

Development Is Plastic

Both brain and behavior are far more plastic than once was thought. The term *plasticity* denotes two complementary aspects of development: Human traits can be molded (as plastic can be), and yet people maintain a certain durability (as plastic does). This provides both hope and realism—hope because change is possible and realism because development builds on what has come before.

Plasticity is basic to our contemporary understanding of human development because it simultaneously incorporates two facts: People can change over time, and new behavior depends partly on what has already happened.

This is evident in the **dynamic-systems approach**, a framework many contemporary developmentalists use. The idea behind this approach is that human development is an ongoing, ever-changing interaction between the individual and all the systems, domains, and cultures.

Note the word *dynamic*: Physical contexts, emotional influences, the passage of time, each person, and every aspect of the ecosystem are always interacting, always in flux, always in motion. For instance, a useful strategy for developing motor skills in children with autism spectrum disorder (described in Chapter 7) is to think of the dynamic systems that undergird movement—the changing physical and social contexts (Lee & Porretta, 2013). Systematically considering contexts helps such children—not to make the autism disappear (past conditions are always-influential) but to improve the child's ability to function.

The most surprising example of plasticity in recent years involves the brain. Expansion of neurological structures, networks of communication between one cell and another, and even creation of neurons (brain cells) occurs in adulthood. This neurological plasticity is evident in hundreds of studies mentioned later in this text (see Figure 1.9).

Plasticity is especially useful when anticipating growth of a particular person: Everyone is constrained by past circumstances, but no one is confined by them. Consider David.



Dynamic Interaction A dynamic-systems approach highlights the ever-changing impact that each part of a system has on all the other parts. This classroom scene reflects the eagerness for education felt by many immigrants, the reticence of some boys in an academic context, and a global perspective (as demonstrated by the world map). These facets emerge from various systems—family, gender, and culture—and they have interacted to produce this moment.

OBSERVATION QUIZ

What country is this? (see answer, page 23) A

dynamic-systems approach

A view of human development as an ongoing, ever-changing interaction between the physical, cognitive, and psychosocial influences.

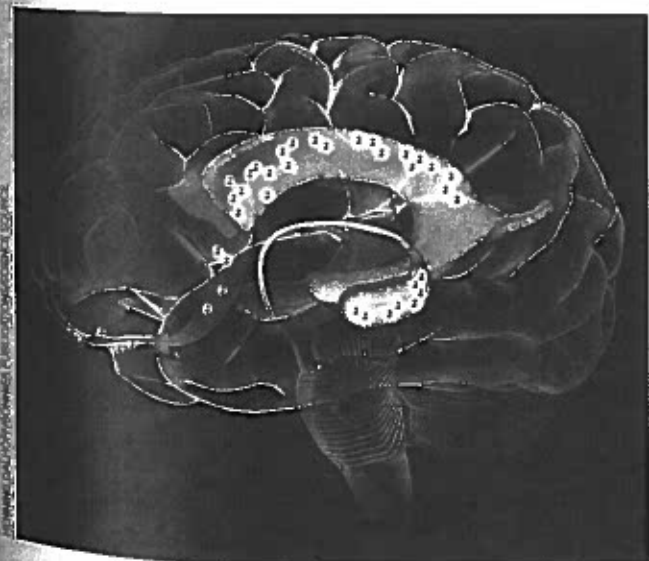


FIGURE 1.9 Birth of a Neuron A decade ago neuroscientists thought that adult brains lost neurons, with age or alcohol, but never gained them. Now we know that precursors of neurons arise in the lateral ventricles (bright blue, center) to become functioning neurons in the olfactory bulb (for smell, far left) and the hippocampus (for memory, the brown structure just above the brain stem). Adult neurogenesis is much less prolific than earlier in life, but the fact that it occurs at all is astounding.

A CASE TO STUDY*

My Nephew David

My sister-in-law contracted rubella (also called German measles) early in her third pregnancy, a fact not recognized until David was born, blind and dying. Heart surgery two days after birth saved his life, but surgery at 6 months to remove a cataract destroyed that eye. Malformations of his thumbs, ankles, teeth, feet, spine, and brain became evident. David did not walk or talk or even chew for years. Some people wondered why his parents did not place him in an institution.

Yet dire early predictions—from me as well as many others—have proven false. David is a productive adult, and happy, sometimes surprisingly so. His father died in 2014. In the days after the death, most of us were sad and grieving, but not David. “Dad is in a better place. I miss him, but he is happy,” he told me.

He attended regular public school, then the Kentucky School for the Blind, and then the University of Kentucky, earning a college degree. He then studied at an international school in Germany for translators. He relates well to his two older brothers (see photo) and especially to his two sisters-in-law, who call him every week to discuss family and politics.

Remember, plasticity cannot erase a person’s genes, childhood, or permanent damage. David’s disabilities are always with him (at age 46 he still lives with his mother). But his childhood experiences gave him lifelong strengths. His family loved and nurtured him, sending him to four preschools and then public kindergarten at age 6. By age 10, David had skipped a year of school and was a fifth-grader, reading large print at the eleventh-grade level. He learned to speak a sec-

ond and a third language. In college, after one failing semester (requiring family assistance again), he earned several As.

