

Drug Prohibition in the United States: Costs, Consequences, and Alternatives

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"Drug legalization" increasingly merits serious consideration as both an analytical model and a policy option for addressing the "drug problem." Criminal justice approaches to the drug problem have proven limited in their capacity to curtail drug abuse. They also have proven increasingly costly and counterproductive. Drug legalization policies that are wisely implemented can minimize the risks of legalization, dramatically reduce the costs of current policies, and directly address the problems of drug abuse.

AS FRUSTRATIONS WITH THE DRUG PROBLEM AND CURRENT drug policies rise daily, growing numbers of political leaders, law enforcement officials, drug abuse experts, and common citizens are insisting that a radical alternative to current policies be fairly considered: the controlled legalization (or decriminalization) of drugs (1).

Just as "Repeal Prohibition" became a catchphrase that swept together the diverse objections to Prohibition, so "Legalize (or Decriminalize) Drugs" has become a catchphrase that means many things to many people. The policy analyst views legalization as a model for critically examining the costs and benefits of drug prohibition policies. Libertarians, both civil and economic, view it as a policy alternative that eliminates criminal sanctions on the use and sale of drugs that are costly in terms of both individual liberty and economic freedom. Others see it simply as a means to "take the crime out of the drug business." In its broadest sense, however, legalization incorporates the many arguments and growing sentiment for de-emphasizing our traditional reliance on criminal justice resources to deal with drug abuse and for emphasizing instead drug abuse, prevention, treatment, and education, as well as noncriminal restrictions on the availability and use of psychoactive substances and positive inducements to abstain from drug abuse.

There is no one legalization option. At one extreme, some libertarians advocate the removal of all criminal sanctions and taxes on the production and sale of all psychoactive substances—with the possible exception of restrictions on sales to children. The alternative extremes are more varied. Some would limit legalization to one of the safest (relatively speaking) of all illicit substances: marijuana.

Others prefer a "medical" oversight model similar to today's methadone maintenance programs. The middle ground combines legal availability of some or all illicit drugs with vigorous efforts to restrict consumption by means other than resort to criminal sanctions. Many supporters of this dual approach simultaneously advocate greater efforts to limit tobacco consumption and the abuse of alcohol as well as a transfer of government resources from anti-drug law enforcement to drug prevention and treatment. Indeed, the best model for this view of drug legalization is precisely the tobacco control model advocated by those who want to do everything possible to discourage tobacco consumption short of criminalizing the production, sale, and use of tobacco.

Clearly, neither drug legalization nor enforcement of anti-drug laws promises to "solve" the drug problem. Nor is there any question that legalization presents certain risks. Legalization would almost certainly increase the availability of drugs, decrease their price, and remove the deterrent power of the criminal sanction—all of which invite increases in drug use and abuse. There are at least three reasons, however, why these risks are worth taking. First, drug control strategies that rely primarily on criminal justice measures are significantly and inherently limited in their capacity to curtail drug abuse. Second, many law enforcement efforts are not only of limited value but also highly costly and counterproductive; indeed, many of the drug-related evils that most people identify as part and parcel of "the drug problem" are in fact the costs of drug prohibition policies. Third, the risks of legalization may well be less than most people assume, particularly if intelligent alternative measures are implemented.

The Limits of Drug Prohibition Policies

Few law enforcement officials any longer contend that their efforts can do much more than they are already doing to reduce drug abuse in the United States. This is true of international drug enforcement efforts, interdiction, and both high-level and street-level domestic drug enforcement efforts.

The United States seeks to limit the export of illicit drugs to this country by a combination of crop eradication and crop substitution programs, financial inducements to growers to abstain from the illicit business, and punitive measures against producers, traffickers, and others involved in the drug traffic. These efforts have met with scant success in the past and show few indications of succeeding in the future. The obstacles are many: marijuana and opium can be grown in a wide variety of locales and even the coca plant "can be grown in virtually any subtropical region of the world which gets

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between 40 and 240 inches of rain per year, where it never freezes, and where the land is not so swampy as to be waterlogged. In South America this comes to [approximately] 2,500,000 square miles," of which less than 700 square miles are currently being used to cultivate coca (2). Producers in many countries have reacted to crop eradication programs by engaging in "guerrilla" farming methods, cultivating their crops in relatively inaccessible hinterlands, and camouflaging them with legitimate crops. Some illicit drug-producing regions are controlled not by the central government but by drug trafficking gangs or political insurgents, thereby rendering eradication efforts even more difficult and hazardous.

Even where eradication efforts prove relatively successful in an individual country, other countries will emerge as new producers, as has occurred with both the international marijuana and heroin markets during the past two decades and can be expected to follow from planned coca eradication programs. The foreign export price of illicit drugs is such a tiny fraction of the retail price in the United States [approximately 4% with cocaine, 1% with marijuana, and much less than 1% with heroin (3)] that international drug control efforts are not even successful in raising the cost of illicit drugs to U.S. consumers.

U.S. efforts to control drugs overseas also confront substantial, and in some cases well-organized, political opposition in foreign countries (4). Major drug traffickers retain the power to bribe and intimidate government officials into ignoring or even cooperating with their enterprises (5). Particularly in many Latin American and Asian countries, the illicit drug traffic is an important source of income and employment, bringing in billions of dollars in hard currency each year and providing liveable wages for many hundreds of thousands. The illicit drug business has been described—not entirely in jest—as the best means ever devised by the United States for exporting the capitalist ethic to potentially revolutionary Third World peasants. By contrast, United States-sponsored eradication efforts risk depriving those same peasants of their livelihoods, thereby stimulating support for communist insurgencies ranging from Peru's Shining Path (6) to the variety of ethnic and communist organizations active in drug-producing countries such as Colombia and Burma. Moreover, many of those involved in producing illicit drugs overseas do not perceive their moral obligation as preventing decadent gringos from consuming cocaine or heroin; rather it is to earn the best living possible for themselves and their families. In the final analysis, there is little the U.S. government can do to change this perception.

