

HEALTHY AGING

Presented by

CONTINUING PSYCHOLOGY EDUCATION INC.

7 CONTINUING EDUCATION HOURS

“The ability to prolong life is indeed within our grasp.”
Marie-Francoise Schulz-Aellen (1997)

Course Objective

The purpose of this course is to provide an understanding of the concept of healthy aging. Major topics include current biological theories of aging, physical factors, prevalent diseases and health strategies, Baltimore Longitudinal Study of Aging, psychological factors, social factors, long-term care, and the nature of healthy aging.

Accreditation

Continuing Psychology Education Inc. is approved by the California Association of Marriage and Family Therapists (CAMFT # 1000067) to sponsor continuing education for LMFTs, LCSWs, LPCCS, and LEPs. Continuing Psychology Education Inc. maintains responsibility for this program/course and its content. This course, Healthy Aging, meets the qualifications for 7 hours of continuing education for LMFTS, LCSWs, LPCCs, and/or LEPs as required by the California Board of Behavioral Sciences.

Mission Statement

Continuing Psychology Education Inc. provides the highest quality continuing education designed to fulfill the professional needs and interests of mental health professionals. Resources are offered to improve professional competency, maintain knowledge of the latest advancements, and meet continuing education requirements mandated by the profession.

Learning Objectives

- Upon completion, the participant will be able to:
1. Discuss five current biological theories regarding the causes of aging.
 2. Explain three physical factors associated with aging.
 3. Acknowledge three common older adult diseases and their recommended preventative measures.
 4. Articulate five findings from the Baltimore Longitudinal Study of Aging.
 5. Expound upon four psychological effects of aging.
 6. Understand five social theories of aging, and the value of social support systems.
 7. Describe three prevalent concerns in long-term care.
 8. Discuss four key characteristics which promote healthy aging.
 9. The information was current and current.
 10. The instructor was responsive to participants (timely responded by email, if requested).
 11. There was accessibility for distance-learning support (questions/problems addressed effectively and timely).
 12. The course technology was user-friendly.

Faculty

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Outline

1. Biological theories of aging
 - a. Programmed aging theories
 - b. Random error theories
 - c. Rate of living theory
 - d. Waste product accumulation theory
 - e. Cross-linking theory
 - f. Free radical theory
 - g. Autoimmune theory
 - h. Heat shock proteins theory
 - i. Order to disorder theory
2. Age-related physical factors
 - a. Skin, hair, body build, muscles, bones, joints
 - b. Cardiovascular system, Respiratory system, Urinary system, Endocrine system, Immune system, Nervous system
 - c. Vision, hearing, balance
3. Prevalent diseases and health strategies
 - a. Cardiovascular system diseases
 - b. Cancer
 - c. Musculoskeletal system disorders
 - d. Diabetes
 - e. Alzheimer's disease
4. Baltimore Longitudinal Study of Aging
 - a. Mental and physical effects of aging
5. Psychological factors in aging
 - a. Information processing, attention, memory
 - b. Language, problem-solving, intelligence, personality
6. Social factors and theories explaining changes in social relationships during aging
 - a. Role Theory, Activity Theory, Disengagement Theory, Continuity Theory, The elderly as a subculture, Age Stratification Theory, Interactionist Perspectives, Social Exchange Theory, Political Economy of Aging
 - b. Social support systems
7. Long-term care
 - a. Legislative issues
 - b. Long-term care financing
 - c. Personal adjustment factors
8. The nature of healthy aging

produce antibodies which circulate in the blood, deactivate foreign substances (antigens), and prepare them for digestion by other cells.

The *autoimmune theory* states that, with age, the immune system loses ability to distinguish normal from foreign materials leading to the attack and destruction of important body components causing age changes. An example of autoimmune disease in older people is inflammation of the joints (arthritis).

