

Chapter in Review

1. There is no consensus on how to define consciousness or how to study it. One commonsense definition contributed by John Searle is that consciousness consists of inner, qualitative, subjective states and feelings or awareness. According to this definition, consciousness exists as long as a person is alive and not in a state of thoughtless, dreamless sleep or coma. Consciousness defined in this way includes qualitiveness, subjectivity, and unity. The “hard problem” of consciousness is the question of how a physical organ (the brain) produces the seemingly disembodied subjective state of consciousness. Altered states of consciousness (ASC) could include sleep, dreams, hypnosis, hallucinations, meditations, drug states, and so forth.
2. The urge to sleep is profound. All animals sleep regularly. Total sleep deprivation results in severe impairments in functioning. Individuals vary in the amount of sleep they need. Sleep patterns are regulated by the circadian pacemaker and the sleep homeostat. Falling asleep is a series of continuous gradual changes. Some people may experience hypnagogia as they fall asleep. There are two types of sleep—REM (active sleep) and NREM (slow-wave sleep). REM is characterized by high levels of nervous system activity and vivid dreaming. NREM, which covers the greater portion of sleep time, is characterized by the deepest levels of relaxation. Sleep is experienced in five sleep stages, the first four consisting of NREM and the fifth of REM. These stages (minus Stage 1, which occurs only once) play out in a 90- to 110-minute repeated sleep cycle throughout the night. The function of sleep is unknown, but the most often-discussed current theories are the idea that sleep promotes memory consolidation and the idea that sleep allows for synaptic pruning to strengthen important connections and lessen those less important so that the brain can apply resources where they are most needed.
3. There is little agreement among dream researchers as to the nature and function of sleep mentation, which can be divided into the categories cognitive activity, ordinary dreaming, and apex dreaming. Cognitive activity during sleep is often called “sleep thinking.” It lacks dramatic progression, is rational and unemotional, and nonhallucinatory. Ordinary dreaming is the most frequent type of dream, with recognizable characters engaged in relatively realistic activities. Apex dreams are the most intense, vivid, bizarre, hallucinatory dreams—what most people think of when they hear the word “dream.” However, apex dreams are a minority of dreaming activity. Most apex dreaming occurs during REM sleep. An unusual type of apex dream is the lucid dream, where the dreamer becomes aware that he or she is dreaming.
4. Numerous theories have been advanced regarding the purpose of dreams. However, none of these theories is accepted by all. The one fact that remains clear is that dreams have meaning to the dreamer, consisting of content drawn from each person’s life history, circumstances, emotions, and subjective experience. The content of dreams is not random, and despite major cultural changes over the second half of the 20th century, the content of dreams of college students has remained largely unchanged. There are also cross-cultural similarities as well as difference in typical content of dreams. There is continuity between people’s

- waking thoughts and their dream content, and the sleeping environment may also influence dream content.
5. A large number of people have problems connected to their sleep, but only a small number experience a genuine sleep disorder. Insomnia is a chronic difficulty falling asleep, staying asleep, and/or being unable to obtain restful sleep, often resulting in daytime exhaustion, irritability, and hopelessness. Obstructive sleep apnea (OSA) is a sleep disorder caused by repeated narrowing along the upper airway throughout the night, leading to complete or partial inability to breathe. The elderly and obese are at greatest risk for OSA. Parasomnias are a group of disorders characterized by unusual or bizarre physical behaviors, perceptions, dreams, or emotions during sleep. These include REM-behavior sleep disorder, where the sleeper is missing ordinary dream-related muscle paralysis and may attempt to act out his or her dream; night terrors, typically a childhood-related condition involving episodes of extreme terror during NREM sleep; and sleepwalking. Sufferers from narcolepsy may abruptly fall asleep at inappropriate times and places in part due to a dysfunction in the production of a sleep-related hormone due to a gene-related autoimmune response.
 6. The question of whether hypnosis is an actual ASC has been under debate for over 100 years (the “special state” vs. “nonstate” debate). Those subscribing to neodissociation theory propose that hypnosis is a true ASC, whereas those subscribing to sociocognitive theory propose that the same behaviors seen under hypnosis can be produced without any special procedures through nonhypnotic suggestions. However, sociocognitive theorists do not claim that hypnosis is “not real,” only that it is similar in some ways to placebo response. Hypnosis has recently been redefined by the American Psychological Association simply as a procedure in which a person acting as a “hypnotist” gives suggestions for “imaginative experiences” to a “subject.” Suggestions are generally preceded by the hypnotic induction procedure. However, the induction procedure does not “hypnotize” the subject. The subject becomes suggestible and thus hypnotizes himself or herself. Moreover, the specifics of the induction procedure do not matter, and it is not even necessary to use an induction procedure at all—merely giving suggestions when the subject believes he or she is being hypnotized is enough.
 7. Meditation derived from Buddhist and Hindu or yogic practices are based upon two basic characteristics: relaxed attention and not thinking. The essential attitude of meditation is relaxed attention to the moment, without strain, expectation, or self-criticism. Concentrative meditation and open meditation are different approaches to achieving relaxed attention and no-thought. Unlike hypnosis, evidence strongly supports the view that meditation is an altered state.
 8. A psychoactive drug is any substance with properties that affect mental life or consciousness in some way. Nonmedical use of drugs (so-called recreational drugs) includes all drug uses specifically intended to alter consciousness. Use of psychoactive drugs is an ordinary part of most people’s lives, if alcohol, nicotine, and caffeine are included. It is difficult to obtain accurate information about nonmedical drug use because powerful moral, social, economic, and political