Interdiction efforts have shown little success in stemming the flow of cocaine and heroin into the United States (7). Indeed, during the past decade, the wholesale price of a kilo of cocaine has dropped by 80% even as the retail purity of a gram of cocaine has quintupled from 12 to about 60%; the trend with heroin over the past few years has been similar if less dramatic (8). Easily transported in a variety of large and small aircraft and sea vessels, carried across the Mexican border by legal and illegal border crossers, hidden in everything from furniture, flowers, and automobiles to private body parts and cadavers, heroin and cocaine shipments are extraordinarily difficult to detect. Despite powerful congressional support for dramatically increasing the role of the military in drug interdiction, military leaders insist that they can do little to make a difference. The Coast Guard and U.S. Customs continue to expand their efforts in this area, but they too concede that they will never seize more than a small percentage of total shipments. Because cocaine and heroin are worth more than their weight in gold, the incentives to transport these drugs to the United States are so great that we can safely assume that there will never be a shortage of those willing to take the risk.

The one success that interdiction efforts can claim concerns

marijuana. Because marijuana is far bulkier per dollar of value than either cocaine or heroin, it is harder to conceal and easier to detect. Stepped-up interdiction efforts in recent years appear to have reduced the flow of marijuana into the United States and to have increased its price to the American consumer (8). The unintended consequences of this success are twofold: the United States has emerged as one of the world's leading producers of marijuana; indeed, U.S. producers are now believed to produce among the finest strains in the world (8); and many international drug traffickers appear to have redirected their efforts from marijuana to cocaine. The principal consequence of U.S. drug interdiction efforts, many would contend, has been a glut of increasingly potent cocaine and a shortage of comparatively benign marijuana.

Domestic law enforcement efforts have proven increasingly successful in apprehending and imprisoning rapidly growing numbers of illicit drug merchants, ranging from the most sophisticated international traffickers to the most common street-level drug dealers. The principal benefit of law enforcement efforts directed at major drug trafficking organizations is probably the rapidly rising value of drug trafficker assets forfeited to the government. There is, however, little indication that such efforts have any significant impact on the price or availability of illicit drugs. Intensive and highly costly street-level law enforcement efforts such as those mounted by many urban police departments in recent years have resulted in the arrests of thousands of low-level drug dealers and users and helped improve the quality of life in targeted neighborhoods (9). In most large urban centers, however, these efforts have had little impact on the overall availability of illicit drugs.

The logical conclusion of the foregoing analysis is not that criminal justice efforts to stop drug trafficking do not work at all; rather, it is that even substantial fluctuations in those efforts have little effect on the price, availability, and consumption of illicit drugs. The mere existence of criminal laws combined with minimal levels of enforcement is sufficient to deter many potential users and to reduce the availability and increase the price of drugs. Law enforcement officials acknowledge that they alone cannot solve the drug problem but contend that their role is nonetheless essential to the overall effort to reduce illicit drug use and abuse. What they are less ready to acknowledge, however, is that the very criminalization of the drug market has proven highly costly and counterproductive in much the same way that the national prohibition of alcohol did 60 years ago.

The Costs and Consequences of Drug Prohibition Policies

Total government expenditures devoted to enforcement of drug laws amounted to a minimum of \$10 billion in 1987. Between 1981 and 1987, federal expenditures on anti-drug law enforcement more than tripled, from less than \$1 billion per year to about \$3 billion (10). State and local law enforcement agencies spent an estimated \$5 billion, amounting to about one-fifth of their total investigative resources, on drug enforcement activities in 1986 (11). Drug law violators currently account for approximately 10% of the roughly 550,000 inmates in state prisons, more than one-third of the 50,000 federal prison inmates, and a significant (albeit undetermined) proportion of the approximately 300,000 individuals confined in municipal jails (12). The U.S. Sentencing Commission has predicted that in 15 years the federal prison population will total 100,000 to 150,000 inmates, of whom one-half will be incarcerated for drug law violations (13). Among the 40,000 inmates in New York State prisons, drug law violations surpassed first-degree robbery in 1987

as the number one cause of incarceration, accounting for 20% of the total prison population (14). In Florida, the 8,506 drug law violators admitted to state prisons in fiscal 1987–88 represented a 525% increase from fiscal 1983–84 and 27.8% of all new admissions to prison in 1987–88 (15). Nationwide, drug trafficking and drug possession offenses accounted for approximately 135,000 (23%) of the 583,000 individuals convicted of felonies in state courts in 1986 (16). State and local governments spent a minimum of \$2 billion last year to incarcerate drug offenders. The direct costs of building and maintaining enough prisons to house this growing population are rising at an astronomical rate. The costs, in terms of alternative social expenditures foregone and other types of criminals not imprisoned, are perhaps even more severe (17).

Police have made about 750,000 arrests for violations of the drug laws during each of the last few years (18). Slightly more than three-quarters of these have been not for manufacturing or dealing drugs but solely for possession of an illicit drug, typically marijuana (19). [Those arrested, it is worth noting, represent less than 2% of the 35 to 40 million Americans estimated to have illegally consumed a drug during each of the past years (20).] On the one hand, these arrests have clogged many urban criminal justice systems: in New York City, drug law violations in 1987 accounted for more than 40% of all felony indictments, up from 25% in 1985 (21); in Washington, D.C., the figure was 52% in 1986, up from 13% in 1981 (22). On the other hand, they have distracted criminal justice officials from concentrating greater resources on violent offenses and property crimes. In many cities, urban law enforcement has become virtually synonymous with drug enforcement.

