Martha Yasso was tired all the time—so tired that whenever her 3-year-old son went down for a nap, she grabbed the chance to rest as well. But even with those precious extra minutes of sleep, she was still so exhausted by late afternoon that she could barely keep her eyes open. One day last fall, as her son played in the den of their New York home, Yasso’s eyelids got heavier and heavier. Just before she nodded off completely, she felt her son’s hands on her face. He was shouting, “Mama, Mama! Wake up!” That was the turning point. . . . She called her doctor, who referred her to the NYU Sleep Disorders Center. After a night in the sleep lab, with electrodes monitoring her brain waves, breathing and movements, Yasso finally understood what was behind her overwhelming fatigue. NYU pulmonologist Ana Krieger told Yasso that during the eight hours she thought she was asleep, she had actually awakened 245 times. “That number shocked me,” Yasso says. “But it also explained a lot.” (Kantrowitz, 2006, p. 51)

Martha Yasso was suffering from a sleep disorder known as sleep apnea, which is characterized by constricted breathing during sleep that forces the sleeper to wake up momentarily—sometimes as many as hundreds of times each night. Fortunately, Martha was able to find rest with an electronic device that helps to keep her airway open while she sleeps.

For most of us, sleep occurs naturally. In this and the following modules we’ll consider a range of topics about sleep and, more broadly, states of consciousness. Consciousness is the awareness of the sensations, thoughts, and feelings being experienced at a given moment. Unobservable to outsiders, consciousness is our subjective understanding of both the environment around us and our private internal world.

In waking consciousness, we are awake and aware of our thoughts, emotions, and perceptions. All other states of consciousness are considered altered states of consciousness. Among these, sleeping and dreaming occur naturally; drug use and hypnosis, in contrast, are methods of deliberately altering one’s state of consciousness.

Because consciousness is so personal a phenomenon, psychologists were sometimes reluctant to study it. After all, who can say that your consciousness is similar to or, for that matter, different from anyone else’s? Contemporary psychologists reject the view that the study of consciousness is unsuitable for the field of psychology. Instead, they argue that several approaches permit the scientific study of consciousness. For example, behavioral neuroscientists can measure brain-wave patterns under conditions of consciousness ranging from sleep to waking to hypnotic trances. And new understanding of the chemistry of drugs such as marijuana and alcohol has provided insights into the way they produce their pleasurable—as well as adverse—effects (Damasio, 2003; Mosher & Akins, 2007).

Whatever state of consciousness we are in—be it waking, sleeping, hypnotic, or drug induced—the complexities of consciousness are profound.
Mike Trevino, 29, slept nine hours in nine days in his quest to win a 3,000-mile, cross-country bike race. For the first 38 hours and 646 miles, he skipped sleep entirely. Later he napped—with no dreams he can remember—for no more than 90 minutes a night. Soon he began to imagine that his support crew was part of a bomb plot. “It was almost like riding in a movie. I thought it was a complex dream, even though I was conscious,” says Trevino, who finished second. (Springen, 2004, p. 47)

Trevino’s case is unusual—in part because he was able to function with so little sleep for so long—and it raises a host of questions about sleep and dreams. Can we live without sleep? What is the meaning of dreams? More generally, what is sleep?

Although sleeping is a state that we all experience, there are still many unanswered questions about sleep that remain, along with a considerable number of myths. Test your knowledge of sleep and dreams by answering the questionnaire in Figure 1.
People progress through a series of distinct stages of sleep during a night’s rest—known as stage 1 through stage 4 and REM sleep—moving through the stages in cycles lasting about 90 minutes. Each of these sleep stages is associated with a unique pattern of brain waves, which you can see in Figure 2.

When people first go to sleep, they move from a waking state in which they are relaxed with their eyes closed into stage 1 sleep, which is characterized by relatively rapid, low-amplitude brain waves. This is actually a stage of transition between wakefulness and sleep and lasts only a few minutes. During stage 1, images sometimes appear, as if we were viewing still photos, although this is not true dreaming, which occurs later in the night.

As sleep becomes deeper, people enter stage 2 sleep, which is characterized by a slower, more regular wave pattern. However, there are also momentary interruptions of sharply pointed, spiky waves that are called, because of their configuration, sleep spindles. It becomes increasingly difficult to awaken a person from sleep as stage 2 progresses.

As people drift into stage 3 sleep, the brain waves become slower, with higher peaks and lower valleys in the wave pattern. By the time sleepers arrive...
Module 4: States of Consciousness

Awake

Stage 1 (non-REM)

Stage 2 (non-REM)

Stage 3 (non-REM)

Stage 4 (non-REM)

Sleep spindle

REM

As sleep becomes deeper, brain waves take on a slower wave pattern.

Figure 2: Brain-wave patterns (measured by an EEG apparatus) vary significantly during the different stages of sleep (Hobson, 2007). As sleep moves from stage 1 through stage 4, brain waves become slower.

Stage 4 sleep: The deepest stage of sleep, during which we are least responsive to outside stimulation.

at stage 4 sleep, the pattern is even slower and more regular, and people are least responsive to outside stimulation.

As you can see in Figure 3, stage 4 sleep is most likely to occur during the early part of the night. In the first half of the night, sleep is dominated by

Figure 3: During the night, the typical sleeper passes through all four stages of sleep and several REM periods. (Source: Hartmann, 1967)
stages 3 and 4. The second half is characterized by stages 1 and 2—as well as a fifth stage during which dreams occur.

**LO 2** REM Sleep: The Paradox of Sleep

Several times a night, when sleepers have cycled back to a shallower state of sleep, something curious happens. Their heart rate increases and becomes irregular, their blood pressure rises, their breathing rate increases, and males—even male infants—have erections. Most characteristic of this period is the back-and-forth movement of their eyes, as if they were watching an action-filled movie. This period of sleep is called rapid eye movement, or REM, sleep and contrasts with stages 1 through 4, which are collectively labeled non-REM (or NREM) sleep. REM sleep occupies a little over 20 percent of adults’ total sleeping time.

Paradoxically, while all this activity is occurring, the major muscles of the body appear to be paralyzed. In addition, and most important, REM sleep is usually accompanied by dreams, which—whether or not people remember them—are experienced by everyone during some part of the night. Although some dreaming occurs in non-REM stages of sleep, dreams are most likely to occur in the REM period, where they are the most vivid and easily remembered (Titone, 2002; Conduit, Crewther, & Coleman, 2004; Lu et al., 2006).

There is good reason to believe that REM sleep plays a critical role in everyday human functioning. People deprived of REM sleep—by being awakened every time they begin to display the physiological signs of that stage—show a rebound effect when allowed to rest undisturbed. With this rebound effect, REM-deprived sleepers spend significantly more time in REM sleep than they normally would.

People progress through four distinct stages of sleep during a night’s rest spread over cycles lasting about 90 minutes. REM sleep, which occupies only 20 percent of adults’ sleeping time, occurs in stage 1 sleep. These photos, taken at different times of night, show the synchronized patterns of a couple accustomed to sleeping in the same bed.
Sleep is a requirement for normal human functioning, although, surprisingly, we don’t know exactly why. It is reasonable to expect that our bodies would require a tranquil “rest and relaxation” period to revitalize themselves, and experiments with rats show that total sleep deprivation results in death. But why?

Some researchers, using an evolutionary perspective, suggest that sleep permitted our ancestors to conserve energy at night, a time when food was relatively hard to come by. Others suggest that the reduced activity of the brain during non-REM sleep may give neurons in the brain a chance to repair themselves. Another hypothesis suggests that the onset of REM sleep stops the release of neurotransmitters called monoamines, and so permits receptor cells to get some necessary rest and to increase their sensitivity during periods of wakefulness. Still, these explanations remain speculative (Porkka-Heiskanen et al., 1997; Siegel, 2003; McNamara, 2004; Steiger, 2007).

