

CASE REPORT: CARL WADSWORTH

One morning, our receptionist gave me a message to call Dr. Elaine Golden, the director of residency training in the medical school, and I called her back as soon as I found a free moment that afternoon. Dr. Golden told me that she was looking for a psychotherapist to treat one of the physicians in the surgical residency program. It was not unusual for physicians in training to be referred for treatment of depression or anxiety, but neither of those was a problem for 31-year-old Dr. Carl Wadsworth. I sensed even in the tone of Elaine's voice that the case of Carl Wadsworth was unusual, an impression that was confirmed when Elaine emphasized the importance of keeping the case absolutely confidential. Before Elaine proceeded to tell me the details, however, I felt that it would be important for me to remind her about the standards of confidentiality, as well as the exceptions to these standards. I explained that I would, of course, keep the case confidential, unless there was serious reason to believe that a client was in danger of harming himself or another person, or was involved in the abuse of a child, an elder, or a person with a disability. Elaine assured me that none of these issues pertained to the case of Carl Wadsworth. Rather, her concern pertained more to the reputation of this young doctor and that of the medical school. As it turned out, Carl Wadsworth was addicted to cocaine. Not only was he using the substance on a daily basis, but he had begun to sell drugs to fellow medical residents and medical students in order to pay for his own habit.

After hearing Elaine share this disturbing information about a physician-in-training, I asked her point blank, "Why aren't you throwing this guy out of the program?" Elaine responded nondefensively, "I've thought seriously about that possibility. However, I think we have a case of a young man who can be salvaged from his self-destructive behavior." She went on to explain, "Carl is a gifted physician, who has, sadly, become caught in a trap, from which he is pleading for help to be released. Sarah, I think that you can help him."

Elaine explained that Carl had called her at home late the previous night, with his wife, Anne, sitting by his side. With a trembling voice, he had begun the phone discussion with the startling words, "Dr. Golden, I desperately need your help. I'm a junkie." As Elaine told me this story, I thought about how fortunate Carl was to have a relationship with such a caring and concerned mentor. Elaine listened carefully to Carl's story and arranged to see him the next morning. In that appointment she told Carl that it was imperative that he contact me that day to set up an appointment, which he did. That afternoon, I received a call from Carl, who urgently pleaded that I see him as soon as possible. We agreed to meet the next morning.

When I first met Carl Wadsworth, I was struck by the fact that he seemed so young and unsure of himself. Rather than wearing his hospital uniform, or any clothing suggestive of his profession, Carl wore a college sweatshirt and matching sweatpants. My guess was that he would have felt embarrassed sitting in the waiting room of the mental health clinic in medical attire. Carl's face was gaunt and haggard, suggesting that he was run down, perhaps to the point of exhaustion. My suspicions were confirmed. After introducing himself, he apologized for his ostensible weariness, explaining that he hadn't slept much in recent days. After entering my office, Carl proceeded to tell me the painful story of his seduction by cocaine and the eventual hold it took over his whole life. He acknowledged that the problem had become so serious that he risked destroying his family and ruining his career. These realizations became startlingly apparent to him when Anne, pregnant with their second child, told Carl that she would divorce him if he did not obtain professional help.

Carl explained that, when he first began using cocaine 1 year ago, he fully believed that he could control his use, and maintain it as a harmless pastime. Predictably, though, Carl began to rely on the drug more and more heavily. Money problems began to accumulate, and, rather than attribute these to the expense of his cocaine habit, he blamed them on his inadequate salary. It became necessary to draw on the family bank account to pay the household bills. Carl soon began to spend more and more time away from home. Telling Anne that he was at work, he spent hours each day seeking ways to pick up extra cash. At the hospital, his work had become sloppy, and Elaine had let him know that he was at risk of being dismissed from the hospital. His patients complained to the nursing staff about his abrupt and insensitive manner.

As we talked about the changes in Carl's professional behavior, I could see that he was becoming increasingly distraught, and, when I asked him about his family life, he fought to hold back tears. He explained that he loved his wife and daughter very much but that he found himself losing control in his interactions with them. He had become irritable and impatient with them and occasionally so angry that he had come close to physical violence.

When Carl first came to see me, he was in serious trouble. He was accurate in his perception that his personal life and his career were on the line and that he needed help immediately.

Sarah Tobin, PhD

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CHAPTER 13



Substance-Related Disorders

We live in a society in which the use of mind-altering substances has become a central part of the culture. Leafing through any popular magazine, you are certain to see advertisements with successful, attractive people using cigarettes. Watching a sporting event on television, you will surely see commercials with fun-loving, happy people consuming alcohol. These legal drugs represent only a small fraction of the substances that Americans ingest each day. As you will see, both legal and illegal drugs affect all sectors of the population, including well-educated and professional people such as Carl.

The Nature of Substance Abuse and Dependence

A **substance** is a chemical that alters a person's mood or behavior when it is smoked, injected, drunk, inhaled, snorted, or swallowed in pill form. Although most of our discussion will focus on drugs of abuse, it is important to realize that people often use medications and toxic chemicals to induce altered psychological states. Because substances are so much a part of everyday life, most people take them for granted. A glass of wine at dinner, a cup of coffee in the morning, a beer or two at a party, a sleeping pill at night—none of these may seem particularly unusual or troublesome. Although most people are able to regulate their use of such substances, many drugs pose high risks. Findings from the National Comorbidity Study revealed that Americans between the ages of 15 and 54 are more affected by dependence on psychoactive substances than by any other psychiatric disturbance (Anthony, Warner, & Kessler, 1994). More than half of all Americans (51 percent) have used an illegal drug or a prescription drug for nonmedical purposes during the course of their lives (Warner et al., 1995), and over one quarter (26.6 percent) of the U.S. population have seriously abused or become dependent on drugs during their lifetime (Kessler et al., 1994). Within the U.S. population, economically disadvantaged people are at particularly high risk for having problems with drugs (U.S. Surgeon General, 2001). The cost to society of all forms of substance abuse in America is approximately \$383 billion per year (Horgan, 2001).

Many people die each year because of their own dangerous use of drugs, and many others die as the result of accidents or homicides committed by substance-abusing individuals. Although the number of alcohol-related fatalities decreased during the 1990s, the statistics are still quite disturbing—40 percent, or 16,653 of all traffic fatalities in 2000 were attributed to alcohol. Young people are particularly at risk. Among the adolescents between the ages of 16 and 20 involved in fatal crashes in 1997, 15 percent were driving while intoxicated. The intoxication rate among fatally injured drivers was even higher for those in their early twenties (27 percent of those 21 to 24 years old) (National Highway Traffic Safety Administration, 2001).



For many people, addictive behavior involves the use of more than one substance.

Behaviors Associated with Substance-Related Disorders

In this section, we will discuss the ways in which substances affect human behavior. Although each substance has specific effects, which depend on its chemical composition and its effects on the brain or body, you will find it helpful to have an overview of how substances in general affect behavior.

Substance-Induced Disorders

The phrases *driving under the influence (DUI)* and *driving while intoxicated (DWI)* are commonly used in legal reports about motor vehicle violations or accidents. In order to appreciate the seriousness of such an accusation, it is important to understand what is meant by intoxication. **Substance intoxication** is the temporary maladaptive experience of behavioral or psychological changes due to the accumulation of a substance in the body. Let's take a closer look at this definition. A condition of substance intoxication is a transient phenomenon that is limited to the period that the substance is biologically potent in the body. The behavior of an intoxicated person is maladaptive, which means that his or her functioning is impaired significantly. In the case of alcohol intoxication, the individual experiences impaired judgment and attention, slurred speech, abnormal eye movements, slowed reflexes, unsteady walking, and changeable moods. By contrast, the person who becomes intoxicated following the ingestion of amphetamines experiences accelerated bodily functioning, as well as perspiration or chills. Even people who drink a great amount of a caffeinated beverage can experience troubling bodily sensations, such as nervousness, twitching, insomnia, and agitation.

In addition to the effects that follow the ingestion of substances, psychological and physical changes also occur when

some substances are discontinued, a reaction that is referred to as **substance withdrawal**. A person in a state of substance withdrawal experiences significant distress or impairment at home, at work, or in other important life contexts. Withdrawal takes different forms, according to the actual substance involved. For example, nicotine withdrawal commonly includes anxiety and irritability. People taking substances with higher potency can undergo such severe psychological and physical withdrawal symptoms that they need medical care. A phenomenon called **tolerance** is related to substance withdrawal. This occurs when an individual requires larger and larger amounts of the substance in order to achieve its desired effects or when the person feels less of its effects after using the same amount of the substance. For example, a man may find that he now needs to drink two six-packs of beer in order to achieve the same state of relaxation that was previously attained with a single six-pack. You will see as you read this chapter that tolerance can develop in different ways—in some instances, tolerance is caused by changes in the body's metabolism of the drug; in others, it results from the way the drug affects the nervous system.

As you will see later in the chapter, when we discuss specific substances, the extent of substance intoxication and the distress associated with substance withdrawal are influenced by the way in which individuals take a specific drug into the body, how rapidly acting the substance is, and how lasting the effect of the drug is. Drugs that are efficiently absorbed into the bloodstream due to intravenous injection or smoking are likely to lead to a more intense kind of intoxication than are drugs taken in pill form. Drugs that have an immediate impact on the person are more seductive than those that take longer to take effect. Further, drugs that have a powerful, but short-lived, effect are more likely to lead to patterns of abuse, because the person craves to repeat the experience time and again within a short time frame.

In addition to the diagnostic categories of substance intoxication and substance withdrawal, there are several other substance-induced disorders that have symptoms that are quite similar to the psychological disorders we discussed in previous chapters. For example, there are several cognitive disorders (Chapter 12) related to substances, such as substance-induced delirium, substance-induced persisting dementia, and substance-induced persisting amnesic disorder. In addition to these cognitive disorders, the *DSM-IV-TR* lists the following substance-induced conditions: psychotic disorder, mood disorder, anxiety disorder, sexual dysfunction, and sleep disorder. Therefore, clinicians conducting their initial assessment of clients realize that it is important to consider the possibility that the symptoms might be the result of substance use. For example, the clinician considers whether manic symptoms are due to bipolar disorder or amphetamines, or whether bizarre symptoms are due to psychosis or hallucinogenic drugs.

Substance Use Disorders

When does a person's use of substances become abuse? When does a person's need for substances reach the point of dependency

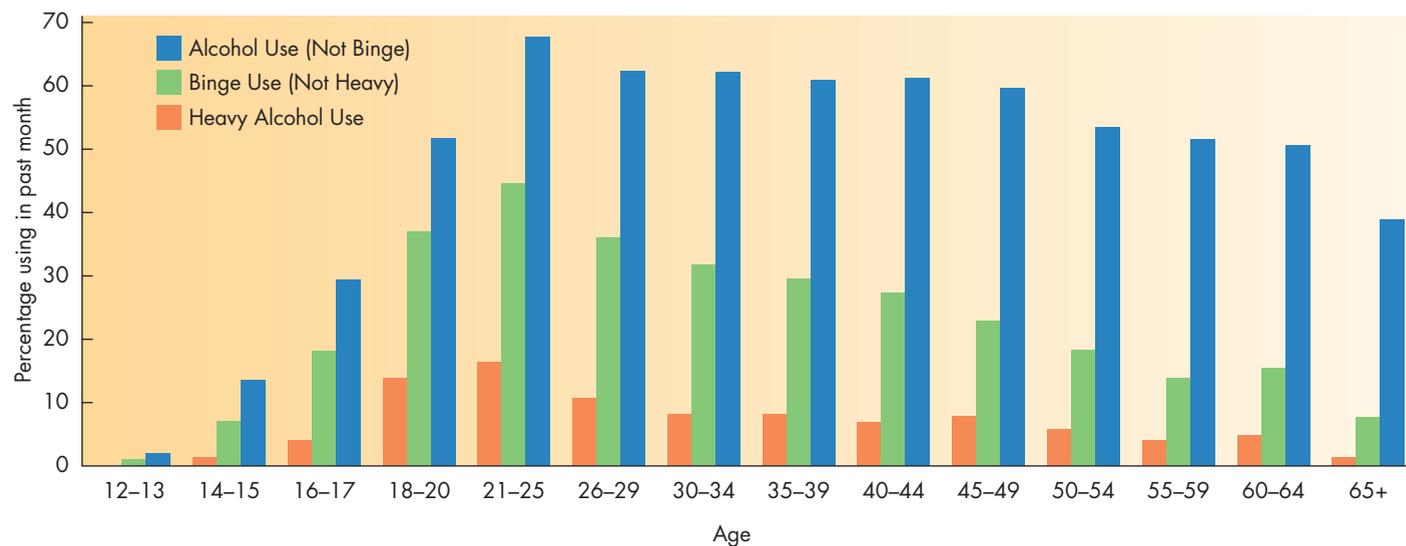
and become an addiction? These are questions that researchers and clinicians have struggled with for decades. Currently, **substance abuse** is defined as the maladaptive pattern of substance use occurring within a 12-month period that leads to significant impairment or distress evidenced by one or more of the following: (1) failure to meet obligations, (2) use of substances in physically hazardous situations, (3) legal problems, or (4) interpersonal problems.

People who abuse substances find that their lives are affected in many ways. They neglect obligations at work, and their commitments to home and family start to erode. In addition to letting their work and family life slide, they may begin to take risks that are personally dangerous and put others in jeopardy, such as driving or operating powerful machinery while intoxicated. Legal problems arise for many people who abuse substances, because their behavior puts them into positions in which they violate the law. In addition to arrests for driving while intoxicated, they may face charges of disorderly conduct or assaultive behavior. Last, and most common, the life of the substance-abusing person is often characterized by interpersonal problems. During episodes of intoxication, they may become argumentative and possibly violent with close ones. Even when the substance-abusing person is sober, his or her relationships are commonly strained and unhappy.

The main feature of abuse, then, is a pattern of behavior in which the individual continues to use substances, even when it is clear that such behavior entails significant risks or creates problems in living. For example, a college professor may insist on having three martinis at lunch, despite the fact that this interferes with her ability to teach her afternoon seminar. Her behavior is characterized as abuse, because her drinking interferes with her work responsibilities. By contrast, her sister, who occasionally has a glass of wine with dinner, would not be regarded as abusing alcohol, because there is no evidence of impairment.

The notion of substance abuse carries with it no implication that the individual is addicted to the substance. Continuing with the example of the three-martini professor, the question is to what extent she "needs" to have those drinks in order to get through the day. If she has reached the point at which she relies on this form of drinking, she would be considered dependent on alcohol. **Substance dependence** is a maladaptive pattern of substance use manifested by a cluster of cognitive, behavioral, and physiological symptoms during a 12-month period and caused by the continued use of a substance.

Experts also strive to understand the roles that psychological and physiological factors play in determining dependence on or tolerance to a substance. Physiological dependence is determined when an individual shows signs of either tolerance or withdrawal. As you will see later in this chapter, clinicians treating people with substance problems must understand these physiological patterns, especially when monitoring the symptoms of withdrawal or when recommending somatic interventions, such as medication.



Alcohol

We begin our discussion of disorders by focusing on alcohol, a substance that has received increased attention in recent years because of the tremendous personal and societal costs associated with the abuse of this mind-altering drug.

Patterns of Use and Abuse

Although the amount of alcohol consumed per person in the United States has steadily decreased since reaching a peak in 1980 (see Figure 13.1), many people use alcohol on a regular basis. Over half of all Americans over the age of 12 admit that they had had at least one drink in the month prior to being surveyed (Substance Abuse and Mental Health Services Administration [SAMHSA], 2003). Approximately 6 percent are considered heavy drinkers, meaning that they consume five or more drinks on the same occasion on at least 5 days in the month. Among high school seniors, 80 percent report having had a drink, and 62 percent report having been drunk at some point in their lives (Johnston, O'Malley, & Bachman, 2001).

According to the National Comorbidity Study, one in seven Americans (14 percent) has a history of alcohol abuse or dependence (Anthony et al., 1994). These estimates vary by sex, with one fifth of the men in the United States (20.1 percent) having a lifetime prevalence of alcohol abuse and/or dependence, which is more than twice the rate for women (8.2 percent). Among women, however, there are variations in prevalence by age, with higher rates reported for adolescent females than for any other age group of women (Kandel et al., 1997).

As can be seen from Figure 13.1, there are variations in alcohol use by age. Young adults aged 18 to 25 have the highest rates of binge drinking (more than five drinks on one occasion) and heavy drinking (five or more drinks on at least five different

days within one month). Age 21 is associated with the highest rates of drinking, with 50.2 percent of 21-year-olds engaging in binge drinking and 20.1 percent in heavy drinking. The rates of binge and heavy drinking decline sharply throughout adulthood; by the age period 45 to 49, less than 22.5 percent engage in binge drinking and less than 10 percent drink heavily. Those over 60 are the least likely to drink heavily, and people over 65 are the least likely to use alcohol at all (SAMHSA, 2003).

The highest prevalence of binge and heavy drinking in 2002 was among young adults aged 18 to 25, with the peak rate occurring at age 21. In 2002, full-time college students aged 18 to 22 were more likely to use alcohol, binge drink, and drink heavily than peers who were not enrolled fulltime. However, binge drinking and heavy drinking were least prevalent among those who had graduated from college.

