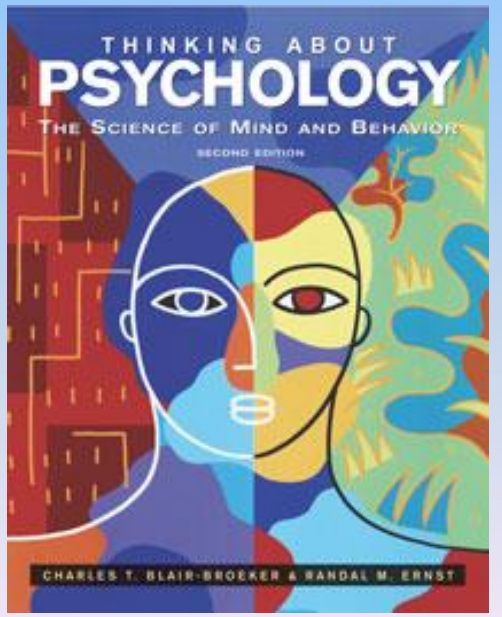
# Thinking About Psychology: The Science of Mind and Behavior 2e

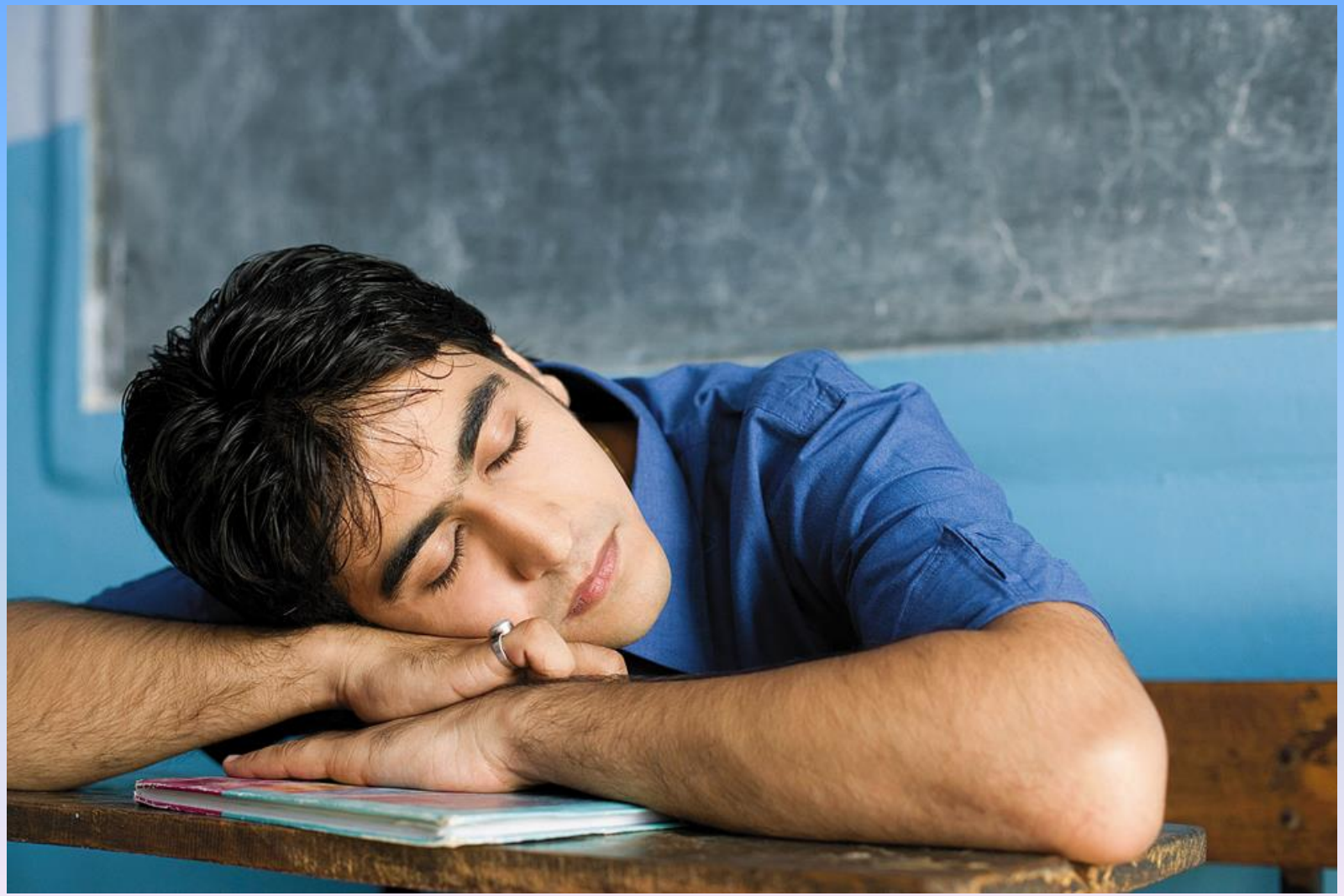



Charles T. Blair-Broeker

Randal M. Ernst

# Cognitive Domain

# Consciousness Chapter



Module 24

# Sleep, Dreams, and Body Rhythms

Module 24: Sleep, Dreams, and Body Rhythms

# Consciousness

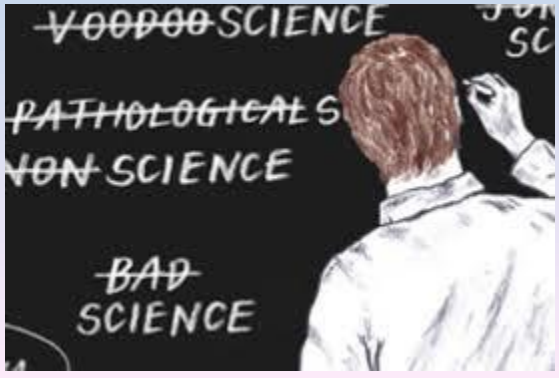
# Consciousness

- Awareness of yourself and your environment

# Body Rhythms

# Pseudoscientific Claim

- Any assertion that is *not based on science*, even though in some circumstances attempts are made to appear scientific
- Appears to be scientific but is not



# Biological Rhythms

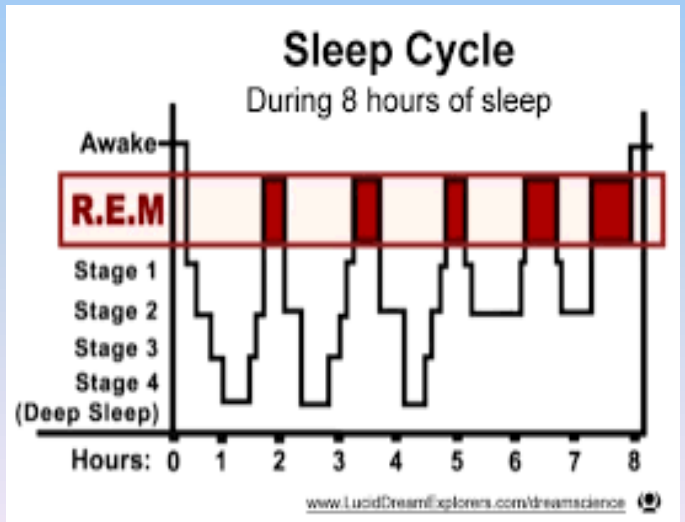
- Periodic physiological fluctuations
- Can affect physiological functioning
- Fall into three main categories
  - *Circadian* Rhythms
  - *Ultradian* Rhythms
  - *Infradian* Rhythms

# Circadian Rhythms

- Biological rhythms that occur approximately *every 24 hours*
- Example: Sleep-wake cycle and temperature

# Ultradian Rhythms

- Biological rhythms that occur *more than once each day*
- Example: Stages of sleep throughout the night



