

Factors that Shape Brain Health and Risk of Alzheimer's Disease in Older Adults

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Alzheimer's
Disease
Center**



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Outline

- Introduction
- Longitudinal studies of cognitive aging at Rush
- Factors that shape brain health and risk of AD
- Highlight key prevention strategies to protect brain health

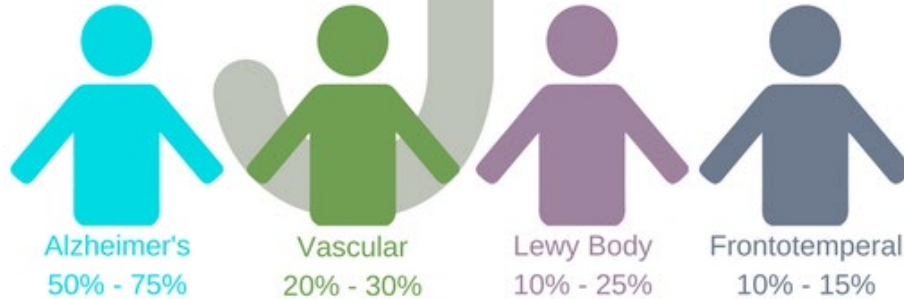
**Dementia is
a growing
health
concern for
our aging
population**

- Today 1 in 8 older Americans (>65 years of age) are affected by Alzheimer's disease and other dementias, at an annual cost of more than \$200 billion.
- With projected population increases in the oldest age groups, ~13.5 million individuals in the USA will have Alzheimer's by the year 2050.
- Thus, prevention is a public health priority.

DEMENTIA

An "umbrella" term used to describe a range of symptoms associated with cognitive impairment.

Look Beyond
Dementia™



Alzheimer's Disease

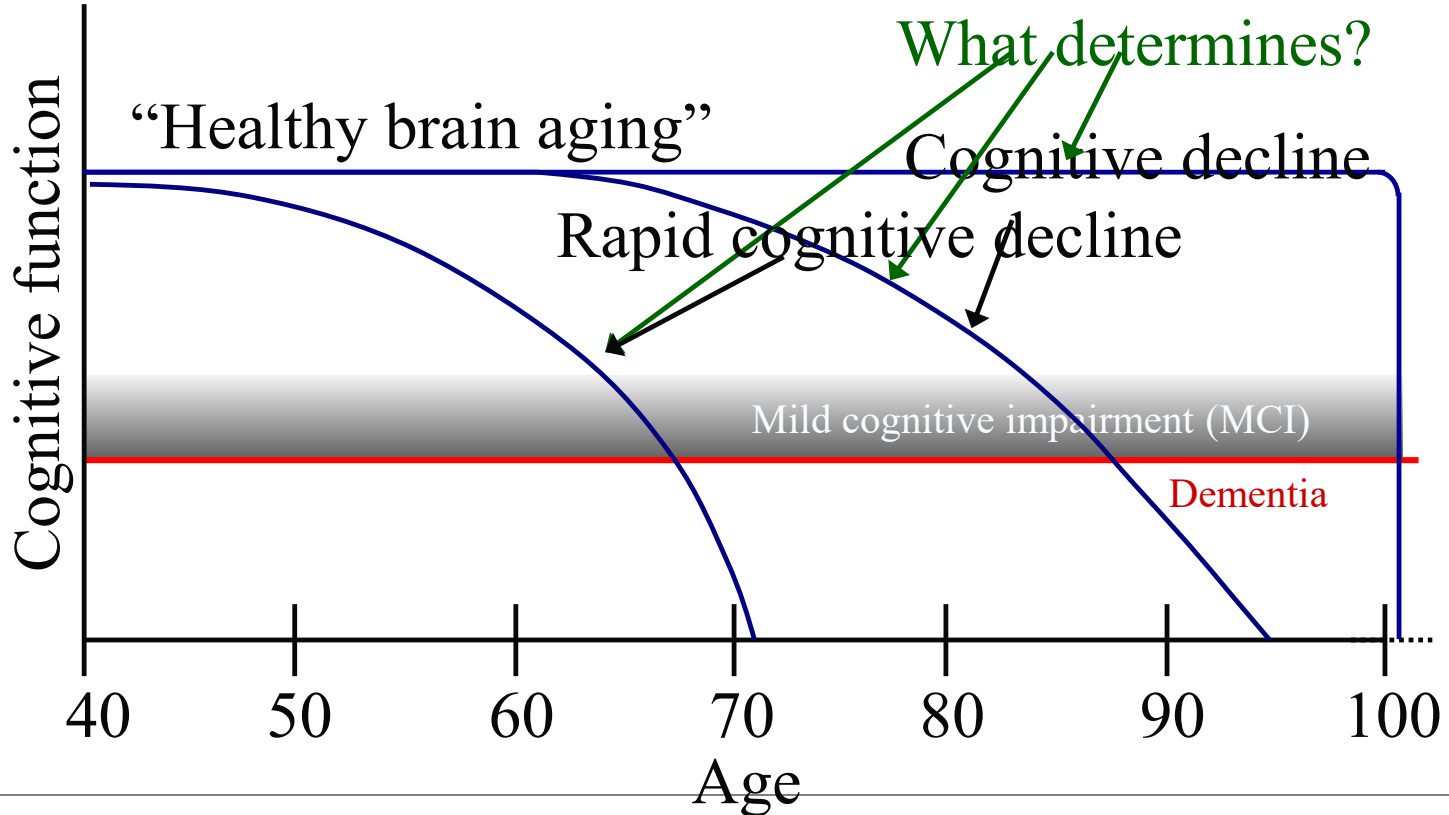
- Common and chronic disease, usually of older persons
- Most common cause of dementia
- Slow onset and gradual progression of memory problems, followed by impairment in other thinking skills
- Not a normal part of aging
- There is no cure
- If we know the factors that shape brain health, can we prevent it?

How do we prevent Alzheimer's dementia or slow cognitive decline?