Effects of Alcohol Use

One of the reasons people consume alcohol is to achieve an altered mood and state of awareness. Before examining the long-term effects of chronic alcohol use, we will look first at its immediate effects on the user and the mechanisms thought to be responsible for these effects.

IMMEDIATE EFFECTS In small amounts, alcohol has sedating effects, leading to feelings of warmth, comfort, and relaxation. In larger amounts, alcohol may lead the drinker to feel more outgoing, self-confident, and uninhibited. Some people stop drinking when they have achieved the positive mood they were seeking from alcohol. If an individual continues to drink beyond that point, though, the effects of alcohol as a **depressant** drug become more apparent, as feelings of sleepiness, uncoordination, dysphoria, and irritability set in. Excessive drinking affects a person's vital functions and can be fatal.



REAL STORIES

BEN AFFLECK: SUBSTANCE ABUSE

At the beginning of this chapter you read about Carl Wadsworth, a young man whose cocaine dependence was wreaking havoc in his family and medical career. Some people are surprised and disturbed when they learn that an individual who seemingly “has it all” would resort to such self-destructive behavior. Yet the media is filled with stories of eminently successful people who stray down the path of substance abuse and lose so much as they become obsessed with satisfying addictive cravings. Such a sad story of self-destructive addiction has been told by Ben Affleck, the successful actor and screenwriter.

Like so many people struggling with addiction, Affleck grew up in a home in which substance abuse caused considerable family turbulence, leading to parental divorce when Affleck was 12 years old. Soon after the divorce, Affleck’s father entered a rehabilitation center where he obtained treatment for his alcohol problem; he subsequently pursued work as a recovery counselor.

Affleck describes his high school years in Cambridge, Massachusetts, as a wild time when he engaged in “underage drinking, pot smoking, and all the attendant shenanigans.” Even during these youthful days, Affleck devoted himself to some remarkable creative endeavors with his close friend Matt Damon, with whom he wrote the screenplay for the critically acclaimed movie *Good Will Hunting*. Although Affleck graduated from high school, he dropped out of college after only one semester to pursue an acting career. He was in



Ben Affleck

several small, low-budget movies before landing the starring role in the 1997 hit *Chasing Amy*.

After the explosive success of *Good Will Hunting* and *Chasing Amy*, Affleck’s life changed dramatically. Although he was experiencing many wonderful things, he was also encountering some demons. On the positive side, he became romantically involved with another prominent star, Gwyneth Paltrow, and also immersed himself in exciting and successful creative endeavors. He also became socially proactive, as evident in his public efforts to increase research funding

for neurological disease. But there was also the negative side of Affleck’s life in which he turned increasingly to alcohol for relief from the pressures of life.

“My life changed so quickly I lost any sense of who exactly I was. . . . I made some poor choices.” Affleck describes the impact of gross intoxication:

The next morning, my head was throbbing, it was all I could do to find the car. . . .

I started regretting some of the things I did when I was drunk. It’s funny to be obnoxious or out of control, but then it’s like, “I think I hurt that person’s feelings. I made a fool of myself,” or “I didn’t want to kiss that girl. . . .” Now it’s kind of depressing to be bombed at 3 in the morning.

Affleck also talks about the ineffectiveness of his reliance on partying and alcohol to get through rough times: “I had broken up with Gwyneth . . . and I felt very adrift. . . . So I thought, . . . ‘Okay, I’ll go to these parties. I’ll try to embrace this life people think I have.’ . . . And I found myself even more miserable.” The good news is that Affleck has come to terms with his addiction and has found the courage to seek treatment and to speak publicly about the perils associated with the abuse of substances. He is now committed to a healthier lifestyle without alcohol, and he is grateful for the support of his family and friends.

Excerpts from Anne-Marie O’Neill, “Reality Check” in *People Weekly*, August 20, 2001. Reprinted with permission.

The mixture of alcohol with other drugs is referred to as **potentiation**, meaning that the effect of two drugs taken together is greater than the effect of either substance alone. For example, combining alcohol, which is a depressant, with another depressant would exaggerate the effects on the body and possibly would be fatal.

The rate at which alcohol is absorbed into the bloodstream depends in part on the concentration of alcohol in the particular

beverage, the amount of alcohol consumed, the rate at which it is consumed, and the amount of food present in the stomach. The rate of alcohol absorption also depends on individual characteristics, including gender and a person’s metabolic rate, or the rate at which the body converts nutrients to energy (in this case, the “nutrient” is alcohol). The rate at which alcohol is metabolized determines how long the person will continue to experience the effects of alcohol. The average person metabolizes alcohol at a



The unpredictability and dysfunctional behavior of an alcoholic parent or spouse create tension and insecurity for all family members.

rate of one third of an ounce of 100 percent alcohol per hour, which is equivalent to an ounce of whiskey per hour. A guide to blood alcohol levels is shown in Table 13.1.

Following a bout of extensive intake of alcohol, a person is likely to experience an abstinence syndrome, what everyone knows as a “hangover.” The symptoms of hangover include nausea and vomiting, tremors, extreme thirst, headache, tiredness, irritability, depression, and dizziness. The extent of a person’s hangover depends on how much alcohol he or she has consumed and over what period of time. Metabolic rate also affects the duration of a person’s hangover. Contrary to whatever advice one hears about homemade remedies, there is no cure for a hangover, other than to wait for the body to recover.

LONG-TERM EFFECTS In part, alcohol’s harmful long-term effects may be attributed to the factor of tolerance. The more a person consumes, the more alcohol that person needs to achieve the desired impact. Heavy drinkers tend to increase their intake of alcohol over time, thereby increasing the likelihood of bodily damage. As we will see later, scientists are attempting to understand the biochemical changes associated with long-term heavy alcohol use as a way of comprehending the factors leading to tolerance and dependence.

Alcohol affects almost every organ system in the body, either directly or indirectly. Long-term use of alcohol can lead to permanent brain damage, with symptoms of dementia, blackouts, seizures, hallucinations, and damage to the peripheral parts of the nervous system. Two forms of dementia are associated with long-term, heavy alcohol use: Wernicke’s disease and Korsakoff’s syndrome. **Wernicke’s encephalopathy**, as discussed in Chapter 12, is an acute condition involving

delirium, eye movement disturbances, difficulties in movement and balance, and deterioration of the peripheral nerves to the hands and feet. The cause of Wernicke’s encephalopathy is not alcohol itself, but a thiamine (Vitamin B) deficiency due to the deleterious effects of alcohol on the metabolism of nutrients, as well as an overall pattern of poor nutrition. Adequate thiamine intake can reverse Wernicke’s encephalopathy. People who develop Wernicke’s disease are likely to develop **Korsakoff’s syndrome**, a permanent form of dementia in which the individual develops retrograde and anterograde amnesia, leading to an inability to remember recent events or to learn new information. It is thought that both disorders represent the same underlying disease process, with Wernicke’s being the acute form and Korsakoff’s being the chronic form of the disorder. The chances of recovering from Korsakoff’s syndrome are less than one in four, and about one quarter of those who have this disorder require permanent institutionalization.

Death from long-term, heavy alcohol use is often associated with liver disease. Most chronic alcohol users develop fatty liver, a condition characterized by abnormal changes in the blood vessels in the liver. This condition develops in 90 to 100 percent of heavy drinkers and may be a precursor to cirrhosis, a degenerative disease that results in progressive and irreversible liver damage. Cirrhosis is one of the primary factors associated with death due to chronic alcohol use. Although the death rate for this disease has diminished over the past few decades, cirrhosis is the twelfth leading cause of death in the United States (Hoyert et al., 2001). Heavy alcohol consumption also causes a number of harmful changes in the gastrointestinal system, including inflammation of the esophagus, stomach lining, and pancreas, and a slowing down of smooth muscle contractions throughout the gastrointestinal tract. These conditions can interfere with the process of digestion and can lead to serious nutritional imbalances, including thiamine deficiency, as mentioned earlier, and even malnutrition. A diet that is deficient in zinc may lead to a decrease in the activity of **alcohol**

TABLE 13.1 Alcohol Impairment Chart**Men: Approximate Blood Alcohol Percentage**

Drinks*	Body Weight in Pounds								Effect on Person
	100	120	140	160	180	200	220	240	
0	.00	.00	.00	.00	.00	.00	.00	.00	Only safe driving limit.
1	.04	.03	.03	.02	.02	.02	.02	.02	Impairment begins.
2	.08	.06	.05	.05	.04	.04	.03	.03	
3	.11	.09	.08	.07	.06	.06	.05	.05	Driving skills significantly affected. Possible criminal penalties.
4	.15	.12	.11	.09	.08	.08	.07	.06	
5	.19	.16	.13	.12	.11	.09	.09	.08	
6	.23	.19	.16	.14	.13	.11	.10	.09	
7	.26	.22	.19	.16	.15	.13	.12	.11	Legally intoxicated. Criminal penalties imposed.
8	.30	.25	.21	.19	.17	.15	.14	.13	
9	.34	.28	.24	.21	.19	.17	.15	.14	
10	.38	.31	.27	.23	.21	.19	.17	.16	

Women: Approximate Blood Alcohol Percentage

Drinks*	Body Weight in Pounds								Effect on Person	
	90	100	120	140	160	180	200	220		240
0	.00	.00	.00	.00	.00	.00	.00	.00	.00	Only safe driving limit.
1	.05	.05	.04	.03	.03	.03	.02	.02	.02	Impairment begins.
2	.10	.09	.08	.07	.06	.05	.05	.04	.04	Driving skills significantly affected. Possible criminal penalties.
3	.15	.14	.11	.11	.09	.08	.07	.06	.06	
4	.20	.18	.15	.13	.11	.10	.09	.08	.08	
5	.25	.23	.19	.16	.14	.13	.11	.10	.09	
6	.30	.27	.23	.19	.17	.15	.14	.12	.11	Legally intoxicated. Criminal penalties imposed.
7	.35	.32	.27	.23	.20	.18	.16	.14	.13	
8	.40	.36	.30	.26	.23	.20	.18	.17	.15	
9	.45	.41	.34	.29	.26	.23	.20	.19	.17	
10	.51	.45	.38	.32	.28	.25	.23	.21	.19	

National Clearinghouse for Drug and Alcohol Information, SAMHSA, <http://www.samhsa.gov/centers/clearinghouse/clearinghouses.html>, Accessed 12/20/01.

Subtract .01% for each 40 minutes of drinking.

*One drink is equal to 1¼ oz. of 80 proof liquor, 12 oz. of beer, or 4 oz. of table wine.

dehydrogenase (ADH), a zinc-containing enzyme in the stomach. ADH breaks down a portion of the alcohol into fatty acids, carbon dioxide, and water before it enters the bloodstream. As a result of lowered ADH activity, a greater portion of the alcohol enters the bloodstream without first being broken down, increasing its effect throughout the body. Women appear to be more vulnerable to the effects of alcohol because of their lower amounts of ADH, leading to the dispersion of greater amounts of undigested alcohol throughout the body's tissues. As a result, women reach higher blood alcohol concentrations for a given

amount of alcohol consumption, and they are more susceptible to liver disease caused by excessive alcohol intake.

The list of damaging effects of alcohol is long. Chronic alcohol consumption lowers a person's bone strength and puts the individual at risk for developing chronic muscle injury due to atrophy and a bone-weakening disease called osteoporosis. Alcohol can increase a person's risk of developing various forms of cancer, a risk that grows if the individual also smokes cigarettes. A reduction in the functioning of the immune system, which helps fight off cancer as well as infectious diseases,

appears to play a role in the deteriorative process. Because of the effects of alcohol on the immune system, people infected with HIV who drink heavily are more likely to accelerate the progression of AIDS. Finally, the abrupt withdrawal of alcohol after chronic usage can result in such symptoms as severe hangover, sleep disturbances, profound anxiety, tremulousness, sympathetic hyperactivity, psychosis, seizures, and even death.

Theories of Alcohol Dependence

Researchers in the field of alcohol dependence were among the first in abnormal psychology to recognize the need for a biopsychosocial model to explain why some people develop alcoholism (Zucker & Gomberg, 1986). This model, as applied to alcohol dependence, emphasizes genetic vulnerability in interaction with influences from the home and peer environments.

BIOLOGICAL PERSPECTIVE Researchers are making major advances in understanding the important role that biology plays in determining whether a person becomes dependent on alcohol. Pointing to the influence of genetics, it is a well-established finding that the risk of alcohol dependence runs in families. Siblings of alcohol-dependent individuals have a three to eight times greater risk of becoming dependent themselves. Based on research with twins, the heritability of alcohol dependence is estimated to be 50 to 60 percent, meaning that at least half of the tendency to develop alcohol dependence is due to genetic factors (Reich et al., 1998).

Given the inherited component of alcohol dependence, it seems likely that biological markers could be identified that would help indicate a person's predisposition to the disorder. One potential marker is the individual's subjective reaction to alcohol, or how much alcohol is needed to produce the feeling of being under the influence of the substance. Researchers have found that genetically predisposed people who have less of a subjective reaction following the intake of alcohol in a laboratory seem to be at higher risk of becoming dependent themselves. The low subjective response to alcohol is most predictive of development of alcohol dependence in men who have poor coping strategies and low levels of social support (Schuckit & Smith, 2001). Another possible biological marker is the event-related brain potential (ERP), the positive voltage charge that occurs 300 to 500 milliseconds after exposure to a stimulus. An abnormal ERP response is an inherited characteristic linked to a high genetic risk for alcohol dependence (Hesselbrock et al., 2001).

Although there is strong evidence that predisposition to alcohol dependence has a genetic basis, there is much that is not known, such as the number of genes, their locations, and the way in which they lead to vulnerability. It is hoped that the process of genetic mapping will identify genetic markers of alcohol susceptibility that can be linked to behavioral responses to alcohol. Researchers have identified a gene or genes involved in alcohol susceptibility on chromosome 1 (Nurnberger et al., 2001). It is thought that genetic mechanisms

play a role in causing abnormalities in several neurotransmitters, including gamma-aminobutyric acid (GABA), dopamine, serotonin, and opioids (Rader & Goldman, 2001).

PSYCHOLOGICAL PERSPECTIVE Proponents of the behavioral perspective view alcohol dependence as resulting from a process in which classical conditioning plays a role in the development of cravings (O'Brien, Childress, Ehrman, & Robbins, 1998). However, theorists and researchers realize that alcohol dependence must be due to a broader range of factors. One model that is gaining considerable support is the **expectancy model**, which has evolved from cognitive-behavioral and social learning perspectives (Parks, Anderson, & Marlatt, 2001). According to this model, people with alcohol dependence develop problematic beliefs about alcohol relatively early in life through a combination of reinforcement and observational learning.

Concepts central to the expectancy model are self-efficacy and coping. Self-efficacy, as you will recall from Chapter 4, refers to an individual's perception that he or she has the ability to meet the challenges of a difficult situation. The concept of coping, as used in the cognitive-behavioral model, refers to the strategies that an individual uses to reduce the perception of a threat or danger. According to the expectancy model, these cognitive factors, along with the individual's ideas or expectations about the effects of alcohol, presumably play a role in determining whether or not an individual will relapse to problem drinking. A sample of an assessment inventory based on the model is shown in Table 13.2.

The expectancy model describes a series of reactions that occurs when an alcohol-dependent individual attempts to remain abstinent. Consider the contrasting cases of Marlene, who has been successful in remaining abstinent, and Edward, who has been unsuccessful. Both Marlene and Edward encounter high-risk situations, such as parties at which other people are con-

TABLE 13.2 Sample Items from Expectancy-Based Assessment Measures

The Inventory of Drinking Situations is used to determine which situations represent a high risk for the alcohol-dependent individual. Each item is rated on the following 4-point scale: "I DRANK HEAVILY—Never, Rarely, Frequently, Almost Always." The items on the Situational Confidence Questionnaire (Annis, 1984) are the same but are rated according to the scale of "I WOULD BE ABLE TO RESIST THE URGE TO DRINK HEAVILY," with percentages ranging from Not at All Confident (0 percent) to Very Confident (100 percent).

Determinants	Item	Scale
Intrapersonal	When I felt that I had let myself down	Negative emotional state
	When I had trouble sleeping	Negative physical state
	When I felt confident and relaxed	Positive emotional state
	When I convinced myself that I was a new person now and could take a few drinks	Testing personal control
	When I remembered how good it tasted	Urges and temptations
Interpersonal	When other people treated me unfairly	Social rejection
	When pressure built up at work because of the demands of my superior	Work problems
	When I felt uneasy in the presence of someone	Tension
	When I had an argument with a friend	Family/friends problems
	When I was out with friends and they stopped by for a drink	Social pressure to drink
	When I was out with friends "on the town" and wanted to increase my enjoyment	Social drinking
	When I wanted to heighten my sexual enjoyment	Intimacy

From H. M. Annis in *Inventory of Drinking Situations: Short Form*. Copyright © 1984 Center for Addiction and Mental Health. Reprinted with permission.

suming alcohol. Marlene is able to abstain from drinking at the party, because she has learned how to cope with such situations, and she feels capable of carrying through with her intention not to drink alcohol. Each successful episode of abstinence reinforces her sense of self-efficacy, causing her to feel more capable of abstaining in subsequent situations. Unlike Marlene, some individuals, such as Edward, lack a satisfactory coping response. The actual consumption of alcohol is not what leads to a relapse but, rather, the individual's interpretation of the act of drinking as a sign of loss of self-control. Thus, when Edward enters a high-risk situation, he feels incapable of staying away from alcohol because of his low sense of self-efficacy. A compelling expectation that alcohol will have a positive mood-altering effect adds to his low sense of self-efficacy and leads him to take the first drink. The positive sensations the alcohol produces further undermine Edward's resolve, but cognitive factors enter at this point in the process as well. Having violated the self-imposed rule of remaining abstinent, he now is subject to the **abstinence violation effect**, a sense of loss of control over one's behavior that has an overwhelming and demoralizing effect (see Figure 13.2). Thus, Edward's self-efficacy is further eroded, initiating a downward spiral, which eventually ends in renewed alcohol dependence.