# Infradian Rhythms

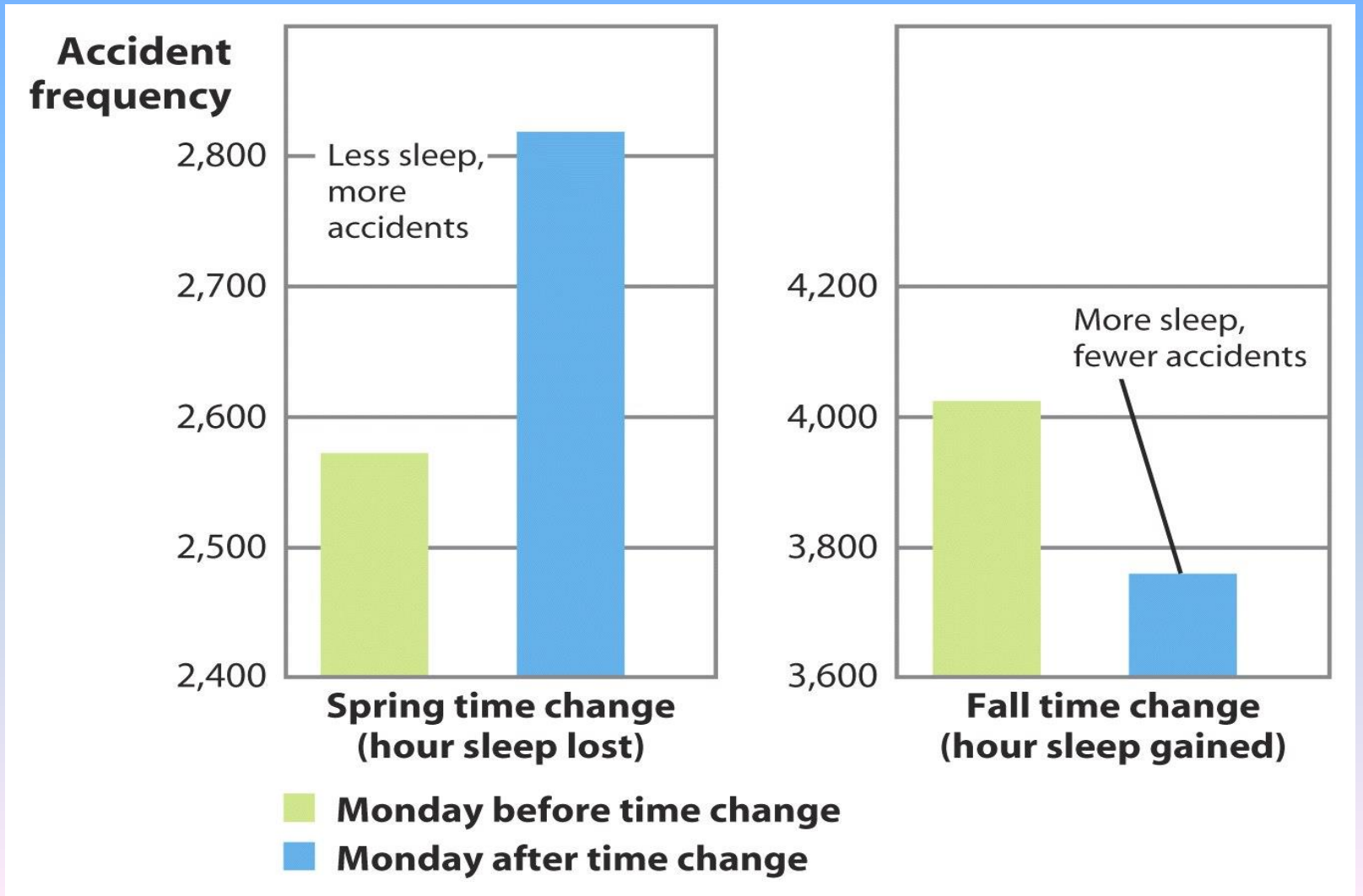
- Biological rhythms that occur *once a month* or *once a season*
- Example: Women's menstrual cycle
- a hibernating bear

# Sleep and Sleep Deficit

# Sleep Deprivation Effects

- Decreases efficiency of immune system functioning
- Safety and accident issues
- Contributes to hypertension, impaired concentration, irritability, etc.

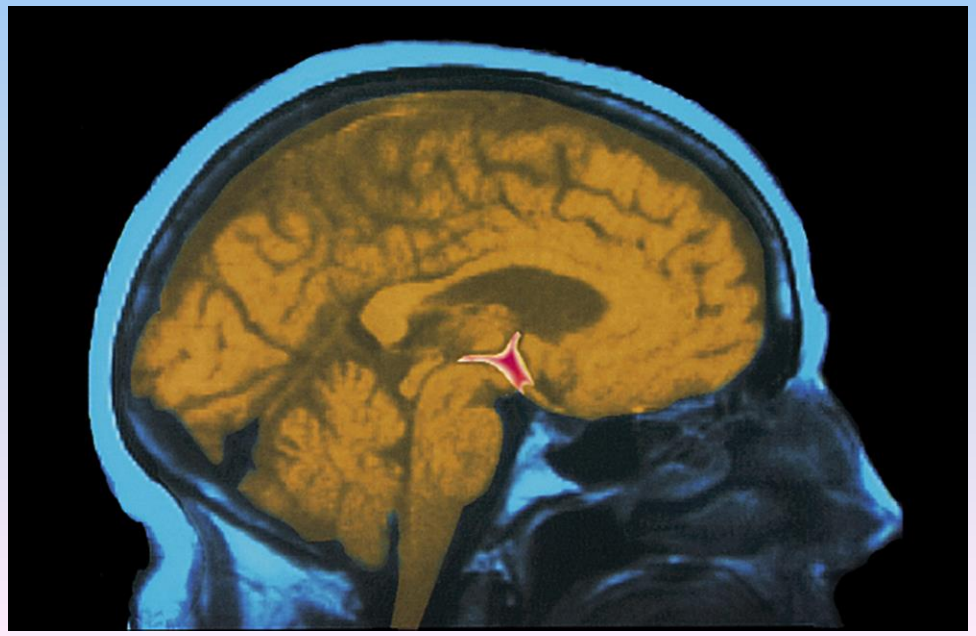
# Sleep Deprivation



# Why We Sleep

# Hypothalamus

- Sleep control center in the brain
- Monitors changes in light or dark in the environment
- Changes levels of hormones in the body



# Melatonin

- Hormone that helps regulate daily biological rhythms
- Linked to the sleep-wake cycle
- Melatonin level *increases during the night* and decreases with exposure to morning light