- Identify risk factors (genetic/environmental)
- Determine biologic pathways linking risk factors to clinical symptoms

Age-related change in cognitive function



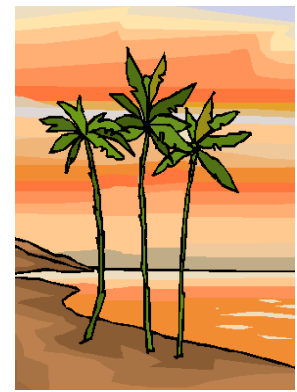
Longitudinal Cohort Studies at Rush

Religious Orders Study

Rush Memory and Aging Project

Minority Aging Research Study

The Religious Orders Study



- Began in 1994
- >1,500 older nuns, priests, and brothers
- All enroll without known dementia from across the U.S.
- All agree to annual clinical evaluation and brain donation
- 92% White, but 3 African American and 1 Latino orders
- ~30% have developed Alzheimer's dementia

The Memory and Aging Project

... because memories should last a lifetime



- Began in 1997
- >2,200 older persons
- All enroll without dementia from across northeastern Illinois
- All agree to annual clinical evaluation, annual blood donation, and donation of nerve, muscle, spinal cord, and brain
- Approximately 93% White
- ~25% have developed Alzheimer's dementia



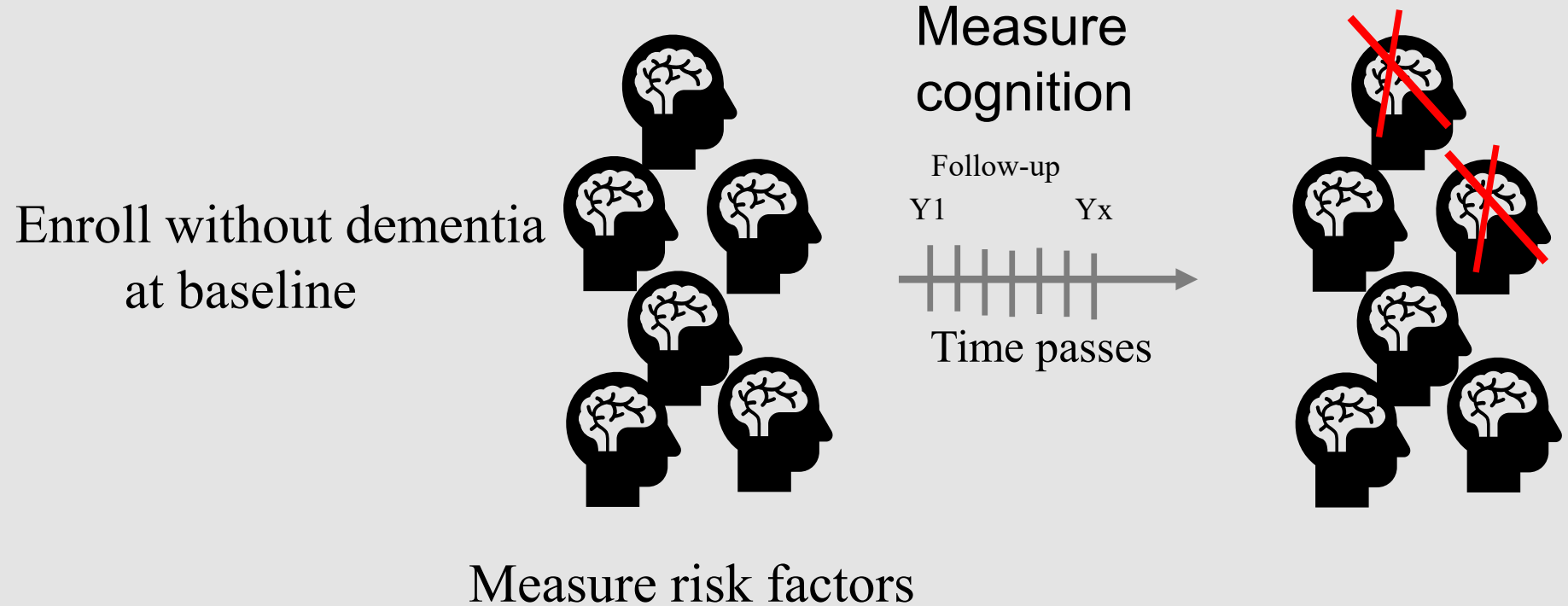
Minority Aging Research Study (MARS)



