

Detailed Chapter Outline with Key Terms

Chapter 17: Physical and Cognitive Development in Late Adulthood

Focus: John Glenn, Space Pioneer

OLD AGE TODAY

- **Ageism:** Prejudice or discrimination against a person (most commonly an older person) based on age.

The Graying of the Population

Young Old to Oldest Old

- **Primary aging:** Gradual, inevitable process of bodily deterioration throughout the life span.
- **Secondary aging:** Aging processes that result from disease and bodily abuse and disuse and are often preventable.
- *Young old:* People age 65 to 74, or those who are the healthy, active majority of older adults.
- *Old old:* People age 75 to 84, or those who are frail, infirm, and in the minority of older people.
- *Oldest old:* People age 85 and above.
- **Functional age:** Measure of a person's ability to function effectively in his or her physical and social environment in comparison with others of the same chronological age.
- *Subjective age:* The age people feel themselves to be.
- **Gerontology:** Study of the aged and the process of aging.
- **Geriatrics:** Branch of medicine concerned with processes of aging and age-related medical conditions.

PHYSICAL DEVELOPMENT

LONGEVITY AND AGING

- **Life expectancy:** Age to which a person in a particular cohort is statistically likely to live (given his or her current age and health status), on the basis of average longevity of a population.
- **Longevity:** Length of an individual's life.
- **Life span:** The longest period that members of a species can live.

Trends and Factors in Life Expectancy

Gender Differences

Regional and Ethnic Differences

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Why People Age

- **Senescence:** Period of the life span marked by changes in physical functioning associated with aging; begins at different ages for different people.

Genetic-Programming Theories

- **Genetic-programming theories:** Theories that explain biological aging as resulting from a genetically determined developmental timetable.
- *Programmed senescence:* Theory of aging in which specific genes “switch off” before age-related losses, such as in vision or hearing, become evident.
- *Mitochondria:* Minute organisms that generate energy for cell processes, whose fragmentation is hypothesized to be a cause of aging
- *Hormonal changes:* Changes in the hormones used by the body, possible due to genetic malfunction and creating the effects of aging.
- *Immune system:* The body’s defense system against disease.
- *Telomeres:* The protective tips of chromosomes, which shorten each time a cell divides.
- *Telomerase:* An enzyme that enables sex chromosomes to repair their telomeres.
- *Evolutionary theory of aging:* A variation of genetic-programming theory, this theory views aging as an evolved trait enabling members of a species to live only long enough to reproduce.

Variable-Rate Theories

- **Variable-rate theories:** Theories explaining biological aging as a result of processes that vary from person to person and are influenced by both the internal and the external environment; sometimes called *error theories*.
- **Metabolism:** Conversion of food and oxygen into energy.
- *Wear-and-tear theory:* Theory that the body ages as a result of accumulated damage to the system beyond the body’s ability to repair it.
- *Free-radical theory:* Theory that attributes aging to the harmful effects of *free radicals*, which react with and can damage cell membranes, cell proteins, fats, carbohydrates, and even DNA.
- **Free radicals:** Highly unstable oxygen atoms or molecules formed during metabolism.
- *Mitochondria:* Organisms contained in human cells that generate energy.
- *Rate-of-living theory:* Theory of aging that suggests that the body can do just so much work, and the faster it works, the faster it wears out.
- *Autoimmune theory:* Theory of aging that suggests that an aging immune system can become “confused” and release antibodies that attack the body’s own cells.
- **Autoimmunity:** Tendency of an aging body to mistake its own tissues for foreign invaders and to attack and destroy them.

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How Far Can the Life Span Be Extended?

- *Prolongevity*: The concept that people can control the length and quality of their lives.
- **Survival curves**: Curves, plotted on a graph, showing percentages of a population that survive at each age level.
- **Hayflick limit**: Genetically controlled limit, proposed by Hayflick, on the number of times cells can divide in members of a species.

PHYSICAL CHANGES

Organic and Systemic Changes

- **Reserve capacity**: Ability of body organs and systems to put forth four to ten times as much effort as usual under stress; also called *organ reserve*.

The Aging Brain

- *Neurons*: Nerve cells.
- *Cerebral cortex*: The part of the brain that handles most cognitive tasks.

Sensory and Psychomotor Functioning

Vision and Hearing

- **Cataracts**: Cloudy or opaque areas in the lens of the eye, which cause blurred vision.
- **Age-related macular degeneration**: Condition in which the center of the retina gradually loses its ability to discern fine details; leading cause of irreversible visual impairment in older adults.
- **Glaucoma**: Irreversible damage to the optic nerve caused by increased pressure in the eye.

Strength, Endurance, Balance, and Reaction Time

- *Plasticity*: Modifiability of performance.
- *Tai chi*: Traditional Chinese exercises.

Sleep

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Sexual Functioning

PHYSICAL AND MENTAL HEALTH

Health Status

Chronic Conditions and Disabilities

Common Chronic Conditions

Disabilities and Activity Limitations

- **Activities of daily living (ADLs):** Essential everyday activities such as eating, dressing, bathing, and getting around the house.
- **Instrumental activities of daily living (IADLs):** Everyday activities, competence in which is considered a measure of the ability to live independently; these activities include managing finances, shopping for necessities, using the telephone, obtaining transportation, preparing meals, taking medication, and housekeeping.

Lifestyle Influences on Health and Longevity

Physical Activity

Nutrition

- *Periodontitis:* Gum disease.

