

## Cognitive Modeling

### Cognitive Health and Older Adults

Cognitive health “ the ability to clearly think, learn, and remember “ is an important component of performing everyday activities. Cognitive health is just one aspect of overall brain health.

What Is Brain Health? Brain health refers to how well a person’s brain functions across several areas. Aspects of brain health include: Cognitive health “ how well you think, learn, and remember

Motor function “ how well you make and control movements, including balance

Emotional function “ how well you interpret and respond to emotions (both pleasant and unpleasant)

Tactile function “ how well you feel and respond to sensations of touch “ including pressure, pain, and temperature Brain health can be affected by age-related changes in the brain, injuries such as stroke or traumatic brain injury, mood disorders such as depression, substance use disorder or addiction, and diseases such as Alzheimer’s disease. While some factors affecting brain health cannot be changed, there are many lifestyle changes that might make a difference.

A growing body of scientific research suggests that the following steps are linked to cognitive health. Small changes may really add up: Making these part of your routine could help you function better.

Research shows that a combination of these healthy lifestyle behaviors may also reduce the risk for Alzheimer’s disease.

### Take Care of Your Physical Health

Taking care of your physical health may help your cognitive health. You can:

#### Manage High Blood Pressure

Preventing or controlling high blood pressure, not only helps your heart, but may help your brain too. Decades of observational studies have shown that having high blood pressure in midlife “ the 40s to early 60s “ increases the risk of cognitive decline later in life. In addition, the SPRINT-MIND study, a nationwide clinical trial, showed that intensive lowering of blood pressure (even below the previous standard target of 140 for systolic blood pressure) lowers the risk for mild cognitive impairment, which is a risk factor for dementia.

High blood pressure often does not cause signs of illness that you can see or feel. Routine visits to your doctor will help pick up changes in your blood pressure, even though you might feel fine. To control or lower high blood pressure, your doctor may suggest exercise, changes in your diet, and if needed

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â€” medications. These steps can help protect your brain and your heart.

### Eat Healthy Foods

A healthy diet can help reduce the risk of many chronic diseases such as heart disease or diabetes. It may also help keep your brain healthy.

In general, a healthy diet consists of fruits and vegetables; whole grains; lean meats, fish, and poultry; and low-fat or nonfat dairy products. You should also limit solid fats, sugar, and salt. Be sure to control portion sizes and drink enough water and other fluids.

Researchers are looking at whether a healthy diet can help preserve cognitive function or reduce the risk of Alzheimer's. For example, there is some evidence that people who eat a Mediterranean diet have a lower risk of developing dementia.

While scientists aren't sure yet why the Mediterranean diet might help the brain, its effect on improving cardiovascular health might in turn reduce dementia risk. In contrast, the typical Western diet often increases cardiovascular disease risk, possibly contributing to faster brain aging.

Researchers have developed and are testing another diet, called MIND, a combination of the Mediterranean and DASH (Dietary Approaches to Stop Hypertension) diets. According to observational studies of more than 900 dementia-free older adults, closely following the MIND diet was associated with a reduced risk of Alzheimer's and a slower rate of cognitive decline.

Learn more about diet and prevention of Alzheimer's disease.

### Be Physically Active

Being physically active â€” through regular exercise, household chores, or other activities â€” has many benefits. It can help you:

Keep and improve your strength

Have more energy

Improve your balance

Prevent or delay heart disease, diabetes, and other concerns

Perk up your mood and reduce depression

Studies link ongoing physical activity with benefits for the brain and cognition as well, although a strong link between physical activity and Alzheimer's disease prevention has not yet been documented.

In one study, exercise stimulated the human brain's ability to maintain old network connections and make new ones that are vital to cognitive health. Other studies have shown that exercise increases the size of a brain structure important to memory and learning, resulting in better spatial memory. Aerobic exercise, such as brisk walking, is thought to be more beneficial to cognitive health than nonaerobic stretching and toning exercise. One study found that the more time spent doing a moderate levels of physical activity, the greater the increase in brain glucose metabolism " or how quickly the brain turns glucose into fuel " which may reduce the risk for developing Alzheimer's disease.

Federal guidelines recommend that all adults get at least 150 minutes (2.5 hours) of physical activity each week. Walking is a good start. You can also join programs that teach you to move safely and prevent falls, which can lead to brain and other injuries. Check with your health care provider if you haven't been active and want to start a vigorous exercise program.

Clinical Trials on Exercise for Cognitive Health Volunteers are needed for clinical trials that are testing different forms of exercise for cognitive health. By joining one of these studies, you may learn new ways to be physically active and also contribute useful information to help other older adults in the future! To learn more, visit the [Alzheimers.gov](https://www.alzheimers.gov) Clinical Trials Finder to search for a trial in your area.

