Developing Through the Life Span

Chapter 4

Prenatal Development and the Newborn
- Conception
- Prenatal Development
- The Competent Newborn

Infancy and Childhood
- Physical Development
- Cognitive Development
Developing Through the Life Span

Adolescence
- Physical Development
- Cognitive Development
- Social Development
- Emerging Adulthood

Adulthood
- Physical Development

Adulthood (continued)
- Cognitive Development
- Social Development

Reflections on Two Major Developmental Issues
- Continuity and Stages
- Stability and Change

Developmental Psychology

<table>
<thead>
<tr>
<th>Issue</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nature/Nurture</td>
<td>How do genetic inheritance (our nature) and experience (the nurture we receive) influence our behavior?</td>
</tr>
<tr>
<td>Continuity/Stages</td>
<td>Is developmental a gradual, continuous process or a sequence of separate stages?</td>
</tr>
<tr>
<td>Stability/Change</td>
<td>Do our early personality traits persist through life, or do we become different persons as we age.</td>
</tr>
</tbody>
</table>
Prenatal Development and the
Newborn

How, over time, did we come to be who we are?
From zygote to birth, development progresses
in an orderly, though fragile, sequence.

Conception

A single sperm cell (male) penetrates the outer
coating of the egg (female) and fuses to form
one fertilized cell.

Prenatal Development

A zygote is a fertilized cell with 100 cells that
become increasingly diverse. At about 14 days
the zygote turns into an embryo (a and b).
Prenatal Development

At 9 weeks, an embryo turns into a fetus (c and d). Teratogens are chemicals or viruses that can enter the placenta and harm the developing fetus.

The Competent Newborn

Infants are born with reflexes that aid in survival, including rooting reflex which helps them locate food.

The Competent Newborn

Offspring cries are important signals for parents to provide nourishment. In animals and humans such cries are quickly attended to and relieved.
Cognitive Development in the Newborn

Investigators study infants becoming habituated to objects over a period of time. Infants pay more attention to new objects than habituated ones, which shows they are learning.

Infancy and Childhood

Infancy and childhood span from birth to the teenage years. During these years, the individual grows physically, cognitively, and socially.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Span</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infancy</td>
<td>Newborn to toddler</td>
</tr>
<tr>
<td>Childhood</td>
<td>Toddler to teenager</td>
</tr>
</tbody>
</table>

Physical Development

Infants’ psychological development depends on their biological development. To understand the emergence of motor skills and memory, we must understand the developing brain.
Developing Brain

The developing brain overproduces neurons. Peaking around 28 billion at 7 months, these neurons are pruned to 23 billion at birth. The greatest neuronal spurt is in the frontal lobe enabling the individual to think rationally.

Maturation

The development of the brain unfolds based on genetic instructions, causing various bodily and mental functions to occur in sequence—standing before walking, babbling before talking—this is called maturation.

Maturation sets the basic course of development, while experience adjusts it.

Motor Development

First, infants begin to roll over. Next, they sit unsupported, crawl, and finally walk. Experience has little effect on this sequence.
Maturation and Infant Memory

The earliest age of conscious memory is around 3½ years (Bauer, 2002). A 5-year-old has a sense of self and an increased long-term memory, thus organization of memory is different from 3-4 years.

Cognitive Development

Piaget believed that the driving force behind intellectual development is our biological development amidst experiences with the environment. Our cognitive development is shaped by the errors we make.

Schemas

Schemas are mental molds into which we pour our experiences.
Assimilation and Accommodation

The process of **assimilation** involves incorporating new experiences into our current understanding (schema). The process of adjusting a schema and modifying it is called **accommodation**.

Piaget’s Theory and Current Thinking

<table>
<thead>
<tr>
<th>Typical Age Range</th>
<th>Description of Stage</th>
<th>Developmental Phenomena</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth to nearly 2 years</td>
<td>Sensorimotor</td>
<td>Object permanence, Stranger anxiety</td>
</tr>
<tr>
<td>2 to about 6 or 7 years</td>
<td>Preoperational</td>
<td>Formal play, Language development</td>
</tr>
<tr>
<td>Abt. 7 to 11 years</td>
<td>Concrete operational</td>
<td>Conservation, Mathematical transformations</td>
</tr>
<tr>
<td>Abt. 12 through adulthood</td>
<td>Formal operational</td>
<td>Abstract thinking, Potential for mature moral reasoning</td>
</tr>
</tbody>
</table>

Sensorimotor Stage

In the **sensorimotor** stage, babies take in the world by looking, hearing, touching, mouthing, and grasping. Children younger than 6 months of age do not grasp **object permanence**, i.e., objects that are out of sight are also out of mind.
Sensorimotor Stage: Criticisms

Piaget believed children in the sensorimotor stage could not think—they do not have any abstract concepts or ideas.

