

MARLENA ZUBER, 2001

CHAPTER
10

Substance-Related Disorders

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CROSSROADS: NEW WRINKLES TO A FAMILIAR STORY

"I am Duncan. I am an alcoholic." The audience settled deeper into their chairs at these familiar words. Another chronicle of death and rebirth would shortly begin [at] Alcoholics Anonymous. . . .

. . . "I must have been just past my 15th birthday when I had that first drink that everybody talks about. And like so many of them . . . it was like a miracle. With a little beer in my gut, the world was transformed. I wasn't a weakling anymore, I could lick almost anybody on the block. And girls? Well, you can imagine how a couple of beers made me feel, like I could have any girl I wanted. . . .

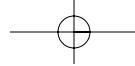
"Though it's obvious to me now that my drinking even then, in high school, and after I got to college, was a problem, I didn't think so at the time. After all, everybody was drinking and getting drunk and acting stupid, and I didn't really think I was different. . . . I guess the fact that I hadn't really had any blackouts and that I could go for days without having to drink reassured me that things hadn't gotten out of control. And that's the way it went, until I found myself drinking even more—and more often—and suffering more from my drinking, along about my third year of college.

. . . "My roommate, a friend from high school, started bugging me about my drinking. It wasn't even that I'd have to sleep it off the whole next day and miss class, it was that he had begun to hear other friends talking about me, about the fool I'd made of myself at parties. He saw how shaky I was the morning after, and he saw how different I was when I'd been drinking a lot—almost out of my head was the way he put it. And he could count the bottles that I'd leave around the room, and he knew what the drinking and carousing was doing to my grades. . . . [P]artly because I really cared about my roommate and didn't want to lose him as a friend, I did cut down on my drinking by half or more. I only drank on weekends—and then only at night. . . . And that got me through the rest of college and, actually, through law school as well. . . .

"Shortly after getting my law degree, I married my first wife, and . . . for the first time since I started, my drinking was no problem at all. I would go for weeks at a time without touching a drop. . . .

"My marriage started to go bad after our second son, our third child, was born. I was very much career-and-success oriented, and I had little time to spend at home with my family. . . . My traveling had increased a lot, there were stimulating people on those trips, and, let's face it, there were some pretty exciting women available, too. So home got to be little else but a nagging, boring wife and children I wasn't very interested in. My drinking had gotten bad again, too, with being on the road so much, having to do a lot of entertaining at lunch when I wasn't away, and trying to soften the hassles at home. I guess I was putting down close to a gallon of very good scotch a week, with one thing or another.

"And as that went on, the drinking began to affect both my marriage and my career. With enough booze in me and under the pressures of guilt over my failure to carry out my responsibilities to my wife and children, I sometimes got

**>>IN THEIR WORDS**

"Wine is the most healthful and most hygienic of beverages."
Louis Pasteur

"There is a devil in every berry of the grape."
The Koran

kind of rough physically with them. I would break furniture, throw things around, then rush out and drive off in the car. I had a couple of wrecks, lost my license for two years because of one of them. Worst of all was when I tried to stop. By then I was totally hooked, so every time I tried to stop drinking, I'd experience withdrawal in all its horrors . . . with the vomiting and the 'shakes' and being unable to sit still or to lie down. And that would go on for days at a time. . . .

"Then, about four years ago, with my life in ruins, my wife given up on me and the kids with her, out of a job, and way down on my luck, [Alcoholics Anonymous] and I found each other. . . . I've been dry now for a little over two years, and with luck and support, I may stay sober. . . ."

(Spitzer *et al.*, 1983, pp. 87-89)

Human beings enjoy a remarkable variety of foods and drinks. Every substance on earth probably has been tried by someone, somewhere, at some time. We also have discovered substances that have interesting effects—both medical and pleasurable—on our brains and the rest of our bodies. We may swallow an aspirin to quiet a headache, an antibiotic to fight an infection, or a tranquilizer to calm us down. We may drink coffee to get going in the morning or wine to relax with friends. We may smoke cigarettes to soothe our nerves. However, many of the substances we consume can harm us or disrupt our behavior or mood. The misuse of such substances has become one of society's biggest problems; it has been estimated that the cost of drug misuse is a staggering \$414 billion each year in the United States alone (RWJF, 2001).

A *drug* is defined as any substance other than food that affects our bodies or minds. It need not be a medicine or be illegal. The term "substance" is now frequently used in place of "drug," in part because many people fail to see that such substances as alcohol, tobacco, and caffeine are drugs, too. When a person ingests a substance—whether it be alcohol, cocaine, marijuana, or some form of medication—trillions of powerful molecules surge through the bloodstream and into the brain (Nash, 1997). Once there, the molecules set off a series of biochemical events that disturb the normal operation of the brain and body. Not surprisingly, then, substance misuse may lead to various kinds of abnormal functioning.

Drugs may cause *temporary* changes in behavior, emotion, or thought. As Duncan found out, for example, an excessive amount of alcohol may lead to *intoxication* (literally, "poisoning"), a temporary state of poor judgment, mood changes, irritability, slurred speech, and poor coordination. Drugs such as LSD may produce a particular form of intoxication, sometimes called *hallucinosis*, consisting of perceptual distortions and hallucinations.

Some substances can also lead to *long-term problems*. People who regularly ingest them may develop maladaptive patterns of behavior and changes in their body's physical responses (APA, 2000). In one such pattern, called **substance abuse**, they rely on the drug excessively and chronically and in so doing damage their family and social relationships, function poorly at work, or put themselves and others in danger. A more advanced pattern, **substance dependence**, is also known as **addiction**. In this pattern, people not only abuse the drug but also center their lives on it and perhaps acquire a physical dependence on it, marked by a **tolerance** for it, withdrawal symptoms, or both (see Table 10-1). When people develop tolerance, they need increasing doses of a drug in order to keep getting the desired effect. **Withdrawal** consists of unpleasant and even dangerous symptoms—cramps, anxiety attacks, sweating, nausea—that occur when individuals suddenly stop taking or cut back on the drug.

Duncan, who described his problems to fellow members at an Alcoholics Anonymous meeting, was caught in a pattern of alcohol dependence. When he was a college student and later a lawyer, alcohol damaged his family, social, academic, and work life. He also built up a tolerance for the substance over time and experienced withdrawal symptoms such as vomiting and shaking when he tried to

SUBSTANCE ABUSE A pattern of behavior in which people rely on a drug excessively and regularly, bringing damage to their relationships, functioning poorly at work, or putting themselves or others in danger.

SUBSTANCE DEPENDENCE A pattern of behavior in which people organize their lives around a drug, possibly building a tolerance to it or experiencing withdrawal symptoms when they stop taking it, or both. Also called *addiction*.

TOLERANCE The adjustment that the brain and the body make to the regular use of certain drugs so that ever larger doses are needed to achieve the earlier effects.

WITHDRAWAL Unpleasant, sometimes dangerous reactions that may occur when people who use a drug regularly stop taking or reduce their dosage of the drug.



The Granger Collection

Wonder drug Drugs often go through periods of broad acceptance before their dangers are discovered. Cocaine, for example, was legal in the United States until 1914 and was an ingredient in over-the-counter medicines, such as Cocaine Toothache Drops. This 1885 ad shows that it was used to treat children as well as adults. Cocaine was also part of Coca-Cola's formula until 1903.

stop using it. In any given year, 7.3 percent of all adults in the United States display a pattern of substance abuse or dependence (NHSDA, 2002). Only 20 percent of them receive treatment.

Many drugs are available in our society, and new ones are introduced almost every day. Some are found in nature, others derived from natural substances, and still others produced in the laboratory. Some, such as antianxiety drugs and barbiturates, require a physician's prescription for legal use. Others, such as alcohol and nicotine, are legally available to adults.

Still others, such as heroin, are illegal under all circumstances. In 1962 only 4 million people in the United States had ever used marijuana, cocaine, heroin, or another illegal substance; today the number has climbed to more than 94 million (NHSDA, 2002). In fact, 28 million people have used illegal substances within the past year, and 16 million are using one currently. More than one-quarter of all high school seniors have used an illegal drug within the past month (Johnston, O'Malley, & Bachman, 2002).

The substances people misuse fall into several categories: *depressants*, such as alcohol and opioids, which slow the central nervous system; *stimulants* of the central nervous system, such as cocaine and amphetamines; *hallucinogens*, such as LSD, which cause delusions, hallucinations, and other powerful changes in sensory perception; and *cannabis* substances, such as marijuana, which cause a mixture of hallucinogenic, depressant, and stimulant effects. Many people take more than one of these substances at a time, a practice known as *polydrug* use. In this chapter we shall look at some of the most problematic substances and the abnormal patterns they may produce. After first examining the substances separately, we shall consider the causes and treatments of substance-related disorders together as a group.

Table 10-1 DSM-IV Checklist

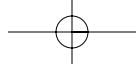
SUBSTANCE ABUSE

1. A maladaptive pattern of substance use leading to significant impairment or distress
2. At least one of the following features occurring within one year:
 - (a) Recurrent substance use, resulting in failure to fulfill major role obligations at work, school, or home
 - (b) Recurrent substance use in situations in which it is physically hazardous
 - (c) Recurrent substance-related legal problems
 - (d) Substance use that continues despite its causing or increasing persistent social or interpersonal problems

SUBSTANCE DEPENDENCE

1. A maladaptive pattern of substance use leading to significant impairment or distress
2. At least three of the following:
 - (a) Tolerance
 - (b) Withdrawal
 - (c) Substance often taken in larger amounts over a longer period than was intended
 - (d) Persistent desire for substance or unsuccessful efforts to control substance use
 - (e) Considerable time spent trying to obtain, use, or recover from the substance
 - (f) Substance use in place of important activities
 - (g) Substance use that continues despite its causing or increasing persistent physical or psychological problems

Based on APA, 2000, 1994.



Depressants

ALCOHOL Any beverage containing ethyl alcohol, including beer, wine, and liquor.

Depressants slow the activity of the central nervous system. They reduce tension and inhibitions and may interfere with a person's judgment, motor activity, and concentration. The three most widely used groups of depressants are *alcohol*, *sedative-hypnotic drugs*, and *opioids*.

Alcohol

Two-thirds of the people in the United States at least from time to time drink beverages that contain **alcohol** (CDC, 2002). Purchases of beer, wine, and liquor amount to tens of billions of dollars each year in the United States alone. Nearly 6 percent of persons over 11 years of age are heavy drinkers, having at least five drinks on at least five occasions each month (NCHS, 2002). Among heavy drinkers, males outnumber females by more than three to one, around 9 percent to 3 percent.

All alcoholic beverages contain *ethyl alcohol*, a chemical that is quickly absorbed into the blood through the lining of the stomach and the intestine. The ethyl alcohol immediately begins to take effect as it is carried in the bloodstream to the central nervous system (the brain and spinal cord), where it acts to depress, or slow, functioning by binding to various neurons. One important group of neurons to which ethyl alcohol binds are those that normally receive the neurotransmitter GABA. As we observed in Chapter 4, GABA carries an *inhibitory* message—a message to stop firing—when it is received at certain neurons. When alcohol binds to receptors on those neurons, it apparently helps GABA to shut down the neurons, thus helping to relax the drinker (Harvey et al., 2002; Heinz et al., 2001).

At first ethyl alcohol slows down the areas of the brain that control judgment and inhibition; people become looser, more talkative, and often more friendly. As their inner control breaks down, they may feel relaxed, confident, and happy. When more alcohol is absorbed, it slows down additional areas in the central nervous system, leaving the drinkers less able to make sound judgments, their speech less careful and less clear, and their memory weaker. Many people become highly emotional and perhaps loud and aggressive.

Motor difficulties increase as drinking continues, and reaction times slow. People may be unsteady when they stand or walk and clumsy in performing even simple activities. They may drop things, bump into doors and furniture, and misjudge distances. Their vision becomes blurred, particularly side vision, and they have trouble hearing. As a result, people who have drunk too much alcohol may have great difficulty driving or solving simple problems.

The extent of the effect of ethyl alcohol is determined by its *concentration*, or proportion, in the blood. Thus a given amount of alcohol will have less effect on a large person than on a small one (see Table 10-2). Gender also affects the concentration of alcohol in the blood. Women have less of the stomach enzyme *alcohol dehydrogenase*, which breaks down alcohol in the stomach before it enters the blood. So women become more intoxicated than men on equal doses of alcohol.

Levels of impairment are closely related to the concentration of ethyl alcohol in the blood. When the alcohol concentration reaches 0.06 percent of the blood volume, a person usually feels relaxed and comfortable. By the time it reaches 0.09 percent, however, the drinker crosses the line into intoxication. If the level goes as high as 0.55 percent, death will probably result. Most people, however, lose consciousness before they can drink enough to reach this level.

The effects of alcohol subside only when the alcohol concentration in the blood falls. Most of the alcohol is broken down, or *metabolized*, by the liver into carbon dioxide and water, which can be exhaled and excreted. The average rate of this breakdown of alcohol is 13 percent of an ounce per hour, but different people's livers work at different speeds; thus rates of "sobering up" vary. Despite popular belief, only time and metabolism can make a person sober. Drinking black coffee, splashing cold water on one's face, or "pulling oneself together" cannot hurry the process.

»LOOKING AROUND

Fatal Competition

In November 2003, a vodka-drinking contest ended in tragedy in a southern Russian town. The contest "winner," who downed three half-liter bottles within 40 minutes, died just 20 minutes after the competition. Five other contestants ended up in intensive care (Reuters, 2003). «

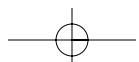


Table 10-2**Relationships between Sex, Weight, Oral Alcohol Consumption, and Blood Alcohol Level**

ABSOLUTE ALCOHOL (oz.)	BEVERAGE INTAKE*	BLOOD ALCOHOL LEVEL (PERCENT)					
		FEMALE (100 LB.)	MALE (100 LB.)	FEMALE (150 LB.)	MALE (150 LB.)	FEMALE (200 LB.)	MALE (200 LB.)
1/2	1 oz. spirits [†] 1 glass wine 1 can beer	0.045	0.037	0.03	0.025	0.022	0.019
1	2 oz. spirits 2 glasses wine 2 cans beer	0.090	0.075	0.06	0.050	0.045	0.037
2	4 oz. spirits 4 glasses wine 4 cans beer	0.180	0.150	0.12	0.100	0.090	0.070
3	6 oz. spirits 6 glasses wine 6 cans beer	0.270	0.220	0.18	0.150	0.130	0.110
4	8 oz. spirits 8 glasses wine 8 cans beer	0.360	0.300	0.24	0.200	0.180	0.150
5	10 oz. spirits 10 glasses wine 10 cans beer	0.450	0.370	0.30	0.250	0.220	0.180

*In 1 hour.

†100-proof spirits.

Source: Ray & Ksir, 1993, p. 194.

ALCOHOL ABUSE AND DEPENDENCE Though legal, alcohol is actually one of the most dangerous of recreational drugs, and its reach extends across the life span. In fact, around 10 percent of elementary school students admit to some alcohol use, while nearly 50 percent of high school seniors drink alcohol each month (most to the point of intoxication) and 3.6 percent report drinking every day (Johnston et al., 2002; NIDA, 1995) (see Figure 10-1 on the next page). Similarly, alcohol misuse is a major problem on college campuses (Schulenberg et al., 2001).

