

Cognitive Development

Cognitive development is the process of how thinking changes with time. It is more than just learning new facts. It includes how the facts are used and integrated into a person's understanding of the world. Discussing cognitive development in children generally ends up examining Jean Piaget's model.

In this model, Piaget claims learning occurs as people adapt to changes in their perception of the world around us through two mechanisms. Assimilation occurs when new information about the world is fit into existing information and beliefs. Accommodation occurs when current organizations of information must be shifted to incorporate the new information. Over time, thought is organized into some smoothly functioning cognitive system. When new information comes to a person that does not fit the current organization, the system must accommodate this change and return to what Piaget calls a state of equilibrium. Piaget's model calls for considerable amounts of movement from equilibrium to disequilibrium as assimilation and accommodation work to create change in the cognitive system (Santrock, 1994). This part of Piaget's theory is useful in understanding how new information is added to what is previously known. It explains the acquisition of new information.

Consider how a child learns about grass as an illustration of this process. Somewhere along the way, children are learning words for things. They learn colors, inside, outside, yard, ball, toy.... Then, one day they are outside. They pull up something and ask what it is.

"It's grass. It's green grass. The yard is all covered with green grass," they are told.

They already know yard and green. The new information fits into the already known information. It is assimilated into the existing patterns of organized facts.

Now, imagine that something happens and the child cannot go outside for a few months. Then, say in November on a sunny day, the child goes outside again. In southern climates where bermuda grass is grown, the grass is now brown, not green. The presence of brown grass does not fit with the existing patterns of information -- green grass covers the yard. This new information -- grass turns brown -- requires the patterns of information to shift around and accommodate the change.

Children learn about the world around them by assimilating new information and by accommodating the patterns they have developed to fit in new information that does not fit the existing patterns. This process also goes for adults as well.

Another aspect of cognitive development is how the information is processed. Once all of the facts are in place, how does the brain process them? Piaget also noted that cognitive development moves through four stages, each qualitatively different from the one before.

Piaget's Stages of Cognitive Development		
The Sensorimotor Stage	Birth to about Age 2	During this time, infants develop the ability to organize and coordinate their sensations and perceptions with their physical movements and actions. This stage ends when elementary use of symbols develops such as imagining how to manipulate a toy before touching it or use of simple sentences as symbols of some event.
Preoperational Thought	Approximately Age 2 to Age 7	Preoperational thought is the beginning of the ability to reconstruct in thought what has been experienced. It also involves the development of more sophisticated use of symbols.
Concrete Operational Thought	Approximately Age 7 to between 11 and 15	Concrete operations allow children to coordinate several characteristics rather than focus on a single property of an object. Children with this ability have the ability to classify or divide things into sets or subsets and to consider interrelationships.
Formal Operational Thought	From between age of 11 and 15 into adulthood	Much more abstract. They have the ability to develop hypothesis about problems. They can systematically deduce or conclude. The presence of introspection first appears.

Because most elementary school aged children are in the two middle stages, it is useful to more closely examine the characteristics of those two stages. Formal operational thinking is explored more closely as it relates to adolescent development in the next chapter.

Characteristics of Preoperational and Concrete Operational Thought	
Preoperational Thought	<ul style="list-style-type: none"> • More symbolic than sensorimotor thought. • Can't make mental reversals. • Lacks conservation skills. • Can't distinguish between own perspective and someone else's. • Intuitive rather than logical. • Deals with language literally. • Imaginative thinking begins.
Concrete Operational Thought	<ul style="list-style-type: none"> • Can make classifications related to concrete characteristics. • Has developed a sense of conservation and reversibility. • Can see things from other's perspective when dealing with concrete. • Lacks logical ability. • Lacks the ability to handle abstractions. • Deals with language somewhat more figuratively, but still more literal than not. • Experimentation is replaced with a desire for simplicity, rules, and order.

Piaget's model of cognitive development is extremely convenient for establishing expectations for children. It represents the age related limits of their ability to understand the world around them and provides parents with general idea of what limits apply to what ages. While his theory does not model all aspects of children's behavior, it does provide a good depiction of how they think.

Applying this model to your interaction with children, keep in mind their ability to comprehend things as you communicate with them. Have you ever noticed how little children just don't get many jokes? It is because they don't have the capacity to

see the double meaning most jokes rely upon. Humor to little kids must appeal to their level of thought. Physical humor plays a major role in many cartoons because it is concrete enough to be understood by children. The humor comes from the absurdity at a concrete level. The Tweety Bird episode where the two cats are trying to grab Tweety from the nest comes to mind. Both cats grab. Both think they have him, but Tweety is not there at all. Laugh goes here. Little kids see that as funny. If this does not convince you, consider how many times you have heard people comment how the really funny part of cartoons is intended for the adults. Conventional wisdom recognized, once more, that children are just not able to understand thing at the same level as adults.

