

FOCUS ON VOCABULARY AND LANGUAGE

After *zoning me out* with *nitrous oxide*, my dentist tells me to turn my head to the left. When he was at the dentist's office, Myers was given a drug (*nitrous oxide*). This **psychoactive drug** affected his **consciousness**, causing him to feel detached and somewhat disconnected from his surroundings (he was *zoned out*). Despite his conscious attempt to rebel against his dentist's instructions, his head automatically obeyed the request (his *robotic head* turned to the left).

. . . *drops by* . . . If a person casually visits the author without an appointment (*drops by his office*) and begins talking to him (*strikes up a conversation*), Myers can continue typing the sentence he has been working on without difficulty. This ability to engage in two tasks simultaneously illustrates how **consciousness** can split or separate, with one part focused on accomplishing a routine task and the other part free to roam or meander (*the mind is wandering*).

Brain States and Consciousness

To psychologists, consciousness is similarly a *fundamental yet slippery concept*. In science, many *fundamental concepts* are difficult to define (for example, life, matter, energy). Consciousness is one of the most basic (*fundamental*) ideas in psychology, yet it is an elusive and difficult concept to grasp (*a slippery concept*).

Defining Consciousness

. . . psychology had nearly *lost consciousness* . . . Myers is using a little humor to illustrate the fact that changes have taken place during psychology's history. To "*lose consciousness*" can have two meanings here: (1) to fall unconscious or pass out and (2) to fail to keep (*lose*) "consciousness" as the subject matter of psychology. Psychology started out as the study of conscious experience; then, because of problems in scientifically investigating the mind, overt behavior replaced consciousness during the first half of the twentieth century. Finally, in the 1960s, psychologists *regained consciousness* as a legitimate subject for study.

How do *brain cells jabbering* to one another create our awareness of the taste of a taco, the idea of infinity, the feeling of fright? In contemporary science, the search to comprehend the biology of consciousness is popular, exciting, and interesting. Nevertheless, it is a very difficult endeavor. For example, how do neurons (*brain cells*), which rapidly communicate (*jabber*) with one another, give rise to the mind—to conscious awareness of taste sensations, conceptual ideas, basic and complex emotions, and so on? (This is known as the "*hard-problem*.")

The Biology of Consciousness

(*Figure 3.2*) . . . *vegetative patient* . . . This refers to a person who is in a coma and whose routine functions are reduced or absent. Despite being unable to respond in a normal fashion, these noncommunicative patients exhibit brain activity similar to that of a healthy person's brain. Such brain activity suggests that, even in a comatose, paralyzed (*motionless*) body, the brain and the mind may still be active.

What is *mind-blowing* to many of us is the growing evidence that we have, *so to speak, two minds*, each *supported* by its own neural equipment. What is surprising or even astonishing (*mind-blowing*) is that we possess two separate levels of consciousness (*two minds, so to speak*). Each is helped and

sustained (*supported*) by its own neural system; one level is conscious awareness (*what's on the screen*) and the other is out of awareness and unconscious (*off stage and out of sight*).

We know more than we know we know. This sentence sounds confusing, but it simply means that we have more knowledge than we are consciously aware of having. There is information contained at both the unconscious, automatic level (*the "low road"*) and at the aware, deliberate, conscious level (*the "high road"*). Perception, memory, thinking, language, and attitudes all operate at these two levels—and this is referred to as **dual processing**.

But consciousness . . . is but *the tip of the information-processing iceberg*. Just as most of the mass or volume of an iceberg is below the surface of the ocean and out of sight, most mental functioning goes on without conscious awareness. Consciousness is a small part (*the tip of the iceberg*) of total information processing.

Running on automatic pilot allows our consciousness—our mind's *CEO*—to *monitor* the whole system and *deal with* new challenges, while neural *assistants* automatically take care of routine business. Myers is pointing out that much of our information processing occurs outside of conscious awareness (*we run on automatic pilot*). Conscious awareness is similar to the top manager of an organization (the *CEO* or chief executive officer) whose many helpers (*assistants*) take care of all the routine tasks, allowing him or her to pay attention to (*monitor*) the total system and tackle (*deal with*) new challenges.

Selective Attention

Now, suddenly, *your attentional spotlight shifts*. *Your feet feel encased, your nose stubbornly intrudes on the words before you.* **Selective attention** refers to our tendency to focus on only a small part of what it is possible for us to experience. If you do attend to more aspects of your experience (*if your attentional spotlight shifts*), you will be surprised at the amount of stimulation you process without awareness, such as the feel of the shoes on your feet (*your feet feel encased*) and the fact that your nose actually blocks your line of vision (*your nose stubbornly intrudes on the words before you*).