- interests are involved. People's attitudes toward various drugs are the result of historical and social forces and change with the times. These attitudes are not always based realistically on the relative harmfulness of the drug.
9. Addiction has no accepted definition. Traditionally, addiction referred to dependent and compulsive use of a drug which resulted in three outcomes: withdrawal, craving, and tolerance. However, so-called "non-addictive" drugs, which do not produce withdrawal and tolerance (e.g., cocaine), can produce craving and dependence as powerful as addictive drugs such as the opioids. There is no safe drug, just as there is no dangerous drug. All substances are potentially toxic if taken in sufficient quantities. There is a dose level for every substance above which it poses a danger and below which it does not. Researchers compute a safety ratio of each psychoactive drugs; the larger the ratio, the less toxic the drug given the doses normally used. Marijuana has the highest safety ratio of all commonly used psychoactive drugs. The most dangerous drugs in terms of potential for death and disease are alcohol and tobacco, although if used in small to moderate quantities on a regular basis alcohol is relatively safe and may even have certain health benefits.
 10. Psychoactive drugs can be grouped in four general categories: narcotics, depressants, stimulants, and psychedelics. However, some psychoactive drugs do not fit neatly into these categories. Narcotics refer generally to drugs synthesized from the dried nectar of poppy flowers (opium), including heroin, morphine, oxycodone, hydrocodone, and codeine among others. Apart from their potential for addiction when abused, opioid drugs are among the safest and most useful drugs of any kind. Addiction generally does not result from medically necessary prescribed use, but these drugs are very dangerous when used for nonmedical purposes. When addiction occurs, it can be extremely difficult to treat because withdrawal symptoms are severe and agonizing. Despite popular beliefs, deaths occurring from the use of these drugs generally do not happen from simple overdose, but from combining opioid drugs with other CNS depressants such as alcohol or benzodiazepines.
 11. Stimulant drugs include cocaine, amphetamines, caffeine, and nicotine. Cocaine, the concentrated form of an alkaloid of the coca plant, produces euphoria, alertness, and feelings of well-being, but long-term users experience sleeplessness, depression, and impairment in thought and perception. The drug can produce an extremely severe form of dependence, although it does not produce true withdrawal or tolerance characteristic of narcotics. Amphetamines produce somewhat similar feelings of exhilaration, alertness, confidence, and mood elevation, but the effects are much longer lasting and "harsh." Amphetamines can easily produce symptoms of mania. These drugs may also cause long-lasting changes in brain structure and functioning. Caffeine, found naturally in coffee, tea, and chocolate, wards off fatigue and produces alertness. In very large doses it produces unpleasant symptoms or even psychiatric symptoms. Most human beings use caffeine in some form. Caffeine can produce dependence but is not "addictive" in the ordinary sense of the word. Possible benefits or dangers of caffeine are controversial.