SOCIOCULTURAL PERSPECTIVE Researchers and theorists working within the sociocultural perspective regard stressors within the family, community, and culture as factors that, when combined with genetic vulnerability, lead the individual to develop alcohol dependence. The sociocultural perspective was given support in a landmark longitudinal study conducted in the early 1980s. Researchers followed individuals from childhood or adolescence to adulthood, the time when most individuals who become alcohol dependent make the transition from social or occasional alcohol use to dependence (Zucker & Gomberg, 1986). Those most likely to become alcohol dependent in adulthood had a history of childhood antisocial behavior, including aggressive and sadistic behavior, trouble with the law, rebelliousness, lower achievement in school, completion of fewer years of school, and a higher truancy rate. These individuals also showed a variety of behaviors possibly indicative of early neural dysfunction, including nervousness and fretfulness as infants, hyperactivity as children, and poor physical coordination. It was thought that these characteristics reflect a genetically based vulnerability, which, when combined with environmental stresses, leads to the development of alcohol dependence. More recent studies have continued to support the role of family environment as influenced by larger sociocultural factors. In one

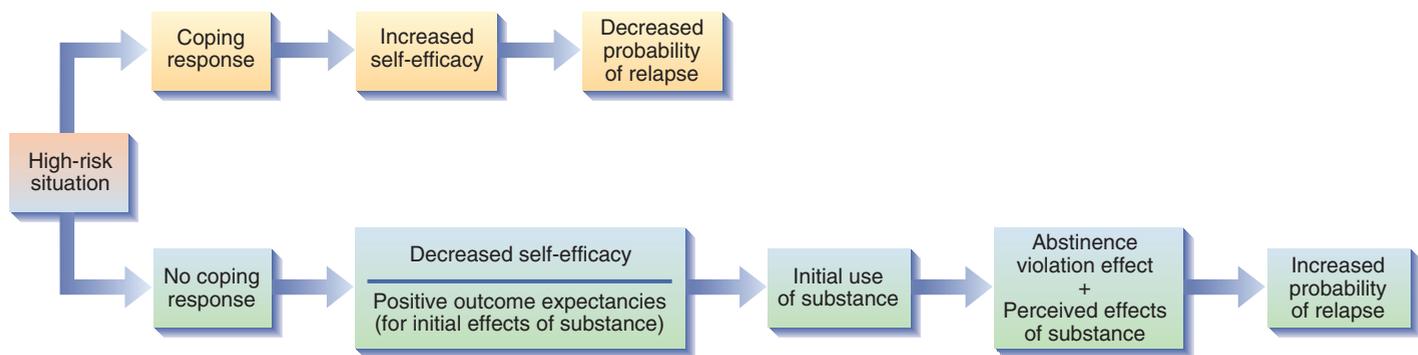


FIGURE 13.2 A cognitive-behavioral model of the relapse process. From G. A. Marlatt and J. R. Gordon in *Relapse Prevention: Maintenance Strategies in Addictive Behavior Change*. Copyright © 1985 Guilford Publications, Inc. Reprinted by permission.

2-year study of more than 800 suburban adolescents, the teenagers who received high levels of social support from their families at home were less likely to consume alcohol. The effect of social support seemed to be due primarily to the fact that families providing high levels of social support were also more likely to have a strong religious emphasis in the home. School grades also correlated with lower teen use of alcohol. Teens who got good grades were more likely to receive higher levels of social support from their families, which in turn was associated with lower rates of alcohol use. The teens who used alcohol were more likely to show poorer school performance over the course of the study (Mason & Windle, 2001).

Another approach within the sociocultural perspective focuses on the offspring of parents who are dependent on alcohol. According to this perspective, adult children of alcoholics (ACOA) are at a heightened risk for developing difficulties in their relationships with others (Woititz, 1983) and are at a higher risk for becoming dependent on alcohol. For example, because of their chaotic and unpredictable home life during childhood, these people go through life finding it difficult to know what “normal” is. They are unable to have fun, and they have difficulty establishing intimate relationships. Further, according to this view, they tend to feel different from other people, act impulsively, lie, and desperately seek approval and attention. The increasing recognition given to the problems shared by children of alcoholics has helped many people gain self-understanding. Although this is a compelling argument, it is important to recognize that the research support for the ACOA perspective is mixed. Research focusing on personality characteristics that differentiate ACOAs from non-ACOA does not support such a broad-based set of distinctions (Mintz, Kashubeck, & Tracy, 1995). There is a risk of overidentifying with the list of ACOA-related traits, because they are so general that at least some of them can apply to virtually anyone (Logue, Sher, & Frensch, 1992).

Critics may raise questions about the legitimacy of general characterizations of the family members of alcoholics, but there is no question that alcohol-related disorders create emotional stress for individuals and families. In addition, there is a wider social cost. Besides the damaging effects of substances on the fabric of society, there are the exorbitant financial costs associated with medical treatment for alcohol-related conditions, lost work time, the loss of human life, and the treatment of children with fetal

alcohol syndrome. In one recent year, the societal cost of alcohol abuse and dependence was estimated to be \$185 billion (National Institute on Drug Abuse [NIDA], 2001).

Treatment of Alcohol Dependence

The search for the effective treatment of alcohol dependence has been a difficult and challenging process. Alcohol use is so much a part of Western culture that many people who abuse or are dependent on alcohol do not realize that their behavior is problematic. There are no legal sanctions against the use of alcohol other than a minimum drinking age; in fact, endorsements of drinking as a socially acceptable behavior frequently appear in advertising. Little consideration is given to the down side of alcohol consumption—namely, that it can involve a serious disorder. Nor is much attention given to the fact that alcohol-related disorders are treatable.

Due to denial, most alcohol-dependent individuals do not seek treatment voluntarily. Therefore, developing strategies for health-care and social service institutions, families, and informal service providers aimed at changing social networks and referring people to treatment is an important goal (Weisner, Matzger & Kaskutas, 2003).

BIOLOGICAL TREATMENT Medications are becoming increasingly used as biological treatment for alcohol dependence. Medications that seem to have the most success are those that block or interact with the brain mechanisms thought to be the causes of alcohol dependence. The newest medication to be used for this purpose is naltrexone (ReVia), approved in 1995 by the U.S. Food and Drug Administration as an aid in preventing relapse among people with alcohol dependence. Naltrexone originally was used as a treatment for opioid dependence. The way in which naltrexone works is not well understood, but researchers believe that it blocks the pleasurable effects of opioids, both those produced by the body as well as those that are ingested. As a result, a person taking naltrexone who then drinks alcohol will find the experience much less reinforcing and is therefore more likely to abstain. At that point, the individual is better able to take advantage of psychotherapy. Unfortunately, naltrexone has unpleasant gastrointestinal side effects,



SOCIAL CONTEXT

THE INFLUENCE OF RACE AND CULTURE ON ALCOHOLISM

Researchers have discovered that the symptoms of alcoholism are consistent across a variety of cultures and ethnic groups (Helzer, Burnam, & McEvoy, 1991), but their work has also demonstrated differences in prevalence and possible precipitants to alcohol dependence. Perhaps no one will ever develop an exhaustive list of the myriad factors that influence drinking behavior, but an examination of current perspectives on cultural and racial differences in alcohol abuse and dependence sheds light on how social settings and expectations influence the development of the disorder.

Alcohol use is common throughout the world, yet different societies view drinking in very different ways. For example, in some American societies, such as the Amish and certain conservative religious orders, alcohol use is strictly discouraged or prohibited. On the other hand, in many European societies, alcohol is integrated into the daily diet and is a standard accompaniment to meals. In some Asian societies, it is acceptable for men to consume large quantities of alcohol, often in the company of work colleagues. In those societies, drinking by women is strongly discouraged.

Differences in social views of alcohol consumption highlight the interplay of cul-

ture and symptomatology. In one study, for example, African American and Caucasian men developed alcoholism at similar rates, yet the African American men experienced significantly more alcohol-related problems, including health and interpersonal problems (Herd, 1994). As a group, the African American men were less tolerant of drinking outside of social settings—for instance, when driving or with young children. For others, their religious affiliation provided an ethical stance against intoxication. At the same time, many of the African American men included in the study had come from disadvantaged, urban environments. Disadvantages in health care, employment, and education, combined with a higher police presence relative to affluent neighborhoods, might have contributed to the relatively higher frequency of alcohol-related problems. Interestingly, similar cultural and social deprivations seem to contribute to the high rates of alcoholism in Russia and other countries of the former Soviet bloc (Anderson & Hibbs, 1992).

Cross-cultural studies have demonstrated lower rates of alcoholism in some Asian countries, such as Taiwan and Korea, relative to Western nations (Helzer et al., 1990). Although heavy drinking by men may become problem-

atic when sanctioned in certain work settings, drinking by women and drinking outside of social situations are often discouraged. Furthermore, some members of Asian cultures seem vulnerable to the buildup of potentially toxic by-products of alcohol, making intoxication a potentially unpleasant experience.

Women may differ from men in their patterns of alcohol use and dependence. While men may drink to excess to suppress painful emotions, women seem more likely to drink to escape painful interpersonal situations (Hodgins, el-Guebaly, & Armstrong, 1995). In traditional, male-dominated societies, strong prohibitions may prevent women from drinking to the point of intoxication, accounting for the low rates of alcoholism among Hispanic and Asian women (Canino, 1994; Helzer et al., 1990).

These are just a few of the possible explanations for the variability in patterns of alcohol use and alcoholism throughout the world. Despite this variability, it is important to remember that alcohol dependence is a problem worldwide and that each individual who becomes dependent may have reached that point for a variety of reasons, including biological predisposition, psychological distress, and cultural influences.

and for that reason, its clinical utility is limited (Kranzler, Modesto-Lowe, & Van Kirk, 2000).

Another medication used to treat alcohol dependence is acamprosate, which has shown promise in large-scale controlled European studies. More than twice as many individuals receiving a combination of psychotherapy and acamprosate remained abstinent up to 1 year compared with people receiving psychotherapy alone (Swift, 1999). Acamprosate interacts with GABA, one neurotransmitter thought to be involved in alcohol dependence.

Some medications are used to control symptoms of co-existing conditions: for example, benzodiazepines can manage the symptoms of withdrawal and prevent the development of **delirium tremens**, a physical condition consisting of autonomic nervous system dysfunction, confusion, and possibly seizures. Other antianxiety medications, and antidepressants, may help reduce the individual's dependence on alcohol by

alleviating the symptoms of anxiety and depression, which can foster the need for alcohol. Because antianxiety medications carry the risk of dependence, these must be carefully monitored.

Another category of medications used to treat alcohol dependence consists of those that are intended to produce a strongly aversive physiological reaction when a person drinks. This method relies on an aversive conditioning process, in which the unpleasant reaction to alcohol provoked by the medication causes the individual to form a negative association to alcohol intake, providing a strong incentive for not drinking. The medication used in this form of treatment is **disulfiram**, known popularly as Antabuse. Disulfiram inhibits **aldehyde dehydrogenase (ALDH)**, an enzyme that, along with ADH, is responsible for metabolizing alcohol. When ALDH is inhibited, the level of blood acetaldehyde, a toxic substance, rises, and within 30 minutes the individual



Mini Case

Substance Dependence (Alcohol)

Rhona is a 55-year-old homemaker married to a successful builder. Every afternoon, she makes herself the first of a series of daiquiris. On many evenings, she has passed out on the couch by the time her husband arrives home from work. Rhona lost her driver's license a year ago after being arrested three times on charges of driving while intoxicated. Although Rhona's family has urged her to obtain treatment for her disorder, she denies that she has a problem because she can "control" her drinking. The mother of three grown children, Rhona began to drink around the age of 45, when her youngest child left for college. Prior to this time, Rhona kept herself extremely busy through her children's extracurricular activities. When she found herself alone every afternoon, she took solace in having an early cocktail. Over a period of several years, the "cocktail" developed into a series of five or six strong drinks. Rhona's oldest daughter has lately begun to insist that something be done for her mother. She does not want to see Rhona develop the fatal alcohol-related illness that caused the premature death of her grandmother.

- Why would Rhona's pattern of alcohol use be regarded as dependence rather than abuse?

- What factors in her life may be contributing to Rhona's use of alcohol?

Diagnostic Features

- ◆ During a 12-month period, people with substance dependence show at least three of the following:
 - Tolerance
 - Withdrawal
 - Use of the substance in larger amounts or over a longer period than intended
 - Persistent desire or unsuccessful efforts to cut down or control substance use
 - Extensive time devoted to activities involved in obtaining, using, or recovering from substance use
 - A giving up of or reduction in important activities because of substance use
 - Continued use despite knowledge of a substance-caused physical or psychological problem

experiences a severe physical reaction lasting for as long as 1 hour. Depending on the amount of alcohol in the body, this reaction includes a headache, hot and flushed face, chest pain, weakness, sweating, thirst, blurred vision, confusion, rapid heart rate and palpitations, a drop in blood pressure, difficulty breathing, nausea, and vomiting. Although disulfiram has been used for decades, controlled studies have failed to validate its efficacy. This is due to the fact that people, expecting negative side effects from drinking on disulfiram, resist the medication rather than continue to abstain from drinking alcohol (MacKillop et al., 2003). The use of disulfiram is not without risks, however. Because of the intensity of the physical reaction it provokes, disulfiram must be used with caution for individuals with cirrhosis, a disorder that is common among chronic alcohol users (Saxon, Sloan, Reoux, & Haver, 1998).

Before leaving the topic of pharmacological treatments for alcohol dependence, it is important to point out that such treatments are controversial. Criticism rests on what some perceive as an irony—using one form of substance to eliminate the abuse of another. Furthermore, these treatments have yet to prove their effectiveness over the long term in the treatment of individuals with alcohol dependence (Schuckit & Smith, 1996).

PSYCHOLOGICAL TREATMENT Although disulfiram is a biological intervention, you can see that it relies heavily on the behavioral principles of aversive conditioning. It is not an

ideal aversive stimulus, however, because its effects are not immediate. Other behavioral methods use an aversive conditioning model in which something unpleasant, such as a mild electric shock, occurs in direct association with alcohol consumption during a treatment session. Again, although this approach appears to have obvious merit and has been used for more than 50 years, most experts do not regard its effectiveness rate to be high enough to counter the objections about its safety.

In the **cue exposure method**, another behavioral approach, the individual is given a priming dose of alcohol, which initiates the craving for more alcohol. At that point, the individual is urged to refuse further alcohol. Each successive treatment constitutes an extinction trial intended to reduce craving. This method shows promise as a means of reducing problem drinking in people who do not meet the criteria for alcohol dependence (Sitharthan, Sitharthan, Hough, & Kavanagh, 1997). However, among individuals hospitalized for alcohol dependence, the exposure to alcohol cues can have an effect opposite to the intended outcome, leading to an increased craving for alcohol (Stasiewicz et al., 1997).

An alternative to approaches aimed at replacing positive associations to alcohol with aversive ones is **relapse prevention therapy**, a treatment method developed by University of Washington psychologist G. Alan Marlatt and his colleagues. This method is based on the expectancy model. Built into the model is the assumption that alcohol-dependent individuals invariably are faced with the temptation to have a drink and at some point fail to follow through with the desire to abstain.

What happens at that point is crucial. According to the notion of the abstinence violation effect, if the lapse is seen as a sign of weakness, or a character flaw, this will damage the individual's sense of self-efficacy so severely that the possibility of future abstinence seems out of the question. If, instead, the individual can learn to interpret the drinking episode as a single incident that was unfortunate but not a permanent failing, the individual's self-efficacy can remain intact and a relapse can be prevented.