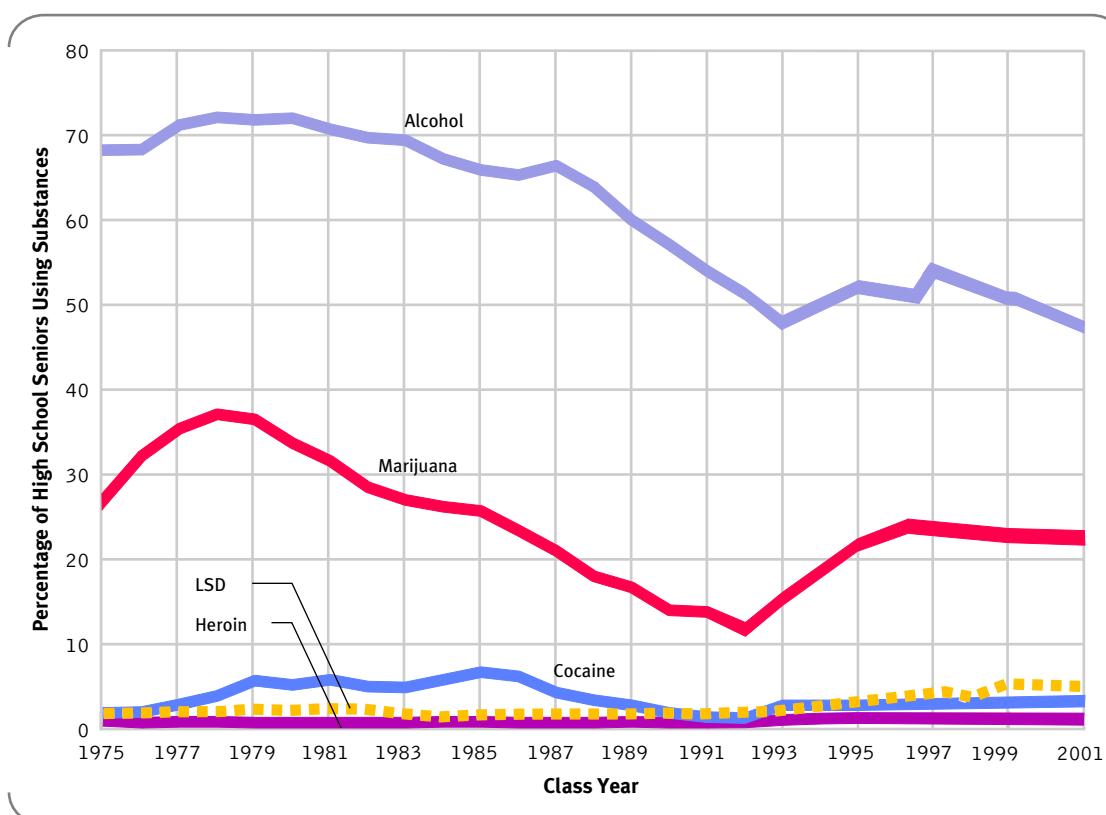
Surveys indicate that over a one-year period, 5.9 percent of all adults in the United States fall into a long-term pattern of alcohol abuse or dependence, either of which is known in popular terms as *alcoholism* (NHSDA, 2002). Between 13 and 18 percent of the nation's adults display one of the patterns at some time in their lives, with men outnumbering women by at least 2 to 1 (NHSDA, 2002; Kessler & Zhao, 1999; Regier et al., 1999). Many teenagers also experience alcohol abuse or dependence (Johnston et al., 2002).

The prevalence of alcoholism in a given year is around 7 percent for both white Americans and African Americans and 9 percent for Hispanic Americans (APA, 2000; Anthony et al., 1995; Helzer et al., 1991). Generally, Asians in the United States and elsewhere have lower rates of alcoholism than do people from other cultures. As many as one-half of Asians have a deficiency of alcohol dehydrogenase, the chemical responsible for breaking down alcohol, so they react quite negatively to even a modest intake of alcohol. Such reactions in turn prevent extended use (Wall et al., 2001; APA, 2000).

ALCOHOL ABUSE Generally speaking, people who abuse alcohol drink large amounts regularly and rely on it to enable them to do things that would otherwise make

>>LOOKING BACK**Fighting Black Death**

A popular theory in the mid-1300s was that strong drinks of alcohol offered protection from the Black Death, the bubonic plague that was sweeping Europe. This mistaken belief led to a plague of drunkenness as widespread as the plague of contagion (Asimov, 1997).<<

**FIGURE 10-1** Teenagers and substance use

The overall percentage of high school seniors who admitted to using substances illicitly at least once within the previous 30 days rose in the 1970s, declined in the 1980s, rose again in the early 1990s, and has been declining slightly since 1997 (Johnston et al., 2002). In addition to the drugs shown in this figure, other drugs used by high school seniors within the past month include MDMA, or Ecstasy (2.8 percent), inhalants (1.7 percent), and steroids (1.3 percent).

them anxious. Eventually the drinking interferes with their social behavior and ability to think and work. They may have frequent arguments with family members or friends, miss work repeatedly, and even lose their jobs (Schmidt et al., 2000).

Individually, however, people vary in their patterns of alcohol abuse. Some drink large amounts of alcohol every day and keep drinking until intoxicated. Others go on periodic binges of heavy drinking that can last weeks or months. They may remain intoxicated for days and later be unable to remember anything about the period. Still others may limit their excessive drinking to weekends or evenings, or both. The actor Dick Van Dyke commented:

I didn't miss work ever because of drinking. And I never drank at work. Never drank during the day—only at home and only in the evenings. . . . I never craved a drink during the day. I was never a morning drinker—I didn't want one then. The idea made me as sick as it would make anyone else. But evening drinking is a form of alcoholism, just like periodic drinking is a form of alcoholism. . . .

(HEW, 1976, p. 76)

ALCOHOL DEPENDENCE For many people, the pattern of alcohol misuse includes dependence. Their bodies build up a tolerance for alcohol and they need to drink ever greater amounts to feel its effects. They also experience withdrawal when they stop drinking. Within hours their hands, tongue, and eyelids begin to shake; they feel weak and nauseated; they sweat and vomit; their heart beats rapidly; and their blood pressure rises. They may also become anxious, depressed, unable to sleep, or irritable (APA, 2000).

A small percentage of people who are dependent on alcohol experience a particularly dramatic withdrawal reaction called **delirium tremens** (“the DTs”). It consists of terrifying visual hallucinations that begin within three days after they stop or reduce their drinking. Some people see small, frightening animals chasing

or crawling on them or objects dancing about in front of their eyes. Like most other alcohol withdrawal symptoms, the DTs usually run their course in two to three days. However, people who experience severe withdrawal reactions such as this may also have seizures, lose consciousness, suffer a stroke, or even die. Today certain medical procedures can help prevent or reduce such extreme reactions (D'Onofrio et al., 1999).

WHAT IS THE PERSONAL AND SOCIAL IMPACT OF ALCOHOLISM? Alcoholism destroys millions of families, social relationships, and careers. Medical treatment, lost productivity, and losses due to deaths from alcoholism cost society as much as \$148 billion annually (NIDA, 1998). The disorder also plays a role in more than one-third of all suicides, homicides, assaults, rapes, and accidental deaths, including 41 percent of all fatal automobile accidents in the United States (NHSDA, 2002; McClelland & Teplin, 2001; Mustane & Tewksbury, 1998). Altogether, intoxicated drivers are responsible for 19,000 deaths each year (CDC, 2002). One of every ten adults has driven while intoxicated at least once in the past year (NHSDA, 2002).

Alcoholism has serious effects on the 30 million children of persons with this disorder. Home life for these children is likely to include much conflict and perhaps sexual or other forms of abuse. In turn, the children themselves have higher rates of psychological problems such as anxiety, depression, phobias, conduct disorder, attention-deficit disorder, and substance-related disorders during their lifetimes (Hall & Webster, 2002; Mylant et al., 2002). Many have low self-esteem, poor communication skills, poor sociability, and marital problems (Watt, 2002; Lewis-Harter, 2000).

Long-term excessive drinking can also seriously damage one's physical health. It so overworks the liver that people may develop an irreversible condition called *cirrhosis*, in which the liver becomes scarred and dysfunctional. Cirrhosis is the twelfth most frequent cause of death in the United States, accounting for some 26,000 deaths each year (CDC, 2002). Alcohol abuse and dependence may also damage the heart and lower the immune system's ability to fight off cancer and bacterial infections and to resist the onset of AIDS after infection (NIAAA, 1992).

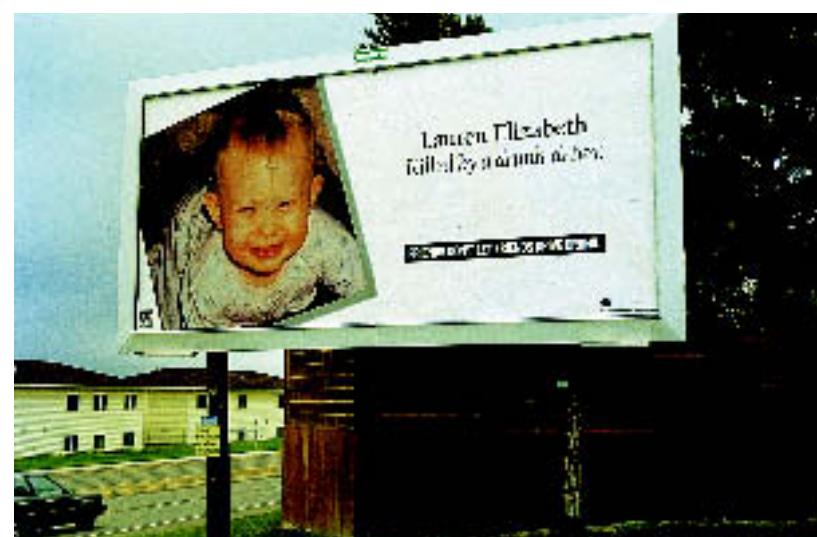
Long-term excessive drinking also causes major nutritional problems. Alcohol makes people feel full and lowers their desire for food, yet it has no nutritional value. As a result, chronic drinkers become malnourished, weak, and prone to disease. Their vitamin and mineral deficiencies may also cause problems. An alcohol-related deficiency of vitamin B (thiamine), for example, may lead to **Korsakoff's syndrome**, a disease marked by extreme confusion, memory loss, and other neurological symptoms (Heap et al., 2002). People with Korsakoff's syndrome cannot remember the past or learn new information and may make up for their memory losses by *confabulating*—reciting made-up events to fill in the gaps.

Finally, women who drink during pregnancy place their fetuses at risk. Excessive alcohol use during pregnancy may cause a baby to be born with **fetal alcohol syndrome**, a pattern of abnormalities that can include mental retardation, hyperactivity, head and face deformities, heart defects, and slow growth (Hankin, 2002; Zevenbergen & Ferraro, 2001). It has been estimated that in the overall population 1 to 2 of every 1,000 babies are born with this syndrome (May & Gossage, 2001; Ray & Ksir, 1993). The rate may increase to as many as 29 of every 1,000 babies of women who are problem drinkers. In addition, heavy drinking early in pregnancy often leads to a miscarriage.

DELIRIUM TREMENS (DTs) A dramatic withdrawal reaction experienced by some people who are alcohol-dependent. It consists of confusion, clouded consciousness, and terrifying visual hallucinations.

KORSAKOFF'S SYNDROME An alcohol-related disorder marked by extreme confusion, memory impairment, and other neurological symptoms.

FETAL ALCOHOL SYNDROME A cluster of problems in a child, including low birth weight, irregularities in the head and face, and intellectual deficits, caused by excessive alcohol intake by the mother during pregnancy.



Kevin & Betty Collis/Visuals Unlimited

Spreading the word Educating the public with billboard, television, and radio ads about the dangers of alcohol has helped reduce the number of alcohol-related automobile deaths by over 25 percent in recent years (CDC, 1997).

THE CURRENT SCENE

College Binge Drinking: An Extracurricular Crisis

Drinking large amounts of alcohol in a short time, or *binge drinking*, is a serious problem on college campuses (Vicary & Karshin, 2002). Studies show that as many as 40 percent of college students binge-drink at times, around half of them at least six times per month (Wechsler et al., 2000, 1997, 1994; Bennett et al., 1999). These are higher rates than those displayed by people of the same age who are not in college. In many circles, alcohol use is an accepted part of college life (Schulenberg et al., 2001). Are we as a society taking the issue too lightly? Consider some of the following statistics:

- ❖ Alcohol is a factor in nearly 40 percent of academic problems and 28 percent of all college dropouts (Anderson, 1994).
- ❖ Although 84 percent of incoming freshmen consider heavy alcohol use to be a problem on campus, 68 percent drink during their first semester, at least half of them during their first week on campus (Harvard School of Public Health, 1995).
- ❖ Alcohol affects not only those who drink but also those who do not, with approximately 600,000 students each year physically or emotionally traumatized or sexually assaulted by a student drinker (Higson et al., 2002).
- ❖ Binge drinking has been linked to severe health problems and serious injury, auto crashes, unplanned and unprotected sex, aggressive behaviors, and various psychological problems (Wechsler et al., 1995; Wechsler & Isaac, 1992). Binge

drinking among college students has been associated with an estimated 1,400 student deaths, 500,000 injuries, and 70,000 cases of sexual assault, including date rape, every year (Wechsler et al., 2000)

- ❖ There was a 31 percent increase in the number of female binge drinkers in colleges from 1993 to 2001.

These findings have led some educators to describe binge drinking as "the No. 1 public health hazard" for full-time college students, and many researchers and clinicians have turned their attention to it. Henry Wechsler and his colleagues (1995) at the Harvard School of Public Health mailed a questionnaire about drinking patterns to students at 140 college campuses around the United States and received close to 18,000 replies. According to the responses, people most likely to binge-drink were those who lived in a fraternity or sorority house, pursued a party-centered lifestyle, and engaged in high-risk behaviors such as smoking marijuana, having multiple sex partners, and smoking cigarettes. The study also

found that students who were binge drinkers in high school were more likely to binge-drink in college.

Efforts to change such patterns have begun to make a difference. For example, some universities now provide substance-free dorms: 36 percent of the residents in such dorms were binge drinkers, according to one study, compared to 75 percent of those who lived in a fraternity or sorority (Wechsler et al., 2002).

The results of studies on binge drinking are often based on self-administered questionnaires, and subjects' responses may be biased. Perhaps binge drinkers are more (or less) likely than nondrinkers to respond to such questionnaires. Still, the implications are clear: college drinking, certainly binge drinking, may be more common and more harmful than was previously believed. At the very least, it is a problem whose research time has come.



Andrew Lichtenstein/Corbis Sigma

Testing the limits Binge drinking, similar to this display at a college campus party, has led to a number of deaths in recent years.

Sedative-Hypnotic Drugs

Sedative-hypnotic drugs produce feelings of relaxation and drowsiness. At low dosages, the drugs have a calming or sedative effect. At higher dosages, they are sleep inducers, or hypnotics. The sedative-hypnotic drugs include *barbiturates* and *benzodiazepines*.

BARBITURATES First discovered in Germany more than 100 years ago, **barbiturates** were widely prescribed in the first half of the twentieth century to fight anxiety and to help people sleep. Although still prescribed by some physicians, these drugs have been largely replaced today by benzodiazepines, which are generally

safer drugs. Barbiturates can cause many problems, not the least of which are abuse and dependence. Several thousand deaths a year are caused by accidental or suicidal overdoses.

Barbiturates are usually taken in pill or capsule form. In low doses they reduce a person's level of excitement in the same way that alcohol does, by attaching to receptors on the neurons that receive the inhibitory neurotransmitter GABA and by helping GABA operate at those neurons (Mazarakis & Nestoros, 2001; Frey et al., 1995). People can get intoxicated from large doses of barbiturates, just as they do from alcohol. At too high a dose, the drugs can halt breathing, lower blood pressure, and lead to coma and death.