12. Nicotine is a stimulant that produces a slight increase in alertness. It is highly addictive, and withdrawal is difficult to endure. Smoking cigarettes is likely the most dangerous “ordinary” behavior in which a person may engage. Half of those who smoke cigarettes will die of a disease caused by smoking before they turn 70, and smoking is responsible for approximately 5 million deaths per year worldwide. Cigarettes are the most deadly of all recreational drugs because they affect virtually every organ in the body and increase levels of stress. Smoking almost always begins in adolescence, and few people begin smoking in adulthood. Adolescence is the usual time to begin smoking because advertisers target adolescents, adolescents are prone to engage in risky behaviors, and adolescents are peer-oriented, so adolescent smokers “infect” their friends.
13. Depressant (hypnotic) drugs include alcohol, rohypnol, and GHB. Alcohol is the oldest and most widely used psychoactive drug second to caffeine. The effects of alcohol vary according to the user, the setting, beliefs about alcohol, and the dose. Like smoking, binge drinking can damage virtually every bodily organ. About one-third of the earth’s population use alcohol, and the drug directly causes close to 2 million deaths per year. A small percentage of users become dependent, although considerably more than that may abuse the drug. Alcohol dependence is very difficult to treat. Although alcohol is the most dangerous psychoactive drug second to cigarettes, alcohol can be safe and even beneficial if taken in small to moderate amounts. Rohypnol produces sensations somewhat similar to alcohol, but high doses are very unpleasant. Rohypnol is safer than alcohol, narcotics, or cocaine. However, if dependence does result, withdrawal can be dangerous as well as unpleasant. GHB in low doses also produces alcohol-like effects, but at medium doses can produce stimulating effects simultaneously. GHB is particularly dangerous, because the difference between recreational and fatal doses is not as great as with most other drugs. GHB is known as the “date rape drug” but research suggests that if such a drug exists, it is alcohol, not GHB.
14. Psychedelic drugs (hallucinogens) include LSD, peyote, psychedelic mushrooms, ecstasy (MMDA), and marijuana. These drugs produce effects that vary by individual, setting, dose, and cultural beliefs even more dramatically than alcohol. LSD, peyote, and psychedelic mushrooms share the ability to alter perception, strongly affecting sensory experiences and effecting radical changes in thought and emotion. The potential for dependence upon these drugs is low to nonexistent, and their safety ratio is very high. The dangers they may pose are primarily psychological in nature. Although the effects of these drugs can be quite positive if they are used in controlled circumstances, “bad trips” can be so devastating as to affect the individual negatively for many years. Ecstasy produces a general sense of well-being, openness, empathy, and reduced fear. However, the safety of this drug is highly controversial and the subject of debate. The drug has not been “proved safe” as some claim, but neither has it been shown to cause brain damage as claimed by others. It is deadly when taken in excessive doses, but it is almost never taken in such doses, and many fewer deaths can reliably be attributed to this drug than to opioids, alcohol, methamphetamine, cocaine, and other drugs. Some evidence suggests that this drug (when in its pure, “uncut” form) may be among the safest recreational drugs in use.

15. Marijuana (cannabis) is the safest recreational drug commonly in use, but perhaps also the most controversial for social as well as scientific reasons. Massive resources have been applied in attempts to determine harms of marijuana (but relatively scant research devoted to evaluating benefits). Marijuana can result in dependence, but this only occurs in a small minority of cases. “Bad trips” can be terrifying, but the drug has many positive effects as well. Claims that marijuana use results in psychological disturbance, poor cognitive functioning, and reduced educational performance are not well supported. However, there may be small effects on memory in some cases. Smoking marijuana produces tars hazardous to the lungs, but there is no evidence that marijuana actually increases mortality as a result, likely because marijuana users do not typically smoke very much per day as compared with cigarette smokers. There is no known fatal dose of marijuana. There are many recognized medical uses of marijuana.

Section Summaries

What is consciousness?

1. Scientists and philosophers do not agree on a definition of consciousness.
2. The commonsense definition of consciousness devised by John Searle includes three prominent qualities: qualitateness, subjectivity, and unity.
3. The “hard problem” of consciousness is explaining how the brain—a material object—creates consciousness, a seemingly immaterial experience.
4. An altered state of consciousness could be defined subjectively as a temporary but radical change in the overall pattern of a person’s normal subjective experience.

How and why do we sleep?

1. Sleep is regulated by the circadian pacemaker and the sleep homeostat.
2. Sleep is divided into five stages. Stage 1 is sleep onset, Stages 2–4 are NREM, and Stage 5 is REM. The stages of sleep occur in a sleep cycle repeated through the night.
3. NREM is associated with the deepest “slow wave” sleep, whereas REM is associated with the most intense, vivid, and hallucinatory dreaming.
4. The function of sleep is unknown.

What are dreams?