In relapse prevention, the individual learns decision-making abilities that make it possible for him or her to analyze a high-risk situation and determine which coping skills would work best to prevent a relapse. Skill training can also help individuals learn how to express and receive positive and negative feelings, how to initiate contact, and how to reply to criticism. For example, consider the case of a woman named Sheila, who knows that going to a party will put her in a high-risk situation. For years, Sheila believed that she needed alcohol in such situations so that she could "loosen up," thereby appearing more likable and lively. Now that she is trying to maintain abstinence, she can make alternative plans prior to going to a party that will prepare her with coping skills, such as staying away from the bar and asking a friend to keep her glass full with a nonalcoholic beverage. Cognitive restructuring would help Sheila interpret high-risk situations more productively. If she believes that it is necessary to have alcohol to be popular and lively, she can learn to reframe this belief, so she can see that people like her even if she is not high on alcohol. Maintenance is an important part of the treatment approach as well; therefore, Marlatt emphasizes the need for continued therapeutic contacts, social support from friends and family, and changes in lifestyle to find alternate sources of gratification. Sheila needs to keep in periodic contact with her therapist, to find new friends and seek help from her family, and to find other ways to socialize, such as joining a health club. Skill training and the development of alternate coping methods can also be combined with behavioral techniques, such as cue exposure.

The goal of relapse prevention cannot be achieved in one step; rather, it requires a graded program that exposes the individual to high-risk situations in greater and greater increments. At each step, the therapist encourages the individual to draw inferences from successful behavior that will reinforce feelings of self-efficacy. The relapse prevention model is growing in popularity. Furthermore, the effectiveness of interventions involving self-control can be improved when stress management principles are incorporated into the program and when clients are given help in improving supportive relationships with others outside the therapeutic setting (Hodgson, 1994).

ALCOHOLICS ANONYMOUS While biologists and psychologists continue to explore treatment approaches based on scientific models of alcohol dependence, one intervention model, whose roots are in spirituality rather than science, continues to be used on a widespread basis: Alcoholics Anonymous, or AA. This movement was founded in 1935 by Bill W., a Wall Street stockbroker, and Dr. Bob, a surgeon from Akron, Ohio, and from these humble beginnings AA has grown to worldwide



Meetings are central to the Alcoholics Anonymous movement. Members describe their experiences with alcohol dependence, hoping to inspire others to resist the omnipresent temptations of the addiction.

proportions. More than 2 million members participate in approximately 98,000 AA groups throughout the world (<http://www.alcoholicsanonymous.org/em24doc4.html>). The value of this approach has become generally accepted, and AA is now a component of most treatment programs in the United States.

The standard recovery program in AA involves a strong commitment to participate in AA-related activities, with the most important component being the AA meeting. Many AA meetings begin with an introduction of members, who state their first names, followed by the statement "I am an alcoholic." This ritual is the basis for the name of the program, Alcoholics Anonymous, meaning that members never consider themselves not to be alcoholics and that they are not required to divulge their identities. During the meeting, one or more members share their experiences about how they developed drinking problems, the suffering their drinking caused, the personal debasement they may have felt when they lied and cheated, and how they "hit bottom" and began to turn around their drinking patterns and their lives. The 12 steps to recovery form the heart of AA's philosophy. This emphasis on honesty, confrontation, and storytelling is seen as the essential element of the 12-step program. The popularity and massive development of AA have led to many variants on the basic theme, with specialized groups for nonsmokers, single-gender groups, and members of alternative lifestyles, for example (Johnson & Chappel, 1994). (See Table 13.3.)

The second component of AA is the constant availability of another member, called a sponsor, who can provide support during times of crisis, when the urge to drink becomes overpowering. Round-the-clock hot lines staffed by AA volunteers also help make such assistance continuously available. Third, the spiritual element is a major factor within the AA movement, in that members admit that they are powerless over alcohol and turn over their lives to a power greater than themselves. The AA experience differs considerably from person to person, with some people deriving benefit from attendance at meetings, and others from adherence to the spiritual principles (Caldwell & Cutler, 1998).

TABLE 13.3 Is AA for You?

This is AA General Service
 Conference-approved literature
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Answer “yes” or “no” to the following questions.

1. **Have you ever decided to stop drinking for a week or so, but lasted for only a couple of days?**
2. **Do you wish people would mind their own business about your drinking—stop telling you what to do?**
3. **Have you ever switched from one kind of drink to another in the hope that this would keep you from getting drunk?**
4. **Have you had to have an eye-opener on awakening during the past year?**
5. **Do you envy people who can drink without getting into trouble?**
6. **Have you had problems connected with drinking during the past year?**
7. **Has your drinking caused trouble at home?**
8. **Do you ever try to get “extra” drinks at a party because you do not get enough?**
9. **Do you tell yourself you can stop drinking any time you want to, even though you keep getting drunk when you don’t mean to?**
10. **Have you missed days of work or school because of drinking?**
11. **Do you have “blackouts”?**
12. **Have you ever felt that your life would be better if you did not drink?**

What’s Your Score?

Did you answer “yes” four or more times? If so, you are probably in trouble with alcohol. Why do we say this? Because thousands of people in AA have said so for many years. They found out the truth about themselves—the hard way. But, again, only you can decide whether you think AA is for you. Try to keep an open mind on the subject. If the answer is yes, we will be glad to show you how we stopped drinking ourselves. Just call. AA does not promise to solve your life’s problems. But we can show you how we are learning to live without drinking “one day at a time.” We stay away from that “first drink.” If there is no first one, there cannot be a tenth one. And, when we got rid of alcohol, we found that life became much more manageable.

ALCOHOLICS ANONYMOUS® is a fellowship of men and women who share their experience, strength and hope with each other that they may solve their common problem and help others to recover from alcoholism.

- The only requirement for membership is a desire to stop drinking. There are no dues or fees for AA membership; we are self-supporting through our own contributions.
 - AA is not allied with any sect, denomination, politics, organization or institution; does not wish to engage in any controversy; neither endorses nor opposes any causes.
 - Our primary purpose is to stay sober and help other alcoholics to achieve sobriety.
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The fundamental approach that AA fosters with regard to understanding alcohol dependence is that alcoholism is a disease that prevents those who have it from controlling their drinking (Yalisove, 1998). If the alcoholic does succumb to temptation and goes on a drinking binge, this is attributed within the AA model not to a moral failing but to a biological process. A second tenet of AA is that alcoholics are never cured; they are “recovering.” The goal of AA treatment is total abstinence. According to the AA philosophy, one drink

is enough to send the individual back into a state of alcohol dependence.

An offshoot of AA was formed in the early 1950s for relatives and friends of people with alcohol dependence. Called Al-Anon, to distinguish it from AA, this program provides support for people who are close to alcoholics and need help to cope with the problems alcoholism creates in their lives. A later movement, called Alateen, is specifically designed for teenagers whose lives have been affected by alcoholism in the family. As

we mentioned earlier, there are also groups for adult children of alcoholics, which focus on the psychological problems that result from growing up in a family with an alcoholic parent. There are currently 30,000 Al-Anon and Alateen groups existing in 112 countries (<http://www.al-anon.alateen.org/helppro.html>).

Millions of people credit AA for their sobriety; in addition, proponents of AA cite glowing outcome figures, which, if correct, would make it the most successful approach to treating alcohol dependence. According to AA, the average length of abstinence is slightly over 4 years; 29 percent have been abstinent for more than 5 years, 38 percent from 1 to 5 years, and 33 percent for less than a year. A recent study confirmed that AA participation causes subsequent decreases in drinking and related problems and that comorbid psychiatric disorders do not necessarily change the relationship between AA involvement and alcohol problems (McKellar et al., 2003).

What lessons can researchers and clinicians learn from AA? We can see from the elements involved in this program that AA has much in common with a cognitive-behavioral approach. AA encourages the alcohol-dependent individual to avoid self-blame for failures and to develop alternative coping skills, features shared with the expectancy model that may also enhance the outcome of AA (Morgenstern et al., 1997). Similarly, AA encourages the individual to use coping skills that rely on seeking help from outside the self rather than from within. Both approaches, however, share the element of recommending continued contact with the treatment provider. They also include an emphasis on social support, one of the most striking elements in the AA model (National Institute on Alcohol Abuse [NIAA], 2000). All alcohol treatment programs, however, share the major limitation of appealing to and being effective with only those who are motivated to change. Without that motivation, neither medication nor the most elaborate psychological treatment strategy will have a lasting impact.

Substances Other Than Alcohol

Various substances other than alcohol have the potential for abuse and dependence. In the following sections, we will review the major categories of substances and examine their effects on behavior and their mechanisms of action. Many of these drugs share features, however, in that they alter the neurons in an area of the brain involved in the regulation of pleasure or reward.

Dopamine is one of the major neurotransmitters involved in this pleasure pathway. The functions associated with dopamine in addition to the sensation of pleasure include motor activity, awareness, judgment, and motivation. A circuit of dopamine-producing neurons located at the top of the brainstem in an area called the ventral tegmental area (VTA) plays a particularly important role in regulating the sensation of pleasure (see Figure 13.3).

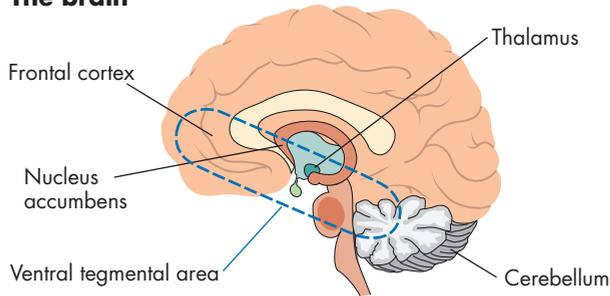
These neurons relay messages about pleasure to neurons in a structure within the limbic system called the nucleus

accumbens. They also project to the frontal cortex. This entire circuit is known as the mesolimbic dopamine system. It is thought to play a role in survival, in that the sensation of pleasure associated with such activities as eating and sexual arousal helps ensure that organisms engage in activities that maintain life and perpetuate the species.

Psychoactive drugs seem to activate the mesolimbic dopamine system. Substances such as heroin and LSD mimic the effects of a natural neurotransmitter on the neurons in the brain's pleasure center. Others, such as PCP, block the synaptic receptors and, consequently, interfere with normal transmission. Such drugs as cocaine interfere with the molecules responsible for ensuring that dopamine is absorbed from the synapse back to the neurons that released them. Drugs such as methamphetamine stimulate the excess release of neurotransmitters, resulting in heightened stimulation and arousal. Thus, many drugs with abuse potential become addictive by virtue of their actions on the dopamine system in the mesolimbic pathway, even though each drug may operate according to a different mechanism.

Over a prolonged period of time, the constant use of one of these substances produces permanent changes in the brain. If the substance is not present in the individual's nervous system, the neurons change their functioning. For example, in the case of cocaine, dopamine accumulates in the synapses because cocaine blocks the reabsorption of dopamine by the presynaptic neurons. As the dopamine accumulates, the neurons with dopamine receptors decrease the number of receptors they produce, a process called "down regulation." If the individual stops taking cocaine, dopamine levels eventually return to normal, but now there are fewer dopamine receptors available to be stimulated. The individual experiences this state as a craving for higher levels of dopamine, leading to a desire for more cocaine. Another change that occurs in the brain is the destruction of neurons as a result of long-term or heavy substance use.

In attempting to understand the role of biology in drug dependence, researchers have searched for genes that control levels of dopamine, the neurotransmitter thought to play a primary role in the brain's response to drugs. For various reasons, researchers must rely on evidence from animal models. One approach involves removing a specific gene in mice and observing the results (these mice are appropriately called "knockout" mice). Such a manipulation was performed on the gene for a protein called Nurr1. When this happened, the mice failed to generate neurons containing dopamine in the midbrain area involved in the brain's pleasure circuit. One effect of such a manipulation was that the mice continued to have reduced dopamine levels into adulthood (Zetterstrom et al., 1997). If this result is generalized to humans, it would mean that such an abnormality may cause a craving for drugs to counteract the dopamine deficiency. A second approach involves studying the response to drugs among inbred mice with identical genetic makeups. Using this strategy, researchers have found differences among these mice strains in their responses to drugs, with some strains refusing most drugs and others showing preferences for many drugs of abuse (Crabbe, Gallagher, Cross, & Belknap, 1998; Grisel et al., 1997).

The brain

Addicts become accustomed to high levels of dopamine, which plays an important role in the regulation of pleasure. Dopamine is manufactured in nerve cells within the ventral tegmental area and is released in the nucleus accumbens and the frontal cortex.

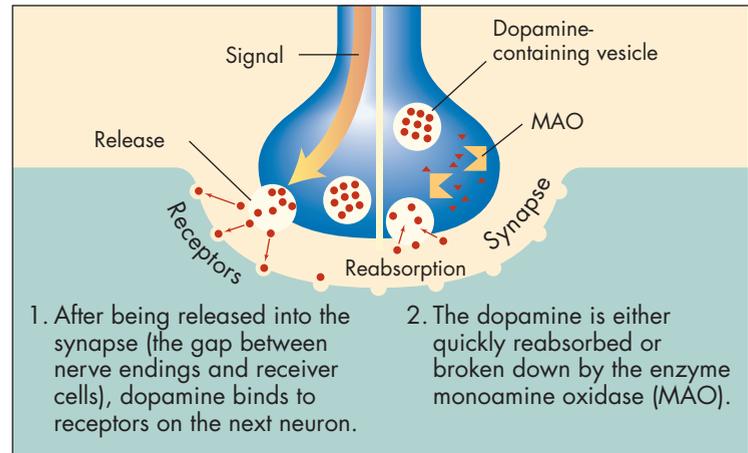
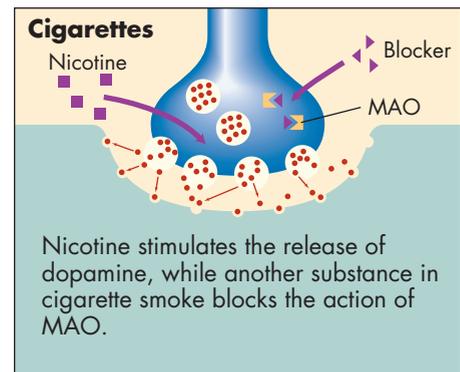
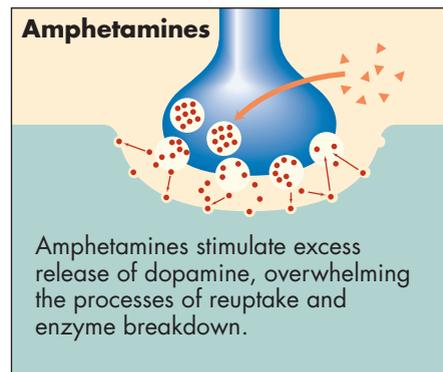
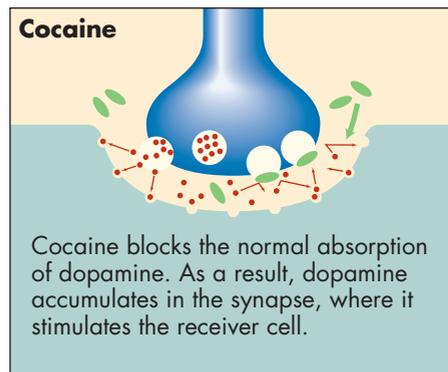
Dopamine's normal action**How drugs affect dopamine levels**

FIGURE 13.3 Normal action of dopamine Dopamine is released into the synapse and binds to receptors on the postsynaptic neuron. The dopamine is either reabsorbed or broken down by monoamine oxidase (MAO).

Among humans, the situation is obviously far more complicated. However, some progress has been made by comparing the DNA of people who abuse drugs with the DNA of people who do not. This method has resulted in the identification of a gene that leads to the production of the COMT enzyme (catechol-o-methyl-transferase). This enzyme, found throughout the body, is involved in breaking down and inactivating dopamine. The version of the gene that produces higher levels of COMT is found more often in individuals who are drug abusers (Vandenberg et al., 1997). In another approach, researchers investigated the role of subjective responses to drugs. In an unusual study of subjective responses to marijuana in identical twins and fraternal twins, researchers found that identical twin pairs were more likely than fraternal twin pairs to have similar reactions to the drug, a finding that supports the notion that there is a genetic component involved in the ways people experience the effects of drugs (Lyons et al., 1997).

Clearly, more research on humans is needed to understand the contribution of genetic factors to drug abuse and dependence. Furthermore, in humans, as compared with mice, learning and environmental factors are important contributors that add to whatever genetic vulnerabilities may exist. For example, in one comprehensive long-term study of more than 650 teenagers, the use of alcohol, cigarettes, and marijuana

was tracked. Various factors were found to be powerful influences associated with increased substance use; these factors included the failure of parents to monitor their children, conflict between parents and children, academic failure, and the influential behavior of their peers (Duncan, Duncan, Biglan, & Ary, 1998).

Current treatment programs rely heavily on psychosocial factors (in conjunction with medical treatments), but, in the future, treatment based on insights gained from genetic research may also hold important potential for curbing the cravings that initially predispose an individual to a life of drug dependence (Crawley et al., 1997).

Stimulants

You have perhaps on occasion wished you could be more alert and energetic. You may have sought a “pick-me-up,” such as a cup of coffee. Caffeine is just one substance in a category of drugs called **stimulants**—substances that have an activating effect on the nervous system. The stimulants associated with psychological disorders are amphetamines, cocaine, and caffeine. These differ in their chemical structure, their specific physical and psychological effects, and their potential danger to the user. In the following sections, we will discuss the major stimulant drugs.