Repeated use of barbiturates can quickly result in a pattern of abuse. Users may spend much of the day intoxicated, irritable, and unable to do their work. Dependence can also result. The user organizes his or her life around the drug and needs increasing amounts of it to calm down or fall asleep. A great danger of barbiturate dependence is that the lethal dose of the drug remains the same even while the body is building up a tolerance for its sedating effects (Landry, 1994; Gold, 1986). Once the prescribed dose stops reducing anxiety or inducing sleep, the user is all too likely to increase it without medical supervision and eventually may take a dose that proves fatal. Those caught in a pattern of barbiturate dependence may also experience withdrawal symptoms such as nausea, anxiety, and sleep problems. Barbiturate withdrawal is particularly dangerous, for it can cause convulsions.

BENZODIAZEPINES Chapter 4 described **benzodiazepines**, the antianxiety drugs developed in the 1950s, as the most popular sedative-hypnotic drugs available. Xanax and Valium are just two of the dozens of these compounds in clinical use. Like alcohol and barbiturates, they calm people by binding to receptors on the neurons that receive GABA and by increasing GABA's activity at those neurons (Nutt & Malizia, 2001). These drugs, however, relieve anxiety without making people as drowsy as other kinds of sedative-hypnotics. They are also less likely to slow a person's breathing, so they are less likely to cause death in the event of an overdose (Nishino et al., 1995).

When benzodiazepines were first discovered, they seemed so safe and effective that physicians prescribed them generously, and their use spread. Eventually it became clear that in high enough doses the drugs can cause intoxication and lead to abuse or dependence. As many as 1 percent of the adults in the United States abuse or become physically dependent on these antianxiety drugs at some point in their lives (APA, 2000; Anthony et al., 1995) and thus become subject to some of the same dangers that researchers have identified in barbiturate misuse.

Opioids

Opioids include opium—taken from the sap of the opium poppy—and the drugs derived from it, such as heroin, morphine, and codeine. **Opium** itself has been in use for thousands of years. In the past it was used widely in the treatment of medical disorders because of its ability to reduce both physical and emotional pain. Eventually, however, physicians discovered that the drug was physically addictive.

In 1804 a new substance, **morphine**, was derived from opium. Named after Morpheus, the Greek god of sleep, this drug relieved pain even better than opium did and initially was considered safe. However, wide use eventually revealed that it, too, could lead to addiction. So many wounded soldiers in the United States received morphine injections during the Civil War that morphine dependence became known as "soldiers' disease."

In 1898 morphine was converted into yet another new pain reliever, **heroin**. For several years heroin was viewed as a wonder drug and was used as a cough medicine and for other medical purposes. Eventually, however, physicians learned that heroin is even more addictive than the other opioids. By 1917 the

SEDATIVE-HYPNOTIC DRUG A drug used in low doses to reduce anxiety and in higher doses to help people sleep.

BARBITURATES Addictive sedative-hypnotic drugs used to reduce anxiety or to help people fall asleep.

BENZODIAZEPINES The most common group of antianxiety drugs, which includes Valium and Xanax.

OPIOID Opium or any of the drugs derived from opium, including morphine, heroin, and codeine.

OPIUM A highly addictive substance made from the sap of the opium poppy.

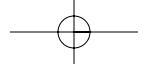
MORPHINE A highly addictive substance derived from opium that is particularly effective in relieving pain.

HEROIN One of the most addictive substances derived from opium, illegal in the United States under all circumstances.

»PSYCH•NOTES Opioids in Action

How Potent Is Heroin? When heroin is injected intravenously, 68 percent of it is absorbed in the brain, compared to less than 5 percent of injected morphine (Sporer, 1999).«

Delicate Balance The drug quinine is often added to heroin to counteract potential infections. While quinine does have this effect, too much of it can be lethal. Many deaths attributed to heroin may actually have been caused by a quinine-induced flooding of the lungs.«



Rodolfo Valtierra/Corbis Sygma



Purer blend In the past, heroin was usually injected. However, heroin, derived from poppies such as those cultivated in this field in Mexico, is purer today than it was in the 1980s (65 percent pure vs. 5 percent), so that users can heighten the impact of the drug considerably by snorting or smoking it.

U.S. Congress had concluded that all drugs derived from opium were addictive (see Table 10-3), and it passed a law making opioids illegal except for medical purposes.

Still other drugs have been derived from opium, and *synthetic* (laboratory-blended) opioids such as *methadone* have also been developed. All these opioid drugs—natural and synthetic—are known collectively as *narcotics*. Each drug has a different strength, speed of action, and tolerance level. Morphine and *codeine* are medical narcotics usually prescribed to relieve pain. Heroin is illegal in the United States under all circumstances.

Narcotics are smoked, inhaled, snorted, injected by needle just beneath the skin (“skin popped”), or injected directly into the bloodstream (“mainlined”). Injection seems to be the most common method of narcotic use, although the other techniques have been used increasingly in recent years (NHSDA, 1998). An injection

quickly brings on a *rush*—a spasm of warmth and ecstasy that is sometimes compared with orgasm. The brief spasm is followed by several hours of a pleasant feeling called a *high* or *nod*. During a high, the drug user feels relaxed, happy, and unconcerned about food, sex, or other bodily needs.

Opioids create these effects by depressing the central nervous system, particularly the centers that help control emotion. The drugs attach to brain receptor sites that ordinarily receive **endorphins**—neurotransmitters that help relieve pain and reduce emotional tension (Doweiko, 1999; Snyder, 1991, 1986). When neurons at these receptor sites receive opioids, they produce pleasurable and calming feelings just as they would do if they were receiving endorphins. In addition to reducing pain and tension, opioids cause nausea, narrowing of the pupils (“pinpoint pupils”), and constipation.

HEROIN ABUSE AND DEPENDENCE Heroin use exemplifies the kinds of problems posed by opioids. After taking heroin repeatedly for just a few weeks, users may become caught in a pattern of abuse: the drug interferes significantly with their

Table 10-3

Risks and Consequences of Drug Misuse

	INTOXICATION POTENTIAL	DEPENDENCY POTENTIAL	RISK OF ORGAN DAMAGE OR DEATH	RISK OF SEVERE SOCIAL OR ECONOMIC CONSEQUENCES	RISK OF SEVERE OR LONG-LASTING MENTAL AND BEHAVIORAL CHANGE
Opioids	High	High	Low	High	Low to moderate
Sedative-hypnotics					
Barbiturates	Moderate	Moderate to high	Moderate to high	Moderate to high	Low
Benzodiazepines	Moderate	Low	Low	Low	Low
Stimulants (cocaine, amphetamines)	High	High	Moderate	Low to moderate	Moderate to high
Alcohol	High	Moderate	High	High	High
Cannabis	High	Low to moderate	Low	Low to moderate	Low
Mixed drug classes	High	High	High	High	High

Source: APA, 2000, 1994; Gold, 1986, p. 28.

social and occupational functioning. In most cases, heroin abuse leads to a pattern of dependence as well, and users soon center their lives on the substance, build a tolerance for it, and experience a withdrawal reaction when they stop taking it. At first the withdrawal symptoms are anxiety, restlessness, sweating, and rapid breathing; later they include severe twitching, aches, fever, vomiting, diarrhea, loss of appetite, high blood pressure, and weight loss of up to 15 pounds (due to loss of bodily fluids). These symptoms usually peak by the third day, gradually subside, and disappear by the eighth day. A person in withdrawal can either wait out the symptoms or end withdrawal by taking heroin again.

People who are dependent on heroin soon need the drug just to avoid going into withdrawal, and they must continually increase their doses in order to achieve even that relief. The temporary high becomes less strong and less important. The individuals may spend much of their time planning their next dose, in many cases turning to criminal activities, such as theft and prostitution, to support the expensive "habit."

Surveys suggest that close to 1 percent of adults in the United States become addicted to heroin or other opioids at some time in their lives (APA, 2000, 1994). The rate of addiction dropped considerably during the 1980s, rose in the early 1990s, and now seems to be falling once again (Johnston et al., 2002). The number of persons currently addicted to these drugs is estimated to be less than 150,000 (NHSDA, 2002, 1998; Morral et al., 2000). The actual number may be even higher, however, given the reluctance of many people to admit an illegal activity.

WHAT ARE THE DANGERS OF HEROIN ABUSE? The most immediate danger of heroin use is an overdose, which closes down the respiratory center in the brain, almost paralyzing breathing and in many cases causing death. Death is particularly likely during sleep, when a person is unable to fight this effect by consciously working to breathe. People who resume heroin use after having avoided it for some time often make the fatal mistake of taking the same dose they had built up to before. Because their bodies have been without heroin for a while, however, they can no longer tolerate this high level. Each year approximately 2 percent of persons dependent on heroin and other opioids die under the drug's influence, usually from an overdose (APA, 2000; Sporer, 1999).

Users run other risks as well. Often pushers mix heroin with a cheaper drug or even a deadly substance such as cyanide or battery acid. In addition, dirty needles and other unsterile equipment spread infections such as AIDS, hepatitis, and skin abscesses (Ferrando, 2001). In some areas of the United States the HIV infection rate among persons dependent on heroin is reported to be as high as 60 percent (APA, 2000, 1994).

SUMMING UP

Depressants

Depressants—including alcohol, sedative-hypnotic drugs, and opioids—are substances that slow the activity of the central nervous system. Long-term and high use of these substances can lead to a pattern of abuse or dependence.

Alcoholic beverages contain ethyl alcohol, which is carried by the blood to the central nervous system, depressing its function. Among other actions, alcohol increases the activity of the neurotransmitter GABA at key sites in the brain. The sedative-hypnotic drugs, which produce feelings of relaxation and drowsiness, include barbiturates and benzodiazepines. These drugs also increase the activity of GABA.

Opioids include opium and drugs derived from it, such as morphine and heroin, as well as laboratory-made opioids. They all reduce tension and pain and produce other effects. Opioids operate by binding to neurons that ordinarily receive endorphins.

ENDORPHINS Neurotransmitters that help relieve pain and reduce emotional tension. They are sometimes referred to as the body's own opioids.



Tony O'Brien/Picture Group

Injecting heroin Opioids may be taken by mouth, inhaled, snorted, injected just beneath the surface of the skin, or, as here, injected intravenously. Users who share needles to inject themselves risk developing AIDS or hepatitis.

A CLOSER LOOK**Tobacco, Nicotine, and Addiction**

Almost one-quarter of all Americans over the age of 12 regularly smoke tobacco (NCHS, 2002). Surveys also suggest that nearly 30 percent of all high school seniors have smoked within the past month, more than half of them on a regular basis (Johnston et al., 2002). At the same time, 430,000 persons in the United States die each year as a result of smoking (Carpenter, 2001). Smoking is directly tied to high blood pressure, coronary heart disease, lung disease, cancer, strokes, and other deadly medical problems (NCHS, 2002).

Nonsmokers who inhale cigarette smoke from their environment have a higher risk of lung cancer and other diseases (Report of the Surgeon General, 1987). And pregnant women who smoke are more likely than nonsmokers to deliver premature and underweight babies (NCHS, 2002).

Research suggests that smoking may actually increase stress levels (Parrott, 2000, 1999), and most smokers know that smoking is unhealthy, so why do they continue to smoke? Because *nicotine*, the active substance in tobacco and a *stimulant* of the central nervous system, is as addictive as heroin, perhaps even more so (Report of the Surgeon General, 1988). Regular smokers develop a tolerance for nicotine and must smoke more and more in order to achieve the same results. When they try to stop smoking, they experience withdrawal symptoms—irritability, increased appetite, sleep disturbances, slower metabolism, cognitive difficulties, and a powerful desire to smoke (APA, 2000). Nicotine acts on the same neurotransmitters and reward center in the brain as amphetamines and cocaine (McGehee et al., 1995). Inhaling a puff of cigarette smoke delivers a dose of nicotine to the brain faster than it could be delivered by injection into the bloodstream.

The declining acceptability of smoking in our society has created a market for products and techniques to help people kick the habit. Most of these meth-

ods do not work very well. Self-help kits, commercial programs, and support groups are of limited help. Smokers who do quit permanently tend to be successful only after several failed attempts (Spanier et al., 1996).

One fairly successful behavioral treatment for nicotine addiction is *aversion therapy*. In one version of this approach, known as *rapid smoking*, the smoker sits in a closed room and puffs quickly on a cigarette, as often as once every six seconds, until he or she begins to feel ill and cannot take another puff. The feelings of illness become associated with smoking, and the smoker develops an aversion to cigarettes (Spiegler & Guevremont, 2003).

Several biological treatments have also been developed. A common one is the use of *nicotine gum*, which contains a high level of nicotine that is released as the smoker chews. Theoretically, people who obtain nicotine by chewing will no longer feel a need to smoke (Moss, 1999). A similar approach is the *nicotine patch*, which is attached to the skin like a Band-Aid. Its nicotine is absorbed through the skin throughout the day, supposedly easing withdrawal and re-

ducing the smoker's need for nicotine. Studies find that both nicotine gum and the nicotine patch help people to abstain from smoking (O'Brien & McKay, 2002; Shiffman et al., 2002). Combining the two techniques has also shown promise. *Nicotine nasal spray*, a relatively new biological approach, delivers nicotine much more rapidly than other methods (Perkins et al., 1996). It can be used several times an hour, whenever the urge to smoke arises. Finally, the antidepressant drug *bupropion* (brand names Zyban and Wellbutrin) has demonstrated some success as a treatment for cigarette smoking (Jorenby et al., 1999).

The more one smokes, the harder it is to quit. On the positive side, however, former smokers' risk of disease and death decreases steadily the longer they continue to avoid smoking (Goldstein, 1994; Jaffe, 1985). This assurance may be a powerful motivator for many smokers, and, in fact, around 45 percent of regular smokers want to stop and are eventually able to stop permanently (Wellner, 2001; APA, 2000). In the meantime, more than 1,000 people die of smoking-related diseases each day.



Michelle McDonald, Arlington, Massachusetts

An early start An Albanian boy in Kosovo is already acquainted with the powers of nicotine.

Stimulants

Stimulants are substances that increase the activity of the central nervous system, resulting in increased blood pressure and heart rate, greater alertness, and speeded-up behavior and thinking. Among the most troublesome stimulants are *cocaine* and *amphetamines*, whose effects on people are very similar. When users report different effects, it is often because they have ingested different amounts of the drugs. Two other widely used and legal stimulants are *caffeine* and *nicotine*.

COCAINE An addictive stimulant obtained from the coca plant. It is the most powerful natural stimulant known.

Cocaine

Cocaine—the central active ingredient of the coca plant, found in South America—is the most powerful natural stimulant now known. The drug was first separated from the plant in 1865. Native people of South America, however, have chewed the leaves of the plant since prehistoric times for the energy and alertness the drug offers. Processed cocaine is an odorless, white, fluffy powder. For recreational use, it is most often snorted so that it is absorbed through the mucous membrane of the nose. Some users prefer the more powerful effects of injecting cocaine intravenously or smoking it in a pipe or cigarette.

For years people believed that cocaine posed few problems aside from intoxication and, on occasion, temporary psychosis. Only later did researchers come to appreciate its many dangers. Their insights came after society witnessed a dramatic increase in the drug's popularity and in problems related to its use. In the early 1960s an estimated 10,000 persons in the United States had tried cocaine. Today 28 million people have tried it, and 1.7 million—most of them teenagers or young adults—are using it currently (NHSDA, 2002). In fact, nearly 5 percent of all high school seniors have used cocaine within the past year (Johnston et al., 2002). Altogether, close to 3 percent of the population become dependent on cocaine at some point in their lives (Anthony et al., 1995).

