Carl L. Hart
Charles J. Ksir

# DRUGS, SOCIETY & Human Behavior

Seventeenth Edition

Mc Graw Hill Education

# Drugs, Society & Human Behavior

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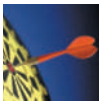

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# About the Authors

Dr. Hart is the chair of the Department of Psychology and Dirk Ziff Professor in Psychiatry at Columbia University. He has published extensively in the area of neuropsychopharmacology and continues to lecture on the topic of psychoactive drug use throughout the world.

Dr. Ksir is professor emeritus of psychology and neuroscience at the University of Wyoming. Now retired after 35 years of research and teaching, he has authored or coauthored *Drugs, Society and Human Behavior* since 1984. He continues to teach a class based on this text via the Internet.

# Preface

Today's media-oriented college students are aware of many issues relating to drug use. Nearly every day we hear new concerns about the "opioid crisis" legal pharmaceuticals, and the effects of tobacco and alcohol, and most of us have had some personal experience with these issues through family, friends, or co-workers. This course is one of the most exciting students will take because it will help them relate the latest information on drugs to their effects on society and human behavior. Students will not only be in a better position to make decisions to enhance their own health and well-being, but they will also have a deeper understanding of the individual problems and social conflicts that arise when others misuse and abuse psychoactive substances.

Much has changed in the 40 plus years since *Drugs, Society and Human Behavior* was first published. The 1970s were a period of widespread experimentation with cannabis and psychedelics, while the 1980s brought increased concern about illegal drugs and conservatism, along with decreased use of alcohol and all illicit drugs. Not only did drug-using behavior change, but so did attitudes and knowledge. And, of course, in each decade the particular drugs of immediate social concern have changed: LSD gave way to angel dust, then to heroin, then to cocaine. In the 1990s, we saw increased use of LSD and cannabis, but not to the levels of the 1970s.

## Recent Trends

The most alarming trend in recent years has been the increased misuse of heroin and prescription opioid pain relievers such as Oxycontin and Vicodin. This class of drug has now replaced cocaine as the leading cause of drug overdose deaths in the United States (not counting alcohol overdoses), and it inspired a new White House task force on opioid addiction.

Meanwhile, our old standbys, alcohol and tobacco, remain with us and continue to create serious health and social problems. Regulations undergo frequent changes, new scientific information becomes available, and new approaches to prevention and treatment are being tested, but the reality of substance use and abuse always seems to be with us.

This text approaches drugs and drug use from a variety of perspectives—behavioral, pharmacological, historical, social, legal, and clinical—which will help students connect the content to their own interests.

## Special Features

### Updated Content in the Seventeenth Edition

Throughout each chapter, we have included the very latest information and statistics, and—the Drugs in the Media feature has allowed us to comment on breaking news right up to press time. In addition, we have introduced many timely topics and issues that are sure to pique students' interest and stimulate class discussion.

The following are just some of the new and updated topics in the seventeenth edition.

- Statistics on drug use trends, new drug treatments, and drug-related mortality statistics from National Survey on Drug Use and Health and DAWN (Chapter 1 and throughout)
- Toxicity data from the Drug Abuse Warning Network (Chapter 2)
- Information on the cost of current drug control strategies (Chapter 3)
- Introduction to the concept of neuropeptides (Chapter 4)

- Information on how racial discrimination persists today in the enforcement of cocaine laws (Chapter 6)
- Updated tables containing information on antipsychotic and antidepressant medications (Chapter 8)
- Updated statistics on per-capita ethanol consumption by beverage type (Chapter 9)
- Presentation of tips that may be useful in preventing opioid overdoses (Chapter 13)
- Updated information on the number of states that allow the medical and/or recreational use of cannabis (Chapter 15)
- New chapter on drug policies that work (Chapter 18)

## Focus Boxes

Boxes are used in *Drugs, Society and Human Behavior* to explore a wide range of current topics in greater detail than is possible in the text itself. The boxes are organized around key themes.

**Drugs in the Media** Our world revolves around media of all types—TV, films, radio, print media, and the Web. To meet students on familiar ground, we have included Drugs in the Media boxes, which take an informative and critical look at these media sources of drug information. Students can build their critical thinking skills while reading about such topics as alcohol advertising, media coverage of prescription drugs, and the presentation of cigarette smoking in films.

**Taking Sides** These boxes discuss a particular drug-related issue or problem and ask students to take a side in the debate. This thought-provoking material will help students apply what they learned in the chapter to real-world situations. Taking Sides topics include potential medical uses of marijuana, current laws relating to drug use, and the issue of government funding for research on psychedelics.

**Targeting Prevention** The Targeting Prevention boxes offer perspective and provoke thought regarding which drug-related behaviors we, as a society, want to reduce or prevent. Topics include syringe exchange programs, criminal penalties for use of date rape drugs, and nondrug techniques for overcoming insomnia. These boxes help students better evaluate prevention strategies and messages.

**Drugs in Depth** These boxes examine specific, often controversial, drug-related issues such as the extrapolation of animal studies to humans, and the growing number of people in prison for drug-related offenses. Drugs in Depth boxes are a perfect starting point for class or group discussion.

**Life Saver** These boxes provide simple and specific information that can reduce many negative effects associated with drug use harms, such as avoiding the combination of sleeping pills with alcohol or opioids and getting sufficient amounts of sleep if taking amphetamines. Life Saver boxes are concise harm reduction tips.

**Unintended Consequences** Students quickly learn that drugs have multiple effects, including unwanted negative ones. The same is true for drug policy. The Unintended Consequences boxes highlight unexpected negative consequences of policies aimed at controlling drug use and/or sales. These boxes provide students with opportunities to think critically about such topics as whether restricting the sale of hypodermic needles and syringes increase the risk for contracting a blood-borne disease.

**Myth Buster** There are many misconceptions about psychoactive drugs use. The Myth Buster boxes present a popular drug use myth and systematically dissect it using the best available empirical information.

These boxes provide an excellent example of how to think through information critically. Topics covered include the "meth mouth" phenomenon and the "real" performance-enhancing drug in Major League Baseball.

**Focus on Drug Policy** These boxes examine drug policies from around the globe that successfully strike a balance between individual freedom and public health and safety. Focus on Drug Policy boxes provide excellent examples of how local governments work to solve local problems.

**Focus on Treatment** Focus on Treatment boxes provide up-to-date information on treatment strategies used for specific drug addictions. These boxes help students to understand the available treatments for addiction.

### Check Yourself! Activities

These self-assessments, found at the end of most chapters, help students put health concepts into practice. Each Check Yourself! activity asks students to answer questions and analyze their own attitudes, habits, and behaviors. Self-assessments are included in such areas as sleep habits, daily mood changes, alcohol use, caffeine consumption, and consideration of consequences.

### Attractive Design and Illustration Package

The inviting look, bold colors, and exciting graphics in *Drugs, Society and Human Behavior* draw the reader in with every turn of the page. Sharp and appealing photographs, attractive illustrations, and informative tables support and clarify the chapter material.

### Pedagogical Aids

Although all the features of *Drugs, Society and Human Behavior* are designed to facilitate and improve learning, several specific learning aids have been incorporated into the text:

- **Chapter Objectives:** Chapters begin with a list of objectives that identify the major concepts and help guide students in their reading and review of the text.
- **Definitions of Key Terms:** Key terms are set in boldface type and are defined in corresponding boxes. Other important terms in the text are set in italics for emphasis. Both approaches facilitate vocabulary comprehension.
- **Chapter Summaries:** Each chapter concludes with a bulleted summary of key concepts. Students can use the chapter summaries to guide their reading and review of the chapters.
- **Review Questions:** A set of questions appears at the end of each chapter to aid students in their review and analysis of chapter content.
- **Appendices:** The appendices include handy references on brand and generic names of drugs and on drug resources and organizations.
- **Summary Drugs Chart:** A helpful chart of drug categories, uses, and effects appears on the back inside cover of the text.

## Supplements

The seventeenth edition of *Drugs, Society and Human Behavior* is now available online with Connect, McGraw-Hill Education's integrated assignment and assessment platform. Connect also offers SmartBook for the new edition, which is the first adaptive reading experience proven to improve grades and help students study more effectively. All of the title's website and ancillary content is also available through Connect, including:

- A full Test Bank of multiple-choice questions that test students on central concepts and ideas in each chapter.
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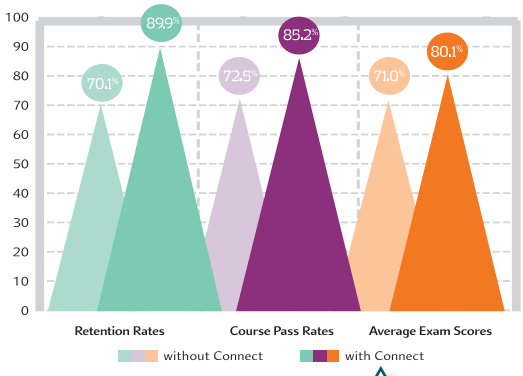


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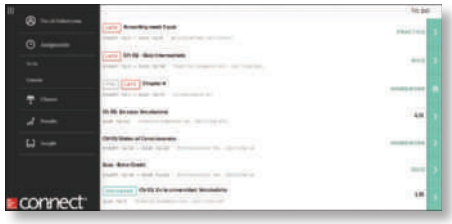


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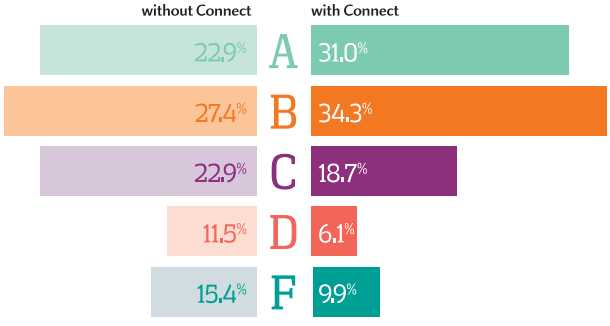


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*Carl L. Hart*

*Charles Ksir*

SECTION ONE

# Drug Use in Modern Society



The interaction between drugs and behavior can be approached from two general perspectives. Certain drugs, the ones we call "psychoactive", have profound effects on behavior. Part of what a book on this topic should do is describe the effects of these drugs *on behavior*, and later chapters do that in some detail. Another perspective, however, views drug taking *as behavior*. The psychologist sees drug-taking behaviors as interesting examples of human behavior that are influenced by many psychological, social, and cultural variables. In the first section of this text, we focus on drug taking as behavior that can be studied in the same way that other behaviors, such as aggression, learning, and human sexuality, can be studied.

# 1 Drug Use: An Overview

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## Objectives

*When you have finished this chapter, you should be able to:*

- **Develop an analytical framework for understanding any specific drug-use issue.**
- **Apply five general principles of psychoactive drug use to any specific drug-use issue.**
- **Explain the differences between misuse, abuse, and dependence.**
- **Describe the general trends of increases and decreases in drug use in the United States since 1975.**
- **Remember several correlates and antecedents of adolescent drug use.**
- **Describe correlates and antecedents of drug use in the terminology of risk factors and protective factors.**
- **Discuss motives that people may have for illicit and/or dangerous drug-using behavior.**

## "The Drug Problem"

Drug use is an issue that affects individuals, families, communities, and all levels of government, not just in the United States, but around the world. Of course, the simple term *drug use* represents a complex mix of behaviors, scientific questions, legal issues, moral dilemmas, and more. In fact, this entire book provides an opportunity to examine the many kinds of substances involved, the biology underlying their effects, the psychology of various drug-using behaviors, and societal influences on drug use and reactions to drug issues. As we discuss these topics, our aim is to report evidence that is based on empirical data, derived from scientific studies. This stands in contrast to anecdotal evidence, which is typically based on one person's casual observation or perception. What we began by calling *drug use* is not a simple thing at all. In this first chapter, as we take an overview of drug use, there are some general principles that we can always rely on.

### Use Is Not Abuse

Most users of any given substance do not use it in ways that can be defined as either abuse or dependence (see definitions on page 5). We know that many people drink alcohol in ways that do not cause problems for them or their families, but about 10 percent of drinkers do have significant problems such as missing work due to a hangover or having multiple arrests for driving under the influence, and some require treatment for alcohol dependence. The same principle applies to all drugs. The single most common type of illicit drug use is marijuana smoking, and the vast majority of those users are what some have called "recreational" or "social" or "casual" users. The last

**Our concern about the use of a substance often depends on who is using it, how much is being used, and when, where, and why it is being used.** ©Emma Lee/Life File/Getty Images RF (*left*), ©Getty Images RF (*right*)

three U.S. presidents and at least one current member of the U.S. Supreme Court have admitted to using marijuana when they were young. A small fraction of marijuana users seek admission to treatment programs because they want to quit and have not been able to do so without help. Even for drugs such as heroin, crack cocaine, and methamphetamine, which the media consistently portray as producing "instant addiction," the actual experiences of most users of those substances do not support such claims. We will learn much more about these drugs and their use in later chapters. Some have argued that if a substance like methamphetamine is illegal, then any use at all should be considered abuse. Not only does that not fit the accepted definition of abuse, it ignores and trivializes one of the most important questions about substance abuse: Why do some people develop serious problems while most avoid them?

## Every Drug Has Multiple Effects

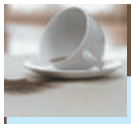
Although a user might be seeking only one effect (relaxation, or alertness, or feeling "high"), every psychoactive drug acts at multiple sites, both in the brain and on other organs. So relaxation might be accompanied by slower reaction time, or alertness might be produced along with an increase in heart rate.