Understanding this concept will become critical when considering how to establish a discipline system for the home. At that point, it will become necessary to establish expectations and consequences for the children. Furthermore, it will be necessary to communicate them to the children as well. This must be done with their capacity to understand in mind. Explanations must be far more concrete with younger children. With older adolescents, these discussion can become a bit more abstract.

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At the same time the body is changing, the mind is changing too. “The child who could reason logically about real world problems becomes the adolescent who can think systematically and abstractly about worlds that do not even exist or propositions that flatly contradict reality” (Sigelman & Shaffer, 1991, p 574). It is during the period of adolescence that Piaget’s formal operational thought stage is reached. One primary difference between formal operational thought and concrete operational thought (the stage that Piaget places before formal operational thought) is the degree of abstractness the adolescent can handle (Muuss, 1996).

The presence of this higher level of think is in part indicated by increases in verbal problem solving ability. Where before, in concrete operational stage, it would be necessary to see concrete examples to solve certain problems, the formal operational thinker can solve them merely by hear the verbal presentation. The abstract nature of adolescent thought also points to the presence of formal operational thinking. There is also a tendency to think about the process of thought itself (Santrock, 1998).

Adolescents are no longer limited to concrete experiences as basis of their thought. They can deal with hypothetical cases, “what if’s,” and make-believe (Santrock, 1998). They develop the capacity to systematically form and test hypotheses. They learn to understand abstract theories and can grasp philosophy (Sigelman & Shaffer, 1991). As they develop this ability, the complexity of their abstractions increases. In the end, when the process has reached completion the young adult has developed some means of organizing systems of abstractions (Newton, 1995).

Higher level thinking abilities also illuminate, to the adolescent, the differences “between what is and what should be” (Sigelman & Shaffer, 1991, p 574). The adolescent begins to think about how things should be. In this mode, the adolescent tends to be overly idealistic (Santrock, 1998). They test their world with the new skills that come from the capacity to reason logically. When parts of their world fail to meet their expectations that all should be logical they are sometimes rebellious (Sigelman & Shaffer, 1991).

The capacity to think in broad abstract terms facilitates the ability to take on the perspective of others (Santrock, 1998). Coupled with the preoccupation with self, the

adolescent begins to consider how they must appear to others. The adolescent develops the ability to look at self from the viewpoint of others. "David Elkind calls this 'playing to an imaginary audience'" (Newton, 1995, p 42).

As a result, a great deal of cognitive development relates to the development of a sense of identity. During the period of adolescence, individuals, according to Erikson, must examine "who they are, what they are all about, and where they are going in life" (Santrock, 1998, p 322). He characterized adolescence as the period in which the individual must establish a sense of personal identity (Muuss, 1996). Much energy is spent on this task as adolescents "obsessively posture as a result of self-awareness" concerned with all aspects of image such as how they stand, smile, walk or talk (Newton, 1995, p 73).

By the late adolescence, many have developed a good sense of who they are. They have resolved what Erikson's called their identity crisis. As the mind and body mature, the adolescent begins to view the world in new ways. They begin to describe themselves in terms of their values and philosophies about life. With their identity established, their approach to social relationships change. By the end of adolescence, more emphasis is placed on personality compatibility in selecting friends (Sigelman & Shaffer, 1991).

In Newton's model, this identity formation -- along with development of moral reasoning and values -- is the end product of the withdrawal, isolation, and reentry of the adolescent from and back into society and the family (1995). Newton's model is not totally unlike James Marcia's representation of changes that go on in adolescent development of self. Marcia presents the process as three phases he calls deconstruction, reconstruction, and consolidation (Santrock, 1994).

Moral development also increases as the ability to use higher order thinking increases. The questioning of why things are as they are begins in preadolescence. By age 13, most are beginning to question values of the family and other authorities (Newton, 1995). What must follow is the replacement of blind obedience with behavior based on the development of moral reasoning. Lawrence Kohlberg developed a model of moral reasoning that moves individuals through six stages of development (Muuss, 1996). At the bottom level, all moral thinking is based on external consequences. In the highest level, moral decisions are based on an overarching internal belief system (Santrock, 1998). Many adolescents reach a level of moral development where they recognize the need for law and order in the social system (Sigelman & Shaffer, 1991). This would place them on Kohlberg's fifth level which is the normal adult perspective about morality and values (Newton, 1995).