The *immune deficiency theory* believes that the immune system weakens with usage and ultimately cannot defend the body against foreign molecules and microbes. These toxic agents injure and disrupt cell functioning leading to damaging age changes. For example, the immune system of a younger rather than older person may more effectively keep cancer cells in check. A possible cause for immune function decline with age is the thymus gland, located in the upper chest. This gland produces T-cells which are white blood cells that are vital in the body's ongoing effort to fight disease. The thymus begins to wither beyond adolescence and it is theorized that this spurs the ultimate demise of the entire immune system.

The immune system theory has not received strong support for several reasons. First, it is not universal as some animals that age do not manifest a well-developed immune system. Second, the immune system is subject to control by various hormones and the nervous system, therefore, a more basic source could be causing immune function changes with age. Despite the immune system revealing some functional decline with age, it lacks evidence as being the cause of aging.

Theories of errors and repairs - Proposes that mutations occur in somatic cells (those not involved in reproduction) causing age changes. A variant of the theory, called the error catastrophe theory (Orgel, 1963), believes that errors in protein manufacturing accumulate exponentially causing many cells to malfunction and die.

The production of proteins and reproduction of DNA are vital to life but these molecules are not always produced with complete constancy. Error theorists submit that an organism's manufacturing machinery sustains errors, and natural repair processes cannot make perfect repairs every time, and may be flawed from the onset. Errors then affect the molecules that compose or are produced by our cells, metabolic failures arise, and age changes and death result. Evidence shows that errors do occur and repair processes are not perfect and do not function forever.

Preserving the fidelity of DNA is so important that cells have developed methods to repair it given damage. DNA may be damaged by normal background radiation, ultraviolet radiation, cancer-causing chemicals, some normal metabolic processes, cross-linking, and free radicals; fortunately, there are at least six different kinds of DNA repair systems. It is believed that one year's worth of accumulated damage to cells would render cells to be non-

functional.

Some research found that DNA repair systems were more efficient in longer-lived species which would support the error hypothesis of aging; perhaps longer-lived species have evolved more efficient ways to correct errors in vital DNA molecules. Confirmation of this finding, however, has not been constant across trials.

Additional research has found evidence that accumulated errors in enzyme proteins may contribute to aging. Speculation is high that some future version of the error theory will explain a number of age changes. It is known that errors do occur in some of the molecules that compose all cells.

Heat shock proteins theory - Similar to DNA repair mechanisms which protect genes, *heat shock proteins (Hsps)* represent a type of cellular repair mechanism considered to be an aging decelerator. The name derives from research on effects of heat-related stress upon plants. Hsps are found in every living organism, from bacteria to humans, and in almost all types of cells; they are important in protecting cells from nearly all kinds of stressors, including radiation, infection and oxidation. Additionally, they are important in promoting healthy cell growth and proliferation (Punyiczki & Fesus, 1998).

Jurivich, Qiu, and Welk (1997) suggest that cell aging is defined by poorer responses to physiological stress, possibly mediated by transcription errors in heat shock genes. This reduction in efficiency may interfere with organ functioning and may affect the body's ability to communicate and regulate functioning at the systems level causing failures in homeostasis. Continued research is needed.

Homeostasis theory - Organisms must sustain a level of homeostasis, in other words, stability in intracellular and extracellular environmental conditions, such as blood pressure, heart rate, temperature, pH balance, and electrolyte and fluid balance. Conditions change as a function of environmental demands but then must return to baseline levels. Homeostasis demands communication between organ systems and is primarily regulated by the autonomic nervous system via the neuroendocrine system.

Evidence suggests that it becomes harder to maintain homeostasis as we age (Taffett, 1996). Many systems within the elderly reveal slower responses to environmental challenges and more elevated responses requiring much longer to lessen and return to baseline. Both disease and age-related processes are inferred as the cause.

Homeostatic problems may develop from a decline in hormone production or other type of regulatory peptide, target organs may become less responsive, and/or the target organ may synthesize decreased amounts of its product. A number of illnesses associated with aging demonstrate these concerns with homeostasis, such as orthostatic hypotension and diabetes. Research is ongoing.

