CHAPTER 4 LESSON PLAN

NOV 11-NOV 17

STATES OF CONSCIOUSNESS

Learning Objectives

After reading this chapter, students should be able to respond to each of the bulleted objectives below:

Sleep
- Summarize current thinking about why we sleep.
- Describe circadian rhythms and their relationship to jet lag.
- Describe the sleep cycle, distinguishing between the various sleep stages. Explain why REM sleep is also called paradoxical sleep. Explain how the sleep cycle changes across the life span.
- Identify the key sleep disorders, distinguishing between nightmares and night terrors and between insomnia, apnea and narcolepsy.

Dreams
- Explain what dreams are. Summarize the explanations of dream activity and content as set forth in Freudian theory, information processing theory, neural activation theory.

Drug-Altered Consciousness
- Define psychoactive drugs and summarize how their use has changed over the centuries.
- Differentiate substance abuse and substance dependence.
- Explain how double-blind procedures and placebos are used in drug research.
- Describe the major depressants, their effects, the effects of an overdose and the extent to which they are susceptible to dependence.
- Describe the major stimulants, their effects, the effects of an overdose and the extent to which they are susceptible to dependence.
- Describe the effects of LSD and marijuana.
- Describe the biological, psychological, social and cultural factors that make it more likely someone will abuse drugs.

Meditation and Hypnosis
- Describe the biological and psychological effects of meditation.
- Explain why it is difficult to define hypnosis, the process of inducing hypnosis, and the role of hypnotic suggestions.
Web Resources

Body Rhythms

Biotiming Tutorial: http://www.cbt.virginia.edu/tutorial/TUTORIALMAIN.html
A tutorial on biological rhythms, developed by the National Science Foundation, Center for Biological Timing.

Brain Briefings: Biological Clocks: http://www.sfn.org/briefings/bio_clocks.html
Brief information on this topic presented by the Society for Neuroscience.

Scientists Scott Campbell and Patricia Murphy answer questions related to biological rhythms and the role of light after an appearance on Scientific American Frontiers.

Consciousness

Association for the Scientific Study of Consciousness: http://assc.caltech.edu/

This website provides links about hypnosis, out-of-body experiences, and dreams.

Dreams

The Interpretation of Dreams (3rd Edition)
http://www.psychwww.com/books/interp/toc.htm
http://www.yorku.ca/dept/psych/classics/Freud/Dreams/index.htm
Translation of Sigmund Freud's classic (1911) work on this topic, translated by A. A. Brill. This work is available through Psych Web at or through Classics in the History of Psychology.


Lucid Dreaming: Psychophysiological studies of consciousness during REM sleep.
http://www.lucidity.com/SleepAndCognition.html

Drugs


Health Touch: http://www.healthtouch.com/levell/p_dri.htm
Drug Information. Similar to RxList.

How Does Caffeine Affect the Body?: http://www.sciam.com/askexpert/biology/biology37/biology37.html
Summary article from Scientific American.

National Institute on Alcohol Abuse and Alcoholism – NIH: http://www.niaaa.nih.gov/


Neuroscience for Kids: The Effects of Drugs on the Nervous System
http://faculty.washington.edu/chudler/introb.html#drug
– Eric H. Chudler, University of Washington

OxyContin InfoCenter: http://www.oxycontininfocenter.com/

RxList: The Internet Drug Index: http://www.rxlist.com/
That is, a list of drugs posted on the Internet, not necessarily “Internet drugs,” which are different from “television drugs” or “PalmPilot drugs.” If you’d like your students to learn more about drugs and their effects, this is the place to go. A brief report might be in order.

Web of Addictions: http://www.well.com/user/woa/
Not to be confused with the “web of lies,” this site offers a variety of links to sites associated with addiction facts, meetings, topics, and help. Students can start here to prepare a report about the various options available for help with addictions.

Hypnosis

Frequently Asked Questions Regarding the Scientific Study of Hypnosis:
http://psychwww.com/asc/hyp/faq0.html
Excellent summary of scientific issues related to hypnosis.

History of Hypnosis: http://www.wayneperkins.net/hypnosis/history.html
A brief summary on this fascinating topic.

Hypnosis: http://www.openhart.demon.co.uk/hcs/index.html
Information from the Hypno-analysis Centre in Salisbury, England.

Hypnosis.com: http://www.hypnosis.com/

Hypnosis and Smoking: The Mighty Power of Suggestion
http://quitsmoking.miningco.com/library/weekly/aa101298.htm
Summary on this topic from The Mining Company.

Hypnotica: http://www.bcx.net/hypnosis/
A website that provides lots of information about self-hypnosis.

Hypnotic Induction Techniques: http://www.hypnosis.com/trance/ind00.html
Links to information about a variety of techniques for inducing a hypnotic state.

The Social Reconstruction of Memories: http://www.psychwww.com/asc/hyp/memories.html
An online article on this topic by Spanos, N. P., Burgess, C. A., and Burgess, M. F.

A review of the current state of knowledge – an online article on this topic by Marcuse, M. (1993)

Using Hypnosis for Medication-Free Pain Control: http://www.hypnos.co.uk/hypnomag/jenny1.htm
Article by Jenny Sill-Holeman CHT, CtHA.

Sleep

Basics of Sleep Behavior: http://www.sleephomepages.org/sleepsyllabus/
Comprehensive online "syllabus" (really a book) on many aspects of sleep behavior, including dreams.

National Center on Sleep Disorders Research – NIH: http://www.nhlbi.nih.gov/about/ncsdr/

Sleepnet.com: http://www.sleepnet.com/
Lesson plans: Web site annotation(s) should include 2 vocab words learned in class.

Nov 9-13
Homework:
1. Outline 122-131
2. Saturday or Sunday morning – put a pencil and pad of paper by you bed the night before; whenever you wake up, write down everything you remember about your dreams.
3. **Memorize Summary table p. 126 stages of sleep**
4. Take self-quiz “are you getting enough sleep?” on p. 129 in your notebook.

Nov 14 – Introduction; sleep
Lecture
Homework:
Peruse & annotate website sections on Body Rhythms, consciousness, and sleep

Nov 15 – Dreams
Lecture
**Quiz – summary table p. 126 stages of sleep**
Homework:
1. Review figures 4-1, 4-2, 4-3
2. Outline 131-34
3. Peruse & annotate website sections on dreams
4. Do check for understanding p. 133.

Nov 16 – Drugs
Lecture
Homework:
1. Study table 4-1 Signs of substance dependence
2. Outline 134-148
3. Peruse & annotate website sections on drugs

Nov 17 – meditation & hypnosis
Lecture
Homework:
1. Peruse & annotate website related to meditation and hypnosis
2. Memorize Summary Table 4-1 Signs of substance dependence
3. Do check for understanding p. 148

Nov 18
Lecture
Homework:
1. Study summary table on p. 137 Drugs: Characteristics and effects
2. Outline 149-151
3. Do check for understanding p. 151.

Nov 21
**Quiz – summary table 4-1 Signs of substance dependence**

Nov 22
**Quiz on summary table on p. 137 Drugs: Characteristics and effects**

Nov 23
CHAPTER INTRODUCTION (TEXT PAGE 123)

Defining Consciousness:
- **Consciousness** – a person’s awareness of and responsiveness to mental processes and the environment.
- **Waking consciousness** – mental state that encompasses the thoughts, feelings, and perceptions that occur when we are awake and reasonably alert.
- **Altered States of Consciousness** – mental states that differ noticeably from normal waking consciousness; these states are more detached from the external world and may occur naturally (e.g., sleep) or be intentionally induced (e.g., consuming stimulants).

SLEEP (TEXT PAGE 123)

Summarize current thinking about why we sleep (pp. 123-124).

Benefits of sleep:
- Restorative function, both physically and mentally
- Boosts immune system response
- Cleanses the body of chemicals released when cells use energy, including adenosine (which builds up during the day and ultimately signals the brain that it is time to sleep)
- Enhances creativity, decision-making and problem-solving
- Instrumental to the formation of long-term memories

Describe circadian rhythms and their relationship to jet lag (p. 124).

Circadian Cycles: The Biological Clock
- **Circadian rhythms** – a regular biological rhythm with a period of approximately 24 hours that corresponds to the solar cycle of light and dark.
- **Suprachiasmatic nucleus (SCN)** – a cluster of neurons in the hypothalamus that receives input from the retina regarding light and dark cycles and is involved in regulating the biological clock.
- **Jet lag** is the result not of lack of sleep but of desynchronization; sleep-and-wake cycles adapt quickly to time zone changes, but hormones, body temperature, and digestive cycles adapt more slowly. This asynchrony results in feelings of grogginess and lethargy.

Describe the sleep cycle, distinguishing between the various sleep stages. Explain why REM sleep is also called paradoxical sleep. Explain how the sleep cycle changes across the life span (pp. 125-126).

The Rhythms of Sleep
- “Going to sleep” – losing awareness and becoming less responsive to stimuli.
- **Stage One** – sleep is light sleep, marked by slowing of the pulse, muscle relaxation, and rolling movements of the eyes; stage 1 is brief and the sleeper can be easily aroused during it.
- **Stage Two** – sleep is indicated by the presence of sleep spindles, bursts of brain wave activity.
- **Stage Three** – highlighted by the first appearance of delta waves, the slowest and largest waves; sleeper is not easily aroused during stages 2 or 3 nor is the sleeper responsive to lights or noises.
- **Stage Four** – predominantly comprised of delta waves, and the body is at its lowest level of functioning; delta sleep occurs in 15- to 20-minute segments, interspersed with lighter sleep.
• **Rapid-eye movement (REM) sleep** – occurs four or five times a night, replacing Stage One sleep in the sleep-wake cycle and is accompanied by paralysis of the voluntary muscles. REM sleep is called “paradoxical sleep” because most physiological measures (brain activity, blood pressure, heart rate, etc.) approximate those during waking consciousness, but the person in REM sleep is deeply asleep and incapable of moving.
  - See “Summary Table: Stages of Sleep” on page 126 for a summary of the sleep cycle.
• Sleep patterns change with age and vary considerably from person to person.
  - Infants typically need 13-16 hours of sleep during their first year.
  - See Figure 4-3 on page 127 for changes in total sleep and in the proportion of REM and NREM sleep as people age.

**Sleep Deprivation**
• Between one-third and one-half of all adults regularly fail to get enough sleep, and nearly 80% of adolescents fail to get the recommended 9 hours of sleep for their age group. Sleep deprivation leads to many cognitive deficits and physical problems:
  - Reaction time slows down
  - Logical thinking is impaired
  - Productivity decreases and errors increase
  - Risk of automobile accidents increases
  - On-the-job errors in judgment increase
  - Increased risk of heart disease, asthma, strokes, high blood pressure, and diabetes
  - Increased risk of obesity in children
  - Increased rates of depression in adolescents and college students
• Taking short naps (from 20-60 minutes) can improve alertness, reduce irritability, and improve performance.

**Identify the key sleep disorders, distinguishing between nightmares and night terrors and between insomnia, apnea and narcolepsy.**

**Sleep Disorders**
• **Sleeptalking and Sleepwalking** – usually occurring during Stage 4, sleeptalking and sleepwalking are common among children and adults.
• **Nightmares and Night terrors:**
  - Nightmares are bad dreams that occur during REM sleep; we can remember them in the morning.
  - Night terrors occur during NREM sleep; people generally cannot be awakened during them and do not remember them in the morning.
• **Insomnia, Apnea, and Narcolepsy**
  - Insomnia affects approximately 30% of adults worldwide; it is often stress-related and temporary.
  - Insomnia can be caused by psychological problems, interpersonal difficulties, or bad sleep habits (like an inconsistent bedtime).
  - Sleep apnea is associated with breathing difficulties at night; in severe cases, the victim stops breathing.
  - Narcolepsy is a hereditary sleep disorder characterized by sudden nodding off during the day and sudden loss of muscle tone and expression.

