GLOBAL EDITION

Children and Their Development

SEVENTH EDITION

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ALWAYS LEARNING

PEARSON

Children and Their Development

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Chapter 6

Theories of Cognitive Development

Modules

On the TV show *Family Guy*, Stewie is a 1-year-old who can't stand his mother (Stewie: "Hey, mother, I come bearing a gift. I'll give you a hint: It's in my diaper and it's not a toaster.") and hopes to dominate the world. Much of the humor turns on the idea that babies are capable of sophisticated thinking—they just can't express it. Of course, few adults would really attribute such advanced thinking skills to a baby. But what thoughts *do* lurk in the mind of an infant who does not yet speak? And how do an infant's fledgling thoughts blossom into the powerful reasoning skills that older children, adolescents, and adults use daily? In other words, how does thinking change as children develop; and why do these changes take place?

For many years, the best answers to these questions came from the theory proposed by Jean Piaget that was mentioned in Module 1.2. We'll look at this theory in more detail in **Module 6.1**. In **Module 6.2**, we'll examine some of the modern theories that guide today's research on children's thinking. Finally, in **Module 6.3**, we'll see how children acquire knowledge of objects, living things, and people.

Setting the Stage: Piaget's Theory

LEARNING OBJECTIVES

LO1 What are the key ideas in Piaget's theory of cognitive development?

LO2 How does thinking change as children move through Piaget's four stages of development?

LO3 What are the lasting contributions of Piaget's theory? What are some of its shortcomings?

OUTLINE

When 2½-year-old Ethan saw a monarch butterfly for the first time, his mother, Kat, told him, "Butterfly, butterfly; that's a butterfly, Ethan." A few minutes later, a zebra swallowtail landed on a nearby bush and Ethan shouted in excitement, "Butterfly, Mama, butterfly!" A bit later, a moth flew out of another bush; with even greater excitement in his voice, Ethan shouted, "Butterfly, Mama, more butterfly!" Even as Kat was telling Ethan, "No, honey, that's a moth, not a butterfly," she marveled at how rapidly Ethan seemed to grasp new concepts with so little direction from her. How was this possible?

For much of the 20th century, scientists would have answered Kat's question by referring to Jean Piaget's theory. Piaget was trained as a biologist, but he developed a keen interest in epistemology, the branch of philosophy dealing with the nature and origins of knowledge. He decided to investigate the origins of knowledge not as philosophers had—through discussion and debate—but by doing experiments with children.

Because Piaget's theory led the way to all modern theories of cognitive development, it's a good introduction to the study of children's thinking. We'll first consider some basic principles of the theory, where we will discover why

Ethan understands as quickly as he does. Then we'll look at Piaget's stages of development and end the module by examining the enduring contributions of Piaget's work to child-development science.

Basic Principles of Piaget's Theory

LO1 What are the key ideas in Piaget's theory of cognitive development?

Piaget believed that children are naturally curious. They want to make sense out of their experience and, in the process, construct their understanding of the world. For Piaget, children at all ages are like scientists in that they create theories about how the world works. Of course, children's theories are often incomplete, and sometimes incorrect. Nevertheless, theories are valuable to the child because they make the world seem more predictable.

In using their theories to make sense of what's going on around them, children often have new experiences that are readily understood within the context of these theories. **According to Piaget, *assimilation* occurs when new experiences are readily incorporated into a child's existing theories.** Imagine an infant like the one in the photo who knows that the family dog barks and often licks her in the face. When she has the same experience at a relative's house, this makes sense because it fits her simple theory of dogs. Thus, understanding the novel dog's behavior represents assimilation. But sometimes theories are incomplete or incorrect, causing children to have unexpected experiences. **For Piaget, *accommodation* occurs when a child's theories are modified based on experience.** The baby with a theory of dogs is surprised the first time she encounters a cat—it resembles a dog but meows instead of barks and rubs up against her instead of licking. Revising her theory to include this new kind of animal illustrates accommodation.

Assimilation and accommodation are illustrated in the vignette at the beginning of the module. When Kat named the monarch butterfly for Ethan, he formed a simple theory, something like "butterflies are bugs with big wings." The second butterfly differed in color but was still a bug with big wings, so it was readily assimilated into Ethan's new theory of butterflies. However, when Ethan referred to the moth as a butterfly, Kat corrected him. Ethan had to accommodate to this new experience. The result was that he changed his theory of butterflies to make it more precise; the new theory might be something like "butterflies are bugs with thin bodies and big, colorful wings." He also created a new theory, something like "a moth is a bug with a bigger body and plain wings."

This infant's "theory of dogs" includes the facts that dogs are friendly and like licking people's faces.

In this example, assimilation and accommodation involve ideas, but they begin much earlier, in a young baby's actions. For example, a baby who can grasp a ball soon discovers that she can grasp blocks, rattles, and other small objects; extending grasping to new objects illustrates assimilation. When she discovers that some objects can't be grasped unless she uses two hands, this illustrates accommodation: Her revised "theory of grasping" now distinguishes objects that can be grasped with one hand from those that require two hands.

Assimilation and accommodation are usually in balance, or equilibrium. That is, children find

they can readily assimilate most experiences into their existing theories, but occasionally they need to accommodate their theories to adjust to new experiences. This balance between assimilation and accommodation is illustrated both by the baby's theories of dogs and cats as well as by Ethan's understanding of butterflies.