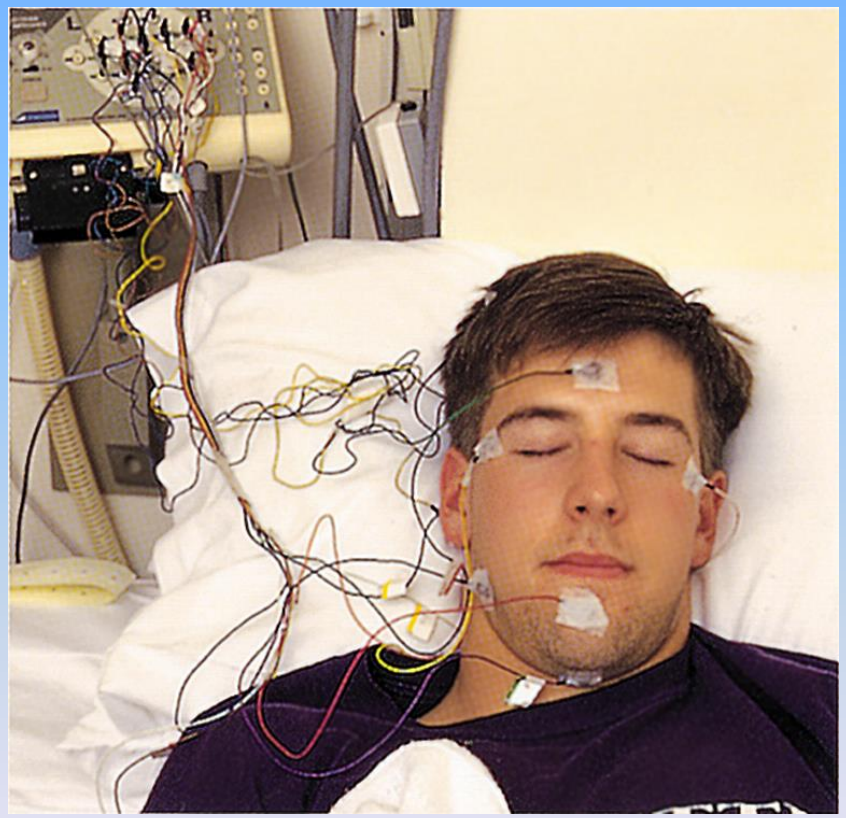
# Reasons for Sleep

- Two primary reasons:
  - *Preservation*: keep us protected from the dangers of the night
  - *Restoration*: recuperate from the wear and tear of the day

# Sleep Stages, REM, and Dreaming: The Stages of Sleep

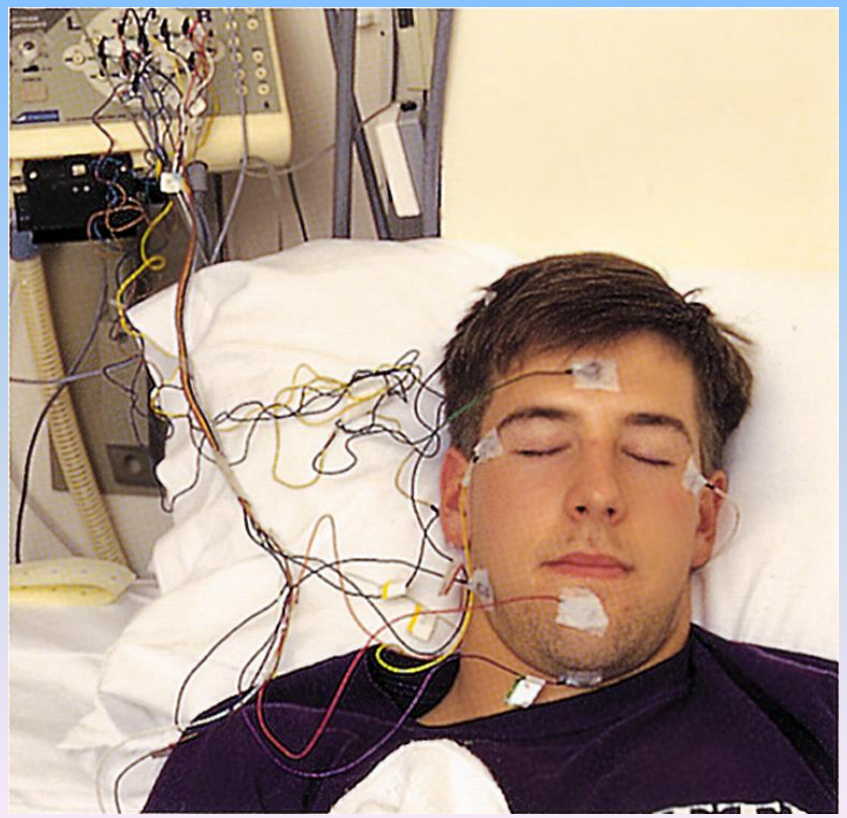
# Electroencephalograph (EEG)

- Machine that amplifies and records waves of electrical activity that sweep across the brain's surface
- Electrodes placed on the scalp measure the waves

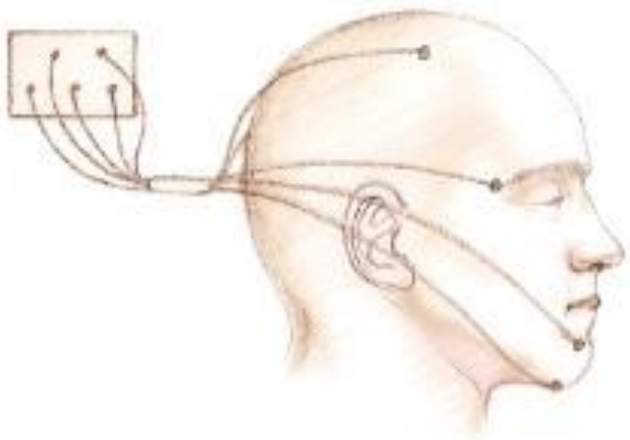


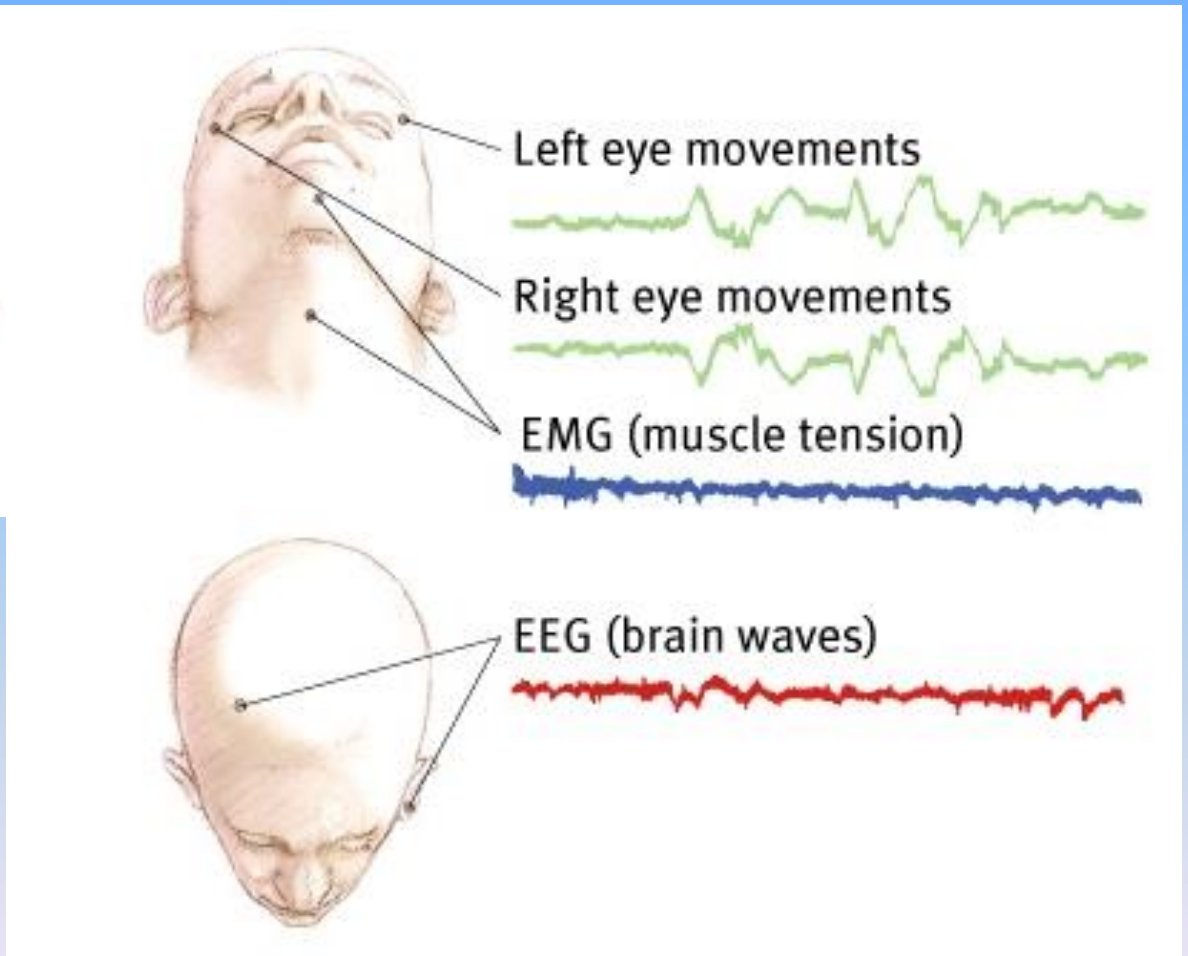
# Electroencephalograph (EEG)