**DREAMS (TEXT PAGE 131)**

Explain what dreams are. Summarize the explanations of dream activity and content as set forth in Freudian theory, information processing theory, neural activation theory (pp. 131-133).
**Dreams** – vivid visual and auditory experiences that occur primarily during REM periods of sleep.
- The average person has 4 or 5 dreams a night.
- Most dreams last about as long as the events would in real life.
- Internal (like hunger) and external (like a train whistle) stimuli can influence dream content.

**Why Do We Dream?**
- **Dreams as Unconscious Wishes** – Sigmund Freud called dreams the “royal road to the unconscious,” believing that dreams represented unfulfilled wishes.
  - Manifest content of a dream is the actual dream and its events.
  - Latent content of a dream is the hidden, unconscious thoughts or desires, often expressed through symbols.

- **Dreams and Information Processing** – in the later part of the 20th century, another explanation for dreaming emerged. Consistent with the information-processing theory, this view asserts that information gathered during the day is reprocessed in dreams as a way of strengthening memories or integrating emotionally significant events with previous experiences.

- **Dreams and Waking Life** – yet another perspective on dreams argues that dreams are an extension of the conscious concerns of daily life in altered but not disguised form. Research has indicated that what people dream about is similar to what they think about and do while awake.

- **Dreams and Neural Activity** – new research using brain imaging techniques has indicated that the limbic system is very active during dreams, while the areas of the forebrain that are involved in working memory, attention, and logic are relatively inactive. This accounts for the highly emotional content of dreams.

**DRUG-ALTERED CONSCIOUSNESS (TEXT PAGE 134)**

Define psychoactive drugs and summarize how their use has changed over the centuries (p. 134).
- **Psychoactive drugs** – chemical substances that change moods, perceptions, mental functioning, or behavior.
- In nearly every known culture throughout history, psychoactive drugs have been consumed, alcohol being the one most widely used. However, how drugs are used and what drugs are used have changed over the centuries.
  - The motives for using drugs have changed from a time when drugs or alcohol were used as a part of religious rituals or for medicinal purposes, for nutritional benefits or for use as culturally-approved stimulants, to their consumption for recreational reasons in contemporary society. This would
  - The drugs themselves are stronger today, and synthetic drugs are also being consumed.
  - Our knowledge about the effects of psychoactive drugs is also much greater than in the past.

Differentiate substance abuse and substance dependence (pp. 135-136).

**Substance Use, Abuse, and Dependence**
- **Substance use** – occasional use of drugs.
• **Substance abuse** – a pattern of drug use that diminishes the ability to fulfill responsibilities at home, work, or school that results in repeated use of a drug in dangerous situations or that leads to legal difficulties related to drug use.

• **Substance dependence** – a pattern of compulsive drug taking that results in tolerance, withdrawal symptoms, or other specific symptoms for at least a year.
  
  o See Table 4-1 on page 135 of the textbook for the “Signs of Substance Dependence.”

**Explain how double-blind procedures and placebos are used in drug research (p. 136).**

*How Drug Effects Are Studied*

• In most cases, researchers compare people’s behavior before the administration of the drug with their behavior afterward.

• **Double-blind procedure** – experimental design in which neither the participant nor the researcher knows at the time of administration which participants are receiving an active drug and which are receiving an inactive substance, called a *placebo*.

• If the behavior differs between those who received the drug and those who received the placebo, the difference was likely caused by the drug.

• Neuroimaging procedures like PET scans are also being used to study drug effects, comparing the brains of those with drug addictions to those without.

**Describe the major depressants, their effects, the effects of an overdose and the extent to which they are susceptible to dependence (pp. 136-141).**

*Depressants: Alcohol, Barbiturates, and the Opiates*

*Depressants* are chemicals that slow down behavior or cognitive processes.

• **Alcohol** – depressant that is the intoxicating ingredient in whiskey, beer, wine, and other fermented or distilled liquors.
  
  o Alcohol is the most frequently used psychoactive drug in Western societies, and is the number-one drug problem in the United States with 9% of adults reporting alcohol dependence or abuse. (See Figure 4-4 for an illustration of teenage use of alcohol.)
  
  o Excessive, chronic use can harm virtually every organ in the body, beginning with the brain.
  
  o The total economic cost of alcohol abuse and dependence is staggering, and alcohol abuse is directly involved in more than 20,000 deaths annually.
  
  o After AIDS, alcohol is the leading contributor to death among young people.
  
  o Alcohol affects various regions of the brain, and in large quantities, can cause death from alcohol poisoning. (See Table 4-2 for a review of the behavioral effects of various blood-alcohol levels.)
  
  o Despite its dangers, alcohol remains popular because of its short-term effects. It calms the nervous system, causing users to relax or elevating their mood. It can also make people feel more courageous, less inhibited, more spontaneous, and more entertaining.
  
  o **Binge drinking** occurs frequently on college campuses because they are among the few places where drunkenness is tolerated and often expected. One survey reported that nearly 68% of college students had consumed alcohol in the past month, and just over 40% of college students reported binge drinking. Binge drinking is defined as 5 or more drinks in a row for men, 4 or more drinks for women. “Frequent binge drinking” is defined as binge drinking three or more times in a two-week period.
  
  o Frequent binge drinkers had more problems, and more serious problems, than other students, including missing classes, engaging in unprotected sex, getting into trouble with campus police, engaging in vandalism or violence, or getting hurt or injured.
Interestingly, the majority of students at four-year institutions abstain or drink in moderation.

- **Barbiturates** – potentially deadly depressants, first used for the sedative and anticonvulsant properties, now used to treat such conditions as epilepsy and arthritis.
  - The effects of barbiturates are similar to those of alcohol.
  - As with alcohol, if barbiturates are consumed by pregnant women, they can produce birth defects.

- **Opiates** – drugs, such as opium and heroin, that dull the senses and induce feelings of euphoria, well-being, and relaxation.
  - Opium is derived from the sap taken from the seed pod of the opium poppy.
  - Opiates have a long history of use in folk medicine and, in its derivative form of morphine, as a pain-killer. Morphine compounds such as codeine are still used in painkillers and other medications.
  - Heroin and other opiates resemble endorphins, and occupy many of the same nerve-receptor sites. Regular use of heroin can lead to tolerance and to physical dependence.

Describe the major stimulants, their effects, the effects of an overdose and the extent to which they are susceptible to dependence (pp. 141-144).

**Stimulants: Caffeine, Nicotine, Amphetamines, and Cocaine**

**Stimulants** – drugs that stimulate the sympathetic nervous system and produced feelings of optimism and boundless energy.

- **Caffeine** – belongs to a class of drugs known as xanthine stimulants and is used to maintain wakefulness and alertness.
  - Caffeine is found in many beverages and nonprescription medications and is considered a benign drug when consumed in small doses.
  - Caffeine is the only stimulant that does not appear to alter sleep stages or cause REM rebound, although its use results in a decrease in the number of sleep minutes and an increase in the time it takes to fall asleep.
  - Dependence and tolerance can occur in those who regularly consume caffeine.

- **Nicotine** – one of the most dangerous and addictive stimulants in use today; the neurochemical properties of nicotine are similar to those in cocaine, amphetamines, and morphine.
  - Depending on the time and amount smoked, nicotine can have sedating or stimulating effects because it affects levels of several neurotransmitters, including norepinephrine, dopamine, and serotonin.
  - Dependence, tolerance, and addiction occur with nicotine, and nicotine addiction in teenagers can happen very quickly.
  - Adolescents who smoke are more likely to use illicit drugs and to drink heavily, and they have an increased risk of depression.

- **Amphetamines** – stimulants that initially produce “rushes” of euphoria often followed by sudden “crashes” and, sometimes, severe depression.
  - The only legitimate medical uses for amphetamines are to treat narcolepsy and attention deficit disorder. However, they are widely used for recreational reasons in various forms of methamphetamine – speed, fire, ice, crystal, crank, and Ecstasy.
  - There are many short- and long-term consequences of methamphetamine use.

- **Cocaine** – drug derived from the coca plant that, although producing a sense of euphoria by stimulating the sympathetic nervous system, also leads to anxiety, depression, and addictive cravings.
Cocaine blocks the reabsorption of the neurotransmitter dopamine, producing feelings of euphoria.

Under normal conditions, when dopamine is reabsorbed, feelings of satiety or satisfaction result. However, cocaine blocks these messages, creating a craving for more.

Addiction occurs because cocaine damages the brain cells that produce dopamine, increasing the amount of cocaine needed to produce the same high in the future.

Describe the effects of LSD and marijuana (pp. 144-146).

**Hallucinogens and Marijuana**

**Hallucinogens** – any of a number of drugs, such as LSD and mescaline, that distort visual and auditory perception.

- **Lysergic Acid Diethylamide (LSD)** – sometimes called “acid,” LSD produces hallucinations and delusions similar to those occurring in a psychotic state. The hallucinations and delusions can be intensely pleasurable or terrifying. These effects can vary for the same person on different occasions.
  - Unlike depressants and stimulants, LSD and other hallucinogens do not appear to produce dependency and withdrawal effects. If LSD is taken repeatedly, tolerance builds up rapidly and the drug will fail to produce significant effects.
  - LSD is generally taken episodically rather than habitually.

- **Marijuana** – a mild hallucinogen that produces a “high” often characterized by feelings of euphoria, a sense of well-being, and swings in mood from gaiety to relaxation; may also cause feelings of anxiety and paranoia.
  - Marijuana is the fourth most popular drug among college students (after alcohol, caffeine, and nicotine).
  - The active ingredient in marijuana, tetrahydrocannabinol (THC), is a mild hallucinogen that produces short-term physiological effects and some potential long-term physiological damage.
  - While under the influence of marijuana, some people experience *temporal disintegration*, or the inability to coordinate information. Users also experience distortions in time.
  - There are documented medical benefits to marijuana, so the debate about whether it is a harmful drug is ongoing.

Describe the biological, psychological, social and cultural factors that make it more likely someone will abuse drugs (pp. 146-148).

**Explaining Abuse and Addiction**

The causes of substance abuse and dependence are complex, the result of a combination of factors that vary from person to person, and depend on the drug or drugs that are used.

- **Biological Factors**
  - At least half of a person’s susceptibility to drug addiction is linked to genetic factors. This link has been strongly established with respect to alcohol addiction.
  - Heredity can influence the amount of enzymes a person has that break down alcohol in the body.
  - Tolerance levels for alcohol in the blood also may be inherited.
  - Heredity may also impact the quantity of neurotransmitters in the brain and the number of receptors that respond to those neurotransmitters.

- **Psychological, Social, and Cultural Factors**
Studies have shown that people use or abuse alcohol because they expect that drinking will help them to feel better. Similar expectations are held about marijuana.

The environment in which a child grows up shapes attitudes and beliefs about drugs, ultimately playing a more powerful role than genetics in determining whether a person starts to drink or use drugs (although genetics are more influential in determining who eventually abuses substances).

Cultural norms and practices also influence the degree to which people use drugs or alcohol. Alcohol plays an important role in the rituals of certain cultures, whereas other cultures limit or prohibit its consumption.

**MEDITATION AND HYPNOSIS (TEXT PAGE 149)**

Describe the biological and psychological effects of meditation (p. 149).

**Meditation**

- **Meditation** – any of the various methods of concentration, reflection, or focusing of thoughts undertaken to suppress the activity of the sympathetic nervous system.
  - **Zen meditation** – concentrates on respiration to focus attention.
  - **Sufism** – relies on frenzied dancing and prayer as the focus of attention.
  - **Transcendental meditation** – practitioners repeat a sound (“mantra”) to focus their thinking and help achieve a deeper state of relaxation.
  - In all of its forms, meditation results in a relaxed yet fully alert state; a state achieved through suppression of the sympathetic nervous system (the part of the nervous system that prepares the body for strenuous activity).

- Meditation results in the following physiological changes:
  - Lower rate of metabolism
  - Reduced heart rate
  - Reduced rate of respiration
  - Decreased blood lactate
  - Increased alpha brain waves (indicating relaxed wakefulness)

- Meditation has been used to treat the following conditions:
  - Muscle tension resulting in pain
  - Attention-deficit hyperactive disorder in children (and the resultant stress felt by parents)
  - Drug use

Explain why it is difficult to define hypnosis, the process of inducing hypnosis, and the role of hypnotic suggestions (p. 150).

