4.E: States of Consciousness (Exercises)

4.1: What Is Consciousness?

Consciousness describes our awareness of internal and external stimuli. Awareness of internal stimuli includes feeling pain, hunger, thirst, sleepiness, and being aware of our thoughts and emotions. Awareness of external stimuli includes seeing the light from the sun, feeling the warmth of a room, and hearing the voice of a friend. We experience different states of consciousness and different levels of awareness on a regular basis.

Review Questions

Q1

The body's biological clock is located in the ________.

A. hippocampus  
B. thalamus  
C. hypothalamus  
D. pituitary gland

Q2

_______ occurs when there is a chronic deficiency in sleep.

A. jet lag
B. rotating shift work  
C. circadian rhythm  
D. sleep debt  

Q3  
_______ cycles occur roughly once every \(24\) hours.  
A. biological  
B. circadian  
C. rotating  
D. conscious  

Q4  
_______ is one way in which people can help reset their biological clocks.  
A. Light-dark exposure  
B. coffee consumption  
C. alcohol consumption  
D. napping  

Critical Thinking Questions  
Q5  
Healthcare professionals often work rotating shifts. Why is this problematic? What can be done to deal with potential problems?  

Q6  
Generally, humans are considered diurnal which means we are awake during the day and asleep during the night. Many rodents, on the other hand, are nocturnal. Why do you think different animals have such different sleep-wake cycles?  

Personal Application Questions  
Q7  
We experience shifts in our circadian clocks in the fall and spring of each year with time changes associated with daylight saving time. Is springing ahead or falling back easier for you to adjust to, and why do you think that is?  

Q8
What do you do to adjust to the differences in your daily schedule throughout the week? Are you running a sleep debt when daylight saving time begins or ends?

Solution

S1
C

S2
D

S3
B

S4
A

S5

Given that rotating shift work can lead to exhaustion and decreased mental efficiency, individuals working under these conditions are more likely to make mistakes on the job. The implications for this in the health care professions are obvious. Those in health care professions could be educated about the benefits of light-dark exposure to help alleviate such problems.

S6

Different species have different evolutionary histories, and they have adapted to their environments in different ways. There are a number of different possible explanations as to why a given species is diurnal or nocturnal. Perhaps humans would be most vulnerable to threats during the evening hours when light levels are low. Therefore, it might make sense to be in shelter during this time. Rodents, on the other hand, are faced with a number of predatory threats, so perhaps being active at night minimizes the risk from predators such as birds that use their visual senses to locate prey.

4.2: Sleep and Why We Sleep

We spend approximately one-third of our lives sleeping. Some animals never sleep (e.g., several fish and amphibian species); other animals can go extended periods of time without sleep and without apparent negative consequences (e.g., dolphins); yet some animals (e.g., rats) die after two weeks of sleep deprivation. Why do we devote so much time to sleeping? Is it absolutely essential that we sleep? This section will consider these questions and explore various explanations for why we sleep.
Review Questions

Q1
Growth hormone is secreted by the _______ while we sleep.

A. pineal gland  
B. thyroid  
C. pituitary gland  
D. pancreas

Q2
The _______ plays a role in controlling slow-wave sleep.

A. hypothalamus  
B. thalamus  
C. pons  
D. both a and b

Q3
________ is a hormone secreted by the pineal gland that plays a role in regulating biological rhythms and immune function.

A. growth hormone  
B. melatonin  
C. LH  
D. FSH

Q4
________ appears to be especially important for enhanced performance on recently learned tasks.

A. melatonin  
B. slow-wave sleep  
C. sleep deprivation  
D. growth hormone

Critical Thinking Questions
Q5
If theories that assert sleep is necessary for restoration and recovery from daily energetic demands are correct, what do you predict about the relationship that would exist between individuals’ total sleep duration and their level of activity?

Q6
How could researchers determine if given areas of the brain are involved in the regulation of sleep?

Q7
Differentiate the evolutionary theories of sleep and make a case for the one with the most compelling evidence.

Personal Application Question

Q8
Have you (or someone you know) ever experienced significant periods of sleep deprivation because of simple insomnia, high levels of stress, or as a side effect from a medication? What were the consequences of missing out on sleep?

