CHAPTER 4 States of Consciousness

Links to Learning Objectives

ENDURING ISSUES IN STATES OF CONSCIOUSNESS
- Sleep: Circadian rhythms & jet lag, Sleep disorders
- Dreams: Why we dream

DRUG-ALTERED CONSCIOUSNESS
- Psychoactive drugs
- Substance abuse & substance dependence
- Drug research
- Depressants
- Stimulants
- LSD & marijuana
- Exploring abuse & addiction

MEDITATION AND HYPNOSIS
- Effects of meditation
- Hypnosis

Enduring Issues

How do the settings in which consciousness-altering drugs are taken influence their effects?
Enduring Issues

Are there significant differences among people in their susceptibility to various altered states of consciousness?

Enduring Issues

In what ways do psychological states affect biological processes and, conversely, in what ways do biological processes affect psychological experiences?

Awareness of various cognitive processes, such as sleeping, dreaming, concentrating, and making decisions.
States of Consciousness

Waking:
Thoughts, feelings, and perceptions that occur when we are awake and reasonably alert

Altered states:
Mental states that differ noticeably from normal waking consciousness

Sleep

Evidence exists that sleep is necessary for physical and mental restoration.
- Immune system functioning
- Cognitive functioning
- Problem solving
- Decision making
- Creativity
- Long term memory

LEARNING OBJECTIVE: Summarize current thinking about why we sleep.
Circadian Cycles: The Biological Clock

LEARNING OBJECTIVE: Describe circadian rhythms and their relationship to jetlag.

Circadian rhythm: Regular biological rhythm with a period of approximately 24 hours

Suprachiasmatic nucleus (SCN): Cluster of neurons in hypothalamus that receives input from the retina regarding light and dark cycles; involved in regulating the biological clock

Jet Lag

“We rarely notice circadian rhythms until they are disturbed. Jet lag is a familiar example. Travelers who cross several time zones in one day often feel ‘out of it’ for several days. The reason for jet lag is not so much lack of sleep as desynchronization. Sleep-and-wake cycles adapt quickly, but hormones, body temperature, and digestive cycles change more slowly. As a result, bodily functions are out of sync.”

– Page 124 (Morris & Maisto)

The Rhythms of Sleep

LEARNING OBJECTIVE: 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.

Twilight State: “Going to Sleep”

- Alpha waves (irregular, low-voltage)
- Brain-wave pattern mirrors sense of relaxed wakefulness experienced while lying on a beach or resting after a big meal
Stage 1:
Pulse slows, muscles relax, eyes make rolling movements, sleeper is easily awakened

Stage 2 and 3:
Sleeper is hard to awaken, unresponsive to stimuli; heart rate, blood pressure, temperature continue to drop; sleep spindles appear (2) and delta waves emerge (3)

Stage 4:
Lowest heart rate, breathing rate, blood pressure, body temperature; very slow delta waves

Non-REM Sleep

REM Sleep

- Characterized by:
  - Rapid-eye movements
  - Increased dreaming
- Also called paradoxical sleep

The Brain-Wave Patterns Typical of the Five Stages of Sleep
Stages of Sleep

<table>
<thead>
<tr>
<th>Stages of Sleep</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Twilight stage</td>
<td>Low voltage delta waves, relaxed movements,</td>
</tr>
<tr>
<td>Stage 1</td>
<td>Lower pulse, relaxed muscles, side-to-side rolling of eyes, eyes closed.</td>
</tr>
<tr>
<td>Stage 2</td>
<td>Slow spindle waves, still tension, blood pressure, body temperature, heart in synchrony.</td>
</tr>
<tr>
<td>Stage 3</td>
<td>Low alpha waves, unresponsiveness to stimuli.</td>
</tr>
<tr>
<td>Stage 4</td>
<td>Delta waves, very low pulse rate, blood pressure, body temperature, slow breathing.</td>
</tr>
<tr>
<td>REM paradoxical</td>
<td>Low voltage delta waves, increased heart rate, blood pressure, muscle very relaxed, rapid eye movements (REM), very difficult to awaken.</td>
</tr>
</tbody>
</table>

A Night’s Sleep Across the Life Span

Changes in REM and NREM Sleep
Sleep Deprivation

• Between 1/3 and 1/2 of all adults regularly fail to get enough sleep.
• 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.

Applying Psychology

• Maintain a regular bedtime and a relaxing bedtime routine.
• Don’t overeat or use drugs.
• Keep the room temperature comfortable.
• Don’t exercise within several hours of bedtime.
• Avoid anxious thoughts while in bed.
• Don’t fight insomnia when it occurs.

Sleep Disorders

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

Sleeptalking and Sleepwalking

– Usually occur during Stage 4
– More common among children than adults
Frightening dreams that occur during REM sleep and are remembered

Frightening dreams that occur during NREM sleep from which a person is difficult to awaken and doesn't remember the content.