Cocaine brings on a euphoric rush of well-being and confidence. Given a high enough dose, this rush can be almost orgasmic, like the one produced by heroin. At first cocaine stimulates the higher centers of the central nervous system, making users feel excited, energetic, talkative, and even euphoric. As more is taken, it stimulates other centers of the central nervous system, producing a faster pulse, higher blood pressure, faster and deeper breathing, and further arousal and wakefulness.

Cocaine apparently produces these effects largely by increasing supplies of the neurotransmitter *dopamine* at key neurons throughout the brain (Maurice et al., 2002) (see Figure 10-2). Excessive amounts of dopamine travel to receiving neurons throughout the central nervous system and overstimulate them. In addition, cocaine appears to increase the activity of the neurotransmitters *norepinephrine* and *serotonin* in some areas of the brain (Quiñones-Jenab, 2001; Volkow et al., 1999, 1997).

High doses of the drug produce *cocaine intoxication*, whose symptoms are poor muscle coordination, grandiosity, bad judgment, anger, aggression, compulsive behavior, anxiety, and confusion. Some people experience hallucinations or delusions, or both, a condition known as *cocaine-induced psychotic disorder* (APA, 2000).

A young man described how, after free-basing, he went to his closet to get his clothes, but his suit asked him, "What do you want?" Afraid, he walked toward the door, which told him, "Get back!" Retreating, he then heard the sofa say, "If you sit on me, I'll kick your ass." With a sense of impending doom, intense anxiety, and momentary panic, the young man ran to the hospital where he received help.

(Allen, 1985, pp. 19–20)

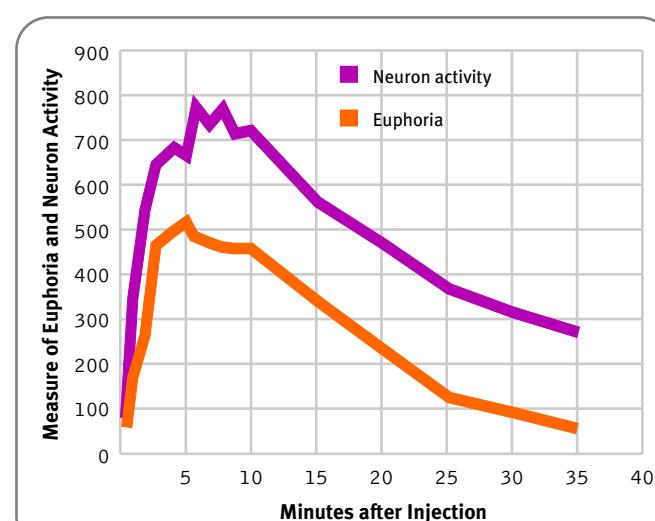
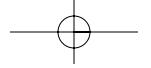


FIGURE 10-2 Biochemical euphoria The subjective experiences of euphoria after a cocaine injection closely parallel cocaine's action at dopamine-using neurons. The peak experience of euphoria seems to occur around the same time as the peak of neuron activity (Fowler et al., 1994, p. 110; Cook et al., 1985).



As the stimulant effects of cocaine subside, the user experiences a depression-like letdown, popularly called *crashing*, a pattern that may also include headaches, dizziness, and fainting (Doweiko, 2002). For occasional users, the aftereffects usually disappear within 24 hours, but they may last longer for people who have taken a particularly high dose. These individuals may sink into a stupor, deep sleep, or, in some cases, coma (Coambs & McAndrews, 1994).

Charlie Steiner/B Pictures



Smoking crack Crack, a powerful form of free-base cocaine, is produced by boiling cocaine down into crystalline balls and is smoked with a special crack pipe.

COCAINE ABUSE AND DEPENDENCE Regular use of cocaine may lead to a pattern of abuse in which the person remains under its effects much of each day and functions poorly in social relationships and at work. Regular drug use may also cause problems in short-term memory or attention (Rosselli & Ardila, 1996). Dependence may also develop, so that cocaine dominates the person's life, higher doses are needed to gain the desired effects, and stopping it results in depression, fatigue, sleep problems, irritability, and anxiety (APA, 2000). These withdrawal symptoms may last for weeks or even months after drug use has ended.

In the past, cocaine use and impact were limited by the drug's high cost. Moreover, cocaine was usually snorted, a form of ingestion that has less powerful effects than either smoking or injection. Since 1984, however, the availability of newer, more powerful, and sometimes cheaper forms of cocaine has

produced an enormous increase in abuse and dependence. Currently, one user in five falls into a pattern of abuse or dependence. Many people now ingest cocaine by **free-basing**, a technique in which the pure cocaine basic alkaloid is chemically separated, or "freed," from processed cocaine, vaporized by heat from a flame, and inhaled through a pipe.

Millions more people use **crack**, a powerful form of free-base cocaine that has been boiled down into crystalline balls. It is smoked with a special pipe and makes a crackling sound as it is inhaled (hence the name). Crack is sold in small quantities at a fairly low cost, a practice that has resulted in crack epidemics among people who previously could not have afforded cocaine, primarily those in poor urban areas. Approximately 2 percent of high school seniors report having used crack within the past year, up from 1.5 percent in 1993, yet down from a peak of 2.7 percent just a few years ago (Johnston et al., 2002).

WHAT ARE THE DANGERS OF COCAINE? Aside from cocaine's harmful effects on behavior, the drug poses serious physical dangers. Its growing use in powerful forms has caused the annual number of cocaine-related emergency room incidents in the United States to multiply 44 times since 1982, from around 4,000 cases to 175,000 (NCHS, 2002; DAWN, 1998). In addition, cocaine use has been linked to as many as 20 percent of all suicides by persons under 61 years of age (Marzuk et al., 1992).

The greatest danger of cocaine use is an overdose. Excessive doses have a strong effect on the respiratory center of the brain, at first stimulating it and then depressing it, to the point where breathing may stop. Cocaine can also produce major, even fatal, heart irregularities (Doweiko, 2002; Mittleman et al., 1999) or brain seizures that bring breathing or heart functioning to a sudden stop. In addition, pregnant women who use cocaine run the risk of having a miscarriage (Ness et al., 1999) and of having children with abnormalities in immune functioning, attention and learning, thyroid size, and dopamine and serotonin activity in the brain (Adler, 1992).

Brooks Kraft/Syagma



Prenatal concerns This baby, born prematurely to a woman dependent on cocaine, lived only a few months. The use of cocaine, alcohol, or other drugs during pregnancy greatly increases the risk of miscarriage, premature birth, and child abnormalities.

Amphetamines

The **amphetamines** are stimulant drugs that are manufactured in the laboratory. Some common examples are amphetamine (Benzedrine), dextroamphetamine (Dexedrine), and methamphetamine (Methedrine). First produced in the 1930s to help treat asthma, these drugs soon became popular among people trying to lose weight; athletes seeking an extra burst of energy; soldiers, truck drivers, and pilots trying to stay awake; and students studying for exams through the night. Physicians now know the drugs are far too dangerous to be used so casually (Liu et al., 2002), and they prescribe them much less freely.

Amphetamines are most often taken in pill or capsule form, although some people inject the drugs intravenously for a quicker, more powerful effect. Others take the drugs in such forms as "ice" and "crank," counterparts of free-base cocaine and crack, respectively. Like cocaine, amphetamines increase energy and alertness and lower appetite when taken in small doses; produce a rush, intoxication, and psychosis in high doses; and cause an emotional letdown as they leave the body. Also like cocaine, amphetamines stimulate the central nervous system by increasing the release of the neurotransmitters dopamine, norepinephrine, and serotonin throughout the brain, although the brain actions of amphetamines differ somewhat from those of cocaine (Doweiko, 2002, 1999).

Tolerance to amphetamines builds very quickly, so users are at great risk of becoming dependent (Liu et al., 2002). People who start using the drug to reduce their appetite and weight, for example, may soon find they are as hungry as ever and increase their dose in response. Athletes who use amphetamines to increase their energy may also find before long that larger and larger amounts of the drug are needed. So-called speed freaks, who pop pills all day for days at a time, have built a tolerance so high that they now take as much as 200 times their first amphetamine dose. When people who depend on the drug stop taking it, they plunge into a deep depression and extended sleep identical to the withdrawal from cocaine. Around 1.5 to 2 percent of the population in the United States become dependent on amphetamines at some point in their lives (APA, 2000; Anthony et al., 1995).

SUMMING UP

Stimulants

Stimulants are substances that increase the activity of the central nervous system. They may lead to intoxication, abuse, and dependence, including a withdrawal pattern marked by depression, fatigue, and irritability. Cocaine and amphetamines produce their effects by increasing the activity of dopamine, norepinephrine, and serotonin in the brain.

FREE-BASE A technique for ingesting cocaine in which the pure cocaine basic alkaloid is chemically separated from processed cocaine, vaporized by heat from a flame, and inhaled with a pipe.

CRACK A powerful, ready-to-smoke free-base cocaine.

AMPHETAMINE A stimulant drug that is manufactured in the laboratory.

>>LOOKING AROUND

Wake-Up Call

Caffeine is the world's most widely used stimulant.«

Around 75 percent of all caffeine is consumed in the form of coffee.«

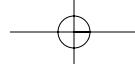
Many people who suddenly stop their usual intake of caffeine—even if the usual intake is low—experience withdrawal symptoms (headaches, depression, anxiety, fatigue).«

Paton & Beer, 2001; APA, 2000; Chou, 1992; Silverman, 1992

©The New Yorker Collection 1993,
Mort Gerberg, from cartoonbank.com



"Nowadays, Hal is ninety-nine per cent caffeine-free."



Hallucinogens, Cannabis, and Combinations of Substances

Other kinds of substances may also cause problems for their users and for society. **Hallucinogens** produce delusions, hallucinations, and other sensory changes. **Cannabis substances** produce sensory changes, but they also have depressant and stimulant effects, and so they are considered apart from hallucinogens in DSM-IV. And many individuals take *combinations of substances*.

Hallucinogens

Hallucinogens are substances that cause powerful changes in sensory perception, from strengthening a person's normal perceptions to producing illusions and hallucinations. They produce sensations so out of the ordinary that they are sometimes called "trips." The trips may be exciting or frightening, depending on how a person's mind interacts with the drugs. Also called **psychedelic drugs**, the hallucinogens include LSD, mescaline, psilocybin, and MDMA (Ecstasy). Many of these substances come from plants or animals; others are laboratory-produced.

THE CURRENT SCENE

X Marks the (Wrong) Spot

You probably know of the drug MDMA (3,4-methylenedioxymethamphetamine) by its common street name, *Ecstasy*. It is also known as X, Adam, hug, beans, and love drug. This laboratory-produced drug is technically a *stimulant*, similar to amphetamines, but it also produces hallucinogenic effects and so is often considered a *hallucinogen drug*. MDMA was developed as far back as 1910, but only in the past two decades has it gained life as a "club drug"—the drug of choice for all-night techno-dance parties known as "raves." Today, in the United States alone, consumers collectively take hundreds of thousands of doses of MDMA weekly (Holland, 2001).

What is Ecstasy's attraction? As a stimulant and hallucinogen, it helps to raise the mood of many partygoers and provides them with an energy boost that enables them to keep dancing and partying. However, it also turns out to be a dangerous drug, particularly when taken repeatedly, and so in 1985 the federal government banned its use (Murray, 2001). However, as with many drugs, this taboo status seemed only to make it more attractive to many consumers. Altogether, 8 million Americans have tried it at least once in their lifetimes (NHSDA, 2002). More than 9 percent of

all high school seniors have used it within the past year, double the number who used it five years ago (Johnston et al., 2002); and nearly 3 percent of seniors have used it within the past month. Use of the drug is even more widespread among 18- to 25-year-olds (NHSDA, 2002).

What Are the Dangers of Using Ecstasy?

The mood and energy lift produced by MDMA comes at a high price. The problems that the drug may cause include the following:

- ❖ Immediate psychological problems such as confusion, depression, sleep difficulties, severe anxiety, and paranoid thinking. These symptoms may also continue for weeks after taking MDMA (NIDA, 2002).
- ❖ Significant impairment of memory and other cognitive skills (Reneman et al., 2000).
- ❖ Physical symptoms such as muscle tension, nausea, blurred vision, faintness, and chills or sweating (NIDA, 2002). MDMA also causes many people to clench and grind their teeth for hours at a time (Milosevic et al., 1999; Redfearn, Agrawal, & Mair, 1998).
- ❖ Increases in heart rate and blood pressure, which place people with heart disease at special risk (NIDA, 2002).
- ❖ Reduced sweat production. At a hot, crowded dance party, taking Ecstasy can even cause heat stroke, or *hyperthermia* (Pedersen & Blessing, 2001). Users generally try to fix this problem by drinking lots of water, but since the body cannot sweat under the drug's influence, the excess fluid intake can result in an equally dangerous condition known as *hyponatremia*, or "water intoxication" (Braback & Humble, 2001; Holmes et al., 1999).
- ❖ Potential liver damage (De Carlis et al., 2001; Garbino et al., 2001). This may happen when users take MDMA in combination with other drugs that are broken down by the same liver enzyme, such as the cheaper compound *DXM*, which is commonly mixed in with Ecstasy by pushers (Malberg & Bonson, 2001).

How Does MDMA Operate in the Brain?

MDMA works by causing the neurotransmitter *serotonin*, and to a lesser extent *dopamine*, to be released all at once throughout the brain, at first increasing

LSD (lysergic acid diethylamide), one of the most famous and most powerful hallucinogens, was derived by the Swiss chemist Albert Hoffman in 1938 from a group of naturally occurring drugs called *ergot alkaloids*. During the 1960s, a decade of social rebellion and experimentation, millions of persons turned to the drug as a way of expanding their experience. Within two hours of being swallowed, LSD brings on a state of *hallucinogen intoxication*, sometimes called *hallucinosis*, marked by a general strengthening of perceptions, particularly visual perceptions, along with psychological and physical changes. People may focus on small details—the pores of the skin, for example, or individual blades of grass. Colors may seem enhanced or take on a shade of purple. Illusions may be experienced in which objects seem distorted and may appear to move, breathe, or change shape. A person under the influence of LSD may also hallucinate—seeing people, objects, or forms that are not actually present.

Hallucinosis may also cause one to hear sounds more clearly, feel tingling or numbness in the limbs, or confuse the sensations of hot and cold. Some people have been badly burned after touching flames that felt cool to them under the influence of LSD. The drug may also cause different senses to cross, an effect called *synesthesia*. Colors, for example, may be “heard” or “felt.”

and then depleting a person’s overall supply of the neurotransmitters (Malberg & Bonson, 2001). MDMA also interferes with the body’s ability to produce new supplies of serotonin, reducing the availability of the neurotransmitter still further. With chronic use, the brain eventually produces less and less serotonin and shuts down the neuron receptors to which it normally binds (Baggot & Mendelson, 2001).

Ecstasy’s impact on these neurotransmitters accounts for its various psychological effects. High levels of serotonin, such as those produced after one first ingests MDMA, produce feelings of well-being, sociability, and even euphoria. Remember, though, that MDMA also increases levels of dopamine. As we shall observe in Chapter 12, very high levels of that neurotransmitter can produce paranoid—even psychotic—thinking (Jansen, 2001).

Conversely, abnormally low serotonin levels are associated with depression and anxiety (Jansen, 2001). This is why “coming down” off a dose of Ecstasy often produces those psychological symptoms (Malberg & Bonson, 2001). Moreover, because repeated use of Ecstasy leads to long-term serotonin deficits, the depression and anxiety may be long-lasting. Finally, serotonin is

linked to our ability to concentrate; thus the repeated use of Ecstasy may produce problems in memory and learning (Heffernan et al., 2001; Rodgers, 2000).