Order to disorder theory - States that an organism loses efficiency after passing the reproductive age due to a lack of energy needed to maintain the system; increasing disorder causes errors to develop that lead to death.

This model borrows from the field of physics, specifically, thermodynamics. Physicists report that in a *closed system*, matter tends to a state of equilibrium, which equates to increasing disorder. The measure of this state is called entropy and is illustrated in the second law of thermodynamics.

Peak efficiency drops after sexual maturation due to the notion that “perfect order requires infinite work” and a biological system cannot supply infinite work. Further, deterioration and disorder continues to accumulate. Some biogerontologists believe that increased molecular disorder develops from mistakes in molecules (similar to error theories) leading to changes in cells, tissues, and organs called aging.

Humans and animals are examples of an *open system* through which matter and energy flow. We are affected by many environmental factors such as the food we eat and the air we breathe, consequently, it may be argued that the laws of thermodynamics may not generalize well from a closed system to a living organism. Contrarily, our bodies experience the same kind of disorder or entropy in our earlier well-ordered molecules as any machine, complex system, or even the universe itself.

Some biogerontologists argue that aging has many causes requiring a synthesis of many theories while others promote only one theory. Gerontology is still a young science searching for knowledge offering explanation for why we age. Science now knows that age changes occur within individual cells but knowledge has been essentially descriptive - answering “what” happens as we age rather than “why” it happens. Researchers have explained changes that occur as we age from the molecular level to the whole animal but these descriptive observations do not clarify the basic process. Optimism grows, as many scientists, for the first time in the history of biology, are working in the aging field, and they are encouraged by the potential of modern technological tools, the human genome and stem cell research. Understanding causes of aging may enable scientists to influence the processes of biological aging and to minimize common harmful age changes.

PHYSICAL FACTORS

Age-related physical changes may have psychological and social implications. Biological changes can affect the individual’s attitudes, behaviors, and identity as self-perception is affected by one’s appearance and competence. This section examines age changes within body, brain, and sensory functions beyond the well-known factors of gray hair and wrinkles.

Skin - With age, cells of the epidermis become less regularly arranged (Kligman, Grove, & Balin, 1985), explaining part of visual appearance changes in skin. Most skin change is due to loss of skin’s flexibility and ability to conform to the changing shape of the skin as the limbs move. Skin sags because it cannot return to its original state of tension after being stretched out through movement.

Skin age-changes also occur due to the following: sweat glands become less active; sebaceous glands, which provide oils that lubricate skin, become less active; the layer of subcutaneous fat, which gives skin its opacity and smoothness, lessens in thickness causing skin to sag and become translucent; pigmented outgrowths (moles), elevations of small blood vessels (angiomas), and large irregularities in blood vessels (varicose veins) develop. Facial appearance changes due to teeth discoloration from enamel loss, and baggy eyes due to accumulation of fat, fluid, and dark pigmentation.

Photoaging, age changes resulting from exposure to the sun’s harmful radiation, causes many negative skin effects. Body parts exposed to sun, such as face and arms, show more negative effects than non-exposed areas (Takema et al., 1997). Sunscreen, minimal level 15 SPF, is the most effective prevention (Farmer & Naylor, 1996). Some evidence shows that facial massages (Iida & Noro, 1995), skin emollients, and applying vitamin E (Nachbar & Korting, 1995) offer beneficial skin effects.

Hair - Turns gray then white, and thins. Hair changes color due to increasing loss of pigmentation as melanin production stops. People vary greatly regarding rate of hair changing color. Hair thinning occurs in both sexes but is more obvious in males. Hair loss generally results from destruction of germination centers that produce hair under the surface of the skin. Male pattern baldness occurs when hair follicles continue to produce hair but this hair is not visible; though hair stops growing or is less evident, it may surface in larger amounts in other places, such as the chin in women, ears, and eyebrows.