Sleep Disorders

**Insomnia:** Difficulty in falling asleep or remaining asleep throughout the night

**Sleep apnea:** Breathing difficulties at night; in severe cases, the person stops breathing

**Narcolepsy:** Sudden nodding off during the day and sudden loss of muscle tone and expression
LEARNING OBJECTIVE: Explain what dreams are. Summarize the explanations of dream activity and content as set forth in Freudian theory, information processing theory, and neural activation theory.

Dreams

manifest and latent content

extension of emotional concerns of daily life in fictional form

mind’s reprocessing of daily information that is important for survival

very active limbic system (relatively primitive areas of forebrain) involved in working memory, emotions, logic, and self-monitoring + highly emotional content of dreams

Drug-Altered Consciousness
Psychoactive drugs are chemical substances that change moods, perceptions, mental functioning, or behavior.

Drug Use Over the Centuries

**LEARNING OBJECTIVE:** Define psychoactive drugs and summarize how their use has changed over the centuries.

- **How drugs are used and what drugs are used have changed over the centuries.**
- **Motives for use:**
  - In most cultures: religious rituals, medicinal purposes, nutritional benefits, culturally-approved stimulants
  - Contemporary society: recreational reasons
- **Today:**
  - Stronger drugs
  - Synthetic drugs
  - Greater knowledge about drug effects

Substance Use, Abuse, and Dependence

**LEARNING OBJECTIVE:** Differentiate substance abuse and substance dependence.

- **Substance use:** Occasional use of drugs
- **Substance abuse:** Pattern of drug use that results in:
  - diminished ability to fulfill responsibilities
  - repeated drug use in dangerous situations
  - legal difficulties related to drug use
- **Substance dependence:** Pattern of compulsive drug taking that results in:
  - tolerance
  - withdrawal symptoms
  - other specific symptoms for at least a year
How Drug Effects Are Studied

LEARNING OBJECTIVE: Explain how double-blind procedures and placebos are used in drug research.

- Carefully controlled scientific conditions
  - Double-blind procedure
  - Placebo
- Neuroimaging techniques such as PET scans

Categories of Psychoactive Drugs

LEARNING OBJECTIVE: Describe the major depressants, their effects, the effects of an overdose, and the extent to which they are susceptible to dependence.

Depressants: Alcohol, Barbiturates, and the Opiates

- Alcohol
- Barbiturates
- Opiates
Alcohol

- Most frequently used psychoactive drug in Western societies
- Number-one drug problem in the United States; 9% of adults report dependence or abuse
- Staggering economic cost of abuse/dependence
- Directly involved in more than 20,000 deaths annually
- Despite dangers, remains popular because of short-term effects
- *Binge drinking frequent occurrence on college campuses*

Table 4-2 THE BEHAVIORAL EFFECTS OF BLOOD ALCOHOL LEVELS

<table>
<thead>
<tr>
<th>Levels of Alcohol in the Blood (%)</th>
<th>Behavioral Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.05</td>
<td>Feels good, less alert, reduced inhibitions</td>
</tr>
<tr>
<td>0.10</td>
<td>Is slower to react, lessawareness, slowed speech</td>
</tr>
<tr>
<td>0.15</td>
<td>Reaction time is much slower</td>
</tr>
<tr>
<td>0.20</td>
<td>Sensory motor abilities are suppressed</td>
</tr>
<tr>
<td>0.25</td>
<td>Is staggering (motor abilities severely impaired); perception is limited as well</td>
</tr>
<tr>
<td>0.30</td>
<td>Is in semistupor; confused</td>
</tr>
<tr>
<td>0.35</td>
<td>Is at level for anesthesia, death is possible</td>
</tr>
<tr>
<td>0.40</td>
<td>Death</td>
</tr>
<tr>
<td>0.50</td>
<td>Coma</td>
</tr>
<tr>
<td>0.60</td>
<td>Respiratory arrest/death</td>
</tr>
</tbody>
</table>

Teenage Use of Alcohol (% Drunk in Past 30 Days)

Per Capita Annual Alcohol Consumption in the United States, 1977 - 2005

Persons Killed in Alcohol-Related Traffic Crashes

Barbiturates

- Potentially deadly depressants
- First used for their sedative and anticonvulsant properties, now used only to treat such conditions as epilepsy and arthritis
- Sometimes prescribed as a sleep aid, but actually disrupt the body’s natural sleep patterns and cause dependence

Opiates

• Drugs, such as opium and heroin, derived from the opium poppy
• Dull the senses and induce feelings of euphoria, well-being, and relaxation
• Synthetic drugs resembling opium derivatives also classified as opiates
• Morphine compounds still used in painkillers and other medications
• Heroin, other opiates resemble the body’s endorphins

Stimulants: Caffeine, Nicotine, Amphetamines, and Cocaine

LEARNING OBJECTIVE: Describe the major stimulants, their effects, the effects of an overdose, and the extent to which they are susceptible to dependence.