Solution

S1
C

S2
D

S3
B

S4
B

S5

Those individuals (or species) that expend the greatest amounts of energy would require the longest periods of sleep.

S6
Researchers could use lesion or brain stimulation techniques to determine how deactivation or activation of a given brain region affects behavior. Furthermore, researchers could use any number of brain imaging techniques like fMRI or CT scans to come to these conclusions.
One evolutionary theory of sleep holds that sleep is essential for restoration of resources that are expended during the demands of day-to-day life. A second theory proposes that our sleep patterns evolved as an adaptive response to predatory risks, which increase in darkness. The first theory has little or no empirical support, and the second theory is supported by some, though not all, research.

4.3: Stages of Sleep

Sleep is not a uniform state of being. Instead, sleep is composed of several different stages that can be differentiated from one another by the patterns of brain wave activity that occur during each stage. These changes in brain wave activity can be visualized using EEG and are distinguished from one another by both the frequency and amplitude of brain waves. Sleep can be divided into two different general phases: REM sleep and non-REM (NREM) sleep.

Review Questions

Q1

________ is(are) described as slow-wave sleep.

A. stage 1  
B. stage 2  
C. stage 3 and stage 4  
D. REM sleep

Q2

Sleep spindles and K-complexes are most often associated with ________ sleep.

A. stage 1  
B. stage 2  
C. stage 3 and stage 4  
D. REM

Q3

Symptoms of ________ may be improved by REM deprivation.

A. schizophrenia  
B. Parkinson’s disease  
C. depression  
D. generalized anxiety disorder
Q4

The ________ content of a dream refers to the true meaning of the dream.

A. latent
B. manifest
C. collective unconscious
D. important

Critical Thinking Questions

Q5

Freud believed that dreams provide important insight into the unconscious mind. He maintained that a dream's manifest content could provide clues into an individual’s unconscious. What potential criticisms exist for this particular perspective?

Q6

Some people claim that sleepwalking and talking in your sleep involve individuals acting out their dreams. Why is this particular explanation unlikely?

Personal Application Question

Q7

Researchers believe that one important function of sleep is to facilitate learning and memory. How does knowing this help you in your college studies? What changes could you make to your study and sleep habits to maximize your mastery of the material covered in class?

Solution

S1
C

S2
B

S3
C
The subjective nature of dream analysis is one criticism. Psychoanalysts are charged with helping their clients interpret the true meaning of a dream. There is no way to refute or confirm whether or not these interpretations are accurate. The notion that “sometimes a cigar is just a cigar” (sometimes attributed to Freud but not definitively shown to be his) makes it clear that there is no systematic, objective system in place for dream analysis.

Dreaming occurs during REM sleep. One of the hallmarks of this particular stage of sleep is the paralysis of the voluntary musculature which would make acting out dreams improbable.

4.4: Sleep Problems and Disorders

Many people experience disturbances in their sleep at some point in their lives. Depending on the population and sleep disorder being studied, between 30% and 50% of the population suffers from a sleep disorder at some point in their lives. This section will describe several sleep disorders as well as some of their treatment options.

Review Questions

Q1

________ is loss of muscle tone or control that is often associated with narcolepsy.

A. RBD
B. CPAP
C. cataplexy
D. insomnia

Q2

An individual may suffer from ________ if there is a disruption in the brain signals that are sent to the muscles that regulate breathing.

A. central sleep apnea
B. obstructive sleep apnea
C. narcolepsy
D. SIDS
Q3
The most common treatment for ________ involves the use of amphetamine-like medications.

A. sleep apnea  
B. RBD  
C. SIDS  
D. narcolepsy

Q4
_______ is another word for sleepwalking.

A. insomnia  
B. somnambulism  
C. cataplexy  
D. narcolepsy

Critical Thinking Questions

Q5
One of the recommendations that therapists will make to people who suffer from insomnia is to spend less waking time in bed. Why do you think spending waking time in bed might interfere with the ability to fall asleep later?

Q6
How is narcolepsy with cataplexy similar to and different from REM sleep?

Personal Application Question

Q7
What factors might contribute to your own experiences with insomnia?