**Hypnosis**

First practiced in the mid-18th century by Viennese physician Anton Mesmer, hypnosis (originally called “mesmerism”) had been alternately criticized and embraced since.

- **Hypnosis** – trancelike state in which a person responds to suggestions.
  - Defining hypnosis has been difficult because individuals who have undergone hypnosis describe their experiences in very different ways. Researchers debate whether or not it should be characterized as a state of altered consciousness.

- **The Process of Hypnosis** – most hypnotic induction procedures involve suggestions to relax. The hypnotist guides the subject to respond to suggestions for changes in their subjective experiences, perceptions, sensations, emotions, thoughts or behaviors. Some people can even hypnotize themselves (“self-hypnosis”).

- **Hypnotic Suggestions** – individuals vary in their susceptibility to hypnosis; susceptibility is related to ability to become absorbed in reading, music, and daydreaming.
Hypnotic suggestions cannot force people to do foolish or embarrassing things against their will.

Posthypnotic commands – while under hypnosis, subjects may be given instructions to respond to certain sensations or behaviors in specific ways after they are aroused. These posthypnotic commands are popular among athletes as a way to reduce pain or enhance performance.

Posthypnotic commands have also been used to enhance the effectiveness of psychotherapy, as an anesthetic by dentists, to treat some medical conditions or reduce pain and discomfort from some medical procedures, and temporarily diminish a person’s desire to smoke or overeat.
The chapter opens with a vivid real-world description of extreme fatigue, setting a frame from which to explore states of consciousness and their effects. **Consciousness** is our awareness of various cognitive processes that operate in our daily lives such as sleeping, dreaming, concentrating, and making decisions. To make sense of our complex environment, we selectively choose which stimuli to absorb and we filter out the rest. Psychologists divide consciousness into two broad areas: **waking consciousness**, which includes thoughts, feelings, and perceptions that arise when we are awake and reasonably alert; and **altered states of consciousness**, during which our mental state differs noticeably from normal waking consciousness.

The chapter first tackles the fascinating subject of sleep. Nobody knows exactly why we need to sleep, although sleep appears to play an important restorative function, both physically and mentally. Getting adequate sleep boosts our immune response and cleanses the body of chemicals like adenosine, which is released when cells use energy. Sleep also appears to play a crucial role in long-term memory formation. Like many other biological functions, sleep and waking follow a daily biological cycle known as a **circadian rhythm**. The human **biological clock** is governed by a tiny cluster of neurons in the brain known as the **suprachiasmatic nucleus (SCN)** that regulates proteins related to metabolism and alertness. Normally, the rhythms and chemistry of the body’s cycles interact smoothly; but when we cross several time zones in one day, hormonal, temperature, and digestive cycles become desynchronized.

Normal sleep consists of several stages. During **Stage 1**, the pulse slows, muscles relax, and the eyes move from side to side. The sleeper is easily awakened from Stage 1 sleep. In **Stages 2 and 3**, the sleeper is hard to awaken and does not respond to noise or light. Heart rate, blood pressure, and temperature continue to drop. During **Stage 4** sleep, heart and breathing rates, blood pressure, and body temperature are at their lowest points of the night. About an hour after first falling asleep, the sleeper begins to ascend through the stages back to Stage 1—a process that takes about 40 minutes. At this stage in the sleep cycle, heart rate and blood pressure increase, the muscles become more relaxed than at any other time in the cycle, and the eyes move rapidly under closed eyelids. This stage of sleep is known as **rapid-eye movement (REM)** or **paradoxical sleep**.

Between one-third and one-half of adults fail to get enough sleep. Among adolescents, not getting enough sleep may result in falling asleep at school. Sleep deprivation negatively affects reaction time, memory, judgment and the ability to pay attention. Driving while sleepy is just as dangerous as driving drunk. Sleep deprivation has been associated with errors and poor performance at work leading to serious mishaps in high-risk professions such as medicine or working at a nuclear power plant. The lack of sleep also contributes to such diseases as heart attacks, asthma, strokes, high blood pressure, and diabetes and is associated with depression and being overweight. Unfortunately, people do not always know when they are not getting enough sleep.

Sleep disorders include sleeptalking, sleepwalking, night terrors, insomnia, apnea, and narcolepsy. Most episodes of sleeptalking and sleepwalking occur during a deep stage of sleep. Unlike **nightmares**, frightening dreams that most often occur during REM sleep and are remembered, **night terrors** are more common among children than adults, prove difficult to be awakened from, and are rarely remembered the next morning. **Insomnia** is characterized by difficulty in falling asleep or remaining asleep throughout the night. **Apnea** is marked by breathing difficulties during the night and feelings of exhaustion during the day. **Narcolepsy** is a hereditary sleep disorder characterized by sudden nodding off during the day and sudden loss of muscle tone following moments of emotional excitement.
The chapter turns next to a discussion of dreams. **Dreams** are visual or auditory experiences that occur primarily during REM periods of sleep. Less vivid experiences that resemble conscious thinking tend to occur during NREM sleep.

Several theories have been developed to explain the nature and content of dreams. According to Freud, dreams have two kinds of contents: manifest (the surface content of the dream itself) and latent (the disguised, unconscious meaning of the dream). According to a more recent hypothesis, dreams arise out of the mind’s reprocessing of daytime information that is important to the survival of the organism. With this hypothesis, dreaming thus strengthens our memories of important information.

The chapter shifts gears into a wide-ranging discussion of drug-altered consciousness, with a starting point of how today’s drug problem compares to drug use in other societies and times. Chemical substances that change moods and perceptions are known as **psychoactive drugs**. Although many of the psychoactive drugs available today have been used for thousands of years, the motivation for using drugs is different today. Traditionally, these drugs were used in religious rituals, as nutrient beverages, or as culturally approved stimulants. Today, most psychoactive drug use is recreational, divorced from religious or family traditions.

**Substance abuse** is a pattern of drug use that diminishes the person’s ability to fulfill responsibilities at home, work, or school and that results in repeated use of a drug in dangerous situations or that leads to legal difficulties related to drug use. Continued abuse over time can lead to **substance dependence**, a pattern of compulsive drug taking that is much more serious than substance abuse. It is often marked by tolerance, the need to take higher doses of a drug to produce its original effects or to prevent withdrawal symptoms. Withdrawal symptoms are the unpleasant physical or psychological effects that follow discontinuance of the psychoactive substance. When studying drug effects, most researchers use the **double-blind procedure** in which some participants receive the active drug while others take a neutral, inactive substance called a **placebo**.

**Depressants** are chemicals that slow down behavior or cognitive processes. **Alcohol** calms down the nervous system, working like a general anesthetic. It is often experienced subjectively as a stimulant because it inhibits centers in the brain that govern critical judgment and impulsive behavior. This accounts for its involvement in a substantial proportion of violent and accidental deaths. **Barbiturates** are potentially deadly depressants, first used for their sedative and anticonvulsant properties, but today their use is limited to the treatment of such conditions as epilepsy and arthritis. The **opiates** are highly addictive drugs such as opium, morphine, and heroin that dull the senses and induce feelings of euphoria, well-being, and relaxation. Morphine and heroin are derivatives of opium.

**Stimulants** are drugs that stimulate the sympathetic nervous system and produce feelings of optimism and boundless energy, making the potential for their abuse significant. Caffeine occurs naturally in coffee, tea, and cocoa. Considered a benign drug, in large doses caffeine can cause anxiety, insomnia, and other unpleasant conditions. Nicotine occurs naturally only in tobacco. Although it is a stimulant, it acts like a depressant when taken in large doses. **Amphetamines** are stimulants that initially produce “rushes” of euphoria often followed by sudden “crashes” and, sometimes, depression. **Cocaine** brings on a sense of euphoria by stimulating the sympathetic nervous system, but it can also cause anxiety, depression, and addictive cravings. Its crystalline form—crack—is highly addictive.

**Hallucinogens** include drugs such as **LSD**, psilocybin, and mescaline that distort visual and auditory perception. **Marijuana** is a mild hallucinogen capable of producing feelings of euphoria, a sense of well-being, and swings in mood from gaiety to relaxation to paranoia. Though similar to hallucinogens in certain respects, marijuana is far less potent, and its effects on consciousness are far less profound. Marijuana can disrupt memory, causing people to forget what they are talking about in midsentence.
A possible genetic predisposition, the person’s expectations, the social setting, and cultural beliefs and values make drug abuse more likely.

The chapter concludes with material on meditation and hypnosis. Meditation refers to any of several methods of concentration, reflection, or focusing of thoughts intended to suppress the activity of the sympathetic nervous system. Meditation not only lowers the metabolic rate but also reduces heart and respiratory rates. Brain activity during meditation resembles that experienced during relaxed wakefulness; and the accompanying decrease in blood lactate reduces stress.

Hypnosis is a trancelike state in which the hypnotized person responds readily to suggestions. Susceptibility to hypnosis depends on how easily people can become absorbed in concentration. Hypnosis can ease the pain of certain medical conditions and can help people stop smoking and break other habits.
Lecture Launcher: The Bubble, the Butterfly, the Fighter

The name Jean-Dominique Bauby may never enter the annals of psychology; it may not even be recognized by most Americans. But Bauby’s last work sheds light on the nature of consciousness and what it means to be human.

Bauby was the former editor-in-chief of Elle magazine. A noted French journalist, the 45-year-old led a fast-paced life filled with glamour and travel, until December 8, 1995. A massive stroke felled Bauby and left him in a locked-in coma. Locked-in syndrome is characterized by a virtually complete paralysis, although the brain (and the mind) is left largely unaffected. The condition is like being “a mind in a jar” to use Bauby’s own words.

But what words? Unable to move, unable to speak, and dependent on machines for all of his bodily functions, Bauby’s prognosis was grim. He found, however, that the muscle of his left eyelid was still under his control, and through a series of blinks and twitches Bauby was able to communicate his mental alertness to his caregivers. In fact, his nurses would recite a specially-sequenced alphabet, to which Bauby would blink on certain letters. In this fashion he was able to craft words, sentences, and entire discussions with his doctors and letters to his friends.

One such letter, to French editor Robert Laffont, prompted an offer to compose a book about his condition. Through the tedious process of “blinking dictation,” Bauby wrote, letter by letter, Le Scaphrande et le Papillon (The Bubble and the Butterfly), a 137-page account of his locked-in state. In it he recounts the daily tedium of physical therapy sessions, of being unable to swallow the sea of saliva that permanently wells in his mouth, or to shoo the flies that walk brazenly across his face. Deeper reflections reveal the anger and frustration of being imprisoned in a shell of a body, unable to hold his son or talk to his loved ones. Through it all, however, Bauby retained his joie de vivre. He founded an association for other victims of locked-in syndrome, appeared on a French television special about his condition, and proposed several other blinking/writing projects.

Unfortunately Bauby was unable to see these projects to completion. Within 72 hours of his book’s publication he died. The light that he shed on this fascinating and macabre syndrome, however, illuminates an indomitable spirit.

Bauby’s story is told in the 2007 French film “The Diving Bell and the Butterfly” directed by Julian Schnabel.


Lecture/Discussion: Subjective Descriptions of States of Consciousness

Objective: To illustrate the difficulties involved in defining consciousness
Materials: None
**Procedure:** This activity can either be in a verbal form for a small class or in a written form for larger sections. Ask students to describe what they "feel" when they daydream; when they drift off to sleep; or when they consume mind-altering substances, such as alcohol. If any students have been hypnotized, have them describe the experience.

Lecture/Discussion: The Disadvantages of Shift Work

There are several studies that have documented the detrimental health effects of shift work. One study conducted by Gordon et al. (1986) found that males who work variable work schedules had higher rates of heavy drinking, job stress, and emotional problems than did males working set schedules. Females who worked variable shifts reported more use of sleeping pills, tranquilizers, and alcohol as well as more job stress and emotional problems. One interesting finding was that no difference was found in heavy cigarette smoking or coffee drinking between straight-shift workers and variable-shift workers. The authors suggest that more attention should be placed on health promotion at variable shift worksites.

