
UNIT 13 COGNITIVE DEVELOPMENT :

TOWARDS MENTAL REPRESENTATION AND SYMBOLIC THINKING

Structure

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13.1 INTRODUCTION

In the last Block we studied the first four substages of the sensory-motor period of development. You will recall that by the end of the first year the infant's actions and behaviour become intentional. She is able to co-ordinate her actions for a purpose, i.e., behaviour becomes goal-directed. In this Unit you will read about the development of thought in the second and third year of life. As in Unit 8, the discussions in this Unit are based on Piaget's theory of cognitive development.

Objectives

After studying this Unit, you should be able to

- describe the development of thinking in the fifth and sixth substages of the sensory-motor period, i.e. from 13 months to 24 months
- explain how the child in substage five uses trial and error to arrive at solutions to problems
- understand how the ability to be able to represent events mentally helps the toddler to deal more effectively with situations
- state how the ability of mental representation influences the toddler's understanding of cause and effect relationships, imitation and make-believe play
- summarize what the toddler achieves in the area of cognitive development by the third birthday
- relate the characteristics of toddlers' thinking described in the text to your everyday observations of children

13.2 THOUGHT IN THE SECOND YEAR : SENSORY-MOTOR PERIOD

In the last Block you read about the first four substages of the sensory-motor period as described by Piaget in his theory of cognitive development. In this Unit we will read more about the development of cognition in the sensory-motor period and we shall briefly touch upon the characteristics of thinking in the pre-operational period. As you know, one of the major sources of data for Piaget, as he was formulating his theory of cognitive development, was his observations of his three children. The discussion in Unit 8 was based on his observations. In this Unit too, we will draw upon Piaget's recordings of his children's activities to describe the changes in thinking that occur with age. As you read the descriptions that follow, you will be able to relate them to your everyday observations of children.

Let us now study the development of thought in the fifth and sixth substages of the sensory-motor period.

The advance in learning from substage four to substage five is clear. In Unit 8 you read that in substage four the infant begins to understand that her actions have a result. Now, in substage five, she finds out that she can vary her actions and the result will be different. In the above example, the toddler found a solution to his problem—that of getting the toy—through trial and error. Trial and error means to systematically try out different methods of solving a problem and then adopt the one which gives the best solution. We do many tasks through trial and error. We try out different ways of doing a task and, learning from our errors, adopt the one which is best suited to achieving the task. This ability to vary one's behaviour and actions deliberately is a valuable tool in problem-solving and we see the first signs of it in substage five of the sensori-motor period.

You know that by this time the toddler also uses words to communicate. The desire for active experimentation combined with the development of language and the development of motor skills enhances learning. The child's information about objects increases.

13.2.2 Substage Six

Between eighteen months and two years of age, a major shift in the child's manner of thinking occurs. This is the sixth substage of the sensori-motor period of development. To understand the difference between substage five and substage six, let us read how Piaget's children solved the problem of putting a long chain into a matchbox, which was partially open.

This is how one of his children, in substage five, solved the problem. *She put one end of the chain into the box and then tried to put the rest of the chain in, little by little. She was able to put only a little bit in when the chain fell out. The child began again and the chain dropped out as before. She tried the same technique fifteen times in succession, with the same result each time. On her sixteenth attempt, by chance, she grasped the chain in the middle. The chain was now no longer lengthened as before, but took the form of two entwined cords. Held this way, the child was better able to put the chain inside the matchbox. However, even now she succeeded in putting the chain in partially; she was not able to put it in completely. In the next attempt she tried to put the chain in as she did in the first fifteen instances and, as expected, was unable to put it in the matchbox. In the next try she again held the chain in the middle and succeeded in putting the chain in partly.* Thus we see that during the process of repeated trials and errors, the child accidentally discovered a solution (that of holding the chain in the middle) and then deliberately modified her behaviour to achieve the task—behaviour typical of a child in substage five.