## Amount Matters

This may seem obvious, but it's important to point out that large doses, frequent doses, or taking the drug by a method that results in a lot of the drug getting to the brain quickly can produce very different effects, and generally more problems, than taking the same drug in a single lower dose. Not only are a drug's effects often increased with higher drug concentrations, but additional effects tend to show up as well. This principle is easily illustrated with alcohol, as the increased talkativeness of low doses becomes accompanied by slower reaction times, then slurred speech and difficulty walking, and eventually unconsciousness as blood alcohol rises.

## Psychoactive Drug Effects Are Powerfully Influenced by the User's History and Expectations

Experienced users may react differently than new users, for example, showing less disruption in a driving simulator test after drinking alcohol (the same happens with marijuana). Experienced users may also report more of the positive effects of a drug, partly because of associations from their prior use. But even people who have never used a substance have learned a lot about what they are supposed to expect from it, and those expectations can influence what they do experience. It's easy to imagine that if someone has to take a drug for medical reasons but has been told that it will produce an unpleasant side effect, that person might be fearful and have a much worse reaction than if he or she had not been warned. But you probably didn't know



## Unintended Consequences

### Reporting on the "Drug du Jour"

One of the most common types of drug stories appearing in news media has to do with prescription drug abuse. Over the years there have been several "waves" of drug topics that grow to dominate the news media for a period of time and then slowly give way to the next wave. The hot topic in the 1980s was crack cocaine, which gave way to stories on ecstasy, then GHB, and methamphetamine. More recent waves of publicity have focused on "spice," "flakka," carfentanil, and U-47700 ("pink"). Although there is overlap, it almost seems that at any given time the news media all tend to be focused on the *drug du jour* (drug of the day).

One question that doesn't get asked much is this: What role does such media attention play in popularizing the current drug fad, perhaps making it spread farther and faster than would happen without the publicity? About 40 years ago, in a chapter titled "How to Create a Nationwide Drug Epidemic," journalist E. M. Brecher described a sequence of news stories that he believed were the key factor in spreading the practice of sniffing the glues sold to kids for assembling plastic models of cars and airplanes (see *volatile solvents* in Chapter 7). He argued that, without the well-meant attempts to warn people of the dangers of this practice, it would probably have remained isolated to a small group of youngsters in Pueblo, Colorado. Instead, sales of model glue skyrocketed across America, leading to widespread restrictions on sales to minors.

Thinking about the kinds of things such articles often say about the latest drug problem, are there components of those articles that you would include if you were writing an advertisement to promote use of the drug? Do you think such articles actually do more harm than good, as Brecher suggested? If so, does the important principle of a free press mean there is no way to reduce the impact of such journalism?

For an interesting look at the 2014 wave of media reports on the "flesh-eating Zombie drug" Krokodil, see http://www.forbes.com/sites/jacobsullum/2014/01/10/krokodil-crock-how-rumors-of-a-flesh-eating-zombie-drug-swept-the-nation/.

*Box icon credit: ©Adam Gault/age fotostock RF*

this: The more a person believes that alcohol makes people more sociable, the more talkative and friendly that person will become after drinking even a small amount.

## Drugs, Per Se, Are Not Good or Bad

There are no "bad drugs." When drug abuse, drug dependence, and deviant drug use are talked about, it is the behavior, the way the drug is being used, that is being referred to. This statement is controversial to many, and even offensive to some. It therefore requires some defense. To a chemist, it is difficult to view the drug, the chemical substance itself, as somehow possessing evil intent. It sits there in its bottle and does nothing until we put it into a living system. Ascribing morality to the substance—a pure chemical—seems illogical. On the other hand, a psychologist who has spent years treating drug users, or a police officer whose job it is to arrest them, finds it difficult to imagine what good there might be in a drug like heroin or cocaine or methamphetamine, and easily views the substance as an enemy of the good work he or she is trying to perform. The truth is that any drug that produces effects might produce some benefit when used carefully and has the potential to produce harm when abused. For example, heroin is a perfectly good painkiller, as effective as any of the widely prescribed opioid analgesics, and it is used medically in many countries. Cocaine is a good local anesthetic and is still used for medical procedures, even in the United States. Methamphetamine is available as a prescription drug in the United States, approved to treat ADHD and obesity. Each of these drugs can also produce bad effects when people abuse them. In the cases of heroin and cocaine, our society has weighed its perception of the risks of bad consequences against the potential

## Drugs in Depth

### Important Terms—and a Caution!

Some terms that are commonly used in discussing drugs and drug use are difficult to define with precision, partly because they are used so widely for many different purposes. For each of the following terms, we have pointed out some of the "gray areas" that help us to clarify our understanding of the term, as well as to make us leery of hard-and-fast labeling of someone's behavior.

The word **drug** will be defined as "any substance, natural or artificial, other than food, that by its chemical nature alters structure or function in the living organism." One obvious difficulty is that we haven't defined *food*, and how we draw that line can sometimes be arbitrary. Alcoholic beverages, such as wine and beer, may be seen as drug, food, or both. Are we discussing how much sherry wine to include in beef Stroganoff, or are we discussing how many ounces of wine can be consumed before becoming intoxicated? Since this is not a cookbook but, rather, a book on the use of psychoactive chemicals, we will view all alcoholic beverages as drugs.

**Illicit drug** is a term used to refer to a drug that is unlawful to possess or use. Many of these drugs are available by prescription, but when they are manufactured or sold illegally they are illicit. Traditionally, alcohol and tobacco have not been considered illicit substances even when used by minors, probably because of their widespread legal availability to adults. Common household chemicals, such as glues and paints, take on some characteristics of illicit substances when people inhale them to get "high."

**Deviant drug use** is drug use that is not common within a social group *and* that is disapproved of by the majority, causing members of the group to take corrective action when it occurs. The corrective action may be informal (making fun of the behavior, criticizing the behavior) or formal (incarceration, treatment). Some examples of drug use might be deviant in the society at large but accepted or even expected in particular subcultures. We still consider this behavior to be deviant, since it makes more sense to apply the perspective of the larger society.

**Drug misuse** generally refers to the use of prescribed drugs in greater amounts than, or for purposes other than, those prescribed by a physician or dentist. For nonprescription drugs or chemicals such as paints, glues, or solvents, misuse might mean any use other than the use intended by the manufacturer.

**Abuse** consists of the use of a substance in a manner, amounts, or situations such that the drug use causes problems or greatly increases the chances of problems occurring. The problems may be social (including legal), occupational, psychological, or physical. Once again, this definition gives us a good idea of what we're talking about, but it isn't precise. For example, some observers would consider any use of an illicit drug to be abuse because of the possibility of legal problems, but the majority of marijuana users do not meet the clinical criteria for substance abuse. Also, the use of almost any drug, even under the orders of a physician, has at least some potential for causing problems. The question might come down to how great the risk is and whether the user is recklessly disregarding the risk. For someone to receive a diagnosis of having a *substance use disorder* (see the DSM-5 feature in Chapter 2), the use must be recurrent, and the problems must lead to significant impairment or distress.

**Addiction** is a controversial and complex term that has **different** meanings for different people. Some people want to reserve the term only for those whose lives have been completely taken over by substance use, whereas others will apply the term broadly to anyone who is especially interested in watching television, reading, running, skiing, or any other activity. When it comes to substance use, we will use *addiction* only to refer to cases in which people have struggled to control their use and have suffered serious negative consequences from that use.

Drug **dependence** refers to a state in which the individual uses the drug so frequently and consistently that it appears that it would be difficult for the person to get along *without* using the drug. For some drugs and some users, there are clear withdrawal signs when the drug is not taken, implying a *physiological dependence*. Dependence can take other forms, as shown in the DSM-5 feature in Chapter 2. If a great deal of the individual's time and effort is devoted to getting and using the drug, if the person often winds up taking more of the substance than he or she intended, and if the person has tried several times without success to cut down or control the use, then the person meets the behavioral criteria for dependence. This behavioral dependence is what we mean when we use the term *addiction*.

**The effects of drugs are influenced by the setting and the expectations of the user.** ©Brand X Pictures RF

benefits and decided that we should severely restrict the availability of these substances. It is wrong, though, to place all of the blame for these bad consequences on the drugs themselves and to conclude that they are simply "bad" drugs. Many people tend to view some of these substances as possessing an almost magical power to produce evil. When we blame the substance itself, our efforts to correct drug-related problems tend to focus exclusively on eliminating the substance, perhaps ignoring all of the factors that led to the abuse of the drug.

## How Did We Get Here?

Drug use is not new. Humans have been using alcohol and plant-derived drugs for thousands of years—as far as we know, since *Homo sapiens* first appeared on the planet. A truly "drug-free society" has probably never existed, and might never exist. Psychoactive drugs were used in rituals that we could today classify as religious in nature, and Chapter 14 provides several examples of hallucinogenic drugs reported to enhance spiritual experiences. A common belief in many early cultures was that illness results from invasion by evil spirits, so in that context it makes sense that psychoactive drugs were often used as part of a purification ritual to rid the body of those spirits. In these early cultures the use of drugs to treat illness likely was intertwined with spiritual use so that the roles of the "priest" and that of the "shaman" (medicine man) often were not separate. In fact, the earliest uses of many of the drugs that we now consider to be primarily recreational drugs or drugs of abuse (nicotine, caffeine, alcohol, and marijuana) were as treatments for various illnesses.

Psychoactive drugs have also played significant roles in the economies of societies in the past. Wine was a significant trade item among Greek, Turkish, Egyptian, and ltalian people via the Mediterranean Sea over 2,000 years ago. Chapter 10 describes the importance of tobacco in the early days of European exploration and trade around the globe as well as its importance in the establishment of English colonies in America; Chapter 6 discusses the significance of the coca plant (from which cocaine is derived) in the foundation of the Mayan empire in South America; and Chapter 13 points out the importance of the opium trade in opening China's doors to trade with the West in the 1800s.

One area in which enormous change has occurred over the past 100-plus years is in the development and marketing of legal pharmaceuticals. The introduction of vaccines to eliminate smallpox, polio, and other communicable diseases, followed by the development of antibiotics that are capable of curing some types of otherwise deadly illnesses, laid the foundation for our current acceptance of medicines as the cornerstone of our health care system. The introduction of birth control medications in the early 1960s was important not only for the enormous implications they had for women's opportunities to pursue educational and career goals, but also because millions of young, healthy people were taking drugs for reasons other than illness. During this same time period, mental health treatment began to shift dramatically as new drugs were introduced to reduce symptoms of schizophrenia, anxiety, mania, and depression (Chapter 8).

Another significant development in the past 100 years has been government efforts to limit access to certain kinds of drugs that are deemed too dangerous or too likely to produce dependence to allow them to be used in an unregulated fashion. The enormous growth, both in expenditures and in

## Focus on Drug Policy

### Is There Really a "War on Drugs"?

"War on drugs" is not an official term but rather a shorthand way to refer to the efforts by the United States and other governments to reduce or eliminate certain kinds of drug use. It is often attributed to U.S. president Richard Nixon, who in 1971 declared that drug abuse was "public enemy number one." The term has been used for many years, mostly by people critical of drug-control efforts. Two of the terms defined on page 5 are relevant for understanding these government efforts. *Deviant drug use* is drug use that is disapproved of by a social group, and which the group acts to correct when it occurs. In this case, the important group is the governing body (e.g., Congress in the United States, or parliament in some other countries). The corrective actions taken by these governments are formalized and may include some form of punishment, or treatment offered as an alternative to punishment. Therefore, these examples of deviant drug use also comprise *illicit drug use* (use of a drug that is illegal). It is important to understand that the deviant and illicit quality of these acts depends both on the drug-using behavior and on the government's response to that behavior. For example, 50 years ago interracial dating and marriage were considered by many to be deviant behaviors and were even outlawed in several U.S. states prior to a 1967 Supreme Court decision. The same type of behavior now is neither illicit nor deviant in the eyes of most Americans. As marijuana use becomes increasingly acceptable to more Americans, it is less likely to be considered deviant, at least at the level requiring formal legal correction. Many U.S. states have reduced or eliminated penalties for possession and use, and pressure is being put on Congress to take similar steps at the federal level.

The origins of today's war on drugs are described in Chapter 3, but for now we need to understand that a great deal of money is spent and many peoples' jobs depend on these efforts worldwide. The United States is considered by most to be the leading governmental factor, both in terms of the amount of money spent and its influential role in convincing other nations to pass similar laws and to participate in international drug control efforts.

In subsequent chapters we will examine the effects of this so-called war on drugs on the lives of users, service providers, and other participants, whether willing or unwilling.

U.S. President Richard Nixon, 1971

*Box icon credit: ©Edward.J.Westmacott/Alamy Images RF*

the breadth of substances now controlled, has led many to refer to this development as a "war on drugs." These laws are also outlined in Chapter 3, but we will trace their effect throughout the chapters on different drug classes, and the chapters on prevention and treatment of drug abuse and dependence.

With both of these developments, the proportion of our economy devoted to psychoactive drugs, both legal and illegal, and to their regulation, has also expanded considerably. Drug use would be an important topic for us to understand if only for that fact. In addition, drug use and its regulation are reflective of changes in our society and in how we as individuals interact with that society. Also, drug problems and our attempts to solve them have in turn had major influences on us as individuals and on our perceptions of appropriate roles for government, education, and health care. Therefore, the topic of psychoactive drugs provides a window through which we can study our own current psychology, sociology, and politics.

