UNIT 8 COGNITIVE DEVELOPMENT:
THE EMERGENCE OF THOUGHT

Structure

8.1 Introduction
8.2 What is Cognition
8.3 Thought in the First Year
  8.3.1 The Sensori-motor Stage
8.4 The Role of the Caregiver
8.5 Summing Up
8.6 Glossary
8.7 Answers to Check Your Progress Exercises

8.1 INTRODUCTION

At birth the child does not know about the people and the world around her. She is
not aware of what she can do. In this Unit we will read how the infant develops an
understanding about herself, people and things. We will also read how her thinking
capacities evolve during the first year of life.

Objectives

After studying this Unit, you should be able to
• explain the meaning of the term ‘cognition’ and understand that learning, memory,
  reasoning, symbolizing and concept formation are aspects of cognition
• understand that the child’s mind is active from birth onwards
• explain the meaning of the term ‘sensori-motor period’
• describe the stages in the development of thought in the first year
• state how heredity and environment influence cognitive development
• understand the importance of the caregiver’s role in the infant’s mental
  development.

8.2 WHAT IS COGNITION

As a newborn, Ramesh would suck on anything that was brought to his mouth—the
pacifier, the finger, the mother’s breast. His mother would often give him a pacifier to
suck when he cried. By one month of age, Ramesh would not suck on the pacifier if it
was given to him when he was hungry; instead he would spit it out. He would, however,
take the breast. This showed that he had learned what provided food and what did not.
In other words, the child had learned to discriminate between the mother’s breast and its
substitute, the pacifier.

Nine month old Tina is very attached to her father and is possessive about his
belongings, particularly his sandals. If she sees anyone else wearing his sandals, she pulls
at them to take them away. The child has learnt to associate the sandals with the father,
i.e. she remembers that they are his. When she was around 18 months old, she would
often take her father’s lunch box from the kitchen and would say: “Tata, Tata.” The
child had seen her father doing this and was enacting the same. In her imitation of his
behaviour memory is involved.

At eleven months Mansur is able to crawl and can pull himself to standing position. One
day he spotted a box lying on a table nearby. He crawled to the table, pulled himself
upright and tried to reach for the box. But the table was high and he could not get to it.
He gave up after some time and crawled to his mother who had been watching him. She
The Child: Development in the First Twelve Months

picked him up, went to the table and gave him the toy. Mansur was delighted. Two months later he began to walk. Now when he wanted the toy from the table, he would go up to the table and get it. In both instances, the child solved the problem. In the first case he got his mother to help him. In the second instance he had worked out how he could get the toy and carried out his plan effectively.

Ela is an active fifteen month old infant. She and her father were lying on the bed one day when Ela bit him quite fiercely on the arm. Ela’s father pretended to be hurt, turned his face away from Ela and cried out: “Ooh! Oooh! ……” Ela’s mother said in mock anger: “You have hurt papa!” The child looked at her father for a while, then went over to him and started kissing him on his face and arms and calling out to him. It is clear that the child thought that her father was hurt and reasoned that she could placate him by kissing him. Clearly, she is imitating the consoling she gets when she is hurt.

These examples show that from the earliest months, infants understand what is happening around them. You will be able to think of similar incidents from your observations. The mental activities that have been illustrated in the examples—learning through association and discrimination, remembering, problem solving, imitating, reasoning, understanding what is expected of one—are all aspects of cognition or intelligence. Besides these mental processes, cognition also involves concept formation and symbolizing. What do we mean by these terms?

Concepts are ways of organizing information. They help us to group or categorize information. A concept develops out of characteristics that are common to a set of objects, actions or thoughts. For example, we have a concept of edible and inedible things. We may further categorize edible things as fruits, vegetables, cereals, bread, nuts and so forth. In the same way, we have concepts of living and non-living things, shapes, colours, seasons, work, play and so on. Researchers have tried to determine how early in life children begin to form concepts.

