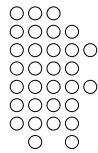


Chapter 4

Consciousness and Its Variations



Circadian Rhythm



- Any rhythmic change that continues at close to a 24-hour cycle in the absence of 24-hour cues
 - body temperature
 - cortisol secretion
 - sleep and wakefulness
- In the absence of time cues, the cycle period will become somewhat longer than 24 hours.

Table 4.1

Examples of Human Circadian Rhythms

Function	Typical Circadian Rhythm
Peak mental alertness and memory functions	Two daily peaks: around 9:00 A.M. and 9:00 P.M.
Lowest body temperature	About 97°F around 4:00 A.M.
Highest body temperature	About 99°F around 4:00 P.M.
Peak physical strength	Two daily peaks: around 11:00 A.M. and 7:00 P.M.
Peak hearing, visual, taste, and smell sensitivity	Two daily peaks: around 3:00 A.M. and 6:00 P.M.
Lowest sensitivity to pain	Around 4:00 P.M.
Peak sensitivity to pain	Around 4:00 A.M.
Peak degree of sleepiness	Two daily peaks: around 3:00 A.M. and 3:00 P.M.
Peak melatonin hormone in blood	Between 1:00 A.M. and 3:00 A.M.
Peak allergic sensitivity to pollen and dust	Between 11:00 P.M. and 1:00 A.M.

SOURCES: Campbell (1997); Czeisler & Dijk (2001); Refinetti (2000); M. Young (2000).



The Body's Clock



- Suprachiasmatic nucleus (SCN)—cluster of neurons in the hypothalamus that governs the timing of circadian rhythms
- Melatonin—hormone of the pineal gland that produces sleepiness

Electroencephalogram (EEG)

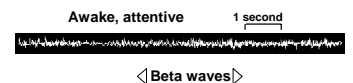
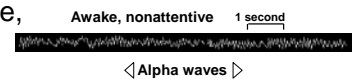
- Electrodes placed on the scalp provide a gross record of the electrical activity of the brain
- EEG recordings are a rough index of psychological states



EEG Waves of Wakefulness

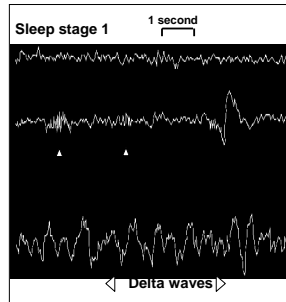


- Awake but non-attentive: large, regular alpha waves
- Awake and attentive: low amplitude, fast, irregular beta waves



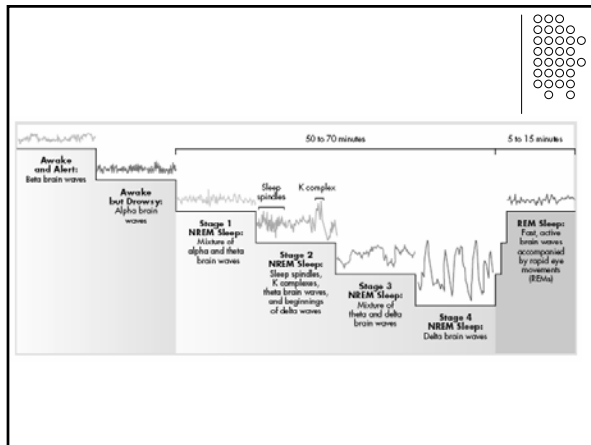
Stages of Sleep

- Sleep stage 1: brief transition stage when first falling asleep
- Stages 2 through 4 (slow-wave sleep): successively deeper stages of sleep
- Characterized by an increasing percentage of slow, irregular, high-amplitude delta waves



Stages of Sleep

- Upon reaching stage 4 and after about 80 to 100 minutes of total sleep time, sleep lightens and returns through stages 3 and 2.
- REM sleep emerges, characterized by EEG patterns that resemble beta waves of alert wakefulness
 - muscles most relaxed
 - rapid eye movements occur
 - dreams occur
- Four or five sleep cycles occur in a typical night's sleep; less time is spent in slow-wave, more is spent in REM



Functions of Sleep

- Restoration theory—body wears out during the day and sleep is necessary to put it back in shape
- Adaptive theory—sleep emerged in evolution to preserve energy and protect during the time of day when there is little value and considerable danger

Sleep Deprivation

- Has little effect on performance of tasks requiring physical skill or intellectual judgment
- Hurts performance on simple, boring tasks more than challenging ones
- Most reliable effect is sleepiness itself