# Drugs and Drug Use Today

## Extent of Drug Use

In trying to get an overall picture of drug use in today's society, we quickly discover that it's not easy to get accurate information. It's not possible to measure with great accuracy the use of, let's say, cocaine in the United States. We don't know exactly how much is imported and sold, because most of it is illegal. We don't know exactly how many cocaine users there are in the country, because none of the

measures we do have (survey results, arrest data, admissions to treatment programs) captures every single one. For some substances, such as prescription drugs, tobacco, and alcohol, we have a wealth of sales information and can make much better estimates of rates of use. Even there, however, our information might not be complete (home-brewed beer would not be counted, for example, and prescription drugs might be bought and then left unused in the medicine cabinet).

Just because we can't get precise answers to these questions doesn't mean that we should give up and conclude that we don't know anything about how much drug use is going on. We do have information about which drugs are more widely used than others and also whether the use of a particular drug is increasing or decreasing. So let's look at some of the kinds of information we do have. A large number of survey questionnaire studies have been conducted in junior highs, high schools, and colleges, partly because this is one of the easiest ways to get a lot of information with a minimum of fuss. Researchers have always been most interested in drug use by adolescents and young adults, because drug use usually begins and reaches its highest levels in this age group.

This type of research has a couple of drawbacks. The first is that we can use this technique only on the students who are in classrooms. We can't get this information from high school dropouts. That causes a bias, because those who skip school or have dropped out are more likely to use drugs.

A second limitation is that we must assume that most of the self-reports are done honestly. In most cases, we have no way of checking to see if Johnny really did smoke marijuana last week, as he claimed on the questionnaire. Nevertheless, if every effort is made to encourage honesty (including assurances of anonymity), we expect that this factor is minimized. To the extent that tendencies to overreport or underreport drug use are relatively constant from one year to the next, we can use such results to reflect trends in drug use over time and to compare relative reported use of various drugs.

**Table 1.1**
**Percentage of College Students One to Four Years beyond High School Reporting Use of Eight Types of Drugs (2015)**

| Drug | Ever Used | Used in Past 30 Days | Used Daily for Past 30 Days |
|---|---|---|---|
| Alcohol | 81 | 63 | 3.1 |
| Cigarettes | NA | 11 | 4.2 |
| E-cigarettes | 26 | 8.8 | NA |
| Marijuana/ hashish | 50 | 21 | 4.6 |
| Inhalants | 3 | 0.2 | 0.0 |
| Amphetamines | 14 | 4.2 | 0.0 |
| Hallucinogens | 7 | 1.4 | 0.0 |
| Cocaine (all) | 6 | 1.5 | 0.0 |
| Crack | 0.5 | 0.0 | 0.0 |

Source: Monitoring the Future Project, University of Michigan 2016.

Let's look first at the drugs most commonly reported by young college students in a recent nationwide sample. Table 1.1 presents data from one of the best and most complete research programs of this type, the Monitoring the Future Project at the University of Michigan.[1] Data are collected each year from more than 15,000 high school seniors in schools across the United States, so that nationwide trends can be assessed. Data are also gathered from 8th- and 10th-graders and from college students. Three numbers are presented for each drug: the percentage of college students (one to four years beyond high school) who have *ever* used the drug, the smaller percentage who report having used it within the past *30 days,* and the still smaller percentage who report *daily* use for the past 30 days. Note that most of these college students have tried alcohol at some time in their lives. Half have tried marijuana, about one-third have tried

cigarettes or e-cigarettes, and most students report never having tried the rest of the drugs listed. Also note that daily use of any of these drugs may be considered rare.

## Populations of Users

One very important thing to remember about the people who use a particular substance is that there is a wide range of rates and amounts of use, even within the using population. Look again at Table 1.1. Starting with alcohol, we can see that over 80 percent of college students have used alcohol at some time in their lives, and about two-thirds report drinking within the month prior to the survey. The difference between those two figures includes some who might have tried drinking at one time but never plan to drink again, but a larger number who have no real objection to drinking but only do so on rare occasions throughout a given year, such as at a wedding or on New Year's Eve. Then there is a big drop in numbers down to the 3 percent or so who reported daily drinking. So, when we think about those who have reported drinking in the past 30 days, some of them might have had only one drink in that month. Others might have one or two drinks in a typical week. Others might have a few drinks on one occasion and then not drink again for a month. Others might regularly have two or three drinks on Friday and Saturday nights and not drink at all during the week. Others might start their weekend on Wednesday or Thursday and drink pretty heavily several nights each week, but still not drink daily. Most of us have some familiarity with this wide range of behavior when it comes to alcohol, because we probably know some people in each of these categories: never used, used at one time but won't use again, use rarely, use regularly but in small amounts, and so on.

What is harder for most people to understand is that the same wide range of behavior is found among users of every psychoactive drug. Not every marijuana user, crack smoker, or heroin user is the same. Given the wide range of human behavior when it comes to everything else in life, this should not be a surprise, but we often forget that there are many types of users of any kind of drug. Look at Table 1.1 for amphetamines. The 14 percent who report ever using includes what? In these surveys, we exclude the legitimate use of prescribed amphetamines for treating ADHD, for example. But, if you have a friend who has a prescription and she gives you an Adderall pill to stay awake and study, then that nonmedical use would be included in this figure, along with someone who was smoking or injecting methamphetamine. As we dig more specifically into even the use of illicit methamphetamine, we find the same range of users: Some have tried it and will never use again, some might use it on rare occasions, some might use it more regularly but in small doses, and a fairly small percentage of users will meet the criteria for dependence. When we ask college students about daily (nonmedical) use of amphetamines, the percentage drops to virtually zero.

This range of users has important implications for our prevention efforts, treatment efforts, and law enforcement, and must be kept in mind when

### Drugs in Depth

#### Determining the Extent of Substance Use and Abuse

Imagine that you have been asked to participate in a task force in the community where you are living. This group is specifically looking into substance abuse, and one of the group members, a parent of two teenagers, has heard that high-school students have been using *Salvia divinorum*, also called diviner's sage. We will learn more about this substance and its effects in Chapter 14, but for now let's just ask ourselves how your group can get an idea of the actual extent of its use. What kinds of agencies would you turn to for information? What kinds of information would each of them be likely to have? What else could your task force do to gather even more information? Given all these sources, how close do you think you could come to estimating the size of the problem in your community?

we discuss the nature of dependence. We are going to look at more data on the proportions of users of various substances, but remember this wide variety of behavior as we look at trends over time.

## Trends in Drug Use

The Monitoring the Future study, which has now been conducted annually for almost 40 years, allows us to see changes over time in the rates of drug use. Figure 1.1 displays data on marijuana use among 12th-graders.[2] Look first at the line labeled "Use." In 1975, just under 30 percent of high school seniors reported that they had used marijuana in the past 30 days (an indication of "current use"). This proportion rose each year until 1978, when 37 percent of 12th-graders reported current marijuana use. Over the next 14 years, from 1979 to 1992, marijuana use declined steadily so that by 1992 only 12 percent of 12th-graders reported current use (about one-third as many as in 1978). Then the trend reversed, with rates of current use climbing back to 24 percent of 12th-graders by 1997. Changes over the past 20 years have been small, with the 2015 rate at 21 percent. Because marijuana is by far the most commonly used illicit drug, we can use this graph to make a broader statement: Illicit drug use among high school seniors has not changed a great deal in the past 20 years. Currently, marijuana use is about half as common among 12th-graders as it was in 1978, but it is more common than it was at its lowest point 25 years ago. This is important because there always seem to be people trying to say that drug use is increasing among young people, or that people are starting to use drugs at younger and younger ages, but the best data we have provide no support for such statements (e.g., data from 8th-graders show the same trends as for 12th-graders).

How can we explain these very large changes in rates of marijuana use over time? Maybe marijuana

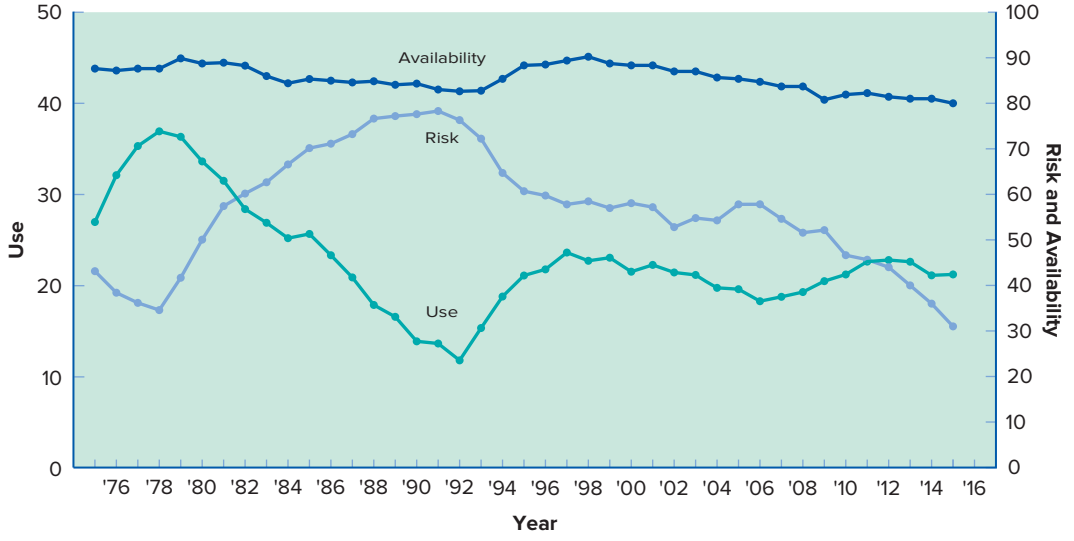



**Figure 1.1** Marijuana: Trends in Perceived Availability, Perceived Risk of Regular Use, and Prevalence of Use in the Past 30 Days for 12th-Graders

SOURCE: Monitoring the Future Study, The University of Michigan.

was easier to obtain in 1978, less available in 1992, and so on. Each year the same students were asked their opinion about how easy they thought it would be to get marijuana if they wanted to do so. Looking at the "Availability" line, and using the scale on the right-hand side of Figure 1.1, we can see that back in 1975 about 90 percent of the seniors said that it would be fairly easy or very easy for them to get marijuana.[2] The interesting thing is that this perception has not changed much, remaining above 80 percent for 40 years. Thus, the perceived availability does NOT appear to explain differences in rates of use over time. This is important because it implies that we can have large changes in rates of drug use even when the supply of the drug does not appear to change much.

There is another line on Figure 1.1, labeled "Risk" (and also tied to the right-hand scale). In 1975, about 40 percent of 12th-graders rated the risk of harm from regular marijuana use as "great risk of harm." The proportion of students reporting great risk declined over the same time that use was increasing (up to 1978). Then, as use dropped from 1979 to 1992, perceived risk increased. Perceived risk declined during the 1990s when use was again increasing, and then didn't change a great deal in recent years. You should be able to see from Figure 1.1 that as time goes by, the line describing changes in perception of risk from using marijuana is essentially a mirror image of the line describing changes in rates of using marijuana. This is important because it seems to say that the best way to achieve low rates of marijuana use is by convincing students that it is risky to use marijuana, whereas efforts to control the availability of marijuana ("supply reduction") might have less of an influence. However, we must keep in mind that a cause and effect relationship has not been proven. Changes in both rates of use and perceptions of risk could be caused by something else that we are not directly measuring.

In addition to the surveys of students, broad-based self-report information is also gathered through house-to-house surveys. With proper sampling techniques, these studies can estimate the drug use in most of the population, not just among students. This technique is much more time-consuming and expensive, it has a greater rate of refusal to participate, and we must suspect that individuals engaged in illegal drug use would be reluctant to reveal that fact to a stranger on their doorstep. The National Survey on Drug Use and Health is a face-to-face, computer-assisted interview done with more than 68,000 individuals in carefully sampled households across the United States. Figure 1.2 displays the trends in reported past month use of marijuana for two different age groups.[3] This study shows the same pattern as the Monitoring the Future study of 12th-graders: Marijuana use apparently grew throughout the 1970s, reaching a peak in about 1980, and then declining until the early 1990s, when it increased again. The 18–25 age group does show a slow but steady increase in use over the past 20 years, whereas the 12–17 age group has been more stable.

We have seen fairly dramatic trends over time in marijuana use, but what about other substances? Figure 1.3 shows rates of current use of alcohol and cocaine alongside marijuana use for Americans between 18 and 25 years of age.[3] Many more people are current users of alcohol (about two-thirds of adults), and many fewer use cocaine in any given year. But overall, the trends over time are generally similar, with the peak year for all three substances around 1980, lower rates of use in the early 1990s, and less dramatic changes in recent years.

Finding such a similar pattern in two different studies using different sampling techniques gives us additional confidence that these trends have been real and probably reflect broad changes in American society over this time. Political observers will be quick to note that Ronald Reagan was president during most of the 1980s, when use of marijuana and other drugs was declining, while Bill Clinton was in office during most of the 1990s, when these rates rose. Were these changes in drug use the result of more conservative drug-control policies under the Reagan administration and more liberal policies under the Clinton administration? There are two reasons to think that is not the answer.

