Chapter Preview

Chapter 24 discusses the changes in information processing experienced by older adults. As measured by standardized laboratory tests (which are often biased against the older adult), some cognitive processes become slower and less efficient during late adulthood. In part, this is because older adults use fewer and less efficient strategies to help them remember and solve problems.

Age-related declines in cognitive functioning may also result from the neurophysiological changes tied to aging. The chapter describes these changes, which include the progressive loss of brain cells and, more important, the slowing of brain processes due to reduced production of key neurotransmitters.

Most older adults are not hampered in their daily life by cognitive difficulties. Through their use of compensating memory techniques, such as practice and priming, older adults are able to function acceptably.

Chapter 24 also explores the loss of cognitive function suffered by victims of dementia. The most common forms of dementia are Alzheimer disease and vascular dementia. Many other dementias begin with impaired motor control. The most common of these is Parkinson disease. Many other problems, such as depression, malnutrition, and overmedication, are misdiagnosed as dementia.

As emphasized by such theorists as Maslow and Erikson, many older adults show new cognitive development during later life, developing a heightened aesthetic sense, gaining in wisdom, and becoming more philosophical.

What Have You Learned?

The “What Have You Learned?” questions at the end of the text chapter are reprinted here for your convenience in checking students’ understanding of the chapter contents.

1. What aspects of the brain slow down with age?
2. Why does slower thinking reduce scores on IQ tests?
3. Why do the elderly use more parts of their brains at once to think?
4. Why is multitasking particularly difficult in late adulthood?
5. How does sensory loss affect cognition?
6. Why does interference affect thinking, even if the person eventually reaches an accurate conclusion?
7. Which kinds of things are harder to remember with age?
8. Which kinds of memories seem well preserved or even improved with age?
9. What is the difference between short-term and long-term memory in the elderly?
10. How are short-term and long-term memory measured?
11. Why are the elderly likely to benefit from learning control strategies?
12. How does priming help people remember?
13. Why is ecological validity especially important for prospective memory?
14. Why is the number of years until death a better measure of late-life cognition than years since birth?
15. What diseases or conditions correlate with loss of cognition?
16. In what specific ways does exercise affect the brain?
17. How and why does training in cognitive skills help the elderly?
18. Why is calling a demented person senile an example of ageism?
19. What proof is there that Alzheimer disease is partly genetic?
20. How might a person in stage 2 of Alzheimer disease function in daily life?
21. Why are most people unaware of the early stages of vascular dementia?
22. In what ways is frontal lobe dementia worse than Alzheimer disease?
23. If a person has Parkinson disease, what effect does that person’s age have?
24. Why is Lewy body dementia sometimes mistaken for Parkinson disease?
25. How successful are scientists at preventing dementia?
26. What is the purpose of the life review?
27. Why might older people become more creative, musical, and spiritual than before?
28. Why do scientists hesitate to say that wisdom comes with age?

Chapter Guide

- "On Your Own" Activities: Developmental Fact or Myth?; Portfolio Assignment
- AV: The Journey Through the Life Span, Program 9: Late Adulthood; Transitions Throughout the Life Span, Program 24: Late Adulthood: Cognitive Development

I. The Aging Brain

_Instructional Objective:_ To describe the typical age-related changes that occur in the brain during late adulthood.

1. Senescence reduces production of neurotransmitters, including dopamine, glutamate, and acetylcholine. Other changes in the brain include a decrease in serotonin, a decrease in neural fluid, thinning of myelin, a reduction in the corpus callosum, and a slowing of the circulation of cerebral blood. Together, these changes result in an overall brain slowdown that is evident in reaction time, talking, and thinking. However, a person’s past education and current intellectual challenge may correlate with better neurological functioning in late adulthood.

2. In addition to a reduction in speed, brain aging is accompanied by decreased size, especially in the hypothalamus and in the prefrontal cortex. In every part of the brain, the volume of gray matter is reduced, causing many people to have to use their cognitive reserve to understand events.

3. Compared with younger adults, older adults use more parts of their brains to solve problems. This change in activity may be the result of compensation by other brain regions during complex thinking. However, challenging tasks may become too hard if the aging brain has insufficient brain reserve. If cognitive loss also includes reduced control, the result may be thinking that is more diffuse and attention that wanders.

4. Older adults often find multitasking particularly difficult, especially when a motor task is combined with a cognitive task. Combined tasks such as reading while walking require the use of both brain hemispheres.
II. The Usual: Information Processing After Age 65

_Instructional Objective:_ To describe the typical age-related changes that occur in sensory memory, working memory, the knowledge base, and cognitive control processes during late adulthood.

- Teaching Tips: Attributing Behaviors to the Aged; Cognitive Development: Specialization
- Classroom Activity: Classroom Debate: “Resolved: Research on Cognitive Decline Supports Mandatory Retirement Laws”
- “On Your Own” Activity: Role-Playing an Older Adult

1. Sensory input is reduced in late adulthood. Thus, older adults may miss subtle clues in communication. Reduced sensory input also affects cognition by increasing interference.

2. Older individuals are particularly likely to experience difficulty with working memory.

3. Memory for past events requires the use of long-term memory. This type of memory usually stays strong with age. Older adults' emotional or autobiographical memories and flashbulb memories are especially well retained.

4. Management of the control processes of memory, such as selective attention, memory and retrieval strategies, and rules or strategies for problem solving, is also generally less efficient in older adults.

5. Memory benefits when older people are given a clue before being asked to remember something, a process called priming.

6. The Seattle Longitudinal Study found that beyond age 60 adults begin to show significant declines in the five primary mental abilities (verbal meaning, spatial orientation, reasoning, number ability, and word fluency). However, two important factors modify this decline: health and training.