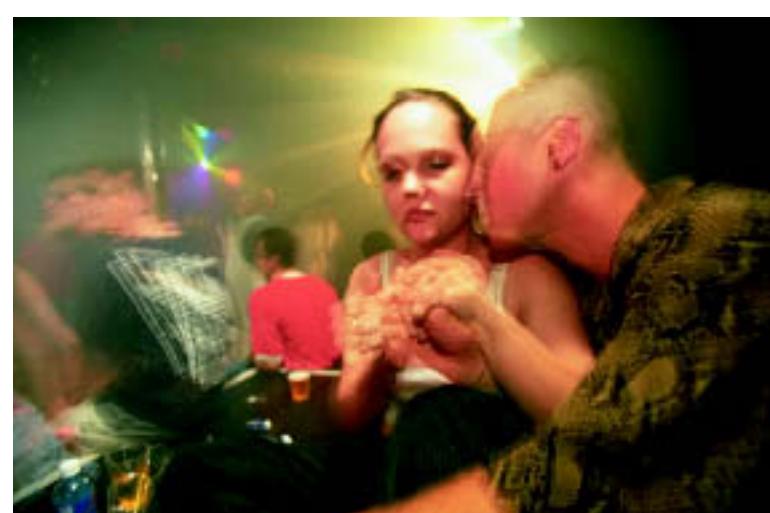
End of the Honeymoon?

The dangers of MDMA do not yet seem to outweigh its pleasures in the minds of some individuals. In fact, use of the drug is now expanding to many social settings beyond raves, dance clubs, and

HALLUCINOGEN A substance that causes powerful changes primarily in sensory perception, including strengthening perceptions and producing illusions and hallucinations. Also called *psychedelic drug*.

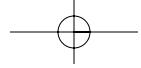
LSD (LYSERGIC ACID DIETHYLAMIDE) A hallucinogenic drug derived from ergot alkaloids.

college scenes (NHDA, 2002). Clearly, the honeymoon for this drug is not yet over. In turn, MDMA emergency room visits are on the rise, as are the number of deaths caused by the drug, for reasons ranging from kidney failure (the result of heat stroke) to liver failure to a heart attack. Like other dangerous drugs over the years, it will eventually lose its popularity, but obviously not before it has taken a considerable toll.



Houston Scott/Corbis Sygma

Feeling the effects Shortly after taking MDMA, this couple manifests a shift in mood, energy, and behavior. Although this drug can feel pleasurable and energizing, often it produces undesired immediate effects, including confusion, depression, anxiety, sleep difficulties, and paranoid thinking.



Inspired art Psychedelic art seemed all-pervasive in the 1960s. Displayed on advertisements, clothing, record albums, and book covers, it was inspired by the kinds of images and sensations produced by psychedelic drugs such as LSD.

LSD can also induce strong emotions, from joy to anxiety or depression. The perception of time may slow dramatically. Long-forgotten thoughts and feelings may return. Physical symptoms can include sweating, palpitations, blurred vision, tremors, and poor coordination. All these effects take place while the user is fully awake and alert, and they wear off in about six hours.

It seems that LSD produces these symptoms primarily by binding to some of the neurons that normally receive the neurotransmitter *serotonin*, changing the neurotransmitter's activity at those sites (Goodman, 2002; Jacobs, 1994, 1984). These neurons ordinarily help the brain send visual information and control emotions (as we observed in Chapter 7); thus LSD's activity there produces various visual and emotional symptoms.

More than 12 percent of all persons in the United States have used LSD or another hallucinogen at some point in their lives (NHSDA, 2002). Around 2 percent have used such drugs within the past year. Although people do not usually develop tolerance

to LSD or have withdrawal symptoms when they stop taking it, the drug poses dangers for both one-time and long-term users. It is so powerful that any dose, no matter how small, is likely to produce enormous perceptual, emotional, and behavioral reactions. Sometimes the reactions are extremely unpleasant—an experience called a “bad trip.” Reports of LSD users who injure themselves or others usually involve a reaction of this kind:

A 21-year-old woman was admitted to the hospital along with her lover. He had had a number of LSD experiences and had convinced her to take it to make her less constrained sexually. About half an hour after ingestion of approximately 200 microgm., she noticed that the bricks in the wall began to go in and out and that light affected her strangely. She became frightened when she realized that she was unable to distinguish her body from the chair she was sitting on or from her lover's body. Her fear became more marked after she thought that she would not get back into herself. At the time of admission she was hyperactive and laughed inappropriately. Her stream of talk was illogical and affect labile. Two days later, this reaction had ceased.

(Frosch, Robbins, & Stern, 1965)

Another danger is the long-term effect that LSD may have. Some users eventually develop psychosis or a mood or anxiety disorder. About one-quarter of users have **flashbacks**—a recurrence of the sensory and emotional changes after the LSD has left the body (Lerner et al., 2002; APA, 2000). Flashbacks may occur days or even months after the last LSD experience. Although they typically become less severe and disappear within several months, some people report flashbacks a year or more after taking the drug.

FLASHBACK LSD-induced sensory and emotional changes that recur long after the drug has left the body.

CANNABIS DRUGS Drugs produced from the varieties of the hemp plant *Cannabis sativa*. They cause a mixture of hallucinogenic, depressant, and stimulant effects.

MARIJUANA One of the cannabis drugs, derived from the buds, leaves, and flowering tops of the hemp plant *Cannabis sativa*.

TETRAHYDROCannabinol (THC) The main active ingredient of cannabis substances.

Cannabis

Cannabis sativa, the hemp plant, grows in warm climates throughout the world. The drugs produced from varieties of hemp are, as a group, called **cannabis**. The most powerful of them is *hashish*; the weaker ones include the best-known form of cannabis, **marijuana**, a mixture derived from the buds, crushed leaves, and flowering tops of hemp plants. Of the several hundred active chemicals in cannabis, **tetrahydrocannabinol (THC)** appears to be the one most responsible for its effects. The greater the THC content, the more powerful the cannabis.

When smoked, cannabis produces a mixture of hallucinogenic, depressant, and stimulant effects. At low doses, the smoker typically has feelings of joy and relaxation and may become either quiet or talkative. Some smokers, however, be-

come anxious, suspicious, or irritated, especially if they have been in a bad mood or are smoking in an upsetting environment. Many smokers report sharpened perceptions and fascination with the intensified sounds and sights around them. Time seems to slow down, and distances and sizes seem greater than they actually are. This overall "high" is technically called *cannabis intoxication*. Physical changes include reddening of the eyes, fast heartbeat, increases in blood pressure and appetite, dryness in the mouth, and dizziness. Some people become drowsy and may fall asleep.

In high doses, cannabis produces odd visual experiences, changes in body image, and hallucinations (Mathew et al., 1993). Smokers may become confused or impulsive. Some worry that other people are trying to hurt them. Most of the effects of cannabis last three to six hours. The changes in mood, however, may continue longer (Chait, Fishman, & Schuster, 1985).

MARIJUANA ABUSE AND DEPENDENCE Until the early 1970s, the use of marijuana, the weak form of cannabis, rarely led to a pattern of abuse or dependence. Today, however, many people, including large numbers of high school students, are caught in a pattern of marijuana abuse, getting high on marijuana regularly and finding their social and occupational or academic lives greatly affected. Many regular users also become physically dependent on marijuana (Johns, 2001). They develop a tolerance for it and may experience flulike symptoms, restlessness, and irritability when they stop smoking (Smith, 2002; Kouri & Pope, 2000). Around 1.5 percent of all persons in the United States have displayed marijuana abuse or dependence in the past year; between 4 and 5 percent fall into one of these patterns at some point in their lives (NHSDA, 2002; APA, 2000; Anthony et al., 1995).

Why have patterns of marijuana abuse and dependence increased in the last three decades? Mainly because the drug has changed (NIDA, 2002). The marijuana widely available in the United States today is 2 to 10 times more powerful than that used in the early 1970s (see Figure 10-3). The THC content of today's marijuana is as high as 10 to 15 percent, compared to 1 to 5 percent in the late 1960s (APA, 2000). Marijuana is now grown in places with a hot, dry climate, which increases the THC content.

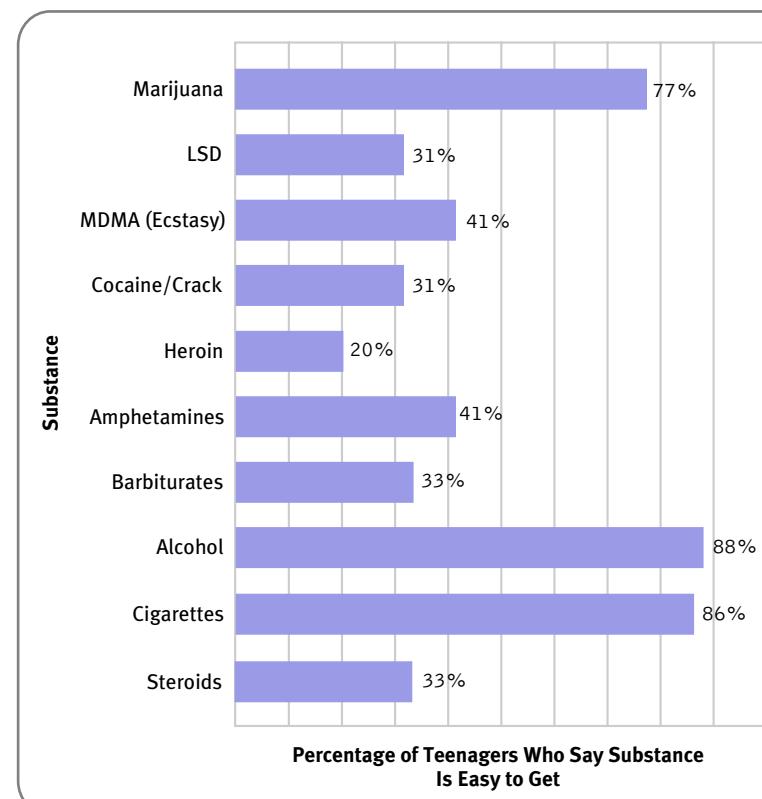
Is MARIJUANA DANGEROUS? As the strength and use of marijuana have increased, researchers have discovered that smoking it may pose certain dangers. It occasionally causes panic reactions similar to the ones caused by hallucinogens, and some smokers may fear they are losing their minds (APA, 2000; Ray & Ksir, 1993). Typically such reactions end in three to six hours, along with marijuana's other effects.

Because marijuana can interfere with the performance of complex sensorimotor tasks (Ashton, 2001; Volkow et al., 1995) and with cognitive functioning (NIDA, 2002; Quiroga, 2001), it has caused many automobile accidents. Furthermore, people on a marijuana high often fail to remember information, especially anything that has been recently learned, no matter how hard they try to concentrate; thus heavy marijuana smokers are at a serious disadvantage at school or work (NIDA, 2002).

FIGURE 10-3 How easy is it for teenagers to acquire substances? According to the vast majority of surveyed tenth graders, it is very easy in the case of cigarettes, alcohol, and marijuana. In addition, at least one-third of the students say it is easy to get Ecstasy, amphetamines, steroids, and barbiturates (Johnston et al., 2002).



Vaughan Fleming/Science Photo Library/Photo Researchers



>>Q & A**Do animals get high?**

Animals sometimes do use substances to get high or relieve stress. Llamas in Peru get frisky eating coca leaves (which contain cocaine). Grasshoppers that eat wild marijuana leaves jump unusually high. Elephants seek out fermented ripe fruit (Siegel, 1990).<<

There are indications that regular marijuana smoking may also lead to long-term problems. It may, for example, contribute to lung disease. Studies show that marijuana smoking reduces the ability to expel air from the lungs even more than tobacco smoking does (NIDA, 2002; Nahas et al., 1999). In addition, marijuana smoke contains more tar and benzopyrene than tobacco smoke. Both of these substances have been linked to cancer (Ray & Ksir, 1993). Another concern is the effect of regular marijuana smoking on human reproduction. Studies since the late 1970s have discovered lower sperm counts in men who are chronic smokers of marijuana, and abnormal ovulation has been found in female smokers (Nahas et al., 1999).

Efforts to educate the public about the growing dangers of regular repeated marijuana use appeared to have paid off throughout the 1980s. The percentage of high school seniors who smoked the substance on a daily basis decreased from 11 percent in 1978 to 2 percent in 1992 (Johnston et al., 1993). Furthermore, in 1992 about 77 percent of high school seniors believed that regular marijuana smoking poses a serious health risk, a much higher percentage than that in earlier years. However, marijuana use among the young jumped up again during the 1990s. Today nearly 6 percent of high school seniors smoke marijuana daily, and fewer than 60 percent believe that regular use can be harmful (Johnston et al., 2002).

CANNABIS AND SOCIETY: A ROCKY RELATIONSHIP For centuries cannabis played a respected role in medicine. It was recommended as a surgical anesthetic by Chinese physicians 2,000 years ago and was used in other lands to treat cholera, malaria, coughs, insomnia, and rheumatism. When cannabis entered the United States in the early twentieth century, mainly in the form of marijuana, it

was likewise used for various medical purposes. Soon, however, more effective medicines replaced it, and the favorable view of cannabis began to change. Marijuana began to be used as a recreational drug, and its illegal distribution became a law enforcement problem. Authorities assumed it was highly dangerous and outlawed the “killer weed.”

But marijuana didn’t go away. During the 1960s, a time of disillusionment, protest, and self-exploration, young people discovered the pleasures of getting high from smoking marijuana. By the end of the 1970s, 16 million people reported using it at least once, and 11 percent of the population were recent users.

In the 1980s researchers developed precise techniques for measuring THC and for extracting pure THC from cannabis; they also developed laboratory forms of THC. These inventions opened the door to new medical applications for cannabis (Mack & Joy, 2001; Watson et al., 2000), such as its use in treating glaucoma, a severe eye disease. Cannabis was also found to help patients with chronic pain or asthma, to reduce the nausea and vomiting of cancer patients in chemotherapy, and to improve the appetites of AIDS patients

and so combat weight loss in people with that disorder.

In light of these findings, several interest groups campaigned during the late 1980s for the *medical legalization* of marijuana, which operates on the brain and body more quickly than the THC capsules developed in the laboratory. In 1992, however, the Drug Enforcement Administration opposed this measure and the Food and Drug Administration stopped reviewing requests for the “compassionate use” of marijuana (Karel, 1992). They held that prescriptions for pure THC served all needed medical functions.

Advocates of the medical use of marijuana challenged the government position again during the elections of 1996. Voter referendums, which have the force of law, were passed in California and Arizona, giving physicians the right to prescribe marijuana for “seriously ill” or “terminally ill” patients. Voters in a num-

Elaine Thompson/AP Photo



Medicinal use Suffering from severe arthritis and an eye condition similar to glaucoma, this woman puffs on a pipe filled with marijuana several times a day. It apparently eases her pain and helps clear her vision.

ber of other states followed suit in subsequent years. But the federal government responded by threatening to revoke the prescription-writing privilege of any physician who prescribed marijuana and even to prosecute such physicians. In turn the *New England Journal of Medicine*, one of the world's most prestigious medical publications, published an editorial in 1997 favoring the medical use of marijuana. Unfazed, the federal government continued to fight and punish the production and distribution of marijuana for medical purposes. In 2003, a shift began to occur in this position by the federal government when the Supreme Court decided to let stand a federal circuit court's ruling that physicians in California and Oregon cannot be punished for generally advising patients on the medical use of marijuana. This ruling did not, however, apply to other states and the matter is far from settled.

