Section 4.1

How Do We Develop in the Womb?
4.1 How Do We Develop in the Womb?

• Developmental psychology
  – The scientific study of how humans change over the life span, from conception until death
  – Developmental changes can be grouped into three domains:
    1. Physical
    2. Socio-emotional
    3. Cognitive

• See figure 4.2 next slide
**Physical:**
growth of the body and changes in the brain, sensory and motor skills, and hormones

**Cognitive:**
how our mental processes and abilities to think and communicate change over time

**Socio-emotional:**
changes in how we understand ourselves, interact with others, and experience and regulate emotions

*Psychology in Your Life  Figure 4.2
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Prenatal Development Occurs in Three Phases

• **Germinal period**
  - The period in prenatal development from conception to two weeks after fertilization of the egg, when the zygote divides rapidly and implants in the uterine wall

• **Embryonic period**
  - The period in prenatal development from 2 to 8 weeks after conception, when the brain, spine, major organs, and bodily structures begin to form in the embryo
Prenatal Development Occurs in Three Phases

• **Fetal period**
  – The period in prenatal development from 8 weeks after conception until birth, when the brain continues developing, bodily structures are refined, and the fetus grows in length and weight and accumulates fat in preparation for birth

• See figures 4.3a, 4.3b, 4.3c, 4.4 next slide
### Figure 4.3

#### (a) Germinal period (weeks)
- 1: Period of dividing zygote and implantation of blastocyst
- Indicates common site of action of teratogen

#### (b) Embryonic period (weeks)
- 3-4: Central nervous system
  - Eye
  - Heart
  - Brain
  - Ear
  - Teeth
  - Palate
- 5-6: External genitalia
- 7-8: Major defects in structure
  - Heart
  - Legs
  - Arms
  - Eyes
  - Teeth
  - Palate

#### (c) Fetal period (weeks)
- 9-12: Unusually not susceptible to teratogens
- 12-20: External genitalia
- 20-36: Physiological defects and major defects in structure
- 38: Prenatal death
Nature and Nurture Affect Prenatal Development

• **Teratogens**
  – Environmental agents that can harm prenatal development: smoking, drugs, alcohol, pollutants, and other substances
Nature and Nurture Affect Prenatal Development

• Drugs and alcohol
  – Women who drink alcohol when pregnant are gambling with their baby’s development; alcohol can lead to a variety of defects. The most severe disorder is fetal alcohol syndrome (FAS)

• See figure 4.7 next slide
Section 4.2

How Do Infants and Children Develop over Time?
4.2 How Do Infants and Children Develop over Time?

- Both infancy and childhood are times of great change across all three developmental domains.
Infants and Children Change Physically

• As infants and children develop, the brain changes in two critical ways
  – First, myelinated axons form synapses with other neurons
  – Second, over time and with experience, the synaptic connections are refined to preserve the most important and helpful connections
  – Unfortunately, sometimes infants and young children are raised in environments that do not stimulate their brains

• See figures 4.8a, 4.8b, 4.8c next slide
Infants and Children Change Physically

• Inborn reflexes
  – rooting reflex
  – sucking reflex
  – grasping reflex

• See figures 4.9a, 4.9b, 4.9c next slide
Infants and Children Change Physically

• Motor skills
  – **Maturation**: Physical development of the brain and body that prepares an infant for voluntary movement, such as rolling over, sitting, and walking

• See figure 4.10 next slide
Fig. 4.10
Average age of motor skill acquisition (months)

- Roll over (2.8 months)
- Sit without support (5.5 months)
- Sit with support (4 months)
- Stand holding on (5.8 months)
- Pull self to standing position (7.6 months)
- Walk holding on to furniture (9.2 months)
- Crawl and creep (10 months, but many babies skip this stage)
- Stand alone (11.5 months)
- Walk without assistance (12.1 months)

*Psychology in Your Life* Figure 4.10
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Infants and Children Change Physically