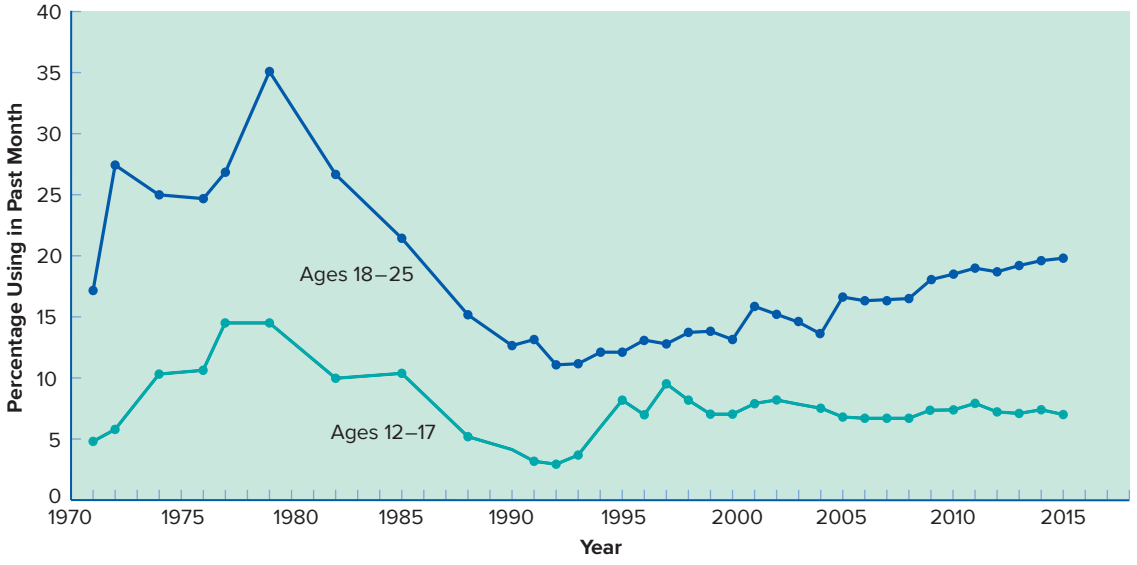



**Figure 1.2** Trends in Marijuana Use among Persons Ages 12–25, by Age Group

SOURCE: National Survey on Drug Use and Health.

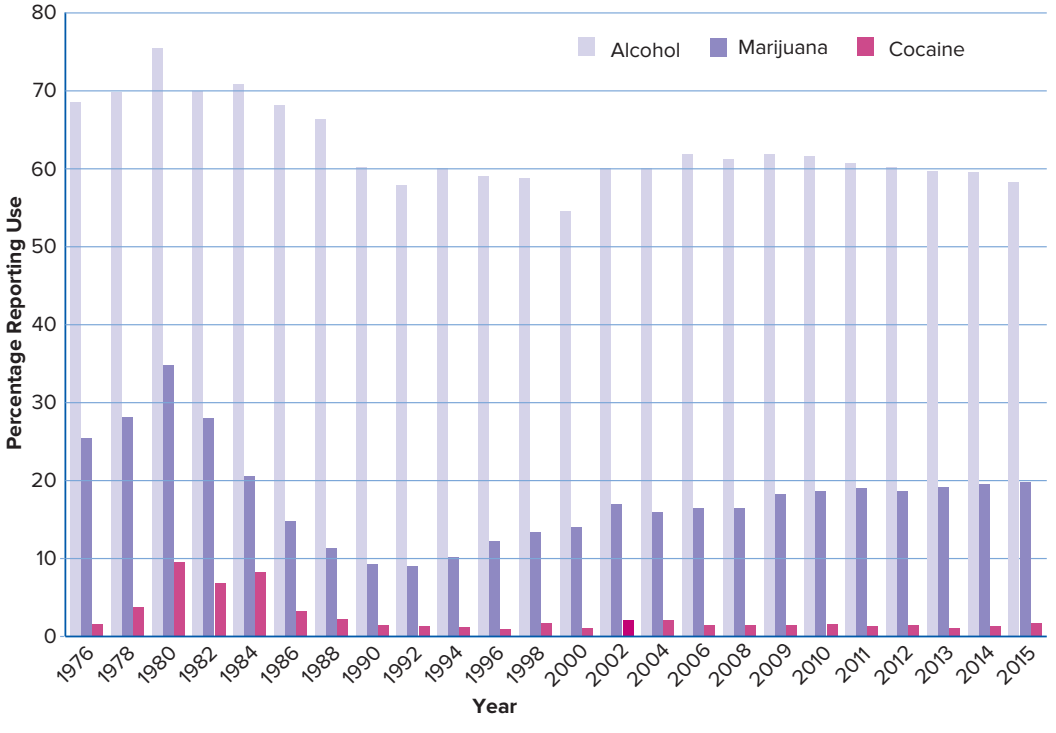



**Figure 1.3** Trends in Reported Drug Use within the Past 30 Days for Young Adults Ages 18 to 25

SOURCE: National Survey on Drug Use and Health.

**Marijuana is the most commonly used illicit drug, and major surveys including the Monitoring the Future study and the National Survey on Drug Use and Health track trends in its usage.** ©McGraw-Hill Education/Gary He, photographer

First, the timing is not quite right. President Reagan was elected in 1980, took office in 1981, and didn't begin focusing on the "Just Say No" antidrug messages until 1983. Most of the important legislation was passed in 1986. All of this was after the downward trend in drug use had already begun. It seems more likely that the Reagan administration recognized the opportunity provided by an underlying change in attitude among the general public. The government's policies might have helped to amplify the effects of this underlying social change, but they did not create it. The same timing problem is associated with trying to link increased drug use to the Clinton presidency: The election was in 1992, and increased use was already beginning in 1993, during the first year of the Clinton administration. Also, the Clinton administration can hardly be accused of having liberal drug-control policies—drug-control budgets and arrests for drug violations were higher than in any previous administration. Finally, if the country was in a more conservative mood during the George W. Bush years (2000–2008) and then shifted to a more liberal mood in 2008 when Barack Obama was elected, the corresponding changes in marijuana use are not very apparent in Figure 1.2.

If we can't point to government policies as causes of these substantial changes in drug use, how can we explain them? The short answer is that for now, we can't. We are left with saying that changes in rates of illicit drug use and in alcohol use probably reflect changes over time in a broad range of attitudes and behaviors among Americans—what we can refer to as "social trends." As of now, we can't explain why the use of a particular drug increases and decreases over time, any more than we can explain why people wore loud bell-bottom trousers in the 1970s or why people in the current decade have more tattoos than previous generations. This isn't much of an explanation, and that is somewhat frustrating. After all, if we understood why these changes were taking place it might allow us to influence rates of substance use among the general population, or at least to predict what will happen next. Perhaps some of today's college students will be the ones to develop this understanding over the next few years.

Let's summarize the kinds of things we do and don't know from these studies: We can determine which kinds of substances are most widely used (alcohol, cigarettes, and marijuana are much more widely used than the other substances), and we can follow some fairly significant overall trends in substance use (not much change over the past decade, somewhat higher than in the early 1990s, but much lower use than in 1980). And, while there have been ups and downs in the use of marijuana and other illicit drugs, we should be skeptical of claims that a slight downward trend means that government efforts are "working," or of claims that a slight upward trend signals a new "epidemic."

## Correlates of Drug Use

Once we know that a drug is used by some percentage of a group of people, the next logical step is to ask about the characteristics of those who use the drug, as compared with those who don't. Often the same questionnaires that ask each person which drugs they have used also include several questions about the persons completing the questionnaires. The researchers might then send their computers "prospecting" through the data to see if certain personal characteristics can be correlated with drug

**Table 1.2**
**Risk and Protective Factors Associated with Marijuana Use by Adolescents**

**Risk Factors** (in order of importance):

1. Having friends who use marijuana or other substances
2. Engaging in frequent fighting, stealing, or other antisocial activities
3. Perceiving that substance use is prevalent at your school
4. Knowing adults who use marijuana or other substances
5. Having a positive attitude toward marijuana use

**Protective Factors** (in order of importance):

1. Perceiving that there are strong sanctions against substance use at school
2. Having parents as a source of social support
3. Being committed to school
4. Believing that religion is important and frequently attending religious services
5. Participating in two or more extracurricular activities

use. But these studies rarely reveal much about either very unusual or very common types or amounts of drug use. For example, if we send a computer combing through the data from 1,000 questionnaires, looking for characteristics correlated with heroin use, only one or two people in that sample might report heroin use, and you can't correlate much based on one or two people. Likewise, it would be difficult to identify the distinguishing characteristics of the people who have "ever tried" alcohol, because that group usually represents more than 90 percent of the sample.

Much of the research on **correlates** of drug use has used marijuana smoking as an indicator, partly because marijuana use has been a matter of some concern and partly because enough people have tried it so that meaningful correlations can be done. Other studies focus on early drinking or early cigarette smoking.

## Risk and Protective Factors

Increasingly, researchers are analyzing the correlates of drug use in terms of *risk factors* and *protective factors.* Risk factors are correlated with higher rates of drug use, while protective factors are correlated with lower rates of drug use. A study based on data obtained from the National Survey on Drug Use and Health examined risk and protective factors regarding use of marijuana among adolescents (ages 12–17).[4] This large-scale study provides some of the best information we have about the correlates of marijuana use among American adolescents. The most significant factors are reported in Table 1.2.

In some ways, the results confirm what most people probably assume: The kids who live in rough neighborhoods, whose parents don't seem to care what they do, who have drug-using friends, who steal and get into fights, who aren't involved in religious activities, and who don't do well in school are the most likely to smoke marijuana. The same study analyzed cigarette smoking and alcohol use, with overall similar results.

There are some surprising results, however. Those adolescents who reported that their parents frequently monitored their behavior (e.g., checking homework, limiting TV watching, and requiring chores) were actually a little more likely to report using marijuana than adolescents who reported less parental monitoring. This finding points out the main problem with a correlational study: We don't know if excessive parental monitoring makes adolescents more likely to smoke marijuana, or if adolescents' smoking marijuana and getting in fights makes their parents more likely to monitor them (the latter seems more likely).

Another example of the limitation of correlational studies is the link between marijuana

**Table 1.3**
**Drug Use among 18- to 25-Year-Olds: Percentage Reporting Use in the Past 30 Days**

| Drug | Male | Female | White | African American | Hispanic | American Indian | Asian | High School Graduate | College Graduate |
|---|---|---|---|---|---|---|---|---|---|
| Alcohol | 60 | 57 | 64 | 50 | 51 | 52 | 48 | 50 | 81 |
| Tobacco | 40 | 26 | 38 | 30 | 25 | 51 | 16 | 37 | 22 |
| Marijuana | 23 | 16 | 21 | 23 | 18 | 17 | 9 | 19 | 16 |
| Cocaine | 2 | 1.3 | 2.0 | 0.8 | 1.1 | 1.6 | 0.9 | 1.3 | 2.2 |

Source: National Survey on Drug Use and Health, 2015 data, available at http://www.samhsa.gov/data.

smoking and poor academic performance. Does smoking marijuana cause the user to get lower grades? Or is it the kids who are getting low grades anyway who are more likely to smoke marijuana? One indication comes from the analysis of risk and protective factors for cigarette smoking in this same study. The association between low academic performance and cigarette smoking was even stronger than the association between low academic performance and marijuana smoking. This leads most people to conclude that it's the kids who are getting low grades anyway who are more likely to be cigarette smokers, and the same conclusion can probably be reached about marijuana smoking.

## Deviant Drug Use

The overall picture that emerges from studies of risk and protective factors is that the same adolescents who are likely to smoke cigarettes, drink heavily, and smoke marijuana are also likely to engage in other deviant behaviors, such as vandalism, stealing, fighting, and early sexual behaviors, and to not do well in school. It can be useful to simply consider adolescent drug use as one of a cluster of deviant behaviors. Calling early use of cigarettes, alcohol, or marijuana deviant behavior does nothing to explain why these behaviors appear in some people, but it does change our perspective a bit. Rather than asking whether one of these behaviors causes the other (i.e., Does marijuana cause poor school performance?), we can understand that either of these behaviors indicates that an adolescent's conduct is less influenced by society's expectations than most others of the same age, and that in such cases a variety of deviant behaviors might appear. From this perspective, drug use, stealing, fighting, and poor school performance are all indicators that the individual's conduct is not conforming to the norms of society. If we now look again at Table 1.2, instead of thinking of these entries as factors that either help to cause or prevent marijuana use, we can see that they are the characteristics of people who are more or less likely to conform to social norms in general.

## Race, Gender, and Level of Education

Table 1.3 shows how demographic variables are related to current use of some drugs of interest.[3] The first thing to notice is something that has been a consistent finding over many kinds of studies for many years: Males are more likely to drink alcohol, use tobacco, smoke marijuana, and use cocaine than are females. This probably doesn't surprise most people too much, but it is good to see that in many cases the data do provide support for what most people would expect.

**correlate (*core* a let):** a variable that is statistically related to some other variable, such as drug use.

Expectations regarding ethnic and racial influences on drug use are more likely to clash with the data from the National Survey on Drug Use and Health. For example, overall, whites are more likely to drink alcohol, use tobacco, or use cocaine than are African Americans and Hispanics, and these three groups are about equally likely to use marijuana. These results do not conform to many peoples' stereotypes, so let's remind ourselves that we are talking about household surveys that cut across socioeconomic and geographic lines and attempt to examine American society at large. Also, remember that we are getting data simply about recent use of these substances, which for most people means relatively low-level and infrequent use. Why then, do we have such a strong stereotyped image of drug use being highly prevalent in black and Latino communities? This stereotype likely comes from the poorest neighborhoods, where crime rates are high and therefore police presence is more concentrated.[5] These neighborhoods are often characterized by limited educational and economic opportunities, and in these circumstances there is less incentive to adhere to the social norms of the overall society. We therefore do see somewhat higher rates of various types of deviant behavior, including drug use. But perhaps more important is that the selling of drugs in these neighborhoods often occurs openly on the street, and this combines with heavy police presence to result in high arrest rates. It is important for us to understand that the majority of black and Latino citizens do not live in these neighborhoods and also that people in these neighborhoods are much more likely to be arrested for selling drugs than people living in other areas of the same cities where there are fewer police and drug sales take place behind closed doors. In other words, overall drug use is not much influenced by one's ethnic grouping, but arrest rates for drug crimes are higher in high-crime neighborhoods. We do see from Table 1.3 that the group labeled American Indian has somewhat higher rates of tobacco and marijuana use, and across Asian groups there is a generally lower rate of use of all these substances.

