Physiological Approaches to Personality

Chapter 7

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.
Structure of the Neuron

- **Cell Body (Soma)**
- **Dendrites**
- **Node of Ranvier**
- **Axon**
- **Presynaptic Terminal**
- **Myelin**
- **Nucleus**

**fMRI**
Structure of the Neuron

At the Synapse
Neurotransmitters and Personality

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

Cloninger’s Tridimensional Personality Model
- Novelty seeking—low levels of dopamine
- Harm avoidance—low levels of serotonin
- Reward dependence—low levels of norepinephrine
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