However, recent research shows that children in the sensorimotor stage can think and count.

1. Children understand the basic laws of physics. They are amazed at how a ball can stop in midair or disappear.

2. Children can also count. Wynn (1992, 2000) showed that children stared longer at the wrong number of objects than the right ones.

Preoperational Stage

Piaget suggested that from 2 years old to about 6-7 years old, children are in the preoperational stage—too young to perform mental operations.
Preoperational Stage: Criticism

DeLoache (1987) showed that children as young as 3 years of age are able to use metal operations. When shown a model of a dog’s hiding place behind the couch, a 2½-year-old could not locate the stuffed dog in an actual room, but the 3-year-old did.

Egocentrism

Piaget concluded that preschool children are egocentric. They cannot perceive things from another’s point of view.

When asked to show her picture to mommy, 2-year-old Gabriella holds the picture facing her own eyes, believing that her mother can see it through her eyes.

Theory of Mind

Preschoolers, although still egocentric, develop the ability to understand another’s mental state when they begin forming a theory of mind.

The problem on the right probes such ability in children.
Concrete Operational Stage

In concrete operational stage, given concrete materials, 6- to 7-year-olds grasp conservation problems and mentally pour liquids back and forth into glasses of different shapes conserving their quantities.

Children in this stage are also able to transform mathematical functions. So, if $4 + 8 = 12$, then a transformation, $12 - 4 = 8$, is also easily doable.

Formal Operational Stage

Around age 12, our reasoning ability expands from concrete thinking to abstract thinking. We can now use symbols and imagined realities to systematically reason. Piaget called this formal operational thinking.

Formal Operational Stage

Rudiments of such thinking begin earlier (age 7) than what Piaget suggested, since 7-year-olds can solve the problem below (Suppes, 1982).

If John is in school, Mary is in school. John is in school. What can you say about Mary?
Reflecting on Piaget’s Theory

Piaget’s stage theory has been influential globally, validating a number of ideas regarding growth and development in many cultures and societies. However, today’s researchers believe the following:

1. Development is a continuous process.
2. Children express their mental abilities and operations at an earlier age.
3. Formal logic is a smaller part of cognition.

Social Development

Stranger anxiety is the fear of strangers that develops at around 8 months. This is the age at which infants form schemas for familiar faces and cannot assimilate a new face.

Origins of Attachment

Harlow (1971) showed that infants bond with surrogate mothers because of bodily contact and not because of nourishment.
Origins of Attachment

Like bodily contact, familiarity is another factor that causes attachment. In some animals (goslings), imprinting is the cause of attachment.

Attachment Differences

Placed in a strange situation, 60% of children express secure attachment, i.e., they explore their environment happily in the presence of their mothers. When their mother leave, they show distress.

The other 30% show insecure attachment. These children cling to their mothers or caregivers and are less likely to explore the environment.

Secure Attachment

Relaxed and attentive caregiving becomes the backbone of secure attachment.
Insecure Attachment

Harlow’s studies showed that monkeys experience great anxiety if their terry-cloth mother is removed.

![Image of monkey experiencing anxiety](image_url)

Attachment Differences: Why?

Why do these attachment differences exist?

<table>
<thead>
<tr>
<th>Factor</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mother</td>
<td>Both rat pups and human infants develop secure attachments if the mother is relaxed and attentive.</td>
</tr>
<tr>
<td>Father</td>
<td>In many cultures where fathers share the responsibility of raising children, similar secure attachments develop.</td>
</tr>
</tbody>
</table>

Separation Anxiety

Separation anxiety peaks at 13 months of age, regardless of whether the children are home or sent to day care.