Nicotine

• One of a class of drugs known as xanthine stimulants
• Found in coffee, tea, other beverages, and nonprescription drugs
• Generally considered benign in small doses
• Can cause dependence and tolerance in those who consume it regularly

Caffeine

• One of a class of drugs known as xanthine stimulants
• Found in coffee, tea, other beverages, and nonprescription drugs
• Generally considered benign in small doses
• Can cause dependence and tolerance in those who consume it regularly
The Amount of Caffeine in Some Common Preparations

Nicotine

- Neurochemical properties similar to cocaine, amphetamines, and morphine
- Affects several different neurotransmitters
- 12- to 17-year-olds who smoke:
  - 12 times more likely to use illicit drugs
  - 16 times more likely to drink heavily
  - Increased risk of depression

Amphetamines

- Stimulant drugs that initially produce “rushes” of euphoria, often followed by sudden “crashes” and, sometimes, severe depression
- Methamphetamine
- Ecstasy
Teenage Use of Ecstasy


Cocaine

- Derived from the coca plant
- Produces a sense of euphoria by stimulating the sympathetic nervous system, but also leads to anxiety, depression, and addictive cravings
  - Status drug: “amphetamine of the wealthy”
  - Damages dopamine brain cells

LEARNING OBJECTIVE: Describe the effects of LSD and marijuana.

Hallucinogens and Marijuana

LSO

Distort visual and auditory perception
**Lysergic Acid Diethylamide (LSD)**

- Produces hallucinations and delusions similar to those occurring in a psychotic state; can be pleasurable or terrifying
- Does not appear to produce dependency and withdrawal effects
- Taken repeatedly, tolerance builds up rapidly and drug fails to produce significant effects
- Generally taken episodically rather than habitually

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**Marijuana**

- 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
  - Active ingredient is tetrahydrocannabinol (THC)
  - Subject of much debate in scientific circles and public forums

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**Teenage Use of Marijuana in Past Year**

Abuse of Multiple Drugs

“As a rule, young people who use ‘club drugs’ also drink and smoke; likewise, college binge drinkers typically smoke cigarettes and marijuana as well (National Center on Addiction and Substance Abuse, 2007). The same behavior is true of older drug abusers. In addition, people who use one drug...often use another drug...to counteract the effects of the first drug. This practice not only multiplies their risks as individuals, but also makes efforts to diagnose and treat drug problems more difficult.”

– Page 146 (Morris & Maisto)
**Meditation**

LEARNING OBJECTIVE: Describe the biological and psychological effects of meditation.

Any of the various methods of concentration, reflection, or focusing of thoughts undertaken to suppress the activity of the sympathetic nervous system

- Useful for stress reduction
- May enhance effectiveness of the immune system and overall psychological well-being

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**Hypnosis**

LEARNING OBJECTIVE: Explain why it is difficult to define hypnosis, the process of inducing hypnosis, and the role of hypnotic suggestions.

Trancelike state in which a person responds readily to suggestions

- Debate over what it really means to be hypnotized
- Individuals vary in degree of suggestibility
- Therapeutic uses for pain
- Used for cessation of smoking but effectiveness debated

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Let's list a few “altered states” of consciousness. Think about when and how these states have affected you in the past or may affect you in the future.

In small groups discuss:
1) your experiences with insomnia
2) various factors that lead to insomnia
3) ways to reduce insomnia
What methods to stop smoking have worked for you or people that you know? What is it like to break a heavy nicotine addiction? What advice would you give to others who are trying to quit?

You've probably heard stories about people getting their pets high on marijuana. Usually, animals do not have voluntary access to drugs. When they do have access to drugs, will non-human animals seek out drugs, and can they become addicted to drugs like humans can?

**YES.** Drugs typically work by mimicking neurotransmitters which are evolutionarily old and present in many animals, including humans. Physical addiction is thus possible for non-human animals.

**NO.** Experiencing effects of psychoactive drugs requires a state of altered consciousness. Only humans experience true consciousness.

**YES.** Animals will seek drugs, but only when the search does not interfere with the normal instinctive behavior, such as mating and grooming. They will search, but will not become addicted.

**NO.** Non-human animals cannot experience psychological dependence, and both psychological and physical dependence are necessary for true addiction.

Is hypnosis just another form of meditation? If so, can anyone do it? What does it take to really concentrate and relax? What are the benefits? On the next slide you will be guided briefly through an exercise in concentrative meditation.
Why does meditation promote feelings of well-being and satisfaction?

Why is it difficult to keep distracting thoughts from entering consciousness while meditating?

Does meditation lead to heightened states of consciousness or creativity?

Acknowledgments