Symbolizing means representing an event, object, action, quality or concept by something else, i.e. the symbol. This symbol then stands for that particular event or object. For example, the symbol ## on the road signifies that there is a railway track ahead. The red cross symbolizes hospitals. Words are symbols that stand for actual objects and events. When the preschooler pretends that the wooden block is a bus and plays with it, she is symbolizing. When Bala was two years old, her grandmother (Nani) came to visit her in the village. When she was leaving, the entire family, including Bala, went to see her off at the bus stop. From then on, whenever Bala would see the bus coming into the village she would say: “Nani come!” For Bala the bus symbolized her grandmother’s visit.

You have probably grasped by now that cognition is concerned with how we come to know the world around us. Each one of us has our own ideas about people and events. How do we form these ideas and beliefs? How does knowledge develop? Cognition deals with the development of thought and knowledge. Thinking or cognition has to do with how we receive and interpret information and how we use it to guide further actions. One may ask why the development of cognitive abilities must be studied. The development of cognition enables the individual to adapt to surroundings and situations. With the development of thought, the person is able to understand and handle situations with greater effectiveness. Therefore, it is important to know about the stage in cognitive development and understand how we can stimulate the child’s thinking.

Check Your Progress Exercise 1

Answer the following questions briefly in the space provided below.

1) From your observation of an infant, write an anecdote which illustrates any one cognitive process.
2) What do you understand by the term "Cognition"?


3) Read the following statements carefully. Each of the statements stands for one aspect of cognition. Write in the space provided below each statement, the cognitive process it describes.

a) Representing an event, object, action, quality or concept by something else

b) A set of characteristics that are common to a group of objects, actions, or thoughts; ways of organizing information.

c) Storing information and recalling it when necessary.

8.3 THOUGHT IN THE FIRST YEAR

Let us read how thought develops from the time the child is born. When we talk about cognitive development we must remember the name of Swiss psychologist, Jean Piaget. He studied how children come to understand people and events. Can young infants learn? In what way do infants and children show their intelligence? Does the child's thinking change over time? Piaget's research focused on such issues. He stated that children view the world and understand events in a way which is different from that of adults. Their logic is different from that of adults. The nature of children's thinking changes from one age to the next. Piaget in his theory of cognitive development describes these changes. As the child grows not only does her store of information increase, but the manner in which she thinks also changes. At successive ages, her thought is qualitatively different from the earlier ages.

Piaget stated that the development of thinking proceeds through four stages. The first stage lasts till two years of age and is the sensori-motor period of development. The second stage, from 2-6 years, is the pre-operational stage. The third stage, from 7-11 years, is the concrete-operational stage and from 12 years onwards, the child enters the stage of formal operations. Since at each of the these stages the child has a different way of understanding events, it is not correct to say that a two year old is less intelligent than a six year old.

One of the major sources of data for Piaget, as he was formulating his theory of cognitive development, was his observations of this three children. While discussing cognitive development in this Unit and others, we shall draw upon Piaget's recordings of his children's activities as well as those of other children to describe the changes in thinking that occur with age.
Let us now read about the development of thinking during the first year, i.e., the sensori-motor period.

8.3.1 The Sensori-motor Stage

As the term suggests, in this stage the child understands the world using her senses and motor capacities. She comes to know about things in terms of what her senses convey and what she can do with them (motor capacities). Thus the infant knows a wooden block, for example, in terms of how it feels to her touch and appears to her eyes (i.e., sensory information), and that she can throw it, kick it, push it and bang it (i.e., motor capacities). She cannot think of its properties (such as solid, wooden, colour) in adult terms because she does not yet have these concepts. In other words, the infant at this stage cannot think conceptually (i.e., in terms of concepts). To find out about things, the infant has to act upon them (i.e., feel them, explore them, do something with them). Even adults first look at a new object and then feel it. But adults and older children do not rely merely upon the information from the senses to understand events or objects. They also categorize information into concepts, think in abstract terms and reason. The infant begins to develop concepts towards the end of the second year.