## Keep Your Mind Active

Being intellectually engaged may benefit the brain. People who engage in personally meaningful activities, such as volunteering or hobbies, say they feel happier and healthier. Learning new skills may improve your thinking ability, too. For example, one study found that older adults who learned quilting or digital photography had more memory improvement than those who only socialized or did less cognitively demanding activities. Some of the research on engagement in activities such as music, theater, dance, and creative writing has shown promise for improving quality of life and well-being in older adults, from better memory and self-esteem to reduced stress and increased social interaction.

However, a recent, comprehensive report reviewing the design and findings of these and other studies did not find strong evidence that these types of activities have a lasting, beneficial effect on cognition. Additional research is needed, and in large numbers of diverse older adults, to be able to say definitively whether these activities may help reduce decline or maintain healthy cognition.

Lots of activities can keep your mind active. For example, read books and magazines. Play games. Take or teach a class. Learn a new skill or hobby. Work or volunteer. These types of mentally stimulating activities have not been proven to prevent serious cognitive impairment or Alzheimer's disease, but they can be fun! Plus, findings from observational studies suggest that some informal mentally stimulating activities, such as reading or playing games, may lower the risk of Alzheimer's-related cognitive impairment and dementia.

Some scientists have argued that such activities may protect the brain by establishing "cognitive reserve." They may help the brain become more adaptable in some mental functions so it can compensate for age-related brain changes and health conditions that affect the brain.

Some types of cognitive training conducted in a research setting also seem to have benefits. For the Advanced Cognitive Training for Independent and Vital Elderly (ACTIVE) trial, healthy adults 65 and older participated in 10 sessions of memory training, reasoning training, or processing-speed training. The sessions improved participants' mental skills in the area in which they were trained with evidence suggesting these benefits persisted for two years.

Be wary of claims that playing certain computer and online games can improve your memory and other types of thinking

as evidence to back up such claims is evolving. There is currently not enough evidence available to suggest that computer-based brain training applications offered commercially have the same impact on cognitive abilities as the ACTIVE study training. NIA and other organizations are supporting research to determine whether different types of cognitive training have lasting effects.

For more information, see [Participating in Activities You Enjoy](#).

### Stay Connected with Social Activities

Connecting with other people through social activities and community programs can keep your brain active and help you feel less isolated and more engaged with the world around you. Participating in social activities may lower the risk for some health problems and improve well-being.

People who engage in personally meaningful and productive activities with others tend to live longer, boost their mood, and have a sense of purpose. Studies show that these activities seem to help maintain their well-being and may improve their cognitive function.

So, visit with family and friends. Consider volunteering for a local organization or join a group focused on a hobby you enjoy. Join a walking group with other older adults. Check out programs available through your Area Agency on Aging, senior center, or other community organizations. Increasingly, there are groups that meet online too, providing a way to connect from home with others who share your interests or to get support.

We don't know for sure yet if any of these actions can prevent or delay Alzheimer's and age-related cognitive decline. Still, some of these have been associated with reduced risk of cognitive impairment and dementia.

### Manage Stress

Stress is a natural part of life. Short-term stress can even focus our thoughts and motivate us to take action. However, over time, chronic stress can change the brain, affect memory, and increase the risk for Alzheimer's and related dementias. To help manage stress and build the ability to bounce back from stressful situations, there are many things you can do:

Exercise regularly. Practicing tai chi or going for a walk, especially in nature, can restore a sense of well-being.

Write in a journal. Putting your thoughts or worries on paper can help you let go of an issue or see a new solution.

Try relaxation techniques. Practices such as mindfulness " which involves focusing awareness on the present moment without judgment " or breathing exercises can help your body relax. These can help lower blood pressure, lessen muscle tension, and reduce stress.

Stay positive. Release grudges or things beyond your control, practice gratitude, or pause to enjoy the simple things, like the comfort of a cup of tea or the beauty of a sunrise.

#### Reduce Risks to Cognitive Health

Genetic, environmental, and lifestyle factors are all thought to influence cognitive health. Some of these factors may contribute to a decline in thinking skills and the ability to perform everyday tasks such as driving, paying bills, taking medicine, and cooking.

Genetic factors are passed down (inherited) from a parent to child and cannot be controlled. But many environmental and lifestyle factors can be changed or managed to reduce your risk. These factors include:

Some physical and mental health problems, such as high blood pressure or depression

Brain injuries, such as those due to falls or accidents

Some medicines, or improper use of medicines

Lack of physical activity

Poor diet

Smoking

Drinking too much alcohol

Sleep problems

Social isolation and loneliness

What Is Dementia? It's normal to be a little more forgetful as we age. However, some difficulties with cognitive function, such as dementia and mild cognitive impairment (MCI) are more serious. Dementia is the loss of cognitive functioning " thinking, remembering, and reasoning " and behavioral abilities to such an extent that it interferes with daily life and activities. Symptoms may include problems with language skills, visual perception, or paying attention. Some people have personality changes. There are different forms of dementia including Alzheimer's disease, frontotemporal disorders, and Lewy body dementia. MCI is a condition in which people have more memory or thinking problems than other people their age but can still do their normal daily activities. People with MCI are more likely to develop Alzheimer's disease than those without. However, not everyone with MCI will develop Alzheimer's disease.