Many students also tend to work shifts. You might ask your students how difficult it is to maintain sleep schedules that are conducive to them being a good employee as well as a good worker.


Lecture/Discussion: Reflecting on Self-Awareness

A basic question of consciousness focuses on how we come to know ourselves. Advocates of mind-altering substances or devotees of certain mystic rites point to the “expanded consciousness” and greater awareness of ourselves that can be attained, and almost everyone embraces the admonition to “know thyself.”

The framework suggested by these examples, however, recruits a rather select group of self-knowers: sentient, rational adults with long prior experience (from any number of sources) of acquiring self-knowledge. An investigation of the origins and limits of self-knowledge, however, might entail both phylogenetic and ontogenetic approaches. For example, how much self-recognition does an infant have? Certainly a preverbal child cannot describe his or her experience of the self, and if the child could, its vocabulary would probably be inadequate to capture the richness of the self-recognition experience. (Imagine your two-year-old reporting that she “apprehended the self-as-known in a moment of lucid insight.”) To press the point further, to what extent are members of other species self-aware? We can repeatedly ask the two-year-old child what he or she is experiencing until, with time, a vocabulary capable of describing the experiences is developed. We cannot, however, expect our cat to relate the “reflective experience of comparing the present self to the ideal self,” no matter how much we ask it.

Several researchers have been interested in questions of self-recognition, self-awareness, and self-knowledge in other species, and have actively sought ways to gather evidence for these processes. As an example, Gordon G. Gallup, Jr., developed a technique for testing self-recognition among primates that...
circumvented the barrier produced by lack of a common communication system between species. One marker of self-recognition is the ability to visually identify oneself, such as occurs when looking in a mirror. Gallup capitalized on this facet of recognition in a study using chimpanzees. The chimps were given several days of exposure to a mirror in their environment. Gallup noted that at first the chimpanzees acted as though the image in the mirror was another animal. Gradually, however, they began to respond in a way that suggested they had realized they were seeing an image of themselves. To validate these observations, Gallup anesthetized the chimpanzees and applied an odorless, bright red dye to their faces, in such a location that it could only be seen in the mirror. When the chimpanzees were revived and the mirrors were reintroduced, all the chimpanzees reacted in a way that strongly suggested mirror self-recognition. The chimps reached up to their faces, exploring the marks, while watching their reflections, and did so more often than under control conditions.

This procedure, subsequently dubbed the “mark test,” has been used with a number of other species. Gallup contends, however, that although chimpanzees and orangutans can reliably demonstrate self-recognition of this type, the effect has not been reliably demonstrated among gorillas, monkeys, or prosimians. Recently, work has begun testing the phenomenon among bottlenose dolphins. An article in Scientific American outlines some of this more recent research http://www.sciam.com/article.cfm?id=dolphin-self-recognition.

Lecture/Discussion: How to get a good night’s sleep

Health Writer Russell Wild has these suggestions for getting a good night’s sleep. (1) Turn off the T.V. – this means the radio as well. (2) Turn off the lights because they block the sleep promoting hormone melatonin … if you can get extra darkening window shades. (3) Go to bed the same time every night – those who do, research shows they get better sleep. (4) Go to bed sober – any alcohol may interfere with REM sleep. (5) Eat your dinner early – 6 or 7 o’clock is best. If you need a snack try something that contains tryptophan – milk, yogurt, cheese, turkey or fish. Tryptophan is converted to serotonin which will help you feel drowsy. (6) Don’t exercise right before going to bed. (7) Read something that is good for you.

It is suggested that many people are not getting the amount of sleep that they need on an ongoing basis. This may be the cause of more automobile accidents and lowered job performance. This website http://www.sleep-deprivation.com/ lists many of the causes of sleep deprivation as well as ways to remedy the problem.


Lecture/Discussion: Sleeping Too Much?

Is it possible to get too much sleep? Most people who are returning to work after a long weekend would say “no!” However, there are some researchers who seem to believe that there are some people who get too much sleep. A study in the journal Sleep has found after surveying more than 104,000 people in Japan ages 40–79, for nearly 10 years, found that those who reported sleeping eight or more hours a night were more at risk of death than those who slept seven hours. Overall, subjects who slept seven hours had the best survival rate. However, everyone does not need the same amount of sleep. You should strive to get the amount of sleep that makes you feel the best and stick with it.


Lecture/Discussion: Sleep Disorders and Treatment

As many as 100 million Americans suffer from sleep disturbances or sleep disorders. Three major sleep disorders include sleep apnea, insomnia, and narcolepsy.

Approximately 18 million Americans have sleep apnea, which is characterized by brief interruptions of breathing during sleep. During any given night, the number of involuntary breathing interruptions can number up to 20 to 300 or more instances per hour. Two forms of sleep apnea include central sleep apnea and upper-airway sleep apnea. In central sleep apnea, the sleeper’s brain ceases to send signals to the diaphragm, so the diaphragm stops functioning. In upper-airway sleep apnea, loss of muscle tone in the throat, tongue, and larynx can block breathing. This type of sleep apnea is also accompanied by loud snoring, as the sleeper tries to get air into the lungs. The sleeper often awakes after about 60–100 seconds of sleep and begins gasping for air, then falls back to sleep. Often, the sleeper is oblivious to frequent

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awakenings for air, and rarely remembers waking so many times during the night. Often, these individuals complain of insomnia. Experimental treatments include the Nasal CPAP (Continuous Positive Airway Pressure), in which a fan inside a mask is placed over the nose during sleep; the mouth must be closed, so there is a chinstrap to keep the mouth closed. A Stanford surgical procedure involves slicing tendons in the tongue to pull it away from the back of the throat.

Insomnia is characterized by a chronic inability to fall asleep at night and/or stay asleep. Factors that contribute to insomnia include: medical illness, including head trauma, asthma, hypertension, arthritis, headache and lower back pain, Parkinson’s, Alzheimer’s, and kidney/thyroid dysfunction; psychiatric illness, including major depression, PTSD, generalized anxiety disorder, bipolar disorder, dementia, and schizophrenia; medication and drugs, including alcohol, narcotics, amphetamines, caffeine, nicotine, and certain antidepressants; co-morbid sleep disorders, such as sleep apnea; poor sleep habits, such as extended time in bed, napping, and irregular sleep schedules; and situational factors, such as stress, bereavement, jet lag, shift work, poor sleeping environment (bad bed partner, noise, etc.). Some of the most successful treatments for insomnia have been cognitive-behavioral therapy (CBT) treatments. Behavioral sleep medicine experts suggest that individuals have chronic insomnia due to learned behaviors and thought patterns that get in the way of a good night’s sleep. They recommend a combination of methods to help individuals overcome their insomnia, including sleep education (e.g., learning about your own sleep and resting patterns), cognitive therapy (e.g., to change negative beliefs and thoughts about sleep), stimulus control (e.g., don’t drink a soda before you go to bed), sleep restriction (e.g., bed is only for sleeping and sex), and relaxation (e.g., progressive muscle relaxation at bedtime).

Narcolepsy, or “sleep attack,” is characterized by feeling sleepy all the time and falling asleep throughout the day without realizing it. We often think of dogs who are running across the yard, then suddenly fall asleep for a few minutes; this is the same sort of occurrence in adults. Approximately 1–5 individuals of every 5,000 are narcoleptic. Often the sleep attack is triggered by an intensely experienced emotion, such as surprise, excitement, stress, or anger. The attacks last for about 5 minutes, but can last longer. Often, individuals with narcolepsy experience vivid dreams while awake, called hypnagogic hallucinations. Amphetamine drug treatment is one treatment used to maintain alertness, however this is not a cure for narcolepsy. More recently, Provigil has been approved by the FDA for the treatment of narcolepsy. Provigil is not an amphetamine, but how it works for treatment of narcolepsy is still a mystery.

National Center on Sleep Disorders Research, National Institutes of Health. www.nhlbi.nih.gov/about/ncsdr

Lecture/Discussion: Sleep and School Times

Studies have shown that adolescents have greater sleep needs than adults, due to changes in circadian rhythms. If they are in their late adolescence, your students are likely to report preferring to go to sleep later at night and then to sleep later in the morning. In addition, adolescents face a need for a greater amount of sleep.

Ask students how this information can be used. For example, recently high schools have begun moving their start times to a later hour in the morning to accommodate these adolescent sleep needs. Schools that have taken this step report better attendance. However, this measure often causes a logical problem with busing young children in the pre-dawn hours. In addition, later school start times may restrict teens’ abilities to participate in sports or to hold after-school jobs. Nevertheless, the findings from studies of
adolescent sleep needs led Rep. Zoe Lofgren (D-CA) to propose the Z’s to A’s Act in March 2001. The act is designed to encourage school districts to delay school start times until after 9 a.m. by providing federal grants of up to $25,000 to cover the administrative and operating costs associated with making this transition. Would your students support such a bill? Do they wish that their schools had started later? What do they see as the pros and cons?

Additional source:
♦ Frontline: Inside the Human Brain
   http://www.pbs.org/wgbh/pages/frontline/shows/teenbrain/from

Lecture/Discussion: Drowsy Driving

Because drowsy driving occurs so frequently, it warrants additional attention during class. Present the warning signs of drowsy driving (see the Sleep Foundation Web site, listed below). Ask students what they do when they feel tired behind the wheel. Point out that many of their ideas (e.g., cracking the window, blasting the music) are unlikely to prevent them from entering into microsleeps. Give them some alternatives that might work (e.g., caffeine or—even better—taking a break to nap).

In addition, ask students to consider whether technological advances might help to ward off drowsy driving. For example, BMW has been testing a “driving alertness assistant,” a built-in warning system that monitors eye movements to determine drivers’ alertness. See the online article “You May Be Sleeping at the Wheel,” by Annelena Lobb, for more information (http://money.cnn.com/2002/09/05/pf/autos/q_microsleep/).

Finally, lead a discussion (or a debate) about whether there should be laws against knowingly driving while drowsy.

Additional sources:
♦ Smart Drivers Brake for Sleep
   http://www.drowsydriving.cornell.edu/
♦ Drowsy Driving, by AAA
   http://www.aaafoundation.org/resources/index.cfm?button=drowsyfaq

Lecture/Discussion: The Bitter Taste of Drugged Sleep

Sleeping pills and tranquilizers are often taken to get a night of good sleep. The same pills that initially may bring sought-after sleep to the weary insomniac can, over a period of time, profoundly disturb sleep. Reliance on sleeping pills can:

• change the percentage of REM and NREM sleep experienced;
• cause insomnia;
• reduce certain deeper stages of sleep;
• cause withdrawal experiences of nightmares;
• result in more REM sleep than usual (called REM rebound); and
• sometimes even cause convulsive seizures.

Barbiturates are commonly prescribed in the United States to decrease insomnia, yet they are commonly abused. They are the most common chemical causing death by suicide. Studies have conclusively shown that barbiturates decrease the percentage of REM sleep during the night. With prolonged use there is a loss of this REM suppressant effect and, when the drug is withdrawn after chronic use, an REM rebound effect occurs. Barbiturates do increase total sleep time.

Alcohol also increases total sleep time but decreases REM sleep, particularly in the first half of the night. This is the effect of acute alcohol ingestion on sleep in normal humans. Withdrawal from alcohol after taking it several days often results in a pronounced REM rebound. This REM rebound is actually larger than that following withdrawal of barbiturates or any other drug. The hallucinatory experiences of individuals with delirium tremens (DTs) where they report seeing bugs and other things crawling around may be related to the underlying physiology of the REM state.

It is a general pharmacological rule that many chemical agents decrease REM sleep. In addition to alcohol and barbiturates, morphine, heroin, amphetamines, narcotics, and acute doses of marijuana produce similar effects on sleep. Those few drugs (e.g., LSD and reserpine) that increase REM sleep interact with the brain serotonin, whereas those that reduce it do not.

Lecture/Discussion: Do We Dream in Color?

