Developmental Psychology: Theories of Development - Part I

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The Psychoanalytic Perspective

• According to the psychoanalytic perspective, children move through a series of stages in which they confront conflicts between biological drives and social expectations. How these conflicts are resolved determines the person’s ability to learn, to get along with others, and to cope with anxiety.

• Among the many individuals who contributed to the psychoanalytic perspective, two were especially influential: Sigmund Freud, founder of the psychoanalytic movement, and Erik Erikson.
Freud’s Theory Freud (1856–1939), a Viennese physician, sought a cure for emotionally troubled adults by having them talk freely about painful events of their childhoods. Working with these recollections, Freud examined the unconscious motivations of his patients and constructed his psychosexual theory, which emphasizes that how parents manage their child’s sexual and aggressive drives in the first few years is crucial for healthy personality development.

In Freud’s theory, three parts of the personality—id, ego, and superego—become integrated during a sequence of five stages. The id, the largest portion of the mind, is the source of basic biological needs and desires. The ego, the conscious, rational part of personality, emerges in early infancy to redirect the id’s impulses so they are discharged in acceptable ways. Between 3 and 6 years of age, the superego, or conscience, develops through interactions with parents, who insist that children conform to the values of society.

Now the ego faces the increasingly complex task of reconciling the demands of the id, the external world, and conscience (Freud, 1923/1974). For example, when the id impulse to grab an attractive toy from a playmate confronts the superego’s warning that such behavior is wrong, the ego must mediate between these two forces, deciding which will win the inner struggle or, alternatively, working out a compromise, such as asking for a turn with the toy. According to Freud, the relations established among id, ego, and superego during the preschool years determine the individual’s basic personality.
• Freud (1938/1973) believed that during childhood, sexual impulses shift their focus from the oral to the anal to the genital regions of the body. In each stage, parents walk a fine line between permitting too much or too little gratification of their child’s basic needs.

• If parents strike an appropriate balance, then children grow into well-adjusted adults with the capacity for mature sexual behavior and investment in family life.

• Freud’s theory was the first to stress the influence of the early parent–child relationship on development—an emphasis that continues to play a role in many contemporary theories.

• But his perspective was eventually criticized. First, it overemphasized the influence of sexual feelings in development. Second, because it was based on the problems of sexually repressed, well-to-do adults in nineteenth-century Victorian society, it did not apply in other cultures. Finally, Freud had not studied children directly.
Freud’s Psychosexual Stages

Oral Stage: Birth to 1 Year
Erogenous Zone: Mouth

Anal Stage: 1 to 3 Year
Erogenous Zone: Bowel and Bladder Control

Phallic Stage: 3 to 6 Year
Erogenous Zone: Genitals

Latent Stage: 6 to Puberty
Libido Inactive

Genital Stage: Puberty to Death
Maturing Sexual Interests
Erikson’s Theory

• Several of Freud’s followers took what was useful from his theory and improved on his vision. The most important of these neo-Freudians is Erik Erikson (1902–1994), who expanded the picture of development at each stage. In his psychosocial theory, Erikson emphasized that in addition to mediating between id impulses and superego demands, the ego makes a positive contribution to development, acquiring attitudes and skills that make the individual an active, contributing member of society. A basic psychosocial conflict, which is resolved along a continuum from positive to negative, determines healthy or maladaptive outcomes at each stage. Erikson’s first five stages parallel Freud’s stages, but Erikson added three adult stages. He was one of the first to recognize the lifespan nature of development.