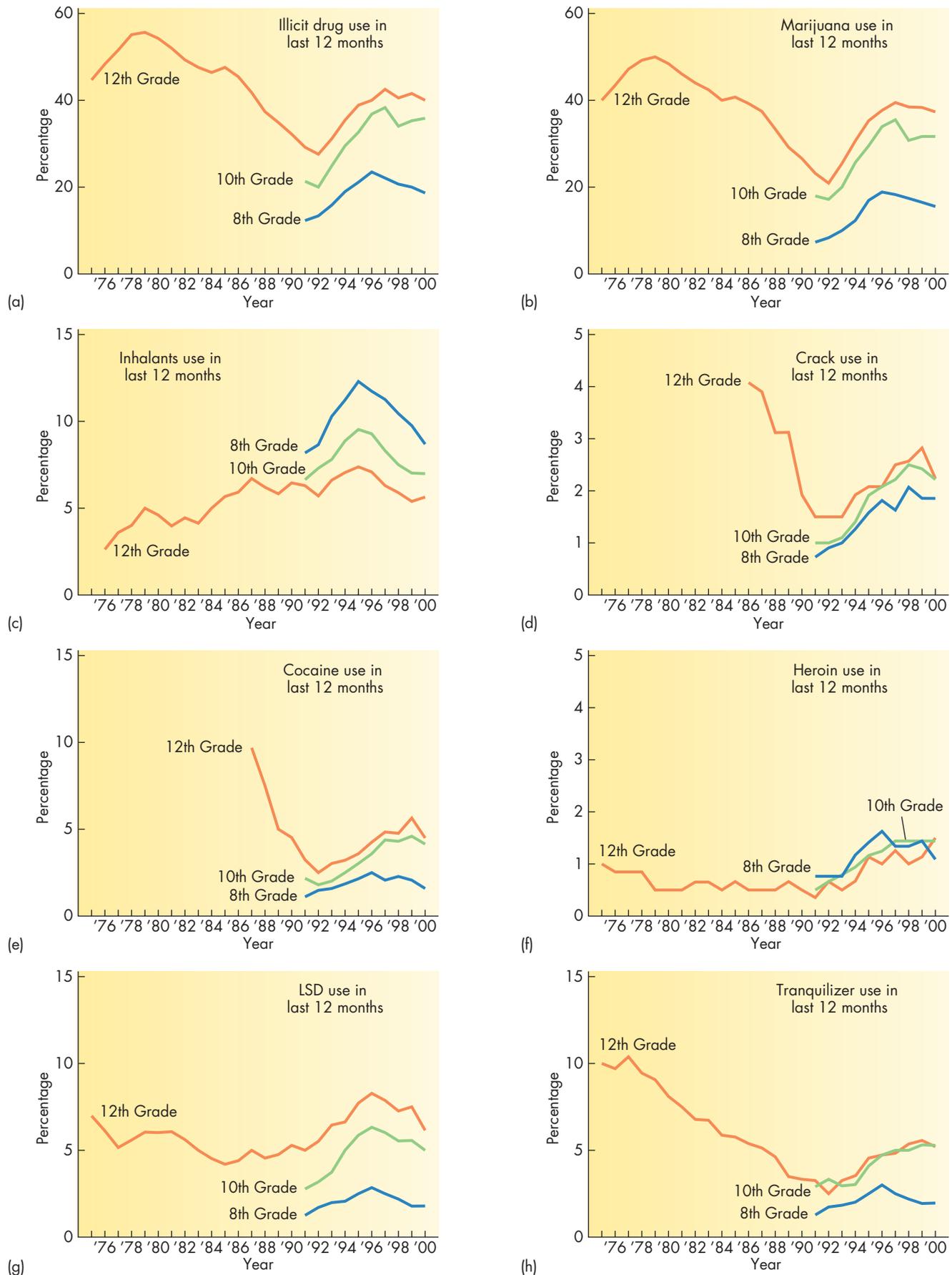


FIGURE 13.4 The Monitoring the Future study Trends in annual prevalence of illicit drug use. (Note differences in the range of each scale.)



Mini Case

Amphetamine Dependence

Catherine is a 23-year-old salesperson who tried for 3 years to lose weight. Her physician prescribed amphetamines but cautioned her about the possibility that she might become dependent on them. She did begin to lose weight, but she also discovered that she liked the extra energy and good feelings caused by the diet pills. When Catherine returned to her doctor after having lost the desired weight, she asked him for a refill of her prescription to help her maintain her new figure. When he refused, Catherine asked around among her friends until she found the name of a physician who was willing to accommodate her wishes for ongoing refills of the prescription. Over the course of a year, Catherine has developed a number of psychological problems, including depression, paranoid thinking, and irritability. Despite the fact that she realizes that something is wrong, she feels driven to continue using the drug.

- Why would Catherine be regarded as dependent on amphetamines?
- What kind of personality traits would you expect to find in a person who has such limited control over both eating behavior and substance dependence?

Diagnostic Features

- ◆ During a 12-month period, people with amphetamine dependence show at least three of the following:
 - Tolerance
 - Withdrawal
 - Use of amphetamines in larger amounts or over a longer period than intended
 - Persistent desire or unsuccessful efforts to cut down or control amphetamine use
 - Extensive time devoted to activities involved in obtaining, using, or recovering from amphetamine use
 - A giving up of or reduction in important activities because of amphetamine use
 - Continued use despite knowledge of an amphetamine-caused physical or psychological problem

AMPHETAMINES Amphetamines are stimulants, or “uppers,” that cause a range of effects, depending on the amount, method, and duration of use, as well as the specific form of the drug that is taken. In moderate amounts taken orally, amphetamines and related drugs cause euphoria, increased confidence, talkativeness, and energy. When taken intravenously, amphetamines have more powerful effects. Immediately after injection, the user feels a surge, or “rush,” of extremely pleasurable sensations that some describe as similar to orgasm. A smokeable methamphetamine called “ice” (because of its crystalline appearance) is a highly addictive and toxic amphetamine.

One reason amphetamines become a problem for users is that people quickly build up tolerance. For example, people who use them for dieting find that, after a certain period (as brief as 4 to 6 weeks), they must use higher doses to maintain the same appetite suppressant effect. At that point, they have become dependent on the drug’s mood-altering results. Tolerance to amphetamines also extends to psychological effects. In order to achieve the same “high,” long-term users must take greater doses of the drug. A debate exists about whether amphetamines cause physical dependence, but most researchers agree that these drugs are psychologically addictive.

Although an overdose of amphetamines rarely results in death, many medical problems can occur, such as stroke, heart irregularity, kidney failure, temporary paralysis, circulatory collapse, seizures, and even coma. Some users develop psy-

chotic symptoms, including delusions, hallucinations, or profound mood disturbance. Paranoid delusions may develop, as well as tactile hallucinations, such as feeling that bugs are crawling on the skin. People in this state may have little control over their behavior; feeling terrified or out of control, they may act in violent or self-destructive ways.

When people discontinue amphetamines after heavy usage, they exhibit withdrawal symptoms, called “crashing,” that include profound depression, extreme hunger, craving for the drug, exhaustion, and disturbed sleep. These symptoms can last for 2 weeks or more, and some residual problems may last for a year.

There are two principal routes to amphetamine dependence: medical abuse and street abuse. In medical abuse, the individual begins taking amphetamines for a medical reason, such as to reduce weight or to treat fatigue, increasing the dose as tolerance develops and obtaining the drug by seeking multiple or refillable prescriptions. Efforts to stop taking the drug result in an increase of the symptoms it was intended to reduce, leading the individual to increase dosages to harmful levels. Because of these worrisome effects, physicians are reluctant to prescribe these medications. Street abusers take amphetamines deliberately to alter their state of consciousness, perhaps in alternation with depressants. An even more dangerous mode of amphetamine use involves taking the drug in “runs” of continuous ingestion for 2 to 4 days, a pattern that often results in withdrawal and psychosis.

COCAINE Cocaine became the drug of choice for recreational users during the 1980s and spread to every segment of the population. The widespread availability of **crack cocaine**, a crystallized, inexpensive form of street cocaine that is usually smoked, has added to the problem.

Cocaine has a fascinating history that dates back thousands of years. In the United States, its popular use can be traced to the late 1800s, when it was marketed as a cure for everything from fatigue to malaria. A major pharmaceutical company, Parke-Davis, sold tablets, sprays, and cigarettes that contained cocaine. Coca-Cola was developed in the 1880s, and its stimulating mixture of cocaine and caffeine made it a popular beverage. The cocaine was eliminated from Coca-Cola in 1905.

In the early 1900s, as the use of cocaine continued to spread, authorities in medicine and government began to question the medicinal value of the drug and the harm it could cause. Reports of addiction, death, and associated crime circulated throughout the United States, resulting in legislation prohibiting the interstate shipment of cocaine-containing products. Government controls continued to tighten on the distribution of cocaine for medicinal purposes until it was banned. The drug then became so expensive and difficult to obtain that its use sharply declined for several decades.

During the 1960s and 1970s, a resurgence of cocaine use occurred, because the drug became inaccurately perceived once again as relatively harmless. When crack cocaine became available in the 1980s, a new set of social problems developed that continues today. A significant proportion of the population struggles with cocaine dependence. According to the National Household Survey (SAMHSA, 2003), approximately 2 million Americans 12 years and older (0.9 percent of the population)



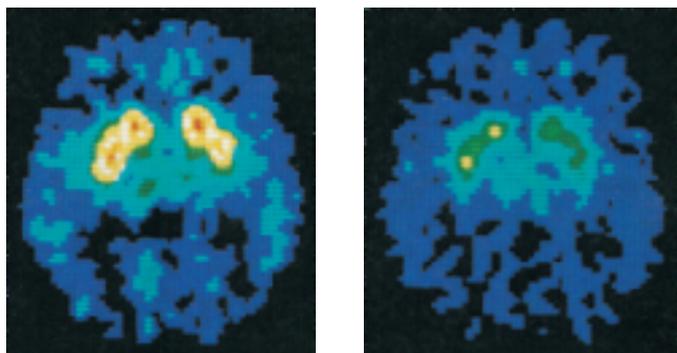
are cocaine users, meaning that they use cocaine at least once per month. Of these cocaine users, about 567,000 use crack. The highest rate of cocaine use is among the 18 to 25 age group. No longer is cocaine viewed as an innocuous recreational drug; rather, cocaine is now implicated in various social problems, such as increased crime committed by drug-dependent individuals and/or the neglect and abuse of children by parents who are incapacitated. It is estimated that about half a million “crack” babies are born prematurely to crack-addicted mothers.

Compared with amphetamines, the stimulating effects of cocaine last for a shorter period of time but are much more intense. Users experience the strongest effects within the first

TABLE 13.4 Sample Items from the Cocaine Abuse Assessment Profile: Addiction/Dependency Self-Test

Each item receives a “yes” or “no” answer; a “yes” counts toward a positive cocaine abuse score.

1. Do you tend to use whatever supplies of cocaine you have on hand, even though you try to save some for another time?
2. Do you go on cocaine binges for 24 hours or longer?
3. Do you need to be high on cocaine in order to have a good time?
4. Does the sight, thought, or mention of cocaine trigger urges and cravings for the drug?
5. Do you feel guilty and ashamed of using cocaine and like yourself less for doing it?
6. Have your values and priorities been distorted by cocaine use?
7. Do you tend to spend time with certain people or go to certain places because you know that cocaine will be available?
8. Do you hide your cocaine use from “straight” friends or family because you’re afraid of their reactions?
9. Have you become less involved in your job or career due to cocaine use?
10. Do you worry about whether you are capable of living a normal and satisfying life without cocaine?



Following the prolonged use of cocaine, nerve endings deaden in the brain's system of pleasure regulation. A brain scan (*right*) provides a graphic image of the drop in the number of functioning dopamine receptors.

10 minutes after administration, and these effects quickly subside. In moderate doses, cocaine leads to feelings of euphoria, sexual excitement, potency, energy, and talkativeness. At higher doses, users may experience psychotic symptoms; for example, they may become delusional, hallucinate, and feel confused, suspicious, and agitated. Their paranoid delusions tend to include suspicions that the police or drug dealers are about to apprehend them or that others who are nearby plan to attack them and steal their cocaine. They may have illusory experiences, perhaps misinterpreting an unexplained noise or misperceiving an object in ways that coincide with their delusional thinking. They may also hallucinate that bugs or foreign objects are on their skin and try desperately to scratch off these objects. Violence is a common part of the scenario; these people may become dangerously out of control and lash out at others, including those who are closest to them.

Needless to say, the psychotic-like states that result from cocaine use are distressing and even terrifying. When the effects of cocaine wear off, the user “comes down,” or “crashes,” experiencing a depressed mood, sleep disturbance, agitation, craving, and fatigue. Chronic heavy users experience these symptoms intensely for up to 3 or 4 days, and for a month afterward they may still feel some effects of withdrawal.

In addition to its powerful, addictive effects, cocaine poses a significant danger to a person's vital functions of breathing and blood circulation. The risks associated with cocaine are the result of the drug's actions as a local anesthetic and as a stimulant to the central nervous system and sympathetic nervous system. Cocaine simultaneously increases the sympathetic nervous system stimulation to the heart and anesthetizes the heart muscle, so that it is less able to contract and pump blood. During a binge, the individual seeks an ever greater high by taking in more and more cocaine, leading to higher and higher blood levels of the drug. At such levels, the pumping of the heart becomes impaired, and it becomes unable to contract to force blood into the arteries. Also, high blood levels of cocaine have a paradoxical effect on the way it is eliminated from the blood. Rather than being eliminated in higher amounts, as you might expect, the elimination rate actually is reduced, further contributing to a rise in cocaine blood levels. Other calamitous

changes in the heart also occur during a binge: oxygen can be cut off to the heart muscle, further impairing its ability to contract, and changes in the heart's electrophysiological functioning lead to irregular rhythms. Cocaine may also produce the effect of kindling, through which the user develops convulsions, because the brain's threshold for seizures has been lowered by repeated exposure to cocaine.

CAFFEINE Caffeine is a drug that has been used or at least tried by virtually everyone. In fact, most Americans ingest caffeine daily, either in coffee, tea, chocolate candy, or caffeinated soft drinks. It is also an ingredient in many prescription and nonprescription medications, including headache remedies and diet pills.

Although people may not think of caffeine as a substance of abuse, it is in the category of psychoactive drugs. Caffeine's effect on mood and alertness occurs through its activation of the sympathetic nervous system. Even half a cup of coffee can bring about slight improvements in mood, alertness, and clarity of thought; however, as the amount of caffeine ingested on one occasion increases (up to three to four cups of coffee), more symptoms of anxiety and irritability similar to those seen in amphetamine use begin to appear. After four to six cups of coffee, an individual can develop symptoms that resemble those of a panic attack and may experience overstimulation, anxiety, dizziness, ringing in the ears, feelings of unreality, visual hallucinations, and confusion. People who are susceptible to panic attacks may experience these symptoms even after consuming relatively small amounts of caffeine.

Unlike other substance-related disorders, it is uncommon for people to consult clinicians because of problems associated with caffeine intake. However, sometimes people seek help because they are experiencing some disturbing symptoms, not realizing the possibility that caffeine might cause them. The diagnosis of caffeine intoxication is assigned when the individual is distressed or functionally impaired and experiences a set of at least five symptoms following caffeine ingestion. These symptoms include restlessness, nervousness, excitement, insomnia, flushed face, frequent urination, stomach disturbance, muscle twitching, rambling thoughts, heartbeat irregularity, periods of inexhaustible energy, and psychomotor agitation. In some cases, caffeine can cause symptoms similar to those of anxiety disorders and sleep disorders. When this occurs, the clinician assigns the diagnosis of caffeine-induced anxiety disorder or caffeine-induced sleep disorder.

You might think that only large quantities of caffeine at one time can bring on physical symptoms, but, in fact, the regular consumption of two to three cups a day can cause the symptoms of intoxication. A person who drinks up to six cups of coffee a day on a regular basis may develop delirium. Over the course of years of such heavy consumption, the individual may develop such medical conditions as high blood pressure, rapid and irregular heartbeat, increased respiration rate, and peptic ulcers.

If we know caffeine has so many negative physical and psychological effects, why do people consume it regularly? Part of the reason that many people continue to consume caf-



Mini Case

Caffeine Intoxication

Carla is a 19-year-old college sophomore who felt compelled to excel at every endeavor and to become involved in as many activities as time and energy would permit. As her commitments increased and her studies became more burdensome, Carla became more and more reliant on coffee, soda, and over-the-counter stimulants to reduce her need for sleep. During final examination week, Carla overdid it. For 3 days straight, she consumed approximately 10 cups of coffee a day, along with a box of No-Doz. In addition to her bodily symptoms of restlessness, twitching muscles, flushed face, stomach disturbance, and heart irregularities, Carla began to ramble when she spoke. At first, Carla thought she was having a heart attack, or possibly an anxiety attack associated with her final exams. At her roommate's insistence, Carla went to the health service, where the treating physician recognized her condition as caffeine intoxication.

- How do you think Carla's state of worry about exams contributed to her intense reaction to caffeine?
- What physical symptoms helped Carla's physician realize that she was in a state of caffeine intoxication?