The greatest beneficiaries of the drug laws are organized and unorganized drug traffickers. The criminalization of the drug market effectively imposes a *de facto* value-added tax that is enforced and occasionally augmented by the law enforcement establishment and collected by the drug traffickers. More than half of all organized crime revenues are believed to derive from the illicit drug business; estimates of the dollar value range between \$10 and \$50 billion per year (23). By contrast, annual revenues from cigarette bootlegging, which persists principally because of differences among states in their cigarette tax rates, are estimated at between \$200 million and \$400 million (23). If the marijuana, cocaine, and heroin markets were legal, state and federal governments would collect billions of dollars annually in tax revenues. Instead, they expend billions in what amounts to a subsidy of organized criminals.

The connection between drugs and crime is one that continues to resist coherent analysis both because cause and effect are so difficult to distinguish and because the role of the drug prohibition laws in causing and labeling “drug-related crime” is so often ignored. There are five possible connections between drugs and crime, at least three of which would be much diminished if the drug prohibition laws were repealed. First, the production, sale, purchase, and possession of marijuana, cocaine, heroin, and other strictly controlled and banned substances are crimes in and of themselves, which occur billions of times each year in the United States alone. In the absence of drug prohibition laws, these activities would largely cease to be considered crimes. Selling drugs to children would, of course, continue to be criminalized, and other evasions of government regulation of a legal market would continue to be prosecuted, but by and large the connection between drugs and crime that now accounts for all of the criminal justice costs noted above would be severed.

Second, many illicit drug users commit crimes such as robbery and burglary, as well as other vice crimes such as drug dealing, prostitution, and numbers running, to earn enough money to purchase cocaine, heroin, and other illicit drugs—drugs that cost far more than alcohol and tobacco not because they cost much more to

produce but because they are illegal (24). Because legalization would inevitably lead to a reduction in the cost of the drugs that are now illicit, it would also invite a significant reduction in this drug-crime connection. At the same time, current methadone maintenance programs represent a limited form of drug legalization that attempts to break this connection between drugs and crime by providing an addictive opiate at little or no cost to addicts who might otherwise steal to support their illicit heroin habits. Despite their many limitations, such programs have proven effective in reducing the criminal behavior and improving the lives of thousands of illicit drug addicts (25); they need to be made more available, in part by adapting the types of outreach programs for addicts devised in the Netherlands (26). Another alternative, the British system of prescribing not just oral methadone but also injectable heroin and methadone to addicts who take drugs intravenously, persists on a small scale even today despite continuing pressures against prescribing injectables. This too merits adoption in the United States, particularly if one accepts the assumption that the primary objective of drug policy should be to minimize the harms that drug abusers do to others (27).

The third connection between drugs and crime is more coincidental than causal in nature. Although most illicit drug users do not engage in crime aside from their drug use, and although many criminals do not use or abuse illicit drugs or alcohol, substance abuse clearly is much higher among criminals than among noncriminals. A 1986 survey of state prison inmates found that 43% were using illegal drugs on a daily or near daily basis in the month before they committed the crime for which they were incarcerated; it also found that roughly one-half of the inmates who had used an illicit drug did not do so until after their first arrest (28). Perhaps many of the same factors that lead individuals into lives of crime also push them in the direction of substance abuse. It is possible that legalization would diminish this connection by removing from the criminal subculture the lucrative opportunities that now derive from the illegality of the drug market. But it is also safe to assume that the criminal milieu will continue to claim a disproportionately large share of drug abusers regardless of whether or not drugs are legalized.

The fourth link between drugs and crime is the commission of violent and other crimes by people under the influence of illicit drugs. It is this connection that seems to most infect the popular imagination. Clearly, some drugs do “cause” some people to commit crimes by reducing normal inhibitions, unleashing aggressive and other asocial tendencies, and lessening senses of responsibility. Cocaine, particularly in the form of “crack,” has gained such a reputation in recent years, just as heroin did in the 1960s and 1970s and marijuana did in the years before that. Crack cocaine’s reputation for inspiring violent behavior may well be more deserved than were those of marijuana and heroin, although the evidence has yet to substantiate media depictions (29). No illicit drug, however, is as strongly associated with violent behavior as is alcohol. According to Justice Department statistics, 54% of all jail inmates convicted of violent crimes in 1983 reported having used alcohol just prior to committing their offense (30). A 1986 survey of state prison inmates similarly found that most of those convicted of arson as well as violent crimes such as murder, involuntary manslaughter, and rape were far more likely to have been under the influence of alcohol, or both alcohol and illicit drugs, than under the influence of illicit drugs alone (31). The impact of drug legalization on this aspect of the drug-crime connection is the most difficult to assess, largely because changes in the overall level and nature of drug consumption are so difficult to predict.

The fifth connection is the violent, intimidating, and corrupting behavior of the drug traffickers. In many Latin American countries, most notably Colombia, this connection virtually defines the “drug

problem.” But even within the United States, drug trafficker violence is rapidly becoming a major concern of criminal justice officials and the public at large. The connection is not difficult to explain. Illegal markets tend to breed violence, both because they attract criminally minded and violent individuals and because participants in the market have no resort to legal institutions to resolve their disputes (32). During Prohibition, violent struggles between bootlegging gangs and hijackings of booze-laden trucks and sea vessels were frequent and notorious occurrences. Today’s equivalents are the booby traps that surround some marijuana fields, the pirates of the Caribbean looking to rob drug-laden vessels en route to the shores of the United States, the machine gun battles and executions of the more sordid drug gangs, and the generally high levels of violence that attend many illicit drug relationships; the victims include not just drug dealers but witnesses, bystanders, and law enforcement officials. Most law enforcement authorities agree that the dramatic increases in urban murder rates during the past few years can be explained almost entirely by the rise in drug dealer killings, mostly of one another (33). At the same time, the powerful allure of illicit drug dollars is responsible for rising levels of corruption not just in Latin America and the Caribbean but also in federal, state, and local criminal justice systems throughout the United States (34). A drug legalization strategy would certainly deal a severe blow to this link between drugs and crime.

