

## **Chapter 16: The Healthy Mind- Stress and coping, health psychology, and positive psychology**

- Adrenal glands are located on top of your kidneys in your lower back
- Cortisol- a hormone that is naturally high in the morning that wakes you up
  - In response to the release of cortisol by your adrenal glands, the body is mobilized for action
- Our bodies are usually protected from too much circulating cortisol by a feedback loop that reduces cortisol release after circulating levels reach a certain point
- Feedback loop malfunctions in stress-related disorders are depressions

### **What is Stress?**

- Stress- an unpleasant emotional state that results from the perception of danger
- Stressor- a stimulus that serves as a source of stress
- No one set of stressors reliably produces stress in everybody
- They are highly individual and idiosyncratic
- Stress is a powerful adaptive response that mobilizes the body's resources to enhance survival in dangerous situations
- A diathesis-stress model predicts that stress can contribute to the development of depression, schizophrenia, post-traumatic stress disorder, and other serious conditions

### **The stress response**

- Walter Cannon- demonstrated the ability of a number of stressors to activate the sympathetic division of the autonomic nervous system
  - Extreme cold, lack of oxygen, and emotional experiences all had the capacity to initiate "fight or flight"
  - Heart rate, blood pressure, and respiration all increase, while nonessential functions, like digesting food, are inhibited
  - Stored energy is released and blood is shunted from the surface of the body to the muscles needed for exertion
- Hans Selye- studied the effects of stronger, longer lasting stressors
  - Worked with rats
- General Adaptation Syndrome (GAS)- Hans Selye's three-stage model for an organism's response to stressors
- Alarm reaction- the first stage of the general adaptation syndrome, characterized by sympathetic arousal and mental clarity
  - Initiated when a stressor is first perceived and identified
  - Equal to "fight or flight" response
- Resistance- the second stage of the general adaptation syndrome, characterized by coping with ongoing stress
  - We alternate between periods of calm and periods of relative arousal
  - We attempt to take care of both arousal and resting functions simultaneously

- Exhaustion- the third and last stage of the general adaptation syndrome, characterized by depletion of physical and psychological resources
  - Strength and energy drop to very low levels
  - Exhaustion stage has much in common with the criteria for major depressive disorder

### **Sources of Stress**

- Cognitive appraisal models- help us to predict when a particular stimulus or event is likely to be a stressor for an individual person
  - We make appraisals, or very rapid initial assessments, or potential stressors to determine if they are irrelevant or harmless, positive or negative.
- The ability of cortisol and other stress hormones to cross the placenta probably accounts for the effects of stress beginning in the prenatal environment
- Changes, including soe changes for the better, can also trigger stress
- Christmas is more stressful than minor violations of the law
- Getting married is more stressful than being fired from your job
- Critics of the Holmes and Rahe approach argue that most of the items on their list are quite negative and that these negative items are responsible for more stress
- It is likely that most of the stress associated with “good” changes occurs when the anticipated event does not live up to the person’s expectations
- Relatively insignificant sources of stress, often referred to as “hassles” can also contribute to a person’s overall level of stress
- Social relationships and their disruption can be a significant source of stress for many people
- Because lonely people see the social environment as threatening, they respond with feelings of hostility, stress, pessimism, anxiety, and low self-esteem

### **What are the biological correlates of stress?**

- Regardless of the identity of a stressor, once you appraise a stimulus as a danger, you initiate Selye’s General Adaptation Syndrome (GAS)
- The first stage, the alarm state, is accompanied by a coordinated reaction including physical, cognitive, and behavioral responses to perceived danger
  - Fight or flight
  - The brainstem will initiate the release of the neurotransmitter norepinephrine, which increases vigilance and fear

### **Stress and the Amygdala**

- Sensory input travels from the thalamus to the amygdala, which plays an important role in the identification of dangerous stimuli
- The amygdala participates in a “fear circuit” that provides a very rapid assessment of a stimulus or situation as potentially dangerous
- If the amygdala is lesioned, animals no longer respond with conditioned fear to previously learned classically conditioned associations between a stimulus and electric shock

- Because sensory information can reach the amygdala along routes that are separate from the pathways for information going to the cortex, we might find ourselves frightened by stimuli that we don't immediately understand or consciously view as dangerous
- Once the amygdala has identified a stimulus as potentially dangerous, it communicates with the hypothalamus
- Hypothalamus most directly commands the autonomic nervous system and the sympathetic division in particular
  - Responsible for fight or flight

### **Stress, SAM, and the HPA Axis**

- Perceiving a potential source of danger mobilizes the body's resources using two systems
  - Sympathetic adrenal-medullary system (SAM)- a circuit that responds to perceived stressors by initiating the release of epinephrine and norepinephrine into the bloodstream
    - From the adrenal glands located above the kidneys in your lower back
    - These chemical messengers circulate to many organs and to the brain, producing many of the immediate, short-lived, fight-flight responses to stress, such as a pounding heart and rapid breathing
  - Hypothalamic-pituitary-adrenal axis (HPA)- a circuit that responds to perceived stressors by initiating the release of cortisol into the bloodstream
    - The hypothalamus communicates with the pituitary gland, located just above the roof of your mouth, which in turn tells the adrenal glands to release cortisol
    - Circulating cortisol boosts the energy available for dealing with a stressor
    - HPA axis response to stress can continue much longer than SAM
  - Cortisol- a hormone released into the bloodstream from the adrenal glands
- One of the possible outcomes of chronic stress is prolonged high levels of circulating cortisol
- Long term exposure to cortisol can produce a number of harmful effects, including death of neurons
- People with unusually high cortisol levels suggest that cortisol abnormalities might contribute to reduced hippocampus volume, memory problems, abnormal sleep patterns, and depression
- Activity of the HPA axis is regulated by a feedback loop involving the hippocampus
- Hippocampus contains large numbers of receptors for cortisol and other stress hormones
- When the hippocampus detects high levels of the hormones, it signals the hypothalamus, which in turn tells the adrenal glands to reduce the release of cortisol, and arousal dissipates