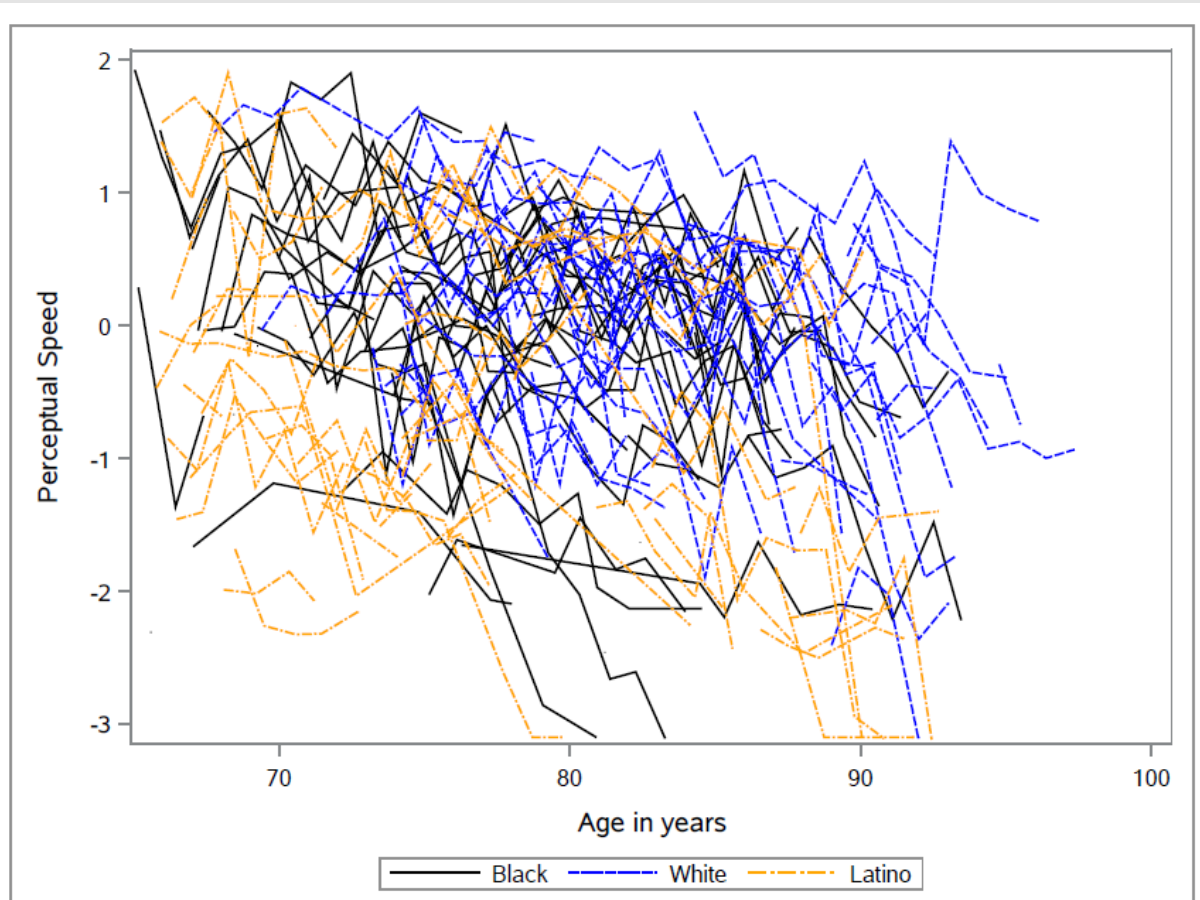
- Began in 2004
- >800 African Americans, >65 years, enrolled without dementia
- Recruited from churches, senior buildings & organizations in Chicago
- All agree to annual in-home cognitive testing, risk factor assessment, and blood draw
- ~ 10% have developed Alzheimer's dementia
- Brain donation optional; >50% have agreed to donate their brain at the time of death



Longitudinal Cohort Design

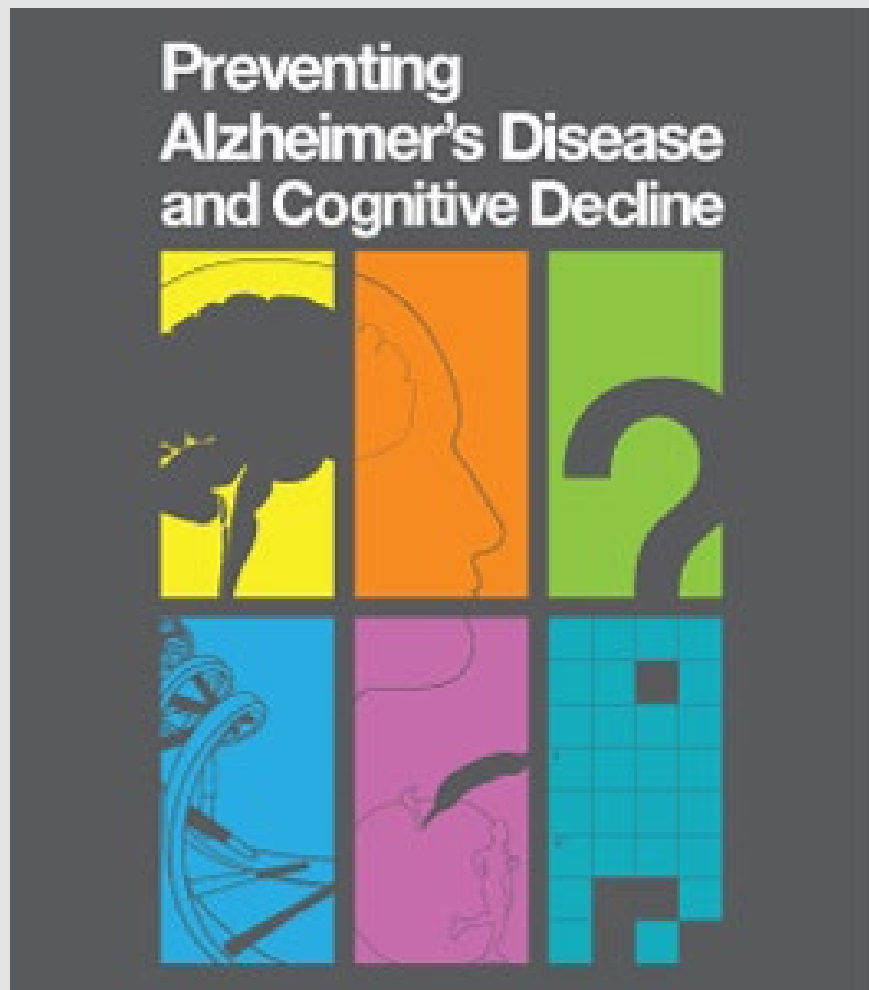


Large differences in where people start and how fast they decline



Can Alzheimer's disease be prevented?

Can we slow cognitive decline?



Conditions in the environment where people are born, grow, work, live and age

Type of neighborhood you live in

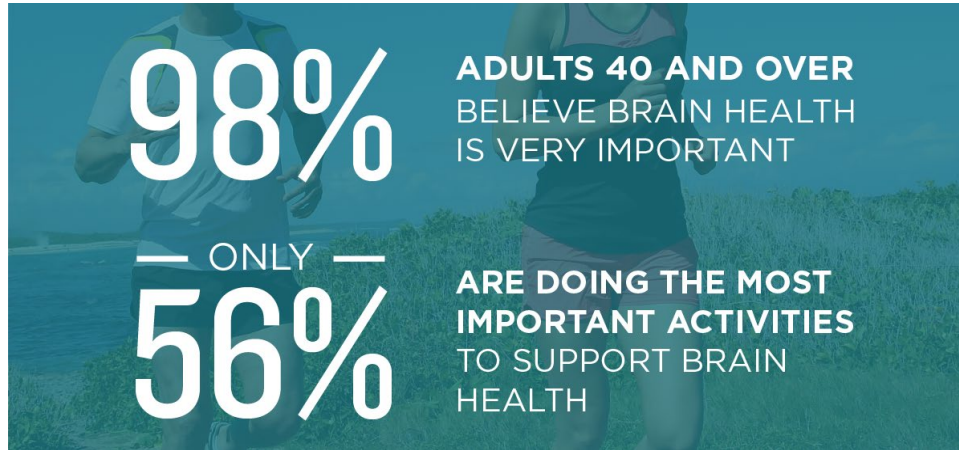
Experiences from early life

Educational experiences

How you handle stress

Access to healthcare

We Know factors across the life course can shape brain health – But what can we do???