Education level is powerfully related to two common behaviors: Young adults with college degrees (compared to those who completed only high school) are much more likely to drink alcohol and much less likely to use tobacco.

## Personality Variables

The relationships between substance use and various indicators of individual differences in personality variables have been studied extensively over the years. In general, large-scale survey studies of substance use in the general population have yielded weak or inconsistent correlations with most traditional personality traits as measured by questionnaires. So, for example, it has been difficult to find a clear relationship between measures of self-esteem and rates of using marijuana. More recently, several studies have found that various ways of measuring a factor called *impulsivity* can be correlated with rates of substance use in the general population.[6] Impulsivity is turning out to be of much interest to drug researchers but also is hard to pin down in that different laboratories have different ways of measuring it. In general, it seems to relate to a person's tendency to act quickly and without consideration of longer-term consequences. We can expect to see more research on this concept over the next few years.

Instead of looking at any level of substance use within the general population, we can look for personality differences between those who are dependent on substances and a "normal" group of people. When we do that, we find many personality differences associated with being more heavily involved in substance abuse or dependence. The association with impulsivity, for example, is much stronger in this type of study. Likewise, if we look at groups of people who are diagnosed with personality disorders, such as conduct disorder or antisocial personality disorder, we find high rates of substance use in these groups. Overall, it seems that personality factors may play a small role in whether someone decides to try alcohol or marijuana but a larger role in whether that use develops into a serious problem. Because the main focus of this first chapter is on

rates of drug use in the general population, we will put off further discussion of personality variables to Chapter 2.

## Genetics

There is increasing interest in genetic influences on drug use. Again, studies looking across the general population and asking simply about recent use are less likely to produce significant results than studies that focus on people diagnosed with substance use disorders. Genetic factors probably play a small role in whether someone tries alcohol or marijuana but a larger role in whether that use develops into a serious problem. Studies of genetic variability in impulsivity and related traits are beginning to show clear association with substance use disorders.[7] Genetic factors in dependence are discussed further in Chapter 2.

## Antecedents of Drug Use

Finding characteristics that tend to be associated with drug use doesn't help us understand causal relationships very well. For example, do adolescents first become involved with a deviant peer group and then use drugs, or do they first use drugs and then begin to hang around with others who do the same? Does drug use cause them to become poor students and to fight and steal? To answer such questions, we might interview the same individuals at different times and look for **antecedents,** characteristics that predict later initiation of drug use. One such study conducted in Finland found that future initiation of substance use or heavy alcohol use can be predicted by several of the same risk factors we have already discussed: aggressiveness, conduct problems, poor academic performance, "attachment to bad company," and parent and community norms more supportive of drug use.[8] Because these factors were measured *before* the increase in substance use, we are more likely to conclude that they may be *causing* substance use. But some other, unmeasured, variables might be causing both the antecedent risk factors and the subsequent substance use to emerge in these adolescents' lives.

## Gateway Substances

One very important study from the 1970s pointed out a typical sequence of involvement with drugs.[9] Most of the high-school students in that group started their drug involvement with beer or wine. The second stage involved hard liquor, cigarettes, or both; the third stage was marijuana use; and only after going through those stages did the students try other illicit substances. Not everyone followed the same pattern, but only 1 percent of the students began their substance use with marijuana or another illicit drug. It is as though they first had to go through the **gateway** of using alcohol and, in many cases, cigarettes. The students who had not used beer or wine at the beginning of the study were much less likely to be marijuana smokers at the end of the study than the students who had used these substances. The cigarette smokers were about twice as likely as the nonsmokers to move on to smoking marijuana.

One possible interpretation of the gateway phenomenon is that young people are exposed to alcohol and tobacco and that these substances somehow make the person more likely to go on to use other drugs. Because most people who use these gateway substances do not go on to become cocaine users, we should be cautious about jumping to that conclusion. More likely is that early alcohol use and cigarette smoking are common indicators of the general deviance-prone pattern of behavior that also includes an increased likelihood of smoking marijuana or trying cocaine. A large cross-cultural study compared patterns of drug initiation across 17 countries and reported many differences in the most common order of drugs used, implying that the gateway phenomenon is not due to a direct chemical effect but instead is heavily influenced by social and cultural factors.[10]

**antecedent (ant eh *see* dent):** a variable that occurs before some event such as the initiation of drug use.

**gateway:** one of the first drugs (e.g., alcohol or tobacco) used by a typical drug user.

**Males who are aggressive in early elementary school are more likely to be drug users as adults.** ©Don Hammond/ Design Pics RF

Because beer and cigarettes are more widely available to a deviance-prone young person than marijuana or cocaine, it is logical that beer and cigarettes would most often be tried first. The socially conforming students are less likely to try even these relatively available substances until they are older, and they are less likely ever to try the illicit substances. Let's ask the question another way: If we developed a prevention program that stopped all young people from smoking cigarettes, would that cut down on marijuana smoking? Most of us think it might, because people who don't want to suck tobacco smoke into their lungs probably won't want to inhale marijuana smoke either. Would such a program keep people from getting D averages or getting into other kinds of trouble? Probably not. In other words, we think of the use of gateway substances not as the *cause* of later illicit drug use but, instead, as an early indicator of the basic pattern of deviant behavior resulting from a variety of psychosocial risk factors.

## Motives for Drug Use

To most of us, it doesn't seem necessary to find explanations for normative behavior; we don't often ask why someone takes a pain reliever when she has a headache. Our task is to try to explain the drug-taking behavior that frightens and infuriates—the deviant drug use. We should keep one fact about human conduct in mind throughout this book: Despite good, logical evidence telling us we "should" avoid certain things, we all do some of them anyway. We know that we shouldn't eat that second piece of pie or have that third drink on an empty stomach. Cool-headed logic tells us so. We would be hard pressed to find good, sensible reasons why we should smoke cigarettes, drive faster than the speed limit, go skydiving, sleep late when we have work to do, flirt with someone and risk an established relationship, or use cocaine. Whether one labels these behaviors sinful or just stupid, they don't seem to be designed to maximize our health or longevity.

But humans do not live by logic alone; we are social animals who like to impress each other, and we are pleasure-seeking animals. These factors help explain why people do some of the things they shouldn't, including using drugs.

The research on correlates and antecedents points to a variety of personal and social variables that influence our drug taking, and many psychological and sociological theorists have proposed models for explaining illegal or excessive drug use. We have seen evidence for one common reason that some people begin to take certain illegal drugs: Usually young, and somewhat more often male than female, they have chosen to identify with a deviant subculture. These groups frequently engage in a variety of behaviors not condoned by the larger society. Within that group, the use of a particular drug might not be deviant at all but might, in fact,

**People who use drugs and who identify with a deviant subculture are more likely to engage in a variety of behaviors not condoned by society.** ©fmajor/E+/Getty Images RF

be expected. Occasionally the use of a particular drug becomes such a fad among a large number of youth groups that it seems to be a nationwide problem. However, within any given community there will still be people of the same age who don't use the drug.

Rebellious behavior, especially among young people, serves important functions not only for the developing individual but also for the evolving society. Adolescents often try very hard to impress other people and may find it especially difficult to impress their parents. An adolescent who is unable to gain respect from people or who is frustrated in efforts to "go his or her own way" might engage in a particularly dangerous or disgusting behavior as a way of demanding that people be impressed or at least pay attention.

One source of excessive drug use may be found within the drugs themselves. Many of these drugs are capable of *reinforcing* the behavior that gets the drug into the system. **Reinforcement** means that, everything else being equal, each time you take the drug you increase slightly the probability that you will take it again. Thus, with many psychoactive drugs there is a tendency to increase the frequency or amount of use. Some drugs (such as intravenous heroin or cocaine) appear to be so reinforcing that this process occurs relatively rapidly. For other drugs, such as alcohol, the process seems to be slower. In many people, social factors, other reinforcers, or other activities prevent an increase. For some, however, the drug-taking behavior does increase and consumes an increasing share of their lives.

Most drug users are seeking an altered state of consciousness, a different perception of the world than is provided by normal, day-to-day activities. Many of the high-school students in the nationwide surveys report that they take drugs "to see what it's like," or "to get high," or "because of boredom." In other words, they are looking for a change, for something new and different in their lives. This aspect of drug use was particularly clear during the 1960s and 1970s, when LSD and other perception-altering drugs were popular. We don't always recognize the altered states produced by other substances, but they do exist. A man drinking alcohol might have just a bit more of a perception that he's a tough guy, that he's influential, that he's well liked. A cocaine user might get the seductive feeling that everything is great and that she's doing a great job (even if she isn't). Many drug-abuse prevention programs have focused on efforts to show young people how to feel good about themselves and how to look for excitement in their lives without using drugs.

Another thing seems clear: Although societal, community, and family factors (the outer areas of Figure 1.4) play an important role in determining whether an individual will first *try* a drug, with increasing use the individual's own experiences with the drug become increasingly important. For those who become seriously dependent, the drug and its actions on that individual become central, and social influences, availability, cost, and penalties play a less important role in the continuation of drug use.

**reinforcement:** a procedure in which a behavioral event is followed by a consequent event such that the behavior is then more likely to be repeated. The behavior of taking a drug may be reinforced by the effect of the drug.

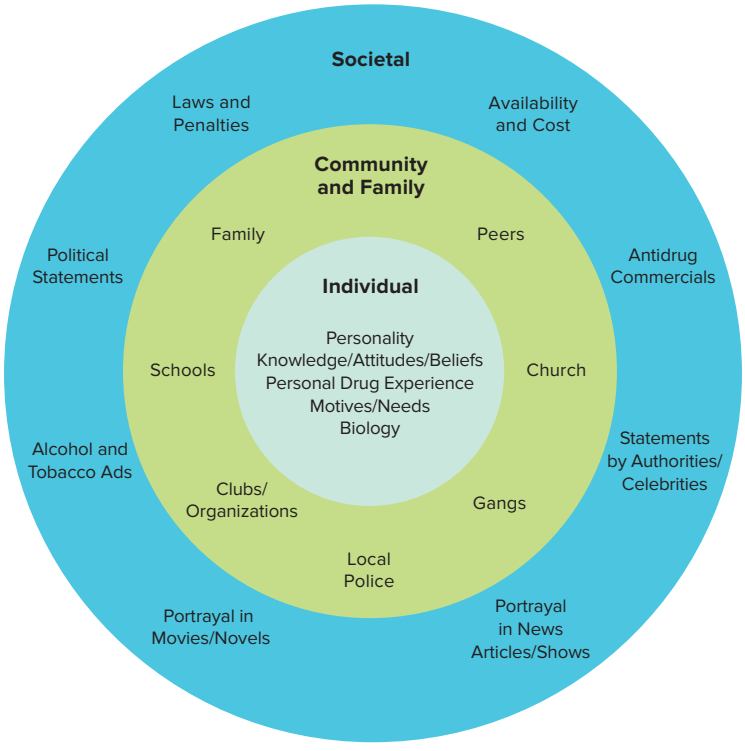



**Figure 1.4** Influences on Drug Use

## Summary

- The users of every type of drug include some who have tried it but won't use it again, some who use it infrequently, some who use it more often but in small amounts, and some who use frequently and in greater amounts. This is as true for users of heroin and crack cocaine as it is for users of alcohol and marijuana.
- No drug is entirely good or bad, and every drug has multiple effects. The size and type of effect depends on the dose of the drug and the user's history and expectations.
- Deviant drug use includes those forms of drug use not considered either normal or acceptable by the society at large. Drug misuse is using a drug in a way that was not intended by its manufacturer. Drug abuse is drug use that causes problems. (If frequent and serious, then a diagnosis of substance use disorder is applied.) Drug dependence involves using the substance more often or in greater amounts than the user intended, and having difficulty stopping or cutting down on its use.
- Among American college students, almost 65 percent can be considered current users of alcohol, less than 20 percent current smokers of tobacco cigarettes, or marijuana, and less than 2 percent current users of cocaine.
- Both alcohol and illicit drug use reached an apparent peak around 1980, then decreased until the early 1990s, with a slower increase after that. Current rates of use are lower than at the peak.
- Adolescents who use illicit drugs (mostly marijuana) are more likely to know adults who use drugs, less likely to believe that their parents

would object to their drug use, less likely to see their parents as a source of social support, more likely to have friends who use drugs, less likely to be religious, and more likely to have academic problems.

- A typical progression of drug use starts with cigarettes and alcohol, then marijuana, then other drugs such as amphetamines, cocaine, or heroin. However, there is no evidence that using one of the "gateway" substances causes one to escalate to more deviant forms of drug use.
- People may use illicit or dangerous drugs for a variety of reasons: They may be part of a deviant subculture, they may be signaling their rebellion, they may find the effects of the drugs to be reinforcing, or they may be seeking an altered state of consciousness. The specific types of drugs and the ways they are used will be influenced by the user's social and physical environment. If dependence develops, then these environmental factors may begin to have less influence.

