

## Motivation, Emotion, and Stress

### Motivation

- The purpose or driving force behind our actions.
- Can be categorized based on what drives people to act. Drives can be external forces (rewards and punishments) or internal forces (behavior is gratifying)
- Extrinsic Motivation: includes rewards for showing a desired behavior or avoiding punishment if a desired behavior is not achieved
  - This is created by external forces – coming from outside one self
- Intrinsic Motivation: motivation that comes from within oneself
  - Driven by interest in task or pure enjoyment
  - E.g. – Student who is interested in subject and want to learn more (intrinsic motivation) & goal of achieving high grades (extrinsic)
- Primary views of motivation include instinct that elicit natural behavior, the desire to maintain optimal levels of arousal, the drive to reduce uncomfortable states, and the goal of satisfying physiological and psychological needs.

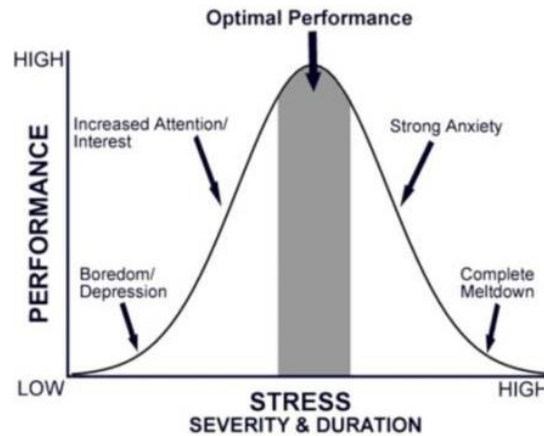
### Instinct Theory

- One of the earlier attempts to understand basis of motivation and was focused on instincts (innate, fixed patterns of behavior in response to stimuli)
- In this theory, people are driven to do certain behaviors based on evolutionarily programmed instincts.
  - Derived from Darwin's theory of evolution
  - First proposed by William James. He suggested that human actions are derived from 20 physical instincts and 17 mental instincts
    - Some of these instincts were in direct conflict with each other and could be overridden by experience
- William McDougall, proposed that humans were driven to all thoughts and behaviors by 18 distinctive instincts (including fight and acquisition)
- E.g. of both theories: Suckling and carrying food to the mouth were a result from the natural motivation to eat.

### Arousal Theory

- Arousal: psychological and physiological state of being awake and reactive to stimuli.
  - Involves the brainstem, autonomic nervous system, and endocrine system, and plays a vital role in behavior and cognition
- Theory states that people perform actions in order to maintain an optimal level of arousal
  - Yerkes-Dodson law: postulates a U-shaped function between the level of arousal and performance
    - States that the performance is worst at extremely high and low levels of arousal and optimal at an intermediate level.
  - Optimal level of arousal varies for different types of tasks
    - Lower levels of arousal are optimal for high cognitive tasks

- Higher levels of arousal are optimal for activities that require physical endurance and stamina.
- Simple tasks generally require a slightly higher arousal than complex tasks.



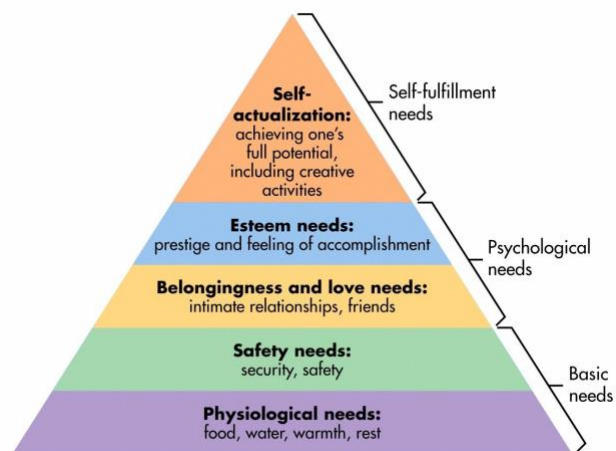
### Drive Reduction Theory

- Drives: internal states of tension that activate particular behaviors which is focused on goals
  - Thought to originate within an individual without requiring any external factors to motivate behaviors
  - I.e. – drives help humans survive by creating an uncomfortable state, which ensures motivation to eliminate this state, or to relieve the internal tension created by unmet needs.
- Primary Drives: includes the needs for food, water, and warmth
  - Motivates us to sustain bodily processes in homeostasis
  - Homeostasis: regulation of the internal environment to maintain an optimal & stable set of conditions
- Homeostasis is generally controlled by **negative feedback** loops. If the monitored variable falls below a certain preset, the body releases hormones to increase the production or consumption of these nutrients or energy.
- Secondary Drives: additional drives that are not directly related to biological processes
  - Thought to stem from learning or from certain emotions
- Drive Reduction Theory: states that motivation is based on the goal of eliminating uncomfortable states.
  - Suggested that certain physiological conditions result in a negative internal environment, which then drives motivation and seeks homeostasis in order to reduce the uncomfortable internal state