During the sensori-motor period, thinking develops gradually and by the end of this stage, the infant understands that her actions can have an effect on people and objects. She can plan her actions and solve simple problems, as Mansur did in obtaining the toy. This period is divided into six substages. In this Unit we will talk about the first four substages that emerge in the first year. The remaining two substages will be discussed in the next Block.

The first substage lasts from birth to one month. During this stage, the newborn adapts to her surroundings through her reflexes. For example, when the baby feels hungry, she cries and when her mouth touches the nipple, she begins to suck. Sucking is a reflex at this stage. You have read about other reflexes in Unit 7. The foundations of later learning are laid now as the baby modifies and adapts her reflexes. Let us take the example of sucking to understand this. One of the first things that the baby sucks on is the mother’s breast. Later she sucks at other objects as well—the finger, the pacifier or the corner of her sheet. This is the beginning of generalization. Generalizing is an important part of cognitive development. It helps the child to form concepts. For example, by sucking on different things (i.e., by generalizing sucking to various objects) the child will develop an idea of things that give nourishment on sucking and those that do not (i.e., develop a concept of food and non-food). From a few exposures to a sound, the infant gradually develops a concept of that sound. The jingling of bangles will quieten a crying child who has learnt to associate the sound of the bangles with the mother’s presence. Concepts are
thus developed as the baby generalizes information. In the above example, the baby generalizes that the sound of bangles signifies the presence of the mother.

By sucking the infant also learns to discriminate. Discrimination in a mental activity which is basic to development. To discriminate is to see the difference between two objects or experiences. When sucking at the breast the baby learns whether to suck slowly or with force, depending upon how hungry she is and how much milk she gets. She discriminates between objects that provide nourishment and those that do not and thus may refuse a pacifier when hungry, just as Ramesh did in the anecdote described earlier. In fact, infants find out about objects by mouthing them. They find out how they feel and taste. This is a major way of learning about objects during the first year of life.

The second substage lasts from the beginning of the second month to four months. During this period babies begin to show interest in their surroundings, which leads them to explore. Since at this time the infant is not able to move about physically, the process of knowing about the surroundings is in the form of visual exploration. They now spend less time sleeping and when alert they scan their environment. How do we know that infants attend to objects? When the infant is attracted towards an object she will look at it attentively for some time as if she wants to learn all she can about it. She may also smile at it.

You know that infants look longer at objects that have a light and dark contrast and those that move. They show more interest in unfamiliar objects compared to familiar ones. That the infant is able to make out that a particular object/person/picture is unfamiliar indicates that she is using her memory. It shows that she remembers a face, recalls it, compares it with the new face and concludes that the latter is unfamiliar. This is a remarkable feat.

You have just read that infants find out about objects by mouthing them. Another way they learn about objects is by touching them. Touch delights them from the moment they swipe at objects and hold their legs. In fact, one of the first things that the baby explores are her own hands. She notices her hands, plays with and stares at them for long periods. This activity interests the baby as her fist is not clenched all the time now. The fingers and the thumb provide interesting variety in movement. You can see how all the senses help the child to learn about her surroundings.

While the infant recognizes familiar people and voices, she does not yet recognize her own name when called out. If it seems that the baby is looking around when her name is called, it is so because she recognizes the intonation. If any word in the same intonation is called out, she will still respond by looking at the person.

At this age the child is also able to anticipate an event based on the actions of others. You may have seen that a three month old infant is able to make out from the actions and speech of the mother that she is about to be fed, and begins to make sucking movements and to adjust her posture to the mother’s body. This shows that the infant remembers that certain actions of the mother will lead to feeding—an other evidence of her growing memory.

The infant begins to coo at this age and if the adult utters a similar sound, she responds and often continues it. This is an example of imitation. Through imitation children and adults acquire many skills throughout the life span and the beginnings of imitation can be seen now.

