Sociological, Psychological and Physiological Aspects of Aging

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Taking Ownership of the Third Age

By

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Cambridge Scholars Publishing

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Here we are, six *éminences grises*[*] who have clawed our way up the highest peak, and now that we have reached the summit what do we find? We find that we are too old and infirm to enjoy the proper fruits of our triumph. *Is this all?* We say to ourselves, surveying the world of delights we cannot have. *Was it worth all that sweat?*
JM Coetzee: Diary of a Bad Year

Old people's speech is not to be dishonoured–after all, they saw the sun first.
Old Namibian proverb

[*] Cambridge Dictionary: person without official position but with power or influence over rulers and decision makers.

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My great thanks to my good friend Leon Retief of Moose Jaw, Saskatchewan, Canada for his valuable contribution to this book. He read it and critically commented on an early version. His comments were sharp and incisive, particularly regarding scientific data where my interpretations were inaccurate. Also, to my friend Willem Landman who painstakingly read every word of a later version and commented in detail. And for the hours spent discussing it with me.

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Old age in America is often tragedy. Few of us like to consider it because it reminds us of our own mortality. It demands our energy and resources, it frightens us with illness and deformity, it is an affront to a culture with a passion for youth and productive capacity. In America, childhood is romanticized, youth is idolized, middle age does the work, wields the power and pays the bills, and old age empty of purpose, gets little or nothing for what is has already done.…Aging is the neglected stepchild of the human life cycle.

Butler R. *Why survive? Being old in America*. Baltimore, MD: Johns Hopkins University Press, 2002. [1975].

Hebe, Greek goddess of youth.

Confucianism treats life as a moral pilgrimage and the old age as the summit of such a journey.

Nie J-B. The summit of a moral pilgrimage: Confucianism on healthy aging and social eldercare. *Nursing Ethics*. August 2020. doi:10.1177/0969733020944446

Geras, the Greek god of old age…a shrivelled figure.

List of Terms and Abbreviations

Aetiology; etiology: science dealing with the causes or origins of disease.

Ageism; age-related discrimination: a process of unwarranted and baseless generalisations and systematic stereotyping, and negative and demeaning, often comic labelling of older persons and discrimination against people because they are old.

AIDS: acquired immune deficiency syndrome.

Alveoli: about 480 million tiny air-sacks in the lungs, where the "work" of the lungs–excretion of carbon dioxide in exchange for oxygen, and the limited excretion of volatile substances in the blood (also called gas exchange)–takes place.

Alzheimer's disease: the most common form of dementia; a progressive, irreversible loss of brain cells and their inter-connectivity leading to progressive cognitive impairment (memory and thinking).

Andropause; male climacterium: gradual, variable decline in the levels of male sex hormones (particularly testosterone) during and after middle age, and associated effects.

Aneurysm: ballooning widening of an artery due to weakening of its wall.

Anorgasmia: inability to achieve orgasm despite adequate sexual stimulation.

Aorta: main artery conveying blood through the body; runs from the left ventricle of the heart and ends by dividing into the left and right common iliac arteries in the lower abdomen/pelvis; it has important branches.

Arrythmia (dysrhythmia): improper beating of the heart due to abnormal generation or conduction of electrical impulses in the heart; may be too fast, too slow, irregular, constant or paroxysms; may be inconsequential or serious; diagnosed clinically and by ECG.

Atheroma: accumulation of material (also called plaque)–cholesterol, other substances, white blood cells, platelets–in the inner layer (intima) of arterial walls, potentially leading to obstructed blood flow.

Atherosclerosis: hardening of arteries due to plaque accumulation in and around arterial walls leading to obstruction and weakening of arterial walls, aneurysm formation and rupture.

Atkinson-Shiffren model: three-phase model of memory (sensory, short-term, and long-term) described in 1968.

Autonomy: the right and condition to govern and decide for yourself.

Berry aneurism: aneurysm shaped like a small berry found in the arteries of the brain, often causing bleeding in younger persons.