1. Sleep mentation includes cognitive activity, ordinary dreaming, and apex dreaming.
2. The function of dreaming is unknown. Researchers theorize that dreams are the cortex’s way of making sense of random brain activity in the absence of neurotransmitters associated with rational thought; dreams are random activation of memories; dreams are a way to keep the sleeper asleep; dreams exist to allow the sleeper to “rehearse” threatening situations.
3. The content of dreams can be summarized in the following statements: The dream life of young adults has remained unchanged over the last 50 years; there are culture similarities and differences in dream content; there is a strong continuity between people’s waking thought and the content of their dreams; sleeping environment can affect the content of dreams.

What are sleep disorders?

1. Although the majority of Americans experience sleep problems from time to time, relatively few can actually be diagnosed with a sleep disorder.
2. Insomnia is a chronic difficulty falling asleep, staying asleep, or obtaining restful sleep.
3. Obstructive sleep apnea is a disorder caused by narrowing at various sites along the upper airway, leading to an inability to breathe.
4. Parasomnias include talking in one’s sleep, bedwetting, leg cramps, REM-sleep behavior disorder, night terrors, and sleepwalking.
5. Narcolepsy is a neurological disorder characterized by a disruption of the sleep homeostat and sleep cycle. Narcolepsy sufferers fall asleep at unpredictable times.

Is hypnosis an altered state of consciousness?

1. Hypnosis is a social interaction between a “hypnotist” and “subject” involving suggestions for “imaginative experiences.” It is not a “trance state.”
2. It is primarily the subjects’ belief that they are undergoing hypnosis—not the induction procedure—which causes hypnotic effects to occur.
3. “State” theorists believe that subjects experience altered states during hypnosis (although they do not generally believe that hypnosis itself is an altered state). “Nonstate” theorists believe that nothing about hypnosis is explained by the idea of altered states.

What is the nature of meditation?

1. Traditional (Eastern) forms of meditation include relaxed attention and not-thinking.
2. One can achieve relaxed attention and not-thinking by concentrative meditation, which involves focusing on a mantra, an object, or one’s breathing; or open meditation, in which one allows everything to enter one’s consciousness.

How do psychoactive drugs affect consciousness?

1. The large majority of people in the world use some sort of psychoactive drug to alter their mental life or consciousness. It is not always easy to obtain accurate information about nonmedical use of psychoactive drugs.
2. Addiction is one of the most destructive consequences of abusive nonmedical use of drugs, but the term *addiction* has no precise definition. Many researchers prefer the term *dependence*, as defined by the American Psychiatric Association.
3. All substances are potentially toxic, and researchers use a formula based upon studies with laboratory animals and humans to compute a safety ratio for psychoactive drugs.
4. Psychoactive drugs used for nonmedical purposes can be categorized as narcotics (opioids), depressants (hypnotics such as alcohol and the benzodiazepines), stimulants (such as cocaine, caffeine, and amphetamines), and psychedelics (such as LSD, Ecstasy, and marijuana).
5. Narcotics: Opioids are narcotic drugs derived from the poppy flower. These drugs are highly effective pain killers and may also produce euphoria and feelings of well-being. Opioids are safe when used medically for pain relief, but dangerous when used “recreationally” because of their potential for classical addiction (tolerance, craving, withdrawal).
6. Stimulants: Cocaine (including crack) produces euphoria, a rush of energy, and feelings of well-being, but these effects are short-lasting. Although cocaine does not produce classical symptoms of addiction, users can experience severe dependence as destructive as addiction to opioids. Amphetamines produce longer-lasting stimulant effects and may produce mania in some cases, and dependence occurs in an unknown number of cases. The safety of caffeine is controversial, but while dependence on the drug may occur, this dependence lacks the destructive qualities of dependence upon other stimulant drugs.
7. In terms of global deaths, illnesses, and related destructive effects, no psychoactive drugs can compete with alcohol and tobacco.

8. **Depressants:** Depressant drugs induce sleep and sleep-like states, and some of these drugs may reduce anxiety when used as prescribed. GHB and Rohypnol are depressant drugs with effects somewhat similar to those of alcohol. GHB is particularly dangerous because the difference between a “recreational” dose and a potentially fatal dose is not as great as with most psychoactive drugs. Alcohol differs from smoking in that it is innately pleasurable, associated with food, and safe to use in moderate doses. The effects of alcohol vary greatly from person to person, culture to culture, and according to dose.
9. **Psychedelics:** Effects of psychedelic (hallucinogenic) drugs are derived from a variety of plants and substances, and their effects differ dramatically according to the personal characteristics of the user and the characteristics of the setting in which the drugs are used. They alter perception in dramatic ways, affecting the senses unpredictably and inducing sensory distortions and hallucinations. LSD, peyote, mushrooms, Ecstasy, and marijuana belong to this group.