David works as a translator, which he enjoys because “I like providing a service to scholars, giving them access to something they would otherwise not have.” As his aunt, I have seen him repeatedly defy predictions, evidence of plasticity. All four of the characteristics of the life-span perspective are evident in David’s life, as summarized in Table 1.3.



My Brother’s Children Michael, Bill, and David (left to right) are adults now, with quite different personalities, abilities, and offspring (4, 2, and none), and contexts (in Massachusetts, Pennsylvania, and California). Yet despite genes, prenatal life, and contexts, I see the shared influence of Glen and Dot, my brother and sister-in-law—evident here in their similar, friendly smiles.

Four Characteristics of Development

Characteristic

Multi-directional. Change occurs in every direction, not always in a straight line. Gains and losses, predictable growth, and unexpected transformations are evident.

Multi-contextual. Human lives are embedded in many contexts, including historical conditions, economic constraints, and family patterns.

Multi-cultural. Many cultures—not just between nations but also within them—affect how people develop.

Plasticity. Every individual, and every trait within each individual, can be altered at any point in the life span. Change is ongoing, although neither random nor easy.

Application in David’s Story

David’s development seemed static (or even regressive, as when early surgery destroyed one eye) but then accelerated each time he entered a new school or college.

The high SES of David’s family made it possible for him to receive good medical and educational care. His two older brothers protected him.

Appalachia, where David and his family lived, has a particular culture, including acceptance of people with disabilities and willingness to help families in need. Those aspects of that culture benefited David and his family.

David’s measured IQ changed from about 40 (severely mentally retarded) to about 130 (far above average), and his physical disabilities became less crippling as he matured. Nonetheless, because of a virus contracted before he was born, his entire life will never be what it might have been.

*Every chapter of this text has A Case to Study. No single case can prove or disprove a hypothesis, but often one example illustrates a general finding or an important concept.

Plasticity emphasizes that people can and do change, that predictions are not always accurate. Three insights already explained have improved predictions: (1) Nature and nurture always interact. (2) Certain ages are sensitive periods for particular kinds of development. (3) Genes predispose people to respond to certain circumstances, in differential susceptibility.

This was apparent for David: His inherited characteristics (from his smart parents) affected his ability to learn, his four preschools in early childhood (a sensitive period for language) helped him lifelong, and his inborn temperament (he is still devastated by criticism but overjoyed by praise) helped him flourish because he was easily influenced by his parents' devoted guidance. If I had known more about human development when he was born with multiple disabilities, I would have predicted a brighter—and more accurate—future for him.

WHAT HAVE YOU LEARNED?

1. How can both continuity and discontinuity be true for human development?
2. What are some of the contexts of your life?
3. How does the exosystem affect children's schooling?
4. What are some cohort differences between your generation and the one of your parents?
5. What factors comprise a person's SES (socioeconomic status)?
6. Can you think of an example (not one in the book) of a social construction?
7. What is the difference between race and ethnicity?
8. How does a culture pass on values to the next generation, according to Vygotsky?
9. In what two contrasting ways is human development plastic?
10. What is implied when human development is described as dynamic?

Theories of Human Development

As you read earlier in this chapter, the scientific method begins with observations, questions, and theories (Step 1). That leads to specific hypotheses that can be tested (Step 2). A *theory* is a comprehensive and organized explanation of many phenomena; a *hypothesis* is more limited and may be proven false. Theories are generalities; hypotheses are specific.

Theories sharpen perceptions and organize the thousands of behaviors we observe every day. Each **developmental theory** is a systematic statement of principles and generalizations, providing a framework for understanding how and why people change over the life span.

Imagine building a house from a heap of lumber, nails, and other materials. Without a plan and workers, the heap cannot become a home. Likewise, observations of human development are raw materials, but theories put them together. Kurt Lewin (1943) once quipped, "Nothing is as practical as a good theory."

Dozens of such theories appear throughout this text. The five theories about to be explained are chosen because each provides a comprehensive, influential, and somewhat distinctive view of human development. Many social scientists are strongly influenced by other theories, as you will see.

Psychoanalytic Theory

Inner drives and motives are the foundation of **psychoanalytic theory**. These basic underlying forces are thought to influence every aspect of thinking and behavior, from the smallest details of daily life to the crucial choices of a lifetime.

ANSWER TO OBSERVATION QUIZ (from page 21) The three Somali girls wearing headscarves may have thrown you off, but these first-graders attend school in Minneapolis, Minnesota, in the United States. Clues include the children's diversity (this school has students from 17 nations), clothing (obviously Western), and—for the sharp-eyed—the flag near the door. ●

developmental theory

A group of ideas, assumptions, and generalizations that interpret and illuminate thousands of observations about human growth. A developmental theory provides a framework for explaining the patterns and problems of development.

psychoanalytic theory

A theory of human development that holds that irrational, unconscious drives and motives, often originating in childhood, underlie human behavior.