Perhaps the most unfortunate victims of the drug prohibition policies have been the poor and law-abiding residents of urban ghettos. Those policies have proven largely futile in deterring large numbers of ghetto dwellers from becoming drug abusers but they do account for much of what ghetto residents identify as the drug problem. In many neighborhoods, it often seems to be the aggressive gun-toting drug dealers who upset law-abiding residents far more than the addicts nodding out in doorways (35). Other residents, however, perceive the drug dealers as heroes and successful role models. In impoverished neighborhoods from Medellín and Rio de Janeiro to many leading U.S. cities, they often stand out as symbols of success to children who see no other options. At the same time, the increasingly harsh criminal penalties imposed on adult drug dealers have led to the widespread recruiting of juveniles by drug traffickers (36). Where once children started dealing drugs only after they had been using them for a few years, today the sequence is often reversed. Many children start to use illegal drugs now only after they have worked for older drug dealers for a while. And the juvenile justice system offers no realistic options for dealing with this growing problem.

Perhaps the most difficult costs to evaluate are those that relate to the widespread defiance of the drug prohibition laws: the effects of labeling as criminals the tens of millions of people who use drugs illicitly, subjecting them to the risks of criminal sanction, and obliging many of those same people to enter into relationships with drug dealers (who may be criminals in many more senses of the word) in order to purchase their drugs; the cynicism that such laws generate toward other laws and the law in general; and the sense of hostility and suspicion that many otherwise law-abiding individuals feel toward law enforcement officials. It was costs such as these that strongly influenced many of Prohibition’s more conservative opponents.

Among the most dangerous consequences of the drug laws are the harms that stem from the unregulated nature of illicit drug production and sale (37). Many marijuana smokers are worse off for having smoked cannabis that was grown with dangerous fertilizers, sprayed with the herbicide paraquat, or mixed with more dangerous substances. Consumers of heroin and the various synthetic substances sold on the street face even more severe consequences, including fatal overdoses and poisonings from unexpectedly potent or impure

drug supplies. In short, nothing resembling an underground Food and Drug Administration has arisen to impose quality control on the illegal drug market and provide users with accurate information on the drugs they consume. More often than not, the quality of a drug addict’s life depends greatly on his or her access to reliable supplies. Drug enforcement operations that succeed in temporarily disrupting supply networks are thus a double-edged sword: they encourage some addicts to seek admission into drug treatment programs, but they oblige others to seek out new and hence less reliable suppliers, with the result that more, not fewer, drug-related emergencies and deaths occur.

Today, about 25% of all acquired immunodeficiency syndrome (AIDS) cases in the United States and Europe, as well as the large majority of human immunodeficiency virus (HIV)–infected heterosexuals, children, and infants, are believed to have contracted the dreaded disease directly or indirectly from illegal intravenous (IV) drug use (38). In the New York metropolitan area, the prevalence of a seropositive test for HIV among illicit IV drug users is over 50% (39). Reports have emerged of drug dealers beginning to provide clean syringes together with their illegal drugs (40). In England, recent increases in the number of HIV-infected drug users have led to renewed support among drug treatment clinicians for providing IV heroin addicts with free supplies of injectable methadone and heroin; this reversal of the strong preference among many drug treatment clinicians since the early 1970s for oral methadone maintenance has been spearheaded by Philip Connell, chairman of the Home Office Advisory Committee on the Misuse of Drugs (41). But even as governments in England, Scotland, Sweden, Switzerland, Australia, the Netherlands, and elsewhere actively attempt to limit the spread of AIDS by and among drug users by removing restrictions on the sale of syringes and instituting free syringe exchange programs (42), state and municipal governments in the United States have resisted following suit, arguing, despite mounting evidence to the contrary (43), that to do so would “encourage” or “condone” the use of illegal drugs (44). Only in late 1988 did needle exchange programs begin emerging in U.S. cities, typically at the initiative of nongovernmental organizations. By mid-1989, programs were under way or close to being implemented in New York City; Tacoma, Washington; Boulder, Colorado; and Portland, Oregon (45). At the same time, drug treatment programs remain notoriously underfunded, turning away tens of thousands of addicts seeking help even as increasing billions of dollars are spent to arrest, prosecute, and imprison illegal drug sellers and users.

Other costs of current drug prohibition policies include the restrictions on using the illicit drugs for legitimate medical purposes (46). Marijuana has proven useful in alleviating pain in some victims of multiple sclerosis, is particularly effective in reducing the nausea that accompanies chemotherapy, and may well prove effective in the treatment of glaucoma (47–49); in September 1988, the administrative law judge of the Drug Enforcement Administration accordingly recommended that marijuana be made legally available for such purposes (49), although the agency head has yet to approve the change. Heroin has proven highly effective in helping patients to deal with severe pain; some researchers have found it more effective than morphine and other opiates in treating pain in some patients (50). It is legally prescribed for such purposes in Britain (50) and Canada (51). The same may be true of cocaine, which continues to be used by some doctors in the United States to treat pain despite recently imposed bans (52). The psychedelic drugs, such as LSD (*d*-lysergic acid diethylamide), peyote, and MDMA (known as Ecstasy) have shown promise in aiding psychotherapy and in reducing tension, depression, pain, and fear of death in the terminally ill (53); they also have demonstrated some potential, as yet unconfirmed, to aid in the treatment of alcoholism (47, 53). Current drug laws and

policies, however, greatly hamper the efforts of researchers to investigate these and other potential medical uses of illegal drugs; they make it virtually impossible for any of the illegal drugs, particularly those in Schedule I, to be legally provided to those who would benefit from them; and they contribute strongly to the widely acknowledged undertreatment of pain by the medical profession in the United States (54).