Physical and Mental Health Problems

Many health conditions affect the brain and pose risks to cognitive function. These conditions include:

Heart disease and high blood pressure " can lead to stroke and changes in blood vessels in the brain that can lead to dementia

Diabetes " damages blood vessels throughout the body, including in the brain; increases risk for stroke and heart attack; increases risk for Alzheimer's

Alzheimer's disease and related dementias " cause a buildup of harmful proteins and other changes in the brain that lead to memory loss and other thinking problems

Stroke " can damage blood vessels in the brain and increase risk for vascular dementia

Depression " can lead to confusion or attention problems and has been linked to dementia

Delirium " shows up as an acute state of confusion, often during a hospital stay, and is associated with subsequent cognitive decline

It's important to prevent or seek treatment for these health problems. They affect your brain as well as your body and receiving treatment for other conditions may help prevent or delay cognitive decline or thinking problems.

#### Brain Injuries

Older adults are at higher risk of falls, car accidents, and other accidents that can cause brain injury. Alcohol and certain medicines can affect a person's ability to drive safely and also increase the risk for accidents and brain injury. Learn about risks for falls and participate in fall prevention programs. Wear helmets and seat belts to help prevent head injuries as well. But don't let a fear of falling keep you from being active. Overcoming this fear can help you stay active, maintain your physical health, and prevent future falls.

#### Medicines

Some drugs and combinations of medicines can affect a person's thinking and the way the brain works. For example, certain ones can cause confusion, memory loss, hallucinations, and delusions in older adults.

Medicines can also interact with food, dietary supplements, alcohol, and other substances. Some of these interactions can affect how your brain functions. Drugs that can harm older adults' cognition include:

Antihistamines for allergy relief

Medicines for anxiety and depression

Sleep aids

Antipsychotics



## Muscle relaxants

Some drugs that treat urinary incontinence

Medications for relief of cramps in the stomach, intestines, and bladder

Talk with your doctor if you're concerned that your medications may be causing cognitive problems. Do not stop taking any medications you've been prescribed without first talking with your health care provider.

## Lack of Physical Activity

Lack of exercise and other physical activity may increase your risk of diabetes, heart disease, depression, and stroke — all of which can harm the brain. In some studies, physical activity has been linked to improved cognitive performance and reduced risk for Alzheimer's disease. In general, staying active is known to lower the risk of high blood pressure, stroke, and symptoms of depression, all of which in turn can improve cognitive health.

## Poor Diet

A number of studies link eating certain foods with keeping the brain healthy and suggest that other foods can increase health risk. For example, high-fat and high-sodium foods can lead to health problems, such as heart disease and diabetes, that can harm the brain.

## Smoking

Smoking is harmful to your body and your brain. It raises the risk of heart attack, stroke, and lung disease. Quitting smoking at any age can improve your health.

## Alcohol

Drinking too much alcohol affects the brain by slowing or impairing communication among brain cells. This can lead to slurred speech, fuzzy memory, drowsiness, and dizziness. Long-term effects may include changes in balance, memory,

emotions, coordination, and body temperature. Staying away from alcohol can reverse some of these changes.

As people age, they may become more sensitive to alcohol's effects. The same amount of alcohol can have a greater effect on an older person than on someone who is younger. Also, some medicines can be dangerous when mixed with alcohol. Ask your doctor or pharmacist for more information.

#### Sleep Problems

At any age, getting a good night's sleep supports brain health. Sleep problems — not getting enough sleep, sleeping poorly, and sleep disorders — can lead to trouble with memory, concentration, and other cognitive functions.

#### Social Isolation and Loneliness

Social isolation and feeling lonely may be bad for brain health. Loneliness has been linked to higher risk for dementia, and less social activity has been linked to poorer cognitive function.

By taking steps now to reduce your risks for cognitive decline, you'll help to maintain your cognitive health for the future.

Sign up for e-alerts about healthy aging

For More Information About Cognitive Health

NIA Alzheimer's and related Dementias Education and Referral (ADEAR) Center

800-438-4380

[adear@nia.nih.gov](mailto:adear@nia.nih.gov)

[www.nia.nih.gov/alzheimers](http://www.nia.nih.gov/alzheimers)

**210.0015555556**

The NIA ADEAR Center offers information and free print publications about Alzheimer's and related dementias for families, caregivers, and health professionals. ADEAR Center staff answer telephone, email, and written requests and make referrals to local and national resources.

McKnight Brain Research Foundation

407-237-4485

<https://mcknightbrain.org/>

Alzheimer's Foundation of America

866-232-8484

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[www.alzfdn.org](http://www.alzfdn.org)

This content is provided by the NIH National Institute on Aging (NIA). NIA scientists and other experts review this content to ensure it is accurate and up to date.

## Reference

[Conflict of Interest in Medical Research, Education, and Practice](#)

[Multidimensional Item Response Theory \(Quantitative Applications in the Social Sciences Book 183\)](#)