Scientists have also been unable to establish just how much sleep is absolutely required. Most people today sleep between seven and eight hours each night, which is three hours a night less than people slept a hundred years ago. In addition, there is wide variability among individuals, with some people needing as little as three hours of sleep (see Figure 4). Sleep requirements also vary over the course of a lifetime: as they age, people generally need less and less sleep.

People who participate in sleep deprivation experiments, in which they are kept awake for stretches as long as 200 hours, show no lasting effects. It’s no fun—they feel weary and irritable, can’t concentrate, and show a loss of creativity, even after only minor deprivation. They also show a decline in logical reasoning ability. However, after being allowed to sleep normally, they bounce back quickly and are able to perform at predeprivation levels after just a few days (Dinges et al., 1997; Veasey et al., 2002; McClelland & Pilcher, 2007).

In short, as far as we know, most people suffer no permanent consequences of such temporary sleep deprivation. But—and this is an important but—a lack of sleep can make us feel edgy, slow our reaction time, and lower our performance on academic and physical tasks. In addition, we put ourselves, and others, at risk when we carry out routine activities, such
The average person experiences 150,000 dreams by the age of 70. They typically encompass everyday events such as going to the supermarket, working at the office, and preparing a meal. Students dream about going to class; professors dream about lecturing. Dental patients dream of getting their teeth drilled; dentists dream of drilling the wrong tooth. The English have tea with the queen in their dreams; in the United States, people go to a bar with the president (Domhoff, 1996; Schredl & Piel, 2005; Taylor & Bryant, 2007). Figure 5 shows the most common themes found in people’s dreams.

But what, if anything, do all these dreams mean? Whether dreams have a specific significance and function is a question that scientists have considered for many years, and they have developed the three alternative theories discussed next (and summarized in Figure 6).

Do Dreams Represent Unconscious Wish Fulfillment?

Sigmund Freud viewed dreams as a guide to the unconscious (Freud, 1900). In his unconscious wish fulfillment theory, he proposed that dreams represent unconscious wishes that dreamers desire to see fulfilled. However, because these wishes are threatening to the dreamer’s conscious awareness,
Researchers have yet to agree on the fundamental meaning of dreams, and so several theories about dreaming have emerged.

<table>
<thead>
<tr>
<th>Theory</th>
<th>Basic Explanation</th>
<th>Meaning of Dreams</th>
<th>Is Meaning of Dream Disguised?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unconscious wish fulfillment</td>
<td>Dreams represent unconscious wishes the dreamer wants to fulfill</td>
<td>Latent content reveals unconscious wishes</td>
<td>Yes, by manifest content of dreams</td>
</tr>
<tr>
<td>theory (Freud)</td>
<td></td>
<td>Clues to everyday concerns about survival</td>
<td>Not necessarily</td>
</tr>
<tr>
<td>Dreams-for-survival theory</td>
<td>Information relevant to daily survival is reconsidered and reprocessed</td>
<td>Dream scenario that is constructed is related to dreamer’s concerns</td>
<td>Not necessarily</td>
</tr>
<tr>
<td>Activation-synthesis theory</td>
<td>Dreams are the result of random activation of various memories, which are tied together in a logical story line</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Figure 6** Three theories of dreams. Researchers have yet to agree on the fundamental meaning of dreams, and so several theories about dreaming have emerged.

**STUDY ALERT**

Use Figure 6 to learn the differences between the three main explanations of dreaming.

---

Latent content of dreams According to Freud, the “disguised” meanings of dreams, hidden by more obvious subjects.

Manifest content of dreams According to Freud, the apparent story line of dreams.

the actual wishes—called the latent content of dreams—are disguised. The true subject and meaning of a dream, then, may have little to do with its apparent story line, which Freud called the manifest content of dreams.

To Freud, it was important to pierce the armor of a dream’s manifest content to understand its true meaning. To do this, Freud tried to get people to discuss their dreams, associating symbols in the dreams with events in the past. He also suggested that certain common symbols with universal meanings appear in dreams. For example, to Freud, dreams in which a person is flying symbolize a wish for sexual intercourse. (See Figure 7 for other common symbols.)

Many psychologists reject Freud’s view that dreams typically represent unconscious wishes and that particular objects and events in a dream are symbolic. Instead, they believe that the direct, overt action of a dream is the focal point of its meaning. For example, a dream in which we are walking down a long hallway to take an exam for which we haven’t studied does not relate to unconscious, unacceptable wishes. Instead, it simply may mean that we are concerned about an impending test. Even more complex dreams can often be interpreted in terms of everyday concerns and stress (Domhoff, 1996; Nikles et al., 1998; Picchioni et al., 2002; Cartwright, Agargum, & Kirkby, 2006).
Dreams-for-Survival Theory

According to the dreams-for-survival theory, dreams permit information that is critical for our daily survival to be reconsidered and reprocessed during sleep. Dreaming is seen as an inheritance from our animal ancestors, whose small brains were unable to sift sufficient information during waking hours. Consequently, dreaming provided a mechanism that permitted the processing of information 24 hours a day.

According to this theory, dreams represent concerns about our daily lives, illustrating our uncertainties, indecisions, ideas, and desires. Dreams are seen, then, as consistent with everyday living. Rather than being disguised wishes, as Freud suggested, they represent key concerns growing out of our daily experiences (Winson, 1990; Ross, 2006).

Research supports the dreams-for-survival theory, suggesting that certain dreams permit people to focus on and consolidate memories, particularly dreams that pertain to “how-to-do-it” memories related to motor skills. For example, rats seem to dream about mazes that they learned to run through during the day, at least according to the patterns of brain activity that appear while they are sleeping (Kenway & Wilson, 2001; Stickgold et al., 2001; Kuriyama, Stickgold, & Walker, 2004; C. Smith, 2006).

Activation-Synthesis Theory

According to psychiatrist J. Allan Hobson, who proposed activation-synthesis theory, the brain produces random electrical energy during REM sleep, possibly as a result of changes in the production of particular neurotransmitters. This electrical energy randomly stimulates memories lodged in various portions of the brain. Because we have a need to make sense of our world even while asleep, the brain takes these chaotic memories and weaves them into a logical story line, filling in the gaps to produce a rational scenario (Porte & Hobson, 1996; Hobson, 2005).

However, Hobson does not entirely reject the view that dreams reflect unconscious wishes. He suggests that the particular scenario a dreamer produces is not random but instead is a clue to the dreamer’s fears, emotions, and concerns. Hence, what starts out as a random process culminates in something meaningful.

<table>
<thead>
<tr>
<th>Symbol (Manifest Content of Dream)</th>
<th>Interpretation (Latent Content)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climbing up a stairway, crossing a bridge, riding an elevator, flying in an airplane, walking down a long hallway, entering a room, train traveling through a tunnel</td>
<td>Sexual intercourse</td>
</tr>
<tr>
<td>Apples, peaches, grapefruits</td>
<td>Breasts</td>
</tr>
<tr>
<td>Bullets, fire, snakes, sticks, umbrellas, guns, hoses, knives</td>
<td>Male sex organs</td>
</tr>
<tr>
<td>Ovens, boxes, tunnels, closets, caves, bottles, ships</td>
<td>Female sex organs</td>
</tr>
</tbody>
</table>

Figure 7 According to Freud, dreams contain common symbols with universal meanings.
LO 5 Sleep Disturbances: Slumbering Problems

Some people are simply unable to fall asleep easily, or they go to sleep readily but wake up frequently during the night. At one time or another, almost all of us have difficulty sleeping—a condition known as insomnia. It could be due to a particular situation, such as the breakup of a relationship, concern about a test score, or the loss of a job. Some cases of insomnia, however, have no obvious cause. Some people are simply unable to fall asleep easily, or they go to sleep readily but wake up frequently during the night. Insomnia is a problem that afflicts as many as one-third of all people (American Insomnia Association, 2005; Bains, 2006; Cooke & Ancoli-Israel, 2006).