• Unlike Freud, Erikson pointed out that normal development must be understood in relation to each culture’s life situation. For example, in the 1940s, he observed that Yurok Indians of the U.S. northwest coast deprived babies of breastfeeding for the first 10 days after birth and instead fed them a thin soup. At age 6 months, infants were abruptly weaned—if necessary, by having the mother leave for a few days. From our cultural vantage point, these practices may seem cruel. But Erikson explained that because the Yurok depended on salmon, which fill the river just once a year, the development of considerable self-restraint was essential for survival. In this way, he showed that child rearing is responsive to the competencies valued and needed by the child’s society.
<table>
<thead>
<tr>
<th>Approximate Age</th>
<th>Freud's Psychosexual Stage</th>
<th>Erikson's Psychosocial Stage</th>
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<tr>
<td>Birth–1 year</td>
<td>Oral: If oral needs are not met through sucking from breast or bottle, the individual may develop such habits as thumb sucking, fingernail biting, overeating, or smoking.</td>
<td><strong>Basic trust versus mistrust:</strong> From warm, responsive care, infants gain a sense of trust, or confidence, that the world is good. Mistrust occurs if infants are neglected or handled harshly.</td>
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<tr>
<td>1–3 years</td>
<td>Anal: Toddlers and preschoolers enjoy holding and releasing urine and feces. If parents toilet train before children are ready or make too few demands, conflicts about anal control may appear in the form of extreme orderliness or disorder.</td>
<td><strong>Autonomy versus shame and doubt:</strong> Using new mental and motor skills, children want to decide for themselves. Parents can foster autonomy by permitting reasonable, free choice and not forcing or shaming the child.</td>
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<td>3–6 years</td>
<td>Phallic: As preschoolers take pleasure in genital stimulation, Freud's Oedipus conflict for boys and Electra conflict for girls arise: Children feel a sexual desire for the other-sex parent. To avoid punishment, they give up this desire and adopt the same-sex parent's characteristics and values. As a result, the superego is formed, and children feel guilty when they violate its standards.</td>
<td><strong>Initiative versus guilt:</strong> Through make-believe play, children gain insight into the person they can become. Initiative—a sense of ambition and responsibility—develops when parents support their child's sense of purpose. But if parents demand too much self-control, children experience excessive guilt.</td>
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<td>6–11 years</td>
<td>Latency: Sexual instincts die down, and the superego strengthens as the child acquires new social values from adults and same-sex peers.</td>
<td><strong>Industry versus inferiority:</strong> At school, children learn to work and cooperate with others. Inferiority develops when negative experiences at home, at school, or with peers lead to feelings of incompetence.</td>
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<tr>
<td>Adolescence</td>
<td>Genital: With puberty, sexual impulses reappear. Successful development during earlier stages leads to marriage, mature sexuality, and child rearing.</td>
<td><strong>Identity versus role confusion:</strong> By exploring values and vocational goals, the young person forms a personal identity. The negative outcome is confusion about future adult roles.</td>
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<tr>
<td>Young adulthood</td>
<td></td>
<td><strong>Intimacy versus isolation:</strong> Young adults establish intimate relationships. Because of earlier disappointments, some individuals cannot form close bonds and remain isolated.</td>
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<tr>
<td>Middle adulthood</td>
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<td><strong>Generativity versus stagnation:</strong> Generativity means giving to the next generation through child rearing, caring for others, or productive work. The person who fails in these ways feels an absence of meaningful accomplishment.</td>
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<tr>
<td>Old age</td>
<td></td>
<td><strong>Integrity versus despair:</strong> Integrity results from feeling that life was worth living as it happened. Older people who are dissatisfied with their lives fear death.</td>
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Contributions and Limitations of the Psychoanalytic Perspective

• A special strength of the psychoanalytic perspective is its emphasis on the individual’s unique life history as worthy of study and understanding. Consistent with this view, psychoanalytic theorists accept the *clinical*, or *case study method*, which synthesizes information from a variety of sources into a detailed picture of the personality of a single child.

• Psychoanalytic theory has also inspired a wealth of research on many aspects of emotional and social development, including infant–caregiver attachment, aggression, sibling relationships, child-rearing practices, morality, gender roles, and adolescent identity.

• Despite its extensive contributions, the psychoanalytic perspective is no longer in the mainstream of child development research. Psychoanalytic theorists may have become isolated from the rest of the field because they were so strongly committed to in-depth study of individual children that they failed to consider other methods. In addition, many psychoanalytic ideas, such as psychosexual stages and ego functioning, are too vague to be tested empirically (Crain, 2005; Thomas, 2005). Nevertheless, Erikson’s broad outline of psychosocial change captures the essence of psychosocial attainments at each age period.
As the psychoanalytic perspective gained in prominence, child study was also influenced by a very different perspective. According to **behaviourism**, directly observable events—stimuli and responses—are the appropriate focus of study. North American behaviourism began in the early twentieth century with the work of psychologist John Watson (1878–1958), who wanted to create an objective science of psychology.

**Traditional Behaviourism:** Watson was inspired by Russian physiologist Ivan Pavlov’s studies of animal learning. Pavlov knew that dogs release saliva as an innate reflex when they are given food. But he noticed that his dogs started salivating before they tasted any food—when they saw the trainer who usually fed them. The dogs, Pavlov reasoned, must have learned to associate a neutral stimulus (the trainer) with another stimulus (food) that produces a reflexive response (salivation). Because of this association, the neutral stimulus alone could bring about a response resembling the reflex. Eager to test this idea, Pavlov successfully taught dogs to salivate at the sound of a bell by pairing it with the presentation of food. He had discovered **classical conditioning**.

