**What is an Emotion?**
Emotions are ________________________________ that arise spontaneously and unconsciously in response to the environment around us.
Emotions have two components:
_______________________________ (rapid heartbeat, etc )
conscious experience or feeling

**Why do we have emotions?**
Task performance ________________________________ (to an extent)
Communication

**Innervation of the Facial Muscles**
The ________________________________ (cranial nerve V) controls deep muscles involved with chewing food and speaking.
The ________________________________ (cranial nerve VII) controls the surface muscles involved with facial expression.
  - The upper face receives both contralateral and ipsilateral input.
  - The lower face receives only contralateral input.
Conclusion: it’s easier to control movement of the ________________________________

**Voluntary and Involuntary Expressions Use Different Pathways**
Voluntary expressions (smile for the camera) involve ________________________________
Spontaneous expressions (smiling at a joke) involve ________________________________
People with ________________________________ can smile spontaneously, but not on command.
People with ________________________________ can smile on command, but not spontaneously.

**Major Expressions are Universal: Genetic**
Major expressions are the same across many diverse cultures.
Blind infants demonstrate major ________________________________ (e.g., social smile) at the same time as sighted infants.
______________________________ separation from mothers at the same time across cultures.

**Environmental factors can override biological expressions**
Doctors learn to withhold ________________________________
Cultures influence how expressive we are in group situations.
  - American students are about as expressive when alone as when in a group of strangers.
  - Japanese students are more expressive when alone than when in a group of strangers.

**Individual Differences**
Temperament ________________________________ (Kagan)
Very responsive babies may develop __________________ later in life
Low responders may develop ____________________ later in life
Psychopaths are extremely non-responsive, possibly leading to lack of empathy

Paul Ekman Says We Can Spot Some Liars
Timing (real emotions are fast, spontaneous)
“Match” between body language and verbal cues
Lying reduces ____________________________
Less upper body movement, more lower body movement
Eye contact is a clue in the US, but not in all cultures

Do Lie Detector Machines Work?

Theories of Emotion
The James-Lange Theory: ____________________________ leads to identification
“we feel sorry because we cry, angry because we strike, and afraid because we tremble”

Other Theories of Emotion
The Cannon-Bard Theory: autonomic __________________ occur simultaneously
The Schachter Theory: general arousal leads to ____________________________ of the situation and the emotion is identified

Support for the James-Lange Theory
Hohmann reported more emotionality in men with
_____________________________ than in men with cervical damage
Supports James-Lange provision regarding the importance of autonomic feedback
Less consistent with Cannon-Bard and Schachter

Theories of Emotion and the Capilano Bridge Experiment
Men ____________________________ of the bridge with sexual arousal
Men on high scary bridge more likely to incorporate
_____________________________ into their stories than men on lower bridge

Support for the other theories
Both Cannon-Bard and Schachter would predict the
_____________________________ results
Further Support for Schachter’s theory
Patients were told they would receive an injection of a vitamin (actually epinephrine, which increases arousal)
Observed either an actor that was happy after the injection, or was angry after injection
Based on what they observed, they ________________________________
_____________________________ equivalently

**Theories of Emotion and Catharsis**
Catharsis: expression reduces emotion: NOT TRUE
Expressing an emotion ________________________________
Maori haka moves used by the New Zealand All Blacks
Imitation as the basis of empathy
Consistent with ________________________________

**Brain Mechanisms of Emotion: The Limbic System**
Paul Broca: the “limbic lobe” contains ________________________________, medial
temporal lobe and cingulate gyrus
Modern inclusion of orbitofrontal cortex, ________________________________,
hypothalamus, septal area, amygdala

**The Amygdala and Emotion**
Klüver-Bucy syndrome (amygdala damage) reduces fear
Human damage to the ________________________________ produces difficulty
identifying fear and anger
Autistics have problems identifying the emotions of other people: have an abnormal
amygdala
The amygdala contains many ________________________________ receptors
   Tranquilizers
Stimulation can produce fear and anxiety
Imaging studies show more activity in the amygdala when viewing expressions of fear

