Chapter 17:

Physical and Cognitive Development in Late Adulthood
IN THIS CHAPTER

• Variability in Late Adulthood
• Physical Changes
• Mental Health
• Cognitive Changes
LEARNING OBJECTIVES

17.1 What factors contribute to life expectancy and longevity?
17.2 What variables contribute to individual differences in health among older adults?
17.3 How does the brain change in late adulthood?
17.4 What types of sensory changes occur in late adulthood?
17.5 How do theories explain biological aging?
17.6 What are the behavioral effects of changes in the various body systems of older adults?
17.7 What is Alzheimer’s disease, and how does it differ from other dementias?
LEARNING OBJECTIVES (con’t)

17.8 What does research suggest about depression among older adults?

17.9 What kinds of memory differences distinguish older and younger adults?

17.10 What do theory and research on wisdom and creativity reveal about cognitive functioning in late adulthood?
VARIABILITY IN LATE ADULTHOOD
Centenarians (100 years old or more)

- Fastest-growing population segment
- Currently, there are 60,000 centenarians in the U.S.
- There may be over 800,000 American centenarians by 2050.
VARIABILITY IN LATE ADULTHOOD
Characteristics of the Elderly Population

Gerontology: the scientific study of aging

- Life expectancy
- Ethnic differences
- Subgroups
THE COMING DEMOGRAPHIC CRISIS

In 2008, Social Security pensions exceeded income from Social Security taxes.

*Options*

- Decrease benefits to recipients.
- Increase taxes to workers.

*Reactions*

- Public opposition to both options; other options were suggested.
- The public wants autonomy over investments and guaranteed retirement income.
- Without a solution, bankruptcy may occur.

*How will this affect you? Your parents? Your grandparents?*
You Decide

Decide which of these two statements you most agree with and think about how you would defend your position:

1. Having autonomy over how my Social Security taxes are invested is more important to me than having a guaranteed income when I reach retirement age.

2. Having a guaranteed income when I reach retirement age is more important to me than having autonomy over how my Social Security taxes are invested.
Overview of Results

- Most rate their health as good.
- Despite health challenges, elders remain emotionally resilient.
- Adults with cardiovascular disease and Alzheimer’s disease show earlier declines in mental abilities.
SELF-RATED HEALTH STATUS AMONG OLDER ADULTS

Percentage of people age 65 and over with respondent-assessed good to excellent health status by age group and race and Hispanic origin, 2008–2010

Figure 17.1 Self-Rated Health Status among Older Adults
VARIABILITY IN LATE ADULTHOOD
Limitations on Activities

Daily Living Tasks
• Activities of daily living (ADLs)
• Instrumental activities of daily living (IADLs)

Rise of Disabilities with Age
• Fifty percent of people over age seventy-five have difficulties with ADLs.
VARIABILITY IN LATE ADULTHOOD
Limitations on Activities

Disability: limitations on someone’s ability to perform certain roles and tasks, especially self-help tasks

- Incidence by age and rate
- Common types
- Gender differences
- Categories of daily tasks
CHRONIC CONDITIONS AMONG OLDER ADULTS

Percentage of people age 65 and over who reported having selected chronic health conditions, by sex, 2009–2010

- **Heart disease**: Men 37%, Women 26%
- **Hypertension**: Men 54%, Women 57%
- **Stroke**: Men 9%, Women 8%
- **Asthma**: Men 10%, Women 13%
- **Chronic bronchitis or emphysema**: Men 10%, Women 11%
- **Any cancer**: Men 28%, Women 21%
- **Diabetes**: Men 24%, Women 18%
- **Arthritis**: Men 45%, Women 56%

Figure 17.2 Chronic Conditions among Older Adults
VARIABILITY IN LATE ADULTHOOD: Racial and Ethnic Health Differences

Among Ethnic Minorities:
- High level of variability
- Good to excellent health ratings
- Some difference: arthritis
- Health habits and health status are correlated.
VARIABILITY IN LATE ADULTHOOD
Individual Heredity

- Twin studies
- Family history of longevity
- Long life and rates of chronic illnesses
VARIABILITY IN LATE ADULTHOOD
Health Habits

Does health matter?