By the time the infant enters the third substage (4–8 months), she is able to grasp objects, push them, kick them and manipulate them. She is able to make things happen and acquires new actions that produce interesting results on the objects. Let us understand this through an example. While lying in the crib, the infant kicks and moves her arms. One such movement accidentally moves the doll hanging by a string from her crib. Delighted at this movement, the infant looks intently at the doll for sometime. She moves her arms again which in turn moves the doll. She begins to perceive some connection between her action and its consequence. Fascinated with the result of her action, the baby continues the kicking and looks at the doll every time it moves. In the earlier stages too the doll may have moved when the child moved her arms, but she had not perceived the link between her movement and that of the doll. Her delight, her intent expression and her repetition of the action show that she has now made the connection. Once the infant realizes that her actions have an effect on
objects, her actions become intentional, i.e., purposeful. Intention means that the child has a wish to do something before she does it, i.e., the child knows what she wants to do. Not only does the infant swing her arms to move the doll, but she varies the force with which she moves them—she begins by swinging her arms gently and then continues more strongly, delighting as the doll moves with greater force. This new-found interest in objects and the consequences of her actions will grow during the subsequent years and form the basis of her learning.

Let us take another situation to show that now the infant performs actions with an intention. You may have often been involved in an activity with the child in which she drops her toy on the floor, you give it back to her only to have her drop it again! And she continues doing so as long as you keep handing it back to her. You may lose patience but the child enjoys herself immensely. The activity of dropping the toy got an interesting result the first time and the infant repeats it. Many actions of the child have a consequence and she gradually perceives the connection between her own activity and its result. In other words, she begins to understand cause and effect relationships.

The emergence of intention in the infant’s actions is an important landmark from the point of view of cognitive development. Most of our actions have an intention—they are performed with a purpose. Once the child begins to act intentionally, her actions tend to be under her control. This gives her confidence that she can control some aspects of her environment.

Being able to perform actions intentionally leads to goal-directed behaviour. What is meant by goal-directed behaviour? This means being able to use one’s actions to reach an end or a goal, i.e. to use one’s actions as a means to an end. In performing goal-directed behaviour, one needs to plan a strategy and then carry it out.

Goal-directed behaviour marks the beginning of the fourth substage which lasts from 8–12 months. From the point of view of problem-solving this stage is an important landmark. Let us see the origin of goal-directed behaviour in the infant through the following example.

The child tries to reach for a box lying some distance from her. As she reaches for it, her mother places a cushion between her and the box so that the child is prevented from reaching the box. To get the box, the child must set aside the cushion. The child at once strikes the cushion down, lowers it and clears her way. When her mother holds the cushion firmly in place, the child pushes it harder to remove it. In the earlier stages when such an obstacle had intervened between the child and the object she wanted, the child had simply ignored the obstacle or tried to pass through the side, but she did not try to displace it. The hallmark of the fourth substage is that the infant is now able to combine two or more actions to reach a goal. In the above example, the infant combined the actions of pushing aside something with grasping to attain her goal, i.e., the box. The intention in actions which could be seen in the third substage is stronger now. Other situations that bring out the infant’s goal-directed behaviour are—putting objects into containers and taking them out; using the help of adults to get something, as Mansur did. In another instance, an infant wanted to move a doll but she was not able to get it swinging herself. The child grasped her father’s hand, placed it against the doll and exerted pressure on his fingers to make him swing it.

Development of physical skills like sitting, rolling over, standing, crawling and holding objects help the infant in goal-directed behaviour.

At this time the infant also begins to understand that objects occupy some position in space and that they can be moved around. When an obstacle, such as a small wooden plank, comes between her and the toy, the infant knows that the obstacle will have to be moved or that she will have to move around the obstacle to reach the toy.

You know that the child is aware that her actions can affect objects and people. During this stage she also realizes that actions of others can also have an effect on things. Therefore, she now approaches the adult to help her get the object which she cannot reach and begins to seek out adults to solve situational problems.