Watson wanted to find out if classical conditioning could be applied to children’s behavior. In a historic experiment, he taught Albert, an 11-month-old infant, to fear a neutral stimulus—a soft white rat—by presenting it several times with a sharp, loud sound, which naturally scared the baby. Little Albert, who at first had reached out eagerly to touch the furry rat, began to cry and turn his head away at the sight of it (Watson & Raynor, 1920). In fact, Albert’s fear was so intense that researchers eventually challenged the ethics of studies like this one. Consistent with Locke’s tabula rasa, Watson concluded that environment is the supreme force in development and that adults can mould children’s behavior by carefully controlling stimulus–response associations. He viewed development as a continuous process—a gradual increase with age in the number and strength of these associations.
• Another form of behaviourism was B. F. Skinner’s (1904–1990) *operant conditioning theory*. According to Skinner, the frequency of a behavior can be increased by following it with a wide variety of *reinforcers* — food, drink, praise, a friendly smile, or a new toy—or decreased through *punishment*, such as disapproval or withdrawal of privileges.

• **Social Learning Theory**

• Several kinds of *social learning theory* emerged. The most influential, devised by Albert Bandura (1977), emphasized *modelling*, otherwise known as *imitation* or *observational learning*, as a powerful source of development. The baby who claps her hands after her mother does so, the child who angrily hits a playmate in the same way that he has been punished at home, and the teenager who wears the same clothes and hairstyle as her friends at school are all displaying observational learning.

• In his early work, Bandura found that diverse factors influence children’s motivation to imitate—their own history of reinforcement or punishment for the behavior, the promise of future reinforcement or punishment, and even vicarious reinforcement or punishment (observing the model being reinforced or punished).
• Bandura’s work continues to influence much research on children’s social development. But today, like the field of child development as a whole, his theory stresses the importance of **cognition**, or thinking. Bandura has shown that children’s ability to listen, remember, and abstract general rules from complex sets of observed behaviours affects their imitation and learning. In fact, the most recent revision of Bandura’s theory places such strong emphasis on how children think about themselves and other people that he calls it a **social-cognitive** rather than a social learning approach.

• In Bandura’s revised view, children gradually become more selective in what they imitate. From watching others engage in self-praise and self-blame and through feedback about the worth of their own actions, children develop **personal standards** for behavior and a **sense of self-efficacy** — the belief that their own abilities and characteristics will help them succeed. These cognitions guide responses in particular situations. For example, imagine a parent who often remarks, “I’m glad I kept working on that task, even though it was hard,” who explains the value of persistence, and who encourages it by saying, “I know you can do a good job on that homework!” Soon the child starts to view herself as hardworking and high-achieving and selects people with these characteristics as models. In this way, as children acquire attitudes, values, and convictions about themselves, they control their own learning and behavior.
### Positive & Negative Reinforcement or Punishment

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<th>Positive Reinforcement</th>
<th>Negative Reinforcement</th>
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<tr>
<td><strong>Reinforcement</strong></td>
<td><strong>Punishment</strong></td>
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<tr>
<td>(Increase/maintain behavior)</td>
<td>(decrease behavior)</td>
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<tr>
<td>Add pleasant stimulus to increase/maintain behavior</td>
<td>Add unpleasant stimulus to decrease behavior</td>
</tr>
<tr>
<td>Remove unpleasant stimulus to increase/maintain behavior</td>
<td>Remove pleasant stimulus to decrease behavior</td>
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</table>

**Positive Reinforcement**

Introduce a reinforcing stimulus following a specific behavior.

**Positive Punishment**

Attempt to decrease an undesirable behavior by introducing an unfavorable outcome.

**Negative Reinforcement**

Strengthen a behavior that avoids or removes a negative outcome.
Contributions and Limitations of Behaviourism and Social Learning Theory

• Behaviourism and social learning theory have had a major impact on practices with children. **Behavior modification** consists of procedures that combine conditioning and modelling to eliminate undesirable behaviours and increase desirable responses. It has been used to relieve a wide range of serious developmental problems, such as persistent aggression, language delays, and extreme fears (Martin & Pear, 2007).

• Behavior modification is also effective in dealing with common, everyday difficulties, including poor time management; unwanted habits such as nail biting and thumb sucking; and anxiety over such recurrent events as test-taking, public speaking, and medical and dental treatments. In one study, researchers reduced 4- and 5-year-olds’ unruliness in a preschool classroom by reinforcing them with tokens (which they could exchange for treats) when they behaved appropriately and punishing them by taking away tokens when they screamed, threw objects, attacked other children, or refused to comply with a teacher’s request. In another investigation, children with acute burn injuries played a virtual reality game while nurses engaged in the painful process of changing their bandages. Visual images and sound effects delivered through a headset made the children feel as if they were in a fantasy world. As the game reinforced children’s concentration and pleasure, it distracted them from the medical procedure, causing their pain and anxiety to drop sharply compared with dressing changes in which the game was unavailable.