One of the questions students ask most frequently about dreams is, “Do we dream in color?” The results of research on this topic vary depending on whether the research used home-based dream reports or reports from individuals in sleep laboratories. The presence of color is reported in 20 to 25 percent of home (i.e., non-laboratory) dreams. In one laboratory-based study, color responses were reported spontaneously in 25 percent of the dreams. When the researchers asked the participants about color in their dreams 70 percent of them reported distinct color in their dreams and 13 percent more reported vague color. Color is more often reported in laboratory dreams because investigators are able to ask participants about it immediately after they are awakened.

An interesting finding is that individuals for whom color perception is a significant feature of their waking lives are quite sensitive to color in their dreams. For example, a group of art students (mostly painters), science students, and engineering students turned in reports of their most recent dreams (home reports). Color was spontaneously reported in the dreams of 50 percent of the art students, 16 percent of science students, and none of the engineering students. When the investigator asked about the possibility of color in dreams, 45 percent of the engineering students denied that their dreams had any color qualities.

The well-known dream researcher, Calvin Hall, compared dreams to a movie or play. When you leave a theater you are most likely to talk about plot, characters, and action. Color is a less important detail and therefore likely to be forgotten or not reported unless it is specifically asked about.


Return to Lecture Guide: Dreams
Lecture/Discussion: Speaking of Dreams

Throughout history, and probably prehistoric times, humans have thought that dreams have special significance; that they have a divine source, that they predict future events, or prescribe a course of action. A primary duty of the wise men in many cultures was to interpret dreams.

One wonders how preliterate tribes react to their dreams, to these images that invade their sleep. Perhaps they think that some alien being has taken over their body, or that they are receiving a message from the spirits of the earth or the demons of the forest.

The idea that dreams have personal meaning was introduced in modern times by Freud when he published *The Interpretation of Dreams* in 1900. Freud said that “Dreams are impartial, spontaneous products of the unconscious psyche...they show us the unvarnished truth.” Freud thought that the vigilance of the ego relaxed during sleep, allowing primitive and forbidden sexual and aggressive urges to escape from the unconscious. However, this material was so threatening that the disgusting desires of the unconscious were disguised in dreams. It is interesting that Freud, like biblical characters and people of the past, thought that only a wise man can interpret dreams, in this case, the wise man being himself or a person trained in his method of psychoanalysis. Freud thought that there was a universal set of symbols that are used by the unconscious to disguise the hidden content of dreams. For example, dreams of flying signify the desire for sexual adventure; elongated objects like trees and pencils symbolize the penis; containers, including closets and automobiles, represent the vagina; and sexual intercourse is disguised as riding a horse or shooting a gun.

Carl Jung was a member of Freud's inner circle who broke away because of theoretical disagreements with Freud. He did agree with Freud that dreams are the clearest expression of the unconscious mind. He did not agree with Freud's idea that there is a universal set of symbols that are used to disguise certain aspects of dreams. He believed that “the general function of dreams is to restore psychological balance.” He also thought that important messages in dreams could only be interpreted from a series of dreams that occur over time. He estimated that he analyzed at least 80,000 dreams during his professional career.

There is a great deal of anecdotal evidence to support Freud's and Jung's ideas about dreams, but their theories cannot be experimentally supported or rejected because of problems in doing the necessary research. Research on dreaming was stimulated in the early 1950s when two investigators (Aserinsky and Kleitman) at the University of Chicago established the relationship between REM sleep and dreaming, but their research does not answer the questions posed by the theories of Freud and Jung.

**Does everyone dream?** Some people claim that they never dream, but research tells us that everyone dreams. People who claim they don't dream just do not recall their dreams. Dreams are not stored in permanent memory, and they will be lost unless they are reviewed or recorded immediately upon waking, before other material replaces them in the temporary memory store.

**How could you prove to a person that he or she dreams?** Watch the person during sleep. When the eyeballs begin to move under the eyelids, give them a few minutes and then wake them up. At this point the person should be in the midst of a dream.

**How long do dreams last?** Until the relationship between rapid eye movements and dreaming was identified, people believed that dreams occur in an instant. This seemed reasonable to most people...
because of having had the experience of an environmental event, like the ringing of an alarm clock, incorporated into the narrative of a dream. Investigators have timed the REM period, and then asked people to report the dream they had. There is a rather close relationship between the time it takes to report the dream and the length of the REM period.

**Are we more likely to have good dreams or bad dreams?** Investigators who have collected and studied dreams have found that bad dreams are more commonly recalled than good dreams. Dreams are more likely to involve failure, misfortune, and frustration than success and pleasant emotions.

**What do people dream about?** Falling or being chased are among the most common dream themes. The appearance of celebrities in dreams is also common. Many dreams involve frustration: trying repeatedly but unsuccessfully to do something, finding yourself nude in a public place, arriving late to catch a plane or take an exam, and losing important papers or treasured objects. Sex is not among the more common dream themes, even among college students. The occurrence of penile and clitoral erections during dreams is apparently unrelated to the content of the dream.

**Can people control the contents of their dreams?** Research shows that people do have some control over the content of their dreams. And some people have more control than others. Control may be something that can be learned. It has been reported that the Senoi people of Malaysia teach children to control their dreams from an early age. Have you ever had the experience of controlling the content or outcome of a dream?

**Does problem solving occur during dreams?** There are many reports of people finding the solution to a troublesome problem in a dream, but research has failed to support the idea that dreams play a significant role in problem solving. You may have “slept on a problem” and found yourself closer to a solution in the morning, but there are a number of explanations for this other than “dream work.”

**Why do people dream?** Several explanations for dreaming have been offered. Freud thought dreams preserve our sanity by allowing us to gratify forbidden or unrealistic wishes. Information-processing theorists suggest that the function of dreams is to assimilate new data into memory and to jettison mental garbage. The activation-synthesis theory says dreams result when the brain tries to make sense of random neural firing that occurs during sleep.

**Do people need to dream?** A number of studies have been done on dream deprivation. Subjects are awakened as soon as rapid eye movements begin to occur. The results show that as dream deprivation continues, REM periods occur more and more frequently, and subjects become harder to arouse. Also, subjects who have been dream deprived dream more than usual when they are allowed to sleep normally. Although some subjects have become irritable after a night or two of dream deprivation, most seem to adjust to it. We do not know what effect it would have on a person if dream deprivation were continued over an extended period.

**What should you do if you want to remember your dreams?** Dreams are very fragile, so if you want to remember them you will need to be able to record them with a minimum of effort.
1. Keep writing material or a tape recorder within easy reach of your bed and be sure that you can turn on a light easily without getting up.
2. Before going to bed, tell yourself that you are going to wake up after a dream. If you are unable to obey your command, try setting a gentle alarm for two hours after retirement and every two hours thereafter.
3. When you wake up, keep your eyes closed, and review the dream before you record it.
4. Make a questionnaire or checklist to remind you of the information you want to record. This might include such things as the setting, actors, activities, outcomes, and emotional tone of the dream.

Lecture/Discussion: Swimming in the Stream of Consciousness

Whether it’s William James’ stream or your Uncle Jeb’s creek that runs down to the fishin’ hole, metaphors that describe consciousness as a continuum hold more than a kernel of truth. Our common experiences of drifting from alertness into a daydream, or from pleasant conversation into the hypnagogic state, reveal that consciousness ebbs and flows rather than existing as discrete states. What this suggests, then, is that thoughts and feelings experienced in one state of consciousness could impact other states of consciousness.

Rosalind Cartwright reasoned that conscious wishes about an important personal dimension should impact one’s dreams. Drawing on “housekeeping” notions of dreaming and Freudian ideas, Cartwright suggested that drawing a person’s attention to a pressing personal problem should make it more likely that the issue would become the focus of a night’s dreaming. To test this idea, 17 volunteers identified aspects of their personality (e.g., “poised,” “shy,” “lazy,” “defensive”) that they wanted to change. As they fell asleep, participants were instructed to repeat to themselves “I wish I were not so _________,” inserting that aspect that they wanted to change. During their REM periods participants were awakened and asked to recount the content of their dreams, which they typically did easily and thoroughly. When the dream content was analyzed, 15 of the 17 participants were found to have dreamt about the target adjective (importantly, they also dreamt about other descriptors they had rated, although these did not appear at significant proportions). Cartwright suggests that dreaming serves not so much as a vehicle for wish fulfillment, in the Freudian sense, but rather as a means of exploring wants and wishes in ways that might not be available to waking consciousness.

Punctuating this approach is the work on lucid dreaming, or dreams in which the dreamer knows that he or she is dreaming. Abandoning that word salad definition for the moment, lucid dreamers essentially are able to control the content and outcomes of their dreams. Realizing that the events unfolding to the mind’s eye are only a dream, lucid dreamers report deciding to behave in ways that would ordinarily be dangerous or physically impossible. For example, a lucid dreamer falling from a great height might decide to sprout wings and fly to safety, or walk away, Wile E. Coyote-style, from the impact. Studies of this type of conscious control over what has long been presumed a nonconscious process remain somewhat controversial. As with many aspects of consciousness, the answer lies in further research.

Lecture/Discussion: Measuring Hypnotizability

As the text mentions, people vary greatly in their susceptibility to being hypnotized. Attempts to quantify these differences may at first seem intractable; short of successfully putting someone into a hypnotic state, it might seem difficult to measure the extent of a person’s susceptibility. Several efforts have been made, however, to address this issue.

Perhaps the best known measures of hypnotic susceptibility are the Stanford Hypnotic Susceptibility Scale (SHSS) and the Harvard Group Scale of Hypnotic Susceptibility (HGSHS). Both were developed in the late 1950s/early 1960s and in fact the Harvard scale is an adaptation of the Stanford scale. The HGSHS presents a hypnotic induction followed by 12 suggested behaviors. The HGSHS often is used as a prescreening instrument; those participants who record scores in response to the behaviors show signs of hypnotic susceptibility. These candidates may then be tested on the SHSS, a more elaborate test that takes 50–60 minutes to administer and also involves a hypnotic induction, followed by 12 suggestions.

A more recent measure is the Waterloo-Stanford Group C (WSGC) Scale of Hypnotic Susceptibility (Bowers, 1993). It takes approximately 1½ hours to administer and is intended as a follow-up to prescreening on the HGHS. Like its predecessors, the WSGC presents a hypnotic induction and 12 suggestions. These include lowering one’s hand, hallucinating tastes, music, and a mosquito, maintaining arm rigidity, and experiencing an age regression.

Other measures include the Hypnotic Induction Profile (Spiegel & Spiegel, 1978), characterized by its brief administration. A rapid hypnotic induction is used followed by a short series of suggestions; the entire procedure takes about 10 minutes. Similarly, the Stanford Hypnotic Arm Levitation Induction and Test (SHALIT; Hilgard, Crawford, & Wert, 1979) is a rapid technique emphasizing motor behavior, as is the Rapid Induction Susceptibility Scale (RISS; Page & Handley, 1989).

What these measures share in common, besides tongue-defying acronyms, is a focus on assessing a person’s likelihood of entering a hypnotic state. This differs from assessing a person’s experience of being hypnotized. This so-called “hypnotic depth,” or immersion in the hypnotic experience, also has been measured using a variety of instruments.

For example, the Depth of Hypnosis Inventory (Field, 1965) and variants of the Linton-Langs Questionnaire (Linton & Langs, 1962; Ludwig & Levine, 1965) were two early measures of hypnotic experiences. Such early measures typically focused on the dissociative effects of hypnosis and its qualities as an altered state of consciousness. More recent efforts, such as the Hypnotic Experiences Questionnaire (Kelly, 1985), take a multidimensional approach. Factors such as relaxation, rapport, visual imagery, and amount of anxious, ruminative, self-reflective thought, as well as dissociation/altered states, are assessed using a self-report format.

Both sets of instruments – those measuring susceptibility and those measuring hypnotic experience – combine to shed light on what is still a rather murky state of consciousness.


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**Lecture/Discussion: Early Birds, Night Owls, and Hypnotic Susceptibility**

“Mornings are primetime for me; 7:00 a.m. comes and I’m ready to go.”

