CHAPTER 5: BIOLOGICAL ASPECTS OF PERSONALITY

This chapter is unique in providing a comprehensive overview of biological influences on personality, but it is written in a way that is tied to other approaches and is easily understandable by students. For example, this chapter does not get into esoteric disputes from biology and genetics. Instead, it focuses on personality. It can easily be integrated into courses that have not previously included a chapter on this topic. With the unraveling of the human genome in the year 2000 and the development of the field of behavioral genomics, it is increasingly important for students to understand biological aspects of personality.

Evolutionary effects and genetic abnormalities are, of course, important, but many biological influences are not genetic! For example, environmental toxins, physical disease, and biologically based creations of environments and expectations are important biological influences on personality. This is too often ignored. This chapter challenges students to think for themselves about the role of biology and reevaluate common stereotypes. Importantly, this chapter concludes with warnings about the political dangers of a simple-minded approach to biology and personality.

Possible Lecture Outline

1. Direct Genetic Effects
   1. Through Charles Darwin’s proposed process of natural selection, certain adaptive or functional characteristics have been reinforced; evolutionary personality theory
      1. These characteristics include behavioral tendencies and emotions: “personality.”
   2. Example of Angelman syndrome as a personality directly caused by genetic abnormality
   3. Behavioral genomics is an area of study that examines relations between genes, the environment, and behaviors.
2. Genetic Effects through Temperament
   1. Major dimensions include activity, emotionality, sociability, and aggression/impulsivity.
   2. Eysenck’s theory links the introversion-extroversion dimension to the underlying nervous system.
      1. Posits that introverts have a higher level of internal arousal and thus seek out less external stimulation (and vice versa)
   3. Jeffrey Gray and his colleagues, in the reinforcement sensitivity theory, suggest that two biological systems, the behavioral inhibition system and the behavioral activation system, influence our preferences for different types of stimulation.
      1. The behavioral inhibition system guides our tendency to avoid potentially punishing situations, while our behavioral activation system regulates our response to rewards.
   4. Zuckerman’s theory posits that those high on “sensation seeking” are driven by a low level of internal arousal; sensation seekers are drawn to novel and exciting experiences.
      1. Sensation seekers may have a low level of natural (internal biological) activation and so seek arousal from the environment.
      2. It is likely some people have natural (genetic) defects or disease-caused weaknesses in their dopamine systems; such people may even be susceptible to drug abuse.
      3. The neurotransmitter serotonin also seems related to impulsivity.
   5. Hemispheres and personality
      1. Individuals vary in the activity level of left versus right brain hemispheres.
      2. Right hemisphere activity is associated with reactions of fear and distress.
      3. Emotional reactions may be measured from hemispheric activity.
   6. Studies of twins reared in different environments have demonstrated impressive similarities between those with the same genetic makeup.
      1. It is still unclear how much of the similarity is genetically preprogrammed and how much is due to similarities in their separate environments, etc.
      2. Twins and siblings do not necessarily experience the same rearing environments.
         1. Nonshared environmental variance comprises those features of the environment that children raised in the same home experience differently.
      3. Epigenetics: the expression of genes (activation or inactivation of important parts of one’s genome); a more recent approach to understanding the interaction of nature and nurture
      4. Twin studies have helped to show that schizophrenia is genetically linked, but it’s clear it’s not simply a genetic disease.
         1. Structural abnormalities have been found in the brains of schizophrenics.
         2. Concordance between identical twins is far from perfect.
      5. Twin studies have also shown that sexual orientation is linked to genetics.
         1. Again, genes do not tell the whole story.
         2. How might homosexuality be addressed from an evolutionary point of view—perhaps through “kin selection” or some other yet-to-be-discovered process?
         3. Other factors may be at play in such developmental issues, including early life experiences and hormone levels.
3. Effects through Environmental Toxins and Physical Illness
   1. Toxins/drugs
      1. “Mad as a hatter”: derived from brain damage hat makers suffered when exposed to mercury in hat-making factories
      2. Lead poisoning and cognitive/behavioral deficits in children
      3. Manganese miners and fighting behavior
   2. Disease
      1. Van Gogh and the possibility of Meniere’s disease
      2. Personality changes as a result of Alzheimer’s disease
      3. Personality changes following stroke
      4. Pick’s disease is an example of dramatic change in a patient’s sense of self long before total incapacity.
      5. Biological determinism: the belief that personality is completely determined by biological (especially genetic) factors
   3. Effects from Legal and Illegal Drugs
      1. Sometimes these effects are not accidental: tranquilizers (Valium), antidepressants (Prozac), sleeping pills (Halcion) all impact personality
      2. Recreational/illegal drugs are also an issue; cocaine’s impact on dopamine activity
      3. Psychopharamacology: the role of drugs and toxic substances in causing and treating psychiatric disturbances
4. Effects from Creation of Environments
   1. The process is cyclical, with certain temperamental characteristics predisposing us to certain experiences, which, in turn, mold our personalities.
      1. Tropisms are the processes by which some individuals grow toward more fulfilling and health-promoting environments while other individuals remain subject to darker, health-threatening environments.
   2. Physical characteristics may also influence the types of experiences we choose; this may be related to underlying physiological characteristics.
      1. Sheldon’s somatotypes (endomorphs, ectomorphs, and mesomorphs) provide an example of this type of thinking on a simple level.
   3. Physical characteristics (fat/thin; short/tall; beautiful/disfigured) influence the way others treat us and thereby mold our views of the world—our “personalities.”
5. Effects from Reactions of Others
   1. Physical attractiveness stereotype: “what is beautiful is good”
   2. Influences our assessments of both adults and children
6. Sociobiology and Evolutionary Personality
   1. The scientific study of the influence of evolutionary biology on an organism’s responses regarding social matters involves the field called sociobiology.
      1. Most commonly, sociobiological-type analyses are applied to human aggression, courtship, and family relations.
      2. Attachment, the bond between a child and caretaker, represents an example of a biologically based social behavior.
      3. The “Cinderella Effect” refers to evidence suggesting that, for evolutionary reasons, parents give preference to biological children over stepchildren.
7. Misuse of Knowledge Regarding Genetics
   1. Social Darwinism and the right to dominate/kill others
   2. American immigration laws to limit “undesirables” who were “inferior” and “unfit”
   3. Eugenics and forced sterilization of various groups
   4. Nazi dream of a “master (or superior) race” and genocide
   5. The Human Genome Project: what are the implications?