Other sleep problems are less common than insomnia, although they are still widespread. For instance, some 20 million people suffer from sleep apnea, the disorder from which the mother in the chapter opening story suffered. Sleep apnea is a condition in which a person has difficulty breathing while sleeping. The result is disturbed, fitful sleep, as the person is constantly reawakened when the lack of oxygen becomes great enough to trigger a waking response. Some people with apnea wake as many as 500 times during the course of a night, although they may not even be aware that they have wakened. Not surprisingly, such disturbed sleep results in extreme fatigue the next day. Sleep apnea also may play a role in sudden infant death syndrome (SIDS), a mysterious killer of seemingly normal infants who die while sleeping (Rambaud & Guilleminault, 2004; Gami et al., 2005; Aloia, Smith, & Arnedt, 2007).

From the perspective of . . .

A Law Enforcement Officer What impact would an irregular sleep schedule have on your job performance? What would you do to ensure you were getting enough rest?

Night terrors are sudden awakenings from non-REM sleep that are accompanied by extreme fear, panic, and strong physiological arousal. Usually occurring in stage 4 sleep, night terrors may be so frightening that a sleeper awakens with a shriek. Although night terrors initially produce great agitation, victims usually can get back to sleep fairly quickly. They occur most frequently in children between the ages of 3 and 8 (Lowe, Humphreys, & Williams, 2007).

Narcolepsy is uncontrollable sleeping that occurs for short periods while a person is awake. No matter what the activity—holding a heated conversation, exercising, or driving—a narcoleptic will suddenly fall asleep. People with narcolepsy go directly from wakefulness to REM sleep, skipping the other stages.
The causes of narcolepsy are not known, although there could be a genetic component because narcolepsy runs in families (Mahmood & Black, 2005; Ervik et al., 2006).

We know relatively little about sleeptalking and sleepwalking, two sleep disturbances that are usually harmless. Both occur during stage 4 sleep and are more common in children than in adults. Sleeptalkers and sleepwalkers usually have a vague consciousness of the world around them, and a sleepwalker may be able to walk with agility around obstructions in a crowded room. Unless a sleepwalker wanders into a dangerous environment, sleepwalking typically poses little risk (Guilleminault et al., 2005; Lee-Chiong, 2006).

LO 6 Circadian Rhythms: Life Cycles

The fact that we cycle back and forth between wakefulness and sleep is one example of the body’s circadian rhythms. Circadian rhythms (from the Latin circa diem, or “around the day”) are biological processes that occur regularly on approximately a 24-hour cycle. Sleeping and waking, for instance, occur naturally to the beat of an internal pacemaker that works on a cycle of about 24 hours. Several other bodily functions, such as body temperature, hormone production, and blood pressure, also follow circadian rhythms (Saper et al., 2005; Beersma & Gordijn, 2007; Blatter & Cajochen, 2007). Circadian cycles are complex, and they involve a variety of behaviors (see Figure 8).

Circadian rhythms
Biological processes that occur regularly on approximately a 24-hour cycle.

Figure 8 Day times, night times: regular body changes over every 24-hour period. Over the course of the day, our circadian rhythms produce a wide variety of effects. (Source: Young, 2000.)
Sleeping Better

Do you have trouble sleeping? You’re not alone—70 million people in the United States have sleep problems. For those of us who spend hours tossing and turning in bed, psychologists studying sleep disturbances have a number of suggestions for overcoming insomnia (Edinger et al., 2001; Benca, 2005; Finley & Cowley, 2005). Here are some ideas.

■ Exercise during the day (at least six hours before bedtime) and avoid naps. Not surprisingly, it helps to be tired before going to sleep! Moreover, learning systematic relaxation techniques and biofeedback can help you unwind from the day’s stresses and tensions.

■ Choose a regular bedtime and stick to it. Adhering to a habitual schedule helps your internal timing mechanisms regulate your body more effectively.

■ Avoid drinks with caffeine after lunch. The effects of beverages such as coffee, tea, and some soft drinks can linger for as long as 8 to 12 hours after they are consumed.

■ Drink a glass of warm milk at bedtime. Your grandparents were right when they dispensed this advice: milk contains the chemical tryptophan, which helps people fall asleep.

■ Avoid sleeping pills. Even though 25 percent of U.S. adults report having taken medication for sleep in the previous year, in the long run sleep medications can do more harm than good because they disrupt the normal sleep cycle.

■ Try not to sleep. This approach works because people often have difficulty falling asleep because they are trying so hard. A better strategy is to go to bed only when you feel tired. If you don’t get to sleep within 10 minutes, leave the bedroom and do something else, returning to bed only when you feel sleepy. Continue this process all night if necessary. But get up at your usual hour in the morning, and don’t take any naps during the day. After three or four weeks, most people become conditioned to associate their beds with sleep—and fall asleep rapidly at night (Sloan et al., 1993; Ubell, 1993; Smith, 2001).

For long-term problems with sleep, you might consider visiting a sleep disorders center. For information on accredited clinics, consult the American Academy of Sleep Medicine at www.aasmnet.org.
Recap

- Consciousness is a person’s awareness of the sensations, thoughts, and feelings at a given moment. Waking consciousness can vary from more active to more passive states. (p. 123)
- Altered states of consciousness include naturally occurring sleep and dreaming, as well as hypnotic and drug-induced states. (p. 123)

Summarize the stages of sleep.

- Using the electroencephalogram, or EEG, to study sleep, scientists have found that the brain is active throughout the night, and that sleep proceeds through a series of stages identified by unique patterns of brain waves. (p. 124)

Explain REM sleep.

- REM (rapid eye movement) sleep is characterized by an increase in heart rate, a rise in blood pressure, an increase in the rate of breathing, and, in males, erections. Dreams occur during this stage. (p. 127)

Explain why we sleep.

- Sleep is a requirement for normal functioning, although it is not yet known why it is necessary. (p. 128)
- There is great variability regarding how much people sleep. (p. 128)

Differentiate the explanations of dreaming.

- Freud suggests dreams have both a manifest content (the story line) and a latent content (the true meaning). (p. 130)
- The dreams-for-survival theory suggests that information relevant to daily survival is reconsidered and reprocessed in dreams. (p. 131)
- The activation-synthesis theory proposes that dreams are a result of random electrical energy that stimulates different memories, which are then woven into a coherent story line. (p. 131)

State the impact of sleep disturbances.

- Insomnia is a sleep disorder characterized by difficulty sleeping. Sleep apnea is a condition in which people have difficulty sleeping and breathing at the same time. People with narcolepsy have an uncontrollable urge to sleep. Sleepwalking and sleeptalking are relatively harmless. (p. 132)
- Psychologists and sleep researchers advise people with insomnia to increase exercise during the day, avoid caffeine and sleeping pills, drink a glass of warm milk before bedtime, and try to avoid going to sleep. (p. 134)

Explain circadian rhythms.

- Circadian rhythms are biological processes that occur regularly on approximately a 24-hour cycle. (p. 133)
- Sleep, wakefulness, body temperature, and other bodily functions follow circadian rhythms. (p. 133)

Evaluate

1. _________ is the term used to describe our understanding of the world external to us, as well as our own internal world.
2. A great deal of neural activity goes on during sleep. True or false?
3. Dreams occur in _________ sleep.
4. _________ _________ are internal bodily processes that occur on a daily cycle.
5. Freud’s theory of unconscious \underline{wish fulfillment} states that the actual wishes an individual expresses in dreams are disguised because they are threatening to the person’s conscious awareness.

6. Match the theory of dreaming with its definition.
   
   1. Activation-synthesis theory
   2. Dreams-for-survival theory
   3. Unconscious theory wish fulfillment

   a. Dreams permit important information to be reprocessed during sleep.
   b. The manifest content of dreams disguises the latent content of the dreams.
   c. Electrical energy stimulates random memories, which are woven together to produce dreams.

**RETHINK**

Suppose that a new “miracle pill” will allow a person to function with only one hour of sleep per night. However, because a night’s sleep is so short, a person who takes the pill will never dream again. Knowing what you do about the functions of sleep and dreaming, what would be some advantages and drawbacks of such a pill from a personal standpoint? Would you take such a pill?

