DSM-IV Criteria for Alcohol Abuse:

Recurrent alcohol use - Neglect of children

Continued alcohol use despite persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of the alcohol (e.g., arguments with spouse about consequences of intoxication or physical fights).

American Psychiatric Association. 1994. Diagnostic and Statistical Manual of Mental Disorders (4th ed.) (DSM-IV). Washington, D.C.: APA.

Related Subjects:
Child development
Cognitive development
Learning
Parenting

COGNITIVE DEVELOPMENT

It does not take an expert to observe the many magnificent changes that take place in a human being from the time of birth through early childhood and beyond. Parents lovingly mark these changes in baby books and with photographs. Other relatives remark at the new abilities that babies seem to acquire daily. While parents may have just one or a few children to observe, developmental psychologists study many more. By studying many children over time, experts can chart the changes, and then begin to explain how they occur.

Overview of Cognitive Development

There are many different types of changes that occur over the course of a child's development. In general, cognitive development refers to the changes over time in children's thinking, reasoning, use of language, problem solving, and learning. The field is vast and researchers across the world study many different aspects of children's thinking at different points in development. For example, some researchers are interested in changes during infancy, such as when a baby recognizes her caregivers, remembers simple events, and understands the language spoken around her. Some researchers examine toddlers to learn how young children progress in their use of language and their understanding of the perspectives of the people around them. The early school years are studied to learn how children become more sophisticated in their ability to solve problems and use their memories. Yet others are interested in the possible changes in academic performance of school-age children and adolescents when they transition from grade school to middle school or from middle school to high school.

Although developmental psychologists begin their work by charting the changes they see in the developing human, their ultimate goal is to explain how those changes came about. This is challenging because humans are dynamic, complex beings who are shaped by different people and events. It is often difficult to draw conclusions about exactly which influences and experiences are most important for particular aspects of cognitive development. Thus, psychologists examine a variety of influences including changes in the brain, the influence of parents, the effect of a child's interaction with siblings and peers, and the role of culture. Typically, in order to accurately characterize aspects of development, psychologists must consider interactions between physiological changes in the brain and the child's social environment. For example, people often use child-directed speech when talking with young children. This type of language accentuates word boundaries and is spoken more slowly compared to adult-directed speech. This aspect of the child's environment may interact with changes in the baby's brain to help the baby comprehend the language spoken around her.

Three theories have had a substantial influence on research in cognitive development. It is important to examine these theories, and a subset of the key experimental demonstrations that support them, to understand how each perspective emphasizes different influences as critical to a child's development. Interestingly, historical trends in the field can often be explained by understanding which theory was most influential during various periods over the last half of the twentieth century.

The first major theory of cognitive development emerged during the 1950s when the work of Swiss psychologist Jean Piaget was discovered and translated. A second major theory of cognitive development, known as the sociocultural theory, can be attributed to translations of work done by Russian psychologist, Lev Vygotsky, who was a contemporary of Piaget. A final important class of theories, information-processing theories, has focused on the child's ability to process information and emerges from an interaction between environmental influences and physiological changes in the child's brain. These three theoretical perspectives have been influential for more than half a century and continue to inform developmental research that is conducted in the early twenty-first century.

Piaget's Theory of Cognitive Development

Piaget is considered the father of cognitive development because his studies were the first to examine children's thinking and because he offered a comprehensive theory of how cognition changed over time. His theory of cognitive development was based on data from a series of experiments and interviews of children (including his own) that explored their thinking in a variety of contexts. Piaget's theory consisted of four stages of development from birth to adolescence: sensorimotor, preoperational, concrete operational, and formal operational.

Piaget's Four Stages

The sensorimotor stage describes the years from birth to about age two. During this time the infant learns to coordinate the visual and tactile information she receives from the

world around her with her emerging motor skills. For example, the child learns that by moving her eyes she can see a different part of her world and monitor how her arms or legs are interacting with various objects. Throughout these first two years of life the infant becomes increasingly aware of the world outside of herself and develops her ability to act on it.