- Health habits that predict longevity change very little with age.
- Most crucial variable = physical exercise
- Eating patterns
PHYSICAL CHANGES
Brain and Nervous System

Four Main Changes

- Reduction of brain weight
- Loss or gray matter
- Slower synaptic speed
- Decline in dendrite density
PHYSICAL CHANGES
The Senses and Other Bodily Organs

Vision

- Presbyopia (farsightedness) increases.
- “Blind spot” and reduction of vision field
- Night vision
- Cataracts
- Glaucoma
- Macular degeneration
PHYSICAL CHANGES
The Senses and Other Bodily Organs

Hearing
- Gradual hearing loss
- Sex differences
- Word discrimination decreases.
- Tinnitus
Taste, Smell, and Touch

- The ability to taste four basic flavors does not seem to decline with age.
- Sense of smell deteriorates with age.
- The skin of elderly adults is less responsive to heat and cold.
STOP AND THINK

If you were asked to give a presentation on the causes of physical aging, what would be your main points?
THEORIES OF BIOLOGICAL AGING

Longevity

- Maximum human lifespan is 110–120 years.
- Hayflick limit
- Genetic limits argument
Genetically Programmed Senescence

Gradual deterioration of body systems with age

Aging genes equipped with built-in clock preventing genes from having aging affect them during the reproductive years

Genes switch on after the reproductive peak passes.
Repair of Genetic Material and Cross-Linking

- Accumulation of unrepaired breaks in DNA results in loss of cellular function over time.
- Cross-linking occurs when undesirable chemical bonds form between proteins or fats.
- Molecules fail to assume the correct shape for proper functioning.
THEORIES OF BIOLOGICAL AGING
More Theories to Consider

Free Radicals

- Molecules or atoms possess an unpaired electron that may cause irreparable cellular damage that accumulates with age.
- Occurs more frequently in older adults because of age-related deterioration of mitochondria.
THEORIES OF BIOLOGICAL AGING
More Theories to Consider

Terminal Decline Hypothesis

- Significant declines occur within few years of death.
- Lead to significant drops in functioning before death

BUT

- Only changes in cognitive functions support the terminal drop hypothesis.
PHYSICAL CHANGES
Behavioral Effects of Physical Changes

General Slowing

- Dendrite loss
- Loss of muscle elasticity
- Decline in speed of nerve impulses
- Changes in temperature sensitivity
PHYSICAL CHANGES
Sleeping and Eating Patterns

**Sleeping**
- Shifts in sleep patterns
- Wake more frequently at night
- Show decreases in REM sleep

**Eating**
- Loss of feelings of satiety, thus overeat
- May become rigid in meal times and food selection to compensate
PHYSICAL CHANGES

Motor Functions

- Reduction in stamina, dexterity, and balance
- Loss of balance is associated with higher risk of falling.
- More problems with fine-motor control
STOP AND THINK

Do old people have sex?
PHYSICAL CHANGES

Sexual Activity

Decreases in sexual activity have many causes.

- Seventy percent of young-old and about half of old-old people continue to have sex.
- Decline in testosterone
- Certain medications or physical pain
MENTAL HEALTH
Alzheimer’s Disease

Alzheimer’s disease (neurocognitive disorder due to Alzheimer’s): very severe form of dementia

- Early stages become evident very slowly.
- As the disease progresses, more serious declines and changes appear.
- Rate of decline related to age at onset
- Eventual inability to remember names of common objects or perform common activities
- One’s ability to communicate declines.
- High incidence of depression
MENTAL HEALTH
Alzheimer’s Disease

Diagnostic Issues

- Diagnosis is difficult because 80 percent of the elderly complain of memory problems.
- On autopsy, presence of neurofibrilar tangles and plaque deposits.
MILD COGNITIVE IMPAIRMENT AND ALZHEIMER’S DISEASE

General
• No specific disorder that accounts for symptoms (e.g., brain tumor, stroke, depression)
• Gradual decline in cognitive function along with low scores on standardized tests

Mild Cognitive Impairment (MCI)
• More common; about one-third of older adults
• Precursor to Alzheimer’s disease; confirmed by brain-imaging and DNA studies

Age-Associated Cognitive Decline (AACD)
• 10 percent in 70s; 25 percent in 80s
Critical Analysis

1. In what way is research on the links among AACD, MCI, and Alzheimer’s disease related to the issues discussed in the No Easy Answers box on page 419?