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**KEY TERMS**

- Consciousness p. 124
- Stage 1 sleep p. 125
- Stage 2 sleep p. 125
- Stage 3 sleep p. 125
- Stage 4 sleep p. 126
- Rapid eye movement (REM) sleep p. 127
- Unconscious wish fulfillment theory p. 129
- Latent content of dreams p. 130
- Manifest content of dreams p. 130
- Dreams-for-survival theory p. 131
- Activation-synthesis theory p. 131
- Circadian rhythms p. 133
You are feeling relaxed and drowsy. You are getting sleepier. Your body is becoming limp. Your eyelids are feeling heavier. Your eyes are closing; you can’t keep them open anymore. You are totally relaxed. Now, place your hands above your head. But you will find they are getting heavier and heavier—so heavy you can barely keep them up. In fact, although you are straining as hard as you can, you will be unable to hold them up any longer.

An observer watching the above scene would notice a curious phenomenon occurring. Many of the people listening to the voice are dropping their arms to their sides. The reason for this strange behavior? Those people have been hypnotized.

**LO1 Hypnosis: A Trance-Forming Experience?**

People under hypnosis are in a trancelike state of heightened susceptibility to the suggestions of others. In some respects, it appears that they are asleep. Yet other aspects of their behavior contradict this notion, for people are attentive to the hypnotist’s suggestions and may carry out bizarre or silly suggestions.

Despite their compliance when hypnotized, people do not lose all will of their own. They will not perform antisocial behaviors, and they will not carry out self-destructive acts. People will not reveal hidden truths about themselves, and they are capable of lying. Moreover, people cannot be hypnotized against their will—despite popular misconceptions (Gwynn & Spanos, 1996; Raz, 2007).

There are wide variations in people’s susceptibility to hypnosis. About 5 to 20 percent of the population cannot be hypnotized at all, and some 15 percent are very easily hypnotized. Most people fall somewhere in between. Moreover, the ease with which a person is hypnotized is related to a number of other characteristics. People who are hypnotized readily are also easily absorbed while reading books or listening to music, becoming unaware of what is happening around them, and they often spend an unusual amount of time daydreaming. In sum, then, they show a high ability to concentrate and to become completely absorbed in what they are doing (Kirsch & Braffman, 2001; Rubichi et al., 2005; Benham, Woody, & Wilson, 2006).
A Different State of Consciousness?

The question of whether hypnosis is a state of consciousness that is qualitatively different from normal waking consciousness is controversial. Some psychologists believe that hypnosis represents a state of consciousness that differs significantly from other states. In this view, the high suggestibility, increased ability to recall and construct images, and acceptance of suggestions that clearly contradict reality suggest it is a different state. Moreover, changes in electrical activity in the brain are associated with hypnosis, supporting the position that hypnosis is a state of consciousness different from normal waking (Hilgard, 1992; Kallio & Revonsuo, 2003; Fingelkurts, Fingelkurts, & Kallio, 2007).

On the other side of the controversy are psychologists who reject the notion that hypnosis is a state significantly different from normal waking consciousness. They argue that altered brain-wave patterns are not sufficient to demonstrate a qualitative difference because no other specific physiological changes occur when people are in trances. Furthermore, little support exists for the contention that adults can recall memories of childhood events accurately while hypnotized. That lack of evidence suggests that there is nothing qualitatively special about the hypnotic trance (Lynn et al., 2003; Lynn, Fassler, & Knox, 2005; Hongchun & Ming, 2006).

There is increasing agreement that the controversy over the nature of hypnosis has led to extreme positions on both sides of the issue. More recent approaches suggest that the hypnotic state may best be viewed as lying along a continuum in which hypnosis is neither a totally different state of consciousness nor totally similar to normal waking consciousness (Lynn et al., 2000; Kihlstrom, 2005b; Jamieson, 2007).

From the perspective of . . .

A Retail or Restaurant Supervisor Would you allow (or even encourage) employees to engage in meditation during the workday? Why or why not?
Meditation:
Regulating Our Own State of Consciousness

When traditional practitioners of the ancient Eastern religion of Zen Buddhism want to achieve greater spiritual insight, they turn to a technique that has been used for centuries to alter their state of consciousness. This technique is called meditation.

Meditation is a learned technique for refocusing attention that brings about an altered state of consciousness. Meditation typically consists of the repetition of a mantra—a sound, word, or syllable—over and over. In other forms of meditation, the focus is on a picture, flame, or specific part of the body. Regardless of the nature of the particular initial stimulus, the key to the procedure is concentrating on it so thoroughly that the meditator becomes unaware of any outside stimulation and reaches a different state of consciousness.

After meditation, people report feeling thoroughly relaxed. They sometimes relate that they have gained new insights into themselves and the problems they are facing. The long-term practice of meditation may even improve health because of the biological changes it produces. For example, during meditation, oxygen usage decreases, heart rate and blood pressure decline, and brain-wave patterns change (Arambula et al., 2001; Barnes et al., 2004; Lee, Ahn, & Lee, 2007; see Figure 1).

Anyone can meditate by following a few simple procedures. The fundamentals include sitting in a quiet room with the eyes closed, breathing deeply and rhythmically, and repeating a word or sound—such as the word one—over and over. Practiced twice a day for 20 minutes, the technique is effective in bringing about relaxation (Benson et al., 1994; Aftanas & Golosheykin, 2005).

Meditation is a means of altering consciousness that is practiced in many different cultures, though it can take different forms and serve different purposes across cultures. In fact, one impetus for the study of consciousness is the realization that people in many different cultures routinely seek ways to alter their states of consciousness (Walsh & Shapiro, 2006).
A group of Native American Sioux men sit naked in a steaming sweat lodge as a medicine man throws water on sizzling rocks to send billows of scalding steam into the air.

Aztec priests smear themselves with a mixture of crushed poisonous herbs, hairy black worms, scorpions, and lizards. Sometimes they drink the potion.

During the sixteenth century, a devout Hasidic Jew lies across the tombstone of a celebrated scholar. As he murmurs the name of God repeatedly, he seeks to be possessed by the soul of the dead wise man’s spirit. If successful, he will attain a mystical state, and the deceased’s words will flow out of his mouth.

Each of these rituals has a common goal: suspension from the bonds of everyday awareness and access to an altered state of consciousness. Although they may seem exotic from the vantage point of many Western cultures, these rituals represent an apparently universal effort to alter consciousness (Fine, 1994; Bartocci, 2004; Irwin, 2006).

Some scholars suggest that the quest to alter consciousness represents a basic human desire (Siegel, 1989). Whether or not one accepts such an extreme view, it is clear that variations in states of consciousness share some basic characteristics.
across a variety of cultures. One is an alteration in thinking, which may become shallow, illogical, or otherwise different from normal. In addition, people’s sense of time can become disturbed, and their perceptions of the physical world and of themselves may change. They may lose self-control, doing things that they would never otherwise do. Finally, they may feel a sense of ineffability—the inability to understand an experience rationally or describe it in words (Martindale, 1981; Finkler, 2004; Travis, 2006).

**RECAP**

**Define hypnosis.**
- Hypnosis produces a state of heightened susceptibility to the suggestions of the hypnotist. Under hypnosis, significant behavioral changes occur, including increased concentration and suggestibility, heightened ability to recall and construct images, lack of initiative, and acceptance of suggestions that clearly contradict reality. (p. 137)

**Describe the effects of meditation.**
- Meditation is a learned technique for refocusing attention that brings about an altered state of consciousness. (p. 139)
- Different cultures have developed their own unique ways to alter states of consciousness. (p. 140)

**EVALUATE**

1. ___________ is a state of heightened susceptibility to the suggestions of others.
2. A friend tells you, “I once heard of a person who was murdered by being hypnotized and then told to jump from the Golden Gate Bridge!” Could such a thing have happened? Why or why not?
3. ___________ is a learned technique for refocusing attention to bring about an altered state of consciousness.
4. Leslie repeats a unique sound, known as a ___________, when she engages in meditation.