## Review Questions

1. Besides asking a person the question directly, what is one way a psychologist can try to determine why a person is taking a drug?
2. What two characteristics of a drug's effect might change when the dose is increased?
3. In about what year did drug use in the United States peak?
4. About what percentage of college students use marijuana?
5. What do the results of the National Survey on Drug Use and Health tell us about the overall rates of marijuana and cocaine use among whites compared to African Americans and Hispanics in the United States?
6. How does having a college degree influence rates of drinking alcohol? Using tobacco?
7. Name one risk factor and one protective factor related to the family/parents.
8. How does impulsivity relate to rates of drug use in the general population? How does impulsivity relate to substance dependence?

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# Check Yourself

Name _____ Date _____

## Do Your Goals and Behaviors Match?

One interesting thing about young people who get into trouble with drugs or other types of deviant behavior is that they often express fairly conventional long-term goals for themselves. In other words, they want or perhaps even expect to be successful in life but then do things that interfere with that success. One way to look at this is that their long-term goals don't match up with their short-term behavior. Everyone does this sort of thing to some extent—you want to get a good grade on the first exam, but then someone talks you into going out instead of studying for the next one. Or perhaps you hope to lose 5 pounds but just can't pass up that extra slice of pizza.

Make yourself a chart that lists your long-term goals down one side and has a space for short-term behaviors down the other side, like the one below.

Write in your goal under each category as best you can. Then think about some things you do occasionally that tend to interfere with your achieving that goal and put a minus sign next to each of those behaviors. After you have gone through all the goals, write down some short-term behaviors that you could practice to assist you in achieving each goal, and put a plus sign beside each of those behaviors.

How do your goals and behaviors stack up? Are there some important goals for which you have too many minuses and not enough pluses? If study skills and habits, relationship problems, or substance abuse appear to be serious roadblocks for your success, consider visiting a counselor or therapist to get help in overcoming them.

| | Goals (Long-Term) | Behaviors (Short-Term) |
|---|---|---|
| **Educational** | | |
| **Physical health and fitness** | | |
| **Occupational** | | |
| **Spiritual** | | |
| **Personal relationships** | | |

# 2 Drug Use as a Social Problem

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## Objectives

*When you have finished this chapter, you should be able to:*

- **Distinguish between the federal government's regulatory approach before the early 1900s and now.**
- **Distinguish between acute and chronic toxicity and between physiological and behavioral toxicity.**
- **Describe the two types of data collected in the DAWN system and know the top four drug classes for emergency room visits and for mortality.**
- **Understand why the risks of HIV/AIDS and hepatitis are higher among injection drug users.**
- **Define tolerance, physical dependence, and behavioral dependence.**
- **Understand how the scientific perspective on substance dependence has changed in recent years.**
- **Differentiate between substance abuse and substance dependence using diagnostic criteria.**
- **Debate the various theories on the cause of dependence.**
- **Describe four ways that drug use might cause an increase in crime.**

As we look into the problems experienced by society as a result of the use of psychoactive drugs, we need to consider two broad categories. The first category is the problems directly related to actually taking the drug, such as the risk of developing dependence or of overdosing. Second, because the use of certain drugs is considered a deviant act, the continued use of those drugs by some individuals represents a different set of social problems, apart from the direct dangers of the drugs themselves. These problems include arrests, fines, jailing, and the expenses associated with efforts to prevent misuse and to treat abuse and dependence. We begin by examining the direct drug-related problems that first raised concerns about cocaine, opium, and other drugs. Problems related to law enforcement, prevention, and treatment will be examined more thoroughly in Chapters 3, 17, and 18.

## Land of the Free?

In the 1800s, the U.S. government, like the majority of countries around the world, had virtually no laws governing the sale or use of most drugs. Many modern-day Libertarians would like to see us return to something like that, either allowing each state to regulate drugs or simply allowing people to choose what to use, as long as they don't harm others. Others believe that approach would be taking too much

of a risk. The tension between freedom and safety plays out in many arenas, whether we're talking about security screening at airports, regulating air and water pollution, or the use of drugs like marijuana or heroin. This chapter will explain why people came to believe that unregulated access to drugs led to serious social problems, with the result that the United States now spends billions of dollars each year trying to control access to and use of hundreds of controlled substances, making 1.5 million arrests each year for drug-law violations. We will also discuss the costs and consequences to society of maintaining the current approach to drug regulation. What happened to cause the leaders of the "land of the free" to believe it was necessary to create especially restrictive regulations for some drugs?

Three main concerns aroused public interest: (1) *toxicity:* some drug sellers were considered to be endangering the public health and victimizing individuals because they were selling dangerous, toxic chemicals, often without labeling them or putting appropriate warnings on them; (2) *dependence:* some sellers were seen as victimizing individuals and endangering their health by selling them habit-forming drugs, again often without appropriate labels or warnings; and (3) *crime:* the drug user came to be seen as a threat to public safety—the attitude became widespread that drug-crazed individuals would often commit horrible, violent crimes. In Chapter 3, we will look at the roots of these concerns and how our current legal structures grew from them. For now, let's look at each issue and develop ground rules for the discussion of toxicity, dependence, and drug-related crime.

# Toxicity

## Categories of Toxicity

The word **toxic** means "poisonous, deadly, or dangerous." All the drugs we discuss in this text can be toxic if misused or abused. We will use the term to refer to those effects of drugs that interfere with normal functioning in such a way as to produce dangerous or potentially dangerous consequences. Seen in this way, for example, alcohol can be toxic in high doses because it suppresses respiration—this can be dangerous if breathing stops long enough to induce brain damage or death. But we can also consider alcohol to be toxic if it causes a person to be so disoriented that, for them, otherwise normal behaviors, such as driving a car or swimming, become dangerous. This is an example of something we refer to as **behavioral toxicity.** We make a somewhat arbitrary distinction, then, between behavioral toxicity and "physiological" toxicity—perhaps taking advantage of the widely assumed mind-body distinction, which is more convenient than real. The only reason for making this distinction is that it helps remind us of some important kinds of toxicity that are special to psychoactive drugs. This kind of behavioral impairment due to drug or alcohol intoxication is potentially dangerous not only to the user but also to others if the user is an airline pilot or is driving a car or performing surgery. This danger has led to special laws to reduce these risks.

Why do we consider physiological toxicity to be a "social" problem? One view might be that if an individual chooses to take a risk and harms his or her own body, that's the individual's business. But impacts on hospital emergency rooms, increased health insurance rates, lost productivity, and other consequences of physiological toxicity mean that social systems also are affected when an individual's health is put at risk, whether by drug use or failure to wear seat belts.

Another distinction we make for the purpose of discussion is **acute** versus **chronic.** Most of the time when people use the word *acute,* they mean "sharp" or "intense." In medicine an acute condition is one that comes on suddenly, as opposed to a chronic or long-lasting condition. When talking about drug effects, we can think of the acute effects as those that result from a single administration of a drug or that are a direct result of the presence of the drug in the system at the time. For example, taking an overdose of a prescription painkiller can slow your respiration rate to dangerously low levels. By

## Drugs in Depth

### Drugged Driving

From the 2016 National Survey on Drug Use and Health (Chapter 1), it is estimated that over 10 million Americans reported driving under the influence of some illicit drug during the past year. Given the frequency of reported use of various drugs, we expect that most of those had been smoking marijuana. When combined with concerns about driving under the influence of legal prescription and nonprescription drugs, the National Highway Traffic Safety Administration (NHTSA) has put increased emphasis on impaired driving caused by a variety of drugs. One of their efforts has been supporting the training of police officers to become **drug recognition experts (DREs).**

When a police officer suspects impaired driving, he or she will usually conduct a field sobriety test. These tests include nystagmus (jerky movements as the eyes track a moving target), walk and turn, and one-legged stand, and have been demonstrated to detect intoxication due to alcohol and some classes of drugs. If the person is arrested based on this test, many police departments are now able to conduct a more detailed examination using trained DREs, who check pulse rates, pupil dilation, and several other factors. Based on the results, these DREs can usually determine which major class of drugs is responsible for the impairment.

Proving impairment in court is a complex and often difficult task. State laws vary considerably regarding blood testing, setting limits for some drugs, and reliance on behavioral testing.

*Box icon credit: ©Ingram Publishing/SuperStock RF*

contrast, the chronic effects of a drug are those that result from long-term exposure and can be present whether or not the substance is in the system at a given point. For example, smoking cigarettes is a major cause of high blood pressure. After you develop high blood pressure, that condition is there when you wake up in the morning and when you go to bed at night, and whether your most recent cigarette was five minutes ago or five days ago doesn't make much difference. Another important example is that chronic exposure to large amounts of alcohol can cause both neurological and liver damage.

## Drug Abuse Warning Network

In an effort to monitor the toxicity of drugs other than alcohol, the U.S. government set up the Drug Abuse Warning Network (**DAWN**). This system collected data on drug-related emergency room visits from hospital emergency departments in major metropolitan areas around the country. The DAWN system was discontinued in 2011, so we are presenting the last data collected. A new data system is being developed by the National Center for Health Statistics, but no results have yet been released.

When an individual went to an emergency room with any sort of problem related to drug misuse or abuse, each drug involved (up to six) was recorded. The visit could be for a wide variety of reasons, such as injury due to an accident, accidental overdose, a suicide attempt, or a distressing panic reaction that was not life-threatening to the patient. If someone was in an automobile accident after drinking alcohol, smoking marijuana, and

**toxic:** poisonous, dangerous.
**behavioral toxicity:** toxicity resulting from behavioral effects of a drug.
**acute:** referring to drugs, the short-term effects of a single dose.
**chronic:** referring to drugs, the long-term effects from repeated use.
**drug recognition expert (DRE):** a police officer trained to examine intoxicated individuals to determine which of several classes of drugs caused the intoxication.
**DAWN:** Drug Abuse Warning Network. System for collecting data on drug-related deaths or emergency room visits.

using cocaine, rather than trying to say which one of these substances was responsible for the accident, each of them was counted as being involved in that emergency room visit.

Not every emergency room in the United States participated in the DAWN system, so the numbers for emergency room visits for 2011 shown in Table 2.1 are the totals from the sampled hospitals.[1]

Alcohol was treated somewhat differently than other drugs in the sample. An emergency room visit related only to alcohol use by an adult was not tracked by the DAWN system. Alcohol-related problems were counted when alcohol and some other drug were involved (alcohol-in-combination). Notice that alcohol-in-combination was in first place for emergency room visits, a place it held for many years. In fact, if alcohol were counted alone, its numbers would be large enough to make the other drugs seem much less important comparatively. This seems to indicate that alcohol is a fairly toxic substance. It can be, but remember that about half of all adult Americans drink alcohol at least once a month, whereas only a small percentage of the adult population uses cocaine, the drug that came in second. The DAWN system did not correct for differences in rates of use, but rather gave us an idea of the relative impact of a substance on medical emergencies. Prescription opioids, including the widely prescribed hydrocodone (Vicodin) and oxycodone (Oxycontin), have become increasingly important over the past two decades in causing medical emergencies, and by 2016 might have passed cocaine. Other groups of prescription drugs, such as benzodiazepine sedatives (e.g., Xanax) and sleeping pills (e.g., Halcion) and the antidepressants, are relatively important. Marijuana was mentioned in a large number of ER visits, largely because it is such a widely used drug and its presence is easily detected in blood or urine samples.

**The Drug Abuse Warning Network (DAWN) used data from hospital emergency rooms to monitor drug toxicity.**
©Martin Barraud/AGE Fotostock RF

It is more difficult to determine how many people actually die as a result of using a particular type of drug, but some evidence is available. The Centers for Disease Control and Prevention (CDC) compiles data from death certificates and in most of these a cause of death is recorded. A recent analysis of data from 2012 found about 40,000 drug overdose deaths, and 39 percent of those (16,007) involved prescription opioids.[2] The next largest contributor was the benzodiazepines, followed by heroin and cocaine.

**Table 2.1**
**Toxicity Data from the Drug Abuse Warning Network (DAWN)**

**DRUG-RELATED EMERGENCY ROOM VISITS, NATIONAL ESTIMATES (2011)**

| Rank | Drug | Number |
|---|---|---|
| 1 | Alcohol-in-combination | 606,653 |
| 2 | Cocaine | 505,224 |
| 3 | Prescription opioids | 488,004 |
| 4 | Marijuana | 455,668 |
| 5 | Benzodiazepines | 357,836 |
| 6 | Heroin | 258,482 |
| 7 | Methamphetamine | 102,961 |
| 8 | Antidepressants | 88,965 |
| 9 | PCP | 75,538 |
| 10 | Antipsychotics | 61,951 |

Source: Drug Abuse Warning Network.

## How Dangerous Is the Drug?

Now that we have some idea of the drugs contributing to the largest numbers of toxic reactions, let's see if we can use that information to ask some questions about the relative danger to a person taking one drug versus another. We mentioned that the DAWN data do not correct for frequency of use. However, in Chapter 1 we reviewed other sets of data that provide information on the relative rates of use of different drugs, such as the National Survey on Drug Use and Health discussed on pages 11–15. The populations and sampling methods are different, so we're not going to be able to make fine distinctions with any degree of accuracy. But we know, for example, that roughly eight times as many people report current use of marijuana as report current use of cocaine. An older (2009) DAWN mortality report found almost 10 times as many cocaine-related deaths as marijuana-related deaths. If one-eighth as many users experience 10 times as many deaths, can we say that the risk of death to an individual cocaine user is 80 times the risk of death to an individual marijuana user? That's too precise an answer, but it seems pretty clear that cocaine is relatively much more toxic than marijuana.