Diagnostic Features

- ◆ This condition, which follows recent consumption in excess of 250 mg of caffeine (more than two or three cups of brewed coffee), causes significant impairment or distress, as evidenced by at least five of the following:
 - Restlessness
 - Nervousness
 - Excitement
 - Insomnia
 - Flushed face
 - Frequent urination
 - Gastrointestinal disturbance
 - Muscle twitching
 - Rambling speech
 - Rapid or irregular heart rate
 - Periods of inexhaustibility
 - Psychomotor agitation

feine is that they experience unpleasant withdrawal symptoms when they stop, such as headache, decreased arousal, fatigue, anxiety, nausea, muscle tension, and irritability (Hughes et al., 1992).

Cannabis

Marijuana (also called “grass,” “pot,” and “weed”) is the most widely used illegal drug in the country. Close to one third of all Americans over the age of 12 have tried marijuana (Substance Abuse and Mental Health Services Administration, 1994); of these, more than one fifth have used it more than 100 times.

Two factors seem to be of central importance in accounting for the relative popularity of marijuana. First, only 40 percent of the Americans surveyed by the National Institute of Drug Abuse regard trying marijuana as harmful—a far smaller number than those who perceive cocaine use to be risky. Among high school seniors, marijuana has the lowest perceived risk of all illegal drugs. Second, marijuana is the most widely available illegal drug, and it is perceived as easily available, as indicated by the fact that 89 percent of high school seniors regard this drug as relatively easy to obtain (Johnson, O'Malley, & Bachman, 2001).

Marijuana has been used for more than 4,000 years in many cultures throughout the world. The active drug in marijuana, delta-9-tetrahydrocannabinol (THC), comes from cannabis sativa, a tall, leafy, green plant that thrives in warm climates. The more sunlight the plant receives, the higher the percentage of active THC it produces. Marijuana comes from

the dried leaves of the plant, and hashish, containing a more potent form of THC, comes from the resins of the plant's flowers. The marijuana or hashish that reaches the street is never pure THC; other substances, such as tobacco, are always mixed in with it. Synthetic forms of THC are used for medicinal purposes, such as treating asthma and glaucoma and reducing nausea in cancer patients undergoing chemotherapy.



Some young people feel that they can achieve social acceptance by agreeing with those who pressure them to try drugs. Researchers have found that marijuana users are much more likely to abuse other substances as well.



Mini Case

Cannabis (Marijuana) Dependence

Gary, a 22-year-old man, has lived with his parents since dropping out of college 3 years ago, midway through his freshman year. Gary was an average student in high school and, although popular, was not involved in many extracurricular activities. When he entered college, Gary became interested in the enticing opportunities for new experiences, and he began to smoke marijuana casually with his roommates. However, unlike his roommates, who limited their smoking to parties, Gary found that a nightly “hit” helped him relax. He started to rationalize that it also helped him study, because his thinking was more creative. As his first semester went by, he gradually lost interest in his studies, preferring to stay in his room and listen to music while getting high. He realized that it was easy to support his habit by selling marijuana to other people in the dorm. Although he convinced himself that he was not really a dealer, Gary became one of the primary suppliers of marijuana on campus. When he received his first-semester grades, he did not feel particularly discouraged about the fact that he had flunked out. Rather, he felt that he could benefit from having more time to himself. He moved home and became friendly with some local teenagers who frequented a nearby park and shared drugs there. Gary’s parents have all but given up on him, having become deeply discouraged by his laziness and unproductivity. They know that he is using drugs, but they feel helpless in their efforts to get

him to seek professional help. They have learned that it is better to avoid discussing the matter with Gary, because violent arguments always ensue.

- In what ways was Gary’s development of a problem with cannabis influenced by the college environment?
- What advice would you give Gary’s parents to help them cope with the situation?

Diagnostic Features

- ◆ During a 12-month period, people with cannabis dependence show at least three of the following:
 - Tolerance
 - Withdrawal
 - Use of cannabis in larger amounts or over a longer period than intended
 - Persistent desire or unsuccessful efforts to cut down or control cannabis use
 - Extensive time devoted to activities involved in obtaining, using, or recovering from cannabis use
 - A giving up of or reduction in important activities because of cannabis use
 - Continued use despite knowledge of a cannabis-caused physical or psychological problem

The most common way to take marijuana is to smoke it, but it can also be eaten or injected intravenously. When a person smokes marijuana, the peak blood levels are reached in about 10 minutes, but the subjective effects of the drug do not become apparent for another 20 to 30 minutes. The effects of intoxication last for 2 to 3 hours, but the metabolites of THC may remain in the body for 8 or more days.

People take marijuana in order to alter their perceptions of their environment and their bodily sensations. The desired effects include relaxation, a heightened sense of sensuality and sexuality, and an increased awareness of internal and external stimuli. However, a number of maladaptive behavioral and psychological changes may occur, including impaired coordination, increased anxiety, the sensation of slowed time, impaired judgment, and social withdrawal. Other disturbing conditions, including delirium, cannabis-induced anxiety disorder, and cannabis-induced psychotic disorder, may also develop. Bodily changes associated with marijuana use include watery eyes, increased appetite, dry mouth, and faster heart rate. The quality and intensity of the experience depend on the purity and form of the drug, on how much is ingested, and on what the user’s expectations are about the drug’s effects.

Most of the acute effects of cannabis intoxication are reversible, but, when marijuana is taken over long periods, abuse is likely to lead to dependence and to have a number of

adverse effects on a person’s bodily functioning and psychological stability. Nasal and respiratory problems, such as those encountered by tobacco smokers, can develop, including chronic sinus inflammation, bronchial constriction, breathing difficulty, and loss of lung capacity. After years of heavy marijuana use, as with all forms of smoking, the risk of cancer and cardiovascular disease increases. Marijuana can also have negative effects on immunological and reproductive functioning. Men who use the drug regularly have a lower sperm count and are more likely to produce defective sperm, and women may experience delayed ovulation.

There is considerable controversy over the psychological effects of long-term use, but in one carefully controlled study the findings were fairly clear. Among college students who were considered “heavy” users (smoking marijuana approximately 29 out of 30 days), a variety of abnormalities were apparent in neuropsychological testing conducted 24 hours after their last drug use. Compared with the “light” users (who smoked 1 day of the past 30), the heavy users showed cognitive deficits in the areas of attention, memory, and learning (Pope & Yurgelun-Todd, 1996). The heavy users found it more difficult to sustain and shift attention, and they were less able to store information into memory. These findings are in agreement with those of others on adults showing deficits in mathematical skills, verbal expression, and memory retrieval (Block & Ghoneim, 1993).

Hallucinogens

Hallucinogens are drugs that cause abnormal perceptual experiences in the form of illusions or hallucinations, which are usually visual. Hallucinogen intoxication causes maladaptive behavioral and psychological changes, such as anxiety, depression, ideas of reference, the fear of losing one's mind, paranoid thinking, and generally impaired functioning. Also prominent are perceptual changes, such as the intensification of perceptions, feelings of depersonalization, hallucinations, and illusions. Physiological responses include dilation of the pupils, increased heart rate, sweating, heart palpitations, blurred vision, tremors, and uncoordination. For some individuals, the reaction is especially severe and may cause hallucinogen-induced disorders, including delirium, psychotic disorder, mood disorder, and anxiety disorder.

Hallucinogens come in a number of forms, both naturally occurring and synthetic. The most frequently used hallucinogens are lysergic acid diethylamide (LSD), psilocybin (found in hallucinogenic mushrooms), dimethyltryptamine (DMT), mescaline (peyote), dimethoxymethylamphetamine (DOM or STP, which stands for “serenity, tranquility, and peace”), methylene dioxymethylamphetamine (MDMA), and phencyclidine (PCP).

LSD was discovered in a pharmaceutical laboratory in the late 1930s, when a scientist named Albert Hofmann was working with a fungus that was accidentally absorbed into his skin, causing him to have an hallucinogenic experience. A few days after this experience, he thought he would take a small amount to study the effects. This “small” amount was actually many times larger than what is now known to be a sufficient dose to trigger hallucinations, and Hofmann experienced intense and frightening effects. For example, he reported thinking that he was losing his mind, that he was outside his own body, and



LSD is often eaten in the form of drug-impregnated paper known as “blotter acid.”

that time was standing still. Everything around him seemed distorted, and he became terrified of what he saw—experiences now known to be typical effects of LSD ingestion. As reports of this powerful drug spread through the scientific community, researchers wondered whether LSD could be used to understand the symptoms of schizophrenia, which the drug seemed to mimic. This gave rise to a new theory of schizophrenia, but researchers later determined that the LSD actions are quite



Mini Case

Hallucinogen Dependence (LSD)

Candace is a 45-year-old artist who has used LSD for a number of years, because she feels that doing so enhances her paintings and makes them more visually exciting. Although she claims to know how much LSD she can handle, she is occasionally caught off guard and experiences disturbing side effects. She begins sweating, has blurred vision, is uncoordinated, and shakes all over. She commonly becomes paranoid and anxious, and she may act in strange ways, such as running out of her studio and into the street, ranting incoherently. On more than one occasion, she has been picked up by the police and taken to an emergency room, where she was given antipsychotic medication.

- What aspect of Candace's use of LSD points to a diagnosis of hallucinogen dependence?
- What hazards does Candace face from her long-term use of LSD?

Diagnostic Features

- ◆ During a 12-month period, people with hallucinogen dependence show at least three of the following:
 - Tolerance
 - Withdrawal
 - Use of hallucinogens in larger amounts or over a longer period than intended
 - Persistent desire or unsuccessful efforts to cut down or control hallucinogen use
 - Extensive time devoted to activities involved in obtaining, using, or recovering from hallucinogen use
 - A giving up of or reduction in important activities because of hallucinogen use
 - Continued use despite knowledge of a hallucinogen-caused physical or psychological problem



RESEARCH FOCUS

HOW DANGEROUS IS ECSTASY?

In recent years, there has been a dramatic surge in the use of the drug MDMA—whose street name is Ecstasy and chemical name is 3,4-methylenedioxymethamphetamine—particularly among young people. Experts in the field of substance abuse have responded with considerable alarm to prevalent misconceptions about this drug and the increase in use among the many grade school and high school youth who consider Ecstasy to be a harmless recreational substance that livens up parties. In addition to the easy availability of MDMA at raves and dance parties, young people have access to the drug in various social settings frequented by young adults, adolescents, and even children. The statistics are striking (see Figure 1). For example, in one survey assessing MDMA usage during the month preceding the study in 2000, approximately 8 percent of 12th-graders had taken the drug, 5 percent of 10th-graders, and 3 percent of 8th-graders (Johnston et al., 2001). Highlighting the risk associated with the use of MDMA is the rising number of emergency room admissions in which MDMA is implicated. In 1994, MDMA was implicated in 253 emergency room procedures, but by 2000 the number had risen to 4,511.

MDMA is an illegal synthetic drug that is manufactured in a capsule or tablet, and is most commonly ingested orally. The effects of the drug last 3 to 6 hours, depending on the dosage, with peak effects usually achieved within an hour. The sensations caused by the drug are variable and are influenced by the presence of other mind-altering agents commonly mixed with the MDMA.

MDMA is especially popular because of its appealing physical and psychological effects. Users refer to Ecstasy as the “hug drug” or “love drug” because it gives them a mellow glow and feelings of physical and emotional warmth; it also sparks a surge in energy that enables all-night dancing. The good

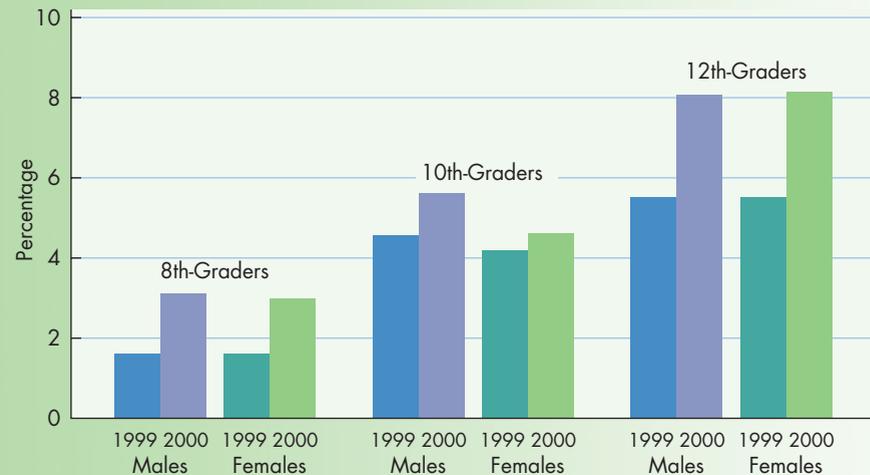


FIGURE 1 Percentage of 8th-, 10th-, 12th-Graders Reporting MDMA (Ecstasy) Use. Past-month use of MDMA increased for all teenagers from 1999 to 2000. *Source:* From NIDA Notes, National Institute on Drug Abuse, Vol. 16, No. 2, p. 7. *Source:* L. D. Johnston, P. M. O'Malley, J. G. Bachman (2001), “Monitoring the Figure National Survey Results in Drug Abuse, 1975–2000, Vol. 1: Secondary School Students (NIH Publication No. 01-4942). National Institute on Drug Abuse.

Effect of MDMA Administration on rCBF

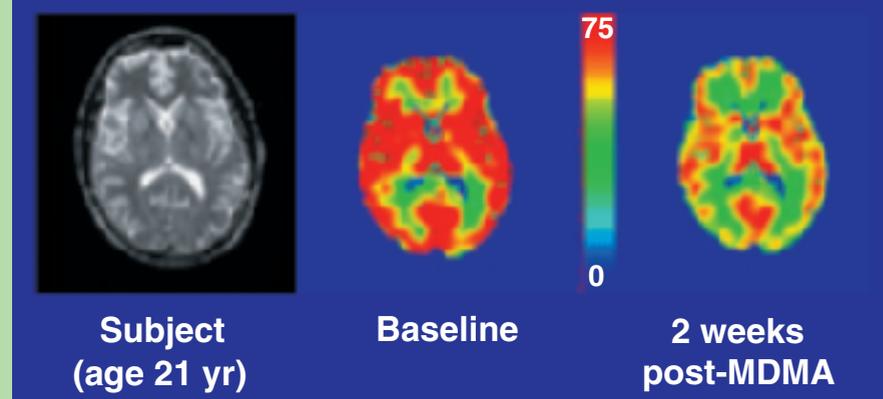


FIGURE 2 Regional cerebral blood flow.

Source: L. Chang, et al., *Psychiatry*
Research: Neuroimaging, Section 98, pp. 15–28, 2000

feelings don't last very long, and the drug can provoke serious medical complications. Because MDMA causes bodily temperature to rise, often in an already heated environment, users can end up in the emergency room suffering from hyperthermia and even convulsions.

The consequences can be fatal due to the body's inability to thermally regulate itself (Kalant, 2001).

MDMA increases the activity levels of serotonin, dopamine, and norepinephrine and causes these substances to be released from their neuronal

RESEARCH FOCUS

HOW DANGEROUS IS ECSTASY? *(continued)*

storage sites, resulting in increased brain activity. As you have read, serotonin plays a prominent role in the regulation of mood, sleep, pain, and appetite. The release of large amounts of serotonin causes a significant depletion of this neurotransmitter in the brain; it then takes some time for these neurotransmitters to be restored in the brain. When individuals take moderate to high doses of MDMA, serotonin depletion can be longlasting and result in abnormal behavioral effects.

Researchers studying the effects of MDMA in rats have found unequivocal evidence that it is a neurotoxic substance that causes brain cell damage. Investigations using innovative brain imaging technology (Chang et al., 2000) and neurocognitive assessment have been

initiated to determine the effects on the human brain. The research findings are indeed dramatic. For example, brain images have highlighted how the brains of MDMA users differ from the brains of people who have never used the drug. It is clear the MDMA affects cerebral blood flow (see Figure 2) and that MDMA users may have fewer serotonin-producing neuronal processes than non-users have.

Reinforcing the conclusion that MDMA causes brain changes, researchers have consistently found that repeated MDMA use is associated with memory impairments (Bhattachary & Powell, 2001; Zakzanis & Young, 2001). In one study of individuals who had stopped using MDMA a year earlier, researchers found that the subjects still had verbal memory

deficits comparable to the deficits found in recent users of MDMA (Reneman et al., 2001). Furthermore, heavy and prolonged use is also linked to confusion, depression, sleep problems, persistent anxiety, aggression, and impulsivity. Experts in the field contend that it should come as no surprise that a powerful agent that changes brain functioning by altering neurotransmitters will have effects, not only during and immediately following ingestion, but well into the future. In fact, some investigators are initiating longitudinal research protocols to follow heavy MDMA users over the course of years to determine the extent to which cognitive impairments and mood disturbances persist throughout life.

different from those occurring in people with schizophrenia. Another theory was that LSD could break down the individual's ego defenses and thus make psychotherapy more effective. This theory was also abandoned, however. In the 1960s, LSD became the central component of a nationwide drug "culture" started by two former Harvard professors, Timothy Leary and Richard Alpert (Alpert now calls himself Baba Ram Dass). Many of the "flower children" of the 1960s celebrated the effects of LSD in art, music, and theater.