“I do my best work between 10 at night and 1 in the morning.”

“I like to get up when the sun is warm, around 1:30 or 2:00 in the afternoon.”

These statements illustrate the difference between day persons and night persons, or those of us who are most alert and active during, respectively, morning and early afternoon hours or late afternoon and evening hours. These differences can be seen through casual observation and have been confirmed by a variety of measures of alertness under more controlled circumstances. These peak periods, however, may themselves be a manifestation of an underlying ultradian rhythm, or fragment of the 24-hour rest-activity cycle of the human body. Many physiological processes (such as gastric motility or urinary flow) and behaviors (such as vigilance, fantasizing, or responsiveness to perceptual aftereffects) seem to follow spontaneous cycles of highs and lows throughout the day. Being a “day person,” then, may in part be a product of responding to these cycles.

These distinctions have been linked to hypnotic susceptibility in a study by Benjamin Wallace of Cleveland State University. Using a within-groups design in two experiments, Wallace identified day persons and night persons, and administered both the Stanford Hypnotic Susceptibility Scale (SHSS) and the Harvard Group Scale of Hypnotic Susceptibility (HGSHS). Regardless of the scale used, patterns were found in the hypnotic susceptibility of the participants. Day persons seemed most susceptible at 10 a.m. and 2 p.m., whereas night persons peaked at 1 p.m. and between 6 p.m. and 9 p.m.

These results hold practical implications for hypnotic induction as well as theoretical import for the study of biological rhythms. First, they indicate that hypnotic susceptibility will differ not only between individuals but also within a single individual, partly as a function of that person’s typical cycles of alertness. Second, although the issue remains unresolved, the role of ultradian rhythms suggests a promising avenue for further research. Such rhythms may impact both the day person/night person distinction as well as one’s susceptibility to hypnosis.


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Lecture/Discussion: The FDA Approves MDMA for PTSD

The FDA has formally approved the hallucinogenic agent Ecstasy (MDMA) for research use in humans. The drug is popular among people of all ages because it produces feelings of euphoria, empathy and contentment. Some researchers feel that these feelings may be helpful in treating terminally ill cancer patients or soldiers suffering from PTSD.

Studies to determine the safety of the drug on humans is being conducted at the University of California at Los Angles. Not until the safety of the drug has been verified can the drug be used in clinical trials. There is some concern regarding serotonin levels. One study reported that heavy Ecstasy users experienced a 30 percent decrease in their serotonin levels. The study also reported that the subjects did not experience the hostile and impulsive behavior linked to lowered serotonin in other studies.

http://clinicaltrials.gov/ct2/show/NCT00252174
Psychedelic medicine: Mind bending, health giving. Feb 2005, NewScientist.com
http://www.newscientist.com/article/mg18524881.400

Lecture/Discussion: Witchcraft or Ergot Poisoning?

Linnda Caporael, a behavioral psychologist and a full professor at Rensselaer Polytechnic Institute in Troy, New York., may have found a possible explanation for the behaviors that started the famous Salem Witch Trials of 1692. “Ergot poisoning can't even explain all of the events at Salem, Caporael concedes. Some of the behaviors exhibited by the witch accusers probably were the result of mass hysteria — or outright fakery. "At the end of June and the beginning of July, 1692, I think there was more imagination than ergot. But by that point in time three people had already been hung, and the trials had taken a path that people felt they had to stay on," Caporael says. "One of the clearest examples is the young accuser who, in the late summer, said 'wait a minute, I don't think that there are witches after all.' At that point, the other girls began accusing HER of being a witch, and she immediately seemed to understand what was going on and began being a vociferous accuser again."

Caporael, as a senior in college writing a research paper for a history class, noticed a link between the strange symptoms reported by Salem's accusers, chiefly eight young women, and the hallucinogenic effects of drugs like LSD. LSD is a derivative of ergot, a fungus that affects rye grain. Ergotism — ergot poisoning — had indeed been implicated in other outbreaks of bizarre behavior, such as the one that afflicted the small French town of Pont-Saint-Esprit in 1951. The conditions that were necessary for the development of ergot poisoning were present at the time the accusations of witches first began. It is also noted that toxicologists now know that eating ergot-contaminated food can lead to a convulsive disorder. The symptoms of this disorder includes violent muscle spasms, vomiting, delusions, hallucinations, crawling sensations on the skin, and a host of other symptoms all of which were presented as evidence at the witch trials.

http://www.luminet.net/~wenonah/history/ergot.htm
Lecture/Discussion: Sleeping and Driving

According to the National Sleep Foundation, fifty-one percent of adult drivers in the United States felt sleepy while driving during the past year. Of that 51%, 14 million adults actually fell asleep at the wheel, 2 million of them had an accident.

Activity: Exploring the Stream of Consciousness

The textbook notes that there are many natural fluctuations in consciousness and that as a result our awareness of our mental processes ebbs and flows continuously throughout the day. Using a modification of a procedure developed by Klinger, your students can record changes in their consciousness that occur during the class period. At the beginning of class distribute copies of the data sheet provided in Handout 4.1 to your students. Explain to them that at four intervals during the class, you will stop the lecture and ask them to write down what they were thinking about when the interruption occurred. You should emphasize that their recordings should be honest, free-flowing, and accurate and that the sheets will not be collected in order to maintain their anonymity. You should arrange the demonstration so that the last interruption occurs about 15 minutes before the end of class to allow time for discussion of the results. Discuss the results within the context of daydreaming and ask students to relate their data to the descriptions of daydream content described in the textbook. For example, you can ask students how many of their thought records reflected something related to the lecture or class. How many were related to worry, stress, guilt, or hostility? How many daydreams reflected positive, happy thoughts? You can also discuss the relationship between the fantasy-prone personality and creativity, as well as the many positive aspects of daydreaming (e.g., it helps to build cognitive skills, relieve tension, and incorporate new, complex information).


Activity: Working Shifts

If you decide to talk about the effects of variable shift work, mention that some of your students are future managers and supervisors who will determine other people’s work schedules. Therefore, this topic will be especially important to them. Ask for a show of hands of those students who have worked on rotating shifts or have parents or close friends who have done so. If some students have worked variable shifts, ask them to describe their experiences including how long they held the job, the number of hours they worked, which shift they worked, and how often they rotated to a different shift. How did shift work affect job satisfaction, productivity, and personal relationships? Others might comment on how shift work affected their family structure or friendship patterns. Ask about sleep schedules with working the night shift. You can point out that a significant number of accidents (e.g., Three Mile Island) have occurred during the middle of the night when people are less alert.

Activity: Sleep and Dream Diary

Most students do not believe that they dream at all because they do not remember their dreams. At least one week before you begin the current material, ask students to keep a Sleep and Dream Diary (Handout Master 4.2). I generally recommend 2 weeks of dream record keeping. Explain to the students that each morning when they first wake up that they need to write down all the dreams that they can remember each morning. At the end of the data collection period, instruct students that they should calculate a mean for the number of dreams that they can remember.

In class, ask students to discuss their data with each other, then generate hypotheses that could easily be tested with the data at hand. Collect a few hypotheses from the class, then analyze the data. For example, one might hypothesize that those who spend more time sleeping also spend more time dreaming and thus can report more dreams; this would be a correlation between Items 1 and 2.

Activity: Dream Survey

As an entertaining introduction to the topic of dreaming, begin your discussion by asking students about their own dreams. Handout 4.3 contains a brief dream survey that can be read aloud (students can simply raise their hands in response to questions) or photocopied and distributed to students. Many students will also be willing to share details of their most interesting dreams. A discussion of common themes in dreams should spark a lively discussion about the function of dreams and will provide a nice context for exploring the various theories of dreaming, including Freud's psychoanalytic explanation, the information processing model, and other recent neurophysiological interpretations mentioned in the text.

Students may also be interested in knowing how their dreams compare to those of over 1000 Psychology Today readers who responded to a survey about dreams. In that survey, 95% of those who responded said that they remember at least some of their dreams, and 68% reported having a recurring dream. Popular recurring dreams included falling, being chased, returning to a childhood home, flying, appearing naked in public, and being unprepared for an exam. Thirty-nine percent reported so-called "lucid" dreams in which they claimed to control the course of the dreams. (Some of your students will no doubt recall using
control over a dream to end a nightmare, and others may report using strategies in an effort to dictate what they will dream about on a particular night.) Interestingly, 28% of respondents reported dying in a dream, and over 45% dreamed about celebrities at one time or another (e.g., sex symbols and rock stars).

Activity: Dream Journal

Ludy Benjamin suggests that having students keep a record of their dreams over a period of time can be a terrific way to generate data for class discussion. Several weeks before you plan to cover states of consciousness, assign students to keep a daily diary or journal of their dreams (Handout Master 4.6 contains a sample assignment that can be photocopied and distributed to students as is or modified for your class as desired). A long lead time is necessary to give students who have trouble remembering their dreams several extra chances to remember at least some of them, and will also give you enough time to make observations about their dreams before discussing them in class (ideally, the assignment should be due the class period prior to your discussion). In doing this assignment, students should try to keep daily notes about their dreams (preferably, as soon as they wake up); they can then type up a summary from their notes after they have successfully remembered several dreams. Be aware that you might need to make provisions for the fact that, despite great effort, some students may not remember their dreams; perhaps you could give these students an alternate assignment or make this one optional. You should also reassure students that you will keep the content of their dream journals strictly confidential, and you should encourage them to freely edit or omit any details that they don't feel comfortable sharing with you. Finally, be sure to caution students against discussing their dreams during this assignment so they don't unintentionally influence each other. After you have read the journals, you can solicit student volunteers to share the content of their dreams with the class during discussion.


(Activity: Demonstrating Hypnotic Suggestibility)

If you'd rather not devote an entire class period to hypnosis, consider performing at least one of several easy demonstrations that require the same kind of suggestibility used in hypnosis. John Fisher describes several simple exercises that can readily be used in class. (1) Bring a small, sealed jar of colored but odorless liquid (e.g., water treated with food coloring) to your class, and explain to students that it contains a very exotic liquid made from foreign ingredients. Tell them that you will open the jar to allow the scent to waft around the room and that they should raise their hands as soon as they smell it. To facilitate acceptance of this suggestion, you might wrinkle your nose as you uncork the jar or even arrange for a cooperative confederate or two to raise their hands. (2) Ask your students to close their eyes and to imagine that they are cutting a large, sour, bitter lemon, a lemon so full of juice that it is dripping on the floor. Then tell them to imagine that they are sucking the juice from the same fruit. The majority of your students should be awash in saliva by this point! (3) Create the perception of a bodily itch by making several suggestions to itching and scratching. Start by reminding students how pleasurable it is to scratch...
an annoying itch, such as a tickle on the back or the ankle or the nose. Suggest that students might be starting to perceive slight itching sensations on various parts of their body, and that these might get progressively stronger so that they soon won't be able to refrain from scratching (scratching yourself unobtrusively at this point helps). The more you play this up (e.g., by describing your itches and scratches in great deal and with emotion), the more students will feel compelled to scratch. Before long, the majority of your audience will be scratching itches on their heads, shoulders, faces, and arms that exist only in their minds. Suggesting a compelling urge to swallow also works well, as does the suggestion of the need to yawn (especially when accompanied by a wide, exaggerated yawn on your part). (4) Tell students to hold their fists in front of them about 15 inches apart with their index fingers pointing towards each other. Then suggest that their fingers are becoming nervous and shaky in this position and that consequently their fingertips are not pointing precisely together. At this point, suddenly and immediately instruct them to bring their fingertips together instantly, without any hesitation ("NOW!"). Although this sounds amazingly easy, the mere suggestion of shakiness and doubt throws most people off just enough to make their fingertips miss.

In complying with these "suggestions," your students will demonstrate the enormous human capacity for accepting an idea and responding to it almost automatically. Note that some students will be more responsive to these suggestions than others, and you can discuss how this variability relates to real individual differences in susceptibility to hypnosis. How do students think they would score on Hilgard's Stanford Susceptibility Scale? Are they surprised by their responsiveness (or nonresponsiveness)? Discuss how hypnotic susceptibility is related to age, childhood upbringing, having an active imagination, hereditary factors, and contextual cues in the hypnotic setting.