• Nevertheless, many theorists believe that behaviourism and social learning theory offer too narrow a view of important environmental influences. These extend beyond immediate reinforcements, punishments, and modelled behaviours to children’s rich physical and social worlds. Behaviourism and social learning theory have also been criticized for underestimating children’s contributions to their own development. Bandura, with his emphasis on cognition, is unique among theorists whose work grew out of the behaviourist tradition in granting children an active role in their own learning.
Piaget’s Cognitive-Developmental Theory

• If one individual has influenced the contemporary field of child development more than any other, it is Swiss cognitive theorist Jean Piaget (1896–1980). According to his cognitive-developmental theory, children actively construct knowledge as they manipulate and explore their world.

Basic Characteristics of Piaget’s Stages

• Piaget believed that children move through four stages—sensorimotor, preoperational, concrete operational, and formal operational—during which infants’ exploratory behaviours transform into the abstract, logical intelligence of adolescence and adulthood.

• Piaget’s stage sequence has three important characteristics:
  ● The stages provide a general theory of development, in which all aspects of cognition change in an integrated fashion, following a similar course.
  ● The stages are invariant; they always occur in a fixed order, and no stage can be skipped.
  ● The stages are universal; they are assumed to characterize children everywhere.

• Piaget regarded the order of development as rooted in the biology of the human brain. But he emphasized that individual differences in genetic and environmental factors affect the speed with which children move through the stages.
Piaget’s Ideas About Cognitive Change

• According to Piaget, specific psychological structures called schemes—organized ways of making sense of experience—change with age.

• At first, schemes are sensorimotor action patterns. Watch a 6-month-old baby catch sight of, grasp, and release objects. Her “dropping scheme” is fairly rigid—she simply lets go of a rattle or teething ring. By 18 months, her dropping scheme has become deliberate and creative. Given an opportunity, she might toss all sorts of objects down the basement stairs, throwing some up in the air, bouncing others off walls, releasing some gently and others forcefully.

• Soon, instead of just acting on objects, the toddler shows evidence of thinking before she acts. For Piaget, this change marks the transition from a sensorimotor approach to the world to a cognitive approach based on mental representations—internal depictions of information that the mind can manipulate.

• Our most powerful mental representations are images—mental pictures of objects, people, and spaces—and concepts, categories in which similar objects or events are grouped together. We use a mental image to retrace our steps when we’ve misplaced something or to imitate another’s behavior long after observing it. By thinking in concepts and labelling them (for example, ball for all rounded, movable objects used in play), we become more efficient thinkers, organizing our diverse experiences into meaningful, manageable, and memorable units.

• In Piaget’s theory, two processes account for this change from sensorimotor to representational schemes and for further changes in representational schemes from childhood to adulthood: adaptation and organization.
Adaptation

- Adaptation involves building schemes through direct interaction with the environment. It consists of two complementary activities: assimilation and accommodation.
- During assimilation, we use our current schemes to interpret the external world. The infant who repeatedly drops objects is assimilating them into his sensorimotor “dropping scheme.” And the preschooler who, seeing a camel at the zoo, calls out, “Horse!” has sifted through her conceptual schemes until she finds one that resembles the strange-looking creature.
- In accommodation, we create new schemes or adjust old ones after noticing that our current way of thinking does not capture the environment completely. The baby who drops objects in different ways is modifying his dropping scheme to take account of the varied properties of objects. And the preschooler who calls a camel a “lumpy horse” has noticed that camels differ from horses in certain ways and has revised her scheme accordingly.
- According to Piaget, the balance between assimilation and accommodation varies over time. When children are not changing much, they assimilate more than they accommodate— a steady, comfortable state that Piaget called cognitive equilibrium. During times of rapid cognitive change, children are in a state of disequilibrium, or cognitive discomfort. Realizing that new information does not match their current schemes, they shift from assimilation to accommodation. After modifying their schemes, they move back toward assimilation, exercising their newly changed structures until they are ready to be modified again.
- Piaget’s term for this back-and-forth movement between equilibrium and disequilibrium is equilibration. Each time equilibration occurs, more effective schemes are produced. Because the times of greatest accommodation are the earliest ones, the sensorimotor stage is Piaget’s most complex period of development.
Organization

• Schemes also change through organization, a process that occurs internally, apart from direct contact with the environment.
• Once children form new schemes, they rearrange them, linking them with other schemes to create a strongly interconnected cognitive system. For example, eventually the baby relates “dropping” to “throwing” and to his developing understanding of “nearness” and “farness.”
• According to Piaget, schemes truly reach equilibrium when they become part of a broad network of structures that can be jointly applied to the surrounding world.