The Canadian government has taken a different tack. In 2003 Canada's health minister announced an interim policy allowing eligible medical sufferers to buy marijuana from the government until that country's *medical marijuana research program* reaches a clear conclusion regarding this complex issue.

Combinations of Substances

Because people often take more than one drug at a time, a pattern called *polysubstance use*, researchers have studied the ways in which drugs interact with one another. When different drugs are in the body at the same time, they may multiply, or potentiate, each other's effects. The combined impact, called a **synergistic effect**, is often greater than the sum of the effects of each drug taken alone: a small dose of one drug mixed with a small dose of another can produce an enormous change in body chemistry.

One kind of synergistic effect occurs when two or more drugs have *similar actions*. For instance, alcohol, benzodiazepines, barbiturates, and opioids—all depressants—may severely depress the central nervous system when mixed (Miller & Gold, 1990). Combining them, even in small doses, can lead to extreme intoxication, coma, and even death (Nishino et al., 1995). A young man may have just a few alcoholic drinks at a party, for example, and shortly afterward take a moderate dose of barbiturates to help him fall asleep. He believes he has acted with restraint and good judgment—yet he may never wake up.

A different kind of synergistic effect results when drugs have *opposite, or antagonistic, actions*. Stimulant drugs, for example, interfere with the liver's usual disposal of barbiturates and alcohol. Thus people who combine barbiturates or alcohol with cocaine or amphetamines may build up toxic, even lethal, levels of the depressant drugs in their systems. Students who take amphetamines to help them study late into the night and then take barbiturates to help them fall asleep are unknowingly placing themselves in serious danger.

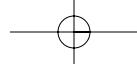
SYNERGISTIC EFFECT In pharmacology, an increase of effects that occurs when more than one substance is acting on the body at the same time.

Richard E. Aaron/Sygma



The Everett Collection

Déjà vu Polysubstance use, particularly a mixture of cocaine and opioids, proved fatal for John Belushi (left) and Chris Farley (right), each a featured actor on the television show Saturday Night Live. Farley had often stated his admiration for Belushi's talent and lifestyle.



POLYSUBSTANCE-RELATED DISORDER A long-term pattern of maladaptive behavior centered on abuse of or dependence on a combination of drugs.

Each year tens of thousands of people are admitted to hospitals with a multiple-drug emergency, and several thousand of them die (DAWN, 2002). Sometimes the cause is carelessness or ignorance. Often, however, people use multiple drugs precisely because they enjoy the synergistic effects (Leri et al., 2003). In fact, **polysubstance-related disorders** are becoming as common as individual substance-related disorders in the United States, Canada, and Europe (Schuckit et al., 2001; Hoffman et al., 2000). As many as 90 percent of persons who use one illegal drug are also using another to some extent (Cornish et al., 1995).

Fans still mourn the deaths of many celebrities who have been the victims of polysubstance use. Elvis Presley's delicate balancing act of stimulants and depressants eventually killed him. Janis Joplin's mixtures of wine and heroin were ultimately fatal. And John Belushi's and Chris Farley's liking for the combined effect of cocaine and opioids ("speedballs") also ended in tragedy.

SUMMING UP

Hallucinogens, Cannabis, and Combinations of Substances

Hallucinogens, such as LSD, cause powerful changes primarily in sensory perception. Perceptions are intensified and illusions and hallucinations can occur. LSD apparently causes such effects by disturbing the release of the neurotransmitter serotonin.

The main ingredient of *Cannabis sativa*, a hemp plant, is tetrahydrocannabinol (THC). Marijuana, the most popular form of cannabis, is more powerful today than it was in years past. It can cause intoxication, and regular use can lead to abuse and dependence. The use of this substance for medical purposes continues to be debated.

Many people take more than one drug at a time, and the drugs interact. The use of two or more drugs at the same time has become increasingly common. Similarly, polysubstance-related disorders have also become a major problem.

What Causes Substance-Related Disorders?

Clinical theorists have developed sociocultural, psychological, and biological explanations for why people abuse or become dependent on various substances. No single explanation, however, has gained broad support. Like so many other disorders, excessive and chronic drug use is increasingly viewed as the result of a combination of these factors.

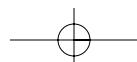
The Sociocultural View

A number of sociocultural theorists propose that people are most likely to develop patterns of substance abuse or dependence when they live under stressful socio-economic conditions. In fact, studies have found that regions with higher levels of unemployment have higher rates of alcoholism. Similarly, lower socioeconomic classes have substance abuse rates that are higher than those of the other classes (Khan, Murray, & Barnes, 2002; Dohrenwend, 2000).

Other sociocultural theorists propose that substance abuse and dependence are more likely to appear in families and social environments where substance use is valued, or at least accepted. Researchers have, in fact, found that problem drinking is more common among teenagers whose parents and peers drink, as well as among teenagers whose family environments are stressful and unsupportive (Lieb et al., 2002; Wills et al., 1996). Moreover, lower rates of alcohol abuse are found among Jews and Protestants, groups in which drinking is typically acceptable only as long as it remains within clear limits, whereas alcoholism rates are higher among the Irish and Eastern Europeans, who do not, on average, draw as clear a line (Ledoux et al., 2002; Vaillant & Milofsky, 1982).

PSYCH NOTES At Risk

Individuals who begin drinking before age 15 are twice as likely to develop alcohol abuse and four times as likely to develop alcohol dependence as those who begin drinking at age 21 (Grant & Dawson, 1998).«



ABNORMALITY AND THE ARTS

Chasing Highs Wherever They May Lead

*J*onathan Melvoin, a backup keyboard player for the rock group Smashing Pumpkins, died of a heroin overdose in July 1996. Word soon spread that the brand of heroin he had taken was Red Rum, a strain smuggled in from Colombia. Its name—“murder” spelled backward—comes from the Stephen King novel *The Shining*.

Within hours the demand for Red Rum rose dramatically on the streets of Manhattan’s Lower East Side. “It’s kind of sick,” a narcotics officer said when interviewed by the *New York Times*. “But when people die from something or nearly die, all of a sudden there’s this rush to get it.”



Corbis

Smashing aftermath The Smashing Pumpkins, posing here for a studio photo a year before the Melvoin incident, fired the band’s drummer after learning that he had been using drugs with the keyboardist Melvoin.

The Psychodynamic View

Psychodynamic theorists believe that people who abuse substances have powerful dependency needs that can be traced to their early years (Stetter, 2000; Shedler & Block, 1990). They claim that when parents fail to satisfy a young child’s need for nurturance, the child is likely to grow up depending excessively on others for help and comfort, trying to find the nurturance that was lacking during the early years. If this search for outside support includes experimentation with a drug, the person may well develop a dependent relationship with the substance.

Some psychodynamic theorists also believe that certain people respond to their early deprivations by developing a *substance abuse personality* that leaves them particularly prone to drug abuse. Personality inventories and patient interviews have in fact indicated that people who abuse or depend on drugs tend to be more dependent, antisocial, impulsive, novelty-seeking, and depressive than other people (Coffey et al., 2003; Cox et al., 2001; Finn et al., 2000). These findings are correlational, however, and do not clarify whether such personality traits lead to drug use or whether drug use causes people to be dependent, impulsive, and the like.

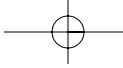
In an effort to determine causation, one study measured the personality traits of a large group of nonalcoholic young men and then kept track of each man’s development (Jones, 1971, 1968). Years later, the traits of the men who developed alcohol problems in middle age were compared with the traits of those who did not. The men who developed alcohol problems had been more impulsive as teenagers and continued to be so in middle age, a finding suggesting that impulsive men are indeed more prone to develop alcohol problems. Similarly, in one laboratory investigation, “impulsive” rats—those that generally had trouble delaying their rewards—were found to drink more alcohol when offered it than other rats (Poulos et al., 1995).

A major weakness of this line of argument is the wide range of personality traits that have been tied to substance abuse and dependence. In fact, different studies point to different “key” traits. Inasmuch as some people with a drug addiction appear to be dependent, others impulsive, and still others antisocial, researchers cannot presently conclude that any one personality trait or group of traits stands out in substance-related disorders (Chassin et al., 2001; Rozin & Stoess, 1993).

»PSYCH•NOTES

Freud’s Folly

Early in his career, Sigmund Freud was a staunch advocate of cocaine use. He proclaimed, “Cocaine brings about an exhilaration and lasting euphoria . . . an increase in self-control and . . . more vitality and capacity for work. . . . In other words, you are simply normal” (Freud, 1885).«



Common substance, uncommon danger A 13-year-old boy sniffs glue as he lies dazed near a garbage heap. In the United States, at least 6 percent of all people have tried to get high by inhaling the hydrocarbons found in common substances such as glue, gasoline, paint thinner, cleaners, and spray-can propellants (APA, 2000). Such behavior may lead to inhalant abuse or dependence and poses a number of serious medical dangers.



Steven Rubin/The Image Works

The Behavioral and Cognitive Views

According to behaviorists, *operant conditioning* may play a key role in substance abuse. They argue that the temporary reduction of tension or raising of spirits produced by a drug has a rewarding effect, thus increasing the likelihood that the user will seek this reaction again (Rutledge & Sher, 2001). Similarly, the rewarding effects of a substance may eventually lead users to try higher dosages or more powerful methods of ingestion (see Table 10-4). Cognitive theorists further argue that such rewards eventually produce an *expectancy* that substances will be rewarding, and this expectation helps motivate individuals to increase drug use at times of tension (Chassin et al., 2001).

In support of these views, studies have found that many subjects do in fact drink more alcohol or seek heroin when they feel tense (Ham et al., 2002; Cooper,

Table 10-4**Methods of Taking Substances**

METHOD	ROUTE	TIME TO REACH BRAIN
Inhaling	Drug in vapor form is inhaled through mouth and lungs into circulatory system.	7 seconds
Snorting	Drug in powdered form is snorted into the nose. Some of the drug lands on the nasal mucous membranes, is absorbed by blood vessels, and enters the bloodstream.	4 minutes
Injection	Drug in liquid form directly enters the body through a needle. Injection may be intravenous or intramuscular (subcutaneous).	20 seconds (intravenous); 4 minutes (intramuscular)
Oral ingestion	Drug in solid or liquid form passes through esophagus and stomach and finally to the small intestines. It is absorbed by blood vessels in the intestines.	30 minutes
Other routes	Drugs can be absorbed through areas that contain mucous membranes. Drugs can be placed under the tongue, inserted anally and vaginally, and administered as eyedrops.	Variable

Source: Landry, 1994, p. 24.

1994). In one study, as subjects worked on a difficult anagram task, a confederate planted by the researchers unfairly criticized and belittled them (Marlatt et al., 1975). The subjects were then asked to participate in an “alcohol taste task,” supposedly to compare and rate alcoholic beverages. The subjects who had been harassed drank more alcohol during the taste task than did the control subjects who had not been criticized.

In a manner of speaking, the behavioral and cognitive theorists are arguing that many people take drugs to “medicate” themselves when they feel tense. If so, one would expect higher rates of drug abuse among people who suffer from anxiety, depression, or intense anger. In fact, substance abuse and dependence do appear to be fairly common among people with mood disorders (McDowell & Clodfelter, 2001; Swendsen & Merikangas, 2000). One study of 835 clinically depressed patients found that more than one-fourth abused drugs during episodes of depression (Hasin et al., 1985). Similarly, higher-than-usual rates of drug abuse have been found among people with posttraumatic stress disorder, eating disorders, schizophrenia, antisocial personality disorder, histories of being abused, and other psychological problems (Brown et al., 2003; Brooner et al., 1997; Yama et al., 1993).

A number of behaviorists have proposed that *classical conditioning* may also play a role in substance abuse and dependence (Drobes, Saladin, & Tiffany, 2001). Objects present at the time drugs are taken may act as classically conditioned stimuli and come to produce some of the same pleasure brought on by the drugs themselves. Just the sight of a hypodermic needle or a regular supplier, for example, has been known to comfort people who abuse heroin or amphetamines and to relieve their withdrawal symptoms. In a similar manner, objects that are present during withdrawal distress may produce withdrawal-like symptoms. One man who had formerly been dependent on heroin experienced nausea and other withdrawal symptoms when he returned to the neighborhood where he had gone through withdrawal in the past—a reaction that led him to start taking heroin again (O’Brien et al., 1975). Although classical conditioning may in fact be at work in particular cases of drug abuse and dependence, it has not received widespread research support as a key factor in such patterns (Drobes et al., 2001).

The Biological View

In recent years researchers have come to suspect that drug misuse may have biological causes. Studies on genetic predisposition and specific biochemical processes have provided some support for these suspicions.

GENETIC PREDISPOSITION For years breeding experiments have been conducted to see whether certain animals are genetically predisposed to become dependent on drugs (Li, 2000; Kurtz et al., 1996). In several studies, for example, investigators have first identified animals that prefer alcohol to other beverages and then mated them to one another. Generally, the offspring of these animals have been found to also display an unusual preference for alcohol (Melo et al., 1996).

Similarly, some research with human twins has suggested that people may inherit a predisposition to abuse substances (Tsuang et al., 2001; Kendler et al., 1994, 1992). One classic study found an alcohol abuse *concordance* rate of 54 percent in a group of identical twins; that is, if one identical twin abused alcohol, the other twin also abused alcohol in 54 percent of the cases. In contrast, a group of fraternal twins had a concordance rate of only 28 percent (Kaij, 1960). As we have observed, however, such findings do not rule out other interpretations (Walters, 2002). For one thing, the parenting received by two identical twins may be more similar than that received by two fraternal twins.

A stronger indication that genetics may play a role in substance abuse and dependence comes from studies of alcoholism rates in people adopted shortly after birth (Walters, 2002; Cadoret, 1995; Goldstein, 1994). These studies have compared adoptees whose biological parents are dependent on alcohol with adoptees whose biological parents are not. By adulthood, the individuals whose biological

>>PSYCH•LISTINGS

Leading Reasons for Arrests in the United States

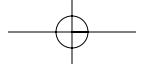
First place	Drug abuse violations
Third place	Driving under the influence
Fifth place	Drunkenness
Sixth place	Violation of liquor laws

(Ash, 1998)



C/B Productions/The Stock Market

Addicted to chocolate? Recent studies suggest that a craving for chocolate may be more than just a state of mind. Apparently some chemicals in chocolate may bind to the same neuron receptors that receive cannabis substances (di Tomaso, Beltramo, & Piomelli, 1996). At the same time, however, a person would have to eat 25 pounds of chocolate in one sitting to experience a cannabis-like effect. Then again, for chocolate lovers...



parents are dependent on alcohol typically show higher rates of alcohol abuse than those with nonalcoholic biological parents.

Genetic linkage strategies and *molecular biology* techniques provide more direct evidence in support of a genetic explanation (Crabbe, 2002, 2001). One line of investigation has found an abnormal form of the so-called *dopamine-2 (D2) receptor gene* in a majority of subjects with alcohol dependence and half of subjects with cocaine dependence, but in less than 20 percent of nondependent subjects (Connor et al., 2002; Finckh, 2001; Blum & Noble, 1993). Other studies have tied still other genes to substance-related disorders (Cook & Gurling, 2001).

