DRUG ADDICTION. IS IT A DISEASE OR IS IT BASED ON CHOICE? A REVIEW OF GENE HEYMAN'S ADDICTION: A DISORDER OF CHOICE.

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In *Addiction: A disorder of choice,* Gene Heyman surveys a broad array of evidence—historical, anthropological, survey, clinical, and laboratory-based to build an argument about the role of basic choice processes in the phenomena that comprise drug addiction. He makes a compelling, multifaceted argument that conceptualizing drug addiction as a chronic disease (like schizophrenia or diabetes) is both misleading and erroneous. In developing his argument, he points out that the best survey data available indicate that most drug addicts quit their addiction, a fact inconsistent with a chronic-disease model. He illustrates how basic, normal choice processes can lead to addiction, arguing that people do not choose to be addicts, but that normal choice dynamics can lead them to that condition. He points to a variety of factors that keep most from becoming addicted, with a focus on the role of choice governed by choice-by-choice contingencies versus choice governed by the outcome of sequences of choices, a difference in an under-described activity called *framing.* His view is consistent with the most effective treatments currently available, and provides a basis for continued basic research on choice as well as research on treatment and prevention.

Key words: drug addiction, chronic disease, operant choice, framing

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In *Addiction: A disorder of choice* Gene Heyman makes a case for drug addiction to be a result of natural processes involving voluntary (i.e., operant) behavior, specifically choice. This approach stands in stark contrast to the current received view, at least as promulgated by the National Institute on Drug Abuse (NIDA) and the National Institute on Alcohol Abuse and Alcoholism (NIAAA), that drug abuse is a *disease*, specifically, ''Addiction is a chronic, often relapsing brain disease…[s]imilar to other *chronic, relapsing* diseases, such as diabetes, asthma, or heart disease….'' (NIDA, 2008). Over the course of seven chapters Heyman makes his case by describing the history of drug abuse and addiction, societal responses to it, case histories from addicts, the epidemiology of drug addiction, ''rational'' and ''irrational'' choice, brain–behavior relationships, and approaches to treatment of drug addiction. These descriptions provide the bases for the focal points made, which are that normal, apparently rational choice processes can lead to poor long-term outcomes (e.g., addiction), and that an understanding of such processes offers a viable approach to the prevention and treatment of drug addiction. Of particular interest to readers of this journal is that the behavioral processes involved have been studied and characterized to a considerable degree by those who investigate operant choice. In addition, scattered throughout the exposition is a litany of evidence making the view that drug addiction is a disease, at least in the normal sense of that word, difficult to defend. In this review I endeavor to describe briefly and evaluate some of the key points made by Heyman about how normal choice processes play a role in drug addiction and to highlight his arguments countering the ''addiction is a brain disease'' view.

The first of the seven chapters provides an overview of the history of drug use and abuse, as well as information about its current prevalence. Although alcohol abuse has been documented from time to time for centuries, abuse of other drugs is a relatively recent phenomenon. Heyman notes that the first ''epidemic'' in the United States occurred in the late 19th century, before legal prohibitions were established. In addition to the perennial problems with alcohol abuse, the period was noted for abuse of opiates. Some of that abuse was centered in the wealthy ''opium eaters'' who abused laudanum. Interestingly, incidence rates from that period, before legal sanctions, were similar to current ones. How-

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ever, abuse also extended to those of lower socioeconomic status, largely in the form of opium smoking in ''opium dens.'' Heyman makes the case that public concern raised by drug abuse among the lower classes set the wheels in motion for governmental responses. The passage of the Harrison Act in 1914 marks a pivotal point in the public response to drug use and abuse. That act applies to the tax code, and since that time the Federal response to drug abuse has been the purview of the Treasury Department, rather than the Department of Justice. The Drug Enforcement Administration (DEA), the successor to the Bureau of Narcotics and Dangerous Drugs (BNDD), is an arm of the Treasury Department. The activities of that organization and the criminal-justice system help to establish the current situation in which societally imposed penalties are applied to those said to be suffering from a disease.