- Used as a means to measure the stages of sleep



# EEG



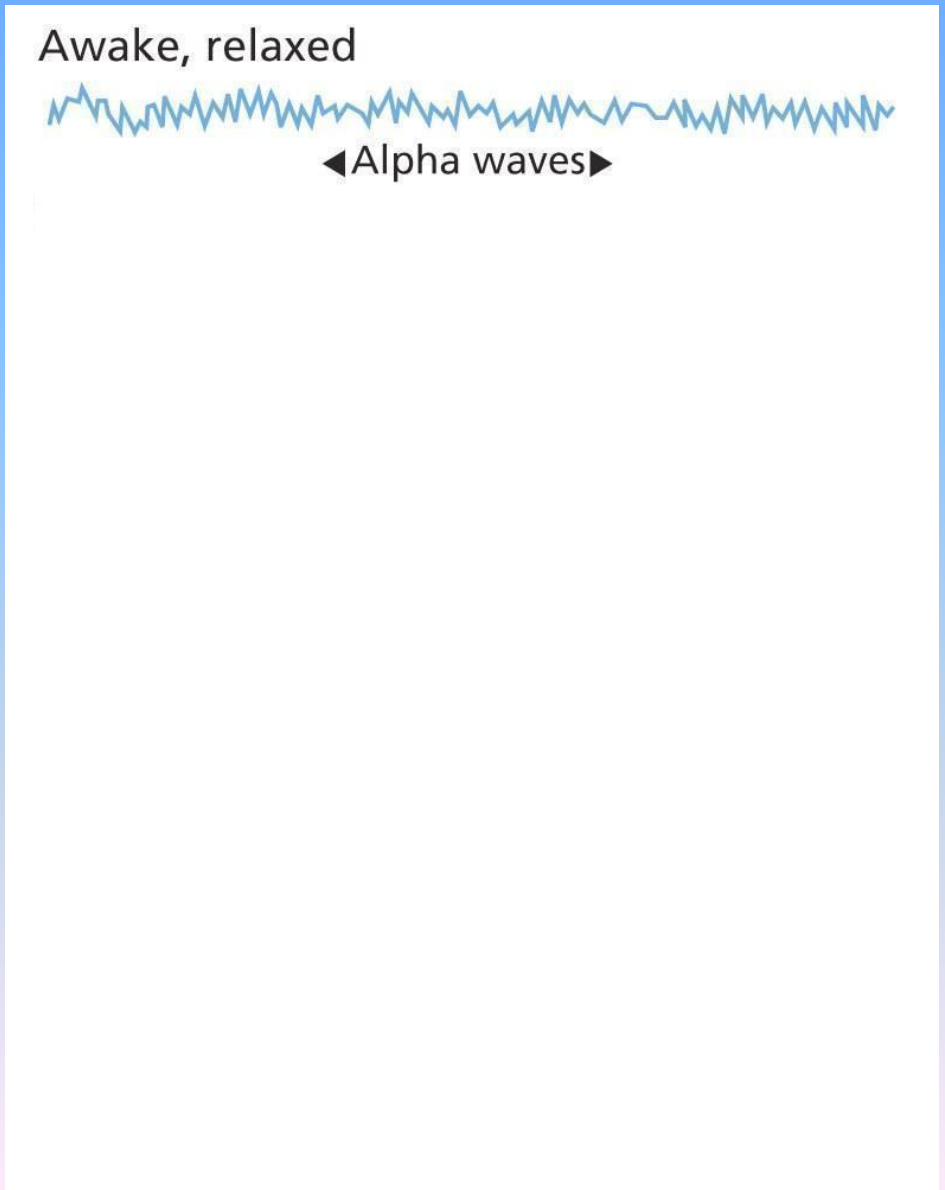

Left eye movements
Right eye movements
EMG (muscle tension)
EEG (brain waves)

# Stage 1 Sleep

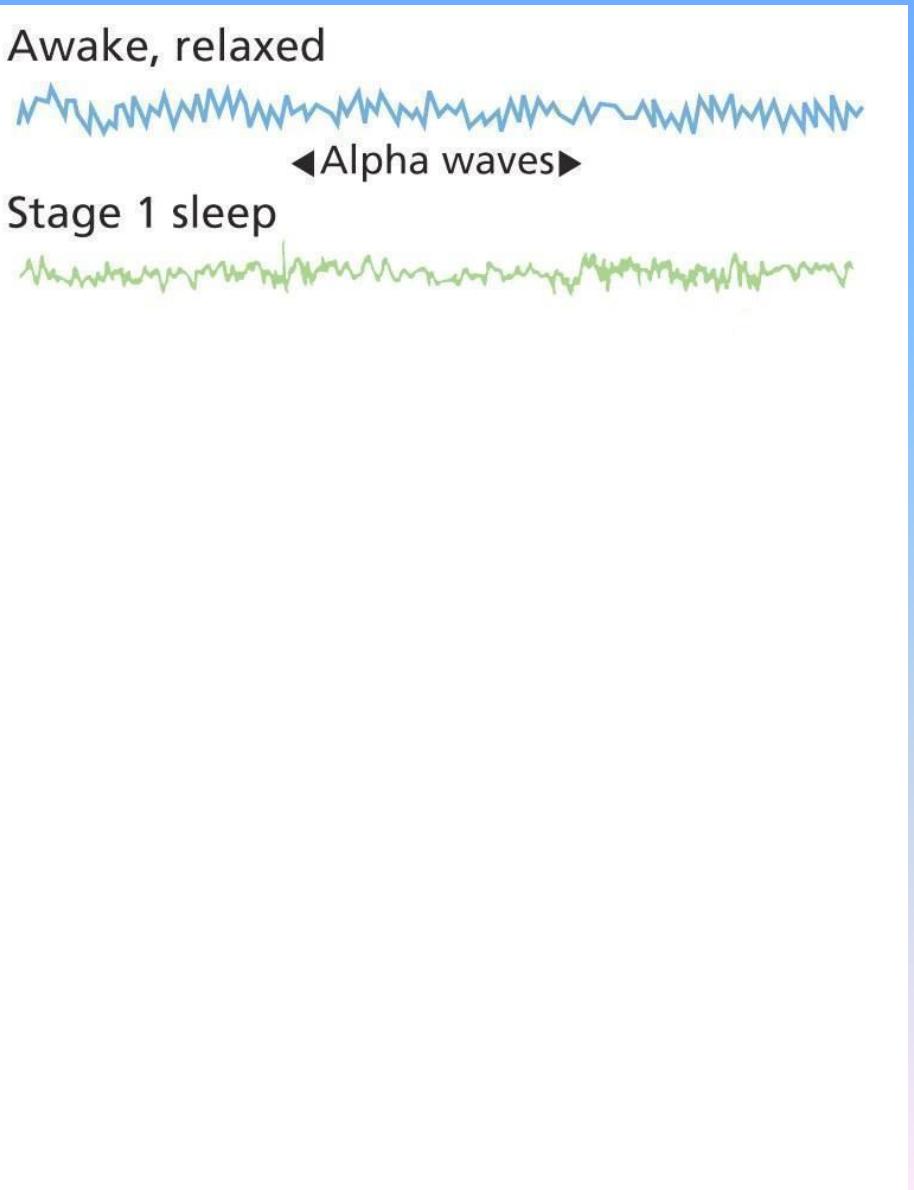
- Breathing is slowed.
- Brain waves become irregular.
- It is easy to wake the person, who will insist they are not asleep.
- Rarely lasts longer than 5 minutes

