

Cognitive Reserve:  
Can It Save You from Alzheimer's Disease?  
by  
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Alzheimer's disease. AD. Just the name is enough to frighten anyone over 50. It's that seemingly inevitable slide from awareness to insensibility, from independence to dependence. But AD is not inevitable: there are things you can do to increase your resistance and stave off AD's effects. AD is not a mental death sentence.

What is AD? It's a disease that destroys brain cells, obliterating memory and interfering with normal thinking and behavior. Work, lifelong hobbies and social life can all be affected. Alzheimer's disease progresses over time and is *always* fatal. That's the bad news.

According to the 2009 Alzheimer's Disease Facts and Figures, published by the Alzheimer's Association<sup>1</sup>:

- AD affects 10 million American baby boomers, one in every eight.
- Twice as many women are affected as men.
- 5.2 million people are living with AD in the United States.
- Up to 250,000 people under the age of 65 have AD.

The Alzheimer's Association estimates that every 70 seconds, someone in America develops AD. They also estimate that by 2050, that number will more than double to one every 33 seconds! AD is one of the fastest growing plagues facing the elderly and near elderly. Here are ten signs of AD as compiled by the Alzheimer's Association:

1. *Memory changes that disrupt daily life.* One of the most common signs of AD, especially in its early stages, is forgetting recently learned information. Others include forgetting important dates or events; asking for the same information over and over, relying on memory aides (e.g., reminder notes or electronic devices) or family members for things they used to handle on their own.

2. *Challenges in planning or solving problems.* Some people may experience changes in their ability to develop and follow a plan or work with numbers. They may have trouble following a familiar recipe or keeping track of monthly bills. They may have difficulty concentrating and take much longer to do things than they did before.
3. *Difficulty completing familiar tasks at home, at work or at leisure.* People with AD often find it hard to complete daily tasks. Sometimes, people may have trouble driving to a familiar location, managing a budget at work or remembering the rules of a favorite game.
4. *Confusion with time or place.* People with AD can lose track of dates, seasons and the passage of time. They may have trouble understanding something if it is not happening immediately. Sometimes they may forget where they are or how they got there.
5. *Trouble understanding visual images and spatial relationships.* For some people, vision problems are a sign of AD. They may have difficulty reading, judging distance and determining color or contrast. In terms of perception, they may pass a mirror and think someone else is in the room. They may not realize they are the person in the mirror.
6. *New problems with words in speaking or writing.* People with AD may have trouble following or joining a conversation. They may stop in the middle of a conversation and have no idea how to continue or they may repeat themselves. They may struggle with vocabulary, have problems finding the right word or call things by the wrong name (e.g., calling a "watch" a "hand-clock").
7. *Misplacing things and losing the ability to retrace steps.* A person with AD may put things in unusual places. They may lose things and be unable to go back over their steps to find them again. Sometimes, they may accuse others of stealing. This may occur more frequently over time.
8. *Decreased or poor judgment.* People with AD may experience changes in judgment or decision-making. For example, they may use poor judgment when dealing with money, giving large amounts to telemarketers. They may pay less attention to grooming or keeping themselves clean.
9. *Withdrawal from work or social activities.* A person with AD may start to remove themselves from hobbies, social activities, work projects or sports. They may have trouble keeping up with a favorite sports team or remembering how to complete a favorite hobby. They may also avoid being social because of the changes they have experienced.
10. *Changes in mood and personality.* The mood and personalities of people with AD can change. They can become confused, suspicious, depressed, fearful or anxious. They may be easily upset at home, at work, with friends or in places where they are out of their comfort zone.

Research has showed us some ways to prevent AD, however. In 1986, Dr. David Snowdon<sup>ii</sup>, then at the University of Minnesota, began a scientific study involving 678 Catholic nuns from the School Sisters of Notre Dame. This research project, often called the “Nun Study,”

is one of the most significant long-term research studies ever done on ageing and Alzheimer's disease.<sup>iii</sup>

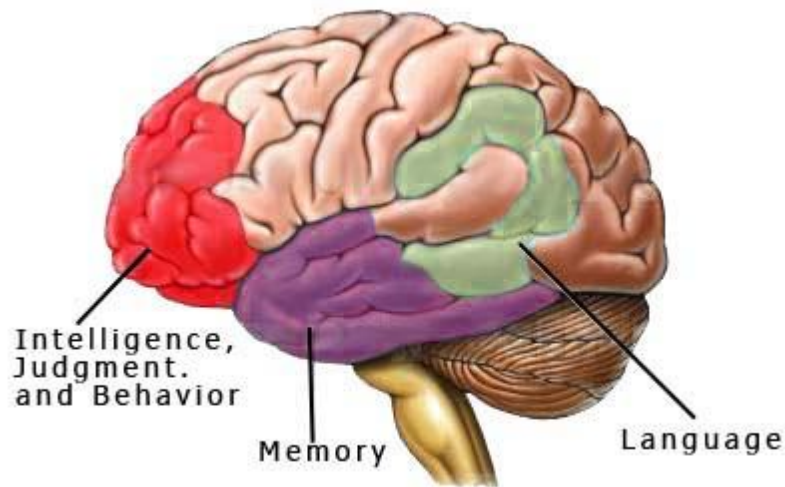
One of the primary questions the Nun Study researchers attempted to answer was how pathology in the human brain related to AD symptoms. Over the period of the study, the only method to determine brain pathology was through autopsy on deceased study participants. During autopsy, researchers observed physical changes in the brains of the study participants. They then attempted to relate their pathological observations back to the lifetime behavior observed in the participant. One of their research questions was: Did every participant with AD-related physical brain changes display symptoms of AD while alive?