![Graph showing separation anxiety](image_url)
Deprivation of Attachment
What happens when circumstances prevent a child from forming attachments?

In such circumstances children become:
1. Withdrawn
2. Frightened
3. Unable to develop speech

Prolonged Deprivation
If parental or caregiving support is deprived for an extended period of time, children are at risk for physical, psychological, and social problems, including alterations in brain serotonin levels.

Day Care and Attachment
Quality day care that consists of responsive adults interacting with children does not harm children’s thinking and language skills.

However, some studies suggest that extensive time in day care can increase aggressiveness and defiance in children.
Self-Concept

Self-concept, a sense of one’s identity and personal worth, emerges gradually around 6 months. Around 15-18 months, children can recognize themselves in the mirror. By 8-10 years, their self-image is stable.

Child-Rearing Practices

<table>
<thead>
<tr>
<th>Practice</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Authoritarian</td>
<td>Parents impose rules and expect obedience.</td>
</tr>
<tr>
<td>Permissive</td>
<td>Parents submit to children’s demands.</td>
</tr>
<tr>
<td>Authoritative</td>
<td>Parents are demanding but responsive to their children.</td>
</tr>
</tbody>
</table>

Authoritative Parenting

Authoritative parenting correlates with social competence — other factors like common genes may lead to an easy-going temperament and may invoke an authoritative parenting style.
Adolescence

Many psychologists once believed that our traits were set during childhood. Today psychologists believe that development is a lifelong process. Adolescence is defined as a life between childhood and adulthood.

Physical Development

Adolescence begins with puberty (sexual maturation). Puberty occurs earlier in females (11 years) than males (13 years). Thus height in females increases before males.

Primary Sexual Characteristics

During puberty primary sexual characteristics — the reproductive organs and external genitalia — develop rapidly.
Secondary Sexual Characteristics

Also secondary sexual characteristics—the nonreproductive traits such as breasts and hips in girls and facial hair and deepening of voice in boys develop. Pubic hair and armpit hair grow in both sexes.

Brain Development

Until puberty, neurons increase their connections. However, at adolescence, selective pruning of the neurons begins. Unused neuronal connections are lost to make other pathways more efficient.

Frontal Cortex

During adolescence, neurons in the frontal cortex grow myelin, which speeds up nerve conduction. The frontal cortex lags behind the limbic system’s development. Hormonal surges and the limbic system may explain occasional teen impulsiveness.
Cognitive Development

Adolescents’ ability to reason gives them a new level of social awareness. In particular, they may think about the following:

1. Their own thinking.
2. What others are thinking.
3. What others are thinking about them.
4. How ideals can be reached. They criticize society, parents, and even themselves.

Developing Reasoning Power

According to Piaget, adolescents can handle abstract problems, i.e., they can perform formal operations. Adolescents can judge good from evil, truth and justice, and think about God in deeper terms.

Developing Morality

Kohlberg (1981, 1984) sought to describe the development of moral reasoning by posing moral dilemmas to children and adolescents, such as “Should a person steal medicine to save a loved one’s life?” He found stages of moral development.
Moral Thinking

1. **Preconventional Morality:** Before age 9, children show morality to avoid punishment or gain reward.
2. **Conventional Morality:** By early adolescence, social rules and laws are upheld for their own sake.
3. **Postconventional Morality:** Affirms people’s agreed-upon rights or follows personally perceived ethical principles.

Moral Feeling

Moral feeling is more than moral thinking. When posed with simulated moral dilemmas, the brain’s emotional areas only light up when the nature of the dilemmas is emotion-driven.

Moral Action

Moral action involves doing the right thing. People who engage in doing the right thing develop empathy for others and the self-discipline to resist their own impulses.
Social Development

<table>
<thead>
<tr>
<th>Erikson's Stages of Psychosocial Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>Infancy</td>
</tr>
<tr>
<td>Childhood</td>
</tr>
<tr>
<td>Middle childhood</td>
</tr>
<tr>
<td>Adolescence</td>
</tr>
<tr>
<td>Early adulthood</td>
</tr>
<tr>
<td>Middle adulthood</td>
</tr>
<tr>
<td>Late adulthood</td>
</tr>
</tbody>
</table>

Forming an Identity

In Western cultures, many adolescents try out different selves before settling into a consistent and comfortable identity. Having such an identity leads to forming close relationships.