### Need-Based Theories

- Needs: motivators that influence human behavior
  - Motivation can be described as how we allocate our energy and resources to best satisfy these needs
  - Motivation determines which behaviors are most important to pursue, how much effort will be taken, and how long the effort will be maintained.

- Maslow's Hierarchy of Needs: needs were classified into five groups and assigned different levels of priority for each group.
  - Based on the fact that certain needs will yield a greater influence on our motivation
  - Base: Most primitive, essential and important needs
  - Second: Safety and security
  - Third: Love and belonging
  - Fourth: Esteem
  - Highest Level: Self-actualization – need to realize one's full potential
- Maslow theorized that if the lowest level of need is not met, then motivation to meet this needs would be of the highest priority.
  - Needs higher up on the chain would only be satisfied once the one below is.



- Self-Determination Theory (SDT): emphasizes the role of three universal needs:
  - **Autonomy**: need to be in control of one's actions and ideas
  - **Competence**: need to complete and excel at difficult tasks
  - **Relatedness**: need to feel accepted and wanted in relationships
  - Three above needs must be met in order to develop healthy relationships with oneself and others

### Additional Theories and Applications

- Incentive Theory: explains that behaviors are motivated by desire to pursue rewards and to avoid punishments. Not by need or arousal
- Expectancy Value Theory: amount of motivation needed to reach a goal is the result of both the individual's expectation of success in reaching the goal and the degree to which he or she values succeeding at that goal.

### Opponent-Process Theory This is a theory that explains continuous drug use

- Motivation are considered destructive if they result in harm to oneself
- Opponent-Process Theory: when a drug is taken repeatedly, the body will attempt to counteract the effects of the drug by changing its physiology
  - E.g. – body will counteract repeated use of alcohol by increasing arousal
  - Reaction will last longer than the drug, which results in withdrawal symptoms that are exactly the opposite of alcohol: anxiety, jitteriness and irritability

- Withdrawal created by this mechanism can create a physical dependence on the drug
- Also explains **tolerance**: decrease in perceived drug effect over time

### Sexual Motivation

- Humans are motivated to sexual behavior based on the secretion of estrogens, progesterone, and androgens
  - Strong correlation between hormone concentration and sexual desire.
- Another motivation is smell: certain odors have shown to increase sexual desire and activity.
- Pleasure is also a key player in sexual motivation, along with the interpretation of pleasure
- Cognition also plays a role in sexual motivation
  - E.g. – women and men show same level of arousal when watching porn, but women frequently reported being unaroused or feelings of disgust.
- Culture and society influence what is deemed appropriate sexual behavior, age at which it is seen as appropriate and with whom.

### Emotions

- Emotion: the natural instinctive state of mind that is derived from one's circumstances, mood or relationships with others

### Three Elements of Emotion

#### Physiological Response

- Arousal is stimulated (by ANS) when a feeling is first experienced
- Induces a change in heart rate, breathing rate, skin temperature, and blood pressure
- Some emotions (e.g. – fear, anger, embarrassment) are associated with more pronounced physiological effects.

#### Behavioral Response

- Includes facial expressions and body language

#### Cognitive Response

- The subjective interpretation of the feeling being experienced.
- Determination of emotion is largely based on memories of past experiences

### Universal Emotions

- Darwin suggested that emotions are a result of evolution, so that would mean that their properties are universal.
  - Assumed that all humans evolved the same set of facial muscles to show the same expressions when communicating emotion
- Much debate regarding Darwin's theory
- Paul Ekman Identified six emotions that are a part of a basic set of emotions that are recognized around the world
  - Those six emotions are associated with consistent facial expressions
- Ekman's list has been expanded on by many.
  - Most common lists seven universal emotions: happiness, sadness, contempt, surprise, fear, disgust, and anger.

- While emotions are indeed experienced universally, they can be greatly affected by culture.
  - Dissimilarities between cultures include: varying reactions to similar events, differences in the emotional experience itself, the behavior exhibited in response to an emotion, and the perception of that emotion by others.