<table>
<thead>
<tr>
<th>Piagetian Concept</th>
<th>Example</th>
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<tbody>
<tr>
<td>Equilibrium</td>
<td>Toddler who has never seen anything fly but birds thinks that all flying objects are birds</td>
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<tr>
<td>Assimilation Start</td>
<td>Seeing an airplane flying prompts the child to call it a birdie</td>
</tr>
<tr>
<td>Accommodation</td>
<td>Child experiences conflict upon realizing that the new birdie has no feathers. Concludes it is not a bird and asks for the proper term or invents a name. Equilibrium restored</td>
</tr>
<tr>
<td>Organization Finish</td>
<td>Forms hierarchical scheme consisting of a superordinate class (flying objects) and two subordinate classes (birdies and airplanes).</td>
</tr>
</tbody>
</table>
Boy has learned schema of cat

Boy saw a cub and called it "cat". Sister said "no, it's a cub".

He accommodate new schema of cub.
The Sensorimotor Stage: Birth to 2 Years

- The **sensorimotor stage** spans the first two years of life. Its name reflects Piaget’s belief that infants and toddlers “think” with their eyes, ears, hands, and other sensorimotor equipment. They cannot yet carry out many activities mentally. Yet the advances of the sensorimotor stage are so vast that Piaget divided it into six substages.

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<tr>
<th>SENSORIMOTOR SUBSTAGE</th>
<th>TYPICAL ADAPTIVE BEHAVIORS</th>
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<tbody>
<tr>
<td>1. Reflexive schemes (birth–1 month)</td>
<td>Newborn reflexes</td>
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<tr>
<td>2. Primary circular reactions (1–4 months)</td>
<td>Simple motor habits centered around the infant’s own body; limited anticipation of events</td>
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<tr>
<td>3. Secondary circular reactions (4–8 months)</td>
<td>Actions aimed at repeating interesting effects in the surrounding world; imitation of familiar behaviors</td>
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<tr>
<td>4. Coordination of secondary circular reactions (8–12 months)</td>
<td>Intentional, or goal-directed, behavior; ability to find a hidden object in the first location in which it is hidden (object permanence); improved anticipation of events; imitation of behaviors slightly different from those the infant usually performs</td>
</tr>
<tr>
<td>5. Tertiary circular reactions (12–18 months)</td>
<td>Exploration of the properties of objects by acting on them in novel ways; imitation of novel behaviors; ability to search in several locations for a hidden object (accurate A-B search)</td>
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<tr>
<td>6. Mental representation (18 months–2 years)</td>
<td>Internal depictions of objects and events, as indicated by sudden solutions to problems; ability to find an object that has been moved while out of sight (invisible displacement); deferred imitation; and make-believe play</td>
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</table>
• Piaget based this sequence on a very small sample: his own three children. He observed his son and two daughters carefully and presented them with everyday problems (such as hidden objects) that helped reveal their understanding of the world.

• According to Piaget, at birth infants know so little that they cannot explore purposefully. The circular reaction provides a special means of adapting their first schemes. It involves stumbling onto a new experience caused by the baby’s own motor activity. The reaction is “circular” because, as the infant tries to repeat the event again and again, a sensorimotor response that originally occurred by chance strengthens into a new scheme.

• Imagine a 2-month-old who accidentally makes a smacking noise after a feeding. Finding the sound intriguing, the baby tries to repeat it until she becomes quite expert at smacking her lips.

• The circular reaction initially centres on the infant’s own body but later turns outward, toward manipulation of objects. In the second year, it becomes experimental and creative, aimed at producing novel effects in the environment.

• Infants’ difficulty inhibiting new and interesting behaviours may underlie the circular reaction. This immaturity in inhibition seems to be adaptive, helping to ensure that new skills will not be interrupted before they strengthen. Piaget considered revisions in the circular reaction so important that he named the sensorimotor substages after them.
Sensorimotor Development

• Piaget saw newborn reflexes as the building blocks of sensorimotor intelligence. In Substage 1, babies suck, grasp, and look in much the same way, no matter what experiences they encounter.

• **Repeating Chance Behaviours**

  • Around 1 month, as babies enter Substage 2, they start to gain voluntary control over their actions through the primary circular reaction, by repeating chance behaviours largely motivated by basic needs. This leads to some simple motor habits, such as sucking the fist or thumb. Babies in this substage also begin to vary their behavior in response to environmental demands. For example, they open their mouths differently for a nipple than for a spoon. And they start to anticipate events: A hungry 3-month-old is likely to stop crying as soon as his mother enters the room—a signal that feeding time is near.