Now let us see how the other child, in substage six, worked out a solution to the same problem. *In the first three attempts she tried to put the chain in part by part, just as the child in substage five did and was unable to put it in. On the fourth attempt she began as before, but then paused for sometime and seemed to be thinking. Then, with sure movements, she put the chain on a flat surface nearby, rolled it into a ball, picked up this ball of chain and put it into the box.*

The difference between the two solutions is striking. The second child did not accidentally discover the solution. On the contrary, she was able to think out the solution and then was able to carry it out. The child had now found a new way of solving problems—that of working out the solution mentally. This means that she was able to represent the task mentally and work out its solution in her imagination, instead of relying on actually doing a task to arrive at the solution. This ability to form mental representation of events, of being able to picture events to oneself, is the hallmark of substage six.

If you were to observe toddlers closely for some time, you would be able to see many such activities in which they represent events to themselves and work out solutions mentally. Let us read another account to get a clearer understanding of this ability.

To go out of the house, Fatima, 22 months old, had to unlatch the door. The latch was within her reach but she did not know how to operate it. On occasions when she could not get anyone to open the door for her, she would kick at the door, shake it with her hands and move it to and fro. During these manoeuvres the latch would usually drop away, the door would open and Fatima would go out. One day Fatima approached the door as usual, began to shake it, but then stopped and looked at the latch for some time. Then she reached up to the latch, removed it from its hook and opened the door. In all

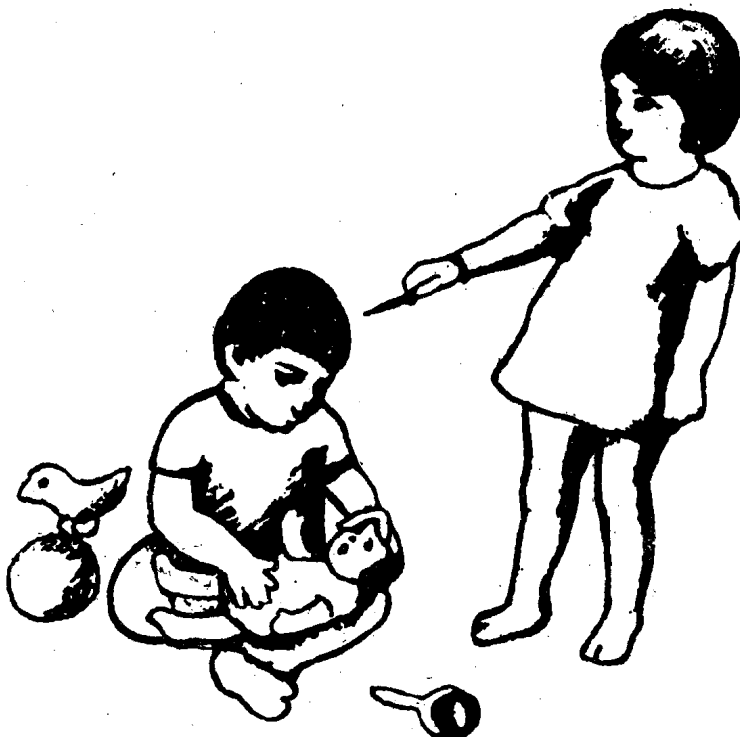
the earlier attempts Fatima had relied on chance for the door to open, and had not understood what it was about the door which caused it to open when she shook it. But in the last instance, she seemed to have grasped that it was latch which controlled the movement of the door. Then she seems to have worked out things in her mind and opened the door with ease.

Mental representation is an integral part of our day-to-day lives. We mentally plan how we will reach our place of work, thinking about the bus we will take, the route we will choose and the way we will reach our place of work from the bus stop. As someone describes an incident or a person to us, we are able to form a picture of the event/person in our mind. **Mental representation is involved in every task that we do and the rudiments of this ability are evident towards the end of the sensori-motor stage.** Can you list three or four tasks from your day-to-day activities in which mental representation and symbolic thinking is involved ?