Brain hemisphere: left or right half of the brain; brain comprises two anatomically (though not functionally) mirror-image lobes sharing blood supply and connected by a mass of white matter–conduction fibres–called the *corpus callosum.*

Bronchus, bronchiole: trachea divides into two main bronchi which further divide like the stems of a tree; smaller divisions are called bronchioles, ending in respiratory bronchioles, carrying alveoli like a bunch of grapes.

Bypass surgery: surgery during which the body is usually cooled down, heart is stopped, and both ventilation and circulation are taken over by a heart-lung machine (extra-corporeal circulation). May also refer to the bypassing of obstructions in the heart or other vessels by stitching in segments of leg veins (in the heart) or sections of artificial tubular structures (other arteries like the abdominal aorta) to bypass obstruction.

Cantankerous: bad-tempered, argumentative, uncooperative.

Capillaries: mesh of smallest blood vessels, 5-10 micron in diameter, where exchanges take place between the fluid in which cells are bathed and blood, connecting the arterial and venous systems.

Cardiac output: amount of blood in litres pumped by the heart in one minute.

Cardiovascular: of the heart and blood vessels.

Carotid arteries: two main arteries supplying blood to the brain.

Catheterisation lab (cathlab): highly technical unit where blood vessels–usually arteries, including those of the heart–are threaded with specially designed catheters and visualised by the injection of radio-contrast substances. Various interventions can be performed under direct vision, including dilatation of short obstructions in the heart vessels, and placing of stents, thermal ablation of "hot spots" in the heart where abnormal impulses are generated, and the placement of aortic valve prostheses.

Cholesterol: a normal lipid essential to metabolism, cell structure and function. It is both taken in orally and produced in the liver. It is transported in the blood in two forms linked to protein: LDL (low density lipoprotein, regarded as "bad"), and HDL (high density; "good"). High LDL:HDL ratios are "bad," leading to atheroma formation.

Claudication: acute, sharp calf pain brought on by exertion (jogging, walking), and caused by atherosclerosis of vessels supplying the leg with blood.

Cognitive impairment: limitation in brain function characterised by problems with memory, language, thinking and judgement.

Collagen: the most abundant bodily protein and the major constituent of bones, tendons, and other structures, where it provides support and structure.

Confabulation: a memory disturbance where gaps are unconsciously filled in with fabricated, misinterpreted, or distorted information. It is not lying.

Connective tissue: one of the four basic bodily tissue types; found throughout the body.

Contractility: inherent strength of cardiac contraction.

COPD: chronic obstructive pulmonary (or airway) disease; diseases that irreversibly obstruct airflow in the lungs, particularly expiration; notably emphysema and chronic bronchitis.

Coronary arteries: right and left coronary arteries and its branches supply the heart muscle itself with blood.

Cortex: cerebral cortex; the thin layer of grey matter (neurones or brain cells) macroscopically visible in the cut surface of the brain.

C-PAP: constant positive airway pressure: technique of maintenance of a low pressure in the airways; used in preventing airway collapse such as in sleep apnoea and collapse of alveoli (in infections and acute lung syndromes).

CT; computed tomography: low-level rotating X-ray machines combine with computers to create cross-section images of the body.

Da Vinci apparatus: stereotactic apparatus used in radical prostate surgery for cancer, allowing careful dissection to spare nerves and vessels, minimal invasion, and limited blood loss. Has become "state of the art."

Daimonion: inward mentor (in the context used in this manuscript).

Debilitating: disease or condition making one weak or infirm.

Degeneration: decline, getting worse.

Diaphragm: muscle layer separating abdomen from chest; at rest, convexly shaped upwards into the chest; at contraction, it flattens out, increases chest volume, and allows inhalation.

Diastolic dysfunction: stiffening of the wall of the left ventricle, with inability to relax properly during diastole, and insufficient filling of the left ventricle, causing limitation in cardiac output.