• Sensory development
  – An infant obtains information from the world by hearing, seeing, smelling, tasting, and perceiving touch. Some of these sensory abilities are more fully developed at birth than others
Infants and Children Change Physically

• Sensory development
  – 2-hour-old infants prefer sweet tastes to all other tastes
  – When infants are born, they can also hear well
  – Newborns have poor vision

• See figures 4.12, 4.13 next slide
Infants and Children Change Socially and Emotionally

• Early attachment
  – All have a fundamental need to form strong connections with caretakers
  – During the late 1950s, psychologists generally believed that the care an infant needed was based primarily on getting food from his mother
  – Harlow money attachment experiment
Infants and Children Change Socially and Emotionally

• Variations in attachment
  – Separation anxiety
  – Ainsworth created the strange-situation test

• See figures 4.15, 4.16 next slide
Infants showing a certain reaction (percentage) vs. Age (months):

- Any negative reaction
- Wariness
- Extreme distress

(a) A secure child is quickly comforted when the attachment figure returns.
(b) An avoidant child avoids the attachment figure when she returns.
(c) An ambivalent child will both seek and reject caring contact when the attachment figure returns.

Child plays while attachment figure is present.

Psychology in Your Life  Figure 4.15
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Infants and Children Change Socially and Emotionally

- Variations in attachment
  - **Secure attachment:** The attachment style for most infants, who are confident enough to play in an unfamiliar environment as long as the caregiver is present and are readily comforted by the caregiver during times of distress
Infants and Children Change Socially and Emotionally

• Variations in attachment
  – Insecure attachment
  – **Avoidant attachment**: The attachment style for infants who are somewhat willing to explore an unfamiliar environment, but seem to have little interest in the caregiver—they do not look at the caregiver when the caregiver leaves or returns
Infants and Children Change Socially and Emotionally

• Variations in attachment
  – Insecure attachment
  – **Ambivalent attachment**: The attachment style for infants who are unwilling to explore an unfamiliar environment but seem to have mixed feelings about the caregiver—they cry when the caregiver leaves the room, but they cannot be consoled by the caregiver upon the caregiver’s return

• See figure 4.17 next slide
Infants and Children Change Cognitively

• Developing theory of mind
  – **Theory of mind**: The capacity to understand that other people have minds and intentions
Infants and Children Change Cognitively

• Piaget’s theory of cognitive development
  – The developmental psychologist Jean Piaget investigated how children’s thinking changes as they develop
  – Piaget proposed that we change how we think as we form new schemas, or ways of thinking about how the world works
Infants and Children Change Cognitively

• Piaget’s theory of cognitive development
  – **Assimilation**: The process we use to incorporate new information into existing frameworks for knowledge
  – **Accommodation**: The process we use to create new frameworks for knowledge or drastically alter existing ones to incorporate new information that otherwise would not fit
Infants and Children Change Cognitively

• Stages of development: Birth to 2 years
  – **Sensorimotor stage**: The first stage in Piaget’s theory of cognitive development; during this stage, infants acquire information about the world through their senses and motor skills
  – Object permanence
Infants and Children Change Cognitively

• Stages of development: 2 to 7 years
  – **Preoperational stage:** The second stage in Piaget’s theory of cognitive development; during this stage, children think symbolically about objects, but they reason based on intuition and superficial appearances rather than logic
  – Law of conservation
  – Centration
  – Egocentrism
Infants and Children Change Cognitively

• Stages of development: 7 to 12 years
  – **Concrete operational stage:** The third stage in Piaget’s theory of cognitive development; during this stage, children begin to think about and understand logical operations, and they are no longer fooled by appearances
Infants and Children Change Cognitively

• Stages of development: 12 to adulthood
  – **Formal operational stage:** The final stage in Piaget’s theory of cognitive development; during this stage, people can think abstractly, and they can formulate and test hypotheses through logic