Among the strongest arguments in favor of legalization are the moral ones. On the one hand, the standard refrain regarding the immorality of drug use crumbles in the face of most Americans' tolerance for alcohol and tobacco use. Only the Mormons and a few other like-minded sects, who regard as immoral any intake of substances to alter one's state of consciousness or otherwise cause pleasure, are consistent in this respect; they eschew not just the illicit drugs but also alcohol, tobacco, caffeinated coffee and tea, and even chocolate. "Moral" condemnation by the majority of Americans of some substances and not others is little more than a transient prejudice in favor of some drugs and against others.

On the other hand, drug enforcement involves its own immoralities. Because drug law violations do not create victims with an interest in notifying the police, drug enforcement agents must rely heavily on undercover operations, electronic surveillance, and information provided by informants. In 1986, almost half of the 754 court-authorized orders for wiretaps in the United States involved drug trafficking investigations (55). These techniques are certainly indispensable to effective law enforcement, but they are also among the least desirable of the tools available to police. The same is true of drug testing. It may be useful and even necessary for determining liability in accidents, but it also threatens and undermines the right of privacy to which many Americans believe they are morally and constitutionally entitled. There are good reasons for requiring that such measures be used sparingly.

Equally disturbing are the increasingly vocal calls for people to inform not just on drug dealers but on neighbors, friends, and even family members who use illicit drugs. Intolerance of illicit drug use and users is heralded not merely as an indispensable ingredient in the war against drugs but as a mark of good citizenship. Certainly every society requires citizens to assist in the enforcement of criminal laws. But societies, particularly democratic and pluralistic ones, also rely strongly on an ethic of tolerance toward those who are different but do no harm to others. Overzealous enforcement of the drug laws risks undermining that ethic and propagating in its place a society of informants. Indeed, enforcement of drug laws makes a mockery of an essential principle of a free society, that those who do no harm to others should not be harmed by others, and particularly not by the state. Most of the nearly 40 million Americans who illegally consume drugs each year do no direct harm to anyone else; indeed, most do relatively little harm even to themselves. Directing criminal and other sanctions at them, and rationalizing the justice of such sanctions, may well represent the greatest societal cost of our current drug prohibition system.

Alternatives to Drug Prohibition Policies

Repealing the drug prohibition laws clearly promises tremendous advantages. Between reduced government expenditures on enforcing drug laws and new tax revenue from legal drug production and sales, public treasuries would enjoy a net benefit of at least \$10 billion per year and possibly much more; thus billions in new revenues would be available, and ideally targeted, for funding much-needed drug treatment programs as well as the types of social and educational programs that often prove most effective in creating

incentives for children not to abuse drugs. The quality of urban life would rise significantly. Homicide rates would decline. So would robbery and burglary rates. Organized criminal groups, particularly the up-and-coming ones that have yet to diversify into nondrug areas, would be dealt a devastating setback. The police, prosecutors, and courts would focus their resources on combating the types of crimes that people cannot walk away from. More ghetto residents would turn their backs on criminal careers and seek out legitimate opportunities instead. And the health and quality of life of many drug users and even drug abusers would improve significantly. Internationally, U.S. foreign policymakers would get on with more important and realistic objectives, and foreign governments would reclaim the authority that they have lost to the drug traffickers.

All the benefits of legalization would be for naught, however, if millions more people were to become drug abusers. Our experience with alcohol and tobacco provides ample warnings. Today, alcohol is consumed by 140 million Americans and tobacco by 50 million. All of the health costs associated with abuse of the illicit drugs pale in comparison with those resulting from tobacco and alcohol abuse. In 1986, for instance, alcohol was identified as a contributing factor in 10% of work-related injuries, 40% of suicide attempts, and about 40% of the approximately 46,000 annual traffic deaths in 1983. An estimated 18 million Americans are reported to be either alcoholics or alcohol abusers. The total cost of alcohol abuse to American society is estimated at over \$100 billion annually (56). Estimates of the number of deaths linked directly and indirectly to alcohol use vary from a low of 50,000 to a high of 200,000 per year (57). The health costs of tobacco use are different but of similar magnitude. In the United States alone, an estimated 320,000 people die prematurely each year as a consequence of their consumption of tobacco. By comparison, the National Council on Alcoholism reported that only 3,562 people were known to have died in 1985 from use of all illegal drugs combined (58). Even if we assume that thousands more deaths were related in one way or another to illicit drug use but not reported as such, we still are left with the conclusion that all of the health costs of marijuana, cocaine, and heroin combined amount to only a small fraction of those caused by either of the two licit substances. At the very least, this contrast emphasizes the need for a comprehensive approach to psychoactive substances involving much greater efforts to discourage tobacco and alcohol abuse.

The impact of legalization on the nature and level of consumption of those drugs that are currently illegal is impossible to predict with any accuracy. On the one hand, legalization implies greater availability, lower prices, and the elimination (particularly for adults) of the deterrent power of the criminal sanction—all of which would suggest higher levels of use. Indeed, some fear that the extent of drug abuse and its attendant costs would rise to those currently associated with alcohol and tobacco (59). On the other hand, there are many reasons to doubt that a well-designed and implemented policy of controlled drug legalization would yield such costly consequences.

