Chapter 5: Consciousness

Section 1: Consciousness

Consciousness
- Consciousness is the awareness of external and internal stimuli. It includes personal awareness.
- Consciousness functions at different levels of awareness (e.g., the subconscious and unconscious states such as sleep and surgical anesthesia).
- Consciousness is related to brain activity. The electroencephalograph (EEG) measures brain-waves, which are associated with states of consciousness.

Section 2: Biological Rhythms

Circadian Rhythms
- Circadian rhythms are the 24-hour biological cycles in humans, including when people sleep.
- Jet lag and shift work affect a person's circadian rhythms.
- The hormone melatonin plays a key role in regulating circadian rhythms. It is produced by the pineal gland, which is controlled by the hypothalamus. Exposure to light affects the production of melatonin.

Section 3: Sleep

Stages of Sleep
- Stage 0
  - Awake but resting
  - EEG shows Alpha waves
- Stage 1
  - Light sleep
  - Respiration, heart rate, muscle tension and body temperature decline
  - Hypnic jerks are brief muscle contractions
  - EEG shows Theta waves
  - Only lasts a few minutes
- Stage 2
  - Respiration, heart rate, body temperature, muscle tension continue to decline
  - EEG shows occasional high frequency brain waves called sleep spindles
  - Lasts 10-25 minutes
- Stage 3
  - From the beginning of Stage 1 to the end of Stage 3 takes about 30 minutes
- Stage 4
  - EEG shows Delta waves most of the time
  - Stage 4 sleep lasts for about 30 minutes, then the process reverses itself.
REM Sleep
- After a sleeper goes through stages 1, 2, 3, and 4, then reverses and goes through stages 3 and 2, the sleeper enters REM sleep.
- REM stands for Rapid Eye Movement.
- Most dreams occur in REM sleep.
- The body is relaxed, but EEG shows Beta waves (just like an awake and alert person).
- Muscle tone is relaxed to the point of near paralysis.
- Most dreaming takes place during REM sleep.
- Stages 1 to 4 are called non-REM sleep or quiet sleep

Sleep Deprivation
- Sleep deprivation, either complete or partial, has negative effects on mood, cognitive performance, and perceptual-motor tasks.

Sleep Disorders
- Insomnia refers to chronic problems getting to sleep or staying asleep.
  - Insomnia can be treated with drugs, though this is a less than ideal solution. Because insomnia has many causes, it can have many solutions.
- Narcolepsy is a disorder marked by a person suddenly and unexpectedly falling asleep.
  - Narcoleptics can go from being awake to REM sleep almost instantly.
  - Drugs can help somewhat, but the causes of narcolepsy are unknown.
- Sleep apnea is a disorder in which the sleeper repeatedly stops breathing, sometimes for as long as 60 seconds.
  - Sleep apnea can be treated with surgery.
- Nightmares are frightening dreams that occur in REM sleep.
  - Nightmares are normal, though persistent nightmares may reflect neurosis or emotional problems.
- Night terrors are sudden awakenings from REM sleep. They are usually characterized by horrific dreams and intense fear. It is not unusual for a person suffering a night terror to awake screaming and not know why.
  - Night terrors are common in children and do not indicate emotional disturbance.
- Sleepwalking, or somnambulism, occurs when a person wanders while asleep.
  - Sleepwalking is more common in childhood.
  - Sleepwalkers are very accident prone.
  - Sleepwalkers occur in slow wave sleep (stages 3 & 4).
  - The cause of sleepwalking isn't known.

Section 4: Dreaming

Dreams
- Dreams are mental experiences that occur during sleep, involving vivid visual imagery and story-like qualities, and are usually perceived as real by the dreamer.
- The most vivid and story-like dreams occur during REM sleep.
- People tend to dream about themselves. The content of dreams tends to be mundane. There are slight differences in content between the dreams of men and women.
- Dreams can be influenced by day residue (concerns from one's waking life) and by experiences while sleeping (e.g., one's alarm clock may become a siren).
- Dreams tend to be symbolic. The manifest content of a dream is what takes place in the dream. The latent content is the meaning of the dream.
- Lucid dreams are dreams in which the dreams knows he or she is asleep and dreaming, and is able to think clearly while dreaming. Lucid dreamers are often able to control the content of their dreams.
Theories of Dreaming

- **Wish Fulfillment**
  - Developed by Sigmund Freud
  - People's ungratified needs form the basis of their dreams.
  - Freud also developed the terms day residue, manifest content, and latent content in this theory.

