility of drug abuse clinical and health services research. These types of studies are particularly important during this time when the entire health care system, including so-called "behavioral health care," is undergoing radical changes. The

Avants et al. study reinforces the fact that drug abuse treatments, when properly administered, are highly effective in reducing drug use and addiction-related problems. This study not only lays out the costs of two levels of intensity of treatment services but also suggests a sequential strategy, where one can begin with lower levels of services and only escalate to more intense services if they are clearly warranted.

This issue of *The American Journal of Psychiatry* includes important examples of the breadth and depth of research on drug abuse and addiction. This type of research is significantly changing our understanding of clinical practice for—and, hopefully, public policies toward—drug abuse and addiction. We are nearing the point where, as Melvin Sabshin (14) would say, science will [at last] replace ideology as the foundation for the way we approach drug abuse and addiction in this country.

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