Barriers Include:

- ⊘ Not knowing what benefits the brain
- ⊘ People Around You

Results from our Rush studies

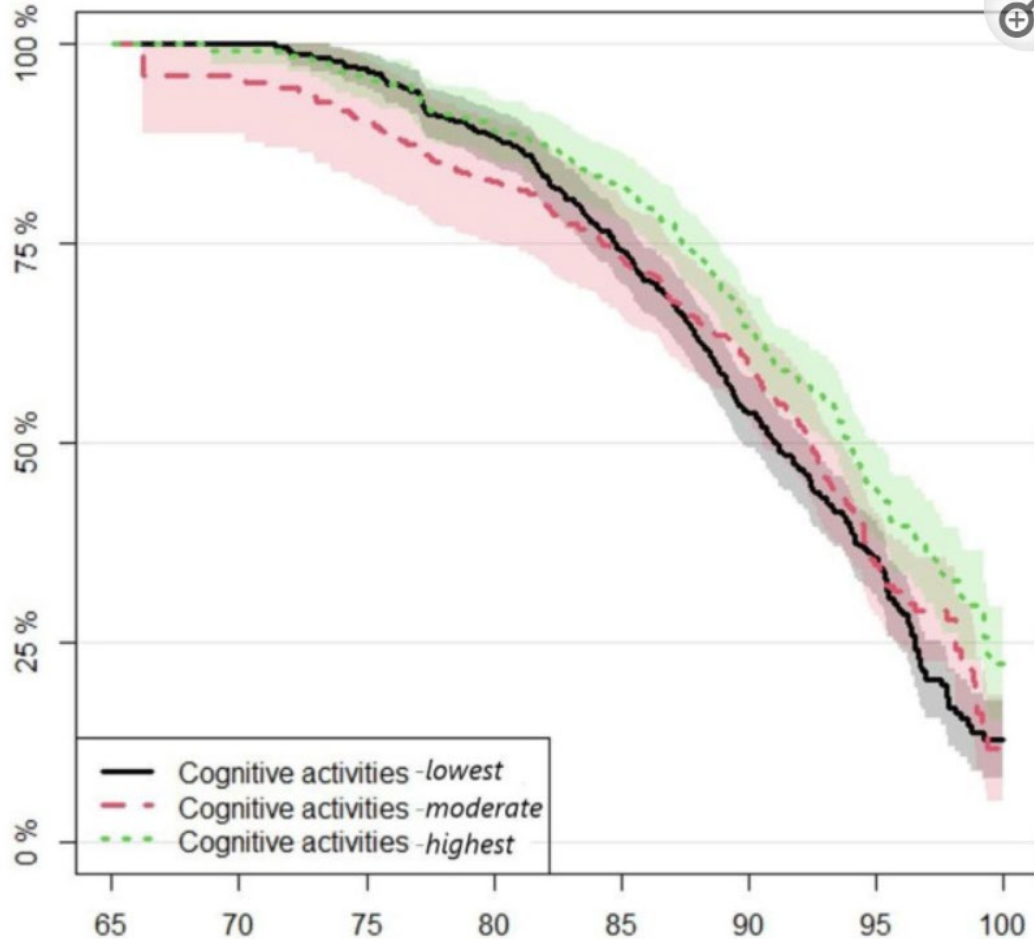
How often do you read books?
Magazines?
Newspapers
Play games (e.g., board games,
crosswords)

Cognitive Activity



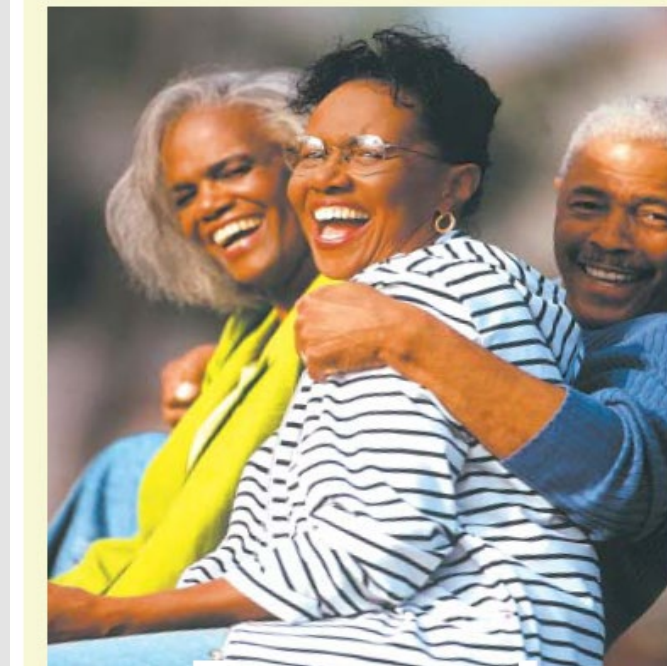
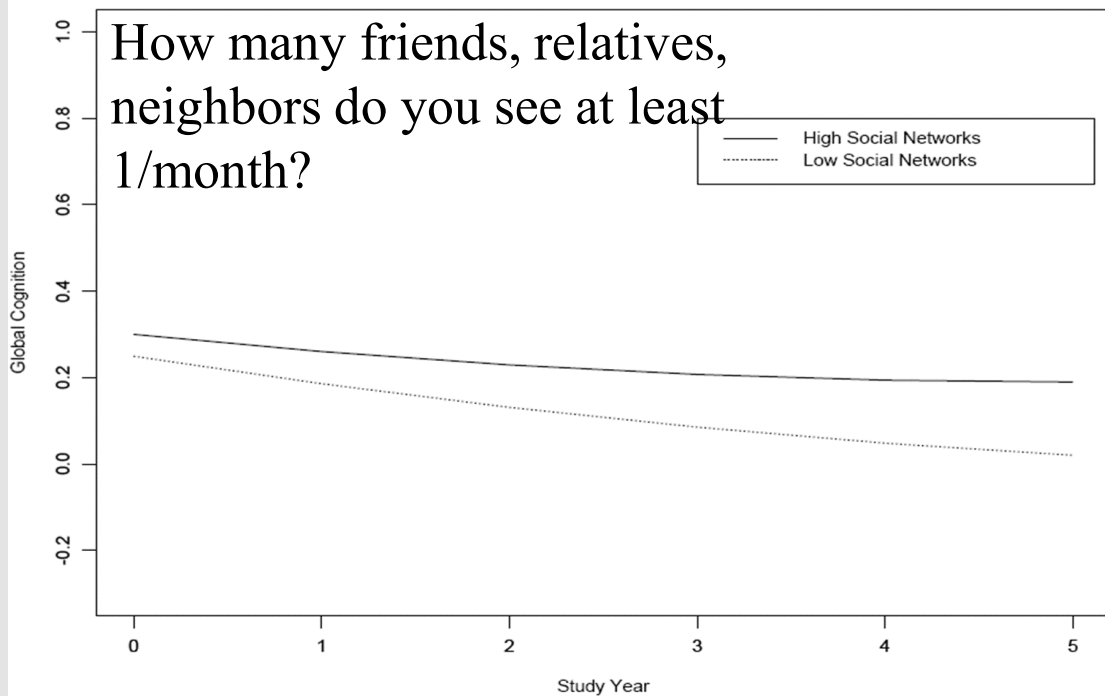
Wilson et al., 2002; Wilson et al., 2007

