Psych 1100 module 5 and 6 summaries

5.8 summary (sensation and perception)

- Sensation is the process of using our senses (i.e., vision, hearing) to detect stimuli or information in our environment, and perception is the process of identifying that sensory information and combining it with our previous knowledge to create our current experience.
- The primary purpose of sensation is to transform signals in the world (e.g., light, sounds, and touch) into the electrochemical language of the brain.
- Bottom up processing involves how we understand basic sensory information, while top-down processing involves recruiting our prior experience or our expectations to help us understand the sensory message.
- The eye is composed of several major structures, including the lens and the retina, which transduce light into the electrochemical language of the brain
- Rod and cone cells are responsible for the transduction of light, and the resulting information is sent to the brain via the optic nerve, which is made up of specialized ganglion cells
- The occipital lobe processes visual information and contains feature detectors (such as simple cells and complex cells) that help us construct a picture of the world around us. The information is understood spatially by the dorsal stream ("where is it?"), while the ventral stream understands its content ("what is it?").
- Trichromatic theory explains how we understand colour via the "mixing" of light, while **opponent process theory** explains **afterimages** and the importance of the colour yellow.
- Depth cues enable us to understand how far away objects are in space. Monocular cues require input form only one eye, while binocular cues require input from both eyes.
- The ear has three major sections: the outer, middle and inner ear. The outer portion funnels sound into the ear, the middle portion amplifies it, and the inner portion transduces sound into the electrochemical language of the brain.
- Place theory describes how the location of neural firing on the basilar membrane indicates the pitch of a sound, while frequency theory describes how the firing rate of neural cells is also indicative of pitch.
- Chemoreceptors in the nose and tongue allow us to smell and taste; this is accomplished by **olfactory receptor neurons** in the nose and papillae on the tongue.
- Mechanoreceptors are responsible for the **sense of touch,** thermoreceptors allow us to **sense temperature,** and nociceptors process **nociceptive pain.**
- Pain can be interpreted through the gate-control theory, which implies that the perception of pain is controlled by the spinal cord and is both context dependent and can also be somewhat subjective.

- Sensory centers in the brain are organized based on space (retinotopic and somatotopic organization for vision and touch) as well as pitch (tonotopic organization for sound).
- We understand where our bodies are in space via our kinesthetic sense
- The vestibular sense helps us keep our balance
- signal detection and its relationship to absolute thresholds allow us to understand the limits of when a person can detect a sensation
- Weber's Law describes that we are more likely to notice the difference between two stimuli when the difference between them grows proportionally larger.

6.5 Summary (States of Consciousness)

- **Consciousness** is referred to as having content (your immediate subjective experience) and state (the level of arousal and attention you are currently able to bring to bear on a situation).
- Split-brain patients illustrate how our brains have a hemispheric specialization, with the left hemisphere responsible for much of what we would consider conscious verbal thought.
- Attention can be either active or passive, referring to directed goal-driven (top-down) efforts to process the environment and the ability to respond to demanding characteristics of the environment (bottom- up efforts), respectively.
- When something captures attention because it influences our bottom-up passive attention system, this is due to **stimulus salience:** bold text, sudden loud noises, and contrasting "popping" colors are examples of this phenomenon.
- **Selective attention** occurs when resources are devoted to processing one piece of information about the environment at the expense of other information and can lead to us "missing" information in the environment because we did not process it effectively.
- **Dichotic listening** is an example of a selective attention task in which you attend to information presented to one ear and ignore information presented to the other; some of the unattended information can be consciously processed, however, such as when you **hear your name in a crowded room.**
- **Divided attention** occurs when two (or more) things in your environment must be done or processed simultaneously; people typically perform poorly in these situations unless one of the tasks is automatic (requiring little processing effort).
- **Attentional "errors"** can occur when we are processing information: inattentional blindness and studies of intentional change detection illustrate some of these.
- **Cases of visual neglect** illustrate how the **parietal lobe is involved in attentional processing; parietal lobe damage can lead to p**eople being unable to process parts of the world around them.

- Sleep is divisible into four stages plus rapid eye movement **(REM) stage sleep;** techniques, including **electroencephalography,** are used to delineate these stages from one another, while **hypnograms** plot out how long a person spends in each stage of sleep.
- Brain activity during sleep becomes progressively more coordinated across the cortex as sleep moves from earlier stages into later slow-wave sleep stages; various wave types show this progression **(desynchronized alpha and beta waves when awake moving to slower and more regular theta and delta activity).**
- **REM-stage sleep** is an exception to the typically slow brain activity seen during sleep and is **when dreams occur;** REM is also thought to be one of the **most important parts of sleep for improving** cognitive functioning and performance.
- Freud thought dreams were a manifestation of the unconscious mind; however, modern psychologists are more likely to endorse the activation-synthesis hypothesis of dreaming or the evolutionary hypothesis of dreaming.
- **Dyssomnias** are a class of sleep disorder related to the quality of sleep a person gets, including various kinds of **insomnia, hypersomnia, apnea, and narcolepsy.**
- **Circadian rhythms**, also known as **biological clocks**, help us regulate our sleep/wake cycle and can be **influenced by things like jet lag and melatonin**; the **suprachiasmatic** nucleus appears to regulate circadian rhythms.
- **Psychoactive drugs**, including stimulants, depressants, and hallucinogens, can alter the state of consciousness a person is in, changing levels of arousal and ability to attend to the world around them.
- **Depressants** include drugs such as alcohol and barbiturates, which influence the level and effectiveness of neurotransmitters such as **GABA, glutamate, and dopamine. Depressants slow reaction time and reduce wakefulness.**
- **Stimulants** include drugs like caffeine, nicotine, cocaine, and amphetamines and typically act on the neurotransmitters adenosine, acetylcholine, and dopamine to increase arousal and alertness, while also reducing feelings of hunger and fatigue.
- **Hallucinogens (or "psychedelics")** include drugs such as LSD and mescaline. **They typically act on the neurotransmitter serotonin** and their effects include hallucinations and other breakdowns in a person's conscious experience, such as an "out-of-body" feeling.