

COGNITIVE DEVELOPMENT IN EARLY CHILDHOOD

I. PIAGET'S THEORY. THE PREOPERATIONAL STAGE

A. The preoperational stage, Piaget's second stage, is marked by rapid growth in representational, or symbolic, mental activity.

B. Advances in Mental Representation

1. Language is our most flexible means of mental representation.

2. Piaget believed that sensorimotor activity provides the foundation for language, just as it underlies deferred imitation and make-believe play.

C. Make-Believe Play

1. Make-believe play increases dramatically during early childhood.

2. Piaget believed that through pretending, young children practice and strengthen newly acquired representational schemes.

3. Development of Make-Believe Play. a. Over time, play becomes increasingly detached from the real-life conditions associated with it. b. Make-believe play gradually becomes less self-centered as children realize that agents and recipients of pretend actions can be independent of themselves. c. Play also includes increasingly more complex scheme combinations. d.

Sociodramatic play is the make-believe play with peers that first appears around age 2 1/2 and increases rapidly until 4 to 5 years. e. The emergence of sociodramatic play signals an awareness that make-believe play is a representational activity.

4. Advantages of Make-Believe. a. Today, Piaget's view of make-believe- as mere practice of representational schemes is regarded as too limited. b. In comparison to social nonpretend activities, during social pretend preschoolers' interactions last longer, show more involvement, draw larger numbers of children into the activity, and are more cooperative. c. Preschoolers who spend more time at sociodramatic play are advanced in general intellectual development and seen as more socially competent by their teachers. d. In the past, creating imaginary companions, invisible characters with whom children form a special relationship, was viewed as a sign of maladjustment. Yet recent research demonstrates that children who have them display more complex pretend play, are advanced in mental representation, and are more sociable with peers.

D. Spatial Representation

1. Spatial understanding improves rapidly over the third year of life. With this representational capacity, children realize that a spatial symbol stands for a specific state of affairs in the real world.

2. Insight into one type of symbol-real world relation, such as that represented by a photograph, helps preschoolers understand others, such as simple maps.

3. Providing children with many opportunities to learn about the functions of diverse symbols, such as picture books, models, maps, and drawings, enhances spatial representation.

E. Limitations of Preoperational Thought

1. Piaget described preschool children in terms of what they cannot, rather than can, understand.

2. Operations are mental representations of actions that obey logical rules.

3. In the preoperational stage, children's thinking is rigid, limited to one aspect of a situation at a time, and strongly influenced by the way things appear at the moment.

4. Egocentric and Animistic Thinking. a. Egocentrism is the inability to distinguish the symbolic viewpoints of others from one's own. b. Piaget's most convincing demonstration of

egocentrism involves a task called the three mountains problem (see Figure 9.1). c. Animistic thinking is the belief that inanimate objects have lifelike qualities, such as thoughts, wishes, feelings, and intentions. d. Young children's thinking is so closely tied to their own point of view that they do not accommodate, or revise their thinking, in response to feedback.

5. Inability to Conserve. a. Conservation refers to the idea that certain physical characteristics of objects remain the same, even when outward appearance changes. b. Preoperational children's inability to conserve highlights several related aspects of their thinking. 1) Centration is the tendency to focus on one aspect of a situation and neglect other important features. 2) Perception-bound describes thinking that is easily distracted by the concrete, perceptual appearance of objects. 3) In focusing on states rather than transformations, children treat the initial and final states in a problem as completely unrelated. 4) Irreversibility is the inability to mentally go through a series of steps in a problem and then reverse direction, returning to the starting point.

6. Transductive Reasoning. a. Transductive reasoning is reasoning from one particular event to another particular event, instead of from general to particular or particular to general. b. Preschoolers link together two events that occur close in time and space in a cause and effect fashion.

7. Lack of Hierarchical Classification. a. Hierarchical classification is the organization of objects into classes and subclasses on the basis of similarities and differences between the groups. b. Piaget illustrated preschoolers' difficulties in hierarchical classification in his class inclusion problem (see Figure 9.3).

F. Recent Research on Preoperational Thought.

1. Many Piagetian problems contain confusing or unfamiliar elements or too many pieces of information for young children to handle at once. As a result, preschoolers' responses do not reflect their true abilities.

2. Egocentric, Animistic, and Magical Thinking . a. When researchers change the nature of the visual display to include familiar objects and use methods other than picture selection, 4-year-olds show clear awareness of other's vantage points. b. Preschoolers adapt their speech to fit the needs of their listeners. c. Research indicates children's animistic responses result from incomplete knowledge about objects, not from a rigid belief that inanimate objects are alive. d. Between 4 and 8 years, as familiarity with physical events and principles increases, children's magical beliefs decline. e. A realistic understanding of death is based on three ideas-permanence, universality, and nonfunctionality. Without explanation, young children rely on egocentric and magical thinking to make sense of death. Ethnic variations suggest that religious teachings affect children's understanding.