• See figure 4.19 next slide
<table>
<thead>
<tr>
<th>Stage</th>
<th>Characterization</th>
</tr>
</thead>
</table>
| Sensorimotor (birth–2 years) | • Starts to mentally represent information acquired through the senses and motor exploration.  
                                 | • Begins to act intentionally—for example, pulls a string to set a mobile in motion or shakes a rattle to make a noise.  
                                 | • Achieves object permanence by realizing that things continue to exist even when no longer present to the senses. |
| Preoperational (2–7 years)   | • Learns to use language and to represent objects by images and words.  
                                 | • Thinking is egocentric, where the child has difficulty taking the viewpoint of others.  
                                 | • Can think intuitively, not logically.  
                                 | • Classifies objects by a single feature—for example, groups red blocks regardless of shape. |
| Concrete operational (7–12 years) | • Can think logically about concrete objects and events.  
                                 | • Achieves conservation of number, volume, mass, and weight.  
                                 | • Classifies objects by several features and can order them in a series along a single dimension, such as size. |
| Formal operational (12 years and up) | • Can think logically about abstract propositions and test hypotheses systematically.  
                                 | • Becomes concerned with hypothetical issues, the future, and ideological problems. |
Infants and Children Change Cognitively

• New ways of thinking about Piaget’s theory
  – We now know that Piaget underestimated the ages at which certain skills develop
  – Psychologists now think of cognitive development in terms of trends rather than strict stages

• See figures 4.22, 4.23 next slide
1 A 4-year-old is shown two rows of marbles. Each row has the same number of marbles, but one row is spread out. When asked which row has more marbles, the 4-year-old says the longer row.

2 However, when asked to count the marbles in each row, the 4-year-old counts correctly and states that the two rows have the same number of marbles.
Language Develops in an Orderly Way

• From zero to 60,000
  – Language is a system in which sounds and symbols are used according to grammatical rules
    – Morphemes
    – Phonemes
    – Syntax

• See figures 4.24a, 4.24b next slide
Sentences
Example: Stephanie asked for some milk.

Phrases
Example: asked for some milk

Words
Example: asked

Morphemes
Examples: ask, ed

Phonemes
Examples: /a/, /s/, /k/, /t/
Language Develops in an Orderly Way

• From zero to 60,000
  – Babbling: Intentional vocalization, often by an infant, with no specific meanings
  – Telegraphic speech: The tendency for toddlers to speak using rudimentary sentences that are missing words and grammatical markings but follow a logical syntax and convey a wealth of meaning
Language Develops in an Orderly Way

• From zero to 60,000
  – Overregularization: The tendency for young children to incorrectly use a regular syntax rule where they should use an exception to the rule
Section 4.3

How Do Adolescents Develop?
4.3 How Do Adolescents Develop?

• Adolescence starts at the end of childhood around ages 11 to 14, and lasts until ages 18 to 21
Adolescents Develop Physically

• Onset of puberty
  – **Puberty**: The physical changes in the body that are a part of sexual development
  – **Primary sex characteristics**: The reproductive organs and genitals that distinguish the sexes and their maturation for reproduction
Adolescents Develop Physically

• Onset of puberty
  – **Secondary sex characteristics:** Sex-differentiating characteristics that are not directly related to reproduction but develop during the hormonal changes of puberty

• See figure 4.25 next slide
**Males**

**Primary sex characteristics**
- Maturation of sex organs
- Development of sperm

**Secondary sex characteristics**
- More angular jaw
- Deepening voice
- Body hair
- Increased muscle mass
- Pubic hair

**Females**

**Primary sex characteristics**
- Maturation of sex organs
- Start of menstruation

**Secondary sex characteristics**
- Fat on the breasts
- Body hair (armpits)
- Loss of baby fat on belly
- Greater definition of the waist
- Fat on the hips
- Pubic hair