# Stage 1

# Stages of Sleep



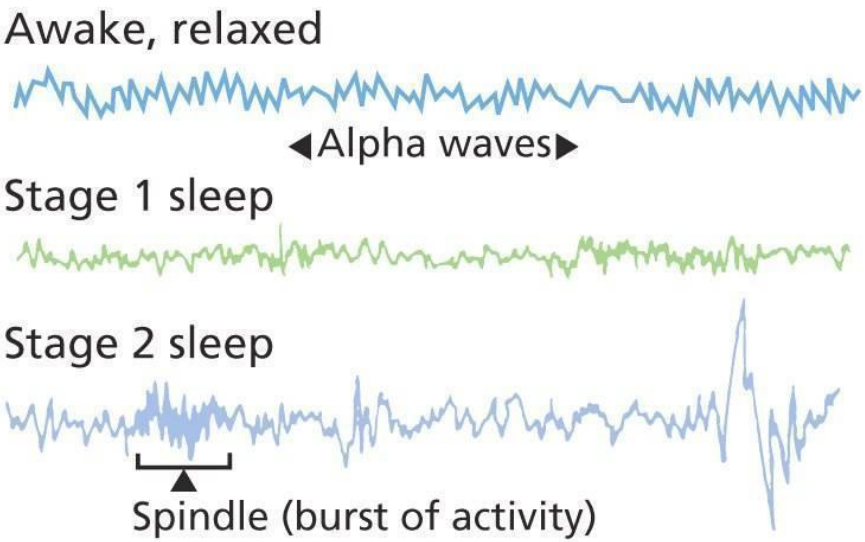
# Stage 1



# Stage 2 Sleep

- Brain wave cycle slows.
- First time through stage 2 last about 20 minutes.

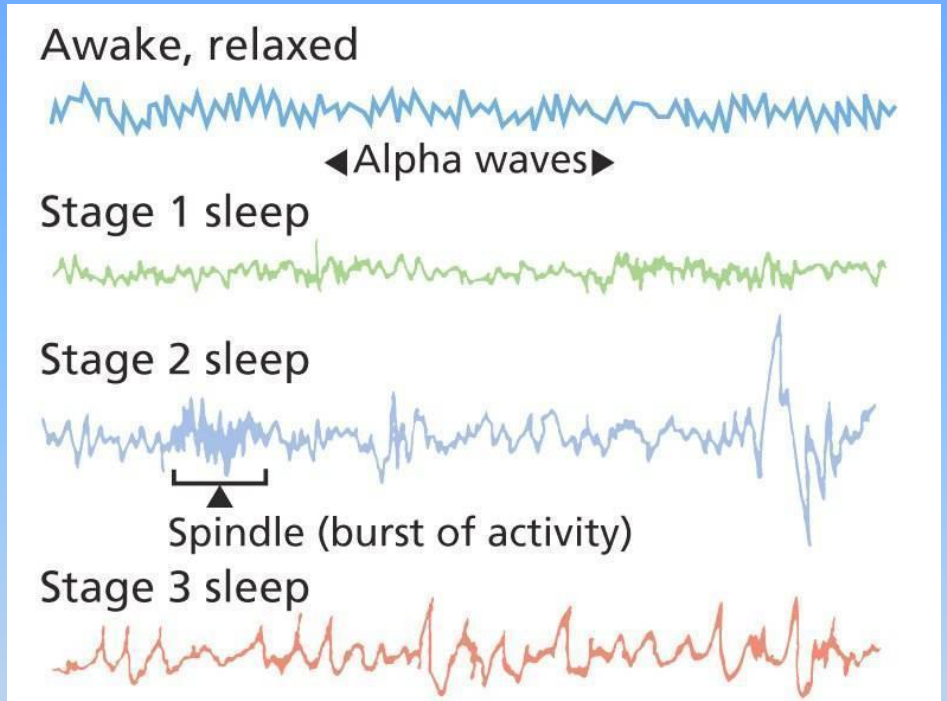
# Stage 2


Awake, relaxed
◀Alpha waves▶
Stage 1 sleep
Stage 2 sleep
Spindle (burst of activity)

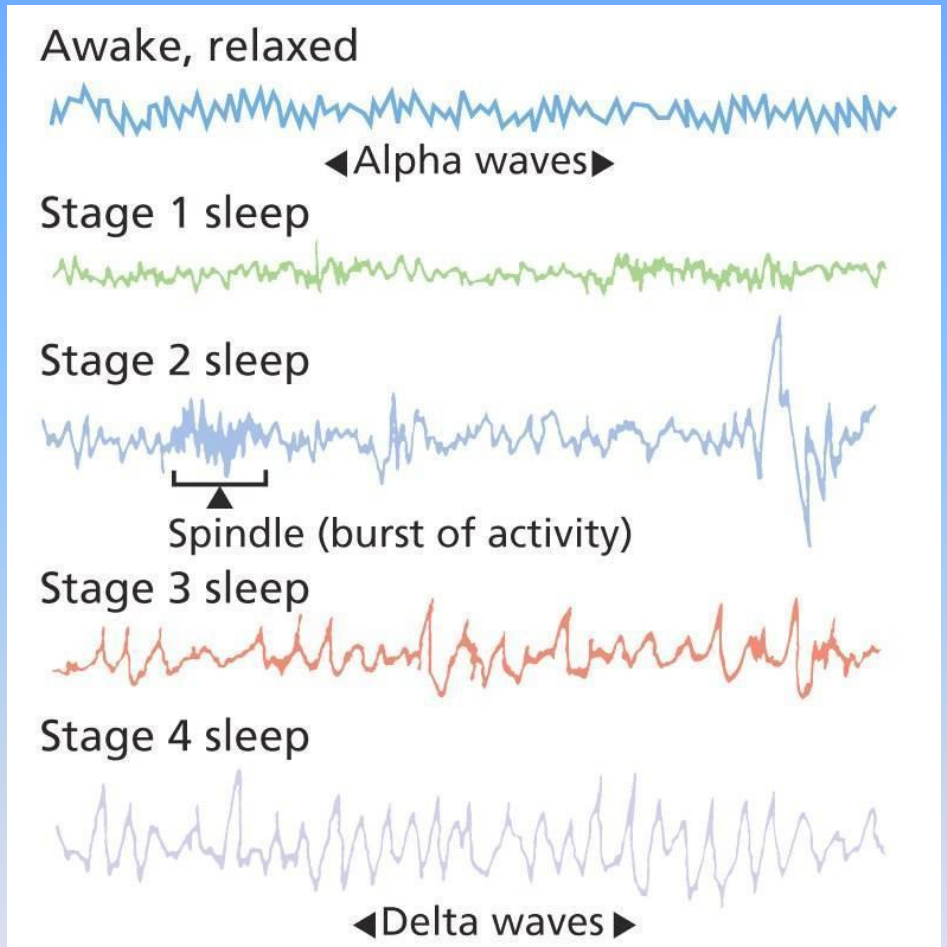
# Stages 3 and 4 Sleep

- Slow wave or deep sleep
- First time through stage 4 is about 30 minutes and is where one gets rejuvenated
- When sleepwalking and talking in your sleep occur
- Very difficult to awaken someone in these stages