  • During Substage 3, from 4 to 8 months, infants sit up and become skilled at reaching for and manipulating objects—motor achievements that strengthen the secondary circular reaction, through which they try to repeat interesting events in the surrounding environment that are caused by their own actions. For example, Piaget (1936/1952) dangled several dolls in front of his 4-month-old son, Laurent. After accidentally knocking them and producing a fascinating swinging motion, Laurent gradually built the sensorimotor scheme of “hitting.” Improved control over their own behavior also permits infants to imitate others’ behavior more effectively. However, 4- to 8-month-olds cannot adapt flexibly and quickly enough to imitate novel behaviours (Kaye & Marcus, 1981). Although they enjoy watching an adult demonstrate a game of pat-a-cake, they are not yet able to participate.
• **Intentional Behavior**

• In Substage 4, 8- to 12-month-olds combine schemes into new, more complex action sequences. Now, behaviours leading to new schemes no longer have a random, hit-or-miss quality— *accidentally* bringing the thumb to the mouth or *happening* to hit the doll. Instead, 8- to 12-month-olds can engage in **intentional**, or **goal-directed**, behavior, coordinating schemes deliberately to solve simple problems.

• The clearest example comes from Piaget’s famous object-hiding task, in which he shows the baby an attractive toy and then hides it behind his hand or under a cover. Infants in this substage can find the object by coordinating two schemes— “pushing” aside the obstacle and “grasping” the toy. Piaget regarded these **means–end action sequences** as the foundation for all problem solving.

• Retrieving hidden objects is evidence that infants have begun to master **object permanence**, the understanding that objects continue to exist when they are out of sight. But this awareness is not yet complete. Babies still make the **A-not-B search error**: If they reach several times for an object at one hiding place (A), then see it moved to another (B), they still search for it in the first hiding place (A). Piaget concluded that the babies do not yet have a clear image of the object as persisting when hidden from view.
• Infants in Substage 4, who can better anticipate events, sometimes use their capacity for intentional behavior to try to change those events. A 10-month-old might crawl after his mother when she is putting on her coat, whimpering to keep her from leaving. Also, babies can imitate behaviours slightly different from those they usually perform. After watching someone else, they try to stir with a spoon, push a toy car, or drop raisins into a cup.

• In Substage 5, the tertiary circular reaction, in which toddlers repeat behaviours with variation, emerges. For example, they can figure out how to fit a shape through a hole in a container by turning and twisting it, and they can use a stick to obtain a toy that is out of reach.

• According to Piaget, this capacity to experiment leads to a more advanced understanding of object permanence. Toddlers look for a hidden toy in more than one location, displaying an accurate A–B search. Their more flexible action patterns also permit them to imitate many more behaviours—stacking blocks, scribbling on paper, and making funny faces.
• **Mental Representation**

• In Substage 6, sensorimotor development culminates in mental representation. One sign of this capacity is that 18- to 24-month-olds arrive at solutions to problems suddenly rather than through trial-and-error behavior, apparently experimenting with actions inside their heads. Seeing her doll carriage stuck against the wall, Piaget’s daughter Lucienne paused for a moment, as if to “think,” then immediately turned the toy in a new direction.

• Representation also enables older toddlers to solve advanced object permanence problems involving *invisible displacement* —finding a toy moved while out of sight, such as into a small box while under a cover. Second, it permits **deferred imitation** —the ability to remember and copy the behavior of models who are not present. And it makes possible **make-believe play**, in which children act out everyday and imaginary activities. As the sensorimotor stage draws to a close, mental symbols have become major instruments of thinking.
The Preoperational Stage: 2 to 7 Years

• As children move from the sensorimotor to the preoperational stage, which spans the years 2 to 7, the most obvious change is an extraordinary increase in representational, or symbolic, activity. Infants’ and toddlers’ mental representations are impressive, but in early childhood, representational capacities blossom.

Advances in Mental Representation

• Piaget acknowledged that language is our most flexible means of mental representation. By detaching thought from action, it permits far more efficient thinking than was possible earlier. When we think in words, we can deal with past, present, and future at once and combine concepts in unique ways, as when we imagine a hungry caterpillar eating bananas or monsters flying through the forest at night.

• But Piaget did not regard language as the primary ingredient in childhood cognitive change. Instead, he believed that sensorimotor activity leads to internal images of experience, which children then label with words. In support of Piaget’s view, children’s first words have a strong sensorimotor basis, usually referring to objects that move or can be acted on or to familiar actions. And as we have seen, infants acquire an impressive range of categories long before they use words to label them.