The preoperational stage lasts from about two years of age until about six years of age. Piaget described preoperational children as egocentric; they have difficulty seeing the world from a perspective that is different from their own. A classic illustration of this was children's performance on Piaget and BärbelInhelder's three mountain task. Children viewed a three-dimensional display of three mountains from a particular perspective. Each mountain was slightly different in shape and had a small distinguishing reference object on top (e.g., a church steeple). The child was asked to select a two-dimensional picture that represented what another person would see from a different vantage point. Not surprisingly, the children were unsuccessful at seeing the display from another person's perspective. They often chose the picture of the mountains as they saw them from their own perspective.

FIGURE 1: Preschool children shown this diorama of three mountains with a distinctive landmark on each mountain were unable to say how the scene might look from perspectives other than the one they had adopted at the moment. (From Piaget &Inhelder, 1956.)

The third stage, concrete operations, lasts from about six years of age until about twelve years of age. In this stage, children become more flexible in their thinking and more able to perform concrete mental operations, such as conservation, which requires the simultaneous consideration of multiple pieces of information. In a typical task involving the conservation of liquid, water from a short, fat glass is poured into an empty glass that is tall and skinny. In order to understand that the volume of water does not change even though the level of the water does, the child must account for change in two different aspects at once: the circumference of the glass and the height of the liquid in that glass.

Piaget argued that in the formal operations stage children become even more flexible in their thinking and are able to think about the world more abstractly. During this final stage, from about twelve years of age through adolescence, children can think about hypothetical problems and give hypothetical solutions to those problems, such as how a society would maintain peace if there were no laws.

Critiques of Piaget's Theory

Piaget is widely recognized for his substantial contribution to the study of cognitive development. His experiments laid the foundation for much of the early work that examined cognitive development. During the 1970s and 1980s, however, much research questioned the timing of Piaget's stages. Because children vary widely as to when a particular stage starts or ends, it is unclear whether cognitive development occurs in stages, as Piaget's theory suggests, or whether it is a continuous process. Specifically, many researchers believe that Piaget underestimated the timing of some of children's abilities and that sometimes children understand a concept before they are able to demonstrate their understanding of it. This "competence performance gap" can occur when a child's motor skills are not advanced enough or their language skills are not sophisticated enough to indicate their knowledge and mental processes.

One example of a cognitive deficit inappropriately attributed to the preoperational stage of development involves object permanence. A child who understands object permanence realizes that an object continues to exist when it is moved out of sight. Some researchers suggest that a competence performance gap accounts for Piaget not finding evidence of object permanence in the sensorimotor stage. Piaget conducted the following experiment to examine an infant's understanding of object permanence. He showed an object such as a stuffed animal to an infant and then placed it behind an opaque screen that was in front of the infant. Piaget noticed that as soon as the object "disappeared" behind the screen the infant acted as if it had never existed and did not try to look behind the screen. Contrary to Piaget's suggestion that the infants in this study were unaware that the object still existed when it was out of view, some researchers have argued that these infants did indeed realize that the object existed, but that it was difficult for them to coordinate reaching around the screen with their memory for the object.

Researchers tested whether it was truly the difficulty of coordinating the motor skills or whether the children thought that out of sight was out of mind as Piaget had argued. Renee Baillargeon and her colleagues used a method different from Piaget's and were able to show that infants as young as four months old seemed to understand that an object that was out of sight still existed. Baillargeon used a methodology known as habituation, which exploits the tendency of infants to look at interesting displays until they become bored and look away. Thus, this method provides information about which objects in the environment capture an infant's attention without relying on their ability to coordinate motor movements. Subsequently, researchers can change a display in certain ways to examine whether the infant is sensitive to the change. Typically, a researcher records the length of time that an infant looks at the subsequent changed display. If the infant does not look at the second display for a longer amount of time than he looked at the first display, then the researcher concludes that the infant does not see this display as different from the original. If the infant does look for a longer amount of time, then it is assumed that he sees the subsequent display as novel and distinct from the first display.

