Heredity and Environment

**Reader's Guide**

- **Main Idea**
  Heredity is the transmission of characteristics from parents to children. Environment is the world around you. Heredity and environment affect your body and behavior.

- **Vocabulary**
  - heredity
  - identical twins
  - genes
  - fraternal twins

- **Objectives**
  - Give examples of the effects of heredity and environment on behavior.
  - Summarize research on the effects of heredity and environment on behavior.

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**Exploring Psychology**

**Nature or Nurture?**

Two monozygotic [derived from the same egg] twin girls were separated at birth and placed in homes far apart. About four years later, researchers interviewed the adoptive parents of each girl. The parents of Shauna said, “She is a terrible eater—won’t cooperate, stubborn, strong-willed. I can’t get her to eat anything unless I put cinnamon on it.” The parents of Ellen said, “Ellen is a lovely child—cooperative and outgoing.” The researcher probed, asking, “How are her eating habits?” The response was: “Fantastic—she eats anything I put before her, as long as I put cinnamon on it!”

—from *Nature’s Thumbprint: The New Genetics of Personality* by P.B. Neubauer and A. Neubauer, 1990

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**HEREDITY AND ENVIRONMENT**

How much do genetic factors contribute to our behavior? How much do environmental factors? These questions have haunted psychologists for years. Some psychologists believe that genetics is like a flower, and the environment is like rain, soil, or fertilizer. Genes establish what you could be, and the environment defines the final product.

**heredity:** the genetic transmission of characteristics from parents to their offspring

People often argue about whether human behavior is instinctive (due to heredity) or learned (due to environment). **Heredity** is the genetic transmission of characteristics from parents to their offspring. Do people learn to be good athletes, or are they born that way? Do people learn to
do well in school, or are they born good at it? The reason for the intensity of the argument may be that many people assume that something learned can probably be changed, whereas something inborn will be difficult or impossible to change. The issue is not that simple, however. Inherited factors and environmental conditions always act together in complicated ways. Asking whether heredity or environment is responsible for something turns out to be like asking, “What makes a cake rise, baking powder or heat?” Obviously, an interaction of the two is responsible.

A Question of Nature vs. Nurture

The argument over the nature-nurture question has been going on for centuries. Nature refers to the characteristics that a person inherits—his or her biological makeup. Nurture refers to environmental factors, such as family, culture, education, and individual experiences. Sir Francis Galton became one of the first to preach the importance of nature in the modern era. In 1869 he published Hereditary Genius, a book in which he analyzed the families of over 1,000 eminent politicians, religious leaders, artists, and scholars. He found that success ran in families and concluded that heredity was the cause.

Many psychologists, however, have emphasized the importance of the environment. The tone was set by John Watson, the founder of behaviorism, who wrote in 1930: “Give me a dozen healthy infants, well-formed, and my own specified world to bring them up in and I'll guarantee to take any one at random and train him to become any type of specialist I might select—a doctor, lawyer, artist, merchant-chief, and, yes, even beggarman and thief, regardless of his talents, penchants, tendencies, abilities, vocations, and race of his ancestors” (Watson, 1930).

Genes and Behavior  Genes are the basic units of heredity. They are reproduced and passed along from parent to child. All the effects that genes have on behavior occur through their role in building and modifying the physical structures of the body. Those structures must interact with their environment to produce behavior. For example, if your parents are musicians, you may have inherited a gene that influences your musical ability by contributing to brain development that analyzes sounds well.

Twin Studies

One way to find out whether a trait is inherited is to study twins. Identical twins develop from a single fertilized egg (thus, they are called monozygotic) and share the same genes. Genes are the basic building blocks of heredity (see Figure 6.13).
Fraternal twins develop from two fertilized eggs (thus, dizygotic), and their genes are not more similar than those of brothers or sisters.

Twins growing up in the same house share the same general environment, but identical twins also share the same genes. So, if identical twins who grow up together prove to be more alike on a specific trait than fraternal twins do, it probably means that genes are important for that trait.

Psychologists at the University of Minnesota have been studying identical twins who were separated at birth and reared in different environments (Holden, 1980). One of the researchers, Thomas Bouchard, reports that despite very different social, cultural, and economic backgrounds, the twins shared many common behaviors. For example, in one set of twins (both named Jim), both had done well in math and poorly in spelling while in school, both worked as deputy sheriffs, vacationed in Florida, gave identical names to their children and pets, bit their fingernails, had identical smoking and drinking patterns, and liked mechanical drawing and carpentry. These similarities and others suggest that heredity may contribute to behaviors that we normally associate with experience.

Many researchers now believe that many of the differences among people can be explained by considering heredity as well as experience. Contrary to popular belief, the influence of genes on behavior does not mean that nothing can be done to change the behavior. Although it is true that it is difficult and may be undesirable to change the genetic code that may direct behavior, it is possible to alter the environment in which the genes operate.

**SECTION 4**

**Assessment**

1. **Review the Vocabulary**  Explain the difference between fraternal twins and identical twins.

2. **Visualize the Main Idea**  In a diagram like the one below, explain how proponents of each view argue the nature-nurture debate.

   Nature
   - Supporters argue that
   - Supporters argue that

   vs.

   Nurture

3. **Recall Information**  What role do the genes play in influencing someone’s behavior?

4. **Think Critically**  Sue and Tracy are identical twins. Sue is good at drawing. Tracy is a starter on the basketball team. Explain what may cause differences in these twins.

5. **Application Activity**  Describe a characteristic that you have. Explain whether you think this characteristic is hereditary or environmental.