### Adaptive Role of Emotion

- Darwin's theory of evolution suggests that everything we do, think and feel is based on specialized functional programs that are designed for any problem we encounter.
- Emotions are thought to be evolutionary adaptations due to situations encountered over our evolutionary history.
  - Guide sensory processing, physiological response, and behavior.
- Different emotions have been thought to have evolved during different periods of history
  - Primal emotions (fear) were first to develop
  - Other social emotions (like guilt and pride) developed later in evolution

### Theories of Emotion

- Early psychologists believed that feelings preceded arousal which preceded action
- Cognitive component of emotion led to the physiological component which led to the behavioral component

### James-Lange Theory

- According to this theory: a stimulus results first in physiological arousal, which then leads to a secondary response in which the emotion is labeled.
  - I.e. – emotions are labeled based on the type of physiological response that is sent from the peripheral organs to the brain.
    - Peripheral organs receive information and respond; the response is then labelled as an emotion by the brain
- Physiological response leads to labeling of an emotion
  - Emotion would not be processed without feedback from the peripheral organs
- Theory predicts that individuals who cannot mount a sympathetic response (e.g. – spinal cord injuries) should show decreased levels of emotions
  - This claim has proven to be false

### Cannon-Band Theory

- Started off as an attempt to verify the above theory by studying the expression of emotion and its relationship to feedback from the sympathetic nervous system by using cats that had afferent neurons severed
- Theory states that the cognitive and physiological components of emotion occur simultaneously
  - This can result in the behavioral component of emotion which may lead to an action
  - In this theory, a person should still be able to experience emotion and act on that emotion without physiological inputs

- Cannon hypothesized that the basis behind this theory was that the thalamus sent received sensory information simultaneously to both the sympathetic nervous system and to the cortex.
- Critics of this theory suggest that it fails to account for the vagus nerve
  - The Vagus nerve is a cranial nerve that functions as feedback system, it conveys information from the peripheral organs back to the CNS
  - The presence of this nerve suggests that the peripheral organs can still relay information to the brain even when the afferent nerves are severed.

### Schachter-Singer Theory (Cognitive Arousal or Two-factor Theory)

- Both arousal and the labeling of arousal, which is based on the environment, must occur in order for an emotion to be experienced
- First theory to introduce cognitive appraisal: to feel an emotion, one must consciously analyze the environment in relation with their own nervous system arousal.
- Study was conducted by injecting epinephrine or a placebo into groups of subjects that were then placed within a specified environment.
  - Epinephrine resulted in an increased physiological arousal, but cognitive processing and environment also had a significant effect on emotion.
- The presence of an unexpected arousal plus an environment that encourages particular emotions is sufficient to create the emotion in the subject.

Theory	Stimulus	Response	Report
Common sense		 Subjective experience → Body response (arousal)	"My heart is pounding because I feel afraid."
James-Lange		 Body response (arousal) → Subjective experience	"I feel afraid because my heart is pounding."
Cannon-Bard		 Stimulus → Body response (arousal) & Subjective experience	"The dog makes me feel afraid and my heart pounds."
Schachter		 Body response (arousal) → Interpretation → Subjective experience	"My pounding heart means I'm afraid because I interpret the situation as dangerous."

**The James-Lange Theory of Emotion**

- According to this theory, you see an external stimulus that leads to a physiological reaction. Your emotional reaction is dependent upon how you interpret those physical reactions.
- EXAMPLE: You are walking down a dark alley late at night. You hear footsteps behind you and you begin to tremble, your heart beats faster, and your breathing deepens. You notice these physiological changes and interpret them as your body's preparation for a fearful situation. You then experience fear.

**The Cannon-Bard Theory of Emotion**

- This theory states that we feel emotions and experience physiological reactions such as sweating, trembling and muscle tension simultaneously. More specifically, it is suggested that emotions result when the thalamus sends a message to the brain in response to a stimulus, resulting in a physiological reaction.

**Schachter-Singer Theory**

- This theory suggests that the physiological arousal occurs first, and then the individual must identify the reason behind this arousal in order to experience and label it as an emotion.

### The Limbic System

- **Limbic System:** complex set of structures that reside below the cerebrum on either side of the thalamus
- Made up of the amygdala, thalamus, hypothalamus, hippocampus and fornix, septal nuclei, and parts of the cerebral cortex.
- Plays a role in both motivation and emotion

### Amygdala

- Small round structure; signals the cortex about stim related to attention and emotions
- Processes environment, detects external cues, and learns from surroundings in order to produce emotion. Associated emotion is fear and also involved in facial expressions.