**RETHINK**

Why do you think people in almost every culture use psychoactive drugs and search for altered states of consciousness?

**KEY TERMS**

Hypnosis p. 137

Meditation p. 139
Drugs of one sort or another are a part of almost everyone’s life. From infancy on, most people take vitamins, aspirin, cold-relief medicine, and the like, and surveys find that 80 percent of adults in the United States have taken an over-the-counter pain reliever in the last six months. However, these drugs rarely produce an altered state of consciousness (Dortch, 1996).

In contrast, some substances, known as psychoactive drugs, lead to an altered state of consciousness. Psychoactive drugs influence a person’s emotions, perceptions, and behavior. Yet even this category of drugs is common in most of our lives. If you have ever had a cup of coffee or sipped a beer, you have taken a psychoactive drug. A large number of individuals have used more potent—and dangerous—psychoactive drugs than coffee and beer (see Figure 1);
for instance, surveys find that 41 percent of high school seniors have used an illegal drug in the last year. In addition, 30 percent report having been drunk on alcohol. The figures for the adult population are even higher (Johnston et al., 2007).

Of course, drugs vary widely in the effects they have on users, in part because they affect the nervous system in very different ways. Some drugs alter the limbic system, and others affect the operation of specific neurotransmitters across the synapses of neurons. For example, some drugs block or enhance the release of neurotransmitters, others block the receipt or the removal of a neurotransmitter, and still others mimic the effects of a particular neurotransmitter (see Figure 2).

The most dangerous drugs are addictive. Addictive drugs produce a biological or psychological dependence in the user, and withdrawal from them leads to a craving for the drug that, in some cases, may be nearly irresistible. In biologically based addictions, the body becomes so accustomed to functioning in the presence of a drug that it cannot function without it. Psychologically based addictions are those in which people believe that they need the drug to respond to the stresses of daily living. Although we generally associate addiction with drugs such as heroin, everyday sorts of drugs, such as caffeine (found in coffee) and nicotine (found in cigarettes), have addictive aspects as well (Li, Volkow, & Baler, 2007).

Why do people take drugs in the first place? There are many reasons, ranging from the perceived pleasure of the experience itself, to the escape that a drug-induced high affords from the everyday pressures of life, to an attempt to achieve a religious or spiritual state. In some cases, the motive is simply the thrill of trying something new. Finally, the sense of helplessness

**Addictive drugs** Drugs that produce a biological or psychological dependence in the user so that withdrawal from them leads to a craving for the drug that, in some cases, may be nearly irresistible.

**STUDY ALERT**
Use Figure 2 to learn the different ways that drugs produce their effects on a biological level.

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**Drug Effects**

**Figure 2** Different drugs affect different parts of the nervous system and brain and each drug functions in one of these specific ways.
experienced by unemployed individuals trapped in lives of poverty may lead them to try drugs as a way of escaping from the bleakness of their lives. Regardless of the forces that lead a person to begin using drugs, drug addiction is among the most difficult of all behaviors to modify, even with extensive treatment (Lemonick, 2000; Mosher & Akins, 2007). There is therefore little disagreement that the best hope for dealing with the overall societal problem of substance abuse is to prevent people from becoming involved with drugs in the first place.

**From the perspective of . . .**

**A Co-worker** How could you determine whether your co-worker was addicted to drugs or alcohol? What steps would you take to help him or her? As an employee, what are the limits to which you could get involved?

---

**Stimulants** Drugs that have an arousal effect on the central nervous system, causing a rise in heart rate, blood pressure, and muscular tension.

Does your day not start until you’ve had your morning cup of coffee? Caffeine is one of a number of stimulants, drugs whose effect on the central nervous system causes a rise in heart rate, blood pressure, and muscular tension. Caffeine is present in tea, soft drinks, and chocolate as well as coffee (see Figure 3).

**Figure 3** How much caffeine do you consume? This chart shows the range of caffeine found in common foods and drinks (Blakeslee, 1991). The average person in the United States consumes about 200 milligrams of caffeine each day.
Caffeine produces several reactions. The major behavioral effects are an increase in attentiveness and a decrease in reaction time. Caffeine can also bring about an improvement in mood, most likely by mimicking the effects of a natural brain chemical, adenosine. Too much caffeine, however, can result in nervousness and insomnia. People can build up a biological dependence on the drug. Regular users who suddenly stop drinking coffee may experience headaches or depression. Many people who drink large amounts of coffee on weekdays have headaches on weekends because of the sudden drop in the amount of caffeine they are consuming (Juliano & Griffiths, 2004; Satel, 2006; Kendler, Myers, & Gardner, 2006).

Nicotine, found in cigarettes, is another common stimulant. The soothing effects of nicotine help explain why cigarette smoking is addictive. Smokers develop a dependence on nicotine, and those who suddenly stop smoking develop strong cravings for the drug. This is not surprising: nicotine activates neural mechanisms similar to those activated by cocaine, which, as we see next, is also highly addictive (Collins & Izenwasser, 2004; Haberstick, Timberlake, & Ehringer, 2007).

Amphetamines

Amphetamines are strong stimulants, such as Dexedrine and Benzedrine, popularly known as speed. In small quantities, amphetamines—which stimulate the central nervous system—bring about a sense of energy and alertness, talkativeness, heightened confidence, and a mood “high.” They increase concentration and reduce fatigue. Amphetamines also cause a loss of appetite, increased anxiety, and irritability. When taken over long periods of time, amphetamines can cause feelings of being persecuted by others, as well as a general sense of suspiciousness. People taking amphetamines may lose interest in sex. If taken in too large a quantity, amphetamines overstimulate the central nervous system to such an extent that convulsions and death can occur (Carhart-Harris, 2007).

Methamphetamine is a white, crystalline drug that U.S. police now say is the most dangerous street drug. “Meth” is highly addictive and relatively cheap, and it produces a strong, lingering high. It has made addicts of people across the social spectrum, ranging from soccer moms to urban professionals to poverty-stricken inner-city residents. After becoming addicted, users take it more and more frequently and in increasing doses. Long-term use of the drug can lead to brain damage (Thompson et al., 2004; Brecht et al., 2008).

Cocaine

Although its use has declined over the last decade, the stimulant cocaine and its derivative, crack, still represent a serious concern. Cocaine is inhaled or “snorted” through the nose, smoked, or injected directly into the bloodstream. It is rapidly absorbed into the body and takes effect almost immediately.
### Drugs