Solution

S1
C
Answers will vary. One possible explanation might invoke principles of associative learning. If the bed represents a place for socializing, studying, eating, and so on, then it is possible that it will become a place that elicits higher levels of arousal, which would make falling asleep at the appropriate time more difficult. Answers could also consider self-perpetuating cycle referred to when describing insomnia. If an individual is having trouble falling asleep and that generates anxiety, it might make sense to remove him from the context where sleep would normally take place to try to avoid anxiety being associated with that context.

Similarities include muscle atony and the hypnagogic hallucinations associated with narcoleptic episodes. The differences involve the uncontrollable nature of narcoleptic attacks and the fact that these come on in situations that would normally not be associated with sleep of any kind (e.g., instances of heightened arousal or emotionality).

4.5: Substance Use and Abuse

While we all experience altered states of consciousness in the form of sleep on a regular basis, some people use drugs and other substances that result in altered states of consciousness as well. This section will present information relating to the use of various psychoactive drugs and problems associated with such use. This will be followed by brief descriptions of the effects of some of the more well-known drugs commonly used today.

Review Questions

Q1

_______ occurs when a drug user requires more and more of a given drug in order to experience the same effects of the drug.

A. withdrawal
B. psychological dependence
C. tolerance
D. reuptake
Q2
Cocaine blocks the reuptake of _______.

A. GABA
B. glutamate
C. acetylcholine
D. dopamine

Q3
_______ refers to drug craving.

A. psychological dependence
B. antagonism
C. agonism
D. physical dependence

Q4
LSD affects _______ neurotransmission.

A. dopamine
B. serotonin
C. acetylcholine
D. norepinephrine

Critical Thinking Questions

Q5
The negative health consequences of both alcohol and tobacco products are well-documented. A drug like marijuana, on the other hand, is generally considered to be as safe, if not safer than these legal drugs. Why do you think marijuana use continues to be illegal in many parts of the United States?

Q6
Why are programs designed to educate people about the dangers of using tobacco products just as important as developing tobacco cessation programs?
Many people experiment with some sort of psychoactive substance at some point in their lives. Why do you think people are motivated to use substances that alter consciousness?

Solution

One possibility involves the cultural acceptance and long history of alcohol and tobacco use in our society. No doubt, money comes into play as well. Growing tobacco and producing alcohol on a large scale is a well-regulated and taxed process. Given that marijuana is essentially a weed that requires little care to grow, it would be much more difficult to regulate its production. Recent events suggest that cultural attitudes regarding marijuana are changing, and it is quite likely that its illicit status will be adapted accordingly.

Given that currently available programs designed to help people quit using tobacco products are not necessarily effective in the long term, programs designed to prevent people from using these products in the first place may be the best hope for dealing with the enormous public health concerns associated with tobacco use.

4.6: Other States of Consciousness

Our states of consciousness change as we move from wakefulness to sleep. We also alter our consciousness through the use of various psychoactive drugs. This final section will consider hypnotic and meditative states as additional examples of altered states of consciousness experienced by some individuals.
Review Questions

Q1
_______ is most effective in individuals that are very open to the power of suggestion.

A. hypnosis  
B. meditation  
C. mindful awareness  
D. cognitive therapy

Q2
_______ has its roots in religious practice.

A. hypnosis  
B. meditation  
C. cognitive therapy  
D. behavioral therapy

Q3
Meditation may be helpful in ________.

A. pain management  
B. stress control  
C. treating the flu  
D. both a and b

Q4
Research suggests that cognitive processes, such as learning, may be affected by ________.

A. hypnosis  
B. meditation  
C. mindful awareness  
D. progressive relaxation

Critical Thinking Questions
Q5
What advantages exist for researching the potential health benefits of hypnosis?

Q6
What types of studies would be most convincing regarding the effectiveness of meditation in the treatment for some type of physical or mental disorder?

Personal Application Question

Q7
Under what circumstances would you be willing to consider hypnosis and/or meditation as a treatment option? What kind of information would you need before you made a decision to use these techniques?

Solution

S1
A

S2
B

S3
D

S4
A

S5

Healthcare and pharmaceutical costs continue to skyrocket. If alternative approaches to dealing with these problems could be developed that would be relatively inexpensive, then the potential benefits are many.

S6

Ideally, double-blind experimental trials would be best suited to speak to the effectiveness of meditation. At the very least, some sort of randomized control trial would be very informative.