# Stage 3


Awake, relaxed
◀Alpha waves▶
Stage 1 sleep
Stage 2 sleep
Spindle (burst of activity)
Stage 3 sleep

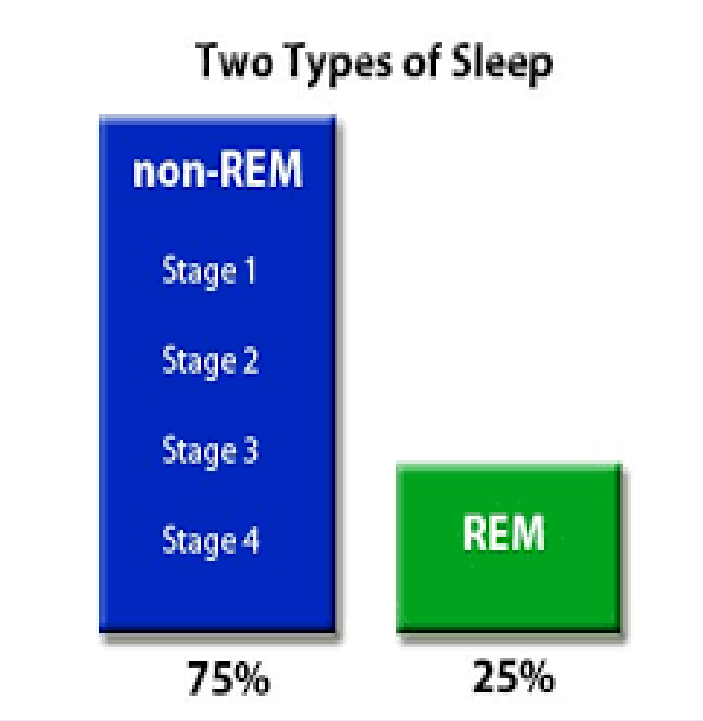
# Stage 4


Awake, relaxed
◀Alpha waves▶
Stage 1 sleep
Stage 2 sleep
Spindle (burst of activity)
Stage 3 sleep
Stage 4 sleep
◀Delta waves▶

# Sleep Stages, REM, and Dreaming: REM Sleep

# Non-REM Sleep

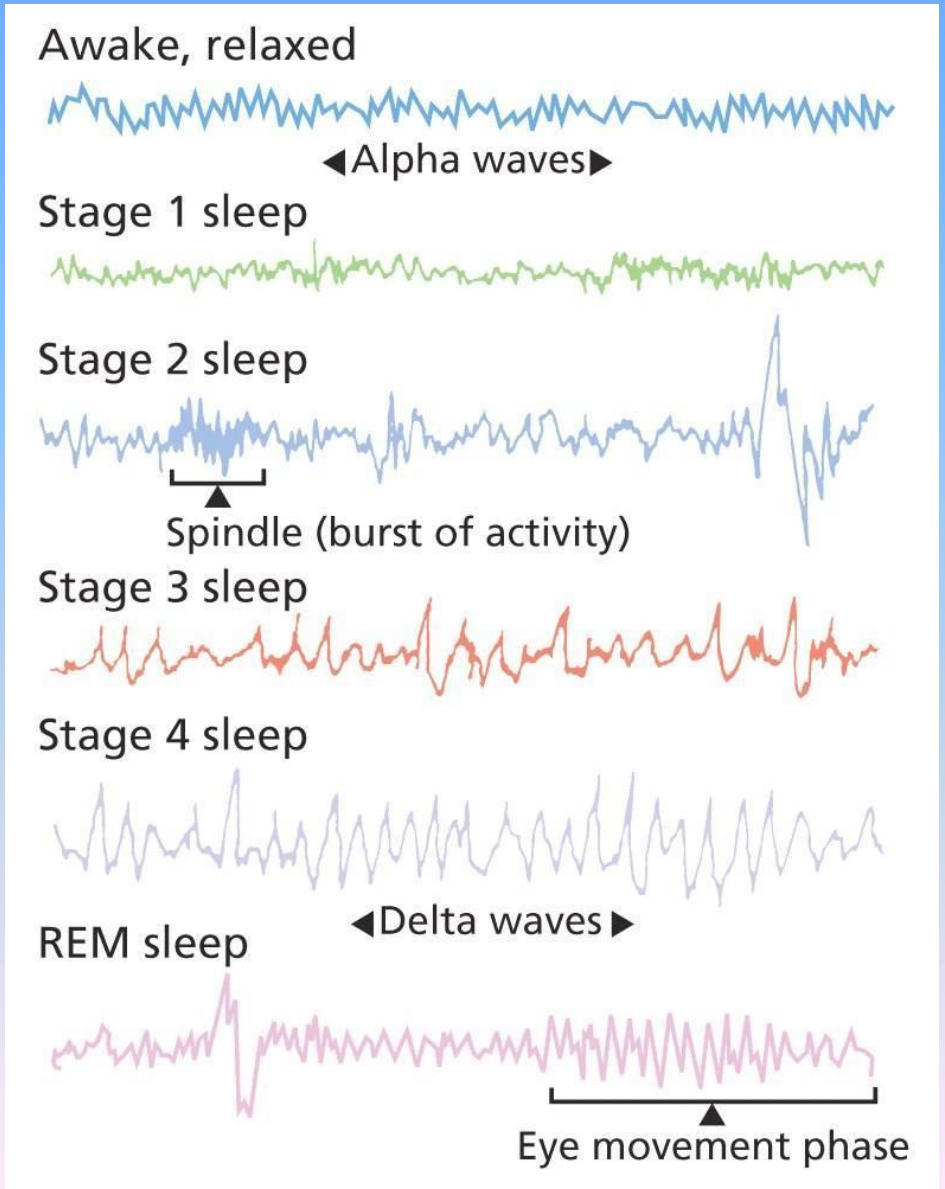
- Stages 1 - 4 considered N-REM (non-REM sleep)



# REM Sleep

- Rapid eye movement (REM Sleep) as eyes move quickly back and forth
- Vivid *dreaming* occurs in REM sleep
- Considered “paradoxical sleep”
- Term coined by William Dement