<table>
<thead>
<tr>
<th>Drugs</th>
<th>Street Name</th>
<th>Effects</th>
<th>Withdrawal Symptoms</th>
<th>Adverse Overdose Reactions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stimulants</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cocaine</td>
<td>Coke, blow, snow, lady, crack</td>
<td>Increased confidence, mood elevation, sense of energy and alertness, decreased appetite, anxiety, irritability, insomnia, transient drowsiness, delayed orgasm</td>
<td>Apathy, general fatigue, prolonged sleep, depression, disorientation, suicidal thoughts, agitated motor activity, irritability, bizarre dreams</td>
<td>Elevated blood pressure, increase in body temperature, face picking, suspiciousness, bizarre and repetitious behavior, vivid hallucinations, convulsions, possible death</td>
</tr>
<tr>
<td>Amphetamines</td>
<td>Speed, Speed</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Benzedrine</td>
<td>Booze</td>
<td>Anxiety reduction, impulsiveness, dramatic mood swings, bizarre thoughts, suicidal behavior, slurred speech, disorientation, slowed mental and physical functioning, limited attention span</td>
<td>Weakness, restlessness, nausea and vomiting, headaches, nightmares, irritability, depression, acute anxiety, hallucinations, seizures, possible death</td>
<td>Confusion, decreased response to pain, shallow respiration, dilated pupils, weak and rapid pulse, coma, possible death</td>
</tr>
<tr>
<td>Dexedrine</td>
<td>Yellowjackets, yellows, Reds</td>
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<tr>
<td><strong>Depressants</strong></td>
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<tr>
<td>Alcohol</td>
<td>Roofies, rope, “date-rape drug”</td>
<td>Muscle relaxation, amnesia, sleep</td>
<td>Seizures</td>
<td>Seizures, coma, incapacitation, inability to resist sexual assault</td>
</tr>
<tr>
<td>Barbiturates</td>
<td>lixir</td>
<td></td>
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<td></td>
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<tr>
<td>Nembutal</td>
<td>Memory</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seconal</td>
<td>Anxiety reduction, impulsiveness, dramatic mood swings, bizarre thoughts, suicidal behavior, slurred speech, disorientation, slowed mental and physical functioning, limited attention span</td>
<td>Weakness, restlessness, nausea and vomiting, headaches, nightmares, irritability, depression, acute anxiety, hallucinations, seizures, possible death</td>
<td>Confusion, decreased response to pain, shallow respiration, dilated pupils, weak and rapid pulse, coma, possible death</td>
<td>Seizures, coma, incapacitation, inability to resist sexual assault</td>
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<tr>
<td>Phenobarbital</td>
<td>rotein</td>
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<tr>
<td><strong>Narcotics</strong></td>
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<tr>
<td>Heroin</td>
<td>Anxiety and pain reduction, apathy, difficulty in concentration, slowed speech, decreased physical activity, drooling, itching, euphoria, nausea</td>
<td>Anxiety, vomiting, sneezing, diarrhea, lower back pain, watery eyes, runny nose, yawning, irritability, tremors, panic, chills and sweating, cramps</td>
<td>Depressed levels of consciousness, low blood pressure, rapid heart rate, shallow breathing, convulsions, coma, possible death</td>
<td>Depressed levels of consciousness, low blood pressure, rapid heart rate, shallow breathing, convulsions, coma, possible death</td>
</tr>
<tr>
<td>Morphine</td>
<td>Drugstore dope, cube, first line, mud</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Hallucinogens</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Cannabis</td>
<td>Bhang, kif, ganja, dope, grass, pot, hemp, joint, weed, bone, Mary Jane, reefer</td>
<td>Euphoria, relaxed inhibitions, increased appetite, disoriented behavior</td>
<td>Hyperactivity, insomnia, decreased appetite, anxiety</td>
<td>Severe reactions rare but include panic, paranoia, fatigue, bizarre and dangerous behavior, decreased testosterone over long-term; immune system effects</td>
</tr>
<tr>
<td>Marijuana</td>
<td>Acid, quasy, microdot, white lightning</td>
<td>Heightened sense of oneself and insight, feelings of peace, empathy, energy</td>
<td>Depression, anxiety, sleeplessness</td>
<td>Increase in body temperature, memory difficulties</td>
</tr>
<tr>
<td>Hashish</td>
<td>Acid, microdot, white lightning</td>
<td>Heightened aesthetic responses; vision and depth distortion; heightened sensitivity to faces and gestures; magnified feelings; paranoia, panic, euphoria</td>
<td>Not reported</td>
<td>Nausea and chills; increased pulse, temperature, and blood pressure; slow, deep breathing; loss of appetite; insomnia; bizarre, dangerous behavior</td>
</tr>
<tr>
<td>Hash oil</td>
<td>Acid, microdot, white lightning</td>
<td>Heightened aesthetic responses; vision and depth distortion; heightened sensitivity to faces and gestures; magnified feelings; paranoia, panic, euphoria</td>
<td>Not reported</td>
<td>Nausea and chills; increased pulse, temperature, and blood pressure; slow, deep breathing; loss of appetite; insomnia; bizarre, dangerous behavior</td>
</tr>
</tbody>
</table>

**Figure 4** The most commonly used drugs and their effects.
When used in relatively small quantities, cocaine produces feelings of profound psychological well-being, increased confidence, and alertness. Cocaine produces this “high” through the neurotransmitter dopamine. Dopamine is one of the chemicals that transmit between neurons messages that are related to ordinary feelings of pleasure. Normally when dopamine is released, excess amounts of the neurotransmitter are reabsorbed by the releasing neuron. However, when cocaine enters the brain, it blocks reabsorption of leftover dopamine. As a result, the brain is flooded with dopamine-produced pleasurable sensations (Redish, 2004; Jarlais, Arasteh, & Perlis, 2007). Figure 4 provides a summary of the effects of cocaine and other illegal drugs.

However, there is a steep price for the pleasurable effects of cocaine. The brain may become permanently rewired, triggering a psychological and physical addiction in which users grow obsessed with obtaining the drug. Over time, users deteriorate mentally and physically. In extreme cases, cocaine can cause hallucinations—a common one is of insects crawling over one’s body. Ultimately, an overdose of cocaine can lead to death (Carpenter, 2001; Nestler, 2001; George & Moselhy, 2005; Paulozzi, 2006).

**LO 2 Depressants: Drug Lows**

In contrast to the initial effect of stimulants, which is an increase in arousal of the central nervous system, the effect of depressants is to impede the nervous system by causing neurons to fire more slowly. Small doses result in at least temporary feelings of intoxication—drunkenness—along with a sense of euphoria and joy. When large amounts are taken, however, speech becomes slurred and muscle control becomes disjointed, making motion difficult. Ultimately, heavy users may lose consciousness entirely.

**Alcohol**

The most common depressant is alcohol, which is used by more people than is any other drug. Based on liquor sales, the average person over the age of 14 drinks 2 1/2 gallons of pure alcohol over the course of a year. This works out to more than 200 drinks per person. Although alcohol consumption has declined steadily over the last decade, surveys show that more than three-fourths of college students indicate that they have had a drink within the last 30 days (Jung, 2002; Midanik, Tam, & Weisner, 2007).
Generally, women are typically somewhat lighter drinkers than men—although the gap between the sexes is narrowing for older women and has closed completely for teenagers. Women are more susceptible to the effects of alcohol, and alcohol abuse may harm the brains of women more than those of men (Wuethrich, 2001; Mann et al., 2005; Mancinelli, Binetti, & Ceccanti, 2007).

Although alcohol is a depressant, most people claim that it increases their sense of sociability and well-being. The discrepancy between the actual and the perceived effects of alcohol lies in the initial effects it produces in the majority of individuals who use it: release of tension and stress, feelings of happiness, and loss of inhibitions (Steele & Josephs, 1990; Sayette, 1993).

As the dose of alcohol increases, however, the depressive effects become more pronounced (see Figure 6). People may feel emotionally and physically unstable. They also show poor judgment and may act aggressively. Moreover, memory is impaired, brain processing of spatial information is diminished, and speech becomes slurred and incoherent. Eventually they may fall into a stupor and pass out. If they drink enough alcohol in a short time, they may die of alcohol poisoning (Zeigler et al., 2005; Thatcher & Clark, 2006).

Although most people fall into the category of casual users, 14 million people in the United States—1 in every 13 adults—have a drinking problem. Alcoholics, people with alcohol-abuse problems, come to rely on alcohol and continue to drink even though it causes serious difficulties. In addition, they become increasingly immune to the effects of alcohol. Consequently, alcoholics must drink progressively more to experience the initial positive feelings that alcohol produces.

In some cases of alcoholism, people must drink constantly in order to feel well enough to function in their daily lives. In other cases, though, people drink inconsistently, but occasionally go on binges in which they consume large quantities of alcohol.

It is not clear why certain people become alcoholics and develop a tolerance for alcohol, whereas others do not. There may be a genetic cause, although the question whether there is a specific inherited gene that produces alcoholism is controversial. What is clear is that the chances of becoming an alcoholic are considerably higher if alcoholics are present in earlier generations of a person’s family. However, not all alcoholics have close relatives who are alcoholics. In these cases, environmental stressors are suspected of playing a larger role (Whitfield et al., 2004; Nurnberger & Bierut, 2007; Zimmerman, Blomeyer, & Laucht, 2007).

