Chapter 7 Physiological Approaches to Personality

Physiological Measures Commonly Used in Personality Research

- Electrodermal Activity (Skin Conductance)
- Cardiovascular activity
- Brain Activity
- Other measures: Biochemical analyses of blood and saliva

Electrodermal Activity (EDA): Skin Conductance

- Most obtained by electrodes or sensors placed on the skin surface
- Advantage: Noninvasive, no discomfort
- Disadvantage: Movement constrained



Cardiovascular activity

- Blood pressure—measure of, e.g., stress reactivity
- Heart rate—increases with anxiety, fear, arousal, cognitive effort

Cardiovascular activity

- Cardiac reactivity
 - greater than normal increase in blood pressure and heart rate when performing tasks
 - Cardiac reactivity (and Type A) associated with coronary heart disease

Brain Activity



- Brain spontaneously produces small amounts of electrical activity
- can be measured by electrodes on scalp

 electroencephalograph (EEG)
- Evoked potential technique

Brain Activity

- Brain imaging techniques—map structure and function of brain
 - Positron emission tomography (PET)
 - PET tracks blood flow by using labelled chemicals
 - Functional magnetic resonance imaging (fMRI)
 - fMRI monitors the oxygen content of the blood.



PET Scan



fMRI

Structure of the Neuron





At the Synapse



Post-Synaptic Cell

Neurotransmitters and Personality

- Dopamine—associated with pleasure
- Serotonin—associated with depression and other mood disorders
- Norepinepherine—associated with fight or flight response

Neurotransmitters and Personality

Cloninger's Tridimensional Personality Model

- Novelty seeking—low levels of dopamine
- -Harm avoidance-low levels of serotonin
- Reward dependence—low levels of norephinepherine

Morningness-Eveningness

- Being a "morning-type" or "evening-type" of person is a stable characteristic
- Due to differences in underlying biological rhythms

Morningness-Eveningness

- Many biological processes fluctuate around a 24-25 hour cycle—circadian rhythm; e.g., body temperature, endocrine secretion rates
- But wide individual differences are in the circadian rhythm, identified through temporal isolation studies

Morningness-Eveningness

- Individuals with shorter circadian rhythms hit peak body temperature and alertness earlier in day, get sleepy earlier, than individuals with longer rhythm
- Individuals with shorter rhythm tend to be morning persons; individuals with longer rhythms tend to be evening persons

Morningness-Eveningness

- Morningness-Eveningness Questionnaire
- Cross-cultural replication and documentation of stability of characteristic

Brain Asymmetry and Affective Style

- Left and right sides of the brain are specialized, with asymmetry in control of psychological functions
- Using EEG, can measure brain waves, such as alpha wave—an inverse indicator of brain activity

Brain Asymmetry and Affective Style

- Left frontal hemisphere is more active than the right when a person is experiencing pleasant emotions; right is more active than left with unpleasant emotions
- Patterns replicated in adults, children, and infants