2. In your opinion, to what degree might misdiagnosis of AACD as MCI contribute to the finding that only one-third of individuals who are diagnosed with MCI develop full-blown Alzheimer’s disease?
MENTAL HEALTH
Alzheimer’s Disease

Treatment

• Galantamine
• Use of anti-inflammatory medication
• Training in memory strategies and tasks
MENTAL HEALTH
Heredity and Alzheimer’s Disease

Genetic factors appear in some but not all individuals; no gene acts alone.

- Age of onset is highly variable.
- Wide variations in severity of behavioral effects of disease
TRUE OR FALSE?

Dementia is a symptom, not a disease. It involves a different process than does Alzheimer’s disease.
MENTAL HEALTH
Other Types of Dementia

Dementia can have many causes.
• Multi-infarct dementia may appear after multiple small strokes.
• Many forms involve irreparable brain damage.
• Different forms of therapy may improve functioning.
MENTAL HEALTH
Depression

Prevalence and Demographics

- Older adults are at greater risk.
- Roughly 14 percent of 65–69-year-olds and 19 percent of those 85 years old and older suffer from depression.
- More common among less-educated adults regardless of other factors, such as ethnicity.
COMPUTERS IN REHABILITATION PROGRAMS

Computers are becoming increasingly important in the treatment of neurological disorders affecting the elderly.

- Computerized speech-rehabilitation programs
- Virtual-reality programs
- Route-learning in virtual environment
Reflection

1. If you worked in a rehabilitation facility and had to convince a technophobic older adult to participate in a computer-based program, what strategies would you use to persuade the patient to give the new technology a try?

2. How do you think computers might be useful to older adults who complain of everyday memory problems?
MENTAL HEALTH
Depression

Risk Factors

- Inadequate social support
- Poverty
- Gender
- Education (independently related)
- Emotional loss or absence of significant others
- Persistent health concerns
MENTAL HEALTH
Depression

Ethnic and Cultural Differences

Poverty and education accounts for some ethnic differences in older adult depression.

Health status is linked to depression.
MENTAL HEALTH
Suicide

Risks

- Gender differences
- Incidence increase and age
- Death of spouse
- Poor health
GENDER DIFFERENCES IN SUICIDE RATES

Figure 17.3 Gender Differences in Suicide Rates

Rate per 100,000 people

Age

35–44  45–54  55–64  65–74  75–84  85+

Men

Women

Figure 17.3 Gender Differences in Suicide Rates
COGNITIVE CHANGES
Memory

Memory and Aging

- Forgetfulness
- Short-term memory capacity
- Cognitive speed
- Strategy learning effects
PERCENTAGE OF OLDER ADULTS WITH MODERATE TO SEVERE MEMORY IMPAIRMENT

Figure 17.4 Percentage of Older Adults with Moderate to Severe Memory Impairment
COGNITIVE CHANGES
Everyday Memory

So WHERE are those car keys?

• Everyday memory tasks decline among older adults (compared to younger adults).
• Prior knowledge is a critical factor in memory functioning.
• Loss of speed is a key aspect of the process of memory decline.
Figure 17.5 West and Crook’s Classic Study of Memory across Adulthood

- 7 digits immediately
- 10 digits immediately
- 7 digits after busy signal
- 10 digits after busy signal

Average number of digits dialed correctly

age groups: 18-35, 40-49, 50-59, 60-69, 70-85
COGNITIVE CHANGES

Strategy Learning

- Older adults showed improvement after training, but their performance was poorer than that of younger adults.
- Learning process simply takes longer for older adults. However, when older adults were allowed more time to associate each picture and word, their performance was more like that of younger participants.
WISDOM AND CREATIVITY

Factual knowledge is only ONE part of wisdom.

- Baltes measured wisdom using major life decision stories.
  - Wisdom is central to solving practical life problems.
  - Complex answers are rated as being higher in wisdom.
COGNITIVE CHANGES
Wisdom and Creativity

Gene Cohen’s Stage Theory of Midlife to Late Life Creativity

- Reevaluation phase
- Liberation
- Summing-up
- Encore phase