7. The overall slowdown of cognitive abilities that often occurs in the days or months before death is called terminal decline (also called terminal drop). With terminal decline, a compression of morbidity is evident.

8. Laboratory tests of memory may put older persons at a disadvantage because they generally use meaningless material, which reduces motivation in older adults. The idea that cognition should be measured in realistic settings that test real-life skills is called ecological validity.

9. Remembering to do something in the future is called prospective memory. When tested in the laboratory, this type of memory is reduced with age. In real-life tests, this type of memory is better among the old than the young.

10. Most older adults do not consider memory problems a significant handicap in daily life.

III. The Impaired: Diseases That Affect the Brain

_Instructional Objective:_ To describe the progressive stages and forms of dementia.

- AV: Alzheimer’s: Effects on Patients and Their Families; Alzheimer's Disease: The Long Nightmare; Alzheimer's Disease; New Views on Alzheimer's; Understanding Depression: Through the Darkness
- Teaching Tip: Cognitive Deficits in the Elderly,
- Classroom Activity: Was Alzheimer Disease Misnamed?
- Internet Activity: Alzheimer Disease

1. _Dementia_ refers to severely impaired judgment, memory, or problem-solving ability. Unlike _delirium_, which is acute, dementia is chronic.

2. Dementia was traditionally called _presenile dementia_ when it occurred before age 60 and _senile dementia_ or _senile psychosis_ when it occurred after age 60. This distinction is arbitrary, however, because the same symptoms can occur at any age.

3. Dementia can be caused by more than 70 diseases, all of which show similar general symptoms. The sequence, severity, and particulars of these symptoms vary.
4. The most common form of dementia is Alzheimer disease (AD), which is associated with abnormalities in the cerebral cortex, called plaques and tangles, that destroy normal brain functioning. Plaques are formed outside the neurons from a protein called beta-amyloid; tangles are masses of a protein called tau found inside the neurons. These usually begin in the brain’s hippocampus.

5. Alzheimer disease is partly genetic. When it appears before age 60, either Down syndrome or one of three dominant genes is the reason.

6. About one-fifth of the population inherits the gene ApoE4 from one parent, which increases the risk of Alzheimer disease. Those who inherit the gene from both parents almost always develop the disease if they live long enough.

7. Even before the first stage of Alzheimer disease, many people have mild cognitive impairment, which is forgetfulness and loss of verbal fluency.

8. The first stage of Alzheimer disease is absentmindedness, sometimes confused with normal aging. Many people remain at this stage and never become worse.

9. The second stage is marked by more general confusion and noticeable deficits in concentration and short-term memory. People at this stage often ramble in conversation and frequently mix up words. The incidence of forgetfulness becomes more repetitious, and long-standing personality traits become more pronounced, such as an asocial person becoming more withdrawn.

10. The third stage begins when memory loss becomes dangerous and the person is no longer able to take care of basic needs. Individuals at this stage become increasingly irresponsible. By the fourth stage they require full-time care. In the fifth stage, people become completely mute and do not respond to any stimulus. In general, death comes 10 to 15 years after the first signs appear.

11. The second major cause of dementia is a stroke or a series of strokes, or transient ischemic attacks (TIAs), often referred to as ministrokes. Repeated TIAs produce more damage, and vascular dementia (VaD), or multi-infarct dementia (MID), occurs. MID, responsible for 15 to 20 percent of all dementia, is the result of a temporary interruption of blood flow to that part of the brain.

12. Another category of dementias, called frontal lobe dementias, originate in brain areas that regulate emotions and social behavior. These areas include the amygdala and the frontal lobes. Other dementias begin with impaired motor control. The most common cause of these dementias is Parkinson disease, which produces a rigidity and/or tremor of the muscles. Parkinson disease causes the degeneration of neurons in the area of the brain that produces dopamine, a neurotransmitter that is essential to normal brain functioning.

13. A related form of dementia is Lewy body dementia, in which both body movements and cognition are affected. People with this disorder may have vivid visual hallucinations, momentary loss of attention, and loss of inhibition.

14. Some other causes of dementia before age 65 are Huntington disease; multiple sclerosis; severe head injury; and the last stages of syphilis, AIDS, and mad cow disease.

15. Brain plasticity continues throughout life. For this reason, exercise may build brain capacity as well as prevent age-related loss. However, for most dementias, prevention is not certain and cure is not yet possible.

16. Oftentimes, the elderly are thought to be suffering from brain disease when, in fact, their symptoms are a sign of reversible dementia, caused by some other factor such as overmedication, inadequate nutrition, dehydration, or brain tumors. Symptoms of dementia can also result from depression or other mental illness. This problem is made worse by the fact that many of the drugs prescribed to older adults can, by themselves, slow down mental processes.

17. Too much of any one substance might put the body out of balance. Caution is especially needed when people take several medications, a circumstance called polypharmacy.
IV. The Optimal: New Cognitive Development

*Instructional Objective:* To discuss positive cognitive changes that may occur during later life.

- AV: Aging and Saging
- Classroom Activity: Problem-Based Learning: Design a More Valid Test of Cognitive Functioning for Older Adults
- Critical Thinking Activity: Personal Wisdom During Late Adulthood

1. Erikson finds that older adults are more interested in the arts, children, and the whole of human experience than are younger adults.

2. According to Maslow, older adults are much more likely than younger adults to reach *self-actualization,* which is defined as heightened aesthetic, creative, philosophical, and spiritual understanding.

3. One formulation of the attempt of older adults to put their lives into perspective is called the *life review,* in which an effort is made to connect one's own life with future and past generations.

4. Wisdom is one of the most positive attributes commonly associated with older people. One summary describes wisdom as an “expert knowledge system dealing with the conduct and understanding of life.”