To test this prediction, Baillargeon and Julie DeVos created a display that showed two events. In one display, a short carrot moved from one side of a screen to the other by passing behind an opaque screen. In the other scenario, a tall carrot passed behind the identical opaque screen. Once the infant habituated to the display, one of two different subsequent displays was shown: an "impossible" event in which the tall carrot passed behind a new screen containing a translucent window that should show the top of the carrot but did not, or a "possible" event showing the short carrot moving behind the screen where it just passed underneath the translucent window and was not seen until it came out on the other side. Because infants as young as four months looked longer at the "impossible" event than the "possible" event, Baillargeon suggested that the infants did remember the characteristics of the carrots and had expectations about whether they should appear in the window. Based on findings such as this, some researchers have argued that Piaget underestimated infants' understanding because he did not take into account the gap between the child's understanding and her ability to demonstrate that understanding. Piaget had contended that infants appear to understand object permanence at nine months old, which is when infants can coordinate their motor skills to successfully reach for a hidden object.

Piaget also seemed to underestimate children's ability to see the world from another person's viewpoint. Piaget used the three mountain task as evidence that children had difficulty taking another's perspective. The three mountain task, however, is not easy. Although the mountains are slightly different in size and have small distinguishing marks on the top, they are still quite similar in appearance. According to Helen Borke, when this task has been modified using a town scene that contains familiar animals and a number of different-shaped landmarks, children in the preoperational stage are successful at taking another person's perspective despite Piaget's contrary prediction.

During the 1980s and 1990s an area of research concerned with children's perspective-taking abilities engaged the field of cognitive development. This area focused on a child's "theory of mind," suggesting that children have theories for the way their minds work, as well as the way other people's minds work. Heinz Wimmer and Josef Perner developed a classic demonstration of children's "theory of mind." Using a task called the Maxi Chocolate Task, Wimmer and Perner told children a story about a child named "Maxi," who places a piece of chocolate in the kitchen cabinet and then goes out to play. While he is out to play, his mother moves the chocolate to another location. Later, Maxi comes home and he wants his chocolate. The test question to the child participant is, "Where will Maxi look for his chocolate?" Three-year-olds typically respond that Maxi will look for the chocolate in the second location, because they themselves know it is there and it is difficult for them to understand that their perspective is different from Maxi's. Alternatively, most four-year-olds and nearly all five-year-olds take the perspective of Maxi and answer that he will look for the chocolate in the kitchen cabinet where he left it because he does not know that his mother has moved it. Thus, contrary to Piaget's suggestion that only children between six and eight years of age will have developed a "theory of mind," this task has shown that four- and five-year-olds can take the perspective of another person.

Beyond Piaget

The work examining children's "theory of mind" is one example of how cognitive development research at the end of the twentieth century and the beginning of the twenty-first century has moved away from experiments designed to test Piaget's theory. Many researchers are no longer focused on showing which Piagetian tasks can be done earlier and instead focus on providing theoretical explanations for why and when children might be successful on certain tasks. Some of these studies employ modern neuro-imaging techniques (such as positron emission tomography, functional magnetic resonance imaging, and electrical encephalographic techniques) to examine the effects of cognitive development in the brain. For example, if psychologists using these techniques can map out when the various brain structures develop during childhood, it may become possible to predict when various skills and capabilities that rely on those structures will emerge. Another burgeoning area of research in cognitive development examines the influence of culture on cognition in order to test for the universality or uniqueness of development across cultures. For example, the study of culture is critical for investigating how language and thought may affect each other, understanding why some people believe intelligence is primarily innate and others believe it is primarily the product of effort, and determining how people may solve problems differently based on their cultural norms and ideals.

Vygotsky's Sociocultural Theory

Vygotsky's theory emphasized the influence of culture, peers, and adults on the developing child. To understand this influence, Vygotsky proposed the "zone of proximal development." This zone refers to the difference in a child's performance when she attempts a problem on her own compared with when an adult or older child provides assistance. Imagine that a child is having difficulty with writing letters, and with the help of an adult who writes out sample letters or helps the child trace over letters, this same child is able to make progress. The help from the adult is called scaffolding. Just as the scaffolding of a building helps to support it, assistance from adults and peers in a child's environment helps support the child's development.

Vygotsky also discussed the importance of cultural tools to the sociocultural approach. These are items in the culture such as computers, books, and traditions that teach children about the expectations of the group. By participating in the cultural events and using the tools of the society, the child learns what is important in his culture. For example, in the United States a child attends school from about six years of age until eighteen years of age, and thus it is in school that children learn important skills such as mathematics. In some countries, such as in Brazil, however, children learn mathematics via buying and selling candy in the streets of the city.

