

PIAGET'S SENSORIMOTOR STAGE

Chapter 11 in *Human Learning* briefly describes Jean Piaget's **sensorimotor stage**, the first stage in his theory of cognitive development. In Piaget's view, this stage begins at birth and continues until about age 2. After extensive observations of infants and toddlers, especially his own three children, Piaget described the sensorimotor stage as a series of six substages:

Substage 1: Reflexes (Birth to 1 Month)

In the first month of life, infants' behaviors reflect innate **reflexes**—automatic responses to particular stimuli. For instance, if you put a nipple or pacifier in or near a newborn's mouth, she will automatically suck on it. If you put something against the palm of a newborn's hand, his fingers will automatically close around it. Many of these inborn reflexes are designed to keep the infant alive. The infant soon begins to modify some reflexes to better accommodate to the environment—for instance, by learning to distinguish between a nipple and the surrounding areas of a breast or bottle. And other reflexes, such as the tendency to grab onto something placed in the hand, fade away over time.

Substage 2: Primary Circular Reactions (1–4 Months)

In the first few months of life, infants' behaviors are focused almost exclusively on their own bodies (in Piaget's terminology, the behaviors are *primary*) and are repeated over and over again (i.e., they are *circular*). Infants also begin to refine their reflexes and combine them into more complex actions. For example, an infant might now open and close her hand and then put it in her mouth.

Substage 3: Secondary Circular Reactions (4–8 Months)

Sometime around 4 months, infants become more aware of and more responsive to the outside world (their behaviors become *secondary*), and they begin to notice that their behaviors can have interesting effects on the objects around them. For instance, an infant may pick up and then drop a favorite stuffed animal; each time his caregiver gives the animal back to him, he may drop it again and yet fret that he no longer has it. Infants in this substage seem fascinated by the effects of their actions, although at this point they are not necessarily making a conscious connection between the particular things they do and the resulting consequences.

Substage 4: Coordination of Secondary Circular Reactions (8–12 Months)

After repeatedly observing that certain actions lead to certain consequences, infants gradually acquire knowledge of cause-effect relationships. Accordingly, they begin to engage in **goal-**

directed behavior: They behave in ways that they *know* will bring about desired results. They also begin to combine behaviors in new ways to accomplish their goals. For example, when an infant sees the string of a pull-toy near her, rather than crawling over to the toy she might instead reach out and grab the string and then purposely pull the string in order to acquire the toy. Yet another acquisition at this substage is **object permanence**, the realization that physical objects continue to exist even when they are removed from view. For example, when a caregiver hides an attractive toy beneath a pillow, the infant knows *that* the toy still exists, also knows *where* it exists, and will attempt to retrieve it.

Substage 5: Tertiary Circular Reactions (12–18 Months)

Beginning sometime around their first birthday, infants show increasing flexibility and creativity in their behaviors, and their experimentation with objects often leads to new outcomes (the term *tertiary* reflects this new versatility in previously acquired responses). Piaget illustrated tertiary circular reactions with a description of his daughter Jacqueline, then 14 months old:

Jacqueline holds in her hands an object which is new to her; a round, flat box which she turns all over, shakes, rubs against the bassinet, etc. She lets it go and tries to pick it up. But she only succeeds in touching it with her index finger, without grasping it. She nevertheless makes an attempt and presses on the edge. The box then tilts up and falls again. Jacqueline, very much interested in this fortuitous result, immediately applies herself to studying it...

Jacqueline immediately rests the box on the ground and pushes it as far as possible (it is noteworthy that care is taken to push the box far away in order to reproduce the same conditions as the first attempt, as though this were a necessary condition for obtaining the result). Afterward Jacqueline puts her finger on the box and presses it. But as she places her finger on the center of the box she simply displaces it and makes it slide instead of tilting it up. She amuses herself with this game and keeps it up (resumes it after intervals, etc.) for several minutes. Then, changing the point of contact, she finally again places her finger on the edge of the box, which tilts it up. She repeats this many times, varying the conditions, but keeping track of her discovery: now she only presses on the edge! (Piaget, 1952, p. 272)

Substage 6: Mental Representation (18–24 Months)

Piaget proposed that in the latter half of the second year, young children develop **symbolic thought**, the ability to represent and think about objects and events in terms of internal, mental entities, or *symbols*. They may “experiment” with objects in their minds, first predicting what will happen if they do something to an object, then transforming their plans into action. To some degree, mental prediction and planning replace overt trial-and-error as growing toddlers experiment and attempt to solve problems.

The capacity for mental representation is seen in the emergence of **deferred imitation**, the ability to recall and copy another person’s behaviors hours or days after their behaviors have been observed. Although infants show some ability to imitate others’ actions quite early in life, up until now, Piaget suggested, they have imitated only the behaviors they see someone else

demonstrating on the spot. Their newly acquired ability to recall and imitate other people's *past* actions enables them to engage in make-believe and pretend play—for instance, by “talking” on a toy telephone or “driving” with the toy steering wheel attached to their car seats.

As children move into more advanced stages of cognitive development, they don't entirely discard sensorimotor ways of interacting with the environment. Even as adults we continue to use the behavioral and perceptual schemes we acquired as infants (reaching and grasping, following a moving object with our eyes, etc.), and sometimes trial-and-error experimentation is the only way to interact with a new and puzzling object.

Reference

Piaget, J. (1952). *The origins of intelligence in children*. New York: International Universities Press.