

States of Consciousness

Consciousness: Our awareness of ourselves and our environment

Some states occur **spontaneously**: Daydreaming, drowsiness, and dreaming for example

Some states are **physiologically induced**: Hallucinations, Orgasm, Food/Oxygen Starvation

Some are **psychologically induced**: Sensory deprivation, Hypnosis, Meditation

Levels of Consciousness:

- **Minimal Consciousness**: Low-level sensory awareness: the mind inputs sensations and may output behaviour
- **Full Consciousness**: You know and are able to report your mental state
- **Self-Consciousness**: Attention is drawn to the self as an object, almost completely

4 Key Properties of Consciousness

- **Intentionality**: Consciousness is about something
- **Unity**: Consciousness resists being divided
- **Selective**: Capacity of consciousness to include some things but not others
- **Transience**: Consciousness has a tendency to change its focus

*We make things conscious by paying attention to a few things in a teeming world. There are so many stimuli...and we have very limited capacity

Dual Processing and the Two-Track Mind: How we do (and don't) pay attention

Dual Processing: Information is simultaneously processed on separate conscious and unconscious levels

Much (almost all) sensory information is ignored and outside our attention...

- Some is simply not available consciousness
- Some is suppressed(ignored) because so much else is going on
 - Human "bit processing rate" about 20-100 bits/second can't cope with..
 - A neural input rate about 10 million bits/second

We have 2 "minds":

1. Conscious, deliberate, "aware"
2. Unconscious, automatic, unaware

*More than one brain mechanism involved in sensation/perception/interpretation of the world

The 2-Track Mind:

- Serial conscious processing: solving problems with focused attention
- Unconscious parallel processing: "automatic pilot" taking care of routine business (walking, avoiding pedestrians)

Paying Attention:

Selective Attention: The focusing of conscious awareness on a particular stimulus

- The cocktail-party effect: ability to tune in to one message while filtering out other (Even louder/more compelling messages nearby)
- We're good at focusing, but not good at sharing attention between tasks
- Our "pool" of attention resources is limited: we can multitask, but only if the total task requirements are within our small capacity
- E.g., easy to text while sitting in Starbucks, but harder (and more dangerous) when driving

Selective Inattention: Inattentional blindness, failure to see visible objects when attention is directed elsewhere

- Change blindness: failure to notice "obvious" changes in our environment

*Consciousness demands that we remain unaware of much of what is going on in the world

States of Consciousness

Circadian (daily) rhythms

Sleep rhythms and dreaming

Hypnosis

Addictive States

Biological Rhythms:

- Circadian Rhythm: The regular bodily rhythm that occurs over a 24-hour period; the biological clock
- Regulated by the suprachiasmatic nucleus, which responds to light and triggers the pineal gland to decrease melatonin
- Circadian rhythms are primarily driven by light levels in day/night cycles, which also drives changes in body temperature
 - But also driven by changes with age, and individual genetic differences
 - Owls and larks are driven by changes with environment
 - Shift work wreaks havoc with rhythms and with culture
- Circadian rhythms are known to produce "highs and lows" of mental acuity that vary throughout the day.
- Disrupting circadian rhythms: about 75% of all train engineers report falling asleep on the job at least once in the last month

Our key body rhythm: Sleep

Why we sleep for 1/3 of our lives:

- Protective role in human evolution
- Brain restoration and repair of damaged neurons
- Stores and rebuilds memories of day's experiences
- Promotes creative problem-solving

- Encourages growth through pituitary gland secretion of growth hormone

How we sleep: biological rhythms:

Sleep stages-sleep occurs in a repeating 5-stage pattern that occurs over 90 minute cycles

Two types:

1. Rapid Eye Movement (**REM**)
2. Non Rapid Eye Movement (**NREM, non-REM**)

Awake and Alert: Beta brain waves

Awake but Drowsy: Alpha brain waves

Stage 1 NREM Sleep: Mixture of alpha and theta brain waves

Stage 2 NREM Sleep: Sleep spindles K complexes, theta brain waves, and beginnings of delta waves

Stage 3 NREM Sleep: Mixture of theta and delta brain waves

Stage 4 NREM SLEEP: Delta brain waves

REM Sleep: Fast, active brain waves accompanied by rapid eye movements (REMs)

REM (Rapid Eye Movement) Sleep:

- “Dreaming” sleep:
 - Almost all dreams occur during REM
- Voluntary muscle activity suppressed (so that we don’t act out what’s going on in our dreams??)
- No movement, but there is still “twitching” of muscles
- Fast brain-wave activity
- Physiological arousal
- Length of REM period increases as sleep progresses

*When we don’t get enough sleep, we mostly lose the REM portion (last portion) of our sleep cycle

Sleep Over the Life Span:

- Shorter sleep cycles in infancy
 - 90-minute cycle emerges around age 5
- From childhood to late adulthood, total sleep time decreases
- Over life span, stages 1 and 2 increase, stages 3 and 4 decrease
- REM sleep decreases in late adulthood
- **Sleep latency: time to go from waking state to full sleep**
- **WASO: wake after sleep onset**
- **SWS: slow-wave sleep (deep sleep)**

Sleep in other mammals:

All mammals have REM sleep - and similar cycles to humans, but we don’t know if animals dream. There are also huge differences in sleep amounts:

- Dogs: 12-18 hours/day
- Large herbivores (e.g., cows, horses) - about 1 or 2 hours/day
- **Survival: sleeping with one eye open**, some animals sleep with only one side of the brain asleep at one time

- Sea mammals. Many birds, reptiles
- Birds have REM cycles of 2-3 seconds vs. humans' 30 minutes

The Effects of Sleep Deprivation:

- Fatigue
- Impairment of concentration, creativity, communication
- Can lead to obesity, hypertension, suppressed immune system
- Can lead to irritability and slowed performance
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Questions to ask yourself about sleep deprivation:

- What factors in contemporary society make people vulnerable to suffering from sleep deprivation?
- Are you sleep-deprived? If so, how does it affect your daily living?
- Are you a morning person (a lark) or an evening person (an owl)? In what ways does being a lark or an owl make a difference

Sleep Disorders

Insomnia

Narcolepsy

Sleep Apnea

Night Terrors

Sleepwalking