The logic of legalization depends in part upon two assumptions: that most illegal drugs are not as dangerous as is commonly believed; and that those types of drugs and methods of consumption that are most risky are unlikely to prove appealing to many people precisely because they are so obviously dangerous. Consider marijuana. Among the roughly 60 million Americans who have smoked marijuana, not one has died from a marijuana overdose (49), a striking contrast with alcohol, which is involved in approximately 10,000 overdose deaths annually, half in combination with other drugs (57). Although there are good health reasons for people not to smoke marijuana daily, and for children, pregnant women, and some others not to smoke at all, there still appears to be little evidence that occasional marijuana consumption does much harm at

all. Certainly, it is not healthy to inhale marijuana smoke into one's lungs; indeed, the National Institute on Drug Abuse (NIDA) has declared that "marijuana smoke contains more cancer-causing agents than is found in tobacco smoke." (60). On the other hand, the number of "joints" smoked by all but a very small percentage of marijuana smokers is a tiny fraction of the 20 cigarettes a day smoked by the average cigarette smoker; indeed, the average may be closer to one or two joints per week than one or two per day. Note that the NIDA defines a "heavy" marijuana smoker as one who consumes at least two joints "daily." A heavy tobacco smoker, by contrast, smokes about 40 cigarettes per day.

Nor is marijuana strongly identified as a dependence-causing substance. A 1982 survey of marijuana use by young adults (18 to 25 years) found that 64% had tried marijuana at least once, that 42% had used it at least ten times, and that 27% had smoked in the last month. It also found that 21% had passed through a period during which they smoked "daily" (defined as 20 or more days per month) but that only one-third of those currently smoked daily and only one-fifth (or about 4% of all young adults) could be described as heavy daily users (averaging two or more joints per day) (61). This suggests in part that daily marijuana use is typically a phase through which people pass, after which their use becomes more moderate. By contrast, almost 20% of high school seniors smoke cigarettes daily.

The dangers associated with cocaine, heroin, the hallucinogens, and other illicit substances are greater than those posed by marijuana but not nearly so great as many people seem to think. Consider the case of cocaine. In 1986, NIDA reported that over 20 million Americans had tried cocaine, that 12.2 million had consumed it at least once during 1985, and that nearly 5.8 million had used it within the past month. Among 18- to 25-year-olds, 8.2 million had tried cocaine; 5.3 million had used it within the past year; 2.5 million had used it within the past month; and 250,000 had used it on the average weekly (20). One could extrapolate from these figures that a quarter of a million young Americans are potential problem users. But one could also conclude that only 3% of those 18- to 25-year-olds who had ever tried the drug fell into that category, and that only 10% of those who had used cocaine monthly were at risk. (The NIDA survey did not, it should be noted, include persons residing in military or student dormitories, prison inmates, or the homeless.)

All of this is not to say that cocaine is not a potentially dangerous drug, especially when it is injected, smoked in the form of "crack," or consumed in tandem with other powerful substances. Clearly, many tens of thousands of Americans have suffered severely from their abuse of cocaine and a tiny fraction have died. But there is also overwhelming evidence that most users of cocaine do not get into trouble with the drug. So much of the media attention has focused on the relatively small percentage of cocaine users who become addicted that the popular perception of how most people use cocaine has become badly distorted. In one survey of high school seniors' drug use, the researchers questioned those who had used cocaine recently whether they had ever tried to stop using cocaine and found that they could not stop. Only 3.8% responded affirmatively, in contrast to the almost 7% of marijuana smokers who said they had tried to stop and found they could not, and the 18% of cigarette smokers who answered similarly (62). Although a survey of crack users and cocaine injectors surely would reveal a higher proportion of addicts, evidence such as this suggests that only a small percentage of people who snort cocaine end up having a problem with it. In this respect, most people differ from captive monkeys, who have demonstrated in tests that they will starve themselves to death if provided with unlimited cocaine (63).

With respect to the hallucinogens such as LSD and psilocybic

mushrooms, their potential for addiction is virtually nil. The dangers arise primarily from using them irresponsibly on individual occasions (53). Although many of those who have used hallucinogens have experienced "bad trips," far more have reported positive experiences and very few have suffered any long-term harm (53). As for the great assortment of stimulants, depressants, and tranquilizers produced illegally or diverted from licit channels, each evidences varying capacities to create addiction, harm the user, or be used safely.

Until recently, no drugs were regarded with as much horror as the opiates, and in particular heroin. As with most drugs, it can be eaten, snorted, smoked, or injected. The custom among most Americans, unfortunately, is the last of these options, although the growing fear of AIDS appears to be causing a shift among younger addicts toward intranasal ingestion (64). There is no question that heroin is potentially highly addictive, perhaps as addictive as nicotine. But despite the popular association of heroin use with the most down-and-out inhabitants of urban ghettos, heroin causes relatively little physical harm to the human body. Consumed on an occasional or regular basis under sanitary conditions, its worst side effect, apart from the fact of being addicted, is constipation (65). That is one reason why many doctors in early 20th-century America saw opiate addiction as preferable to alcoholism and prescribed the former as treatment for the latter where abstinence did not seem a realistic option (66, 67).

It is both insightful and important to think about the illicit drugs as we do about alcohol and tobacco. Like tobacco, some illicit substances are highly addictive but can be consumed on a regular basis for decades without any demonstrable harm. Like alcohol, many of the substances can be, and are, used by most consumers in moderation, with little in the way of harmful effects; but like alcohol they also lend themselves to abuse by a minority of users who become addicted or otherwise harm themselves or others as a consequence. And like both the legal substances, the psychoactive effects of each of the illegal drugs vary greatly from one person to another. To be sure, the pharmacology of the substance is important, as is its purity and the manner in which it is consumed. But much also depends upon not just the physiology and psychology of the consumer but his expectations regarding the drug, his social milieu, and the broader cultural environment, what Harvard University psychiatrist Norman Zinberg called the "set and setting" of the drug (68). It is factors such as these that might change dramatically, albeit in indeterminate ways, were the illicit drugs made legally available.