You may have observed a ten month old baby staring at small pieces lying on the floor such as crumbs, threads and even particles of sand! What is more astonishing is that she manages to pick up these objects as well. This shows the infant’s ability to see details.
The child's memory also grows. She can now remember more events and can recall them quite clearly. Therefore, she is able to anticipate that an event is going to happen again based upon the cues. This is a more developed version of anticipation of events discussed in the earlier part of the Unit through Ambika's example. Ambika had often seen that after the sound of the scooter in the verandah, the father appears at the door. Now when she hears the scooter, she looks towards the door eagerly anticipating her father's appearance.

What does this discussion tell us about the infant? From her first experience the infant understands, remembers and organizes information and acts upon the environment to achieve a goal. The infant is intelligent. By acting upon the objects in the environment she learns the reasons for everyday events. For example, objects can be moved by pushes and kicks. By touching, feeling, seeing, smelling and hearing, she learns about the properties of various objects and forms a concept of them. She also begins to understand the meaning of commonly used words such as milk, bottle and ball. She recognizes her mother, father and people with whom she interacts daily and can distinguish between familiar and unfamiliar people. Similarly, she distinguishes known from unknown objects. By acting upon things, she also develops an idea of what she is capable of doing. She is as yet not able to think in terms of concepts and cannot represent objects and people in the form of symbols in her mind. This will come later.

How can we gauge the infant's intelligence? As far as adults and older children are concerned, we can generally assess their intelligence by how they handle problems and complex situations. But what do we look for in an infant? To gauge the infant's intelligence, we have to look at the development of her senses and motor skills. Her intelligence can be seen in everything she does—focusing, following a moving object, reaching for objects, kicking, banging, squeezing and thumping play objects. How well she anticipates events is also an aspect of intelligent functioning. The achievements of the one-year-old, such as being able to move a rattle, grasp a bowl or imitate a sound may seem rather simple when compared with the three-year-old who knows names of people, talks with them and understands a great deal. However, the abilities of the one-year-old are important accomplishments and the bases of all later development.
Check Your Progress Exercise 2

Answer the following questions briefly in the space provided below.

1) Describe the salient characteristics of each of the four substages of the sensori-motor period.
   a) First substage

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   b) Second substage

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   c) Third substage

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   d) Fourth substage

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2) With reference to cognitive development, what is the child able to do by the first year?

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8.4 THE ROLE OF THE CAREGIVER

In Unit 3 you read that heredity determines one’s potential for intelligence while the opportunities provide the setting for the achievement of this potential. In other words, how much of the inborn traits are developed depends upon environmental factors. Thus the development of intelligence depends upon the interaction between heredity and environment. What the child inherits in terms of intelligence cannot be changed but we can certainly influence the type of experiences that a child will have. Therefore, in this section, we will concentrate upon a major aspect in the infant’s environment, i.e. the caregiver. Providing stimulating experiences to the child is normally the responsibility of the family. You have already read about the role of the caregiver in Unit 5. Let us discuss it here with reference to the child under the age of one.

Since the infant is not mobile, she is able to explore only those things that are within her immediate reach and range of vision. Those who are looking after the infant must be sensitive towards this aspect and give her a variety of things to play with. Just as the infant needs to handle objects to learn about them, she also needs to interact with people. The family members must spend time with the child and play
with her and talk freely to her. By interacting with people, she understands concepts and gathers information. This will also help her to understand her experiences. When the infant becomes 8 to 9 months old, parents delight in showing her new objects and directing her attention towards them. This also helps her to learn about things. To summarize, the role of caregivers lies in providing the infant stimulating experiences in keeping with her abilities.

While we have spoken about how adults can foster development, we must not forget the child's own role in her development. The child is not a passive person who just takes in her experiences. If this were so, all children who have similar experiences would turn out to be alike. There are innate constitutional differences among children which makes them different even in the same situation. The child is an active being who responds to events around her. How the child interprets a particular experience will depend upon her past experiences and a variety of individual factors.