We pay a toll for switching attentional gears . . . When we change our focus from one thing to another (*switch attentional gears*)—and especially when this change in focus involves more complex tasks—there can be a delay in dealing with the changing situation. This delay can be costly (*we pay a toll*) or even deadly (*a fatal delay*).

. . . they failed to notice a young woman carrying an umbrella *saunter* across the screen midway through the video. In this experiment, viewers had to watch a video of basketball players and signal when the ball was passed. Because of their intense *selective attention*, they generally failed to notice a female walking slowly (*sauntering*) through the players. In a replication of this study, the clever, humorous investigators (*smart-aleck researchers*) had a colleague in a gorilla costume (*a gorilla-suited assistant*) walk through the twisting, turning participants (*the swirl of players*); 50 percent of the viewers failed to notice the “gorilla.” This failure to see visible objects when attention is directed elsewhere is called **inattention blindness**.

. . . *pop-out* . . . A very unique object or event (*a strikingly distinct stimulus*) will automatically attract our attention (*it draws our eye*). This experience is called the *pop-out phenomenon*.

Sleep and Dreams

While sleeping, you may feel “*dead to the world*,” but you are not. When we are sound asleep we may be hard to awaken and unresponsive (“*dead to the world*”). Nevertheless, part of our mind is still processing information outside our conscious awareness. Even when we are deeply asleep, our perceptual window is actually not completely shut; it is open a tiny bit (*it is open a crack*).

. . . *limbs often move in concert* . . . To “*move in concert*” is to move simultaneously or in synchrony. When we dream of doing something, our arms and legs do not move in synchrony (do not *move in concert*) with the activity in the dream.

Biological Rhythms and Sleep

Try *pulling an all-nighter* or *working an occasional night shift*. You’ll feel *groggiest* in the middle of the night but may gain new energy when your normal wake-up time arrives. If we decide to stay up all night (*pull an all-nighter*) or have to work during the night (*work the night shift*), we feel most mentally confused and uncoordinated (*groggiest*) around the middle of the night. But as our usual time for getting up approaches, we begin to feel renewed energy and alertness.

. . . “*owls*” . . . “*larks*” . . . Like birds that are nocturnal (*owls* are an example), many younger adults stay up late and are lively at nighttime (*evening-energized “owls”*). As we get older, we are more energetic in the morning (*morning-loving “larks”*) and performance tends to decline as the day progresses—much like birds that wake and become active with the dawn of a new day (*larks* are birds that do this).

. . . Aserinsky watched the machine *go wild*, tracing *deep zigzags* on the graph paper. The discovery of **REM** (rapid eye movement) **sleep** occurred accidentally. To see if an EEG (*electroencephalograph*) was working properly, Aserinsky placed the electrodes near his 8-year-old son’s eyes. Periodically during the night, the machine responded vigorously (*went wild*), producing a pattern of high-frequency waves (*deep zigzags*) on the printout. These patterns were produced by rapid, spasmodic (*jerky*) eye movements and accompanied by very frantic brain activity. When awakened during one of these periods, the boy said he was dreaming.

Rather than continuing in deep *slumber*, you *ascend* from your initial *sleep dive*. During a typical night’s **sleep** (*slumber*), you go through a number of distinct stages. If you were awake and relaxed, perhaps with your eyes closed, an EEG would show **alpha waves**. As you fall deeper and deeper into sleep (*sleep dive*), your brain waves continue to slow down. By NREM-3, your brain waves are long and slow (**delta waves**), but you do not stay here all night. Instead, you go back up (*ascend*) through the stages into the most unique and interesting stage of all, **REM** (rapid eye movement) **sleep**, where most dreams occur. Here, your brain waves resemble fast, uneven non-REM Stage 1 (NREM-1) waves (*they become rapid and saw-toothed*)—but there is much more internal physiological arousal and, paradoxically, your muscles are almost paralyzed.

As the night *wears on*, deep NREM-3 sleep grows shorter and disappears. As the night progresses (*wears on*), the time spent in NREM-3 deep sleep gets shorter and eventually ceases altogether, while time spent in REM and NREM-2 sleep periods increases.

Bright morning light *tweaks* the circadian clock by activating light-sensitive retinal proteins. As the day begins, the vivid daylight induces or provokes (*tweaks*) the activation of light-sensitive proteins in the retina of the eye. These proteins control the circadian clock by generating (*triggering*) signals to the *suprachiasmatic nucleus* (*SCN*). The SCN is a pair of very small 10,000-cell clusters (each the size of a grain of rice or *grain-of-rice-sized*) in the hypothalamus.