3. Illogical Characteristics of Thought. a. When preschoolers are given tasks that are simplified and made relevant to their everyday lives, they do better than Piaget might have expected. b. Research findings indicate that preschoolers notice transformations, reverse their thinking, and understand causality in familiar contexts. c. Transductive reasoning seems to occur only when preschoolers grapple with topics they know little about.

4. Hierarchical Classification. a. Everyday knowledge is organized into nested categories at an early age. b. By the second year, children have formed a variety of global categories consisting of objects that are the same type of thing-animals, plants, furniture, etc. c. Over the preschool years, global categories differentiate and children form basic-level categories. By age 3 or 4, children can combine basic-level categories into general categories, and they can also break them down into subcategories.

5. Appearance versus Reality. a. In certain situations, preschoolers are easily tricked by the outward appearance of things. b. Experiencing the contrast between everyday and playful use of objects may help children refine their understanding of what is real and what is unreal in their environment.

G. Evaluation of the Preoperational Stage.

1. When given simple tasks based on familiar experiences, preschoolers show the beginnings of logical operations.

2. Preschoolers have some logical understanding, which suggests that the attainment of logical operations is a gradual process.

3. Children who possess part of a capacity will benefit from training, unlike those with no understanding at all.

4. Researchers have differing opinions regarding the validity of Piaget's stage concept.

H. Piaget and Education.

1. Three educational principles derived from Piaget's theory are: a. An emphasis on discovery learning. b. Sensitivity to children's readiness to learn. c. Acceptance of individual differences.

2. Perhaps the greatest challenge to Piaget's theory is his insistence that young children learn only through acting on the environment.

II. VYGOTSKY'S SOCIOCULTURAL THEORY.

A. Children's Private Speech.

1. Piaget's View. a. Piaget called children's utterances to themselves egocentric speech. b. He believed that cognitive maturity and certain social experiences eventually bring an end to egocentric speech.

2. Vygotsky's View. a. Vygotsky believed that children speak to themselves for self-guidance and self-direction. b. He viewed language as the foundation for all higher cognitive processes, including controlled attention, memorization, and planning. c. As children get older and tasks become easier, their self-directed speech declines and is internalized as silent, inner speech. d. Children's "speech to self" is now referred to as private speech. e. Private speech is used more often when tasks are difficult or when a child is confused about how to proceed. With age private speech goes underground, changing from utterances spoken out loud into whispers and silent lip movements.

B. Social Origins of Early Childhood Cognition.

1. During early childhood, communication in the zone of proximal development includes verbal dialogues as adults and more skilled peers help children master challenging activities.

2. Effective Social Interaction. a. To promote cognitive development, social interaction must have certain features. 1) Inter-subjectivity is the process whereby two participants who begin a task with different understandings arrive at a shared understanding. 2) Scaffolding refers to a changing quality of social support over the course of a teaching session.

3. Research on Social Interaction and Cognitive Development. a. Children's planning and problem solving show more improvement when their partner is either an "expert" peer or an adult. b. Achieving intersubjectivity during peer interaction is more important in fostering cognitive development than are conflict or disagreement.

C. Vygotsky and Education.

1. Both Vygotskian and Piagetian classrooms have opportunities for active participation and acceptance of individual differences in cognitive development.

2. Piagetian classrooms offer independent discovery, whereas Vygotskian environments promote assisted discovery.

3. Assisted discovery is helped along by peer collaboration and the arrangement of cooperative learning experiences by teachers.

4. According to Vygotsky, make-believe play is a unique zone of proximal development in which children try out a variety of challenging activities and acquire many new competencies.

D. Evaluation of Vygotsky's Theory.

1. Verbal communication may not be the only means, or the most important means, through which children learn in some cultures.

2. New findings suggest that the kind of assistance offered to children varies from culture to culture, depending on the tasks that must be mastered to become a contributing member of society.

III. INFORMATION PROCESSING.

A. Attention.

1. Preschoolers spend only short times involved in tasks, have difficulty focusing on details, and are easily distracted.

2. By the end of early childhood, attention becomes more planful.

3. When given detailed pictures or written materials, preschoolers fail to search thoroughly.

B. Memory.

1. Preschoolers have the language skills to describe what they remember, and they can follow directions on simple memory tasks.

2. Recognition and Recall a. Preschoolers' recognition memory is remarkably good and becomes even more accurate by the end of early childhood. b. Young children's memory is much poorer for recall than recognition.