Check Your Progress Exercise 3

1) In what ways can caregivers promote cognitive development?

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8.5 SUMMING UP

In this Unit you have read how the child’s thinking capabilities develop during the first year of life. Cognitive development is concerned with how the child comes to know about her surroundings and how her thinking becomes more complex with time. Cognitive development refers to the development of thinking capacities. Cognition involves many mental processes—learning, memory, symbolizing, concept formation, reasoning, discrimination, association, imitation and problem solving.

Piaget was concerned with how the child develops knowledge of ordinary things and everyday situations and he propounded a theory of cognitive development. As the infant grows her thinking changes, so that at each age level the nature of the child's thought is different. At each stage the child deals with situations in keeping with her...
level of thinking. As she grows, the infant also gains more information about her surroundings.

The first stage in cognitive development, according to Piaget, is the sensori-motor period, which lasts till two years of age. During this period, the infant understands events and experiences using her senses and motor capacities. She is not able to think in terms of concepts. By the end of this period, the infant develops a fairly good understanding of her surroundings—she recognizes many people, understands that her actions can have an effect and develops an idea of what she is capable of doing. Memory grows, language develops and the infant is able to plan her actions. She learns why things happen the way they do and forms an idea about the world around her.

The sensori-motor period is divided into six substages, four of which have been discussed in this Unit. During the first substage (from birth to one month) the infant is able to use her reflexes and an elementary form of learning begins through generalization and discrimination. During the second substage (from one to four months) the infant begins to show curiosity and visually explores the surroundings. She begins to discriminate between familiar and unfamiliar people. She also imitates some actions. During the third substage (4-8 months) the infant seems to realize that her actions can have an effect on people and things. Her actions become intentional and she understands cause and effect relationships. The fourth substage (8-12 months) is characterized by the infant's ability to perform goal-directed behaviour. She now combines two or more actions purposefully to achieve a goal.

Heredity and environment interact to influence cognitive development. Heredity determines one's potential for intelligent functioning while how much of the potential is achieved will depend on the experiences of the child. Therefore, the role of the caregiver is of importance since she provides stimulating and meaningful experiences.

8.6 GLOSSARY

Coo: The vowel like sound 'oo...,' which the infant begins to produce around one month of age.

Discriminate: To recognize or understand the difference between; distinguish, differentiate

Pacifier: A baby's teething ring

Predisposed: Susceptible, inclined towards

8.7 ANSWERS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress Exercise 1

1) Write any one anecdote which shows any one of the cognitive processes—reasoning, memory, problem-solving, discrimination, generalization, imitation.

2) Cognition deals with the development of thought. It is concerned with how children and adults understand the world around them.

3) a) symbolizing, b) concepts, c) memory
Check Your Progress Exercise 2

1) a) The newborn adapts to the surroundings through her reflexes. While doing so, she learns through generalization and discrimination.

b) The infant explores the surroundings visually. Her memory grows as indicated by her being able to differentiate familiar from unfamiliar people. She is also able to anticipate events. She is able to imitate some behaviours of people.

c) The infant performs actions that produce interesting results on objects. Her actions become purposeful and intentional and she understands cause and effect relationships.

d) The child is able to use her actions in new situations to reach a goal. This means that the child is able to handle more situations. She also understands that objects occupy some position in space. The child’s memory also grows so that she remembers more events and recalls them quite clearly.

2) By the end of the first year the child understands that her actions can have an effect on the things, i.e. becomes aware of cause and effect relationships; plans her actions to achieve a goal; is able to handle simple situations; discriminates among people and objects; recognizes familiar people; begins to acquire language and understands the meaning of commonly used words; imitates actions and behaviours of others; realizes that objects occupy some position in space.

Check Your Progress Exercise 3

1) The caregiver can help in cognitive development by providing the infant stimulating experiences in keeping with the infant’s level of understanding. The caregiver must provide her with a variety of play materials. Playing and talking to the infant and directing her attention towards people and things will help her to learn.