• Make-Believe Play

• Make-believe is another excellent example of the development of representation in early childhood. Piaget believed that through pretending, children practice and strengthen newly acquired representational schemes. Drawing on his ideas, researchers have traced changes in make-believe play during the preschool years.
Development of Make-Believe Play.

- **Play detaches from the real-life conditions associated with it.** In early pretending, toddlers use only realistic objects—a toy telephone to talk into or a cup to drink from. Their earliest pretend acts usually imitate adults’ actions and are not yet flexible. Children younger than age 2, for example, will pretend to drink from a cup but refuse to pretend a cup is a hat. They have trouble using an object (cup) that already has an obvious use as a symbol for another object (hat).

- After age 2, children pretend with less realistic toys (a block for a telephone receiver). Gradually, they can imagine objects and events, without any support from the real world. And by age 3, they flexibly understand that an object (a yellow stick) may take on one fictional identity in one pretend game (a toothbrush) and another fictional identity (a carrot) in a different pretend game.

- **Play becomes less self-centred.** At first, make-believe is directed toward the self; for example, children pretend to feed only themselves. Soon, children direct pretend actions toward other people or objects, pouring tea for a parent or feeding a doll. Early in the third year, they become detached participants, assigning make-believe intentions to objects—making a doll feed itself or pushing a button to launch a rocket. Make-believe becomes less self-centred as children realize that agents and recipients of pretend actions can be independent of themselves (McCune, 1993).

- **Play includes more complex combinations of schemes.** An 18-month-old can pretend to drink from a cup but does not yet combine pouring and drinking. Later, children combine pretend schemes with those of peers in sociodramatic play, the make-believe with others that is under way by the end of the second year and increases rapidly in complexity during early childhood (Kavanaugh, 2006). By age 4 to 5, children build on one another’s play ideas, create and coordinate.
Symbol–Real-World Relations

To make believe and draw—and to understand other forms of representation, such as photographs, models, and maps—pre-schoolers must realize that each symbol corresponds to something specific in everyday life. Grasping this correspondence grants children a powerful cognitive tool for finding out about objects and places they have not experienced directly. By the middle of the second year, children grasp the symbolic function of realistic-looking pictures (such as photos).

When do children comprehend other more challenging symbols—for example, three-dimensional models that stand for real-world spaces? In one study, 2- and 3-year-olds watched an adult hide a small toy (Little Snoopy) in a scale model of a room and then were asked to retrieve it. Next, they had to find a larger toy (Big Snoopy) hidden in the room that the model represented. Not until age 3 could most children use the model as a guide to finding Big Snoopy in the real room (DeLoache, 1987). The 2-year-olds did not realize that the model could be both a toy room and a symbol of another room. They had trouble with dual representation—viewing a symbolic object as both an object in its own right and a symbol.
Categorization

Pre-schoolers organize their everyday knowledge into nested categories at an early age. By the beginning of early childhood, children’s categories include objects that go together because of their common function, behavior, and natural kind (animate versus inanimate), despite varying widely in perceptual features.

Indeed, 2- to 5-year-olds readily draw inferences about non-observable characteristics shared by category members. For example, after being told that a bird has warm blood and a stegosaurus (dinosaur) has cold blood, pre-schoolers infer that a pterodactyl (labelled a dinosaur) has cold blood, even though it closely resembles a bird (Gopnik & Nazi, 2003). And when shown a set of three characters—two of whom look different but share an inner trait (“out going”) and two of whom look similar but have different inner traits (one “shy,” one “outgoing”)—pre-schoolers rely on the trait category, not physical appearance, to predict similar preferred activities (Heyman & Gelman, 2000).
Egocentrism

• Piaget used a number of creative and clever techniques to study the mental abilities of children. One of the famous techniques to demonstrate egocentrism involved using a three-dimensional display of a mountain scene.

• Often referred to as the "Three Mountain Task," children are asked to choose a picture that showed the scene they had observed. Most children are able to do this with little difficulty. Next, children are asked to select a picture showing what someone else would have observed when looking at the mountain from a different viewpoint. Invariably, children almost always choose the scene showing their own view of the mountain scene.

• According to Piaget, children experience this difficulty because they are unable to take on another person's perspective. Developmental psychologists refer to the ability to understand that other people have different perspectives, thoughts, feelings, and mental states as theory of mind.
Conservation

• Another well-known experiment involves demonstrating a child's understanding of conservation. In one conservation experiment, equal amounts of liquid are poured into two identical containers. The liquid in one container is then poured into a differently shaped cup, such as a tall and thin cup or a short and wide cup. Children are then asked which cup holds the most liquid.
• Despite seeing that the liquid amounts were equal, children almost always choose the cup that appears fuller.
• Piaget conducted a number of similar experiments on the conservation of number, length, mass, weight, volume, and quantity. He found that few children showed any understanding of conservation prior to the age of five.
The Concrete Operational Stage: 7 to 11 Years

- According to Piaget, the **concrete operational stage**, extending from about 7 to 11 years, marks a major turning point in cognitive development. Thought becomes far more logical, flexible, and organized, more closely resembling the reasoning of adults than that of younger children.