Individual Differences in Sleep Drive

- Some individuals need more and some less than the typical 8 hours per night
- Nonsomniacs—sleep far less than most but do not feel tired during the day
- Insomniacs—have a normal desire for sleep but are unable to and feel tired during the day

Sleep Disorders

- Insomnia—inability to fall asleep or stay asleep
- REM sleep disorder—sleeper acts out his or her dreams
- Night terrors—sudden arousal from sleep and intense fear accompanied by physiological reactions (e.g., rapid heart rate, perspiration) that occur during slow-wave sleep
- Narcolepsy—overpowering urge to fall asleep that may occur while talking or standing up
- Sleep apnea—failure to breathe when asleep



Dreams and REM Sleep

- True dream—vivid, detailed dreams consisting of sensory and motor sensations experienced during REM
- Sleep thought—lacks vivid sensory and motor sensations, is more similar to daytime thinking, and occurs during slow-wave sleep
- Lucid dreaming



Dreams and REM Sleep

What are true dreams for?

- Psychoanalytic interpretation
- Activation synthesis model



Psychoanalytic Interpretation

- Manifest content—elements of the dream that are consciously experienced and remembered
- Latent content—the unconscious wishes that are concealed in the manifest content
- Dreams as “wish fulfillments”



Activation Synthesis Model

- Brain activity during sleep produces dream images (activation) which are combined by the brain into a dream story (synthesis).
- Meaning is to be found by analyzing the way the dreamer makes sense of the progression of chaotic dream images.



Hypnosis

- State of awareness
- Highly focused attention
- Increased responsiveness to suggestion
- Vivid imagery
- Willingness to accept distortions of logic
- Alteration of sensation and perception



Table 4.4

Help Through Hypnosis

Research has demonstrated that hypnosis can effectively:

- Reduce pain and discomfort associated with cancer, rheumatoid arthritis, burn wounds, and other chronic conditions
- Reduce pain and discomfort associated with childbirth
- Reduce the use of narcotics to relieve postoperative pain
- Improve the concentration, motivation, and performance of athletes
- Lessen the severity and frequency of asthma attacks
- Eliminate recurring nightmares
- Enhance the effectiveness of psychotherapy in the treatment of obesity, hypertension, and anxiety
- Remove warts
- Eliminate or reduce stuttering
- Suppress the gag reflex during dental procedures



Meditation

- Sustained concentration that focuses attention and heightens awareness
- Lowered physiological arousal
 - decreased heart rate
 - decreased BP
- Predominance of alpha brain waves



Psychoactive Drugs

- Depressants—inhibit brain activity
- Opiates—pain relief and euphoria
- Stimulants—increase brain activity
- Psychedelics—distort sensory perceptions



Common Properties

- Physical dependence
- Tolerance
- Withdrawal symptoms
- Drug rebound effect



Drug Abuse

Recurrent drug use that results in disruption of academic, social, or occupational functioning or in legal or psychological problems



Depressants


- Alcohol—CNS depressant
- Barbiturates—induce sleep
- Tranquilizers—relieve anxiety



Table 4.5

Behavioral Effects of Blood Alcohol Levels

Blood Alcohol Level	Behavioral Effects
0.05%	Lowered alertness; release of inhibitions; impaired judgment
0.10%	Slowed reaction times; impaired motor function; less caution
0.15%	Large, consistent increases in reaction time
0.20%	Marked depression in sensory and motor capability; obvious intoxication
0.25%	Severe motor disturbance; staggering; sensory perceptions greatly impaired
0.30%	Stuporous but conscious; no comprehension of the world around them
0.35%	Surgical anesthesia; minimal level causing death
0.40%	About half of those at this level die



This Is Fun? According to a national survey of college students, more than half "drank to get drunk" in the previous year (Wechsler & others, 2002). Approximately 75 percent of students who are members of fraternities and societies admit to binge drinking. Despite the deaths from alcohol poisoning of several college students each year, binge drinking and public drunkenness remain common at spring break celebrations.

Opiates

Chemically similar to morphine and have strong pain-relieving properties

- Mimic the brain's endorphins
- Heroin, methadone
- Percodan, Demerol

Stimulants

- Caffeine
- Nicotine
- Amphetamines
- Cocaine
- Stimulant induced psychosis

Psychedelics

- Create perceptual distortions
- Mescaline
- LSD
- Marijuana
- Flashback reactions and psychotic episodes

"Club" Drugs

- Ecstasy (MDMA)—feelings of euphoria, increased well-being
- Side effects—dehydration, hyperthermia, tremor, rapid heartbeat
- Dissociative anesthetics—include PCP and Ketamine; deaden pain, produce stupor or coma, may induce hallucinations