Dopamine: a neurotransmitter or chemical messenger involved in reward, motivation, memory, attention and regulating bodily movements.

Döstädnung (Swedish); decluttering: "cleaning up after death;" removing unnecessary, unwanted, unused, and redundant items from one's immediate presence, home, and room; in preparation for downscaling.

ECG; EKG; electro-cardiogram: graphic depiction of electrical currents generated in the heart during contraction.

Elastin: elastic connective tissue fibres in the body.

Endocrine gland: glands that produce hormones which are fed into the circulating blood stream and have distant effects.

Enhancement: improving in nature; in medicine, going beyond treatment. In this context with reference to longevity.

Epicurean: devotion to quality food and drink; followers of the Greek philosopher Epicurus.

Epigenetics: study of your behaviours and environment affecting genetic expression– the way your genes work; without changing your DNA sequences, changes the way your body reads them.

Epithelial tissue: thin, protective layers of cells that cover all surfaces and cavities in and of the body, including the skin.

Erectile dysfunction: failure to attain or maintain an erection firm enough to complete sexual intercourse, adequate stimulation notwithstanding.

Exacerbation: acute increase in the severity of a problem, illness, or unpleasant situation.

Existential crises: questioning the meaning, purpose, or value of one's life, often when contemplating mortality.

Exocrine gland: glands that secrete active substances into an epithelial surface via a duct.

Extrasystoles: extra or premature heart beats that disrupt the normal rhythm of the heart.

Fourth age: phase of life characterised by decreased function and debilitation, sometimes leading to senility and mental and physical impairment, also called senescence.

Fourth industrial revolution; 4IR: advances in artificial intelligence, robotics, internet of things, genetic engineering and quantum computing, and integration with human activity.

Gastro-intestinal tract: digestive tract–oesophagus, stomach, small and large bowel, rectum.

Gene expression: see epigenetics; level of activity of genes.

Genetic manipulation: replacement of gene sequences for therapeutic and enhancement purposes.

Geras: Greek god of old age.

Gerontology: study of social, cultural, cognitive, biological, and psychological aspects of aging.

Glomerulofiltration: first step in the kidney's fluid and waste elimination process, filtration of fluid containing waste products from the blood.

Graft: in context, section of artificial vessel to be implanted; the process of grafting.

Heart valves: unidirectional valves in the heart that directs flow in the right direction.

Hebe: Greek goddess of youth.

Hemosiderosis: excessive storage of iron in this form in the body; haemochromatosis is an inherited metabolic disease, causing excessive absorption of iron.

Hippocampus: two structures, one in each hemisphere of the brain, important in consolidating short-term into long-term memory, spatial memory, navigation and memory recall.

HIV: human immune virus.

Homeostasis: maintenance of stable physiological equilibrium.

Homologous: structures of similar evolutionary origin and in similar position, but not necessarily with similar function.

Hyperthymeses; hyperthymesia: condition where person has abnormal recall of almost all her life's events.

Implantation: fixation of the early pre-embryo into the inner layers of the uterine wall.

Intercostal muscles: small muscles stretching between adjacent ribs, responsible for elevating the ribs during inspiration.

Ischaemia: insufficiency in blood supply.

Libido: overall sexual drive or desire.

Medical inflation: year-on-year increase in the healthcare component of the CPI–consumer price index.

Meiosis: germ cell division–two divisions resulting in four germ gametes (sperm or egg cells), each containing just one copy of each maternal or paternal chromosome.

Menopause; climacterium: natural decline in female sex hormones in a woman's 40s or 50s.

Metabolism: life-sustaining chemical reactions using nutrients and oxygen.

Microbiota: community of micro-organisms in an environment (in this context, the gut); microbiome refers to the sum-total of all their genetic material.

Mitochondria: tiny structures ("mini-organs" or organellae) that produce energy in the cell and store it as the energy-rich compound ATP–adenosine triphosphate.

Mitosis: duplication of chromosomes as a precursor to actual division of the nucleus, followed by division of the cell into two identical units.