**Hemisphere Lateralization for Emotion Influences Perception**
Which face looks happy?
Which face looks sad?
The ________________________________ usually “reads” emotion

**The Emotional Right Hemisphere Produces More Expression on the Left Side of the Face**

**Different Emotions Produce Patterns of Brain Activation**
Feeling excluded from a game produced activity in the ________________________________,
an area that responds to physical pain
Recreating feelings of anger, happiness, sadness and fear produced distinct patterns of
brain activation, but single areas could participate in more than one emotion

**Aggression**
Aggression is the intentional initiation of hostile or ________________________________
Aggression probably results from a complex combination of biological and learned variables.

**Genetics and Aggression**

Studies support a role for genetics in aggression. Aggression can be selectively modified in animals. However, murder rates vary widely across cultures so society must play a role. Athens, Greece has 0.55 murders per 100,000 people, compared to 41.12 in Pretoria, South Africa. Washington, D.C. has a rate of 45.79 murders per 100,000 people, compared to 8.77 in New York City.

**Brain Structure and Aggression**

Removal of cortices produces violence provoked for no reason (a pat on the head of a dog). Stimulation of the hypothalamus in cats provokes attack and hunting behaviors. Removal or lesions of the orbitofrontal cortex reduce aggression. Orbitofrontal cortex damage is associated with human violence.

**Biochemistry and Aggression**

Alcohol is related to 65% of murders, 55% of child abuse, and more than 50% of suicides. Testosterone: Children of mothers given testosterone during pregnancy are more aggressive, but not moderate, testosterone levels are correlated with aggression. Testosterone levels may rise in response to stress.

**Administration of Testosterone to Castrated Mice Re-establishes Attack Behavior**

**Serotonin and Aggression**

Serotonin is associated with both aggression and depression. Alpha male rhesus monkeys have much more aggression than subordinates, and subordinates initiate much more aggression. Depression and suicide may represent aggression towards the self.

**Stress**

Stress is defined as “an unpleasant and disruptive state resulting from the perception of danger or threat.” Sources of stress are sources of stress. Walter Cannon described the activation of a “fight or flight” system by stressors.
Hans Selye and the General Adaptation Syndrome

The Stress Response
Sensory systems ____________________________ a stimulus (there’s a lion in front of me)
Higher cognitive centers identify the stimulus as a ____________________________ (memories of lions and their eating habits)
Sensory information also travels to the amygdala, which identifies danger
The amygdala notifies the ____________________________ of danger, activating the hypothalamic-pituitary-adrenal (HPA) axis

The HPA Axis I
Sensory information reaches ____________________________
The amygdala sends information to the hypothalamus via the stria terminalis
The paraventricular hypothalamus releases CRH, which affects the ____________________________

HPA Axis II
The ____________________________ releases ACTH
In response to ACTH, the adrenal glands release ____________________________
Cortisol influences many neurons in the brain, increasing the release of several ____________________________
When the hippocampus senses cortisol, it acts to inhibit CRH release by the hypothalamus
With less CRH, less ACTH and cortisol will be released

Stress and the Immune System
Two types of ____________________________ in the immune system:
   B lymphocytes produced in ____________________________ produce antibodies
   T lymphocytes produced in the ____________________________ directly kill cancer cells and foreign substances
   T lymphocytes boost the activity of B lymphocytes
Stress hormones suppress both types of lymphocytes

Stress and Health
______________________________ is correlated with high levels of hostility
Stress may influence the ability of ____________________________
Attitudes about stress and a sense of control may influence health

Effects of Cortisol
Cortisol increases the amount of ____________________________ entering cells
______________________________ entering the cell increases the amount of neurotransmitter released
Too much calcium can be ____________________________
Neurons in the hippocampus are particularly likely to die
Good Stress Management
Maintain good health habits:
  Sleep
  Diet

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