- **Problem Solving**
  - Developed by Rosalind Cartwright
  - People think through the major problems in their lives while dreaming.

- **Activation-Synthesis**
  - Developed by Allan Hobson and Robert McClary
  - Dreams are the by-product of neural activity.
  - In other words, subcortical neurons fire periodically and randomly; the cortex interprets these signals as dreams.

Section 5: Hypnosis

**Hypnosis**

- *Hypnosis* is a procedure that creates a heightened state of suggestion.
- How well people respond to hypnosis varies widely.
- Movement, perception, motivation, emotion, and thinking can be influenced by hypnosis. The effects of hypnosis may include
  - Anesthesia: some hypnotized subjects can perceive less pain.
  - Sensory distortions/hallucinations: hypnotized subjects can experience visual or auditory hallucinations.
  - Disinhibition: hypnosis reduces a person's inhibitions.
  - **Posthypnotic suggestion/amnesia:** hypnotic suggestions may influence later behaviour.

**Theories of Hypnosis**

- **Role Playing:** subjects are in a normal state of consciousness but act as they think hypnotized people should act
  - A hypnotized person does not have more cognitive ability than a non-hypnotized person (e.g. memory tests).
  - Research indicates that a hypnotized subject is acting out a role.

- **Altered State:** hypnosis is an altered state of consciousness.
  - Hypnotized people behave differently than non-hypnotized people.
  - Some hypnotic behaviour (e.g. dental surgery under hypnosis) is unlikely to be undertaken by a person playing a role.

- **Disassociation:** a hypnotized person experiences a state of divided consciousness
  - One stream of consciousness is in communication with the external world and shares control with or is at the suggestion of the hypnotist.
  - The other stream of consciousness, the "hidden observer," allows control of the other stream to be shared with the hypnotist.
  - Divided consciousness occurs in daily life (e.g. highway hypnosis).
Section 6: Drugs

Drugs and Their Effects
- **Psychoactive drugs** are chemical substances which modify mental processes, emotions, or behaviour.
- **Narcotics** or **opiates** are drugs derived from opium and are used to relieve pain (e.g., morphine, heroin).
- **Sedatives** are sleep inducing drugs that suppress the CNS (e.g., barbiturates).
- **Stimulants** are drugs that increase the functions of the CNS (e.g., amphetamines, cocaine).
- **Hallucinogens** have powerful effects on mental processes, emotions, and perceptions (e.g., LSD).
- **Cannabis** is made from hemp with high THC composition (e.g., marijuana, hashish).
- **Alcohol** is any drink containing ethyl alcohol.

Factors Influencing Drug Effects
- There are many factors influencing drug effects, including age, personality, experience, health, motivation, weight, and expectation.
- People who use a drug regularly develop a tolerance for it.

Biological Basis of Drug Use
- Psychoactive drugs work by affecting neurotransmitters.
- Amphetamines increase the release of NE and DA, then suppress the reuptake of these neurotransmitters. Cocaine has the same effect. People "crash" after using these drugs because the levels of neurotransmitters drop.
- Sedatives and alcohol affect the neurotransmitter GABA, though alcohol also affects DA and serotonin.
- Opiates occupy receptor sites intended for endorphins.
- The full effects of LSD and marijuana are not known, but LSD seems to affect serotonin levels and THC finds receptors site in the brain.

Drug Addiction
- **Physical dependence** occurs when a person must continue taking a drug to avoid withdrawal symptoms.
- **Psychological dependence** occurs when a person must continue taking a drug to satisfy a mental or emotional need.
- Drugs vary in the amount and type of dependence they create. Many drugs create both types of dependence.

Drugs and Health
- Drugs can have a negative effect on physical and psychological health.
- An **overdose** occurs when a drug (or combination of drugs) has a lethal or potentially lethal effect on the CNS. Sedatives and alcohol shut down the CNS, while cocaine and stimulants can cause heart attacks and strokes.
- Some drugs can cause tissue damage, e.g., cocaine can damage nasal tissue, alcohol can damage liver tissue, smoking can damage lung tissue.
- Drug use can affect health through side effects, e.g., poor diet, poor sleep patterns, accidents (especially car accidents), and poor decision making. Alcohol is involved in many rapes and other violent crimes. Sharing needles spreads AIDS and hepatitis.
- There is a correlation between excess drug use and poor mental health.