CONSCIOUSNESS

CHAPTER 6

LEARNING OBJECTIVES

Explain how mental priorities are established
• Define attention and its adaptive value
• Describe automaticity and its effects on awareness
• Describe disorders of attention

Describe the characteristics of sleep
• Describe the various stages of sleep
• Describe the current theories of dreams

Describe how consciousness can be altered biochemically
• Psychoactive drugs

Describe how consciousness can be altered without drugs
MEMORY WORD LIST

Ocean – moon
Card – mouse
Sign - post
Ordeal - roach

OUTLINE

• Consciousness/Unconsciousness
• Attention
• Sleep
  • Dreams
  • Sleep Deprivation
• Hypnosis, Meditation, Religion
• Psychoactive Drugs
Death by distraction

- Oprah Winfrey launches pledge not to text of use a cell phone while driving
- Texting is now outlawed in 30 states and the District of Columbia
- Risks associated with distracted drivers
- Future of cars
- Discuss the implications of this push to get more technology into cars and how much people will be able to handle it.

CONSCIOUSNESS

What does it feel like to be you right now?

- Seat of consciousness inside your head
- You can feel your body and orient to things around you
- You can close your eyes and imagine

Daniel Dennett referred to this as the “Cartesian Theater” after René Descartes – a mental stage or screen

Modern psychology as a science started with the study of consciousness

- Wundt and others thought you could observe and report
- Quickly realized this was incomplete and difficult
NATURE OF CONSCIOUSNESS

Other sciences do not have to worry about their subjective experiences of objects

Problem of other minds
  • How do we know that others are not zombies?

Mind-Body Problem
  • Where is consciousness found?
  • René Descartes and dualism

Reality Paradox
  • The Matrix
  • What is reality?

PROPERTIES OF CONSCIOUSNESS

Intentionality
  • Always focused on something
  • Can’t pay attention to something for long

Unity
  • Resists division
  • Hard to do 2 things at once

Selectivity
  • Dichotic listening tasks
  • Consciousness filters and selects information

Transience
  • Mind wanders
WHAT IS CONSCIOUSNESS?

LEVELS OF CONSCIOUSNESS

Full consciousness
• Normal state when awake
• Self-awareness

Preconscious
• Information that is accessible into awareness
• Automatic behaviors and thoughts
• Tip-of-the-tongue
• Subliminal perception

Subconscious
• Language – “the big red barn” vs. “the red big barn”
FREE ASSOCIATION

Detergent

UNCONSCIOUS INFLUENCES ON BEHAVIOR

• Nisbett & Wilson (1977) – ocean-moon → detergent → Tide
• Bargh et al. (1996) – make sentences: old, Florida, wrinkles
• Freudian slips
• Unconscious thought may help decisions
  • Dijksterhuis (2004) – apartment choices
**AUTOMATICITY**

Life would be chaos if everything were in the forefront of our consciousness – Paul Whelan

Only aware of 5% of our cognitive activity, with 95% of our decisions, emotions, and behavior is beyond conscious awareness

Cost

- Action slip – mistake during well rehearsed behaviors.
- Capture error – frequently performed activity captures attention
- Loss-of-activation error – simply forgetting why you are doing something

Why aren’t we conscious of everything?
What is the purpose of consciousness?

To restrict attention
To provide an interpretation of the world
To help us select and store memories
To allow us to draw selectively from memory
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ATTENTION AND CONSCIOUSNESS

Attention focuses awareness on something that is in consciousness
May receive information and process it without being aware of it
Cocktail party effect
  • Focus attention on one conversation, but someone may call your name
STROOP EFFECT

Red   Yellow   Blue   Green
Blue   Red     Green   Yellow
Yellow Green   Red     Blue

DISORDERS OF ATTENTION

Attention deficit/Hyperactivity Disorder (ADHD)

- Difficulty maintaining concentration
- Common among school age children
- Debate about diagnosis
- PET studies results
- Treatment – medication and behavioral
NEGLECT

Damage to right parietal lobe!

"cross all the Os" – the patient only did this for the right side and "neglected" the left side!
DISORDERS OF ATTENTION

Attention deficit/Hyperactivity Disorder (ADHD)
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- Common among school age children
- Debate about diagnosis
- May have to do with dopamine deficiency
- Treatment – medication and behavioral

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CIRCADIAN RHYTHM

Normal cycles
Jet lag
If you deprive people of any markers of time
  • Dr. Nathaniel Kleitman
  • Mammoth Cave experiment
  • 25-28 hour cycle

Daydreams
  • Mild alteration in consciousness
  • Shift in focus away from external world towards internal thoughts
  • Can be productive or not

WHY DO WE SLEEP?