MRI; fMRI; magnetic resonance imaging: use of powerful electromagnetic pulses to image organs non-invasively; fMRI in addition maps blood flow, providing a real-time assay of regional function/activity.

Multiple sclerosis: auto-immune disease with loss of nerve covering and consequent generation, affecting small areas of the brain and spinal cord, resulting in widely divergent patterns of fall-out.

Muscular dystrophia: usually progressive genetic diseases causing loss of muscle mass and weakness.

Myocardial infarction: acute insufficiency of blood supply to part of the heart muscle causing permanent damage to the area supplied by the vessel obstructed.

Mysticism: belief that contemplation and self-surrender may lead to apprehension of knowledge not accessible by the intellect.

Nanotechnology: in this context, the use of medicines on an atomic or molecular scale.

Nephron: functional unit of the kidney.

Neurogenesis: development of new neurons from adult stem cells in neural tissue.

Neurone; neuron: functional sensory or motor cell/unit of the central nervous system.

Neuroplasticity: growth and reorganisation of neural pathways.

Nucleotide: building block of nucleic acids (RNA and DNA).

Oesophagus: muscular tube connecting pharynx with stomach.

Omega-3 fatty acids: poly-unsaturated fatty acids regarded as beneficial for cardiac health.

Palindromic sequence: nucleic acid sequence read from one side of one of the double DNA strands that corresponds to the same sequence if read from the other direction of the other strand.

Pantaloon: baggy trousers gathered at the ankles.

Papyri: writing material made from the papyrus plant in ancient Egypt; in context, ancient Egyptian documents written on papyrus.

Parkinsonism: an umbrella term for a variety of similar conditions, one of which is Parkinson's disease–a degenerative neurological condition causing a specific type of tremor, rigidity, and bradykinesia, slowness of movement. In context: may cause dementia.

Pathology: in general, study of the causes and effects of diseases or injury.

Patriarch: male head of a family or tribe; in context, one of the Biblical "fathers" of humans.

Peyronie's disease: scar tissue inside the penis causing painful, curved erection.

Platelets: components of blood (they are described as cells but are not typical cells) that aggregate at tissue injury sites, clump together, and secrete various substances to aid clotting and prevent bleeding.

Platonic: in context, non-sexual love.

Polysaccharides: complex, long-chain carbohydrates.

Prefrontal cortex: cortex located at the front of the frontal lobe of the brain, with complex behavioural functions, planning, and personality development.

Premature ejaculation: orgasm and emission before or shortly after beginning sexual intercourse.

Premedication: sedative drugs given to patients to alleviate pre-operative anxiety.

Progeria: random genetic mutation causing progressive rapid aging.

Radical prostatectomy: removal of the prostate, surrounding tissues, seminal vesicles (usually), and lymph nodes in the vicinity aimed at curing cancer.

Regeneration: natural process of replacing or restoring damaged or missing cells, tissues, organs, and even body parts.

Rehabilitation: interventions aimed at optimising function and reducing disability.

Renin-angiotensin: part of normal blood pressure control–inactive substances secreted by the kidney and activated in the lung.

Senescence: see fourth age of life.

Serotonin: key mood-stabilising, well-being, and happiness hormone.

Sleep apnoea: collapse of upper airways causing obstruction, restless sleep and occasionally death.

Spirochaete (Treponema pallidum): spiral-shaped organism causing syphilis.

Statins: most popular class of cholesterol controlling drugs.

Stent: in context, springlike metal tube inserted into narrowed arteries after dilatation to maintain patency.

Stroke: like myocardial infarction but affecting the brain–obstruction in blood supply to a section of the brain causing permanent damage to a particular part of the brain.

Supplements: preparations added to a normal diet with often unproven health advantages.

Synapse: area of interconnectivity between two neurones.

Telomere: cap-like structure to prevent the ends of chromosomes from fraying due to repeated nuclear division.