Sleep Theories

When consciousness leaves your house, brain construction workers come in for a makeover. One theory of why we sleep suggests that sleep helps repair and restore brain tissue. In much the same way that *construction workers* may carry out repairs and renovations when the house is unoccupied (*they come in for a makeover*), the brain uses the time when we are not actively alert and awake (*when consciousness leaves your house*) to repair and restore brain tissue.

Close Up: Sleep and Athletic Performance

. . . *shooting baskets* . . . This means to throw the ball through the hoop in the game of basketball. Slow-wave sleep produces the growth hormone necessary for muscle development, while REM and NREM-2 sleep help strengthen the neural connections that build long-lasting memories of movements learned while practicing games such as tennis or basketball (*“muscle memories”*).

Sleep Deprivation and Sleep Disorders

(*Margin note*) . . . *drowsy* . . . If you were deprived of sleep for a few nights, you would feel very tired and sleepy (*drowsy*) and also unsteady and dazed (*groggy*).

When the going gets boring, the students start snoring. Teenagers get much less sleep than they need and are often seriously sleep deprived (they have a large *sleep debt*). As a result, they are very likely to fall asleep during class—especially during routine lectures (*when the going gets boring, the students start snoring*). Sleep deprivation can result in “difficulty studying, diminished productivity, tendency to make mistakes, irritability, fatigue,” depression, and weight gain. As sleep researcher Dement noted, a large sleep debt “makes you stupid.”

. . . “*spring forward*” to “daylight savings” time and “*fall backward*” to “standard” time. Many countries adopt daylight savings time. This means that in the spring people move their clocks ahead one hour (“*spring forward*”) and back one hour in the fall (“*fall backward*”). Consequently, people lose one hour of sleep in the spring, which results in more traffic accidents on the Monday following the Sunday time change. With the extra hour of sleep in the fall, traffic accidents decline on the Monday following the time change.

The most common *quick fixes* for true insomnia—sleeping pills and alcohol—can *aggravate the problem*, reducing REM sleep and leaving the person with *next-day blahs*. The most popular fast remedies (*quick fixes*) for **insomnia** are sleeping pills and alcohol. Unfortunately, they can make the problem worse (*aggravate it*) by suppressing REM sleep; the next day the person may have less energy and feel very tired (may suffer *next-day blahs*). When these “remedies” are discontinued, the insomnia may get worse.

As a traffic menace, “*snoozing* is second only to *boozing*,” says the American Sleep Disorders Association, and those with narcolepsy are especially at risk (Aldrich, 1989). Falling asleep (*snoozing*) while driving is almost as serious a problem as drinking (*boozing*) and driving. People with **narcolepsy** suffer from occasional periods of uncontrollable sleepiness often associated with emotional arousal, and are thus in danger, and dangerous, while driving.

Dreams

We spend six years of our life in dreams, many of which *are anything but sweet*. Dreams during REM sleep are vivid, emotional, and often very strange (*bizarre*). Many of our dreams are not very

pleasant (*they are anything but sweet*), and about 80 percent of women and men experience at least one distressing episode (*negative event*), such as repeatedly falling, being attacked, chased, rejected, or experiencing misfortune.

He [Freud] proposed that dreams provide a *psychic safety valve* that discharges otherwise unacceptable feelings. According to Freud, the story line of a dream (the **manifest content**) is a disguised version of the real, but hidden, meaning of a dream (the **latent content**). He suggested that, by symbolically expressing our hidden desires and erotic wishes, dreams allow us to ventilate unconscious drives that might otherwise be harmful (act as a *psychic safety valve*). Note that a *safety valve* allows a system to dissipate built-up pressure and thus may prevent an explosion.

However, his [Freud's] critics say *it is time to wake up from* Freud's dream theory, which is a scientific *nightmare*. Here, Myers is having some fun with a play on words. The expression "*it is time to wake up from something*" means that one should start paying attention to reality and facts, rather than fantasy. To say something is a "*nightmare*" means that it is unruly, difficult, or even frightening. Most contemporary psychologists believe that REM sleep and dreams are important aspects of our life but that Freud's theory of dream interpretation is erroneous, unscientific, and misguided (*a nightmare*); thus, we should not place much reliance on its explanations (*it is time to wake up from it*).

The brain regions that *buzz* as rats learn to navigate a maze, or as people learn to perform a visual-discrimination task, *buzz* again during later REM sleep. Studies demonstrate that sleeping helps memory and learning. The areas of the brain that are active (that *buzz*) when learning is taking place are active once more (they *buzz* again) during REM sleep. This is important news for sleep-deprived students who tend to learn and remember less than their non-sleep-derived counterparts. Attempting to make up for the loss of sleep by sleeping longer and later on weekends (*a kind of sleep bulimia—binge sleeping*) will not compensate for the lower levels of learning and recall.

