

Enriched Environments Help Prevent Dementia: The Brain-Health Benefits of Lifelong Learning

by Paul D. Nussbaum

Dementia, which has more than 70 documented causes, is a general decline in intelligence that involves loss of memory and other cognitive abilities, resulting in functional impairment. The leading cause of dementia in the United States is Alzheimer's disease, a condition that affects nearly 4.5 million Americans—a number expected to grow to 15 million by the year 2050. Currently, only five FDA-approved drugs exist to treat the symptoms of Alzheimer's, which has no known cause or cure—and 99 percent of all dementias are considered irreversible.

Many older Americans fear losing their memory and thinking ability—a fear that is particularly justified since U.S. society emphasizes loss with advanced age rather than focusing on elders' strengths. Furthermore, many of the 76 million baby boomers provide direct or ancillary care for a parent with dementia; as a consequence, they naturally develop fears about the future of their own cognitive health.

Despite abundant resources and leadership in science and medicine, U.S. society does not have a good understanding of health. I believe it is critical for society to adopt an active approach to brain health that not only identifies those at risk for future dementia but also champions a brain-healthy culture beginning in the womb. To achieve this agenda, professionals in aging, policymakers and the general public must be educated about behaviors and interventions that can maximize brain development and about the importance of taking active measures to keep the brain healthy.

Tradition holds that the human brain is a fixed, rather limited system that develops its potential in the early years of life. Popular belief maintains that the brain has a finite number of neurons, with no ability to regenerate. These ideas contrast with animal research that has demonstrated the ability of the rodent brain to generate new cells in the

hippocampus, a region critical for memory and learning. Recent research suggests that the human brain has the same neuronal regenerative capacity as that of the rodent.

More importantly, and certainly not coincidentally, this research found new brain-cell development in the same region of the human brain as was found in the rodent brain. This new understanding of the human brain counters the traditional approach to human intelligence. The human brain may actually be a system with significant flexibility, capable of reorganizing and being shaped by environmental input.

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opment in animals: socialization, physical activity and mental stimulation. Collectively, these three factors contribute to what has been called an enriched environment. Research has already shown that the animal brain responds positively in structure and function when exposed to an enriched environment involving these three factors, so it is reasonable to expect the same outcomes for a human brain. Viewed from this perspective, the human brain can be seen as a system to be shaped and developed for health.

What, then, are the proper enriched environments to maximize brain health at different stages of the lifespan? Throughout life, the human brain is nurtured by information and stimuli that are both complex and novel. In contrast, environments that enable a rote, passive mental process will likely be more harmful. A useful method for framing brain health is to use the three critical factors of an enriched environment to improve mental fitness:

Socialization. Human beings who isolate and segregate themselves from others throughout life, but particularly as they get older, have a corresponding increased risk of suffering from dementia. Isolation not only prevents human interaction, but also can easily lead to passive and rote mental processes. Having a meal with other humans is a wonderful social activity that promotes brain health—and the benefits are increased if the food is rich in nutrients that promote brain health: omega-3 fatty acids and vitamins E, B and C.

Physical Activity. Daily walking, dancing, gardening, knitting and other physical activities have been shown to reduce the risk of dementia in elders. Interestingly, we need to use both sides of our bodies to complete these activities, which means we are using both sides of our brain. An ambidextrous brain is likely to be healthier than a brain with one dominant side and one relatively dormant side. Unfortunately, we tend to be encouraged throughout our lives to use one side of our body more than the other.

Mental Stimulation. Stimulating the brain can encompass a broad spectrum of activities—including playing board games, developing language, using sign language and traveling—that relate to a reduced risk of dementia. Prayer and meditation also have a positive effect on the brain, even in those with dementia. Individual pursuit of activities that are novel and complex will foster brain health by developing neuronal connections that underlie experience and learning.

One of the most powerful mentally stimulating activities for the human brain is learning. By definition, learning involves novel information that also can be complex. The second we learn something new, we have changed the structure and, very likely, the function of the brain. Learning new information stimulates the hippocampus, which enables encoding and eventual

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permanent storage of information. Remember, it is the hippocampus that appears to have regenerative capacity, and it is the hippocampus that is destroyed by Alzheimer's disease.

Because learning is so vital to the health of the human brain, it is important that we expose ourselves to new and ongoing learning opportunities throughout life. Lifelong learning programs have gained in popularity, with more older Americans enrolled in college courses than ever before. It is time for the United States to recognize learning as a health-promoting activity that is not only good for the brain but also necessary! To this end, some financial incentive for Americans to continue learning beyond the supposedly sufficient K-12 education should be

part of every healthcare plan.

In addition, we need to review our lifestyles not only for cardiac health but also for brain health. Research has shown that a heart-healthy diet, for example, is also good for the brain. We must reduce the time we spend engaged in rote, passive pursuits and increase our exposure to the novel and the complex. Although resisting such exposure is normal human behavior, the possible consequences are far too devastating. Seeking out and engaging in new learning opportunities, particularly in content areas that are foreign to us, can only enhance our quality of life as we age. ■

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