*Psychology in Your Life  Figure 4.25
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Adolescents Develop Physically

• Brain changes during adolescence
  – Synaptic connections are refined and gray matter increases
  – The frontal cortex of the brain is not fully developed until the early 20s
  – An adolescent’s limbic system—the motivational and emotional center of the brain—tends to be more active than the frontal cortex
Adolescents Develop Socially and Emotionally

• As adolescents develop a sense of identity, of who they are, they are influenced by many factors, including the culture in which they are raised, their gender, and their beliefs about personal characteristics such as race, sex, and age
Adolescents Develop Socially and Emotionally

• Stages of psychosocial development
  – Erikson’s 8 stages of psychosocial development
  – **Identity versus role confusion:** The fifth stage of Erikson’s theory of psychosocial development, in which adolescents face the challenge of figuring out who they are

• See table 4.1 next slide
TABLE 4.1
Erikson’s Eight Stages of Psychosocial Development

<table>
<thead>
<tr>
<th>STAGE</th>
<th>AGE</th>
<th>MAJOR PSYCHOSOCIAL CRISIS</th>
<th>SUCCESSFUL RESOLUTION OF CRISIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Infancy</td>
<td>0–2</td>
<td>Trust versus mistrust</td>
<td>Children learn that the world is safe and that people are loving and reliable.</td>
</tr>
<tr>
<td>2. Toddler</td>
<td>2–3</td>
<td>Autonomy versus shame and doubt</td>
<td>Encouraged to explore the environment, children gain feelings of independence and positive self-esteem.</td>
</tr>
<tr>
<td>3. Preschool</td>
<td>4–6</td>
<td>Initiative versus guilt</td>
<td>Children develop a sense of purpose by taking on responsibilities, but they also develop the capacity to feel guilty for misdeeds.</td>
</tr>
<tr>
<td>4. Childhood</td>
<td>7–12</td>
<td>Industry versus inferiority</td>
<td>By working successfully with others and assessing how others view them, children learn to feel competent.</td>
</tr>
<tr>
<td>5. Adolescence</td>
<td>13–19</td>
<td>Identity versus role confusion</td>
<td>By exploring different social roles, adolescents develop a sense of identity.</td>
</tr>
<tr>
<td>6. Young adulthood</td>
<td>20s</td>
<td>Intimacy versus isolation</td>
<td>Young adults gain the ability to commit to long-term relationships.</td>
</tr>
<tr>
<td>7. Middle adulthood</td>
<td>30s to 50s</td>
<td>Generativity versus stagnation</td>
<td>Adults gain a sense that they are leaving behind a positive legacy and caring for future generations.</td>
</tr>
<tr>
<td>8. Old age</td>
<td>60s and beyond</td>
<td>Integrity versus despair</td>
<td>Older adults feel a sense of satisfaction that they have lived a good life and developed wisdom.</td>
</tr>
</tbody>
</table>


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Adolescents Develop Socially and Emotionally

• Gender identity
  – **Gender identity**: An individual’s beliefs about being male or female
  – **Gender roles**: The characteristics associated with being male or being female, because of cultural influence or learning
Adolescents Develop Socially and Emotionally

• Bruce Reimer: A unique case of gender identity
  – *As Nature Made Him: The Boy Who Was Raised as a Girl*
    
    [https://www.youtube.com/watch?v=GXJN_zXcs pM](https://www.youtube.com/watch?v=GXJN_zXcs pM)

• Ethnic identity
  – Along with a gender identity, each adolescent must establish an ethnic identity
Adolescents Develop Socially and Emotionally

• Parents and peers
  – As adolescents develop their own identities, they come into more conflict with their parents
  – Peers play a crucial role in identity development
Adolescents Develop Cognitively

• Moral reasoning and moral emotions
  – When is it acceptable to take an action that may harm others or that may break implicit or explicit social contracts?
  – Moral emotions, such as embarrassment and shame, are considered self-conscious emotions
Adolescents Develop Cognitively