We will see in Chapter 9 that we have good estimates as to the increased risk of an alcohol-related accident with increasing blood alcohol concentration, so for alcohol we can get a statistical estimate based on that increased risk. The same is true for cigarette smoking and heart disease. So, when we say that alcohol use is responsible for about 100,000 total U.S. deaths annually (Chapter 9) and cigarettes for over 400,000 (Chapter 10), those are fairly good estimates of the mortality that results from using those substances. We do not have similar data for cocaine, heroin, marijuana, and so on, but the total numbers of deaths caused by these substances is much lower than the deaths caused by either alcohol or tobacco.

## Blood-Borne Diseases

One specific toxicity concern for users who inject drugs is the potential for spreading blood-borne diseases, such as **HIV, AIDS,** and the life-threatening liver infections hepatitis B and hepatitis C. These viral diseases can be transmitted through the sharing of needles. Reported rates of these diseases vary widely from one city to another, and have changed over time. For example, one large drug detoxification program in New York City found HIV infections in more than 50 percent of injecting drug users in the early 1990s. However, education programs and an aggressive syringe exchange program have led to a steady reduction in those rates to just over 10 percent. In this population, sexual transmission is now more important than needle-sharing as far as transmitting new cases of HIV.[3]

This type of drug-associated toxicity is not due to the action of the drug itself, but is incidental to the sharing of needles, no matter which drug is injected or whether the injection is intravenous or intramuscular. An individual drug user may inject 1,000 times a year, and that represents a lot of needles. In several states and cities, drug paraphernalia laws make it illegal to obtain syringes or needles without a prescription, and the resulting shortage of new, clean syringes increases the likelihood that drug users will share needles. One response to this has been the development of syringe exchange programs, in which new, clean syringes are traded for used syringes. Although the U.S. Congress had prohibited the use of federal funds to support these programs, based on the theory that they provide moral encouragement for illegal drug use, exchange programs were funded by state and local governments, and many other countries support such programs. Evidence shows that given the opportunity, drug injectors increase their use of clean syringes, rates of infection are lowered, and the programs more than pay for themselves in the long run. In 2008 it was reported that the incidence of new HIV infections associated with intravenous drug use had declined by 80 percent in the past 20 years.[4]

**HIV:** human immunodeficiency virus.
**AIDS:** acquired immunodeficiency syndrome.

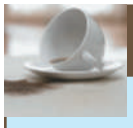
## Focus on Drug Policy

### "Purple Drank"

Fear is a useful emotion. Being afraid of something that threatens you helps you to avoid the real dangers that do exist in our world. But, of course, fear also can be irrational, far out of proportion to any real threat. When that happens, as individuals we might be hampered by being unable to use elevators or ride in airliners, or fear of contamination might seriously interfere with our social lives. Fear is also a favorite tool of many politicians. If they can convince us that there is a real threat of some kind and they offer to protect us from it, we are likely to elect them and to give them the power or funding they seek to provide that protection. Again, this is a rational and perfectly appropriate governmental response to the extent that the threat is both real and likely to harm us, but sometimes it is difficult to get it right. Maybe the U.S. government has underestimated the threat of global climate change. Maybe because of the horrible televised images of a terrorist attack in some faraway place we overestimate the actual risk of being killed by terrorists in our own community. Raising fears about specific types of drugs has been a staple of politics and government in the United States for more than 100 years, from the age of "demon rum" through heroin, marijuana, LSD, PCP, cocaine, MDMA (Ecstasy), and methamphetamine. How do we get it right?

Recently there has been quite a bit of media publicity about "purple drank," which seems to have first appeared in Houston, Texas, and then became more widely known after being mentioned in some rap songs. The major ingredient in this drink is prescription cough syrup containing codeine and promethazine. Codeine is an opioid (Chapter 13) and promethazine is an antihistamine (Chapter 12). Each of these drugs can suppress respiration, and when taken in high doses and if alcohol is also consumed, there is a risk of death from respiratory depression.

*Box icon credit: ©Edward.J.Westmacott/Alamy Images RF*



## Unintended Consequences

### Syringes and the Harm-Reduction Approach

In the early days of concern about drug addiction (1911), New York was the first state to require a prescription to obtain hypodermic syringes. This was done in the belief that limiting access to syringes would reduce the number of injecting drug users. They certainly could not have foreseen one apparent consequence of that law when more than 70 years later, HIV began to spread rapidly among drug users who shared their syringes. Several studies have found that providing clean syringes reduces the spread of HIV, and that cities with over-the-counter sales of syringes have lower rates of HIV infection among drug users.[3] Several states have modified their syringe laws in recent years to allow for either syringe exchanges or nonprescription purchase of syringes, in an effort to reduce the spread of HIV and hepatitis. This is a clear example of something called the *harm-reduction approach*. This approach recognizes that in spite of efforts to control drug use, there will still be users, and if there are ways to reduce the harm to the users and others, that is the right thing to do.

We will see other examples of harm-reduction efforts throughout this book, but one other example will be of interest to college students. In the United States it is illegal for college students under the age of 21 to drink alcohol, yet most do. College administrators mostly recognize that trying to prevent all underage drinking in this population is unrealistic. Therefore, in spite of the illicit nature of underage drinking, freshmen are taught about responsible drinking, avoiding driving under the influence, and preventing alcohol poisoning, sexual assault, and impaired grades due to overindulgence.

*Box icon credit: ©Adam Gault/age fotostock RF*

**Needles are collected through an exchange program in an effort to prevent the spread of HIV among intravenous drug users.** ©Time & Life Pictures/Getty Images

The authors pointed out that intravenous drug users have been acquiring clean needles from pharmacies and syringe exchange programs, and also limiting the number of people sharing their needles. In response to all the evidence favoring syringe exchange, in 2009 the U.S. Congress voted to lift the more than 20-year federal ban on funding for such programs.

## Substance Dependence: What Is It?

All our lives we have heard people talk about "alcoholics" and "addicts," and we're sure we know what we're talking about when one of these terms is used. Years ago when people first became concerned about some people being frequent, heavy users of cocaine or morphine, the term *habituation* was often used. If we try to develop scientific definitions, terms such as *alcoholic* or *addict* are actually hard to pin down. For example, not everyone who is considered an alcoholic drinks every day—some drink in binges, with brief periods of sobriety in between. Not everyone who drinks every day is considered an alcoholic—a glass of wine with dinner every night doesn't match most people's idea of alcoholism. The most extreme examples are easy to spot: the homeless man dressed in rags, drinking from a bottle of cheap wine, or the heroin user who needs a fix three or four times a day to avoid withdrawal symptoms. No hard-and-fast rule for quantity or frequency of use can help us draw a clear line between what we want to think of as a "normal drinker" or a "recreational user" and someone who has developed a dependence on the substance, who is compelled to use it, or who has trouble controlling his or her use of the substance. It would be nice if we could separate substance use into two distinct categories: In one case, the individual controls the use of the substance; in the other case, the substance seems to take control of the individual. However, the real world of substance use, misuse, abuse, and dependence does not come wrapped in such convenient packages.

### Three Basic Processes

The extreme examples mentioned above, of the homeless alcohol drinker or the frequent heroin user, typically exhibit three characteristics of their substance use that distinguish them from first-time or occasional users. These appear to represent three processes that may occur with repeated drug use, and each of these processes can be defined and studied by researchers interested in understanding drug dependence.

**Tolerance** **Tolerance** refers to a phenomenon seen with many drugs, in which repeated exposure to the same dose of the drug results in a lesser effect. There are many ways this diminished effect can occur, and some examples are given in Chapter 5. For now, it is enough for us to think of the body as developing ways to compensate for the chemical imbalance caused by introducing a drug into the system. As the individual experiences less and less

**tolerance:** reduced effect of a drug after repeated use.

of the desired effect, often the tolerance can be overcome by increasing the dose of the drug. Some regular drug users might eventually build up to taking much more of the drug than it would take to kill a nontolerant individual.

**Physical Dependence** **Physical dependence** is defined by the occurrence of a **withdrawal syndrome.** Suppose a person has begun to take a drug and a tolerance has developed. The person increases the amount of drug and continues to take these higher doses so regularly that the body is continuously exposed to the drug for days or weeks. With some drugs, when the person stops taking the drug abruptly, a set of symptoms begins to appear as the drug level in the system drops. For example, as the level of heroin drops in a regular user, that person's nose might run and he or she might begin to experience chills and fever, diarrhea, and other symptoms. When a drug produces a consistent set of these symptoms in different individuals, we refer to the collection of symptoms as a withdrawal syndrome. These withdrawal syndromes vary from one class of drugs to another. Our model for why withdrawal symptoms appear is that the drug initially disrupts the body's normal physiological balances. These imbalances are detected by the nervous system, and over a period of repeated drug use the body's normal regulatory mechanisms compensate for the presence of the drug. When the drug is suddenly removed, these compensating mechanisms produce an imbalance. Tolerance typically precedes physical dependence. To continue with the heroin example, when it is first used it slows intestinal movement and produces constipation. After several days of constant heroin use, other mechanisms in the body counteract this effect and get the intestines moving again (tolerance). If the heroin use is suddenly stopped, the compensating mechanisms produce too much intestinal motility. Diarrhea is one of the most reliable and dramatic heroin withdrawal symptoms.

Because of the presumed involvement of these compensating mechanisms, the presence of a withdrawal syndrome is said to reflect physical (or physiological) dependence on the drug. In other words, the individual has come to depend on the presence of some amount of that drug to function normally; removing the drug leads to an imbalance, which is slowly corrected over a few days.

**Frequent drug use, craving for the drug, and a high rate of relapse after quitting indicate psychological dependence.**
©McGraw-Hill Education/Gary He, photographer

**Psychological Dependence** **Psychological dependence** (also called *behavioral dependence*) can be defined in terms of observable behavior. It is indicated by the frequency of using a drug or by the amount of time or effort an individual spends in drug-seeking behavior. Often it is accompanied by reports of *craving* the drug or its effects. A major contribution of behavioral psychology has been to point out the scientific value of the concept of **reinforcement** for understanding psychological dependence.

The term *reinforcement* is used in psychology to describe a process: A behavioral act is followed by a consequence, resulting in an increased tendency to repeat that behavioral act. The consequence may be described as pleasurable or as a "reward" in some cases (e.g., providing a tasty piece of food to someone who has not eaten for a while). In other cases, the consequence may be described in terms of escape from pain or discomfort. The behavior itself is said to be strengthened, or *reinforced,* by its consequences. The administration of certain drugs can

reinforce the behaviors that led to the drug's administration. Laboratory rats and monkeys have been trained to press levers when the only consequence of lever pressing is a small intravenous injection of heroin, cocaine, or another drug. Because some drugs but not others are capable of serving this function, it is possible to refer to some drugs as having "reinforcing properties" and to note that a general correlation exists between those drugs and the ones to which people often develop psychological dependence.

## Changing Views of Addiction

Until the 20th century, the most common view was probably that alcoholics and addicts were weak-willed, lazy, or immoral (the "moral model"). Then medical and scientific studies began of users of alcohol and opioids. It seemed as if something more powerful than mere self-indulgence was at work, and the predominant view began to be that dependence is a drug-induced illness.

**Early Medical Models** If heroin dependence is induced by heroin, or alcohol dependence by alcohol, then why do some users develop dependence and others not? An early guess was simply that some people, for whatever reasons, were exposed to large amounts of the substance for a long time. This could happen through medical treatment or self-indulgence. The most obvious changes resulting from long exposure to large doses are the withdrawal symptoms that occur when the drug is stopped. Both alcohol and the opioids can produce rather dramatic withdrawal syndromes. Thus, the problem came to be associated with the presence of physical dependence (a withdrawal syndrome), and enlightened medically oriented researchers went looking for treatments based on reducing or eliminating withdrawal symptoms. According to the most narrow interpretation of this model, the dependence itself was cured when the person had successfully completed withdrawal and the symptoms disappeared.

Pharmacologists and medical authorities continued into the 1970s to define *addiction* as occurring only when physical dependence was seen. Based on this view, public policy decisions, medical treatment, and individual drug-use decisions could be influenced by the question "Is this an addicting drug?" If some drugs produce dependence but others do not, then legal restrictions on specific drugs, care in the medical use of those drugs, and education in avoiding the recreational use of those drugs are appropriate. The determination of whether a drug is or is not "addicting" was therefore crucial.

In the 1960s, some drugs, particularly marijuana and amphetamines, were not considered to have well-defined, dramatic, physical withdrawal syndromes. The growing group of interested scientists began to refer to drugs such as marijuana, amphetamines, and cocaine as "merely" producing psychological dependence, whereas heroin produced a "true addiction," which includes physical dependence. The idea seemed to be that psychological dependence was "all in the head," whereas physical dependence involved bodily processes, subject to physiological and biochemical analysis and possibly to improved medical treatments. This was the view held by most drug-abuse experts in the 1960s.

**Positive Reinforcement Model** In the 1960s, a remarkable series of experiments began to appear in the scientific literature—experiments in which

**physical dependence:** drug dependence defined by the presence of a withdrawal syndrome, implying that the body has become adapted to the drug's presence.
**withdrawal syndrome:** a consistent set of symptoms that appears after discontinuing use of a drug.
**psychological dependence:** behavioral dependence; indicated by a high rate of drug use, craving for the drug, and a tendency to relapse after stopping use.
**reinforcement:** a procedure in which a behavioral event is followed by a consequent event such that the behavior is then more likely to be repeated. The behavior of taking a drug may be reinforced by the effect of the drug.