Once a task can be done mentally, it leads to more efficient ways of doing the task. This does not mean that the trial and error way of learning is given up by us entirely. We solve problems through trial and error in adulthood as well. But it no longer remains the only way of solving problems.

Being able to represent events mentally influences the child's imitation. Imitation is one of the ways through which the child learns ways of behaviour. Before the sixth substage, imitation immediately followed an action or a behaviour. But now the toddler is able to delay the imitation over a considerable period of time. The following example brings this out.

One day Tara's mother was observing her as she was playing with her toy monkey. During her play Tara pretended to put the monkey to sleep. She put it on a stool, kissed its cheek, covered it with a rag (which symbolized the quilt) and patted it on the forehead saying : "Nini"—the word Tara's mother used for sleep. Her mother was pleasantly surprised to see that Tara's actions with the monkey were similar to what she herself did when she put Tara to sleep. Had Tara imitated her mother's behaviour as soon as her mother performed it, it would not have involved mental representation, but since she imitated it much later, it shows that she had represented the behaviour in her mind and recalled it later. You must have observed similar incidents of imitation. Can you recall any?



The toddler's understanding of cause and effect also improves during the sixth substage. Earlier the cause and its effect had to be visible to the child for her to understand the link between the two events. Now if the child sees an event, she can infer (imagine) what the cause might be. Again, this is possible because she can picture events to herself and deduce the reasons in her imagination. An example, again from Piaget's observations of his children, will help us to understand this better.

Piaget's son was seated in the carriage and Piaget himself was on a chair beside him. While reading, and without seeming to pay attention to the child, Piaget put his foot near the wheels of the carriage and made it move slowly. The child immediately leaned over the edge and looked in the direction of the wheels and saw his father's foot there.

That, in the above example, the child was not confused as to what may have caused the movement, but unhesitatingly looked for a cause, which he thought would be most likely, shows that he had inferred the cause by thinking it through. It is important to remember that the child can generally make such deductions only about familiar things. The child had often sat in the carriage and knew that it moved on the wheels and that it had to be pushed to move. Had he been unfamiliar with the carriage, it is unlikely that he would have inferred the cause of movement.

Many day-to-day events will show you that the toddler is now able to infer that events have causes even when she does not observe the cause. Upon seeing her toy doll broken, when the toddler asks : "Who hit it?", "What happened to its nose?", it implies that she understands that something must have happened to break the toy. On seeing a baby cry toddlers may ask : "He hurt? Hungry?", which shows that they realize that the baby's crying has a cause.

In the same manner, if toddlers see the cause they can also infer what its likely effect will be. Again, they can make these deductions only about everyday familiar situations and events.

Towards the end of the sensori-motor period, the beginnings of make-believe can be seen in the child's play. You know that in make-believe children pretend that an object is something other than what it actually is. In make-believe play children also pretend to be another person. In other words, being able to make-believe means that the toddler is able to think symbolically. Make-believe and symbolic thinking involve mental representation. You would remember from your reading of Block 2 that symbolism involves using one object or person to represent another.

You may have seen toddlers reproduce acts that they have seen adults perform, like pretending to read a book, picking up the telephone receiver and carrying out an imaginary conversation. A three-year-old may treat blocks that differ in size as if the longer one was a parent, and the shorter one the child, and play with them. These pretend games become more elaborate during the preschool years. You would have often seen a group of preschoolers playing together, assigning imaginary roles to themselves and acting out their parts. You may like to write about a make-believe game that you have seen a toddler play—either alone or with others. What toy/object was she playing with and what was she pretending it to be?

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13.3 PRE-OPERATIONAL PERIOD

Once the child begins to picture events mentally and to use symbols, it marks the transition to the second stage of cognitive development—the pre-operational period. The pre-operational period extends from the second birthday to the sixth or seventh birthday. During this period the child's motor skills diversify and her language also grows rapidly. She learns more about things around her. We shall talk in detail about the nature of thought in the pre-operational period in the next Block where the major period of the preschool years is dealt with. For the purpose of this Block, let us summarize what the toddler achieves in the area of cognitive development.