Probability of Remaining Free of Dementia



More frequent engagement in cognitive activities delayed dementia onset by about 4 years

Social Activity



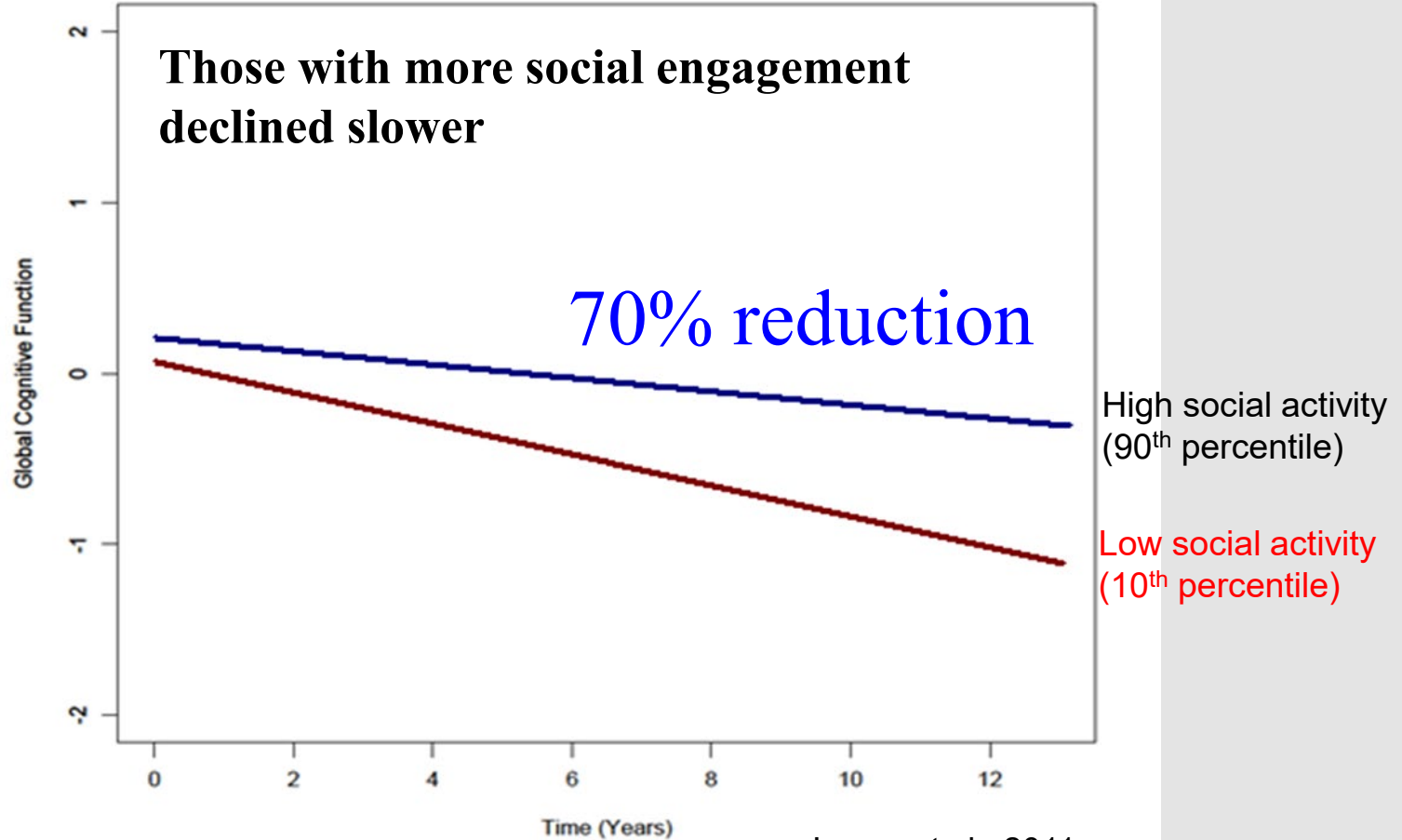
Those with more social contacts had slower rates of decline

Barnes et al., 2004

How often in the past year did you...