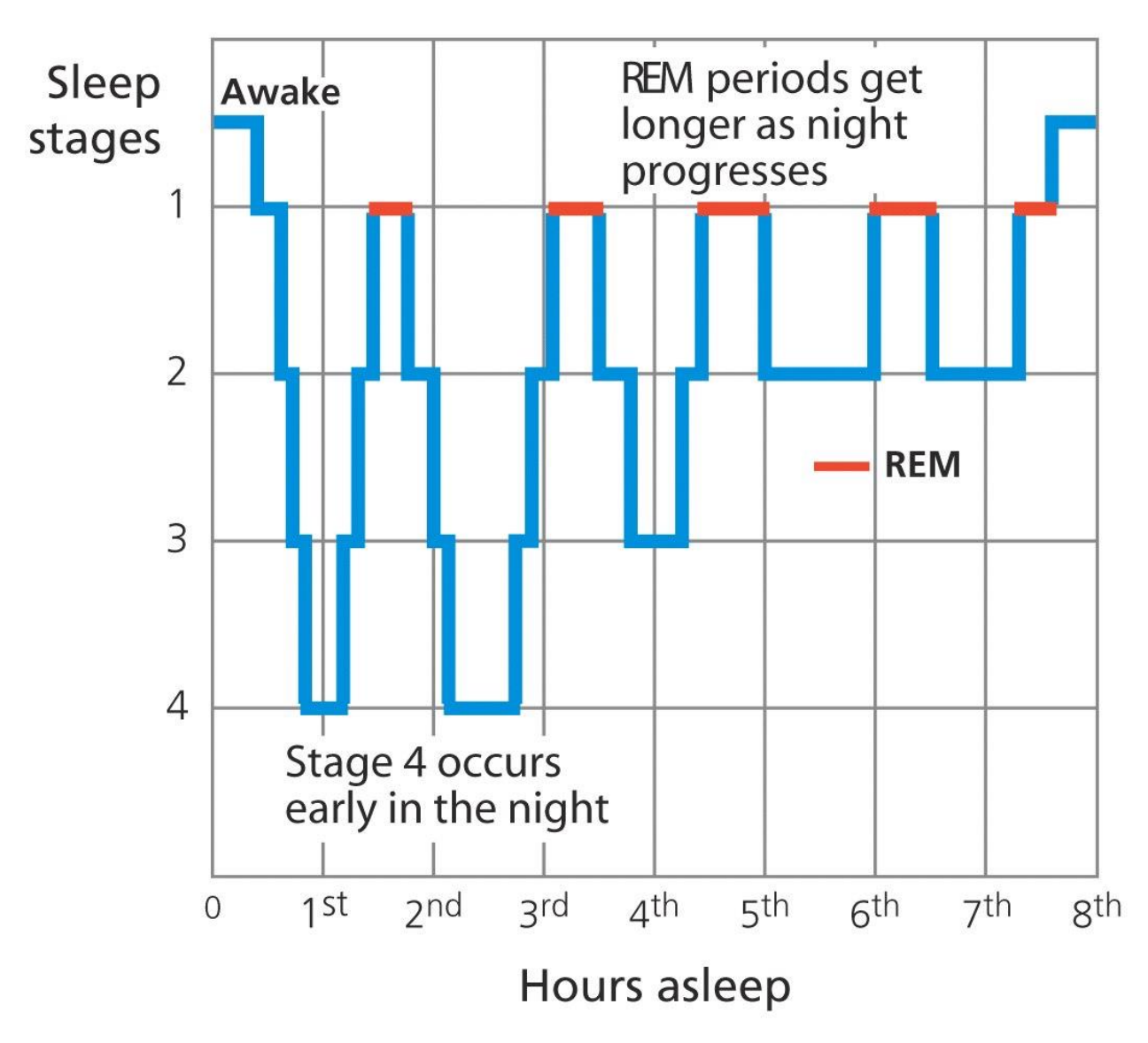
# REM Sleep


Awake, relaxed
◀Alpha waves▶
Stage 1 sleep
Stage 2 sleep
Spindle (burst of activity)
Stage 3 sleep
Stage 4 sleep
◀Delta waves▶
REM sleep
Eye movement phase

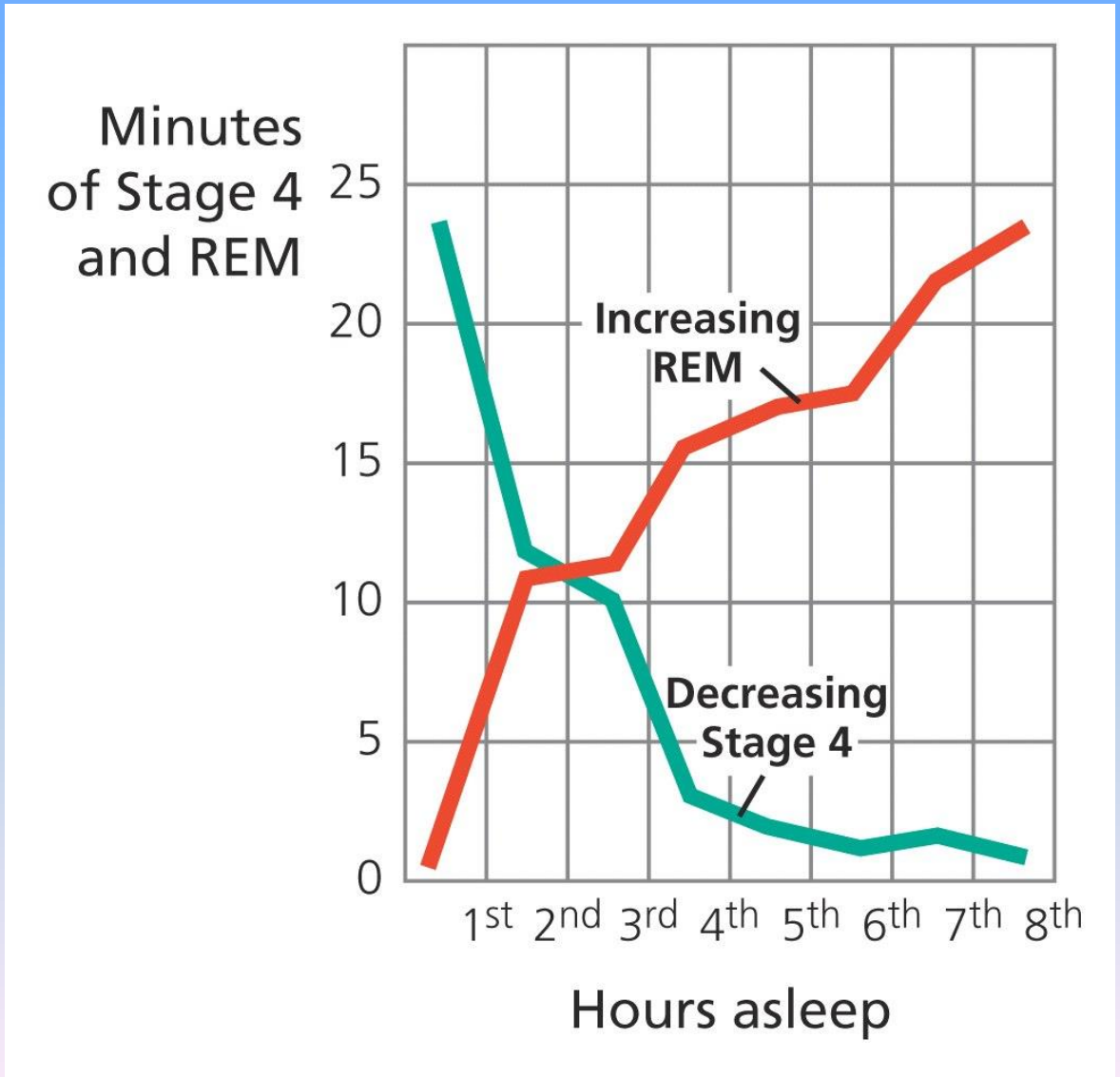
# Paradoxical Sleep

- During REM sleep brain wave patterns are similar to when a person is awake
- Pulse and breathing quickens.
- REM sleep is sometimes called paradoxical sleep as one's physiology is close to that of being awake but the brainstem blocks all muscle movement