LSD is an extremely potent drug. After ingesting LSD, which is usually taken orally, the user experiences hallucinogen intoxication with dizziness, weakness, and various physiological changes that lead to euphoria and hallucinations. This experience can last from 4 to 12 hours, with the "high" depending on such factors as the dose, the individual's expectations, the user's prior drug experiences, the setting, and the person's psychiatric history. During the period of LSD intoxication (or "trip"), individuals risk engaging in bizarre, and even dangerous, behaviors. They may injure themselves, have an accident, or attempt to "fly" from a high place, for example.

Other hallucinogens differ from LSD in various ways, although they all stimulate visual and sometimes auditory hallucinations. Psilocybin (hallucinogenic mushrooms), in low doses, also produces relaxation and feelings of euphoria. PCP, also called "angel dust," "rocket fuel," and "purple," has very unpredictable effects when smoked. In low doses, it acts as a

depressant, and the user feels effects similar to alcohol intoxication. Larger doses cause distorted perceptions of the self and the environment, sometimes causing users to become aggressive and irrational, even violent. Unlike LSD, PCP can precipitate a temporary psychotic state, with symptoms that are virtually indistinguishable from those of schizophrenia. Through a combination of effects on the autonomic nervous system, PCP can also produce severely toxic, life-threatening effects, including coma, convulsions, and high blood pressure, progressing to severe brain damage with psychotic symptoms. Very disturbing cases have been reported of PCP users becoming so disoriented that they died as a result of accidental falls, drowning, or self-inflicted injuries.

Some people who use hallucinogens develop a condition called hallucinogen persisting perception disorder, in which they experience flashbacks or spontaneous hallucinations, delusions, or disturbances in mood similar to the changes that took place while they were intoxicated with the drug. Their perceptual experiences may include sights of geometric figures, flashes of color, halos around objects, and false perceptions of movement. Some people report that they can induce these experiences voluntarily, while others find that they occur spontaneously, possibly when they are stressed, are weary, are using another drug, or even entering a darkened room. These experiences can occur as long as 5 years after ingestion of the hallucinogen. For a discussion of the dangers of taking Ecstasy (MDMA), see the Research Focus box.

Heroin and Opioids

Opioids are drugs that include naturally occurring substances and semisynthetic and synthetic drugs. Morphine and opium are naturally occurring opioids derived from the opium poppy. Semisynthetic opioids, such as heroin, are produced by slight chemical alterations in the basic poppy drug. Heroin is the most abused of the opioids, and the most highly addictive. Most heroin sold on the street is in the form of powder that is mixed, or “cut,” with other drugs or other powdered substances. Although most users inject heroin directly into their bloodstream, increasingly users are sniffing or snorting the drug. There are also synthetic opioids, including methadone, codeine, and other manufactured drugs that have morphine-like effects. **Methadone** is prescribed to heroin-dependent individuals to help them get control over their addiction with a safer and more controlled reaction. Codeine is a commonly prescribed pain killer and cough suppressant.

In one recent survey, it was found that 3.6 million people in the United States used heroin at some time in their lives, and more than 166,000 people admitted to using heroin within the 30 days prior to the survey. And from 1995 to 2002, heroin use in youths aged 12 to 17 rose .3 percent and climbed 0.8 percent in young adults aged 18 to 25 (SAMHSA, 2003). One of the most disturbing features of these statistics on heroin use is the fact that drug overdoses are common. Yet it is important to note that heroin and the combination of other drugs and/or impurities are primarily responsible for overdoses, especially the combination of heroin and cocaine. The overdose rates due to multi-drug use suggest that public health interventions might benefit from discussing the risks associated with the combinations of drugs. And furthermore, findings demonstrate that different drug combinations vary with racial/ethnic backgrounds, which emphasizes the understanding of multi-drug

use for risk reduction efforts in different populations (Coffin et al., 2003).

Following its injection or inhalation, heroin reaches the brain, where it is converted to morphine and binds to opioid receptors. Its effects are perceived by the user as a “rush,” a feeling that varies according to the amount of drug taken in and the speed with which it binds to opioid receptors. Along with pleasurable feelings, however, the user also experiences a set of undesirable side effects, including warm flushing of the skin, dry mouth, a heavy feeling in the extremities,



The fatal drug overdose of comedian Chris Farley at the height of his career renewed public awareness of the danger involved in using drugs such as heroin.



Mini Case

Opioid Dependence (Heroin)

Jimmy is a 38-year-old homeless man who has been addicted to heroin for the past 10 years. He began to use the drug at the suggestion of a friend who told him it would help relieve the pressure Jimmy was feeling from his unhappy marriage and financial problems. In a short period of time, he became dependent on the drug and got involved in a theft ring in order to support his habit. Ultimately, he lost his home and moved to a shelter, where he was assigned to a methadone treatment program.

- What are the health risks associated with Jimmy’s heroin use?
- What do you think the prognosis is for Jimmy’s recovery?

Diagnostic Features

- ◆ During a 12-month period, people with heroin dependence show at least three of the following:
 - Tolerance
 - Withdrawal
 - Use of heroin in larger amounts or over a longer period than intended
 - Persistent desire or unsuccessful efforts to cut down or control heroin use
 - Extensive time devoted to activities involved in obtaining, using, or recovering from heroin use
 - A giving up of or reduction in important activities because of heroin use
 - Continued use despite knowledge of a heroin-caused physical or psychological problem

nausea, vomiting, and severe itching. Following these initial effects, there are residual psychological and physiological changes, including drowsiness, a clouding of cognitive functions, and a slowing of cardiac and respiratory functions, which can be fatal.

There are many undesirable long-term effects of heroin use, not the least of which is heroin dependence. People who suffer from heroin dependence compulsively seek the substance, as their life purpose becomes totally fixated on seeking and using the drug. In part, these behavioral effects result from changes in their brains, as their bodies adapt to the presence of the drug, and go through withdrawal if the drug supply is cut off. Withdrawal can occur anywhere from 6 to 24 hours after the last administration of heroin. The symptoms of withdrawal include restlessness, muscle and bone pain, insomnia, diarrhea, vomiting, cold flashes with goose bumps (“cold turkey”), and leg movements. These symptoms typically peak between 24 and 48 hours after the last dose and diminish after 7 days. However, for some people, withdrawal is a process that persists for many months. Oddly enough, addicted individuals may choose to go through withdrawal in an effort to reduce their tolerance for the drug, so that they can again experience the intense rush they feel when their bodies are exposed to it.

There are a number of additional long-term psychological and physical effects of heroin use. As with some of the other disorders discussed in this chapter, long-term heroin use can also induce other serious conditions, including delirium, psychotic disorder, mood disorder, sexual dysfunction, and sleep disorder. There are also serious physical effects, including scarred or collapsed veins, bacterial infections of blood vessels and heart valves, skin infections, and liver or kidney disease. The individual’s poor health condition and heroin’s negative effects on respiratory functioning can cause lung complications, including pneumonia and tuberculosis. In addition, the additives mixed into heroin include insoluble substances that can clog the major arteries in the body. Arthritis and other rheumatologic problems may occur as the result of immune reactions to these substances. Some of the most serious effects of heroin use come about as the result of sharing needles among heroin users. These effects include infections from hepatitis, HIV, and other viruses passed through the blood. The sexual partners and children of heroin users then become susceptible to these diseases (NIDA, 1997).

Sedatives, Hypnotics, and Anxiolytics

Sedatives, hypnotics, and anxiolytics (antianxiety medications) include a wide range of substances that induce relaxation, sleep, tranquility, and reduced awareness of the environment. They are brain depressants. All have medical value and are manufactured by pharmaceutical companies; therefore, they are not illegal. However, because these drugs have high potential for abuse, much tighter federal controls have been placed on them since the 1970s. The term **sedative** refers to a drug that has a calming effect on the central nervous system, and the term **hypnotic** refers to sleep-inducing qualities. Anxiolytics are antianxiety agents that induce a calmer mental state in the user.

Intoxication resulting from the use of these drugs involves maladaptive behavioral or psychological changes, such as inappropriate sexual or aggressive behavior, unstable mood, impaired judgment, and generally impaired functioning. Other changes include symptoms such as slurred speech, incoordination, unsteady walking, impaired attention and memory, and stupor or possibly coma. Withdrawal symptoms may include trembling, insomnia, nausea, sweating, psychomotor agitation, anxiety, transient illusions or hallucinations, and possibly even grand mal seizures. In severe cases, the use of this group of drugs can result in a range of induced disorders, such as mood, anxiety, sleep, and psychotic disorders.

BARBITURATES Barbiturates are widely prescribed medications that serve important medical functions as anesthetics and anticonvulsants. They were also once widely used to induce sleep, although such prescriptions are now unusual, due to public awareness about the dangers of these drugs. People who use these substances recreationally are seeking a dulling of consciousness similar to the effects of alcohol use. In low doses, these drugs give the individual both a feeling of calm and sedation and a sense of increased outgoingness, talkativeness, and euphoria. In higher doses, barbiturates induce sleep.

Barbiturate users find that they quickly become tolerant to these drugs and need larger and larger doses to achieve the desired effects, not realizing the hazards of such abuse, such as the risk of respiratory failure. Many users increase the risk of death by combining these drugs with alcohol, which potentiates the effects of barbiturates.

The barbiturates most frequently abused are ones whose effects persist for several hours, including secobarbital (Seconal), pentobarbital (Nembutal), amobarbital (Amytal), butabarbital (Butisol), and combinations of these substances, amobarbital and tuinal. (The street names for these drugs are “blue heavens,” “blue devils,” “blue angels,” “goofballs,” and “rainbows.”) The sedative effects of barbiturates are due to their action on the GABA and benzodiazepine receptors in the brain.

BARBITURATE-LIKE SUBSTANCES When the nonbarbiturate sedative-hypnotics were introduced in the 1970s, it was thought that they would be nonaddictive and safe substitutes for the barbiturates. They were originally intended to resolve some of the barbiturates’ side effects, such as sleep disturbances and the feelings of morning-after “hangovers” (Schuckit, 1989). However, it was soon found that the nonbarbiturates have equally addicting effects. They have since been withdrawn from medical use because of their high abuse potential and because nonaddictive substitutes are now available.

One frequently used drug in the category of barbiturate-like substances is methaqualone, once marketed as Quaalude and popularly called “lude.” Users of methaqualone report that the “high” they experience is more pleasant than that achieved from barbiturate use, because there is less of a “knock-out” effect. The feeling that users desire is total dissociation from their physical and mental selves, loss of inhibitions, and greater



What begins as a seemingly harmless use of barbiturates to induce sleep can quickly become a serious problem of dependence and abuse.

euphoria during sexual encounters. This last effect is an illusion, because in reality the user's sexual performance is impaired. Tolerance and dependence develop in ways similar to that for barbiturate use.

Another group of nonbarbiturate medications, sold over the counter, are used to induce sleep. The most common brands are NyTol and Somnex. These are actually antihistamines, whose efficacy in inducing sleep is variable from person to person.

ANXIOLYTICS The antianxiety medications include diazepam (Valium), clonazepam (Clonopin), chlordiazepoxide (Librium), flurazepam (Dalmane), and temazepam (Restoril). These medications are used specifically to treat anxiety, although they do have other medical uses. They are the most widely prescribed of all medicines. Only in recent years has the extent of the legal abuse of antianxiety medications become evident. At one time, prescriptions for these medications were open-ended; that is, physicians prescribed them without limits on the length of time they could be taken, in the belief that tolerance and dependence did not develop. We now know that these drugs have the potential for both responses (Lader, 1994). In the years since these problems were recognized, the federal government has placed tighter controls on these substances.

Abusers of antianxiety medications seek the sense of calm and relaxation that these substances produce; over time, some people increase their intake and become dependent. People who use them for more than a year usually have withdrawal symptoms when they stop. These symptoms include restlessness, irritability, insomnia, muscle tension, and occasionally other bodily sensations, such as weakness, visual problems, and various aches and pains. They may have troubling nightmares and become hypersensitive to light and sound.

Other Drugs of Abuse

So far in this chapter, we have discussed the more commonly used substances, but other substances cause serious psychological problems for millions of people and are tremendously costly for society. For example, although people do not become intoxicated from smoking or chewing nicotine products, many are physiologically dependent on this substance. As the confirmed health risks of nicotine use become known, many people have tried to give up the habit, but they find themselves tormented by a craving for nicotine, as well as such symptoms as depression, insomnia, irritability, anxiety, restlessness, decreased heart rate, weight gain, and concentration difficulty.

In addition to nicotine, other legal and easily available products are associated with substance-related disorders. Inhalants have received increasing attention in recent years, because some people intentionally use such products as gasoline, glue, paint, and other chemical substances to create altered psychological states, such as euphoria. Deeply breathing the fumes from these substances, abusers develop maladaptive behavioral and psychological changes. Symptoms include dizziness, uncoordination, slurred speech, tremor, blurred vision, and stupor. Tolerance develops fairly quickly.

The use of anabolic steroids to enhance strength and musculature, particularly among athletes, has become an international concern that is generally brought to the attention of the public every time the Olympic games are held. However, steroid use has become more of a fact of life in the average U.S. high school. Nearly 3 percent of high school seniors report having used those drugs at least once in their lives (Johnston, O'Malley, & Bachman, 2001). The most likely user is a teenage boy who wants to improve his appearance and sports performance. Using anabolic steroids along with engaging in intensive physical workouts does accelerate the growth of muscles, but at a great psychological and physical cost. Abusers tend to be irritable, aggressive, and moody, while their bodies develop a wide array of problems, ranging from kidney and liver diseases to deterioration of the reproductive system. When young people take steroids, they also tend to abuse other drugs. For example, among ninth-graders, many anabolic steroid users also abuse marijuana, cocaine, smokeless tobacco, and injectable drugs (DuRant et al., 1995).

Another substance that people sometimes abuse is nitrous oxide, or laughing gas, which many dentists use to help patients relax in preparation for a dental procedure. This substance induces a state that is characterized by feelings of lightheadedness and a sensation of floating that lasts for a few minutes. Although extensive research has not been conducted on the consequences of nitrous oxide use, there is concern about the abuse of nitrite inhalants (aerosols and anesthetics), more commonly known as "poppers." These inhalants create a mild euphoria, a change in the perception of time, feelings of relaxation, and intensification of sexual feelings. They are considered dangerous, however, because they are thought to irritate the respiratory system and impair immune functioning.

By this point in the chapter, you have probably come to realize that there is no end to the list of substances that people are likely to use in their efforts to alter consciousness. The *DSM-IV-TR* even includes catnip as a substance to which some individuals turn in their efforts to produce experiences that are likened to intoxication with marijuana or LSD. For an overview of commonly abused drugs, see Table 13.5.

Treatment for Substance Abuse and Dependence

As the high cost of drug dependence to society and individuals became more and more apparent in the 1980s and 1990s, researchers searched for effective treatment methods. The Drug Abuse Treatment Outcome Study (DATOS) was begun in the mid 1990s in order to evaluate the effectiveness of four common drug treatment approaches. Researchers followed more than 10,000 patients in almost 100 programs in 11 cities over a 3-year period. In contrast to the more generally discouraging estimates of drug treatment effectiveness available prior to this study, evidence has been accumulating from DATOS that some of the more commonly used methods can have very positive outcomes, including significant reductions in drug-associated illegal acts and HIV risk (Camacho, Bartholomew, Joe, & Simpson, 1997; Simpson, Joe, & Brown, 1997).

The four major categories of drug treatment studied by DATOS included outpatient methadone programs, long-term residential programs, outpatient drug-free programs, and short-term inpatient programs. In outpatient methadone programs, clients are given methadone to reduce cravings for heroin and block its effects. They also receive counseling and vocational skills development to help them rebuild their lives. In long-term residential programs, clients are given continual drug-free treatment in a residential community they share with counselors and fellow recovering addicts (sometimes called a therapeutic community). In outpatient drug-free programs, a wide range of psychosocial approaches are used, including 12-step programs. Finally, in short-term inpatient programs, clients are stabilized medically and then are encouraged to remain abstinent through taking steps to change their lifestyle.

The methods used in these treatment formats rely on one or more components of biological treatment combined with psychotherapy and efforts to provide clients with social supports and improvements in their occupational and family functioning.

Biological Treatment

In biological treatments, clients are given substances that block or reduce the craving for drugs. One of the oldest forms of treatment for heroin dependence is the provision of methadone which, as we described earlier, is a synthetic opioid. Methadone blocks the effects of heroin and eliminates withdrawal symptoms. When correctly prescribed, methadone

is neither intoxicating nor sedating, and it does not interfere with everyday activities. The symptoms of withdrawal are suppressed for 1 to 3 days, and the craving associated with heroin dependence is relieved. Furthermore, should the individual take heroin when on methadone treatment, the “rush” is greatly reduced. Although methadone can be taken safely for 10 years or longer, ideally, this form of treatment is combined with behavioral therapy or supportive treatment. A side benefit of methadone treatment is a reduction in illnesses associated with heroin use. Unfortunately, individuals taking methadone become physically dependent on it and cannot easily discontinue use.