As Heyman outlines, the current costs of drug abuse are enormous, including costs of enforcement and lost productivity, as well as incarceration, which has increased 10-fold since 1980. Importantly, he reminds us that drug abuse is a behavioral, or psychiatric, disorder. He also notes that drug abuse is the only psychiatric disorder that has two Federal research institutes dedicated to it, namely the National Institute on Drug Abuse (NIDA) and the National Institute on Alcoholism and Alcohol Abuse (NIAAA). Without explicitly noting the irony, he points out that since the official adoption of the viewpoint that drug abuse is a disease, and the expenditure of very large sums of research money by NIDA and NIAAA, prevalence rates of drug use and dependence have either increased or remained unchanged.

In estimating current rates of drug addiction Heyman appears to overstate the case. He argues from cited research that about 30% of American adults have met diagnostic criteria for alcohol abuse or dependence at some time in their lives. Examination of the research cited (Hasin, Stinson, Ogburn, & Grant, 2007; Stinson, Grant, Dawson, Ruan, Huang, & Saha, 2005) however, does not appear to support that estimate. Hasin et al., for example, report about 18% lifetime prevalence for abuse and 12% for dependence, two percentages that ought not to be summed. Regardless, however, of which estimates are correct, the absolute number of current and former addicts is very large. However large that population may be, research reliably confirms that only a relatively small percentage, 25% or less, of those meeting criteria for drug abuse or dependence ever seek and receive treatment. This fact looms large in subsequent chapters.

Chapter 2 presents epidemiological findings about the development and characteristics of drug addiction. First, data are presented confirming the now well-known fact that drug use usually does not advance to drug abuse. For most drugs of abuse only about 2–3% move from occasional use to drug dependence. Heyman notes appropriately, however, that 3% yields a very large absolute number of individuals. He also points out an interesting exception; American military men who served in Vietnam showed an astonishing 40% rate of addiction to opiates following their use. This anomaly is the base for two conclusions. One, the high rate of opiate addiction among Vietnam veterans highlights the fact that understanding a drug's action at the neuronal level is not sufficient to account for the facts of drug abuse. Two, and this comes later in the book, opiate addiction in Vietnam veterans may have implications for the study of addiction in broader populations.

In Chapter 3, Heyman summarizes a few case histories as reported by current and former drug addicts. Although these accounts are highly anecdotal in character and therefore suspect with respect to generality, Heyman makes use of them later in his arguments about the usual courses of drug abuse. There is no clear way to determine in what sense any of the cases is typical, but they at least serve one useful function. Specifically, they illustrate possible temporal trajectories of drug abuse. In particular, several of the cases describe drug abuse ending at some point in the addict's life, usually by their late 20s or early 30s. Therefore, these cases lay some introductory groundwork about whether drug addicts can quit, a focal topic of Chapter 4, which carries the title, ''Once and addict, always an addict?''

The opening parts of Chapter 4 serve to document the prevalence of the current received view that drug addiction is for life, and Heyman summarizes research supporting that contention, noting that relapse from treatment for abuse of any drug generally occurs with a high frequency. Commonly,

relapse rates may exceed 50% within 6 months of completion of initially successful treatment (McClellan, McKay, Forman, Cacciola, & Kemp, 2005). Here Heyman's argument picks up momentum. While agreeing that treatment relapse is common, Heyman notes that treatment itself is not common. Most addicts never enter treatment; so, what happens to them? To answer this question, Heyman analyzes the available epidemiological data on addicts in general, and comes to the conclusion that the majority of all drug addicts eventually cease their addiction according to accepted criteria. His analysis is compelling and well worth reading.

Heyman addresses the issue of whether those entering treatment are somehow different from those who do not, and finds support that, in fact, they are different. For example, the 15% or so of returning Vietnam veterans who sought treatment had relapse rates of over 50% (Robins, 1993; Robins, Helzer, Hesselbrock, & Wish, 1980). The issue, therefore, seems to be: What is different about the population seeking treatment? Here, too, Heyman suggests an interesting possibility. Epidemiological evidence from a very large survey (Regier et al., 1990) indicates that drug addicts who seek treatment, compared to those who do not, are more than twice as likely to exhibit a comorbid psychiatric disorder.