It is thus impossible to predict whether or not legalization would lead to much greater levels of drug abuse. The lessons that can be drawn from other societies are mixed. China's experience with the British opium pushers of the 19th century, when millions reportedly became addicted to the drug, offers one worst-case scenario. The devastation of many native American tribes by alcohol presents another. On the other hand, the decriminalization of marijuana by 11 states in the United States during the mid-1970s does not appear to have led to increases in marijuana consumption (69). In the Netherlands, which went even further in decriminalizing cannabis during the 1970s, consumption has actually declined significantly; in 1976, 3% of 15- and 16-year-olds and 10% of 17- and 18-year-olds used cannabis occasionally; by 1985, the percentages had declined to 2 and 6%, respectively (70). The policy has succeeded, as the government intended, "in making drug use boring." Finally, late 19th-century America is an example of a society in which there were almost no drug laws or even drug regulations but levels of drug use were about what they are today (71). Drug abuse was regarded as a relatively serious problem, but the criminal justice system was not regarded as part of the solution (72).

There are however, strong reasons to believe that none of the currently illicit substances would become as popular as alcohol or tobacco even if they were legalized. Alcohol has long been the principal intoxicant in most societies, including many in which other substances have been legally available. Presumably, its diverse properties account for its popularity: it quenches thirst, goes well with food, often pleases the palate, promotes appetite as well as sociability, and so on. The widespread use of tobacco probably stems not just from its powerful addictive qualities but from the fact that its psychoactive effects are sufficiently subtle that cigarettes can be integrated with most other human activities. None of the illicit substances now popular in the United States share either of these qualities to the same extent, nor is it likely that they would acquire them if they were legalized. Moreover, none of the illicit substances can compete with alcohol's special place in American culture and history, one that it retained even during Prohibition.

Much of the damage caused by illegal drugs today stems from their consumption in particularly potent and dangerous ways. There is good reason to doubt that many Americans would inject cocaine or heroin into their veins even if given the chance to do so legally. And just as the dramatic growth in the heroin-consuming population during the 1960s leveled off for reasons apparently having little to do with law enforcement, so we can expect, if it has not already occurred, a leveling off in the number of people smoking crack.

Perhaps the most reassuring reason for believing that repeal of the drug prohibition laws will not lead to tremendous increases in drug abuse levels is the fact that we have learned something from our past experiences with alcohol and tobacco abuse. We now know, for instance, that consumption taxes are an effective method for limiting consumption rates and related costs, especially among young people (73). Substantial evidence also suggests that restrictions and bans on advertising, as well as promotion of negative advertising, can make a difference (74). The same seems to be true of other government measures, including restrictions on time and place of sale (75), bans on vending machines, prohibitions of consumption in public places, packaging requirements, mandated adjustments in insurance policies, crackdowns on driving while under the influence (76), and laws holding bartenders and hosts responsible for the drinking of customers and guests. There is even some evidence that some education programs about the dangers of cigarette smoking have deterred many children from beginning to smoke (77). At the same time, we also have come to recognize the great harms that can result when drug control policies are undermined by powerful lobbies such as those that now block efforts to lessen the harms caused by abuse of alcohol and tobacco.

Legalization thus affords far greater opportunities to control drug use and abuse than do current criminalization policies. The current strategy is one in which the type, price, purity, and potency of illicit drugs, as well as the participants in the business, are largely determined by drug dealers, the peculiar competitive dynamics of an illicit market, and the perverse interplay of drug enforcement strategies and drug trafficking tactics. During the past decade, for instance, the average retail purities of cocaine and heroin have increased dramatically, the wholesale prices have dropped greatly, the number of children involved in drug dealing has risen, and crack has become readily and cheaply available in a growing number of American cities (8). By contrast, marijuana has become relatively scarcer and more expensive, in part because it is far more vulnerable to drug enforcement efforts than are cocaine or heroin; the result has been to induce both dealers and users away from the relatively safer marijuana and toward the relatively more dangerous cocaine (8). Also by contrast, while the average potency of most illicit substances has increased during the 1980s, that of most legal psychoactive substances has been declining. Motivated in good part by health

concerns, Americans are switching from hard liquor to beer and wine, from high tar and nicotine cigarettes to lower tar and nicotine cigarettes as well as smokeless tobaccos and nicotine chewing gums, and even from caffeinated to decaffeinated coffees, teas, and sodas. It is quite possible that these diverging trends are less a reflection of the nature of the drugs than of their legal status.

A drug control policy based predominantly on approaches other than criminal justice thus offers a number of significant advantages over the current criminal justice focus in controlling drug use and abuse. It shifts control of production, distribution, and, to a lesser extent, consumption out of the hands of criminals and into the hands of government and government licensees. It affords consumers the opportunity to make far more informed decisions about the drugs they buy than is currently the case. It dramatically lessens the likelihood that drug consumers will be harmed by impure, unexpectedly potent, or misidentified drugs. It corrects the hypocritical and dangerous message that alcohol and tobacco are somehow safer than many illicit drugs. It reduces by billions of dollars annually government expenditures on drug enforcement and simultaneously raises additional billions in tax revenues. And it allows government the opportunity to shape consumption patterns toward relatively safer psychoactive substances and modes of consumption.

Toward the end of the 1920s, when the debate over repealing Prohibition rapidly gained momentum, numerous scholars, journalists, and private and government commissions undertook thorough evaluations of Prohibition and the potential alternatives. Prominent among these were the Wickersham Commission appointed by President Herbert Hoover and the study of alcohol regulation abroad directed by the leading police scholar in the United States, Raymond Fosdick, and commissioned by John D. Rockefeller (78). These efforts examined the successes and failings of Prohibition in the United States and evaluated the wide array of alternative regimes for controlling the distribution and use of beer, wine, and liquor. They played a major role in stimulating the public reevaluation of Prohibition and in envisioning alternatives. Precisely the same sorts of efforts are required today.