Classroom Activities, Discussion Topics, and Projects

* + - 1. Periodically, various newsmagazine shows do stories on various types of discrimination. For instance, hidden cameras are used to show how blacks are treated differently than whites when shopping in department stores or trying to rent apartments, or to demonstrate how difficult it is for an overweight or unattractive person to get a job or a date when compared with a thinner, more attractive counterpart. Discuss how biological factors such as skin color, weight, and looks might affect personality through these environmental influences. How does this relate to environmental influences initiated by temperament?
      2. Plastic surgery is becoming more and more common. We are well aware of the outward, physical effects of such surgery, but what are some of the more subtle implications? Might people who have dramatic surgery eventually develop different “personalities”? What are the potentially positive outcomes? Are there any negative implications?
      3. Compare and contrast Sheldon and Eysenck’s approaches to integrating biology and personality. What are the benefits of a more complex model? What are some of the factors that no model has yet been able to take into account?
      4. Administer Zuckerman’s Sensation Seeking Scale (Zuckerman, M., Eysenck, S., & Eysenck, H.J. [1978]. Sensation seeking in England and America: Cross-cultural, age, and sex comparisons. *Journal of Consulting and Clinical Psychology*, 46, 139–149). Discuss the overall score, as well as the subscale scores which may be derived. Identify the lowest and highest scorers in the class and interview them about their hobbies, likes, and dislikes (you may wish to have them leave the room and then call them in one at a time to be interviewed in front of the class). Have the rest of the class take notes on observed differences. Discuss implications for internal levels of arousal.
      5. Multiple births are now common. If there are any twins or friends of twins in the class (identical or fraternal), use this to begin a discussion of biological influences on personality.
      6. Ask students to list qualities they share with a first-degree relative (parent or sibling). Then, ask students to think of qualities that they do not share with this same relative. Do students detect more similarities or differences? Use this demonstration to help students understand that while research suggests that personality is partially genetically determined, social influences are also important.
      7. Ask the class to summarize the story of Cinderella. Be sure that they discuss the relationships between Cinderella, her stepmother, and her stepsisters. Use this discussion as a way to initiate a conversation about the Cinderella Effect. Be sure this discussion is sensitive to the reality that many students will be in stepparent or stepsibling relationships.