Parent and Peer Influence

Although teens become independent of their parents as they grow older, they nevertheless relate to their parents on a number of things, including religiosity and career choices. Peer approval and relationships are also very important.
Emerging Adulthood

Emerging adulthood spans ages 18-25. During this time, young adults may live with their parents and attend college or work. On average, emerging adults marry in their mid-twenties.

Adulthood

Although adulthood begins sometime after a person's mid-twenties, defining adulthood into stages is more difficult than defining stages during childhood or adolescence.

Physical Development

The peak of physical performance occurs around 20 years of age, after which it declines imperceptibly for most of us.
Middle Adulthood

Muscular strength, reaction time, sensory abilities and cardiac output begin to decline after the mid-twenties. Around age 50, women go through menopause, and men experience decreased levels of hormones and fertility.

Old Age: Life Expectancy

Life expectancy at birth increased from 49% in 1950 to 67% in 2004 and to 80% in developed countries. Women outlive men and outnumber them at most ages.

Old Age: Sensory Abilities

After age 70, hearing, distance perception, and the sense of smell diminish, as do muscle strength, reaction time, and stamina. After 80, neural processes slow down, especially for complex tasks.
Old Age: Motor Abilities

At age 70, our motor abilities also decline. A 70-year-old is no match for a 20-year-old individual. Fatal accidents also increase around this age.

Old Age: Dementia

With increasing age, the risk of dementia also increases. Dementia is not a normal part of growing old.

Old Age: Alzheimer’s Disease

The risk for developing Alzheimer’s disease also increases with age. Individuals who are in the early stages of this disease show more MRI activity in the brain than do normal individuals of the same age.
Cognitive Development

Do cognitive abilities like memory, creativity, and intelligence decline with age the same way physical abilities do?

Aging and Memory

As we age, we remember some things well. These include recent past events and events that happened a decade or two back. However, recalling names becomes increasingly difficult.

Aging and Memory

Recognition memory does not decline with age, and material that is meaningful is recalled better than meaningless material. The same is true for prospective memory (remember to …).
Aging and Intelligence

Longitudinal studies suggest that intelligence remains relative as we age. It is believed today that fluid intelligence (ability to reason speedily) declines with age, but crystalline intelligence (accumulated knowledge and skills) does not.

Aging and Other Abilities

A number of cognitive abilities decline with age. However, vocabulary and general knowledge increase with age.

Social Development

Many differences between the young and old are not simply based on physical and cognitive abilities, but may instead be based on life events associated with family, relationships, and work.
Psychologists doubt that adults pass through an orderly sequence of age-bound stages. Midlife crises at 40 are less likely to occur than crises triggered by major events (divorce, new marriage).

Neuroticism scores, 10,000 subjects (McCrae & Costa, 1996).

Love and work are defining themes in adult life. Evolutionary psychologists believe that commitment has survival value. Parents that stay together are likely to leave a viable future generation.

Happiness stems from working in a job that fits your interests and provides you with a sense of competence and accomplishment.
Well-Being Across the Life Span

Well-being and people's feelings of satisfaction are stable across the life span.

Successful Aging

Biological influences:
- no greater propensity for dementia, depression, or other disorders
- normal changes that hinder negative thinking
- approximately meeting nutritional needs

Psychological influences:
- optimistic outlook
- physically and mentally active

Social-cultural influences:
- support from family
- access to meaningful work or activity
- positive expectations of the surrounding culture
- stable and safe living conditions

Death and Dying

There is no “normal” reaction or series of grief stages after the death of a loved one. Grief is more sudden if death occurs unexpectedly. People who reach a sense of integrity in life (in Erikson's terms) see life as meaningful and worthwhile.
Developmental Issues

Continuity and Stages
Researchers who view development as a slow, continuous process are generally those who emphasize experience and learning. Biologists, on the other hand, view maturation and development as a series of genetically predisposed steps or stages. These include psychologists like Piaget, Kohlberg and Erikson.

Developmental Issues

Stability and Change
Lifelong development requires both stability and change. Personality gradually stabilizes as people age. However, this does not mean that our traits do not change over a lifetime. Some temperaments are more stable than others.