Another pharmaceutical approach involves the provision of LAAM (levo-alpha-acetyl-methadol), which, like methadone, is a synthetic opioid that can be used to treat heroin addiction. However, LAAM has longer-lasting effect, and needs to be administered only three times per week, rather than daily. Naltrexone is another medication used in treating heroin dependence; rather than simply reducing craving, it actually blocks the effects of opioids. A person taking naltrexone cannot experience the pleasurable effects of heroin and, therefore, would be less likely to seek it. A third pharmacological intervention (although not approved by the FDA) is buprenorphine. This medication is similar to methadone, but it has a far lower potential of inducing physical dependence. An individual can discontinue buprenorphine without experiencing the withdrawal symptoms associated with methadone discontinuation.

Behavioral and Cognitive Therapies

A number of effective behavioral treatments are available for the treatment of drug dependence. One of these is contingency management, in which the client earns “points” for producing negative drug tests. These points can then be traded for desired items or participation in activities. Cognitive-behavioral therapy involves providing clients with interventions that modify their thoughts, expectancies, and behaviors associated with drug use. This treatment can also include training in coping strategies. Relapse prevention strategies similar to those in alcohol treatment programs can also be used.

Many experts recommend combining behavioral treatment with biological interventions. Psychosocial services, such as vocational counseling, psychotherapy, and family therapy are important adjuncts to increase the effectiveness of methadone treatment (NIDA, 1997). In addition to the method of intervention itself, however, a major factor predicting the success of treatment is the client’s motivation to remain in treatment. DATOS researchers found that a period of 3 months in treatment is needed to prevent relapse (Simpson, Joe, Dansereau, & Chatham, 1997). Not surprisingly, clients who are highly motivated to change are more likely to participate for this amount of time (Joe, Simpson, & Broome, 1998). Adding to the likelihood of continuing involvement in the treatment program is the quality of the therapeutic relationship between the client and the counselor (Simpson, Joe,

TABLE 13.5 Commonly Abused Drugs

Substance	Examples of Proprietary or Street Names	Medical Uses	Route of Administration	DEA Schedule*	Period of Detection
Stimulants					
Amphetamine	Biphetamine, dexedrine; black beauties, crosses, hearts	Attention-deficit/hyperactivity disorder (ADHD), obesity, narcolepsy	Injected, oral, smoked, sniffed	II	1–2 days
Cocaine	Coke, crack, flake, rocks, snow	Local anesthetic, vasoconstrictor	Injected, smoked, sniffed	II	1–4 days
Methamphetamine	Desoxyn; crank, crystal, glass, ice, speed	ADHD, obesity, narcolepsy	Injected, oral, smoked, sniffed	II	1–2 days
Methylphenidate	Ritalin	ADHD, narcolepsy	Injected, oral	II	1–2 days
Nicotine	Habitrol patch, Nicorette gum, Nicotrol spray, Prostep patch; cigars, cigarettes, smokeless tobacco, snuff, spit tobacco	Treatment for nicotine dependence	Smoked, sniffed, oral, transdermal	Not scheduled	1–2 days
Hallucinogens and Other Compounds					
LSD	Acid, microdot	None	Oral	I	8 hours
Mescaline	Buttons, cactus, mesc, peyote	None	Oral	I	2–3 days
Phencyclidine and similar drugs	PCP; angel dust, boat, hog, love boat	Anesthetic (veterinary)	Injected, oral, smoked	I, II	2–8 days
Psilocybin	Magic mushroom, purple passion, shrooms	None	Oral	I	8 hours
Amphetamine variants	DOB, DOM, MDA, MDMA; Adam, Ecstasy, STP, XTC	None	Oral	I	1–2 days
Marijuana	Blunt, grass, herb, pot, reefer, sinsemilla, smoke, weed	No approved use, but recommended by some for nausea reduction in cancer patients, glaucoma	Oral, smoked	I	1 day–5 weeks
Hashish	Hash	None	Oral, smoked	I	1 day–5 weeks
Tetrahydrocannabinol	Marinol, THC	Antiemetic	Oral, smoked	I, II	1 day–5 weeks

(continued)

TABLE 13.5 Commonly Abused Drugs (continued)

Steroids					
Anabolic steroids	Testosterone (T/E ratio), Stanozolol, Nandrolone	Hormone replacement therapy	Oral, injected	III	Oral: up to 3 weeks (for testosterone and others); injected: up to 3 months (nandrolone up to 9 months)
Opioids and Morphine Derivatives					
Codeine	Tylenol w/codeine, Robitussin A-C, Empirin w/codeine, Fiorinal w/codeine	Analgesic, antitussive	Injected, oral	II, III, IV	1–2 days
Heroin	Diacetylmorphine; horse, smack	None	Injected, smoked, sniffed	I	1–2 days
Methadone	Amidone, Dolophine, Methadose	Analgesic, treatment for opiate dependence	Injected, oral	II	1 day–1 week
Morphine	Roxanol, Duramorph	Analgesic	Injected, oral, smoked	II, III	1–2 days
Opium	Laudanum, Paregoric; Dover's powder	Analgesic, antidiarrheal	Oral, smoked	II, III, V	1–2 days
Depressants					
Alcohol	Beer, wine, liquor	Antidote for methanol poisoning	Oral	Not scheduled	6–10 hours
Barbiturates	Amytal, Nembutal, Seconal, Phenobarbital; barbs	Anesthetic, anticonvulsant, hypnotic, sedative	Injected, oral	II, III, IV	2–10 days
Benzodiazepines	Activan, Halcion, Librium, Rohypnol, Valium, Xanax; roofies, tranks	Antianxiety, anticonvulsant, hypnotic, sedative	Injected, oral	IV	1–6 weeks
Methaqualone	Quaalude, ludes	None	Oral	I	2 weeks

*Drug Enforcement Administration (DEA) Schedule I and II drugs have a high potential for abuse. They require greater storage security and have a quota on manufacture, among other restrictions. Schedule I drugs are available for research only and have no approved medical use. Schedule II drugs are available only through prescription, cannot have refills, and require a form for ordering. Schedule III and IV drugs are available with prescription, may have five refills in 6 months, and may be ordered orally. Most Schedule V drugs are available over the counter.

Rowan-Szal, & Greener, 1997). Other pretreatment conditions further influence the treatment outcome; researchers in the DATOS project found that individuals with poor family relations, whose psychosocial functioning is poor, tended to have higher motivation for treatment and, hence, better outcomes (Griffith, Knight, Joe, & Simpson, 1998).

Substance Abuse and Dependence: The Biopsychosocial Perspective

The biopsychosocial model is extremely useful for understanding substance dependence and approaches to treatment. Scientists

have made remarkable leaps in the past decade in understanding how people come to abuse substances, as well as the most effective interventions for treating those with substance problems. Unfortunately, treatment programs for people with substance problems have encountered serious obstacles in recent years. The National Institute of Drug Abuse reports that, during the 1990s, there was a drop in services provided to substance-dependent individuals. Managed care has played a role in this process, reducing the number of covered days in treatment from 28 to 14 or fewer—far less time than the 3 months that researchers recommended as the minimum. Most people in

short-term inpatient programs report that they feel they are not getting the psychological support they need (NIDA, 1997).

In the years ahead, society will continue to deal with the tremendous costs of substance abuse. The emotional havoc experienced by millions of people who have suffered privately with addictions will continue to expand from within the person to the social contexts in which Americans work and live. Dramatic social initiatives will be needed to respond to the powerful biological, psychological, and sociocultural forces involved in the development and maintenance of abuse and dependence.

RETURN TO THE CASE

Carl Wadsworth

Carl's History

After meeting with Carl for an initial intake session, I asked him to return 2 days later, so that I could take some additional history. When Carl returned for our second meeting, he seemed relieved and said that acknowledging the fact that he had a problem was tremendously comforting to him. I explained to Carl that I wanted to get a clearer picture of his life history, and he proceeded to tell the story that would later help me understand how he had gotten to this point of desperation.

An only child, Carl grew up in a small Midwestern town, where his father was a well-loved and respected “family doctor.” Carl’s father had himself been the son of a physician, and Carl’s parents generally assumed throughout his childhood that he would carry on the family tradition. This meant that Carl had to devote himself entirely to his schoolwork, because math and science did not come easily to him. In college, he became desperate about his studies and repeatedly sought help from his classmates. After he entered medical school, this pattern of dependence continued, and he found one or two older students to help him through his exams, lab work, and hospital duties because they felt sorry for him. Even though Carl felt guilty about his reliance on others, he contended that it was necessary, because his parents would be crushed if he failed. In his third year of medical school, Carl met Anne, a nurse at the medical school, and they married after a few months of dating. Shortly after their marriage, Anne became pregnant, and they mutually agreed that she would stay home and care for their baby after the birth.

Assessment

The only psychological test I administered to Carl was the MMPI-2. The diagnostic picture seemed fairly clear to me, but I usually find it helpful to have the quantitative data that the MMPI-2 provides to formulate my treatment recommendations. Carl’s profile was that of a man struggling with dependency issues and having a propensity for acting out, particularly when confronted with difficult or demanding situations. I was not surprised to see that Carl scored very high on indicators of addiction proneness.

Diagnosis

Carl’s Axis I diagnosis was clear. Carl was using large amounts of cocaine, he had begun to undermine successful life pursuits in his attempt to satisfy his cravings, cocaine use was interfering with his work and family life, and he had become more and more withdrawn from others as he compulsively pursued satisfaction for his cravings. As apparent as the diagnosis of cocaine dependence was, this single diagnostic label could not tell the whole story. It was apparent to me that Carl also had a personality disorder, a style of functioning that led him to define himself according to the wishes of his parents and to deal with difficult problems by becoming pathologically dependent on others.

- Axis I: Cocaine Dependence
- Axis II: Dependent Personality Disorder
- Axis III: Deferred
- Axis IV: Problems with primary support group (marital tensions)
Occupational problems

RETURN TO THE CASE

Carl Wadsworth (continued)

Axis V: Current Global Assessment of Functioning: 50. Serious impairment.
Highest Global Assessment of Functioning (past year): 70

Case Formulation

What would lead a young man to risk such a promising career and potentially happy family life just to get high on cocaine? Obviously, there is no simple explanation for why Carl could have become so compulsively involved in a world of drugs. Looking back to Carl's youth, I saw a boy growing up in a family in which intense pressure to become a doctor not only determined his career choice but also set the stage for him to become reliant on others to reach his goal. It was as if Carl had absorbed a message from his father that a medical career was the only acceptable option and that his failure to achieve such a goal would result in rejection. Desperate to avoid this, Carl resorted to any means necessary to succeed, rationalizing that his dependence on others was necessary for the good of other people. As the pressures of medical training mounted and his own feelings of inadequacy grew, Carl sought out someone on whom to rely. His marriage to Anne probably was more of an expression of his need for a caretaker than an expression of love and mutuality. As time went by, Anne could not save Carl from his own feelings of low self-esteem, so he felt compelled to find something that would make him feel better about himself. Unfortunately, that something was cocaine, an insidious substance that would delude Carl into believing that he was happy, competent, and successful.

Treatment Plan

Carl Wadsworth had both immediate and long-term treatment needs. First and foremost, his cocaine dependence required aggressive intervention. I knew that Carl would not receive my recommendation enthusiastically, but I felt that a 4-week inpatient stay would be necessary in order for him to receive the multidisciplinary attention that a severe substance-abuse problem requires. The long-term plan would involve intensive psychotherapy, probably lasting at least a year following his discharge from the

substance-abuse treatment program. As I expected, Carl raised a number of concerns about the interruption of his medical training, the disruption of his family life, and one other concern that was at the heart of his objections—what would other people think? In response, I impressed on Carl the seriousness and urgency of his problem. I also convinced him that this was a good time for him to begin to work on being more honest with other people. Initially, Carl took offense at this observation, but he soon began to see my point. Furthermore, I pointed out to Carl that he needed to come to grips with the issues in his life that had led him to become involved in using drugs, and he needed to develop autonomy and an improved sense of self-esteem. Perhaps he could begin to set his own goals in life; perhaps he could tap his own inner resources to achieve those goals; and perhaps he could develop new cognitive strategies that would result in his feeling better about himself. All this would require intensive confrontational psychotherapy.

Outcome of the Case

Carl did follow through on my recommendations, although initially it seemed to me that his compliance was dictated by a fear of being expelled from residency training. On entering the treatment center, Carl was not completely prepared for the rigor and vigilance shown by the staff in preventing the patients from gaining access to drugs. He made unsuccessful attempts to obtain cocaine, and other patients and staff harshly confronted this behavior. The harshness of the confrontation apparently awakened Carl to the depth of his problem; this proved to be a major turning point in Carl's recovery.

By the time of his discharge, Carl had shown a good deal of psychological growth and was prepared to move to the next step of treatment; intensive psychotherapy. Carl was referred to a psychologist who specializes in treating professionals with substance-abuse problems. A part of Carl's treatment involved participation in weekly meetings of a local group of physicians who had similar problems with substance abuse. The changes in Carl over the course of a year were dramatic. By the time his second child was born, Carl's priorities had evolved to a point at which he was able to recognize how central his wife and children were in his life. At work, he consciously devoted his efforts

RETURN TO THE CASE

Carl Wadsworth (continued)

to resuming a bedside manner with his patients. Carl began to think in more constructive ways, looking for solutions to life's problems, rather than escape, and feeling that he had the personal competence to work toward these solutions.

As I recall the case of Carl Wadsworth, I think of a man who was on the verge of self-destruction. Had he not encountered an understanding supervisor who responded to his crisis with firm insistence that he get help, I fear that Carl's fate would have been tragic.

Sarah Tobin, PhD

Summary

- A substance is a chemical that alters a person's mood or behavior when smoked, injected, drunk, inhaled, or swallowed in pill form. Substance intoxication is the temporary maladaptive experience of behavioral or psychological changes that are due to the accumulation of a substance in the body. When some substances are discontinued, people may experience symptoms of substance withdrawal that involve a set of physical and psychological disturbances. To counteract withdrawal symptoms, people are inclined to use more of the substance, causing them to develop tolerance. Substance abuse is a maladaptive pattern of substance use that leads to significant impairment or distress.
- Approximately one in seven Americans has a history of alcohol abuse or dependence. The short-term effects of alcohol use are appealing to many people because of the sedating qualities of this substance, although side effects, such as hangovers, are distressing. The long-term effects of heavy use are worrisome and involve serious harm to many organs of the body, possibly resulting in medical problems and dementia. Researchers in the field of alcohol dependence were among the first to propose the biopsychosocial model to explain the development of a psychological disorder. In the realm of biological contributors, researchers have focused on the role of genetics in light of the fact that dependence runs in families. This line of research has focused on markers and genetic mapping. Psychological theories focus on concepts derived from behavioral theory, as well as cognitive-behavioral and social learning perspectives. For example, according to the widely accepted expectancy model, people with alcohol dependence develop problematic beliefs about alcohol early in life through reinforcement and observational learning. Researchers and theorists working within the sociocultural perspective regard stressors within the family, community, and culture as factors that lead the person to develop alcohol dependence.
- Treatment for alcohol problems may be derived in varying degrees from each of three perspectives. In biological terms, medications may be used to control symptoms of withdrawal, to control symptoms associated with co-existing conditions, or to provoke nausea following alcohol ingestion. Various psychological interventions are used, some of which are based on behavioral and cognitive-behavioral techniques. Alcoholics Anonymous is a 12-step recovery program built on the premise that alcoholism is a disease.
- Stimulants have an activating effect on the nervous system. Amphetamines in moderate amounts cause euphoria, increased confidence, talkativeness, and energy. In higher doses, the user has more intense reactions and, over time, can become addicted and develop psychotic symptoms. Cocaine users experience stimulating effects for a shorter period of time that are nevertheless quite intense. In moderate doses, cocaine leads to euphoria, sexual excitement, potency, energy, and talkativeness. At higher doses, psychotic symptoms may develop. In addition to the disturbing psychological symptoms, serious medical problems can arise from the use of cocaine. Although not typically regarded as an abused substance, high levels of caffeine can cause a number of psychological and physical problems. Cannabis, or marijuana, causes altered perception and bodily sensations, as well as maladaptive behavioral and psychological reactions. Most of the acute effects of cannabis intoxication are reversible, but a long period of abuse is likely to lead to dependence and to have adverse psychological and physical effects. Hallucinogens cause abnormal perceptual experiences in the form of illusions and hallucinations. Opioids include naturally occurring substances (e.g., morphine and opium) as well as semisynthetic (e.g., heroin) and synthetic (e.g., methadone) drugs. Opioid users experience a rush, involving a range of psychological reactions as well as intense bodily sensations, some of which reflect life-threatening symp-

toms, particularly during episodes of withdrawal. Sedatives, hypnotics, and anxiolytics are substances that induce relaxation, sleep, tranquility, and reduced awareness.

- Various treatment programs for people with substance-related disorders have emerged within the biopsychosocial perspective. Bio-

logical treatment may involve the prescription of substances that block or reduce craving. Behavioral treatment involves such techniques as contingency management, while cognitive behavioral techniques are used to help clients modify their thoughts, expectancies, and behaviors associated with drug use.

Key Terms

See Glossary for definitions

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Internet Resource

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