BIOCHEMICAL FACTORS Over the past few decades, investigators have pieced together a general biological understanding of drug tolerance and withdrawal symptoms (Wise, 1996). As we have seen, when a particular drug is ingested, it increases the activity of certain neurotransmitters whose normal purpose is to calm, reduce pain, lift mood, or increase alertness. When a person keeps on taking the drug, the brain apparently makes an adjustment and reduces its own production of the neurotransmitters. Because the drug is increasing neurotransmitter activity or efficiency, action by the brain is less necessary. As drug intake increases, the body's production of the neurotransmitters continues to decrease, leaving the person in need of more and more of the drug to achieve its effects. In this way, drug takers build tolerance for a drug, becoming more and more reliant on it rather than on their own biological processes to feel comfortable or alert. If they suddenly stop taking the drug, their supply of neurotransmitters will be low for a time, producing the symptoms of withdrawal. Withdrawal continues until the brain resumes its normal production of the necessary neurotransmitters.

Which neurotransmitters are affected depends on the drug used. Repeated and excessive use of alcohol or benzodiazepines may lower the brain's production of the neurotransmitter GABA; regular use of opioids may reduce the brain's production of endorphins; and regular use of cocaine or amphetamines may lower the brain's production of dopamine (Volkow et al., 1999). In addition, researchers have identified neurotransmitters called *anandamides* (from the Sanskrit word for

"bliss") that operate much like THC; excessive use of marijuana may reduce the production of these neurotransmitters (Johns, 2001; Biegon & Kerman, 1995).

This theory helps explain why people who regularly take substances experience tolerance and withdrawal reactions. But why are drugs so rewarding, and why do certain people turn to them in the first place? A number of brain-imaging studies suggest that many, perhaps all, drugs eventually activate a single **reward center**, or "pleasure pathway," in the brain (Kelley & Berridge, 2002; Volkow & Fowler, 2000). A key neurotransmitter in this pleasure pathway appears to be *dopamine*. When dopamine is activated there, a person experiences pleasure. Music may activate dopamine in the reward center. So may a hug or a word of praise. And so may drugs.

Certain drugs apparently stimulate the reward center directly. Remember that cocaine, amphetamines, and caffeine directly increase dopamine activity. Other drugs seem to stimulate it in roundabout ways. The biochemical reactions triggered by alcohol, opioids, and marijuana probably set in motion a series of chemical events that eventually lead to increased dopamine activity in the reward center.

A number of theorists suspect that people who abuse drugs suffer from a **reward-deficiency syndrome**: their reward center is not readily activated by the usual events in their lives (Blum et al., 2000; Nash, 1997), so they turn to drugs to stimulate this pleasure pathway, particularly at times of stress. Abnormal genes, such as the abnormal D2 receptor gene, have been cited as a possible cause of this syndrome (Finckh, 2001; Lawford et al., 1997).

Peter Serrling, New York, NY



One more for the road During the 1990s many people believed that inhaling oxygen might energize them and reduce their stress levels, leading to the opening of "oxygen bars" across North America and Asia. Patrons would hook up to oxygen tanks and inhale nearly pure oxygen. This activity does not appear to be dangerous, but it did not prove to be particularly uplifting either. Most such bars have closed.

SUMMING UP**What Causes Substance-Related Disorders?**

Several explanations for substance abuse and dependence have been offered. Together these theories are beginning to shed light on the disorders.

According to the sociocultural view, the people most likely to abuse drugs are those living in stressful socioeconomic conditions or whose families value or accept drug use. In the psychodynamic view, people who turn to substance abuse have excessive dependency needs traceable to the early stages of life. Some psychodynamic theorists also believe that certain people have a substance abuse personality that makes them prone to drug use. Behaviorists propose that drug use is reinforced by the reduction in tension and raised spirits that it may bring about. According to cognitive theorists, such reductions may also lead to an expectancy that drugs will be comforting and helpful.

The biological explanations are supported by twin, adoptee, genetic linkage, and molecular biology studies, suggesting that people may inherit a predisposition to substance dependence. Researchers have also learned that drug tolerance and withdrawal symptoms may be caused by cutbacks in the brain's production of particular neurotransmitters during excessive and chronic drug use. Finally, biological studies suggest that many, perhaps all, drugs may ultimately lead to increased dopamine activity in the brain's reward center.

>>LOOKING AROUND**Songs of Substance**

Substance use—illegal, legal, and medical—is a popular theme in music, particularly that favored by teenagers and young adults. Hit groups include Morphine, Xanax 25, and Halcion. Hit songs have ranged from the Velvet Underground's "Heroin" and "Sweet Jane" and Eric Clapton's "Cocaine" to Cypress Hill's "I Wanna Get High" and "Insane in the Brain," Nirvana's "Lithium," Lil-Kim's "Drugs," and Jimmy Buffet's "Margaritaville." «

How Are Substance-Related Disorders Treated?

Many approaches have been used to treat substance-related disorders, including psychodynamic, behavioral, cognitive-behavioral, biological, and sociocultural therapies. Although these treatments sometimes meet with great success, more often they are only moderately helpful (Prendergast et al., 2002; Miller et al., 2001). Today the treatments are typically used in combination (Galanter & Brooks, 2001) on both an outpatient and an inpatient basis (Rychtarik et al., 2000).

Psychodynamic Therapies

Psychodynamic therapists first guide patients with substance-related disorders to uncover and resolve the underlying needs and conflicts that they believe have led to the disorders. The therapists then try to help the individuals change their substance-related styles of living (Stetter, 2000; Hopper, 1995). Although often applied, this approach has not been found to be particularly effective in cases of substance-related disorders (Cornish et al., 1995; Holder et al., 1991). It may be that drug abuse or dependence, regardless of its causes, eventually becomes a stubborn independent problem that must be the direct target of treatment if people are to become drug-free. Psychodynamic therapy tends to be of greater help when it is combined with other approaches in a multidimensional treatment program (Galanter & Brooks, 2001; Carroll & Rounsaville, 1995).

Behavioral Therapies

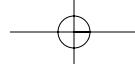
A widely used behavioral treatment for substance-related disorders is **aversion therapy**, an approach based on the principles of classical conditioning. Individuals are repeatedly presented with an unpleasant stimulus (for example, an electric shock) at the very moment that they are taking a drug. After repeated pairings, they are expected to react negatively to the substance itself and to lose their craving for it.

Aversion therapy has been applied to alcohol abuse and dependence more than to other substance-related disorders. In one version of this therapy, drinking behavior is paired with drug-induced nausea and vomiting (Owen-Howard, 2001;

REWARD CENTER A dopamine-rich pathway in the brain that produces feelings of pleasure when activated.

REWARD-DEFICIENCY SYNDROME A condition, suspected to be present in some individuals, in which the brain's reward center is not readily activated by the usual events in their lives.

AVERSION THERAPY A treatment in which clients are repeatedly presented with unpleasant stimuli while performing undesirable behaviors such as taking a drug.



>>LOOKING BACK

Drastic Measure

In one early form of aversion therapy, people with alcoholism were injected with succinylcholine, a drug that actually paralyzed their bodies while they tasted alcoholic beverages (Sanderson et al., 1963). Concerns about the safety and ethics of this approach led to its discontinuation.«

Welsh & Liberto, 2001). Another version, *covert sensitization*, requires people with alcoholism to imagine extremely upsetting, repulsive, or frightening scenes while they are drinking (Cautela, 2000; Kassel et al., 1999). The pairing of the imagined scenes with liquor is expected to produce negative responses to liquor itself. Here are the kinds of scenes therapists may guide a client to imagine:

I'd like you to vividly imagine that you are tasting the (beer, whiskey, etc.). See yourself tasting it, capture the exact taste, colour and consistency. Use all of your senses. After you've tasted the drink you notice that there is something small and white floating in the glass—it stands out. You bend closer to examine it more carefully, your nose is right over the glass now and the smell fills your nostrils as you remember exactly what the drink tastes like. Now you can see what's in the glass. There are several maggots floating on the surface. As you watch, revolted, one manages to get a grip on the glass and, undulating, creeps up the glass. There are even more of the repulsive creatures in the glass than you first thought. You realize that you have swallowed some of them and you're very aware of the taste in your mouth. You feel very sick and wish you'd never reached for the glass and had the drink at all.

(Clarke & Saunders, 1988, pp. 143-144)

A behavioral approach that has been effective in the short-term treatment of people who abuse cocaine and some other drugs is *contingency management*, which makes incentives (such as program privileges) contingent on the submission of drug-free urine specimens (Katz et al., 2001; Petry, 2000). In one study, 68 percent of cocaine abusers who completed a six-month contingency training program achieved at least eight weeks of continuous abstinence (Higgins et al., 1993).

Behavioral interventions for substance abuse and dependence have usually had only limited success when they are the sole form of treatment (Carroll & Rounsaville, 1995). A major problem is that the approaches can be effective only when individuals are motivated to continue with them despite their unpleasantness or demands. Generally, behavioral treatments work best in combination with either biological or cognitive approaches (Kassel et al., 1999; Whorley, 1996).

Cognitive-Behavioral Therapies

Two popular approaches combine cognitive and behavioral techniques to help people gain control over their substance-related behaviors. In one, **behavioral self-control training (BSCT)**, applied to alcoholism in particular, therapists first have clients keep track of their own drinking behavior (Miller et al., 1992; Miller, 1983). Writing down the times, locations, emotions, bodily changes, and other circumstances of their drinking, they become more aware of the situations that place them at risk for excessive drinking. They are then taught coping strategies to use when such situations arise. They learn, for example, to set limits on their drinking, to recognize when the limits are being approached, to control their rate of drinking (perhaps by spacing their drinks or by sipping them rather than gulping), and to practice relaxation techniques, assertiveness skills, and other coping behaviors in situations in which they would otherwise be drinking. Approximately 70 percent of the people who complete this training apparently show some improvement, particularly those who are young and not physically dependent on alcohol (Walters, 2000; Hester, 1995).

In a related cognitive-behavioral approach, **relapse-prevention training**, heavy drinkers are assigned many of the same tasks as clients in BSCT (Spiegler & Guevremont, 2003; Parks & Marlatt, 2000, 1999). They are also taught to plan ahead of time how many drinks are appropriate, what to drink, and under what circumstances. The approach sometimes lowers the frequency of intoxication (Foxhall, 2001). Like BSCT, it seems most effective for people who abuse alcohol but are not physically dependent on it (Meyer et al., 1989). The approach has also

>>LOOKING AROUND

Media Influence

Most Visible Substance After analyzing 224 hours of prime-time television network programming, investigators at Cornell University concluded that alcohol is displayed on television programs more than any other food or drink.«

Ad Power Eighty percent of surveyed persons reported that the "Friends Don't Let Friends Drive Drunk" advertising campaign made them feel more strongly about preventing people from driving drunk (Advertising Council and Caravan Opinion Research, 1995).«

been used, with some success, in the treatment of marijuana and cocaine abuse (Foxhall, 2001; Carroll & Rounsaville, 1995).

Biological Treatments

Biological approaches may be used to help people withdraw from substances, abstain from them, or simply maintain their level of use without further increases (Welsh & Liberto, 2001). As with the other forms of treatment, biological approaches alone rarely bring long-term improvement, but they can be helpful when combined with other approaches.

DETOXIFICATION **Detoxification** is systematic and medically supervised withdrawal from a drug. Some detoxification programs are offered on an outpatient basis (Allan, Smith, & Mellin, 2002, 2000). Others are located in hospitals and clinics and may also offer individual and group therapy, a “full-service” institutional approach that has become popular. One detoxification approach is to have clients withdraw gradually from the substance, taking smaller and smaller doses until they are off the drug completely (Wright & Thompson, 2002). A second detoxification strategy is to give clients other drugs that reduce the symptoms of withdrawal (Malcolm et al., 2002; Schuckit, 1999). Antianxiety drugs, for example, are sometimes used to reduce severe alcohol withdrawal reactions such as delirium tremens and seizures. Detoxification programs seem to help motivated people withdraw from drugs (Zhao et al., 2001; Allan et al., 2000). However, relapse rates tend to be high for those who fail to receive a follow-up form of treatment—psychological, biological, or sociocultural—after successful detoxification.

ANTAGONIST DRUGS After successfully stopping a drug, people must avoid falling back into a pattern of abuse or dependence. As an aid to resisting temptation, some people with substance-related disorders are given **antagonist drugs**, which block or change the effects of the addictive drug (Welsh & Liberto, 2001). *Disulfiram (Antabuse)*, for example, is often given to people who are trying to stay away from alcohol. By itself a low dose of this drug seems to have few negative effects, but a person who drinks alcohol while taking disulfiram will experience intense nausea, vomiting, blushing, faster heart rate, dizziness, and perhaps fainting. People taking disulfiram are less likely to drink alcohol because they know the terrible reaction that awaits them should they have even one drink. Disulfiram has proved helpful, but again only with people who are motivated to take it as prescribed (Cornish et al., 1995).

BEHAVIORAL SELF-CONTROL TRAINING (BSCT) A cognitive-behavioral approach to treating alcohol abuse and dependence in which clients are taught to keep track of their drinking behavior and to apply coping strategies in situations that typically trigger excessive drinking.

RELAPSE-PREVENTION TRAINING An approach to treating alcohol abuse that is similar to BSCT and also has clients plan ahead for risky situations and reactions.

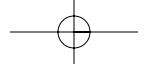
DETOXIFICATION Systematic and medically supervised withdrawal from a drug.

ANTAGONIST DRUGS Drugs that block or change the effects of an addictive drug.



Patrick Davison/The Dallas Morning News

Forced detoxification Abstinence does not always take place in a planned, medically supervised, voluntary manner. This sufferer of alcoholism begins to experience symptoms of withdrawal soon after being imprisoned for public intoxication.

**METHADONE MAINTENANCE PROGRAM**

An approach to treating heroin dependence in which clients are given legally and medically supervised doses of a substitute drug, methadone.

Narcotic antagonists are sometimes used to treat people who are dependent on opioids (Kirchmayer et al., 2002). These drugs attach to *endorphin* receptor sites throughout the brain and make it impossible for the opioids to have their usual effect. Without the rush or high, continued drug use becomes pointless. Although narcotic antagonists have been helpful—particularly in emergencies, to rescue people from an overdose of opioids—some clinicians consider them too dangerous for regular treatment of opioid dependence. These antagonists must be given very carefully because of their ability to throw a person with an addiction into severe withdrawal (Roozen et al., 2002; Ling et al., 2001). In recent years, so-called *partial antagonists*, narcotic antagonists that produce less severe withdrawal symptoms, have been developed (Amass et al., 2000).

Recent studies indicate that narcotic antagonists may also be useful in the treatment of alcohol and cocaine dependence (Kiefer et al., 2003; O'Brien & McKay, 2002). In some studies, for example, the narcotic antagonist *naltrexone* has helped reduce cravings for alcohol (O'Malley et al., 2000, 1996, 1992). Why should narcotic antagonists, which operate at the brain's endorphin receptors, help with alcoholism, which has been tied largely to activity at GABA sites? The answer may lie in the reward center of the brain (Gianoulakis, 2001). If various drugs eventually stimulate the same pleasure pathway, it seems reasonable that antagonists for one drug may, in a roundabout way, affect the impact of other drugs as well.

DRUG MAINTENANCE THERAPY A drug-related lifestyle may be a greater problem than the drug's direct effects. Much of the damage caused by heroin addiction, for example, comes from overdoses, unsterile needles, and an accompanying life of crime. Thus clinicians were very enthusiastic when **methadone maintenance programs** were developed in the 1960s to treat heroin addiction (Dole & Nyswander, 1967, 1965). In these programs, people with an addiction are given the laboratory opioid *methadone* as a substitute for heroin. Although they then become dependent on methadone, their new addiction is maintained under safe medical supervision. Unlike heroin, methadone can be taken by mouth, thus eliminating the dangers of needles, and needs to be taken only once a day.