Third age: commencing at age 65 or so and comprising the next two decades or more–a period in which older persons are active, healthy, and productive, though retired.

"Vitaminogram": a proposed set of investigations aimed at creating a profile of vitamin levels.

Wassermann test: serological test for syphilis.

Wheezing: audible whistling expiration characteristic of asthma.

INTRODUCTION

SIX MYTHS ABOUT AGING

The combination of a series of personal existential crises and experiences–my retirement, an emergency cardiac bypass operation, ICU experience, setback, and recovery, 75th birthday–led to deep reflection on my part, something no other crisis had been able to do. The result is this book.

Let me start by describing, discussing, and dispelling six common myths about aging.

Rowe and Kahn, well known for their work on successful aging[1] maintain that society is in constant denial about aging and falsely stereotypes older persons as sick, demented, weak, incapacitated, devoid of power and sexual urges, passive, lonely and alone, unhappy, and unable to learn new skills. They describe and dispel six myths about older persons and aging:[2]

Myth: To be old is to be sick

Truth: Fewer older persons live in frail care institutions than formerly. More older persons now live without any debility due to disease: 89% of Americans in the age bracket 65-74, and 73% of 75-84-year-olds; 40% of Americans above 85 remain fully functional.

Myth: Older persons are incapable of learning new skills

Truth: Quite the contrary, although older persons are not as sharp at internalising new facts as their grandkids. This myth has a negative impact on the lives of older persons in sustaining a self-fulfilling vicious cycle of mental inactivity and deterioration–older persons believe this myth to be

[1] Authors of the book *Successful Aging.* Dell Publishing, New York, 1998.
[2] Rowe JW & Kahn RL (1999). Six Myths About Aging. Washington Post, 20 July 1999. https://www.washingtonpost.com/archive/lifestyle/wellness/1999/07/20/six-myths-about-aging/5eb77cd1-b822-47ef-8c84-0afe23fe0336/

true and act it out. Three trusted predictors of the maintenance of mental function in aging are:

- Regular exercise.
- Good social support systems and
- Belief in the ability to function.

Scientists accept that the brain maintains its neuroplasticity–the ability to adapt functionally and to a lesser extent, anatomically, to demands placed upon it. Areas of the brain may increase in size.

Myth: The horse has bolted

Truth: The myth falsely proclaims that it is too late to apply strategies like healthy lifestyle choices, the damage has been done. It is never too late; healthy lifestyle choices have almost immediate positive physiological and psychological effects which soon result in a marked improvement in the risk of various diseases. When a smoker stops smoking, for example, his risk of heart disease normalises within five years. Research published in the British Medical Journal confirms that persons who make healthy lifestyle choices–diet (losing weight), not smoking, limiting alcohol intake to less than 15g per day for women, and 30g for men–at age 50 can extend disease-free life by up to ten years.[3]

Myth: Genetics determine longevity, there is little you can do about it

Truth: Best evidence is that genetic effects are limited to 25%; environment and lifestyle account for the rest.

Myth: The "lights are on" but the battery has gone flat

Truth: Research does not support the implication that older persons' mental, physical, and sexual abilities are severely curtailed. 70% of 68-year-old males have regular sex, as do 25% of 78-year-olds. Women are less

[3] Li Y, Schoufour J, Wang DD, Dhana K, Pan A, Liu X et al. (2020). Healthy lifestyle and life expectancy free of cancer, cardiovascular disease, and type 2 diabetes: prospective cohort study *BMJ* 2020; 368 :l6669 doi:10.1136/bmj.l6669

active due to absence of suitable partners. The same applies to other physical activity (sport, jogging, hiking) and mental activity; for example, a 70-year-old former two-time winner of the gruelling 56 km Two Oceans Ultra-marathon works as mainframe computer programmer. Older persons regularly need to master new cell phone apps (and games)–novelties like online banking, payments and shopping, WhatsApp messages and calls, Zoom, Twitter and Facebook–without which we are lost. Like society at large, they, too, need to navigate the demands of digital inclusivity and artificial intelligence (AI), and learn to use generative AI.