It remains unclear to scientists why we sleep and why we can’t survive without it
  • Newborns sleep 6 to 8 times in 24 hours for more than 16 hours
  • 6-year-old child sleeps about 11 hours
  • Decreasing need for sleep as you get older

Theories of sleep
  • Protection
    • Avoid risks at night
  • Restoration
    • Replenish and clean-up
STAGES OF SLEEP

Non-REM
- Stage 1
- Stage 2
- Stages 3 and 4
- End of stage 4

REM
- Similar to awake
- Dreams
- Sleep paralysis

SLEEP CYCLE
OUTLINE

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DREAMS

REM

Not Episodic

NREM

Episodic
DREAMS

NREM
• Episodic dreams
• Cortisol is low
• Areas involved in episodic memory retrieval active (such as hippocampus)
• This reactivation may lead to better consolidation

REM
• Recombined dreams
• Cortisol is high
• Hippocampus activity is disrupted
• REM may be more useful for insight, implicit memory, etc.

Payne and Nadel (2006)

REM DREAM THEORIES

Extensions of everyday life
• Research shows same items come up whether awake or asleep
• Problem-solving

Action-synthesis
• Brain fires randomly
• Brain tries to make sense of randomness

Neurocognitive theory
• Persisting activity in the cortex without competition from sensory input and lower cognitive activity
• Imagination/Insight
• No need for REM, but it makes it more vivid
"...I was sitting writing on my textbook, but the work did not progress; my thoughts were elsewhere. I turned my chair to the fire and dozed. Again the atoms were gamboling before my eyes... My mental eye, rendered more acute by the repeated visions of the kind, could now distinguish larger structures of manifold conformation; long rows sometimes more closely fitted together all twining and twisting in snake-like motion. But look! What was that? One of the snakes had seized hold of its own tail, and the form whirled mockingly before my eyes. As if by a flash of lightning I awoke; and this time also I spent the rest of the night in working out the consequences of the hypothesis.”

Friedrich August Kekulé von Stradonitz
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EFFECTS OF SLEEP DEPRIVATION

• Short nights of sleep can reduce REM
• Next time you sleep, you slip into REM faster to make up for it, but you miss NREM.
• Study:
  • Subjects slept for 4-6 hours a night for fourteen consecutive nights
  • Deficits in cognitive performance equivalent to three days without sleep
  • Subjects reported not feeling sleepy
    (Nat. Institute of Health, 2003)
EFFECTS OF SLEEP DEPRIVATION

Short term (<60 Hrs)
- Enhanced anxiety
- Irritability
- Learning deficits

Task-dependent behavioral consequences
- Poor performance on vigilance tasks

Long term
- Modern record is 453 hour and 40 min – Robert McDonald
- Personality dependent psychotic-like symptoms, e.g., hallucinations

Peter Tripp: 200 Hr (8.4 days)
- Complete physical recovery in 13 hours
- Moody and depressed

http://www.youtube.com/watch?v=nSNRdvusmQs
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HYPNOSIS, MEDITATION, RELIGION

Hypnosis
• Developed by Anton Mesmer
• Altered state of consciousness
• Deep state of relaxation with suggestion
• Therapeutic vs. show business

Meditation
• Manipulation of awareness
• Physiological effects, but not beyond relaxation
• Mindfulness meditation

Religious Experiences
• Some religions encourage altered consciousness
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PSYCHOACTIVE DRUGS

• Change chemistry of the brain
• Mimic natural substances
  • Opiates and endorphines
• Increase or decrease levels of neurotransmitters
  • Fluoxetine and serotonin
• Opiates, CNS depressants (alcohol), CNS stimulants, hallucinogens
**OPIATES**

Derivatives of opium (Narcotics)
Morphine, Heroin, Codeine
Highly addictive
Slows down brain activity
Pain relief, relaxation, sleepiness
Trouble concentrating, respiratory arrest

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**CNS DEPRESSANTS**

Alcohol and other sedatives
Reduce anxiety and relax inhibitions
Severe mood shifts and sensorimotor impairment

**Alcohol**

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.03% - 0.05%</td>
<td>Relaxed, uninhibited, general sense of well-being.</td>
</tr>
<tr>
<td>0.10%</td>
<td>Sensorimotor problems, slurred speech</td>
</tr>
<tr>
<td>0.20%</td>
<td>Severe dysfunction</td>
</tr>
<tr>
<td>0.40%</td>
<td>Serious risk of death</td>
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SEDATIVES-HYPNOTICS

Used to control anxiety and insomnia

Barbiturates
  • Anxiety relief
  • Diazepam (Valium)

Tranquilizers
  • Less habit forming
  • Benadryl

CNS STIMULANTS

Increase heart rate or neurotransmitters in brain

Caffeine, nicotine, cocaine, amphetamine

Low dose response

High or overdose response
HALLUCINOGENS

Psychedelics

Hallucinations: how we perceive external and internal worlds

Mescaline, LSD, marijuana, designer drugs (ecstasy)