

Creativity Delivers Growth to the Aging Brain: A new medical model by Russ Barnes

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What food most nourishes the human brain? Omega 3 fish oil? Spinach? Ginkgo extract? Choline supplements?

What nourishes the brain far more than any of the above--especially for those in the second half of life--is creativity, or what medical literature calls "a challenging and rich environment."

So answers Gene D. Cohen, M.D., Ph.D. whose book, *The Creative Age: Awakening Human Potential in the Second Half of Life* (Quill, an imprint of HarperCollins, 2001) outlines the science as well as the behavioral strategies that keep an aging brain in fine fettle beyond its years.

Creativity Thrives on Limitation

Cohen's definition of creativity is simple. The creative spirit thrives on being confronted with limited resources and the challenges such limitation brings. "All contributions to society come about wherever there is something profoundly needed," explains Cohen, a professor at George Washington University. "But often that need cannot easily be met by conventional practices or perceived supply. This limitation forces the brain to meet a challenge, to develop a 'work-around,' to come up with a simple solution born of necessity and creative exertion."

To bring into existence something new that is valued by society creates, according to Cohen, "a feeling of mastery and contribution." That, in turn, leads not only to self-esteem within us when we are older, but also brings about compensating regeneration of anatomical brain capacity. Even the mass and weight of the brain may increase as a result of regular creative exertion, a phenomenon scientists call "neurogenesis."

The old model of the aging brain portrayed a no-growth rigidity. All the neurons, in that view, are established in a human being by age two. From there it is all downhill, neurons dying off--never to be regenerated again at alarming rates, especially after the age of fifty. While it was believed that the dying cells of other organs such as the liver, pancreas, and skin could be replaced by new ones, the brain cells, once lost it was believed, were gone forever.

The Plasticity of the Aging Brain

A new medical model, constructed over the past decade, has changed our understanding of the brain. Contrary to the old view, the word "plasticity" now characterizes the latest understanding of the aging brain. The brain is flexible well into old age and can, like the creative spirit itself, overcome limitations. Cohen illustrates this with an example of a

patient in whom stroke damaged part of his frontal lobes. Other parts of his brain compensated and reorganized to take up the slack.

The main reason for this flexibility of the brain, even in old age, is that the brain is a communications organ of astounding power. Neurons--100 billion of them in the human brain--are cellular transmitting and receiving stations allowing for 100 trillion original connections among them, referred to as synapses. The organization of the brain in many ways resembles that of the internet where "servers" are decentralized and offer backup redundancy to any part of the network which happens to be temporarily, or even permanently, "down."

The brain makes connections among neurons by transmitting messages using neurotransmitters, electro-chemical substances such as serotonin and acetylcholine. While total numbers of neurons and the volume of available neurotransmitters may decrease with age, some functional parts of the brain have the capacity to grow in later life. These are the receptor sites known as dendrites--gangly, extending, antenna-like appendages to the neuron that pick up messages from many other neurons.

"Neurotransmitters are released and exchanged between the dendrites of neighboring neurons," explains Cohen, "much like squirrels jumping from the branches of one tree to the other. The more dendrites that sprout--and so the more branches that reach out--the richer then is the communication."

Creative Behavior Delivers the Brain into Novel Environments

Behavior--the behavior of the brain's "owner"--is sometimes as important to healthy mental functioning as are bio-chemical and genetic factors. The new model of the brain requires certain behavioral disciplines.

William Greenough, in a 1970's University of Illinois study, documents the growth of dendrites in the brains of older animals as these animals interact with a "novel environment." The study notes that lab animals raised in "enriched environments"--that is, in cages with such playthings as wheels and toys--had thicker cerebral cortexes, larger neurons, and more numerous synapses than did lab animals reared in traditional, sterile laboratory cages.

Cohen expands upon the importance of this research for human beings. He makes the case that creativity is a behavioral discipline that makes for the richest, most novel environment possible--at any age.

Cohen illustrates the special significance of creativity in older age by referring to Erik Erikson's eight stages of human growth. These stages begin with early childhood and move through adolescence to the last stage, mature adulthood, characterized, according to Erikson, by a conflict between integrity and despair. Cohen chooses to call this last life stage, occurring sometime after the age of fifty, as "the liberation stage."

"After age fifty," Cohen says, "it's time to do the right thing." It was after that age that Mark Twain began saying the things he always wanted to say. George C. Marshall became Chief of Staff U.S. Army at age 59, bringing about victory over the Nazis and then spearheading the Marshall Plan. Michelangelo was appointed architect of St. Peter's in Rome at age seventy-two. These few examples are not so much the exception as they are the rule as many move into older age.

Empirical studies support Cohen's understandings. One of them is described by Molly Wagster, Ph.D., Program Director of the Neuropsychology of Aging (Neuroscience and Neuropsychology of Aging Program) of the National Institutes on Aging (NIA) in Bethesda, Maryland. Dr. Wagster reports a correlational study which tracked the engagement older people have with their environment: some with a rich engagement in such activities as reading the newspaper as compared to watching sit-coms on television--and similar comparisons of the effects of rich/less rich activities.

The reports which Wagster details (such as Yaakov Stern, N. Scarmeas, "Influence of Leisure Activity on Alzheimer's," 2001) show that, over time, older people who engage in richer and more novel activities have a statistically significant lower incidence of Alzheimer's disease than do those who engage in less rich activities.

Wagster invokes the folk wisdom: "Use it or lose it." Referring to the health of the brain, creativity, it seems, may be one of the best ways not to lose it.

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