Hypnosis

Frequently Asked Questions About Hypnosis

(*Margin note*) "Hypnosis is not a psychological *truth serum* and to regard it as such has been a source of *considerable mischief*." Research shows that hypnotists can subtly influence what people recall and may inadvertently create false memories by making suggestions and asking leading questions. Thus, **hypnosis** is not like a so-called *truth serum* (a drug alleged to make people tell the truth); rather, it has caused a great deal of annoying—and possibly harmful—effects (*considerable mischief*).

Drugs and Consciousness

Tolerance, Dependence, and Addiction

Why might a person who rarely drinks alcohol get *buzzed* on one can of beer while a long-term drinker shows few effects *until the second six-pack*? Prolonged use of a **psychoactive drug** produces the ability, through *neuroadaptation*, to require larger and larger doses of the substance to experience the same effect (**tolerance**). Thus, an infrequent user of alcohol may get somewhat intoxicated (*buzzed*) from one beer. But for a regular drinker there might be little effect until six or more beers have been consumed (*until the second six-pack [of beer]*).

Thinking Critically About: Addiction

. . . *kicked the habit* . . . This means that the person who has been using a substance on a regular basis (*habitual* behavior) has now stopped doing so (*has kicked the habit*). Myers notes that **addiction** is not an uncontrollable disease (such as diabetes) and many people voluntarily stop using addictive drugs without treatment or therapy. Nevertheless, the addiction-as-disease-needing-treatment idea continues; but, note that labeling a behavior as addictive doesn't explain it.

Types of Psychoactive Drugs

. . . as when *tipsy* restaurant patrons leave *extravagant tips*. Alcohol can increase both harmful and helpful inclinations. Thus, it often happens that restaurant clientele give larger gratuities (*extravagant tips*) when they are more intoxicated (*tipsy*). Whatever tendencies you have when sober will be more obvious when you are drunk.

In larger doses, alcohol can become a *staggering problem* . . . Myers is using humor here to make an important point. To describe a problem as *staggering* means that the problem is enormous and has serious consequences (for example, a "staggering debt" is one that is overwhelming). One of the consequences of ingesting large amounts of alcohol is slowed reaction time, memory loss (*blackouts*), language disruptions (*slurred speech*), and uncoordinated physical movements (a person *staggers*). Thus, drinking too much alcohol has serious implications (it is a *staggering problem*).

Alcohol's effect lies partly in that powerful sex organ, the mind. Alcohol's effects on self-control and social expectations often converge in sexual situations, and may result in unanticipated problems for those involved (*alcohol + sex = the perfect storm*). Over 600 studies have shown that there is a consistent correlation between drinking and risky sex. Myers points out that alcohol is not the only thing involved in this phenomenon—our beliefs about its effects on sexual behavior are also involved (*the effect lies partly in that powerful sex organ, the mind*).

For this short-term pleasure, *opiate users may pay a long-term price: a gnawing craving* for another *fix* . . . There is a cost (*one pays a long-term price*) for enjoying drug-induced pleasures. For an addict, this may be a persistent inner torment (*gnawing*) and an urgent, persistent desire (*craving*) for another dose of the drug (*a fix*). Because of the need for progressively larger doses to achieve the same effect (**tolerance**), and because of the extreme discomfort of **withdrawal**, a drug user may end up paying the highest cost of all (*paying the ultimate price*)—death by overdose.

Cocaine use offers a fast track from *euphoria to crash*. Cocaine enters the bloodstream rapidly, producing a feeling of excitement, rapture, and well-being (*euphoria*). This feeling is followed within an hour by a drop into agitated depression (*a crash*) as the effect of the drug wears off. Many regular cocaine users seeking this elevated mood (*high*) become addicted.

. . . *crack* . . . *Crack* is a very potent, synthetic form of cocaine, which produces a feeling of euphoria (*a rush or high*) followed by deep depression, tiredness, and irritability (*a crash*).

Ecstasy delights for the night but dispirits the morrow. **MDMA** or **Ecstasy** is a popular "club drug" taken at night clubs and *all-night raves* (parties with loud music and dancing that go on most of the night). Myers notes that there are reasons not to be delighted or thrilled about Ecstasy (*reasons not to be ecstatic*) because of the serious and harmful effects it produces. While it may elevate mood and feelings of bliss during the night, there are severe consequences the next day (*Ecstasy delights for the night but dispirits the morrow*).