## Thalamus

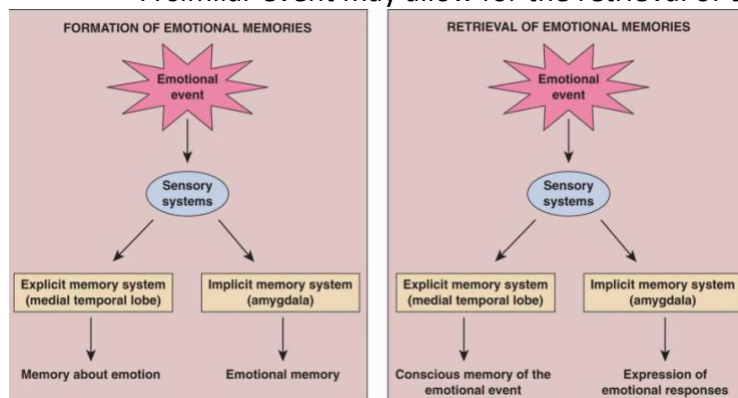
- Preliminary sensory processing station
- Routes information to the cortex and other appropriate areas of the brain.

## Hypothalamus

- Located below the thalamus
- Synthesizes and releases neurotransmitters. Major player in maintaining homeostasis
  - Also modulates emotion by the controlling neurotransmitters

## Hippocampus

- Found in the temporal lobe and is linked to creating long-term memories
  - Storage and retrieval of emotional memories is key in producing an emotional response.
  - Works in conjunction with the thalamus and hypothalamus to produce an emotional response
- Aids in creating a context for stimuli to lead to an emotional experience
- Memory systems can be divided into two categories: explicit & implicit
  - When an emotion is experienced, sensory systems transmit this information into both the explicatory system (controlled by hippocampus) and the implicit system (controlled by the amygdala)
  - Both systems are used in the formation and retrieval of emotional memories
    - Conscious (explicit): memory of experiencing the actual emotion
      - Episodic memories – memories about emotions
    - Unconscious (Implicit): **emotional memory** – the storage of the actual feelings of emotions associated with an event.
      - A similar event may allow for the retrieval of these feelings.



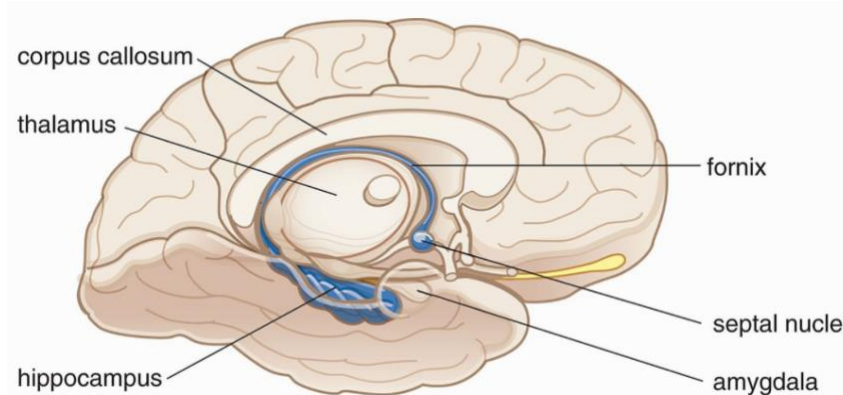
## Interpreting other's facial expressions

- Mainly controlled by the temporal lobe with some input from the occipital lobe.
- Right hemisphere is more active than the left. I.e. – function is lateralized
- Women demonstrate more activation of these brain areas than men
- Ability is weak in children and develops into adulthood

## Prefrontal Cortex

- Anterior portion of the frontal lobes and is associated with planning intricate cognitive functions, expressing personality, and making decisions

- Receives arousal input from the brainstem, so it coordinates arousal and cognitive states
- Left prefrontal cortex is associated with positive emotions while right is associated with negative emotions.
- Dorsal prefrontal cortex: associated with attention and cognition
- Ventral prefrontal cortex: connects with regions of the brain responsible for experiencing emotion
  - Ventromedial prefrontal cortex: plays a substantial role in decision-making and controlling emotional responses from the amygdala



### Autonomic Nervous System and Emotion

- Specific physiological reactions are associated with specific emotions
  - Skin temperature, heart rate, breathing rate, and blood pressure are all affected when experiencing emotion
- Decreased skin temp for fear, and increases for those experiencing anger
- Increased heart rate is found in both fear and anger emotions and it decreases when happy
- Decreased heart rate variability is associated with stress, frustration and anger
- Blood pulse volume increases with anger or stress, and decreases with sadness or relaxation
- Skin conductivity is correlated with sympathetic arousal, but is not associated with any one specific emotion
- Diastolic blood pressure increases to its greatest degree by anger, then followed by fear, sadness and then happiness.