The results from the Nun Study were exciting. They showed that approximately one-third of the sisters whose brains had displayed post-mortem AD changes had shown *no* behavioral symptoms of dementia. In fact, these women scored normal results in all mental and physical tests! The researchers hypothesized that the cause was *Cognitive Reserve*.

Cognition is defined as the process of thought and includes communication, problem-solving, learning and memory. Cognitive Reserve lets individuals with greater cognitive skills delay symptoms of AD in spite of underlying changes occurring in their brains. Lifestyles including intellectual pursuits, physical activities, and socializing are associated with slower cognitive decline in the healthy older set.

There is also evidence from functional imaging studies that subjects engaging in such activities can clinically tolerate more AD pathology. It is possible that training your brain and body creates more efficient cognitive function and therefore delays the onset of dementia.<sup>iv</sup>

## Brain Areas Affected by Alzheimer's disease



This image of the left side view of the brain is color-coded to show the areas of the brain commonly affected by Alzheimer's disease. The areas labeled include:

1. Red: the frontal lobes governing intelligence, judgment and social behavior
2. Purple: the temporal lobes that process memory
3. Green: the parietal lobes that process language

Within the human brain there is a complex mix of chemical and electrical processes that enable us to speak, move, see, think and remember. To accomplish these processes requires a vast communications network in the brain made of billions of cells called *neurons*. To pass messages through this network, an electrical charge travels to the end of the neuron resulting in the release of neurotransmitter chemicals along the myriad pathways. Alzheimer's disease disrupts this intricate signaling system.

This disruption occurs because of the creation of two abnormal structures in the brain called amyloid *plaques* and neurofibrillary *tangles*. Plaques are composed of beta amyloid, a toxic molecule that originates in normal protein. Something causes enzymes in the brain to cut

this protein into fragments that then clump together into damaging plaques. Normally, tau proteins stabilize the internal support structure of neurons, but in Alzheimer's disease, the tau protein threads become entangled, killing the neuron by damaging critical parts of its transport system. As the disease progresses, more neurons die, the brain shrinks, and memory is lost.<sup>v</sup>

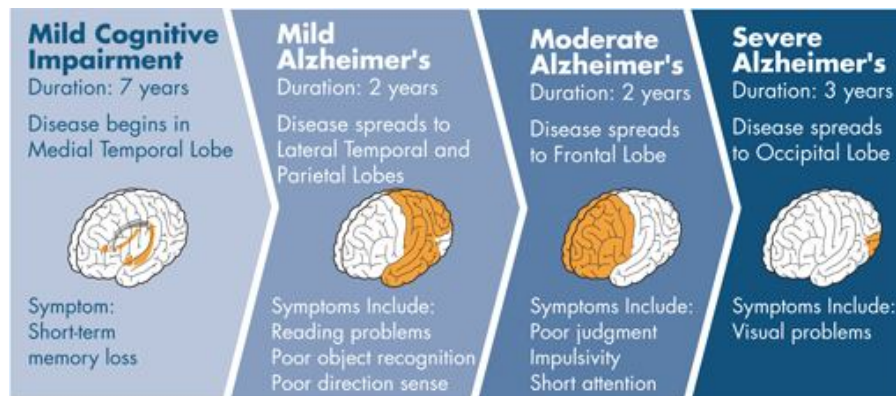


Image from Medical Care Corp.

With all this being said, it is also important to point out that not all memory loss is AD. We all misplace our keys once in a while. However, memory loss that disrupts everyday life is not a typical part of aging. ***If you recognize yourself or someone close to you in one or more of these symptoms, call us today. Our assessments will give you a good view of your cognitive function and our training will help you build up your Cognitive Reserve.***

Keep in mind that not all such changes signal the onset of AD. Normal ageing produces similar changes, just not to the extent of those produced by AD. The following chart illustrates these differences.

**Signs of Alzheimer's disease**

**Typical age-related changes**

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Poor judgment and decision-making	Making a bad decision once in a while
Inability to manage a budget	Missing a monthly payment
Losing track of the date or a season.	Forgetting what day it is, but remembering later.
Difficulty maintaining a conversation	Occasionally forgetting which word to use.
Misplacing things and unable to retrace steps to find them.	Losing things from time to time.

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<sup>i</sup> Alzheimer's Association (2009) Alzheimer's Disease Facts and Figures. Retrieved from [http://www.alz.org/alzheimers\\_disease\\_facts\\_figures.asp](http://www.alz.org/alzheimers_disease_facts_figures.asp)

<sup>ii</sup> Snowden, David (2002) *Aging with Grace: What the Nun Study Teaches Us about Leading Longer, Healthier, and More Meaningful Lives*. Bantum, NY.

<sup>iii</sup> University of Minnesota. Retrieved from <http://www.healthstudies.umn.edu/nunstudy/>

<sup>iv</sup> Stern, Y., (2007) Build Your Cognitive Reserve-Yaakov Stern. Retrieved from <http://www.sharpbrains.com/blog/2007/07/23/build-your-cognitive-reserve-yaakov-stern/>

<sup>v</sup> The National Institute of Health(2009) NIH Senior Health. Retrieved from <http://nihseniorhealth.gov/videolist.html>