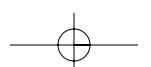
At first, methadone programs seemed very effective, and many of them were set up throughout the United States, Canada, and England (Payte, 1989). These programs became less popular during the 1980s, however, because of the dangers of methadone itself. Many clinicians and clients came to believe that substituting one addiction for another is not an acceptable "solution" for substance dependence (Cornish et al., 1995). In fact, methadone is sometimes harder to withdraw from than heroin, because the withdrawal symptoms can last nearly twice as long (Blackmund et al., 2001; Kleber, 1981). Moreover, pregnant women maintained on methadone have the added concern of the drug's effect on their fetus (DeCubas & Field, 1993).

Despite such concerns, maintenance treatment with methadone (or with *buprenorphine*, a newly developed substitute drug) has again sparked interest among clinicians in recent years, partly because of new research support (Gossop et al., 2001; Ritter, 2001) and partly because of the rapid spread of the HIV virus among intravenous drug abusers and their sex partners and children (Cornish et al., 1995). More than one-quarter of AIDS cases reported in the early 1990s were directly tied to drug abuse, and intravenous drug abuse is the indirect cause in 60 percent of childhood AIDS cases (Brown, 1993; NIDA, 1991). Not only is methadone treatment safer than street opioid use, but many methadone programs now include AIDS education and other health instructions in their services (Sorensen & Copeland, 2000). Research suggests that methadone maintenance programs are most effective when they are combined with education, psychotherapy, family therapy, and employment counseling (O'Brien & McKay, 2002; Woody et al., 1998). Today

Julio Etchart/The Image Works



Is legalization the answer? While clinicians try to identify and treat the effects of substance use and misuse, a number of groups are lobbying for the legalization of certain drugs. At a recent protest in England calling for the decriminalization of marijuana, this woman wears a necklace of cannabis leaves.



more than 900 methadone clinics across the United States dispense the drug to as many as 160,000 patients at an average cost of \$13 a day (ONDCP, 2002, 2000; Marks, 1998).

Sociocultural Therapies

As we have seen, sociocultural theorists believe that psychological problems emerge in a social setting and are best treated in a social context. Three sociocultural approaches have been applied to substance-related disorders: (1) *self-help programs*; (2) *culture- and gender-sensitive programs*; and (3) *community prevention programs*.

SELF-HELP AND RESIDENTIAL TREATMENT PROGRAMS Many people who abuse drugs have organized among themselves to help one another recover without professional assistance. The drug self-help movement dates back to 1935, when two

A CLOSER LOOK

Controlled Drug Use vs. Abstinence

*I*s total abstinence the only cure for drug abuse and dependence, or can people with substance-related disorders learn to keep drug use under control? This issue has been debated for years, especially when the drug in question is alcohol (King & Tucker, 2000).

Some cognitive-behavioral theorists believe that people can continue to drink in moderation if they learn to set appropriate drinking limits. They argue that demanding strict abstinence of people may in fact cause them to lose self-control entirely if they have a single drink (Marlatt et al., 2001; Peele, 1989; Heather et al., 1982). In contrast, those who view alcoholism as a disease take the AA position of "Once an alcoholic, always an alcoholic," and argue that people with alcoholism are in fact more likely to relapse when they believe that they can safely take one drink (Pendery et al., 1982). This misguided belief, they hold, will sooner or later open the door to alcohol once again and lead back to uncontrollable drinking.

Feelings run so strongly that the people on one side have at times challenged the motives and honesty of those on the other (Sobell & Sobell, 1984, 1973; Pendery et al., 1982). Research indicates, however, that both controlled drinking and abstinence may be useful treatment goals, depending on the individual's personality and on the nature of

the particular drinking problem. Studies suggest, for example, that abstinence is a more appropriate goal for people who have a long-standing dependence on alcohol, while controlled drinking can be helpful to younger drinkers whose pattern does not include physical dependence. The latter individuals may in fact need to be taught a nonabusive form of drinking (Foxhall, 2001; Peele, 1992; Marlatt, 1985). Studies also suggest that abstinence is appropriate for people who believe that abstinence is the only

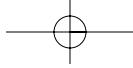
answer for them (Rosenberg, 1993). These individuals are indeed more likely to relapse after having just one drink.

Generally speaking, both abstinence and controlled drinking are extremely difficult for persons with alcoholism to achieve. Although treatment may help them to improve for a while, many of them relapse (Allsop et al., 2000). Such statistics serve as a harsh reminder that substance abuse and dependence remain among society's most disabling problems.



Lane Kennedy, Minneapolis

Changing an image Many kinds of persons in many kinds of places practice abstinence to help them overcome and control problems with alcohol or other substances. Here sober bikers get together at the Dry Gulch, a favorite spot in St. Paul, Minnesota.



ALCOHOLICS ANONYMOUS (AA) A self-help organization that provides support and guidance for persons who abuse alcohol or are dependent on it.

RESIDENTIAL TREATMENT CENTER A place where people formerly dependent on drugs live, work, and socialize in a drug-free environment. Also called a *therapeutic community*.

Ohio men suffering from alcoholism met to discuss alternative treatment possibilities. The first discussion led to others and to the eventual formation of a self-help group whose members discussed alcohol-related problems, traded ideas, and provided support. The organization became known as **Alcoholics Anonymous (AA)**.

Today AA has more than 2 million members in 100,000 groups across the United States and 150 other countries (AA World Services, 2003). It offers peer support along with moral and spiritual guidelines to help people overcome alcoholism. Different members apparently find different aspects of AA helpful. For some it is the peer support (Galanter et al., 1990); for others it is the spiritual dimension (Swora, 2001). Meetings take place regularly, and members are available to help each other 24 hours a day.

By offering guidelines for living, the organization helps members abstain “one day at a time,” urging them to accept as “fact” the idea that they are powerless over alcohol and that they must stop drinking entirely and permanently if they are to live normal lives. Related self-help organizations, *Al-Anon* and *Alateen*, offer support for people who live with and care about persons with alcoholism. Self-help programs such as *Narcotics Anonymous* and *Cocaine Anonymous* have been developed for other substance-related disorders.

Many self-help programs have expanded into **residential treatment centers**, or **therapeutic communities**—such as *Daytop Village* and *Phoenix House*—where people formerly dependent on drugs live, work, and socialize in a drug-free environment while undergoing individual, group, and family therapies and making a transition back to community life (Landry, 1994).

The evidence that keeps self-help and residential treatment programs going comes largely in the form of individual testimonials. Many tens of thousands of persons have revealed that they are members of these programs and credit them with turning their lives around (Gleick, 1995). Studies of the programs have also had favorable findings (Tonigan, 2001; Timko et al., 2000), but their numbers have been limited (Watson et al., 1997).

CULTURE- AND GENDER-SENSITIVE PROGRAMS Many persons who abuse substances live in a poor and perhaps violent setting. A growing number of today's treatment programs try to be sensitive to the special sociocultural pressures and problems faced by drug abusers who are poor, homeless, or members of minority groups (Straussner, 2001). Therapists who are sensitive to their clients' life challenges can do more to address the stresses that often lead to relapse.

Similarly, therapists have become more aware that women often require treatment methods different from those designed for men (Knowlton, 1998; Lisansky-Gomberg, 1993). Women and men have different physical and psychological reactions to drugs, for example (Hamilton, 1991). In addition, treatment of women who abuse substances may be complicated by the impact of sexual abuse, the possibility that they may become pregnant while taking drugs, the stresses of raising children, and the fear of criminal prosecution for abusing drugs during pregnancy (Thompson & Kingree, 1998; Cornish et al., 1995). Thus many women with such disorders feel more comfortable seeking help at gender-sensitive clinics or residential programs; some such programs also allow children to live with their recovering mothers (Clark, 2001).

COMMUNITY PREVENTION PROGRAMS Perhaps the most effective approach to substance-related disorders is to prevent them (Gottfredson & Wilson, 2003). The first drug-prevention efforts were conducted in schools. Today prevention programs are also offered in workplaces, activity centers, and other community settings, and even through the media (Bennett & Lehman, 2003; St. Pierre, 2001). Some prevention programs argue for total abstinence from drugs, while others teach responsible use. Some seek to interrupt drug use; others try to delay the age at which people first experiment with drugs. Programs may also differ in whether they offer drug education, teach alternatives to drug use, try to change

»LOOKING AROUND

Drugs and the Law

Each year over 1.4 million arrests are made in the United States for driving under the influence of alcohol or opioids, involving one of every 123 drivers (Uniform Crime Reports, 1997).«

In 60 percent of the 500 child passenger deaths linked to alcohol in 1996, it was the driver of the child's own car who was alcohol-impaired (CDC, 1997).«

Fifty-seven percent of state prisoners and 45 percent of federal prisoners in the United States report using illicit drugs in the month before committing their offense (Bureau of Justice Statistics, 1999).«

More than 800,000 teenagers are arrested and formally processed by juvenile courts each year. Around half of them test positive for marijuana (Crowley et al., 1998).«

the psychological state of the potential user, seek to change relationships with peers, or combine these techniques.

Prevention programs may focus on the *individual* (for example, by providing education about unpleasant drug effects), the *family* (by teaching parenting skills), the *peer group* (by teaching resistance to peer pressure), the *school* (by setting up firm enforcement of drug policies), or the *community at large* (by public service announcements such as the “Just say no” campaign several years ago). The most effective prevention efforts focus on several of these areas to provide a consistent message about drug abuse in all areas of individuals’ lives (Smith, 2001; Wagenaar et al., 2000). Some prevention programs have even been developed for preschool children (Hall & Zigler, 1997).

SUMMING UP

How Are Substance-Related Disorders Treated?

Treatments for substance abuse and dependence vary widely. Usually several approaches are combined. Psychodynamic therapies try to help clients become aware of and correct the underlying needs and conflicts that may have led to their use of drugs. A common behavioral technique is aversion therapy, in which an unpleasant stimulus is paired with the drug that the person is abusing. Cognitive and behavioral techniques have been combined in such forms as behavioral self-control training (BSCT) and relapse-prevention training. Biological treatments include detoxification, antagonist drugs, and drug maintenance therapy. Sociocultural treatments approach substance-related disorders in a social context by means of self-help groups (for example, Alcoholics Anonymous), culture- and gender-sensitive treatments, and community prevention programs.



Marc R. Wood, Marinette, Wisconsin

Before it begins Community prevention programs for substance-related disorders often target very young children. Here children pledge abstinence from drug use on Red Ribbon Day by releasing balloons.

CROSSROADS: New Wrinkles to a Familiar Story

In some respects the story of the misuse of drugs is the same today as it was in the past. Substance use is still rampant, often creating damaging psychological disorders. New drugs keep emerging, and the public goes through periods of believing, naively, that they are “safe.” Only gradually do people learn that these drugs, too, pose dangers. And treatments for substance-related disorders continue to have only limited effect.

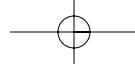
Yet there are important new wrinkles in this familiar story. Researchers have begun to develop a clearer understanding of how drugs act on the brain and body. In treatment, self-help groups and rehabilitation programs are flourishing. And preventive education to make people aware of the dangers of drug misuse is also expanding and seems to be having an effect. One reason for these improvements is that investigators and clinicians have stopped working in isolation and are instead looking for intersections between their own work and that from other models. The same kind of integrated efforts that have helped with other psychological disorders are bringing new promise and hope to the study and treatment of substance-related disorders.

Perhaps the most important insight to be gained from these integrated efforts is that several of the models were already on the right track. Social pressures, personality characteristics, rewards, and genetic predispositions all seem to play roles in substance-related disorders, and in fact to operate together. For example, some people may inherit a malfunction of the biological reward center and so may need special doses of external stimulation—say, intense relationships, an abundance of certain foods, or drugs—to stimulate their reward center. Their pursuit of external rewards may take on the character of an addictive personality (Ebstein & Kotler,

»PSYCH•NOTES

Spontaneous Remission

Between 20 and 30 percent of all people with substance-related disorders apparently recover within 10 years without treatment (Schuckit, 1999). «

**>>IN THEIR WORDS**

"Outlawing drugs in order to solve the drug problem is much like outlawing sex in order to win the war against AIDS."«

Ronald Siegal, *Intoxication*, 1990

2002). Such individuals may be especially prone to experimenting with drugs, particularly when their social group makes the drugs available or when they are faced with intense social and personal stress.

Just as each model has identified important factors in the development of substance-related disorders, each has made important contributions to treatment. As we have seen, the various forms of treatment seem to work best when they are combined with approaches from the other models, making integrated treatment the most productive approach.

These recent developments are encouraging. At the same time, however, enormous and increasing levels of drug use continue. New drugs and drug combinations are discovered almost daily, and with them come new problems, new questions, and the need for new research and new treatments. Perhaps the most valuable lesson is an old one: there is no free lunch. The pleasures derived from these substances come with high psychological and biological costs, some not yet even known.

CRITICAL THOUGHTS

1. Different ethnic, religious, and national groups have different rates of alcohol abuse. What social factors might help explain this observation? Can we be certain that biological factors are not involved? pp. 300–304
2. What effects might the use of drugs by some rock performers have on teenagers? Who has the greater impact on the drug behaviors of teenagers: rock performers who speak out against drugs or rock performers who praise drugs? pp. 301, 299–300
3. Only one-third of the \$15 billion the U.S. government spends on drug abuse goes to prevention and treatment. Does the focus on the criminalization of drugs add to the stigma of drug abuse and, in turn, make effective treatment more difficult (Nash, 1997)? pp. 303, 305–311
4. In 1995, the popular talk show host Oprah Winfrey revealed, with great emotion, that she had been physically dependent on cocaine in the mid-1970s. What impact might admissions like Winfrey's have on people's willingness to seek treatment for substance abuse? pp. 305–311
5. Society has periodically tried treatment programs that offer legal, medically supervised doses of heroin (in Great Britain) or of a heroin substitute (in the United States) to combat heroin dependence. What might be the virtues of such a treatment approach? Why has the effectiveness of such programs been limited? pp. 308–309

KEY TERMS

intoxication p. 280

hallucinosis p. 280

substance abuse p. 280

substance dependence p. 280

tolerance p. 280

withdrawal p. 280

alcohol p. 282

delirium tremens (DTs) p. 284

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Alcoholics Anonymous (AA) p. 310

residential treatment center p. 310

culture- and gender-sensitive programs p. 310

community prevention program p. 310

QUICK QUIZ

1. How does alcohol act on the brain and body? What are the problems and dangers of alcohol misuse? *pp. 282–286*
 2. Describe the features and problems of the misuse of barbiturates and benzodiazepines. *pp. 286–287*
 3. Compare the various opioids (opium, heroin, morphine, and codeine). What problems may result from their use, particularly from the use of heroin? *pp. 287–289*
 4. List and compare two kinds of stimulant drugs. Describe their biological actions and the problems caused by each of them. *pp. 290–293*
 5. Why has cocaine use become a major problem in recent years? *p. 288*
 6. What are the effects of hallucinogens, particularly LSD? *pp. 294–296*
 7. What are the effects of marijuana and other cannabis substances?
- Why is marijuana a greater danger today than it was twenty-five years ago? *pp. 296–299*
8. What special problems does poly-substance use pose? *pp. 299–300*
9. Describe the leading explanations for substance-related disorders. How well supported are these explanations? *pp. 300–305*
10. What are the leading treatments for substance-related disorders? How effective are they? *pp. 305–311*

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*Why do some people develop substance-related disorders?
How does substance abuse affect personal, family, and occupational functioning?
What triggers a user's cravings?*
- ▲ Chapter 10 Practical, Research, and Decision-Making Exercises
*Abstinence versus moderation
The impact of peers in substance use and misuse*
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