Mental and Behavioral Problems

Depression

Dementia

- **Dementia:** Deterioration in cognitive and behavioral functioning due to physiological causes.
- **Alzheimer's disease (AD):** Progressive, degenerative brain disorder characterized by irreversible deterioration in memory, intelligence, awareness, and control of bodily functions, eventually leading to death.
- **Parkinson's disease:** Progressive, irreversible degenerative neurological disorder, characterized by tremor, stiffness, slowed movement, and unstable posture.
- **Multi-infarct dementia (MD):** Irreversible dementia caused by a series of small strokes.

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Alzheimer's Disease

Symptoms

Causes and Risk Factors

- **Neurofibrillary tangles:** Twisted masses of protein fibers found in brains of persons with Alzheimer's disease.
- **Amyloid plaque:** Waxy chunks of insoluble tissue found in the brain of persons with Alzheimer's disease.
- **Cognitive reserve:** Hypothesized fund of energy that may enable a deteriorating brain to continue to function normally.

Diagnosis and Prediction

- *Prospective memory:* The ability to remember what to do at a future time, such as take medicine or keep an appointment.

Treatment and Prevention

- *Cholinesterase inhibitors:* Drugs that slow or stabilize the symptoms of Alzheimer's for at least six months to a year.

Reversible Conditions: Depression

- *Selective serotonin reuptake inhibitors:* Drugs that have an antidepressant effect.

COGNITIVE DEVELOPMENT

ASPECTS OF COGNITIVE DEVELOPMENT

Intelligence and Processing Abilities

Measuring Older Adults' Intelligence

- **Wechsler Adult Intelligence Scale (WAIS):** Intelligence test for adults, which yields verbal and performance scores as well as a combined score.
- *Classic aging pattern:* Tendency for scores on nonverbal performance to become lower as a person gets older, while verbal scores remain relatively stable.

Two Kinds of Intelligence

- *Fluid and crystallized:* Referring to mental abilities, with the former depending largely on neurological status and the latter on accumulated knowledge.

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- **Dual-process model:** Model of cognitive functioning in late adulthood, proposed by Baltes, which identifies and seeks to measure two dimensions of intelligence: mechanics and pragmatics.
- **Mechanics of intelligence:** In Baltes's dual-process model, the abilities to process information and solve problems, irrespective of content; the area of cognition in which there is often an age-related decline.
- **Pragmatics of intelligence:** In Baltes's dual-process model, the dimension of intelligence that tends to grow with age and includes practical thinking, application of accumulated knowledge and skills, specialized expertise, professional productivity, and wisdom.
- **Selective optimization with compensation:** In Baltes's dual-process model, strategy for maintaining or enhancing overall cognitive functioning by using stronger abilities to compensate for those that have weakened.

The Seattle Longitudinal Study: Use it or Lose It

Everyday Problem Solving

Changes in Processing Abilities

Cognitive Abilities and Mortality

Memory: How Does It Change?

Short-Term Memory

- *Digit span forward:* Test of short-term memory in which a person is to repeat a sequence of numbers in the order in which the numbers were presented.
- *Digit span backward:* Test of short-term memory in which a person is to repeat a sequence of numbers in the reverse order in which the numbers were presented.
- **Sensory memory:** Initial, brief, temporary storage of sensory information.
- **Working memory:** Short-term storage of information being actively processed.
- *Rehearsal:* Repetition of information.
- *Reorganization:* Organizing information in a way that allows better retrieval of that information.
- *Elaboration:* Mentally expanding and elaborating upon information to be remembered.

Long-Term Memory

- **Episodic memory:** Long-term memory of specific experiences or events, linked to time and place.
- **Semantic memory:** Long-term memory of general factual knowledge, social customs, and language.

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- **Procedural memory:** Long-term memory of motor skills, habits, and ways of doing things, which often can be recalled without conscious effort; sometimes called *implicit memory*.
- **Priming:** Increase in ease of doing a task or remembering information as a result of a previous encounter with the task or information.

Speech and Memory: Effects of Aging

Why Do Some Memory Systems Decline?

Problems in Encoding, Storage, and Retrieval

- *Encoding:* Process by which information is prepared for long-term storage and later retrieval.
- *Storage:* Retention of memories for future use.
- *Retrieval:* Process by which information is accessed or recalled from memory storage.

Neurological Change

- *Hippocampus:* Area of the brain associated with formation of memory.
- *Frontal lobes:* Lobes of the cerebral cortex involved in both encoding and retrieval of episodic memories.
- *Prefrontal cortex:* Foremost part of the cerebral cortex, associated with planning and decision-making.

Metamemory: The View from Within

- **Metamemory in Adulthood (MIA):** Questionnaire designed to measure various aspects of adults' metamemory, including beliefs about their own memory and selection and use of strategies for remembering.
- *Metamemory:* Beliefs or knowledge about how memory works.

Can Older People Improve Their Cognitive Performance?

Wisdom

- *Cognitive:* Referring to a mental ability.
- *Social judgments theory:* Approach to the study of wisdom that explores people's conceptions of the prototypical "wise person" and looks for commonalities among them.
- *Personality theory:* Approach to the study of wisdom that views wisdom as the culmination of a lifetime of personal growth and ego development.

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- *Cognitive theory*: Approach to the study of wisdom, which views wisdom as an exceptional breadth, and depth of knowledge about the conditions of life and human affairs and reflective judgment about the application of this knowledge."
- *Transcendence*: Detachment from preoccupation with the self.

LIFELONG LEARNING

- **Lifelong learning**: Organized, sustained study by adults of all ages.
- *Kominkans*: Community education centers in Japan.