Present knowledge indicates that age changes in hair are unpreventable, however, pharmaceutical companies are actively searching for the answer to baldness, and improvements in hair stimulation products are considered possible.

Body build - We experience a loss of height through adulthood and it is more pronounced in women (de Groot, Perdigao, & Deurenberg, 1996; Suominen, 1997). Women’s spines collapse and shorten in length due to loss of bone material in the vertebrae.

Whereas body weight increases during middle adulthood from an accumulation of body fat, mainly around the waist and hips, older adults lose weight because they lose lean body mass, which is muscle and bone (Baumgartner, Heymsfield, & Roche, 1995).

TEST - HEALTHY AGING

7 Continuing Education Hours.

Click the link “California MFT/LCSW/LEP/LPCC Answer Sheet” on Home Page, then follow the prompts, which include making your payment, transferring your test answers to the online answer sheet, and printing your certificate immediately.

Passing is 70% or better.

For True/False questions: A = True and B = False.

TRUE/FALSE

1. **Programmed aging and random error theories comprise the biological theories of aging.**
A) True B) False
2. **The free radical theory is being explored as a possible cause of aging.**
A) True B) False
3. **The majority of older people have positive and accepting attitudes toward sexuality.**
A) True B) False
4. **Diet and exercise can affect immune system response.**
A) True B) False
5. **Life expectancy has fallen over the past 60 years.**
A) True B) False
6. **Current research indicates that the aging brain maintains much of its function and structure.**
A) True B) False
7. **Secondary aging involves later life changes due to disease.**
A) True B) False
8. **Higher education and continued mental activity throughout life may protect against Alzheimer’s disease.**
A) True B) False
9. **Most studies on working memory span indicate age-related deficits.**
A) True B) False
10. **The Baltimore Longitudinal Study of Aging concludes that lifestyle decisions cannot affect the occurrence or progression of some age-related diseases.**
A) True B) False
11. **Age-related changes in body composition, such as loss of bone mineral content, fat increase, and muscle mass decrease are related to the _____.**
A) endocrine system
B) respiratory system
C) urinary system
D) reproductive system
12. **Brain research indicates that _____.**
A) mental stimulation can compensate for loss of neurons.
B) remaining neurons do not increase their synapses.
C) there is no neurological basis for memory changes in later adulthood.
D) older adults cannot compensate for brain deficits.
13. **The leading cause of death in people over age 65 involves the _____.**
A) reproductive system
B) cardiovascular system
C) vestibular system
D) bones
14. **The formation of plaques and tangles is associated with _____.**
A) diabetes
B) skin cancer
C) Alzheimer’s disease
D) hearing impairment
15. **Sedentary lifestyle, smoking, body weight, and alcohol intake represent the four major risk factors for _____.**
A) skin disorders
B) diabetes
C) heart disease
D) Alzheimer’s disease

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16. **Older adults demonstrating more flexibility in attitude and personality style are less likely to experience a decline in _____.**
- A) endocrine system functioning
 - B) intellectual functioning
 - C) visual acuity
 - D) cardiovascular system functioning
17. **Decreasing the range of one's relationships to maximize social and emotional gains and minimize risks, illustrates _____.**
- A) age-related memory deficits
 - B) socioemotional selectivity theory
 - C) Alzheimer's disease
 - D) cognitive impairment
18. **The Nursing Home Reform Act concludes that _____.**
- A) residents are always correct
 - B) fees should be waived for the indigent
 - C) resident services must facilitate the highest well-being
 - D) a sliding fee scale is needed
19. **Older people living alone without social support systems, compared to those with strong social supports, have greater likelihood of _____.**
- A) institutionalization
 - B) lower personally reported well-being
 - C) more difficulty adjusting to widowhood
 - D) all of the above
20. **The concepts of increased feelings of satisfaction and positive view of self, with aging, despite hardships, _____.**
- A) rarely occurs
 - B) is an unrealistic expectation
 - C) are overly dependent upon financial status
 - D) seems to be the norm

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