Myth: Older persons contribute little to society

Truth: A considerable proportion of older persons continue with constructive remunerated or voluntary charitable work. They also provide support services to other older persons, their families or society at large.

About the contents of this book

The book is divided into six sections, each examining an aspect of aging. The myths listed above reappear at various points in the text, where they will be addressed more comprehensively. The sections of the book do not correspond to the six myths.

Part One investigates how history and literature have dealt with the question of aging.

Part Two deals with definitions, facts and values related to aging: societal implications of aging, being old, and retirement. Important social developments include the recognition of retired workers as a group distinct from the poor, and the creation of social support systems (social pensions and retirement homes). The downside was that older persons became an identifiable liability to be discriminated against.

Part Three attends to the biology of aging.

Part Four examines money matter related to aging.

Part Five deals with “taboo topics”: sex, erectile dysfunction, midlife crises, menopause, andropause, substance/drug abuse, dependency and addiction–that might result in a professional consultation.

Finally, Part Six: successful–positive–aging.

Methodology

As an author I wear several hats. At times I am a biographer; at times, an observer; at times, a moral philosopher; at times, an enquiring lay; at times an expert, or at least informed; at times, a commentator and at times an investigating journalist. I made a thorough study of the available literature, reflected on what I judged applicable and reference my sources. The text is inevitably subjective–no other investigator would have dealt with the data or have approached the topic quite as I have. Throughout I looked through the eyes of an older person to promote her case and to limit subjectivity.

I

HISTORICALLY SPEAKING

Briefly

After a short detour to relate the pre-biblical epic of Gilgamesh and his search for eternal youth, Part One investigates how history and literature have dealt with the question of aging. The ten Biblical progenitors had exceptionally long lives, but after Noah's flood human life was limited to 120 years. In Biblical terms a long life was a divine blessing and reward for righteous living.

Life expectancy in ancient Egypt was short: 23 years for males, a decade longer for females, although an "ideal age" of 110 years is mentioned. Few reached this ideal. Expectancy for important and financially well-heeled Egyptians exceeded those for the poor; they could often retain state employment and income and lived sheltered lives. Older persons were innovative with respect to managing retirement financially, for example making income-generating donations to temples, thereby averting taxation. Children were expected to care for their parents, or face disinheritance.

The Athenian philosopher Socrates had an interesting conversation with his old friend Cephalus, noted by his student and biographer Plato, concerning the former's perceptions and experiences of aging. How does he find growing old? Not too bad, says Cephalus. Dissatisfied young men turn into dissatisfied and grumpy old men. But he is satisfied with the way things are, also that he has been freed from the "*great mistress*"–the sexual urge! Old age should be a time of liberation and profound contemplation requiring a sound character.

Aristotle wrote that aging was due to the loss of both vital heat which is generated in the heart and disseminates throughout the body, and bodily fluid. Aristotle held distinctly negative views about aging, in contrast to the Romans Cicero and Seneca for whom aging was a positive experience.

I next turn to celebrated (and lesser known) literary characters' descriptions and depictions of old age. Shakespeare's famous depiction of the seven ages of man ends with man devoid of anything worthwhile: "Sans teeth, sans eyes, sans taste, sans everything" (*As you like it*). Hemingway famously describes the struggle between an old man and a giant marlin, Cervantes' Don Quixote (not really all that old) fights giants, JM Coetzee's alter ego character in *Diary of a Bad Year* struggles to come to terms with the inevitable. I end with reference to the Afrikaans poet and author Antjie Krog's anthology on aging, *Verweerskrif.* This is by no means a thorough discussion of the relevant literature. The same applies to the next chapter on biography and memoire, which are not exclusively but usually written by older persons. I shortly discuss works in this genre, each illustrating a particular motive, aim or aspect: justification, discovery or rediscovery, reflection, meditation, revision, reconsideration, self-marketing, testimony, reverie.