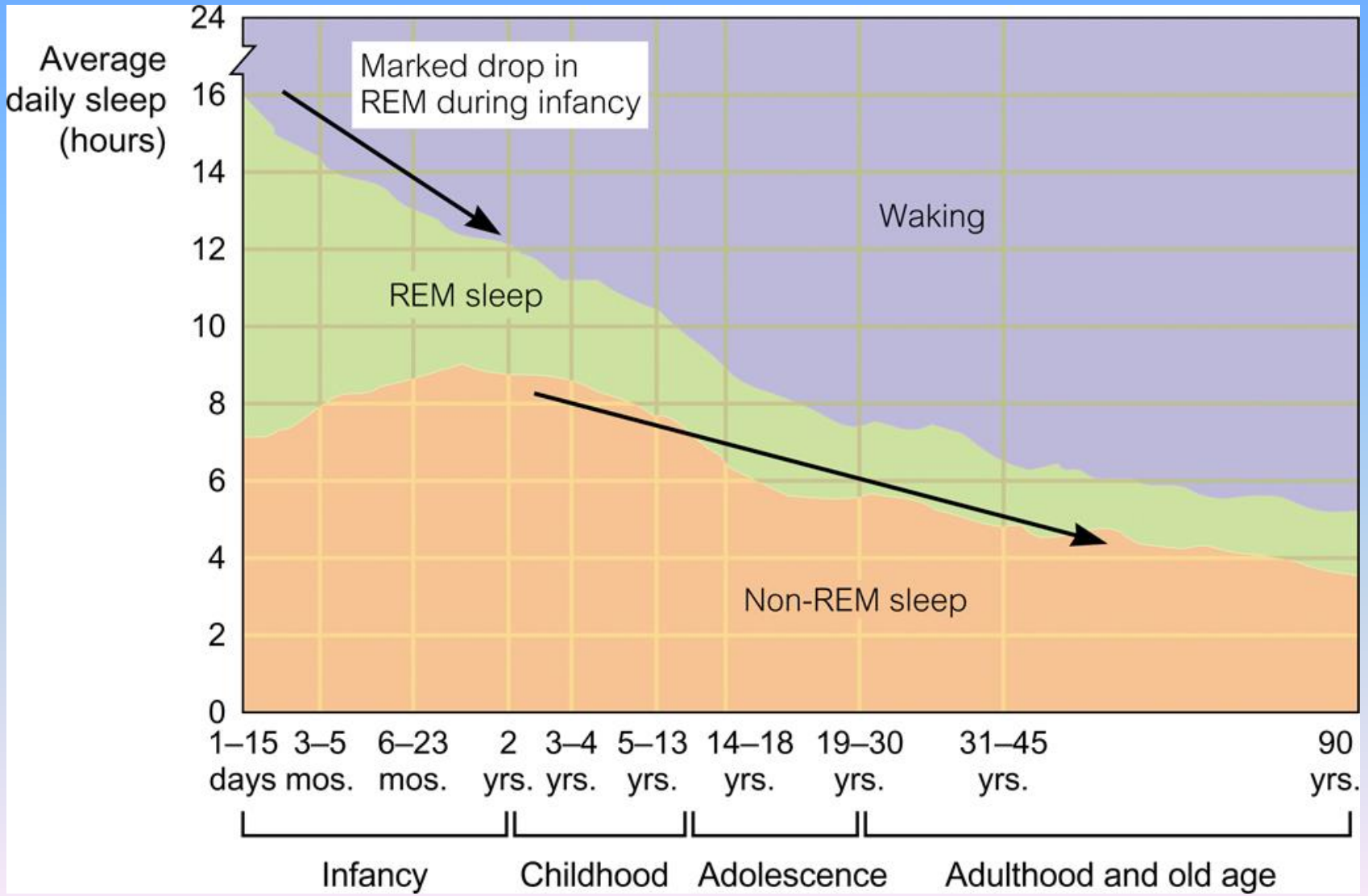
# Typical Night's Sleep



# Stage 4/REM Changes

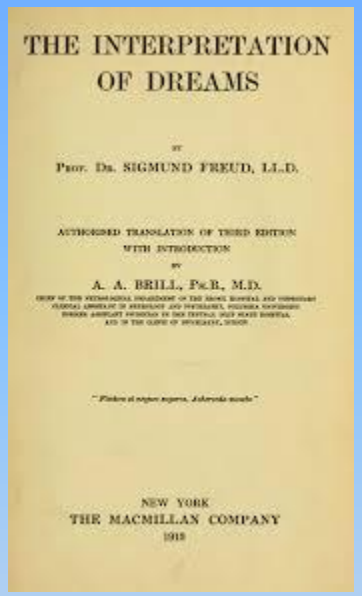


# Sleep Changes through Life



# Sleep Stages, REM, and Dreaming: Why Do We Dream?

# Die Traumdeutung
## (*The Interpretation of Dreams*)


THE INTERPRETATION
OF DREAMS

BY

PROF. DR. SIGMUND FREUD, LL.D.

AUTHORIZED TRANSLATION OF THIRD EDITION
WITH INTRODUCTION
BY

A. A. BRILL, PH.B., M.D.

NEW YORK
THE MACMILLAN COMPANY
1913

- *The Interpretation of Dreams* was Sigmund Freud's groundbreaking book, published in 1899, that spelled out his theory of dream interpretation and the role of the *unconscious* mind in our dreams.

# The Royal Road to the Unconscious

- Freud considered dreams to be the *royal road to the unconscious* as it is in dreams that the ego's defenses are lowered so that some of the *repressed* material comes through to awareness, even though it is in distorted form.
- Dreams perform important functions for the *unconscious* mind and serve as *valuable clues* to how the unconscious mind operates.

# Manifest vs Latent Content

- Freud distinguished between the ***manifest*** content of a dream (what the dreamer remembers) and the ***latent*** content, the *symbolic* meaning of the dream (i.e. the underlying wish).
- The manifest content is often based on the events of the day, but the more *important* part, according to Freud, is the symbolic meaning – what your *unconscious* mind is trying to tell you.

# Modern Theories of Why we Dream

- While Freud's theory of why we dream is more fascinating than most modern explanations, there is *no scientific basis* behind it.
- More modern explanations focus on the *physical* and *cognitive* benefits that dreams and REM sleep provide.

# Information-Processing Theory

- Dreams serve an important *memory- related function* by sorting and sifting through the day's experiences and tying up loose ends.
- Your brain is like a computer that loses its Internet connection when it first goes to sleep but then *comes back online* during REM sleep to *sort through* some of the previous day's activities
- Research suggests REM sleep helps *memory storage.*

# Physiological Function Theory

- Neural activity during REM sleep provides *periodic stimulation* of the brain.
- Infants, whose *brains* are *developing* at a fantastic rate, spend significantly more time than adults do in REM sleep (what are they dreaming about?)
- The pituitary gland secretes a growth hormone during stages 3 & 4 sleep

# Activation-Synthesis Theory

- Dreams are simply the mind's *attempt to make sense of random neural firings* in the brain as one sleeps.

# Cognitive Development Theory

- Dreams part of the *maturation* process
- Dreams of a 3rd grader are far less dynamic and active and tell less of a story when compared to those of a 20-year-old.
- Dreams also *reflect what we've learned* and *what we know*. We only dream about things we've heard of or had experience with
- Reflection of normal cognitive development. *As we become more cognitively complex, so do our dreams*.

# Sleep Disorders and Sleep Problems

# Insomnia

- Recurring problems falling asleep or staying asleep
- Sleeping pills tend to inhibit or suppress REM sleep; worsen the problem
- Alcohol suppresses REM sleep; also worsens the problem
- Studies show most people overestimate how long it took them to get to sleep

# Sleep Apnea

- Sleep disorder characterized by temporary cessations of breathing during sleep and consequent momentary reawakenings.
- Tend to be loud snorers
- Continuous Positive Airway Pressure machine

# Narcolepsy

- Sleep disorder characterized by uncontrollable sleep attacks
- Person may lapse directly into REM sleep which can lead to dangerous situations (driving, etc.)
- Nervous system getting aroused (often from a strong emotion) tends to trigger the sleep attack

# Somnambulism

- Formal name for *sleepwalking*
- Starts in the deep stages of N-REM sleep
- Person can walk or talk, but rarely has any memory of the event


"Wait! Don't! It can be dangerous to wake them!"

# Night Terrors

- Sleep disorder characterized by high arousal and appearance of being terrified
- Usually affect children, who look like they are awake and terrified even though they are sound asleep
- Unlike nightmares which are dreams and occur during REM sleep, night terrors occur during stage 4 when you are sound asleep
- The children seldom remember the event and usually parents are more rattled by it than them

# Other Sleep Disorders

- *Bruxism* – teeth grinding
- *Enuresis* – bed wetting
- *Myoclonus* – sudden jerk of a body part occurring during stage 1 sleep

# The End