Information-Processing Theories

Vygotsky believed the influence of the environment was crucial for development, whereas Piaget believed that the child's ability to independently explore her world was important. Although neither researcher emphasized the role of physiological changes in the brain and their contribution to a child's increasing ability to process information, neither would deny the significance of those changes for development. Information-processing theories attempt to account for changes in a child's cognitive ability via interactions between the developing brain and the child's increasing knowledge of the world. For example, researchers interested in these interactions may examine changes in working memory and how a child's world knowledge affects it.

Working memory (sometimes called short-term memory) is the memory that allows a person to remember a phone number that he has just looked up in the phone book. It involves mental rehearsal processes that maintain the information in memory. The capacity of young children's working memory is under debate. Early on, researchers measured the number of digits children could remember.

FIGURE 2: Study in which infants were tested for object permanence using the habituation-dishabituation response. (a). First, infants were habituated to two events: a short carrot and a tall carrot moving behind a yellow screen, on alternate trials. Then two test events were presented, in which the color of the screen was changed to blue to help the infant notice that now it had a window. (b). In the possible event, the short carrot (which was shorter than the window's lower edge) moved behind the blue screen and reappeared on the other side. (c). In the impossible event, the tall carrot (which was taller than the window's lower edge) moved behind the screen, did not appear in the window, but then miraculously emerged intact on the other side. Infants as young as three-and-one-half months dishabituated to the impossible event. This suggests that young babies must have some notion of object permanence—that an object continues to exist where it is hidden from view. (Adapted from R. Baillargeon and J. DeVos, 1991, "Object Permanence in Young Infants: Further Evidence." Child Development, 62, p. 1230. ©The Society for Research in Child Development.Reprinted by permission.) from this work suggested that children had a smaller working memory capacity compared to adults. For example, participants were asked to listen to a list of single digits and repeat them back in the order they had heard them. Researchers found that adults could typically remember between five and nine digits and children typically remembered about three or four.

Despite this clear result, other researchers, such as Robbie Case, argue that the overall capacity of working memory does not change over the course of development. What changes is the child's ability to efficiently process information. For example, in order to perform well on a digit span task one has to represent the numbers in some way. Adults and older children can quickly repeat the numbers aloud or in their mind. Case, D. Midian Kurland, and Jill Goldberg found that young children take longer to repeat a number. Therefore more of the young child's resources are taken up with saying the numbers than with efficiently remembering them.

Implications of Cognitive Development for Schooling and Parenting

Research in cognitive development prompted by information-processing theories, Piaget's stage theory, and Vygotsky's sociocultural theory have not only informed the work of developmental psychologists but also proved useful in schools and to parents. For example, teacher and student understanding of the workings of memory can affect student performance in school, and teachers can use developmental research to help students become more aware of strategies that may help them improve their memory. In turn, students can enhance their "meta-memory" skills by becoming more aware of the limitations of their memory and the activities that may enhance it. For example, students can learn that repeatedly reading over their class notes does not ensure later recall of that material. Instead, mental strategies called "mnemonics" may be used to successfully learn information in a manner that promotes later recall. For example, one technique, called elaboration, involves relating the material to be learned to already known information in memory. This process, by associating new information with old information, not only helps prevent forgetting, but also increases the number of cues that may lead to later retrieval of that information.

Parents can also benefit from the knowledge gained from current and past research in cognitive development. For example, Vygotsky described parental roles as being critical in a child's development. Early on parents can provide the help that children need to develop certain culturally relevant skills. Parents' sensitivity to their child's skill level and their ability to allow the child to gradually take on more and more responsibility in a task provides an excellent way for children to learn.

Researchers in the field of cognitive development strive to describe and understand changes in children's thinking over the course of development. The work of Piaget and his stage theory of cognitive development guided much of the early work in that field. More recent investigations, however, attempt to understand the continuity of development. Researchers investigate interactions between biological and environmental variables, and thus focus on the ways in which culture, the family, the peer group, and the developing brain make complex contributions to a child's development.

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