By the third birthday, the toddler knows the names of most of the people she interacts with on a regular basis. She may know the names of a few colours and may be able to identify them. She recognizes familiar objects. She can name some parts of the body and may be able to state the functions of some of them. She has begun to understand the concepts of 'big' and 'small', 'tall' and 'short', 'thick' and 'thin', so that she can identify which of the two given sticks is bigger and which of the two stones is smaller. The toddler can make such comparisons with reference to two objects. If you were to give more than two sticks and ask her to show you the biggest, she is likely to get confused.

The toddler likes to use a pencil or a chalk to make drawings and, if asked, names the figure drawn. Her drawings will of course be different from that of an older child or an adult. So do not be surprised if the drawing does not even remotely look like what she claims it to be. At this stage the drawings are in the form of circles and lines rather than exact figures. You will read about children's art in greater detail in Block 6.

The toddler can follow simple instructions. Her memory develops and she can recall events with greater clarity and detail. This enables her to participate with adults in simple games, which require her to follow instructions. She shows an interest in other children. You can see toddlers playing together but this co-operative play lasts only for a short period of time. For the most part, toddlers play on their own or sometimes with adults.

Most toddlers are fascinated with sand and water. They seem to be discovering that these materials can be manipulated in different ways and spend considerable time playing with them. It would be interesting for you to watch a toddler play with her toys or in the mud. Listen carefully to what she says. She is likely to say a few words every now and then, which will help you to understand what she is thinking. In Unit 16 of this Block, you will read about the play activities that toddlers would enjoy and which would foster development.

Check Your Progress Exercise 1

- 1) Listed below are some developments in children's thinking during the sensori-motor period. Tick the ones which are NOT characteristic of the fifth substage.
 - a) deliberately varies her actions
 - b) imitates an action which she has observed two days ago
 - c) finds solutions to problem situations through trial and error
 - d) is able to mentally work out the solution to tasks without physically doing the task
 - e) is able to recall events better
 - f) is interested in pretend play
- 2) Below are listed some characteristics of children's thinking. Of these, which ARE EVIDENT during the sixth substage?
 - a) can infer a cause if she experiences an event
 - b) can represent events mentally
 - c) begins to engage in make-believe play
 - d) can foresee the effect of an event
 - e) has developed an understanding of numbers
- 3) The following abilities emerge in an orderly sequence in the first two years. Put them in the order in which they emerge.
 - experimentation; trial and error
 - use of reflexes
 - goal-directed behaviour
 - mental directed behaviour
 - intention in actions

13.4 SUMMING UP

In this Unit we have read about the fifth and sixth substages of the sensori-motor period of development. The fifth substage is marked by the toddler's ability to vary her actions. She tries out different ways of doing things to get different results, i.e. she experiments. Through modifying her actions, she is able to judge which one is best suited to a particular task. This ability to find solutions through trial and error allows her to handle more complex situations. As she experiments with objects, she finds out more about their properties. The fifth substage lasts from 12 to 18 months.

Once the infant is able to represent events mentally, she enters into the sixth substage of the sensori-motor period. This lasts from 18 to 24 months. Being able to picture events to oneself is a great leap forward in cognitive development. One of its implications is that the toddler is now able to work out solutions in her mind, without going through a process of trial and error. The former method is more efficient. Most of our day-to-day behaviour depends upon mental representation of events and people.

The toddler's understanding of cause and effect also develops as a consequence of mental representation. Pretend play becomes possible as the toddler is able to think symbolically.

The end of the second year marks the entry into the pre-operational period which lasts approximately till six to seven years. The preschooler makes great strides in learning concepts, acquiring information and understanding the reason for many events. We will talk about the nature of thinking during the preschool years in detail in the next Block.

13.5 ANSWERS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress Exercise 1

- 1) b, d, f
- 2) a, b, c, d
- 3) — use of reflexes
— intention in actions
— goal-directed behaviour
— experimentation; trial and error
— mental representation