• Moral reasoning and moral emotions
  – Kohlberg’s three main levels of moral reasoning

1. Preconventional level: Earliest level of moral development; at this level, self-interest and event outcomes determine what is moral

2. Conventional level: Middle level of moral development; at this level, societal laws and the approval of others determine what is moral
Adolescents Develop Cognitively

- Moral reasoning and moral emotions
  - Kohlberg’s three main levels of moral reasoning
  3. Postconventional level: Highest level of moral development; at this level, decisions about morality depend on abstract principles and the value of all life
Section 4.4

How Do We Develop in Adulthood?
4.4 How Do We Develop in Adulthood?

• A wide range of research has demonstrated that throughout adulthood, important changes occur physically, socioemotionally, and cognitively
Our Bodies Change in Adulthood

• Early to middle adulthood
  – Between the ages of 20 and 40, we actually experience a steady decline in muscle mass, bone density, eyesight, and hearing

• Transition to old age
  – By 2030, more than 1 in 5 Americans will be over age 65, and these older people will be ethnically diverse, well educated, and physically fit
  – The body and mind start deteriorating more rapidly at about age 50
Adults Develop Lifelong Social and Emotional Bonds

• Psychosocial challenges
  – Erikson’s theory in later life
  – **Intimacy versus isolation:** Sixth stage of Erikson’s theory of psychosocial development, in which young adults face the challenge of forming committed long-term friendships and romances
Adults Develop Lifelong Social and Emotional Bonds

• Psychosocial challenges
  – Erikson’s theory in later life
  – **Generativity versus stagnation:** Seventh stage of Erikson’s theory of psychosocial development, in which middle-aged adults face the challenge of leaving behind a positive legacy and caring for future generations
Adults Develop Lifelong Social and Emotional Bonds

• Psychosocial challenges
  – Erikson’s theory in later life
  – Integrity versus despair: Eighth stage of Erikson’s theory of psychosocial development, in which older adults face the challenge of feeling satisfied that they have lived a good life and developed wisdom
Adults Develop Lifelong Social and Emotional Bonds

• Marriage
  – Around the world, the vast majority of people marry at some point in their lives or form some type of permanent bond with a relationship partner
  – The benefits of marriage are more significant for men than for women
  – At any given time, the vast majority of married people report satisfaction with their marriages
Adults Develop Lifelong Social and Emotional Bonds

• Having children
  – The birth of a first child is a profound event for most couples
  – Children can strain a marriage, when time and money are tight
  – Couples with children, especially those with adolescent children, report less marital satisfaction than those who are childless
Adults Develop Lifelong Social and Emotional Bonds

• Finding meaning in later life
  – Meaning often becomes a preoccupation for the elderly
  – Older adults want to savor their final years by putting their time and effort into meaningful and rewarding experiences
The Mental Abilities of Adults Begin to Decline

• A senior moment: The inability to remember something we knew a moment before

• We may not notice cognitive decline until later adulthood, although it begins much earlier
The Mental Abilities of Adults Begin to Decline

• Intelligence and memory
  – Older people tend to have difficulty with memory tasks that require juggling multiple pieces of information at the same time
  – **Dementia**: Severe impairment in intellectual capacity and personality, often due to damage to the brain
The Mental Abilities of Adults Begin to Decline

- Intelligence and memory
  - 3 percent to 5 percent of people will develop Alzheimer’s disease by age 70 to 75, and 6.5 percent will develop the disease after age 85
  - The initial symptoms of Alzheimer’s are typically minor memory impairments, but the disease eventually progresses to more serious difficulties, such as forgetting daily routines
The Mental Abilities of Adults Begin to Decline

• Intelligence and memory
  – Despite the physical, social, and emotional challenges of aging, most older adults are healthy and happy
  – Except for dementia, older adults have fewer mental health problems, including depression, than younger adults