Heyman concludes Chapter 4 by offering a hypothesis about why most, not otherwise psychiatrically disabled, drug addicts eventually cease their addiction. His view is based to a considerable extent on the case histories presented in Chapter 3, and it is that, ''…whether addicts keep using drugs or quit depends to a great extent on their alternatives.'' (p.84). The biographical descriptions from recovered addicts frequently point to the role of financial and family concerns, that is, contingencies other than those directly related to procuring and taking drugs, as being major factors in their cessation of drug abuse. That is, the change from abuse to recovery is based on choice alternatives. That, of course, begs the question of how choice can lead to the problem in the first place if choice is, in fact, the avenue to recovery. That question is addressed in Chapters 6 and 7.

In Chapter 5 Heyman addresses the disease model more fully by examining the arguments and data supportive of that perspective. First, those in support of drug abuse as a disease point to the demonstrated role of genetic factors in addiction. Heyman acknowledges genetic contributions, but points out that genetic influence is not a sound basis for concluding that drug abuse is a disease process. He notes, for example, that there is a genetic association for religious choice between identical twins reared apart (Waller, Kojetin, Bouchard, Lykken, & Tellegen, 1990). From that, few would conclude that religious choice is a disease.

A second class of arguments finds its basis in studies of neural changes associated with drug abuse. There is now an abundance of evidence showing that brain activity and neuronal functions are different in drug abusers than in nonabusers (e.g., Volkow, Fowler, Wolf, & Schlyer, 1990). From these results, the common conclusion is: ''That addiction is tied to changes in brain structure and function is what makes it, fundamentally, a disease.'' (Leshner, 1997, p. 45) The logic of this statement is obviously fallacious, as Heyman is quick to point out. Any persistent change in behavior is going to be associated with changes in the central nervous system because the nervous system participates in behavior. One might as well conclude, say, that reading is a disease because the brains of readers necessarily differ from those of nonreaders.

As a final point of the chapter, Heyman seals the fate of the now discredited notion that compulsive, involuntary craving is a characteristic of drug addiction: both that it is a reliable feature and that it somehow indicates that a disease has developed. ''Craving'' has been dropped from the DSM as a diagnostic feature of drug dependence, but it is still invoked as being relevant, especially to relapse. But as Heyman notes, if most drug abusers suffer cravings when they quit, then craving cannot be that important in producing relapse because about three-quarters of those who are dependent quit permanently. Heyman also summarizes sound empirical evidence indicating that reports of craving and actual drug taking may be uncorrelated. He does note, however, that the question remains as to why anyone would voluntarily engage in behavior like incessant drug seeking, given its deleterious effects. He thereby sets up the case for Chapter 6, which is the lynchpin of the book.

In Chapter 6 Heyman argues for the possibility that normal choice processes are at the root of drug abuse. That is, he makes the case that while people do not choose to be drug addicts, they do make choices that lead to addiction. He argues that choice always involves the selection of the better current option, and that under certain circumstances drugs have advantages over other outcomes in that they provide immediate pleasure, their negative effects are delayed, they are not particularly subject to satiation, and they can undermine the value of other options. These advantages, of course, raise the question: Why isn't everyone a drug addict? Heyman's principal response to this question is that people differ in how they *frame* a *sequence* of choices. With lucid examples, he shows convincingly that overall benefit across a series of choices can be maximized by not choosing the immediately (local, in his terms) better option. A key preventative therefore is framing drug taking not locally but across a series of choices, that is, globally. Although his argument is convincing on this point, it also displays the major weakness of his exposition. Specifically, there is no clear explanation of exactly what framing is and how it comes to be. Heyman notes that, ''…global choice requires both reflection and forethought….'' (p. 158). Reflection and forethought appear to be types of behavior, and relatively little is said about precisely what those activities are and how they can be developed and maintained. Do they underlie rational choice? *Aren't they choices themselves?*

Despite the minimal attention paid to the details of framing, Heyman's view strongly encourages a basic research program especially directed toward how to generate global rather than local framing of choices—in my view, a major contribution of this book. Such a program might be of clear benefit in the prevention and treatment of drug abuse—yet another illustration of how basic research not aimed directly at translation can provide important insights eventually leading to effective practical action.