1. go to restaurants, sporting events, or play bingo
2. go on day trips or overnight trips
3. do unpaid community or volunteer work
4. visit relatives' or friends' houses
5. participate in groups, such as senior center, social club
6. attend church or religious services

**Those with more social engagement
declined slower**



High social activity
(90th percentile)

Low social activity
(10th percentile)







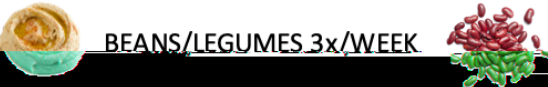





James et al., 2011

MIND Diet

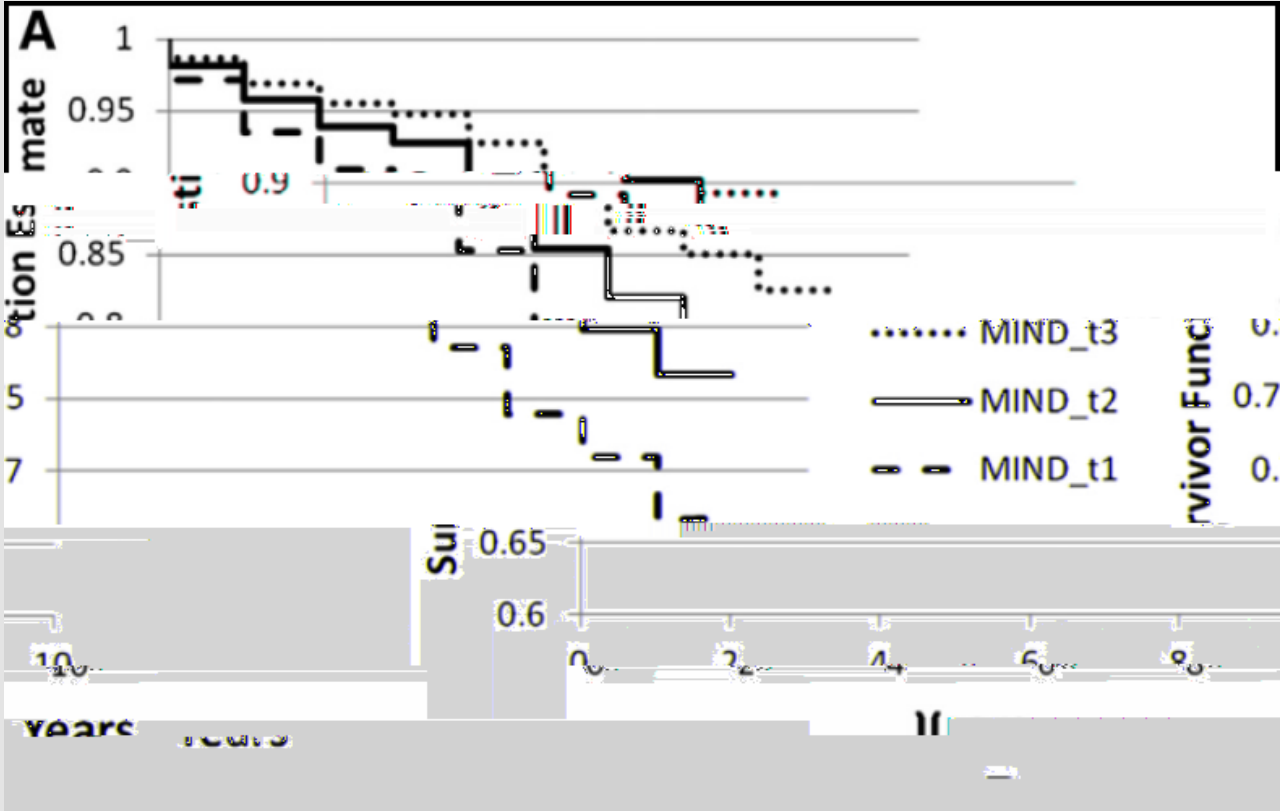
Scores range from 1 - 15

Unique Characteristics

- Leafy green vegetables separate from other vegetables
- Berries only recognized fruit
- Fish 1x/week
- Dairy not emphasized

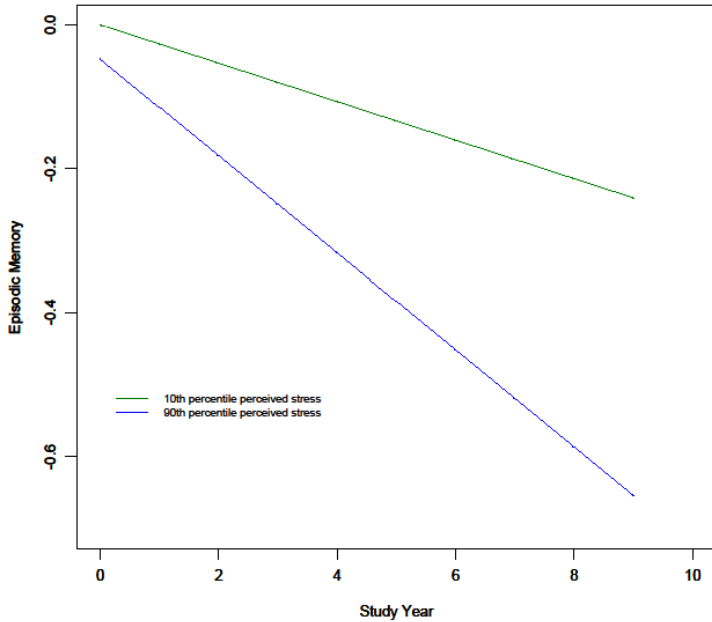
| | | |
|---|--|--|
|  <p>AT LEAST 1 SERVING OF LEAFY GREENS DAILY</p> | | |
| <p>OTHER COLORFUL VEGETABLE DAILY</p>  | | <p>AT LEAST 1 OTHER</p> |
| <p>1/2 CUP BERRIES 5x/WEEK</p>  | <p>1 OZ NUTS/SEEDS 5x/WEEK</p>  | <p>1/2 CUP BERRIES 5x/WEEK</p> |
| <p>2 TBSP EVOO EVERYDAY</p> | <p>FISH/SEAFOOD 1x/WEEK</p>  | |
| <p>WHOLE GRAINS 3x/DAY</p>  | <p>BEANS/LEGUMES 3x/WEEK</p>  | <p>POULTRY 2x/WEEK</p> |
| <p>FULL FAT CHEESE < 2x/WEEK</p>  | <p>FRIED FOOD < 1x/WEEK</p>  | <p>RFD & PROCESSED MFAT < 3x/WEEK</p>  |
| <p>BUTTER/MARGARINE < 1x/DAY</p>  | <p>SWEETS/PASTRIES < 4x/WEEK</p>  | |