However, periodically the balance is upset, causing a state of disequilibrium. Children discover that their current theories are not adequate because they are spending much more time accommodating than assimilating. **When disequilibrium occurs, children reorganize their theories to return to a state of equilibrium, a process that Piaget called *equilibration*.** To restore the balance, current but now-outmoded ways of thinking are replaced by a qualitatively different, more advanced theory.

Returning to the metaphor of the child as a scientist, sometimes scientists find that a theory contains critical flaws. When this occurs, they can't simply revise; they must create a new theory that draws on the older theory but is fundamentally different. For example, when the astronomer Copernicus realized that the Earth-centered theory of the solar system was wrong, he retained the concept of a central object but proposed that it was the Sun, a fundamental change in the theory. In much the same way, children periodically reach a point when their current theories seem to be wrong much of the time, so they abandon these theories in favor of more advanced ways of thinking about their physical and social worlds.

According to Piaget, these revolutionary changes in thought occur three times, at approximately 2, 7, and 11 years of age. This divides cognitive development into four stages: the *sensorimotor stage* (birth to age 2, encompassing infancy); the *preoperational stage* (ages 2 to 6, encompassing preschool and early elementary school); the *concrete operational stage* (ages 7 to 11, encompassing middle and late elementary school); and the *formal operational stage* (ages 11 and up, encompassing adolescence and adulthood).

Piaget held that all children go through these four stages in exactly this sequence. For example, sensorimotor thinking should always lead to preoperational thinking; a child cannot "skip" preoperational thinking and move directly from sensorimotor to concrete operational thought. However, the ages listed are only approximate: Some youngsters move through the stages more rapidly than others, depending on their ability and their experience. In the next section, we'll look more closely at each stage.

Stages of Cognitive Development

LO2 How does thinking change as children move through Piaget's four stages of development?

Just as you can recognize a McDonald's restaurant by the golden arches and Nike products by the swoosh, each of Piaget's stages is marked by a distinctive way of thinking about and understanding the world. In the next few pages, we'll learn about these unique trademarks of Piaget's stages.

The Sensorimotor Stage We know from Chapter 5 that infants' perceptual and motor skills improve quickly. Piaget proposed that these rapidly changing perceptual and motor skills in the first two years of life form a distinct phase in human development: **The *sensorimotor stage* spans birth to 2 years, a period during which the infant progresses from simple reflex actions to symbolic processing.** In the 24 months of this stage, infants' thinking progresses remarkably along three important fronts.

Between 4 and 8 months, infants eagerly explore new objects.

Adapting to and Exploring the Environment Newborns respond reflexively to many stimuli, but between 1 and 4 months, reflexes are first modified by experience. An infant may accidentally touch his lips with his thumb, which leads to sucking and the pleasing sensations associated with sucking. Later, the infant tries to recreate these sensations by guiding his thumb to his mouth. Sucking no longer occurs only reflexively when a mother places a nipple at the infant's mouth; instead, the infant can initiate sucking by himself.

Between 4 and 8 months, the infant shows greater interest in the world, paying far more attention to objects. For example, the infant shown in the photo accidentally shook a new rattle. Hearing the interesting noise, the infant grasped the rattle again, tried to shake it, and expressed great pleasure at the sound that resulted. This sequence was repeated several times.

At about 8 months of age, infants reach a watershed: the onset of deliberate, intentional behavior. For the first time, the "means" and "end" of activities are distinct. For example, if a father places his hand in front of a toy, an infant will move his hand to be able to play with the toy. "Moving the hand" is the means to achieve the goal of "grasping the toy." Using one action as a means to achieve another end is the first indication of purposeful, goal-directed behavior during infancy.

Beginning at about 12 months, infants become active experimenters. An infant may deliberately shake different objects trying to discover which ones produce sounds. Or an infant may decide to drop different objects to see what happens. An infant will discover that stuffed animals land quietly but bigger toys often make a more satisfying "clunk" when they hit the ground. These actions represent a significant extension of intentional behavior: Now babies repeat actions with different objects solely for the purpose of seeing what will happen.

Understanding Objects The world is filled with animate objects such as dogs, spiders, and college students, as well as inanimate objects such as cheeseburgers, socks, and this book. But they all share a fundamental property: They exist independently of our actions and thoughts concerning them. Much as we may dislike spiders, they still exist when we close our eyes or wish they would go away. **Understanding that objects exist independently is called *object permanence*.** Piaget made the astonishing claim that infants lack this understanding for much of the first year. That is, he proposed that an infant's understanding of objects could be summarized as "out of sight, out of mind." For infants, objects are fleeting, existing when in sight and no longer existing when out of sight.

If a tempting object such as an attractive toy is placed in front of a 4- to 8-month-old, the infant will probably reach for and grasp the object. However if the object is then hidden by a barrier or covered with a cloth, the infant will neither reach nor search. Instead, the infant seems to lose all interest in the object, as if the now-hidden object no longer exists. Paraphrasing the familiar phrase, "out of sight, out of existence!"

At about 8 months, infants search for an object that an experimenter has covered with a cloth. In fact, many 8- to 12-month-olds love to play this game—an adult covers the object and the infant sweeps away the cover, laughing and smiling all the while! But, despite this accomplishment, Piaget believed that infants'