Having made a case for drug abuse as operant choice gone awry, Heyman's last chapter focuses on treatment and prevention of drug abuse. He begins with another attack on one of the mainstays of the disease model, specifically the overly simplistic idea that dopamine activity in the brain provides an adequate explanation of drug abuse. All reinforcing consequences, not just drugs, are associated with changes in brain dopamine activity. That is, when we choose things, dopamine activity changes, no matter what it is we are choosing, so those changes cannot be by themselves what is crucial for the development and maintenance of drug abuse. To say dopamine activity is important in drug taking is simply the neuro-pharmacological equivalent of saying that drugs serve as reinforcers, something that has been known for decades.

In this chapter Heyman also examines factors related to the incidence of drug abuse and finds several that support his view that drug abuse results from normal choice processes. For example, he notes that drug abusers tend to be unmarried, with the implication that presence of a marriage partner, that is, a potent source of social consequences, provides alternatives that can compete effectively with other alternatives like drugs. In an additional salvo against the disease model, Heyman notes that marriage is not protective with respect to several other psychiatric maladies including schizophrenia, depression, and obsessive compulsive disorder, among others (Robins & Regier, 1991). That marriage may be protective for drug abuse is consistent with his view that alternative sources of consequences for choices are crucial.

In the last part of the chapter, Heyman attempts to make a case for the importance of what he calls prudential rules in preventing drug abuse. The case is not particularly compelling. No connection is made between choice processes and rule following, so it is not clear how the major argument about the role of choice in drug abuse connects to the prevalence of rule following. Heyman argues that most people do not become drug abusers because they follow established societal rules. A problem with that supposition is that it ignores why people follow those rules. The noted failure of the ''Just say no'' movement to combat drug abuse (Lynman et al., 1999; Rosenbaum, 2010; Rosenbaum & Hanson, 1998) certainly indicates that getting people to state rules and say that they will follow them is not very effective. Moreover, to suggest that somehow the long-term benefit afforded by following rules reinforces rule following is also

glib. The delays are generally far too long to invoke reinforcement as the operative behavioral process. Of course, Heyman is not alone in failing to provide an account of how rule following, whether rational or irrational, develops. This remains one of the great unsolved mysteries of human behavior.

To sum up, Heyman's book is provocative in two major ways. First, it develops a very compelling case that drug abuse should not be considered a disease. The several lines of evidence he presents accumulate and complement each other, building a virtually overwhelming argument in favor of his contention. Certainly, at the very least, research-funding and treatment agencies should not be ''putting all their eggs'' in the disease basket. Second, Heyman presents a reasonable suggestion that drug abuse can be considered as illustrating choice patterns that are appropriate in the short term, appropriate in the sense that they are predictable from what is known about choice. Those patterns are, however, not appropriate in the global, long-term, rational sense. This viewpoint offers several potential avenues for the remediation of drug abuse. One is simply to bring to bear alternatives that are more powerful in directing choice than are those operating when drug abuse is occurring, so that the basics of choice, for example generalized matching, can operate to retard drug abuse rather than promote it. This approach is what characterizes many of the relatively successful treatment approaches now being used. A second approach, one that is less adequately understood, has to do with ''reframing'' choice so that longer term consequences exert their effects. Exactly what behavior ''framing'' entails and how such behavior can be promoted is, however, unexplained. Such puzzles offer an opportunity for additional research to characterize and understand what ''framing'' is and the extent to which it is related to drug abuse. Given the apparent intractability of drug abuse, alternative avenues to understanding like those suggested in *Addiction: A disorder of choice* are certainly worthy of additional research.

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