MIND Diet associated with reduced risk of Alzheimer's Disease



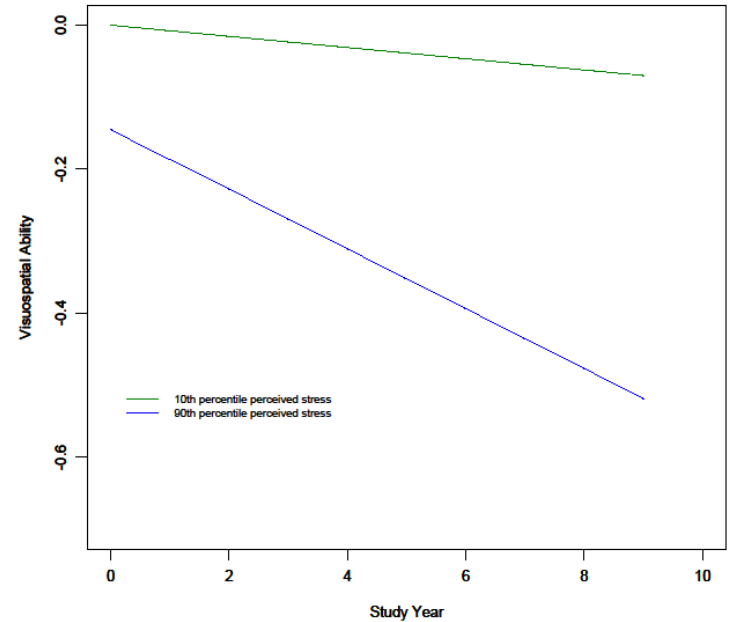
Perceived stress related to faster decline in cognition