**Concrete Operational Thought**

- Concrete operations are evident in the school-age child’s performance on a wide variety of Piagetian tasks.
- **Conservation**
  - The ability to pass conservation tasks provides clear evidence of operations — mental actions that obey logical rules. In conservation of liquid, for example, children state that the amount of liquid has not changed, and they are likely to offer an explanation something like this: “The water’s shorter, but it’s also wider. Pour it back—you’ll see it’s the same amount.” Notice how the child is capable of **decentration**, focusing on several aspects of a problem and relating them, rather than centring on only one. This explanation also illustrates **reversibility** — the capacity to imagine the water being returned to the original container as proof of conservation.
Limitations of Concrete Operational Thought

• As the name of this stage suggests, concrete operational thinking suffers from one important limitation: Children think in an organized, logical fashion only when dealing with concrete information they can perceive directly. Their mental operations work poorly with abstract ideas—ones not apparent in the real world.

• Consider children’s solutions to transitive inference problems. When shown pairs of sticks of unequal length, children 7 years and older readily figure out that if stick A is longer than stick B and stick B is longer than stick C, then A is longer than C. But until age 11 or 12, they have difficulty with a hypothetical version of this task: “Susan is taller than Sally and Sally is taller than Mary. Who is the tallest?”

• That logical thought is at first tied to immediate situations helps account for a special feature of concrete operational reasoning: Children master concrete operational tasks step by step. For example, they usually grasp conservation of number first, then liquid and mass, and then weight. This *continuum of acquisition* (or gradual mastery) of logical concepts is another indication of the limitations of concrete operational thinking (Fischer & Bidell, 1991). Rather than coming up with general logical principles that they apply to all relevant situations, school-age children seem to work out the logic of each problem separately.
The Formal Operational Stage: 11 Years and Older

According to Piaget, around age 11 young people enter the **formal operational stage**, in which they develop the capacity for abstract, systematic, scientific thinking. Whereas concrete operational children can “operate on reality,” formal operational adolescents can “operate on operations.” They no longer require concrete things or events as objects of thought. Instead, they can come up with new, more general logical rules through internal reflection (Inhelder & Piaget, 1955/1958).

**Hypothetico-Deductive Reasoning**

Piaget believed that at adolescence, young people become capable of **hypothetico-deductive reasoning**. When faced with a problem, they start with a **hypothesis**, or prediction about variables that might affect an outcome, from which they **deduce** logical, testable inferences.

Piaget believed that what he referred to as "hypothetical-deductive reasoning" was essential at this stage of intellectual development. At this point, teens become capable of thinking about abstract and hypothetical ideas. They often ponder "what-if" type situations and questions and can think about multiple solutions or possible outcomes.

Piaget tested formal operational thought in a few different ways. Two of the better-known tests explored physical conceptualization and the abstraction of thought.
• **Balance**

• One task involved having children of different ages balance a scale by hooking weights on each end. To balance the scale, the children needed to understand that both the heaviness of the weights and distance from the centre played a role.

• Younger children around the ages of 3 and 5 were unable to complete the task because they did not understand the concept of balance. Seven-year-olds knew that they could adjust the scale by placing weights on each end, but failed to understand that where they put the weights was also important. By age 10, the kids considered location as well as weight but had to arrive at the correct answer using trial-and-error.

• It wasn't until around age 13 that children could use logic to form a hypothesis about where to place the weights to balance the scale and then complete the task.
• **Abstraction of Ideas**

• While children tend to think very concretely and specifically in earlier stages, the ability to think about abstract concepts emerges during the formal operational stage. Instead of relying solely on previous experiences, children begin to consider possible outcomes and consequences of actions. This type of thinking is important in long-term planning.

• In another experiment on formal operational thought, Piaget asked children to imagine where they would want to place a third eye if they had one. Younger children said that they would put the imagined third eye in the middle of their forehead. Older children, however, were able to come up with a variety of creative ideas about where to place this hypothetical eye and various ways the eye could be used.

• For example, an eye in the middle of one's hand would be useful for looking around corners. An eye at the back of one's head could be helpful for seeing what is happening in the background.

• Creative ideas represent the use of abstract and hypothetical thinking, both important indicators of formal operational thought.
Thank you...