Cedric Benson was released from the Chicago Bears after being arrested on suspicions of DUI twice in two months. Despite the charges being dropped, the damage was done to his career. Why do you think he was willing to put his career in jeopardy by continuing his rash behavior?
To determine your own drinking style, complete the Try It! on page 150.

### Barbiturates

Barbiturates, which include drugs such as Nembutal®, Seconal®, and phenobarbital, are another form of depressant. Frequently prescribed by physicians to induce sleep or reduce stress, barbiturates produce a sense of relaxation. Yet they too are psychologically and physically addictive and, when combined with alcohol, can be deadly, since such a combination relaxes the muscles of the diaphragm to such an extent that the user stops breathing.

### Rohypnol

*Rohypnol* is sometimes called the “date rape drug,” because when it is mixed with alcohol, it can prevent victims from resisting sexual assault. Sometimes people who are unknowingly given the drug are so incapacitated that they have no memory of the assault.

---

**Figure 6** The effects of alcohol. The quantities represent only rough benchmarks; the effects vary significantly depending on an individual’s weight, height, recent food intake, genetic factors, and even psychological state.

<table>
<thead>
<tr>
<th>Number of Drinks Consumed in Two Hours</th>
<th>Alcohol in Blood (Percentage)</th>
<th>Typical Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>0.05</td>
<td>Judgment, thought, and restraint weakened; tension released, giving carefree sensation</td>
</tr>
<tr>
<td>3</td>
<td>0.08</td>
<td>Tensions and inhibitions of everyday life lessened; cheerfulness</td>
</tr>
<tr>
<td>4</td>
<td>0.10</td>
<td>Voluntary motor action affected, making hand and arm movements, walk, and speech clumsy</td>
</tr>
<tr>
<td>7</td>
<td>0.20</td>
<td>Severe impairment—staggering, loud, incoherent, emotionally unstable, 100 times greater traffic risk; exuberance and aggressive inclinations magnified</td>
</tr>
<tr>
<td>9</td>
<td>0.30</td>
<td>Deeper areas of brain affected, with stimulus-response and understanding confused; stuporous; blurred vision</td>
</tr>
<tr>
<td>12</td>
<td>0.40</td>
<td>Incapable of voluntary action; sleepy, difficult to arouse; equivalent of surgical anesthesia</td>
</tr>
<tr>
<td>15</td>
<td>0.50</td>
<td>Comatose; centers controlling breathing and heartbeat anesthetized; death increasingly probable</td>
</tr>
</tbody>
</table>

*Note:* A drink refers to a typical 12-ounce bottle of beer, a 1.5-ounce shot of hard liquor, or a 5-ounce glass of wine.
try it!

Consider Your Drinking Style

If you drink alcohol, do you have a style of use that is safe and responsible? Read the statements below and rate the extent to which you agree with them, using the following scale:

1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

<table>
<thead>
<tr>
<th>Statement</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I usually drink alcohol a few times a week.</td>
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<tr>
<td>2. I sometimes go to class after I’ve been drinking alcohol.</td>
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<tr>
<td>3. I frequently drink when I’m alone.</td>
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<tr>
<td>4. I have driven while under the influence of alcohol.</td>
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<tr>
<td>5. I’ve used a fake ID card to purchase alcohol.</td>
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<td>6. I’m a totally different person when I’m drinking alcohol.</td>
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<tr>
<td>7. I often drink so much that I feel drunk.</td>
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<tr>
<td>8. I wouldn’t want to go to party where alcohol wasn’t being served.</td>
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<tr>
<td>9. I avoid people who don’t like to drink alcohol.</td>
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<tr>
<td>10. I sometimes urge others to drink more alcohol.</td>
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</tbody>
</table>

Scoring

The lower your score (i.e., the more 1s and 2s), the better able you are to control your alcohol consumption and the more likely it is that your alcohol use is responsible. The higher your score (i.e., the more 4s and 5s), the greater is your use and reliance on alcohol, and the more likely it is that your alcohol consumption may be reckless. If your score is over 40, you may have an alcohol problem and should seek professional help to control your alcohol usage.
LO 3 Narcotics: Relieving Pain and Anxiety

Narcotics are drugs that increase relaxation and relieve pain and anxiety. Two of the most powerful narcotics, morphine and heroin, are derived from the poppy seed pod. Although morphine is used medically to control severe pain, heroin is illegal in the United States. This has not prevented its widespread use.

Heroin users usually inject the drug directly into their veins with a hypodermic needle. The immediate effect has been described as a “rush” of positive feeling, similar in some respects to a sexual orgasm—and just as difficult to describe. After the rush, a heroin user experiences a sense of well-being and peacefulness that lasts three to five hours. When the effects of the drug wear off, however, the user feels extreme anxiety and a desperate desire to repeat the experience. Moreover, larger amounts of heroin are needed each time to produce the same pleasurable effect. These last two properties are all the ingredients necessary for biological and psychological addiction: the user is constantly either shooting up or attempting to obtain ever-increasing amounts of the drug. Eventually, the life of the addict revolves around heroin.

Because of the powerful positive feelings the drug produces, heroin addiction is particularly difficult to cure. One treatment that has shown some success is the use of methadone. Methadone is a synthetic chemical that satisfies a heroin user’s physiological cravings for the drug without providing the “high” that accompanies heroin. When heroin users are placed on regular doses of methadone, they may be able to function relatively normally. The use of methadone has one substantial drawback, however: although it removes the psychological dependence on heroin, it replaces the biological addiction to heroin with a biological addiction to methadone (Amato et al., 2005; Verdejo, Toribio, & Orozco, 2005; Joe, Flynn, & Broome, 2007).

LO 4 Hallucinogens: Psychedelic Drugs

What do mushrooms, jimsonweed, and morning glories have in common? Besides being fairly common plants, each can be a source of a powerful hallucinogen, a drug that is capable of producing hallucinations, or changes in the perceptual process.

Marijuana

The most common hallucinogen in widespread use today is marijuana, whose active ingredient—tetrahydrocannabinol (THC)—is found in a common weed, cannabis. Marijuana is typically smoked in cigarettes or pipes, although it can be cooked and eaten. Just over 31 percent of high school seniors and 12 percent of eighth-graders report having used marijuana in the last year (Johnston et al., 2007; see Figure 7).

The effects of marijuana vary from person to person, but they typically consist of feelings of euphoria and general well-being. Sensory experiences seem
more vivid and intense, and a person’s sense of self-importance seems to grow. Memory may be impaired, causing the user to feel pleasantly “spaced out.” However, the effects are not universally positive. Individuals who use marijuana when they feel depressed can end up even more depressed, because the drug tends to magnify both good and bad feelings.

There are risks associated with long-term, heavy marijuana use. Although marijuana does not seem to produce addiction by itself, some evidence suggests that there are similarities in the way marijuana and drugs such as cocaine and heroin affect the brain. Furthermore, there is some evidence that heavy use at least temporarily decreases the production of the male sex hormone testosterone, potentially affecting sexual activity and sperm count (Block et al., 2000; Iversen, 2000; Lane, Cherek, & Tcheremissine, 2007).

In addition, marijuana smoked during pregnancy may have lasting effects on children who are exposed prenatally, although the results are inconsistent. Heavy use also affects the ability of the immune system to fight off germs and increases stress on the heart, although it is unclear how strong these effects are. There is one unquestionably negative consequence of smoking marijuana: the smoke damages the lungs much the way cigarette smoke does, producing an increased likelihood of developing cancer and other lung diseases (Cornelius et al., 1995; Julien, 2001).

Despite the possible dangers of marijuana use, there is little scientific evidence for the popular belief that users “graduate” from marijuana to more dangerous drugs. Furthermore, the use of marijuana is routine in certain cultures. For instance, some people in Jamaica habitually drink a marijuana-based tea related to religious practices. In addition, marijuana has several medical uses; it can be used to prevent nausea from chemotherapy, treat some AIDS symptoms, and relieve muscle spasms for people with spinal cord injuries. In fact, several states have made the use of the drug legal if it is prescribed by a physician—although it remains illegal under U.S. federal law (National Academy of Sciences, 1999; Iversen, 2004; Seamon et al., 2007).