**Activity: Mesmerism**

Mesmer’s demonstrations of animal magnetism show an interesting side of psychology. Mesmer’s public displays were effective because of hypnotic suggestion, not because of magnetic forces. Although he demonstrated a real psychological phenomenon, his explanation was entirely wrong. Discussion of his techniques will contrast nicely with contemporary methods. The Royal Commission (which included Ben Franklin and Guillotin) established by the French government to investigate Mesmer’s claims provides an excellent example of a skeptical analysis of paranormal phenomena. Gould (1991) provides a comprehensive and colorful account. Eventually, Mesmer was run out of town. However, his name remains, as we still talk about being mesmerized.

Activity: An Educational Deception

A number of researchers contend that hypnosis is not discretely different from a heightened level of suggestibility. Prearrange with a student in your class to be part of your deception. (Your choice of student is crucial here; select a skeptical student rather than one who is eager to become “hypnotized.”) During class, ask for a “volunteer” to be hypnotized, and then select the student who agreed to be part of the deception. Go through the motions of hypnotizing this student, but do it in a way that hypnosis would be impossible. Then ask the student, who is now supposedly under hypnosis, to carry out several tasks. For example, ask the student to lie on his or her back on the floor. Then have two other students lift him or her by the neck and ankles and place him or her suspended across two chairs. Most students will be impressed by this demonstration, but in fact, most healthy students can do this while fully awake. You can also ask the student to cluck like a chicken, regress to his or her childhood, or to do other typical hypnosis demonstrations.

At the end of the demonstration, ask how many students believe that your volunteer was truly hypnotized. Most of them will. Then ask the volunteer whether he or she indeed was hypnotized. At this point, he or she should admit to the deception. This demonstration should illustrate to the students how difficult it is to determine whether hypnosis is a discretely different state from being awake.

Activity: Brief Meditation Experience

During your discussion of altered states of consciousness, students will undoubtedly ask about meditation, which most will have heard about from popular sources but will have never experienced. Concentrative meditation can be demonstrated fairly easily in the classroom using the following exercise, which was adapted from exercises suggested by Linda Leal and by Antonio Puente. Before you begin, briefly explain the rationale behind meditation. The primary goal of meditation is to achieve a deep state of relaxation, usually by concentrating on one repetitive stimulus so that all other thoughts and images are blocked out. This narrowing of concentration, accompanied by deep, slow breathing, effectively reduces the activity of the sympathetic nervous system (e.g., by lowering heart rate and respiration rate) and slows down metabolism. Meditation promotes feelings of well-being and relaxation, and has been used to help people cope with stress as well as to treat certain medical problems (e.g., drug addiction).

After you've introduced the idea of concentrative meditation, turn off (or dim) the room lights and make sure the room is free of distractions for 10 to 15 minutes. Instruct students to sit erect in a comfortable position, with their hands either on the desk or in their lap and with their feet uncrossed and touching the ground. After students are in a relaxed position, ask them to close their eyes and to sit quietly and breathe in and out as usual for about 30 seconds. Tell students that they should try to clear their minds by letting go of all random thoughts and by focusing on their breathing. Tell them that each breath should come from the abdomen, and, if possible, they should breathe through their nostrils. Thus, they should concentrate on the rise and fall of their abdomen, saying slowly to themselves "in" and "out" with each inhalation and exhalation. Stress that they should think of nothing else but the rise and fall of their abdomen and the corresponding thoughts of "in" and "out." At this point, you might want to reassure students that although they may have trouble concentrating initially, this problem diminishes with practice. After approximately 10 minutes of this exercise, gently tell students to start focusing on bodily sensations as well as the sounds in the room around them. Give them about a minute of this reorientation period before asking them to open their eyes.
Once students are fully alert, allow them to discuss their experiences. Linda Leal suggests the following questions to guide discussion. (1) **Why does meditation promote feelings of well-being and satisfaction?** Research suggests that the beneficial effects are related to the lowered activity of the sympathetic nervous system. The most common bodily change reporting during meditation, hypometabolism, is characterized by decreased metabolic rate and reflected in lower heart and respiration rates and lower oxygen consumption. It may also be that the concentration required in meditation distracts people away from other concerns. (2) **Why is it difficult to keep distracting thoughts from entering consciousness while meditating?** One possible explanation is that the repeated presentation of a single stimulus leads to habituation, or a general decrease in sensory responding. Another possibility is that the mind is undisciplined and requires practice to achieve deep concentration. (3) **Does meditation lead to heightened states of consciousness, alertness, or creativity?** There is some controversy over whether meditation significantly alters normal states of consciousness. Many proponents claim that it does, but it is a difficult proposition to test scientifically and many reports are based on personal accounts for poorly controlled studies. Although many of the same physiological changes can be obtained simply from deep relaxation, the text notes that a meta-analysis comparing transcendental meditation (TM) with other forms of meditation and relaxation techniques found TM to be superior for reducing anxiety.

**Note:** If your roster is too large to perform this exercise in class, consider asking students to practice this technique at home (over the course of several different 20-minute sessions) and to write a short discussion paper describing their experiences and relating them to material presented in the text and lecture.


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**Activity: Changing the Mind, Changing the Body**

This activity is designed to demonstrate that one can change one’s physiology (in this case, reducing heart rate) by changing one’s mental state, via meditation. Even if a student has never meditated before, the concept is rather simple. Meditation can be achieved by closing the eyes and mentally focusing intently on one (rather innocuous) object, such as a building or fountain on campus. Prior to meditating, students should first determine their pulse rate. (An easy way to calculate beats per minute is to count the number of heartbeats in a ten-second period, then multiply that value by 6. After the “baseline” heart rate has been determined, students should clear their mind and relax (preferably in a room with low light and few distracters) for a few minutes. Then, while sitting down, students should close their eyes, try to breathe deeply, attempt to clear their minds of everything except that one thing, and try to maintain this focus for three to five minutes. A second measure of heart rate should then be obtained (some students may even be able to assess their heart rate while meditating). Most students should be able to lower their heart rate by approximately 5 beats per minute just by meditating. Although the average resting heart rate for a male is roughly 72 beats per minute, some Zen Buddhist masters, through meditation, can reportedly lower their heart rate to ~35 beats per minute!
Activity: Drugs’ Effects on the Brain and Behavior (Group Activity)

Assign small groups of four to six students one drug substance, and a controversial question about which they must research and present to the class. Specifically, students should be prepared to (a) describe the drug classification as it pertains to their particular drug substance; (b) describe the behavioral effects of the drug; (c) describe the physiological effects of the drug, with a discussion of the potential for abuse; and (d) discuss their assigned question with the rest of the class. Handout Master 4.4 provides a handout of the various drug topic questions. I recommend that you have groups randomly choose their questions out of a hat; therefore the handout is designed for you to cut into pieces.

Activity/Debate: Is Alcoholism a Disease?

The text discusses the enormous physiological and social costs of alcohol use and abuse. Given these costs, it is not surprising that a major priority of psychologists is to better understand alcoholism and its causes. Despite the large amount of research devoted to the issue, however, there exists a heated controversy over its cause and opinions are sharply divided. The question at the heart of the debate is this: Should alcoholism be viewed as a disease, a physiological defect over which "victims" have little or no control? Those who support the disease model (including Alcoholics Anonymous, which is based on this premise) issue a resounding "yes" and argue that alcoholism is a biological illness stemming from some combination of genetic, metabolic, hormonal, or other physiological factors. Those who say "no" reject the idea that alcoholism is uncontrollable or has biological causes and argue that the disease model discourages alcoholics from taking responsibility for their behavior. Social attitudes are equally divided and mirror those of researchers and practitioners. Some simply view alcoholism as a behavioral or moral problem whereas others see it as a physical problem whose victims deserve treatment rather than punishment.

Your students are likely to have formed strong opinions on this issue from what they have seen or heard in the media. Encourage them to explore this important issue in greater depth by considering the scientific evidence and arguments in a debate format. Is there evidence supporting the disease model of alcoholism? What does biological and genetic research indicate? What implications do answers to these questions have for assigning personal responsibility for alcoholism and its consequences? Using the debate procedures suggested at the beginning of this manual, assign students to research this issue and to be prepared to defend either side.

Activity / Debate: Should Drugs Be Legalized?

Although the enormous societal and financial consequences of legal drug use (such as alcohol and nicotine) are well-documented, few topics arouse as much public and political concern as does the use and abuse of illegal drugs. Drug abuse emerged as an important public issue in the 1960s with the rise of the counterculture and its experimentation with drugs such as heroin, marijuana, and LSD. In the 1980s, the high price of cocaine led to the development of cheap substitutes (such as crack), which produced violent disorderly behavior and led to street wars between gangs fighting over control of its distribution. This epidemic of drug use and violent crime led to the current "war on drugs" (declared during the Reagan and Bush administrations), which advocates stiff penalties for drug-related crimes.

Has the so-called war on drugs improved the drug problem in this country? Opinions are sharply divided. Many experts who argue that the war on drugs has failed have proposed their own controversial solution to the problem: the controlled legalization of drugs. Proponents argue that legalization would diminish crime by driving drug traffickers out of business and would also lead to a savings of several billion dollars each year through tax revenues, which could be used for education and treatment programs. Critics argue that widespread availability, lower prices, and the elimination of the legal stigma would lead to an enormous increase in drug abuse, which in turn would lead to skyrocketing medical costs and would jeopardize public safety. Ask your students to debate the scientific merit of arguments and evidence on both sides of this volatile issue. Use the debate procedures suggested at the beginning of this manual and assign students to research this issue and to be prepared to defend either side.


Activity: Drug Abuse in Film: Drugstore Cowboy

In this critically acclaimed 1989 film, Matt Dillon and Kelly Lynch star in a gritty, intense look at the lives of a junkie couple and their similarly drugged-out friends. It is an honest but not altogether pleasant glimpse into the world of addiction that most of us, thankfully, will never see. This is a real eye-opening film, one that clearly illustrates many of the principles of the text while allowing students to safely step into the shoes of an addict for an hour and a half. Ask students to screen the film and then to write a paper discussing principles from the text and lecture. When possible, their discussion should include any specific drugs that they can identify as well as the physical effects of each as they are manifested in the film (Live; 104 min).
Activity: Crossword Puzzle

Copy and distribute Handout Master 4.5 to students as a homework or in-class review assignment.

The answers for the crossword puzzle are:

Across
6. drugs that increase the functioning of the nervous system. **Stimulants**
9. depressant drugs that have a sedative effect. **Barbiturates**
10. bad dreams occurring during REM sleep. **Nightmares**
13. mental series of exercises meant to refocus attention and achieve a trance-like state of consciousness. **Meditation**
14. drugs that decrease the functioning of the nervous system. **Depressants**
17. narcotic drug derived from opium that is extremely addictive. **Cocaine**
18. stimulants that are synthesized in laboratories rather than being found in nature. **Amphetamines**
21. the inability to get to sleep, stay asleep, or get a good quality of sleep. **Insomnia**
22. drugs that alter thinking, perception, and memory. **Psychoactive**

Down
1. drugs that lower anxiety and reduce stress. **Benzodiazepines**
2. physical symptoms that can include nausea, pain, tremors, crankiness, and high blood pressure, resulting from a lack of an addictive drug in the body systems. **Withdrawal**
3. a class of opium-related drugs that suppress the sensation of pain by binding to and stimulating the nervous system’s natural receptor sites for endorphins. **Narcotics**
4. state of consciousness in which the person is especially susceptible to suggestion. **Hypnosis**
5. stage of sleep in which the eyes move rapidly under the eyelids and the person is typically experiencing a dream. **REM**
7. sleep disorder in which a person falls immediately into REM sleep during the day, without warning. **Narcolepsy**
8. a mild stimulant found in coffee, tea, and several other plant-based substances. **Caffeine**
11. long, slow waves that indicate the deepest stage of sleep. **Delta**
12. a cycle of bodily rhythm that occurs over a 24 hour period. **Circadian**
15. brain waves that indicate a state of relaxation or light sleep. **Alpha**
16. a natural drug derived from the leaves of the coca plant. **Cocaine**
19. a person’s awareness of everything that is going on around him or her at any given moment. **Consciousness**
20. brief sidesteps into sleep lasting only a few seconds. **Microsleeps**
23. disorder in which the person stops breathing for nearly half a minute or more. **Sleep apnea**
24. drugs that cause false sensory messages, altering the perception of reality. **Hallucinogens**
25. the chemical resulting from fermentation or distillation of various kinds of vegetable matter. **Alcohol**
Activity: Fill in the Blank

Copy and distribute Handout Master 4.7 to students as a homework or in-class review assignment.