The controlled drug legalization option is not an all-or-nothing alternative to current policies. Indeed, political realities ensure that any shift toward legalization will evolve gradually, with ample opportunity to halt, reevaluate, and redirect drug policies that begin to prove too costly or counterproductive. The federal government need not play the leading role in devising alternatives; it need only clear the way to allow state and local governments the legal power to implement their own drug legalization policies. The first steps are relatively risk-free: legalization of marijuana, easier availability of illegal and strictly controlled drugs for treatment of pain and other medical purposes, tougher tobacco and alcohol control policies, and a broader and more available array of drug treatment programs.

Remedying the drug-related ills of America's ghettos requires more radical steps. The risks of a more far-reaching policy of controlled drug legalization—increased availability, lower prices, and removal of the deterrent power of the criminal sanction—are relatively less in the ghettos than in most other parts of the United States in good part because drug availability is already so high, prices so low, and the criminal sanction so ineffective in deterring illicit drug use that legalization can hardly worsen the situation. On the other hand, legalization would yield its greatest benefits in the ghettos, where it would sever much of the drug-crime connection, seize the market away from criminals, deglorify involvement in the illicit drug business, help redirect the work ethic from illegitimate to legitimate employment opportunities, help stem the transmission of AIDS by IV drug users, and significantly improve the safety, health, and well-being of those who do use and abuse drugs. Simply stated, legalizing cocaine, heroin, and other relatively dangerous drugs may

well be the only way to reverse the destructive impact of drugs and current drug policies in the ghettos.

There is no question that legalization is a risky policy, one that may indeed lead to an increase in the number of people who abuse drugs. But that risk is by no means a certainty. At the same time, current drug control policies are showing little progress and new proposals promise only to be more costly and more repressive. We know that repealing the drug prohibition laws would eliminate or greatly reduce many of the ills that people commonly identify as part and parcel of the "drug problem." Yet that option is repeatedly and vociferously dismissed without any attempt to evaluate it openly and objectively. The past 20 years have demonstrated that a drug policy shaped by rhetoric and fear-mongering can only lead to our current disaster. Unless we are willing to honestly evaluate all our options, including various legalization strategies, there is a good chance that we will never identify the best solutions for our drug problems.

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Organization of the Human Brain

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Examination of structure-function correlates in the human brain reveals that there is a high degree of functional specificity in the information transmitted over neural systems. It also appears that the human brain has a modular organization consisting of identifiable component processes that participate in the generation of a cognitive state. The effects of isolating entire modular systems or of disconnecting the component parts can be observed. The features of a left hemisphere specialized capacity to interpret the actions of modules are discussed in terms of human consciousness.

THE EXAMINATION OF NEUROLOGIC PATIENTS WITH THE use of experimental methods borrowed from psychology, neuroscience, and medicine yields insights into the cerebral organization of human cognition. An emerging view is that the brain is structurally and functionally organized into discrete units or "modules" and that these components interact to produce mental activities. The idea of modularity is used in several different contexts in the mind sciences. In this article I review the work from my laboratory on patients who have undergone partial or complete brain bisection and address the concept of modularity from three different perspectives.

First, structure-function correlations in the central nervous systems of animals have greatly advanced the understanding of cerebral organization in recent years and continue to represent one of the ways to think about modularity. The clearest instances are in the analysis of sensory systems and, in particular, vision (1). Over the past two decades, for example, several anatomically distinct cortical areas have been discovered that are preferentially but not inclusively or exclusively involved in the processing of various dimensions of visual information such as color, motion, and depth perception. Greater specificity in structure-function correlations has also been seen in the monkey for higher order processes such as memory and problem-solving capacity (2). Thus, research on animals has led to the belief that there are anatomic modules involved in information processing of all kinds and that they work in parallel and are distributed throughout the brain. Evidence for structure-function correlates in humans is presented.

Second, cognitive science has provided useful and diverse models of mental activity that are based on modular interactions. Particular

mental capacities, such as the ability to form visual images, the ability to attend and to remember, the capacity for language, and a host of other cognitive skills, have been analyzed in terms of the "components" or modules that interact to produce what seems to be a unitary skill (3). As these models have developed, there have been continuing attempts to test their biologic validity by examining patients with brain damage, or with brain areas disconnected from one another, in order to identify the specific structures involved in particular aspects of a mental activity. Models of human cognition (as opposed to animal cognition) allow for far more extensive examination of modular concepts because more complex mental activities can be studied.

Finally, the idea of modularity is considered at a more integrative level in which mechanisms of consciousness such as human belief formation are investigated (4). Here the term modularity refers to the collective action of several subprocesses that produce either overt or covert actions and behaviors. Studies on split-brain patients have revealed the presence of a system in the left hemisphere that interprets these actions, moods, and thought processes that are generated by groups of modules that are acting outside the realm of our conscious awareness. The left-brain "interpreter" constructs theories about these actions and feelings and tries to bring order and unity to our conscious lives. It is a special system that works independently from language processes and appears to be unique to the human brain and related to the singular capacity of the brain to make causal inferences.

Neurologic Correlates of Function

By combining in vivo anatomic data obtained by magnetic resonance (MR) imaging with neuropsychological data, investigators are able to determine some of the effects of brain lesions on human behavior and to evaluate the specificity of the correlations between structure and function. My colleagues and I have seen precise structure-function correlates when the corpus callosum (the structure connecting the two halves of the brain) is surgically cut in an effort to control epilepsy.

In a patient whose corpus callosum is completely transected, there is little or no perceptual or cognitive interaction between the hemispheres (Fig. 1A). Also, contrary to findings in primates and

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