3. Young children are less effective at using memory strategies, deliberate mental activities that improve the likelihood of remembering. a. Rehearsal involves repeating items over and over again. b. Organizing information is the intentional grouping together of items that are alike.

4. Memory strategies that preschoolers do use are most effective when recall leads to a desired goal. But preschoolers do not yet rehearse or organize items into categories when asked to recall a set of items.

5. Memory for Everyday Experiences. a. Episodic memory involves selecting experiences, relating them to one another, and interpreting them on the basis of previous knowledge. b. Memory for Familiar Events 1) Scripts are general descriptions of what occurs and when it occurs in a particular situation. 2) With age, children's scripts become more elaborate and can be used to predict what will happen on similar occasions in the future. C. Memory for One-Time Events 1) As preschoolers' cognitive and conversational skills improve, their descriptions of onetime events become better organized, more detailed, and related to the larger context of their lives. 2) Mothers who converse about the past often, ask many questions, and provide a great deal of elaborative information have children who build a more complex autobiographical memory.

C. The Young Child's Theory of Mind.

1. As children start to reflect on their own thought processes, they begin to construct a theory of mind, or set of ideas about the mental processes of themselves and others. This understanding is often called metacognition.

2. We rely on understandings of our mental activities to interpret our own and others' behavior as well as to improve our performance on various tasks.

3. Preschoolers' Understanding of Mental Life. a. "Think," "remember," and "Pretend" are among the first verbs to appear in children's vocabularies. b. Between ages 3 and 4, children figure out that beliefs and desires determine behavior. c. By age 4, children realize that people can hold false beliefs that combine with desire to determine behavior. d. The fact that reasoning about the mind develops similarly in different cultures suggests that it is a universal feature of early childhood development.

4. Where Does a Theory of Mind Originate?. a. There are various speculations regarding how children manage to develop a theory of mind at young ages. 1) Early forms of communication. joint attention and social referencing require a beginning ability to represent another's mental state. 2) Imitation. Copying actions teaches infants that other people are like themselves. 3) Make-believe play. As children play at various roles and use one object to represent another, they notice that the mind can change what objects mean. 4) Language. Understanding the mind requires a vocabulary for talking about mental states, as well as the ability to reflect on thoughts, which is made possible by language. 5) Social interaction. -Having siblings may allow for more interactions that highlight the influence of beliefs on behavior. b. Children with infantile autism, who are indifferent to other people and display poor knowledge of social rules, are impaired in mental understanding.

5. Limitations of the Young Child's Theory of Mind. a. Preschoolers pay little attention to the process of thinking and focus on the outcomes of thought. They do not understand that mental inferences can be a source of knowledge. b. They know that people have an internal mental life, but seem to view the mind as a passive container of information.

D. Early Literacy and Mathematical Development.

1. Early Childhood Literacy. a. Preschoolers understand a great deal about written language long before they learn to read or write in conventional ways. b. Children's active efforts to construct literacy knowledge through informal experiences are called emergent literacy. c. During the early period of literacy development, children view writing as a direct representation of objects and people. d. Gradually, preschoolers become aware of general characteristics of written communication, such as left to right writing, features of certain letters, and combinations of letters. e. The more literacy-related experiences young children have in their everyday lives, the better prepared they are to tackle the complex tasks involved in becoming skilled readers and writers.

2. Young Children's Mathematical Reasoning. a. A beginning grasp of ordinality, or order relationships among quantities, is displayed by toddlers. b. In the early preschool period, children start to attach verbal labels to different amounts and states. c. By age 4, most children have established an accurate one-to-one correspondence between a short sequence of number words and the items they represent. d. The cardinality principle, grasped between the ages of 4 and 5, states that the last number in a counting sequence indicates the quantity of items in the set. e. Cross-cultural research suggests that basic arithmetic knowledge emerges universally, although ways of representing number vary.

IV. INDIVIDUAL DIFFERENCES IN MENTAL DEVELOPMENT.

A. Tests for preschoolers sample a wide range of verbal and nonverbal cognitive abilities.

B. Early Childhood Intelligence Tests.

1. Verbal questions on intelligence tests measure capacities such as vocabulary and sentence memory. Nonverbal questions assess spatial reasoning.

2. Intelligence tests do not sample the full range of human abilities, and performance can be affected by cultural and situational factors. Cultural bias in intelligence testing is a hotly debated topic.

3. Test scores are important predictors of school achievement.

C. Home Environment and Mental Development.

1. A special version of the Home Observation for Measurement of the Environment (HOME) assesses aspects of 3- to 6-year-olds' home lives that support intellectual growth.

2. Preschoolers who develop well intellectually have homes rich in toys and books, and parents who are warm and affectionate, who stimulate language and academic knowledge, who make reasonable demands for mature behavior, and who solve conflicts with reasoning rather than force.