Answer Key: Chapter 4 – States of Consciousness – Fill in the Blank
1. Consciousness
2. Altered State
3. Circadian rhythm
4. Microsleeps
5. Restorative Theory
6. Alpha waves
7. Rapid Eye Movement
8. Night terrors
9. Paradoxical sleep
10. Insomnia
11. Sleep apnea
12. Narcolepsy
13. Hypnosis
14. Tolerance
15. Withdrawal
16. Psychological Dependence
17. Stimulants
18. Depressants
19. Narcotics
20. Psychogenic drugs
4.1 Recording the Stream of Consciousness
4.2 Sleep and Dream Diary
4.3 Dream Survey
4.4 Drugs Effects on Brain and Behavior
4.5 Crossword Puzzle
4.6 Keeping a Journal
4.7 Fill in the Blank
Recording the Stream of Consciousness

Instructions: During class, the lecture will be interrupted at four random intervals. Whenever the instructor says "stop and record your thoughts," you should immediately write down in the spaces provided below exactly what you were thinking about just before the interruption. Please write down exactly what you were thinking (i.e., do not edit yourself); anything is acceptable as long as it is accurate. These data will not be collected by the instructor.

Interruption 1:

Interruption 2:

Interruption 3:

Interruption 4:
### Part 1: Daytime Napping

**Complete before going to bed at night.**

<table>
<thead>
<tr>
<th></th>
<th>Day 1</th>
<th>Day 2</th>
<th>Day 3</th>
<th>Day 4</th>
<th>Day 5</th>
<th>Day 6</th>
<th>Day 7</th>
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</thead>
<tbody>
<tr>
<td>1. Number of naps taken today.</td>
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<td>2. Total sleep time of naps taken today.</td>
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<td>3. Overall rating for sleepiness/alertness today (1–7)*</td>
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* For Item 3 use the following scale:
  1 = feeling active, vital, alert, wide awake
  2 = functioning at a high level
  3 = relaxed, not fully alert, responsive
  4 = a little foggy, not at peak, let down
  5 = fogginess, losing interest, slowed down
  6 = sleepy, prefer to be lying down
  7 = almost in a reverie, hard to stay awake

### Part 2: Nighttime Sleeping

**Complete after waking up in the morning.**

<table>
<thead>
<tr>
<th></th>
<th>Night 1</th>
<th>Night 2</th>
<th>Night 3</th>
<th>Night 4</th>
<th>Night 5</th>
<th>Night 6</th>
<th>Night 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Total time spent sleeping (e.g., 8.25)</td>
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<td>2. Number of times you woke up during the night.</td>
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<td>3. Number of separate dreams you can recall at least partially.</td>
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<td>4. Number of dreams related to experiences of the recent days.</td>
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<td>5. Overall Sleep Rating (1–7)**</td>
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** For Item 5, use the following scale:

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<th></th>
<th>1</th>
<th>2</th>
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<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>I feel very refreshed and ready to start my day</td>
<td>+</td>
<td>I feel somewhat alert</td>
<td>I feel neither refreshed nor tired</td>
<td>I feel groggy</td>
<td>I feel very tired and want to go back to bed</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Dream Survey

Instructions. Respond to each question below by circling "YES" if the answer is "Yes" and by circling "NO" if the answer is "No." Please note that your responses to these questions are strictly anonymous. This survey will not be collected, and no one will see your responses but you (although you are welcome to share your responses with the class if you wish).

1. Do you typically remember your dreams? YES NO
2. Have you ever been able to control what you dream about or how your dream unfolds? YES NO
3. Have you ever died in a dream? YES NO
4. Do you have a recurring dream? YES NO
   Briefly describe it.

5. Have you ever dreamed about doing something impossible (e.g., flying, playing music even though you can't)? YES NO
6. Have you ever had a dream in which one person transformed into another? YES NO
7. Do your dreams often contain inconsistencies (e.g., you know it's your house or your room but it doesn't look like it's suppose to)? YES NO
8. Do you ever dream about celebrities? YES NO Which ones?
9. Do you incorporate outside noises into your dream (e.g., an alarm clock, a telephone ring)? YES NO
10. Have you ever dreamed about:
    • a sexual experience? YES NO
     • being naked in public? YES NO
     • killing someone? YES NO
     • finding money? YES NO
     • being attacked or pursued? YES NO
     • arriving too late for something important? YES NO
     • being locked up? YES NO
     • war? YES NO
Handout Master 4.4

**Drugs' Effects on the Brain and Behavior**

**GHB:** What is date-rape and how has GHB been implicated as a date-rape drug?

**ALCOHOL:** What is meant by binge drinking, and how prevalent is binge drinking on college campuses?

**MARIJUANA:** Should marijuana be legalized? Why or why not?

**HEROIN:** What is the rate of heroin use in your geographic area, and what is being done in our city to treat those with heroin addiction?

**ECSTASY:** Should Ecstasy be used for therapeutic purposes, such as for treatment of depression from loss of a loved one?

**RITALIN:** Is Ritalin over-prescribed for children diagnosed with Attention Deficit Disorder (ADD)?

**NICOTINE:** Should nicotine be made illegal? Why or why not?
Crossword Puzzle Activity

Chapter 4: States of Consciousness
Across

6. drugs that increase the functioning of the nervous system.
9. depressant drugs that have a sedative effect.
10. bad dreams occurring during REM sleep.
13. mental series of exercises meant to refocus attention and achieve a trance-like state of consciousness.
14. drugs that decrease the functioning of the nervous system.
17. narcotic drug derived from opium that is extremely addictive.
18. stimulants that are synthesized in laboratories rather than being found in nature.
21. the inability to get to sleep, stay asleep, or get a good quality of sleep.
22. drugs that alter thinking, perception, and memory.

Down

1. drugs that lower anxiety and reduce stress.
2. physical symptoms that can include nausea, pain, tremors, crankiness, and high blood pressure, resulting from a lack of an addictive drug in the body systems.
3. a class of opium-related drugs that suppress the sensation of pain by binding to and stimulating the nervous system’s natural receptor sites for endorphins.
4. state of consciousness in which the person is especially susceptible to suggestion.
5. stage of sleep in which the eyes move rapidly under the eyelids and the person is typically experiencing a dream.
7. sleep disorder in which a person falls immediately into REM sleep during the day, without warning.
8. a mild stimulant found in coffee, tea, and several other plant-based substances.
11. long, slow waves that indicate the deepest stage of sleep.
12. a cycle of bodily rhythm that occurs over a 24 hour period.
15. brain waves that indicate a state of relaxation or light sleep.
16. a natural drug derived from the leaves of the coca plant.
19. a person’s awareness of everything that is going on around him or her at any given moment.
20. brief sidesteps into sleep lasting only a few seconds.
23. disorder in which the person stops breathing for nearly half a minute or more.
24. drugs that cause false sensory messages, altering the perception of reality.
25. the chemical resulting from fermentation or distillation of various kinds of vegetable matter.
Handout Master 4.6

**Student Assignment: Keeping a Dream Journal**

Your task for this assignment is to keep a dream journal for several weeks in order to record the content of at least 5 different dreams.

**Instructions:**

1. In order to best remember your dreams, you should follow several steps. First, place a pen and pad next to your bed before you go to sleep. Before you go to sleep, tell yourself that you'll be able to remember your dreams when you wake up. When you do wake up, keep your eyes closed and replay the dream until the plot and details become clear in your mind. Then, gently sit up, turn on the light, and write down what you remember about your dream. If you typically have trouble remembering your dreams, try setting your alarm clock for 10 or 15 minutes earlier than normal (this should interrupt your last dream of the night).

2. When recording your dream, include whatever information you can remember about:
   - the setting (e.g., indoors or outdoors)
   - characters (e.g., relatives, friends, strangers)
   - nature of the interaction (e.g., friendly, hostile, sexual)
   - activities (e.g., running, speaking, flying)
   - whether or not the dream was in color
   - any relationship to the previous day's events or the next day's planned activities

3. Once you have recorded your dreams on paper, please type them and arrange them as a list of entries according to the date of the dream. When typing your dreams to hand in, feel free to summarize details or to edit material that you would like to keep to yourself; on the other hand, detailed transcripts are fine, too. Regardless of whether you edit your selections or not, be assured that any information that you turn in to me will be kept strictly confidential.

4. Following your final dream entry, spend a paragraph or two noting your observations and feelings about your dreams. Did you notice any major themes or patterns to your dreams? Did you generally dream in color? Did your dreams seem meaningful or were they totally random and bizarre? Did you have any "lucid" dreams (i.e., in which you were aware of dreaming and exerted control over it)? Were there any recurring characters? Were there any specific events (such as drinking alcohol or getting very little sleep) that seemed to influence the content or character of your dreams?
CHAPTER 4  STATES OF CONSCIOUSNESS

Handout Master 4.7  

Fill in the Blank Class Activity

1. ___________________ is a person’s awareness of everything that is going on around him or her at any given moment.
2. The state in which there is a shift in the quality or pattern of mental activity as compared to waking consciousness is called ___________________ of consciousness.
3. The ___________________ is a cycle of bodily rhythm that occurs over a 24-hour period.
4. ___________________ are brief sidesteps into sleep lasting only a few seconds.
5. The ___________________ of sleep is the theory of sleep proposing that sleep is necessary to the physical health of the body and serves to replenish chemicals and repair cellular damage.
6. ___________ are brain waves that indicate a state of relaxation or light sleep.
7. ___________ is a stage of sleep in which the eyes move rapidly under the eyelids and the person is typically experiencing a dream.
8. ___________________ are a relatively rare disorder in which the person experiences extreme fear and screams or runs around during deep sleep without waking fully.
9. REM sleep is also known as ______________ because there is high level of brain activity.
10. ___________ is the inability to get to sleep, stay asleep, or get a good quality of sleep.
11. ______________ is a disorder in which the person stops breathing for nearly half a minute or more.
12. ___________ is a sleep disorder in which a person falls immediately into REM sleep during the day without warning.
13. The state of consciousness in which the person is especially susceptible to suggestion is called ____________.
14. When more and more of the drug is needed to achieve the same effect it is called _____________.
15. The physical symptoms that can include nausea, pain, tremors, crankiness, and high blood pressure, resulting from a lack of an addictive drug in the body systems are called _____________.
16. The feeling that a drug is needed to continue a feeling of emotional or psychological well-being is _______________.
17. ___________ are drugs that increase the functioning of the nervous system.
18. Drugs that decrease the functioning of the nervous system are known as _______________.
19. _______________ are a class of opium-related drugs that suppress the sensation of pain by binding to and stimulating the nervous system’s natural receptor sites for endorphins.
20. _______________ are drugs including hallucinogens and marijuana that produce hallucinations or increased feelings of relaxation and intoxication.

► Return to Activity: Fill in the Blank Chapter 4
▼ Return to List of Handout Masters for Chapter 4
▲ Return to Chapter 4: Table of Contents
Words to Use:

Alpha waves
Altered State
Circadian rhythm
Consciousness
Depressants
Hypnosis
Insomnia
Microsleeps
Narcolepsy
Narcotics
Night terrors
Paradoxical sleep
Psychogenic drugs
Psychological Dependence
Rapid Eye Movement
Restorative Theory
Sleep apnea
Stimulants
Tolerance
Withdrawal