## DSM-5

### Psychiatric Diagnosis of Substance Use Disorders

A problematic pattern of substance use leading to clinically significant impairment or distress, as manifested by at least two of the following, occurring within a 12-month period:

1. The substance is often taken in larger amounts or over a longer period than was intended.
2. There is a persistent desire or unsuccessful efforts to cut down or control substance use.
3. A great deal of time is spent in activities necessary to obtain the substance.
4. Craving, or a strong desire or urge to use the substance.
5. Recurrent substance use resulting in a failure to fulfill major role obligations.
6. Continued substance use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of the substance.
7. Important social, occupational, or recreational activities are given up or reduced because of substance use.
8. Recurrent substance use in situations in which it is physically hazardous.
9. Substance use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by the substance.
10. Tolerance, as defined by either of the following:
    a. A need for markedly increased amounts of the substance to obtain the desired effect.
    b. A markedly diminished effect with continued use of the same amount of the substance.
11. Withdrawal, as manifested by either of the following:
    a. The characteristic withdrawal syndrome for the substance.
    b. The substance (or a closely related substance) is taken to relieve or avoid withdrawal symptoms.

Adapted from *Diagnostic and Statistical Manual of Mental Disorders,* 5th edition (DSM-5).

laboratory monkeys and rats were given intravenous tubes connected to motorized syringes and controlling equipment so that pressing a lever would produce a single brief injection of morphine, an opioid very similar to heroin. In the initial experiments, monkeys were exposed for several days to large doses of morphine, allowed to experience the initial stages of withdrawal, and then connected to the apparatus to see if they would learn to press the lever, thereby avoiding the withdrawal symptoms. These experiments were based on the predominant view of drug use as being driven by physical dependence. The monkeys did learn to press the levers.

As these scientists began to publish their results and as more experiments like this were done, interesting facts became apparent. First, monkeys would begin pressing and maintain pressing without first being made physically dependent. Second, monkeys who had given themselves only fairly small doses and who had never experienced withdrawal symptoms could be trained to work very hard for their morphine. A history of physical dependence and withdrawal didn't seem to have much influence on response rates in the long run. Clearly, the small drug injections themselves were working as positive reinforcers of the lever-pressing behavior, just as food can be a positive reinforcer to a hungry rat or monkey. Thus, the idea spread that drugs can act as reinforcers of behavior and that this might be the basis of what had been called psychological dependence. Drugs such as amphetamines and cocaine could easily be used as reinforcers in these experiments, and they were known to produce strong psychological dependence in humans. Animal experiments using drug

self-administration are now of central importance in determining which drugs are likely to be used repeatedly by people, as well as in testing new drugs that might be used to treat drug addiction.[5]

### Which Is More Important, Physical Dependence or Psychological Dependence?

The animal research that led to the positive reinforcement model implies that psychological dependence is more important than physical dependence in explaining repeated drug use, and this has led people to examine the lives of heroin users from a different perspective. Stories were told of users who occasionally stopped taking heroin, voluntarily going through withdrawal so as to reduce their tolerance level and get back to the lower doses of drug they could more easily afford. When we examine the total daily heroin intake of many users, we see that they do not need a large amount and that the agonies of withdrawal they experience are no worse than a case of intestinal flu. We have known for a long time that heroin users who have already gone through withdrawal in treatment programs or in jail have a high probability of returning to active heroin use. In other words, if all we had to worry about was users' avoiding withdrawal symptoms, the problem would be much smaller than it actually is.

Psychological dependence, based on *reinforcement,* is increasingly accepted as the real driving force behind repeated drug use, and tolerance and physical dependence are now seen as related phenomena that sometimes occur but probably are not critical to the development of frequent patterns of drug-using behavior.

Researchers and treatment providers rely heavily on the definitions of *substance use disorder* developed by the American Psychiatric Association and presented in their *Diagnostic and Statistical Manual*, 5th edition (DSM-5).[6] These are presented in outline form on the previous page. We have provided a generic version using the word *substance*, but in fact there are 10 separate diagnoses, defined for each class of drug (e.g., alcohol, sedatives, cannabis, stimulants, tobacco, hallucinogens, opioids).Notice that the diagnosis is complex, and the exact set of behaviors seen may vary from person to person. The severity of the disorder is characterized as mild if two or three of the symptoms are present, moderate if there are four or five, and severe if the person exhibits six or more. Also, note that 9 of the 11 symptoms describe behaviors, such as taking more of the substance than was intended or giving up other important activities because of substance use. This again points out that these substance use disorders are seen primarily as behavioral in nature, with tolerance and physical dependence being less important.

## Broad Views of Addiction

If we define drug addiction not in terms of withdrawal but in more behavioral or psychological terms, as an overwhelming involvement with getting and using the drug, then might this model also be used to describe other kinds of behavior? What about a man who visits prostitutes several times a day; someone who eats large amounts of food throughout the day; or someone who places bets on every football and basketball game, every horse race or automobile race, and who spends hours each day planning these bets and finding money to bet again? Shouldn't these also be considered examples of addiction? Do the experiences of overeating, gambling, sex, and drugs have something in common—a common change in physiology or brain chemistry or a common personality trait that leads to any or many of these compulsive behaviors? Are all of these filling an unmet social or spiritual need? More and more, researchers are looking for these common threads and discussing "addictions" as a varied set of behavioral manifestations of a common process or disorder.

### Is Addiction Caused by the Substance?

Especially with chemical dependence, many people speak as though the substance itself is the cause of the addiction. Certainly some drugs are more likely than others to result in dependence. For example, it is widely believed that heroin and cocaine are both likely to lead to compulsive use. In contrast, most

**Alcohol causes dependence in some drinkers.**
©McGraw-Hill Education/Jill Braaten, photographer

users of marijuana report occasional use and little difficulty in deciding when to use it and when not to. We also know that some methods of taking a drug (e.g., intravenous injection) are more likely to result in repeated use than other methods of taking the same drug (by mouth, for instance). There have been estimates of the relative dependence liability of different drugs based on the judgments of panels of experts in the field, but even experts are not always objective about such things. The most scientific approach to date is based on a survey study starting with more than 40,000 participants, who answered questions about their first use of several substances and also questions designed to determine whether they met the criteria for dependence, either currently or in the past.[7] The authors then determined the probability that someone who had used marijuana, for example, would have developed a marijuana dependency at different time points after their first use. The results for nicotine, alcohol, marijuana, and cocaine are shown in Table 2.2. We can see that one year after the initial use, there was only about a 2 percent chance that dependence would develop for alcohol, nicotine, or marijuana, but a 7.1 percent chance for cocaine to produce dependence within one year. Over time, these risks grew at different rates, so that the estimated lifetime risk is 67.5 percent for nicotine, just over 20 percent for alcohol and cocaine, and under 10 percent for marijuana. So yes, some substances are more "addictive" than others, but as we will see, many other factors influence dependence. Thus, the substance itself cannot be seen as the entire cause of the problem, even though some people would like to put all the blame on "demon rum" or on heroin or crack cocaine.

**Table 2.2**
**Dependence Potential of Alcohol, Nicotine, Cocaine, and Marijuana**

| | Probability of Transition to Dependence | | |
|---|---|---|---|
| | After 1 year of use | After 10 years of use | Lifetime estimate |
| Alcohol | 2.0% | 11.0% | 22.7% |
| Nicotine | 2.0% | 15.6% | 67.5% |
| Cocaine | 7.1% | 14.8% | 20.9% |
| Marijuana | 2.0% | 5.9% | 8.9% |

When we extend the concept of addiction to other activities, such as gambling, sex, or overeating, it seems harder to place the entire blame on the activity, again because many people do not exhibit compulsive patterns of such behaviors. Some activities might be more of a problem than others—few people become dependent on filling out income tax forms, whereas a higher proportion of all those who gamble become overwhelmingly involved. Still, it is wrong to conclude that any activity is by its nature always "habit forming."

When a chemical is seen as causing the dependence, there is a tendency to give that substance a personality and to ascribe motives to it. When we listen either to a practicing user's loving description of his interaction with the drug or to a recovering

alcoholic describe her struggle against the bottle's attempts to destroy her, the substance seems to take on almost human characteristics. We all realize that is going too far, yet the analogy is so powerful that it pervades our thinking. **Alcoholics Anonymous (AA)** members often describe alcohol as being "cunning, baffling, and powerful" and admit that they are powerless against such a foe. And those seeking the prohibition of alcohol, cocaine, marijuana, heroin, and other drugs have over the years tended to demonize those substances, making them into powerful forces of evil. The concept of a "war on drugs" reflects in part such a perspective—that some drugs are evil and war must be waged against the substances themselves.

It might be emotionally satisfying to put the blame for dependence on a chemical, and for most people it makes sense to simply treat heroin or methamphetamine as something to be avoided at all cost. But in reality these drugs do have beneficial uses, and dependence does not develop in every user. Placing all the blame on the drug itself is not only illogical, but it also has caused the U.S. government to put most of its drug abuse control funding into efforts to prevent access to the drugs and too little into teaching people how to live in a world in which such drugs will continue to exist.

## Is Dependence Biological?

In recent years, interest has increased in the possibility that all compulsive behaviors might have some common physiological or biochemical action in the brain. For example, many theorists have recently focused on dopamine, one of the brain's important neurotransmitters, which some believe to play a large role in positive reinforcement. The idea is that any drug use or other activity that has pleasurable or rewarding properties spurs dopamine activity in a particular part of the brain. This idea is discussed more fully in Chapter 4. Although this theory has been widely tested in animal models and much evidence is consistent with it, considerable evidence also shows that this model is too simple and that other neurotransmitters and other brain regions are also important.

A great deal of attention has been given to reports from various brain-scanning experiments done on drug users. Although these studies show some of the physiological *consequences* produced by cocaine or by even thinking about cocaine, they have not yet been useful in examining the possible biological *causes* of dependence. One important question that remains is whether the brains of people who have used cocaine intermittently show different responses, compared with the brains of dependent cocaine users. Ultimately, the strongest demonstration of the power of such techniques would be if it were possible to know, based on looking at a brain scan, whether a person had developed dependence. However, that has not been demonstrated (and might never be).

Numerous studies in both animals and humans have shown that there are genetic influences on drug use, effects, and dependence. One study examined over 2,000 twins with a history of substance dependence.[8] Comparisons between monozygotic (identical) and dizygotic (fraternal) twins were used to estimate genetic versus environmental influences. The researchers also looked for "comorbidity," that is, people who developed dependencies on more than one substance. Using a complex statistical technique, they estimated that heritability (genetics) could explain 38 percent of alcohol dependence, 55 percent of tobacco dependence, and 19 percent of marijuana dependence. It was estimated that for alcohol and nicotine, about half of this heritability was due to a common factor increasing risk for any type of substance, and the other half to genetic factors specific to that substance. So, while we have evidence that genetic factors do play a role in determining which people become dependent, we do not know the specific genes involved, nor do we know the biological mechanisms by which the genes influence these behaviors.

**Alcoholics Anonymous (AA):** a worldwide organization of self-help groups based on alcoholics helping each other achieve and maintain sobriety.

These biological studies are fascinating and perhaps someday will lead to a better understanding of, or better treatments for, specific addictions. For now, we recommend caution when someone tries to give you a biological explanation of addiction, since none has yet become widely accepted or truly useful.

## Is There an "Addictive Personality"?

Perhaps the explanation for why some people become dependent but others do not lies in the personality—that complex set of attributes and attitudes that develops over time, partly as a result of particular experiences. Is there a common personality factor that is seen in compulsive drug users but not in others? We've known for some time that people who are diagnosed with certain types of personality disorders, such as antisocial personality or conduct disorder, are more likely to also have one of the substance use disorder diagnoses. We've also known that people who have a long history of alcohol dependence or heroin dependence will demonstrate a variety of differences from the normal population on personality tests. But neither of these findings tells us anything about what caused these relationships. Conduct disorder and antisocial personality disorder reflect a general tendency for a person to violate social norms. Perhaps drug use is just one of many ways this person might choose to break the rules? And someone who has been drinking heavily for many years, has had health problems, perhaps lost a job and family, might well have developed personality differences due to the consequences of years of substance abuse. So we have not had much good information until fairly recently about personality differences that might predispose individuals to develop a substance use disorder.

One personality trait that has frequently been associated with greater risk for abuse of stimulants such as amphetamine or cocaine is called *sensation-seeking*. The sensation-seeking scale measures the person's preference for variety, risk, and various physical sensations. People who score higher on this scale tend to report a greater "high" and a greater "liking" for the drug when given amphetamine in a laboratory setting.[9]

Another, possibly related, personality factor is often referred to as *impulsivity*—the tendency to act quickly without as much regard to long-term consequences. The relationships between impulsivity and drug use are complex, and researchers are becoming more sophisticated in trying to understand the relationships among impulsivity, specific types of drug use, and the setting in which the drug is used. In other words, being impulsive might have more to do with whether a person drinks too much at a party than it does with whether a person has a glass of wine with dinner.[10]

## Is Dependence a Family Disorder?

Although few scientific studies have been done, examination of the lives of alcohol-dependent individuals reveals some typical patterns of family adaptation to the problem. A common example in a home with an alcohol-dependent father is that the mother enables this behavior, by calling her husband's boss to say he is ill or by making excuses to family and friends for failures to appear at dinners or parties and generally by caring for her incapacitated husband. The children might also compensate in various ways, and all conspire to keep the family secret. Thus, it is said that alcohol dependence often exists within a dysfunctional family—the functions of individual members adjust to the needs created by the presence of excessive drinking. This new arrangement can make it difficult for the drinker alone to change his or her behavior, because doing so would disrupt the family system. Some people suspect that certain family structures actually enhance the likelihood of alcohol abuse or dependence developing. For example, the "codependent" needs of other family members to take care of someone who is dependent on them might facilitate drunkenness.

Much has been written about the effects on children who grow up in an "alcoholic family," and there is some indication that even as adults these individuals tend to exhibit certain personality