3. The home plays a major role in the generally poorer intellectual performance of low-SES children in comparison to their higher-SES peers.

D. Preschool and Day Care.

1. Currently, 64 percent of American preschool-age children have mothers who are employed.

2. Preschool refers to half-day programs with planned educational experiences aimed at enhancing development. In contrast, day care identifies a variety of arrangements for supervising children of employed parents.

3. Types of Preschool. a. Child-centered preschools have teachers who provide a wide variety of activities from which children select, and most of the day is devoted to free play. b. In academic preschools teachers structure the program with academic repetition and drill; play is de-emphasized. c. Research shows that emphasizing formal academic training in early childhood undermines motivation and emotional well-being.

4. Early Intervention for At-Risk Preschoolers. a. Project Head Start is a federal program that provides low-income children with a year or two of preschool education before school entry and that encourages parental involvement in children's development. b. Benefits of Preschool Intervention 1) Research with Head Start children reveals that children who attended the programs scored higher in IQ and school achievement than did controls during the first 2 to 3 years of elementary school. 2) In addition, they remained ahead on measures of real-life adjustment into adolescence. They were less likely to be placed in special education classes or retained in grade, and a greater number graduated from high school. c. The Future of Preschool Intervention 1) Because of its demonstrated success, actions are currently underway to expand Head Start and strengthen its impact. 2) New interventions are being conceived as two-generation models that include developmental goals for both parents and children.

5. Day Care. a. Preschoolers exposed to poor quality day care in the United States score lower on measures of cognitive and social skills. b. Four important factors in high-quality day care are group size, caregiver/child ratio, caregiver's educational preparation, and caregiver's personal commitment to learning about and caring for children.

E. Educational Television.

1. In early and middle childhood, boys watch slightly more TV than girls do. In addition, low-SES, ethnic minority children are more frequent viewers.

2. Research shows that "Sesame Street" works well as an academic tutor.
3. Children's programs with slow-paced action, and easy-to-follow story lines lead to more elaborate make-believe play.

V. LANGUAGE DEVELOPMENT.

A. Vocabulary Development.

1. By age 6, a child will have acquired around 10,000 words.
2. Rapid Gains in Vocabulary. a. Fast mapping is connecting a new word with an underlying concept after only a brief encounter. b. Young preschoolers seem to acquire labels for objects especially rapidly. Words for actions are soon added in large numbers, as well as modifiers that refer to noticeable features.
3. Strategies for Word Learning. a. The principle of mutual exclusivity is the assumption by children in the early stages of vocabulary growth that words mark entirely separate (nonoverlapping) categories. b. When a single object has more than one name, children look for cues in the adult's speech and behavior to determine whether the new word refers to a higher- or lower-order category or to particular features. c. According to the syntactic bootstrapping hypothesis, children deduce many word meanings by observing how words are used in the structure of sentences. d. As early as age 2, children coin new words, and preschoolers extend language meanings through metaphors involving concrete, sensory comparisons.

B. Grammatical Development.

1. Grammar refers to the way we combine words into meaningful phrases and sentences.
2. Between ages 2 and 3, English-speaking children use simple sentences that follow a subject-verb object word order.
3. From Simple Sentences to Complex Grammar. a. Over regularization is the application of regular grammatical rules to words that are exceptions. b. By age 4 to 5, children form embedded sentences, tag questions, and indirect objects. By the end of early childhood, children use most of the grammatical constructions of their language competently.
4. Strategies for Acquiring Grammar. a. According to semantic bootstrapping, young children rely on word meanings to figure out grammatical rules. b. Other theorists propose that children do not start with an innate knowledge of grammatical rules, as Chomsky hypothesized, but they do have a special language-making capacity—a set of procedures for analyzing the language they hear that supports discovery of grammatical regularities.

C. Becoming an Effective Conversationalist.

1. Pragmatics is the practical, social side of language that is concerned with how to engage in effective and appropriate communication with others.
2. At the beginning of early childhood in face-to-face interactions, children take turns, respond appropriately to their partners' remarks, and maintain a topic over time.
3. The presence of older siblings provides a language environment that is especially conducive to acquiring language pragmatics.
4. Preschoolers' speech appears less mature in highly demanding situations in which they cannot see their listeners' reactions or rely on conversational aids, such as gestures and objects to talk about.

D. Supporting Language Learning in Early Childhood.

1. Opportunities for conversational give-and-take with adults are consistently related to general measures of language progress.

2. Sensitive, caring adults give helpful, explicit feedback and do not overcorrect a child's language mistakes.

3. Expansions are adult responses that elaborate on a child's utterance, thereby increasing its complexity.

4. Recasts are responses that restructure children's incorrect speech into a more mature form.