1. Show students pictures of different anonymous people (e.g., from magazines). Be sure the pictures you show represent individuals of varying degrees of attractiveness. Ask the class to speculate about the kinds of personality traits that the people in the pictures possess. Does the class demonstrate a “what is beautiful is good” bias? Use this demonstration to discuss physical attractiveness stereotypes and the idea that personality is shaped by reactions from others.
2. Have the class form two teams and debate the extent to which our increasing knowledge of the human genome should be allowed to influence individuals’ personalities. Are “designer personalities” legal and ethical? Have one team propose the potential benefits of using our understanding of the human genome to alter personalities while the other team opposes this view.
3. Starting from the points covered in the “Sharpen Your Thinking” box in this chapter, have the students discuss what the prevalence of postpartum depression tells us about the biological basis of mental health and mental illness. Ask the students to consider whether postpartum depression should be thought of as different from other depressive illnesses, and if so, in what way?

Recommended Outside Readings

Buss, A. H. & Plomin, R. (1984). *Temperament: Early developing personality traits*. Hillsdale, NJ: Erlbaum.

Buss, D. M. (1991). Evolutionary personality psychology. *Annual Review of Psychology*, *42*, 459–492.

Buss, D. M. (1999). *Evolutionary psychology: The new science of the mind*. Boston: Allyn & Bacon.

Buss, D. M. (2008). Human Nature and Individual Differences: Evolution of Human Personality. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of personality: Theory and research* (3rd ed.). New York: Guilford Press.

Daly, M., & Wilson, M. (1998). *The truth about Cinderella: A Darwinian view of parental love*. New Haven, CT: Yale University Press.

Dunn, J., & Plomin, R. (1990). *Separate lives: Why siblings are so different*. New York: Basic Books.

Eibl-Eibesfeldt, I. (1972). Similarities and differences between cultures in expressive movements. In R. Hinde (Ed.), *Non-verbal communication*. Cambridge, MA: Cambridge University Press.

Ekman, P. (1973). Cross-cultural studies of facial expression. In P. Ekman (Ed.), *Darwin and facial expression*. New York: Academic Press.

Eysenck, H.J. (1967). *The biological basis of personality*. Springfield, IL: Charles C. Thomas.

Krueger, R. F., & Johnson, W. Behavioral Genetics and Personality: A New Look at the Integration of Nature and Nurture. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of personality: Theory and research* (3rd ed.). New York: Guilford Press.

Kagan, J., & Snidman, N. (2004). *The long shadow of temperament*. Cambridge, MA: Belknap Press.

Zuckerman, M. (1994). *Behavioral expressions and biosocial bases of sensation seeking*. New York: Cambridge University Press.

Zuckerman, M. (1979). *Sensation seeking: Beyond the optimal level of arousal*. Hillsdale, NJ: Erlbaum.

Films / Videos

*Awakenings*. (1990). 120 minutes. RCA/Columbia Pictures. Story of Dr. Malcolm Sayer, a physician and researcher who finds a drug that will awaken the bodies and personalities of catatonic patients with a rare disease.

*Face Value*. (1990). 38 minutes. Available through Filmaker’s Library: <https://www.academicvideostore.com/video/face-value>. Libraries holding this title can be found at <http://www.worldcat.org/oclc/23685934>. Looks at Ekman’s work on facial expression in New Guinea, as well as Melzoff’s work on two-week-old babies recognizing and imitating facial expressions.

*The Human Animal: Nature and Nurture.* (1986). 52 minutes. Libraries holding this title can be found at <http://www.worldcat.org/oclc/18032285>. Looks at nature versus nurture explanations for behavior. Uses twin studies and neurochemical correlates of particular behaviors to make the case that biology is important. Talks about how biological predispositions are influenced by the environment. Hosted by Phil Donahue.

*Predicting Personality: To what extent is our personality dictated by our genetic makeup?* 30 minutes. Available online as a free download at the Vega Science Trust organization website, <http://vega.org.uk/video/programme/11>. A panel discussion with respected experts about research on the genetic basis of personality, using MRI imaging and genetic analysis.

*What Makes Us Tick?* (1989). 24 minutes. Libraries holding this title can be found at <http://www.worldcat.org/oclc/20300134>. Looks at genetic and environmental influences of personality (makes a stronger case for genetics).