## Stress

### Cognitive Appraisal of Stress

- Cognitive Appraisal: subjective evaluation of a situation that induces stress
  - Primary Appraisal: the initial evaluation of the environment and the associated threat
    - Can be identified as irrelevant, benign-positive, or stressful
  - Secondary Appraisal: begins if 1<sup>st</sup> stage results in appraisal of a threat. This stage is directed at evaluating whether the organism can cope with the stress



- Involves the evaluation of three things:
    - Harm – damage caused by the event
    - Threat – potential for future damage caused by the event
    - Challenge – the potential to overcome and possibly benefit from the event
- Individuals who perceive themselves as having the ability to overcome with the event, experience less stress than those who don't
- Appraisal and stress are personal since individuals have different skills, abilities, and coping mechanisms
- Reappraisal: situations that require ongoing monitoring.
- E.g. – perception of being followed by someone

### Types of Stressors

- Stressor: Biological element, external condition, or event that leads to a stress response
- Common stressors include:
  - Environmental factors: uncomfortable temp, loud sounds, inclement weather
  - Daily Events: running late, losing items, unexpected occurrences,
  - Workplace or academic setting: assignments, hierarchical interaction, time management
  - Social Expectations: demand placed on oneself by society, family, and friends
  - Chem & Biol: diet, alcohol, viruses, allergies, medications, medical conditions.
- Stressors cause either distress or eustress
  - Distress: occurs when experiencing unpleasant stressors
  - Eustress: result from positive conditions (graduating college, etc.)
    - Even though these are positive, any event that requires a person to change or adapt their lifestyle leads to stress
- Social Readjustment Scale: method to measure stress levels.
  - Measured in “life change units”
- Psychological stressors: pressure, control, predictability, frustration & conflict
  - Pressure: when demands are put in place from external sources. Produces a feeling of urgency to complete tasks, perform actions or display behaviors.
    - Ability to control one's surroundings typically reduces stress levels, while the opposite is also true. This is why pressure is a stressor
  - Predictability: e.g. – firefighters/police experience higher stress since there is no routine element to their job.
  - Frustration: occurs when attaining a goal or a need is prevented.
  - Conflict: arises from the need to make a choice.
    - Approach-Approach: need to choose between two desirable options
    - Avoidance-Avoidance: choices between two negative options
    - Approach-avoidance: only one choice/goal/event, but it may have a positive or negative elements.
      - e.g. – getting a promotion: more money, but more responsibility

### Physiological Response to Stressors

- Body initially responds to stress via the sympathetic nervous system

- “fight or flight” response initiates an increased heart rate and decrease in digestion
- General Adaptation Syndrome: sequence of responses and consists of three stages:
  1. Alarm: Initial reaction to a stressor and the activation of the sympathetic nervous system
    - Hypothalamus stimulates pituitary to secrete ACTH.
    - ACTH stimulates adrenal glands to produce cortisol
    - Cortisol maintains a steady supply of blood sugar needed to respond to stressful events.
    - Hypothalamus also activates adrenal gland to release epinephrine and norepinephrine, which activate the sympathetic nervous system
  2. Resistance: continuous release of hormones allows the sympathetic nervous system to remain engaged in order to fight the stressor
  3. Exhaustion: Body can no longer maintain an elevated response.
    - Individual becomes more susceptible to illness and medical conditions
    - Organ systems can begin to deteriorate

### Emotional and Behavioral Responses to Stress

- Takes a toll on both the physical body and on the psyche
- Elevated stress levels can result in irritable, moody, tense, fearful and helpless moods
- Also interferes with concentration and memory.
- Chronic stress can lead to mental health disorders such as anxiety and depression
- Affects behavior: can lead to societal withdrawal, substance use, aggression and suicide.

### Coping and Stress Management

- Problem-focused Strategies: working to overcome a stressor
  - E.g. – reaching out to friends/family, confronting issue head-on, creating a plan
- Emotionally-focused strategies: focus on changing one’s feelings about a stressor
  - Include taking responsibility of the issue, engaging in hopeful thinking, and using positive reappraisal to help in focusing on positive outcomes instead of stressors
- Can also engage in stress management to reduce stress levels.
  - Exercise since it releases endorphins, opioid neuropeptides
  - Relaxation techniques: meditation, deep breathing, and progressive muscle relaxation. Spiritual practice also helps in managing stress.