Degree to which one finds their life uncontrollable, unpredictable, overloading



Episodic memory

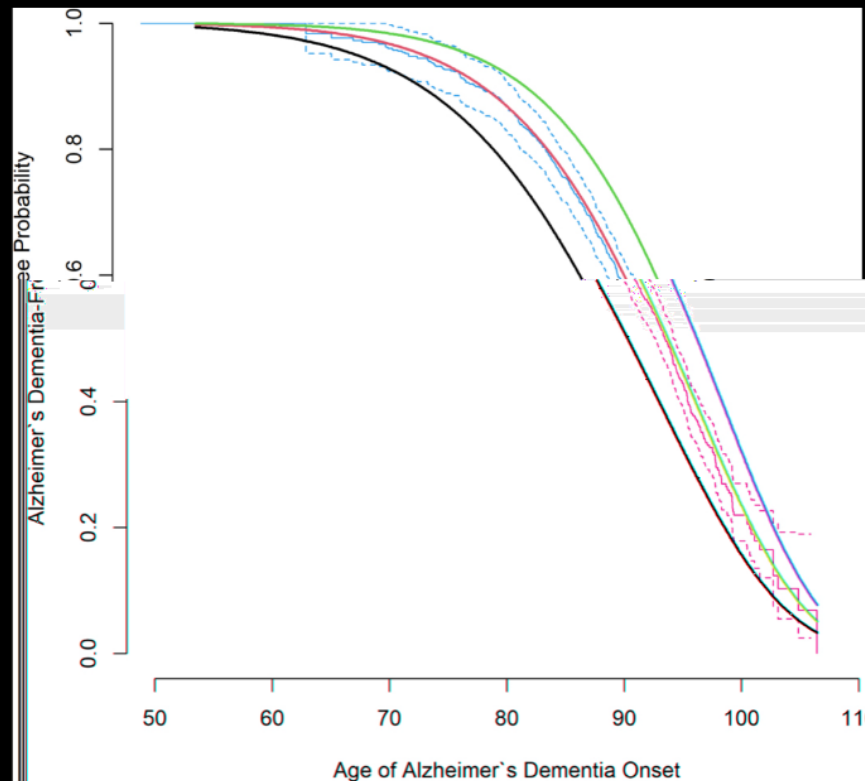
Visuospatial Ability

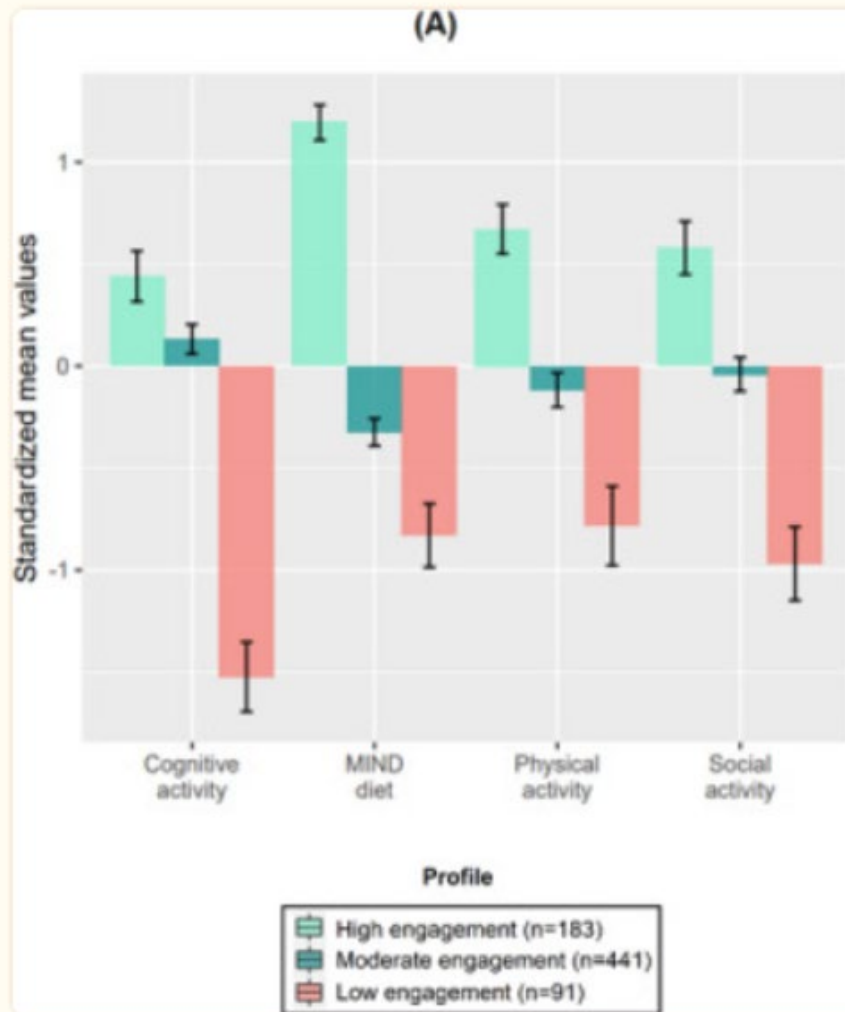


Having a higher purpose in life delays onset of Alzheimer's by ~6 years

Statement

- 1 I feel good when I think of what I have done in the past and what I hope to do in the future.
- 2 I live life 1 day at a time and do not really think about the future.
- 3 I tend to focus on the present because the future nearly always brings me problems.
- 4 I have a sense of direction and purpose in life.
- 5 My daily activities often seem trivial and unimportant to me.
- 6 I used to set goals for myself, but that now seems like a waste of time.
- 7 I enjoy making plans for the future and working them to a reality.
- 8 I am an active person in carrying out the plans I set for myself.
- 9 Some people wander aimlessly through life, but I am not one of them.
- 10 I sometimes feel as if I have done all there is to do in life.



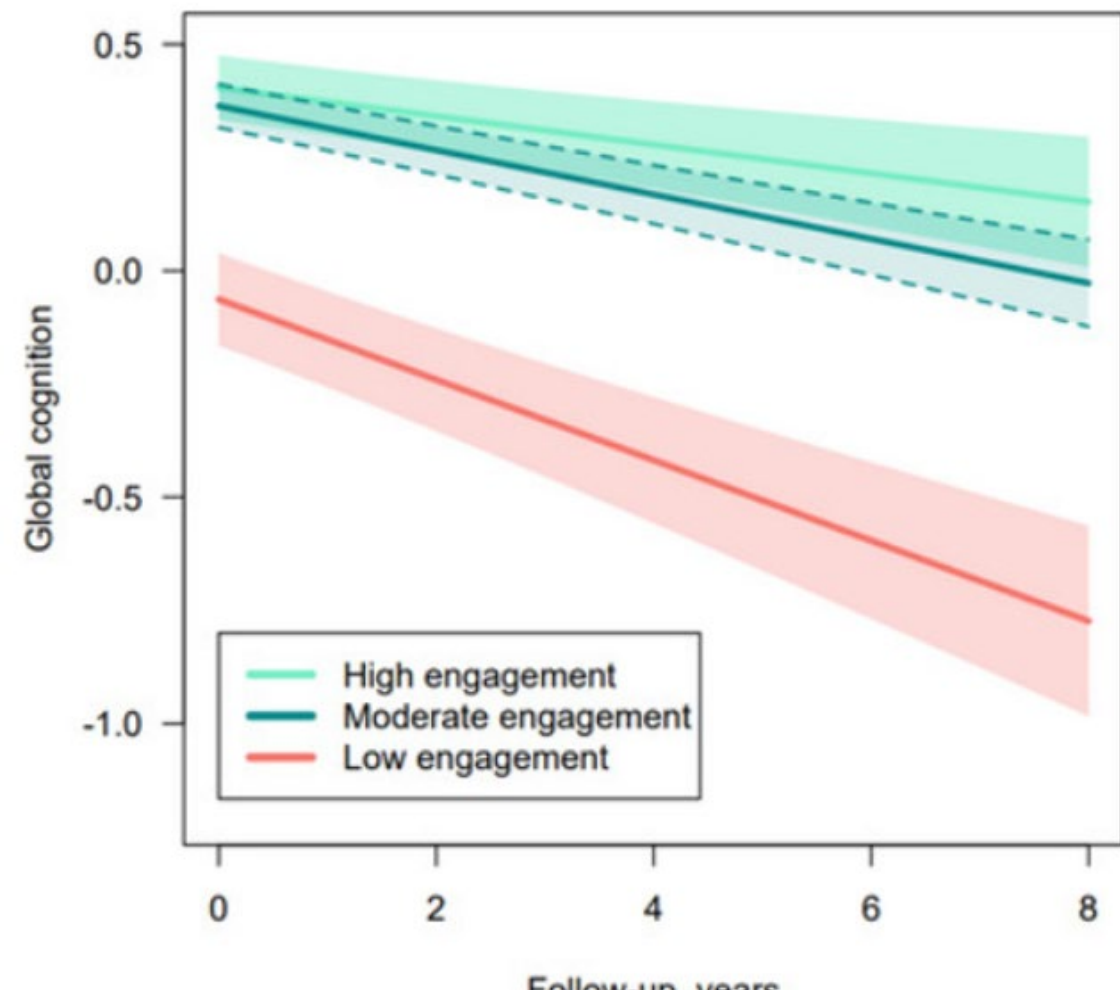


Identified profiles of behavior patterns

- cognitive activity
- diet
- physical activity
- social activity

Grouped people into high, moderate, & low

Halloway et al., 2023



Compared to the high engagement group, those in the low group had the fastest rates of cognitive decline (moderate group declined faster, but to a lesser degree)

Halloway et al., 2023

Take Home Message

- The number of people with Alzheimer's is increasing with our rapidly aging population
- Short of a cure, prevention is our best hope of reducing or delaying the impact on our society
- Brain health is influenced by many factors across the life course – some things we can control, others we have less control
- Adopting healthy lifestyle habits is good for brain health and may reduce our risk of Alzheimer's

Acknowledgments

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Study Participants :

Religious Orders Study
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RADC Research Resource Sharing Hub



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