In recent years the use of Ecstasy has been romanticized in connection with club hopping and raves. What are the potential consequences of idealizing such a harmful drug?

**Figure 7** Although the level of marijuana use has declined slightly in recent years, overall the absolute number of teenagers who have used the drug in the last year remains relatively high. (Source: Johnston et al., 2007.)
**MDMA (Ecstasy) and LSD**

MDMA (“Ecstasy”) and lysergic acid diethylamide (LSD, or “acid”) fall into the category of hallucinogens. Both drugs affect the operation of the neurotransmitter serotonin in the brain, causing an alteration in brain-cell activity and perception (Aghajanian, 1994; Cloud, 2000; Buchert et al., 2004).

Ecstasy users report a sense of peacefulness and calm. People on the drug report experiencing increased empathy and connection with others, as well as feeling more relaxed, yet energetic. Although the data are not conclusive, some researchers have found declines in memory and performance on intellectual tasks, and such findings suggest that there may be long-term changes in serotonin receptors in the brain (Parrott, 2002; Montgomery et al., 2005; El-Mallakh & Abraham, 2007).

LSD, which is structurally similar to serotonin, produces vivid hallucinations. Perceptions of colors, sounds, and shapes are altered so much that even the most mundane experience—such as looking at the knots in a wooden table—can seem moving and exciting. Time perception is distorted, and objects and people may be viewed in a new way, with some users reporting that LSD increases their understanding of the world. For others, however, the experience brought on by LSD can be terrifying, particularly if users have had emotional difficulties in the past. Furthermore, people occasionally experience flashbacks, in which they hallucinate long after they initially used the drug (Baruss, 2003; Wu, Schlenger, & Galvin, 2006).

**Identifying Drug and Alcohol Problems**

In a society bombarded with commercials for drugs that are guaranteed to do everything from curing the common cold to giving new life to “tired blood,” it is no wonder that drug-related problems are a major social issue. Yet many people with drug and alcohol problems deny they have them, and even close friends and family members may fail to realize when occasional social use of drugs or alcohol has turned into abuse.

Certain signs, however, indicate when use becomes abuse (Archambault, 1992; National Institute on Drug Abuse, 2000). Among them are the following:

- Always getting high to have a good time
- Being high more often than not
- Getting high to get oneself going
- Going to work while high
- Missing or being unprepared for work because you were high
- Feeling bad later about something you said or did while high
- Driving a car while high
- Coming in conflict with the law because of drugs
- Doing something while high that you wouldn’t do otherwise
- Being high in nonsocial, solitary situations
- Being unable to stop getting high
- Feeling a need for a drink or a drug to get through the day
- Becoming physically unhealthy
Because drug and alcohol dependence are almost impossible to cure on one’s own, people who suspect that they have a problem should seek immediate attention from a psychologist, physician, or counselor.

You can also get help from national hotlines. For alcohol difficulties, call the National Council on Alcoholism at (800) 622-2255. For drug problems, call the National Institute on Drug Abuse at (800) 662-4357. You can also check your telephone book for a local listing of Alcoholics Anonymous or Narcotics Anonymous. Finally, check out the Web sites of the National Institute on Alcohol Abuse and Alcoholism (www.niaaa.nih.gov) and the National Institute on Drug Abuse (www.nida.nih.gov).

R E C A P

Explain the effects of stimulants.
- Drugs can produce an altered state of consciousness. However, they vary in how dangerous they are and in whether they are addictive. (p. 142)
- Stimulants cause arousal in the central nervous system. Two common stimulants are caffeine and nicotine. More dangerous are cocaine and amphetamines, which in large quantities can lead to convulsions and death. (p. 144)

Explain the effects of depressants.
- Depressants decrease arousal in the central nervous system. They can cause intoxication along with feelings of euphoria. The most common depressants are alcohol and barbiturates. (p. 147)
- Alcohol is the most frequently used depressant. Its initial effects of released tension and positive feelings yield to depressive effects as the dose of alcohol increases. Both heredity and environmental stressors can lead to alcoholism. (p. 147)

Explain the effects of narcotics.
- Morphine and heroin are narcotics, drugs that produce relaxation and relieve pain and anxiety. Because of their addictive qualities, morphine and heroin are particularly dangerous. (p. 151)

Explain the effects of hallucinogens.
- Hallucinogens are drugs that produce hallucinations or other changes in perception. The most frequently used hallucinogen is marijuana, which has several long-term risks. Two other hallucinogens are LSD and Ecstasy. (p. 151)
- A number of signals indicate when drug use becomes drug abuse. A person who suspects that he or she has a drug problem should get professional help. People are almost never capable of solving drug problems on their own. (p. 153)
**E V A L U A T E**

1. Drugs that affect a person’s consciousness are referred to as __________.

2. Match the type of drug to an example of that type.
   1. Narcotic—a pain reliever
   2. Amphetamine—a strong stimulant
   3. Hallucinogen—capable of producing hallucinations
   a. LSD
   b. Heroin
   c. Dexedrine® or speed

3. Classify each drug listed as a stimulant (S), depressant (D), hallucinogen (H), or narcotic (N).
   1. Nicotine
   2. Cocaine
   3. Alcohol
   4. Morphine
   5. Marijuana

4. The effects of LSD can recur long after the drug has been taken. True or false?

5. ________ is a drug that has been used to cure people of heroin addiction.

**R E T H I N K**

Why have drug education campaigns largely been ineffective in stemming the use of illegal drugs? Should the use of certain now-illegal drugs be made legal? Would it be more effective to stress reduction of drug use rather than a complete prohibition of drug use?

**Answers to Evaluate Questions**
1. 1-b, 2-c, 3-a
2. 1-S, 2-S, 3-D, 4-N, 5-H
3. True
4. Methadone

**KEY TERMS**

- Psychoactive drugs p. 142
- Addictive drugs p. 143
- Stimulants p. 144
- Depressants p. 147
- Narcotics p. 151
- Hallucinogen p. 151
Psychology on the Web

1. Find a resource on the Web that interprets dreams and another that reports the results of scientific dream research. Compare the nature and content of the two sites in terms of the topics covered, the reliability of information provided, and the promises made about the use of the site and its information. Write a summary of what you found.

2. There is considerable debate about the effectiveness of D.A.R.E., the Drug Abuse Resistance Education program. Find a discussion of both sides of the issue on the Web and summarize the arguments on each side. State your own preliminary conclusions about the D.A.R.E. program.
Arlene Amarosi, a working mother, has been under a lot of stress this year. She has been having difficulty getting to sleep and often lies in bed staring at the ceiling while worrying about her problems. As a result, she’s often tired throughout her workday and relies on coffee and caffeinated energy drinks to keep her going.

Lately Arlene’s sleep has been disturbed even more often than usual. Several times over the past week she has been awakened by disturbing dreams. In these dreams she is always at work, struggling to keep up with an impossible workload. She is struggling with the new software that her company recently trained her to use, but no matter how fast she goes, she can’t keep up with the workflow. The dream ends when Arlene wakes up in a panic. It often takes Arlene hours to get back to sleep, and she has been feeling even more tired than usual during work.

1. Arlene is worried that her recent dream experiences indicate that something is wrong with her. If you were Arlene’s friend and wanted to reassure her, how would you help her to understand the normal experience of sleep and dreams?

2. Which theory of dreaming seems to best explain Arlene’s disturbing dreams, and why?

3. How might meditation help Arlene?

4. If you were Arlene’s health care provider, how would you advise her to overcome her insomnia?

5. What are some effects on Arlene of her high caffeine intake? What would happen if she just suddenly stopped drinking coffee and energy drinks? How would you advise her to modify her caffeine use?