Brain Health: what do we really know?

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A Prescription for Longevity in the 21st Century.

PhilipA. Pizzo,MD. Departments of Pediatrics and Microbiology and Immunology, Stanford University. JAMA, 2020.

What guidance should clinicians offer parents of a newborn about how to prepare their child for a life that may last to 100 or more years?

A Prescription for Longevity in the 21st Century.

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- By 2030 all baby boomers, those born between 1946 and 1964, will have become 65 years of age and comprise approximately 20%of the US population.
- In many Western European and Asian countries, the percentage of individuals older than 65 years will be closer to 40% of the population.
- The average life expectancy of children born in high-income countries over the next decades is projected to increase to nearly 100 years.

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- The changes in longevity have societal implications as well as individual consequences that affect educational institutions, the workplace, and residential communities, as well as the economic forecasts of individuals, communities, and countries.
- The Hartford Foundation constructed an Aging Society Index that assesses nations on their:
  - well-being (disability-free life expectancy)
  - equity (estimates of food security, risk of poverty, and educational attainment)
  - cohesion (social support, trust ,and intergenerational connectivity)
  - productivity and engagement (participation of older adults in the workforce or volunteerism)
  - security (feeling safe and financially secure).

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- Whether dealing with individuals or communities, a number of factors contribute to successful longevity.
- While the focus of many medical centres is on precision medicine, genetic predisposition constitutes approximately 30% of the risk for early death, and other determinants of early death include social circumstances, environmental exposure, and behaviour and lifestyle.
- Looked at from a different perspective, having less than a high school education or experiencing poverty can adversely affect longevity.

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- In addition to lifestyle choices, measures of wellness also highlight the importance of social connectedness.
- The Kaiser Family Foundation in collaboration with *The Economist* reported in 2018 that one-fifth of adults in the United States and United Kingdom reported that they feel lonely and lack meaningful connections with others.
- These findings are supported by the 2019 University of Michigan Poll on Healthy Aging that surveyed 2000 individuals aged 50 through 80 years, which found that one-third of them indicated a lack of companionship.
- Our studies here in NZ show similar rates of severe loneliness.

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The Importance of Purpose

- In a study of adults older than 50 years, Colby reported in the Pathways to Encore Purpose Project that 31% of 1,198 individuals surveyed had a purpose “beyond the self” that included an interest in improving the lives of others, making the world better, teaching, building community, or pursuing spiritual goals.
- Caring for others (including by grandparents) positively affects all-cause mortality.
- A recent study of 6,985 individuals in the Health and Retirement Study of adults older than 50 years demonstrated that a stronger life purpose was associated with decreased mortality, suggesting that purposeful living has positive health benefits.
- For example, purpose can be renewed through career counseling in the workplace, as well as through education and retraining opportunities at universities and colleges, or through community and public service or volunteer activities.

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The Value of Social Engagement

- In addition to having or renewing purpose, avoiding loneliness and promoting social connection correlate with health outcomes.
- A meta-analysis of 148 studies involving 408,849 participants showed positive social relationships were associated with a 50% increase in survival, whereas poor social relationships were associated with a 29% increase in cardiovascular disease and a 32% increase in strokes.
- Improving engagement can be achieved through friendships, family, and social networks as well as through faith based or community-focused social and volunteer groups.

A Prescription for the Future of Individuals and Communities.

PhilipA. Pizzo,MD. Departments of Pediatrics and Microbiology and Immunology, Stanford University. JAMA, 2020.

- Having a purpose, seeking social engagement, and fostering wellness through positive lifestyle choices (exercise, nutrition, mindfulness) are important in reducing morbidity and mortality and improving the life journey.
- These variables are important at all stages of life and particularly for those in midlife and older.
- These elements should be part of the health assessment and should be prescribed by physicians.
- While these associations are not new, their benefits for individuals, institutions, and society are important and could foster positive outcomes and better alignment of life span and health span with less financial, medical, and social costs for individuals, communities, and society.

2019—A Year of Hope for Alzheimer's Research

ALZFORUM

NETWORKING FOR A CURE

2019—A Year of Hope for Alzheimer's Research

- In the year just past, Alzheimer's researchers, families, and stakeholders felt renewed hope that new treatments might be within grasp.
- While the Lazarus story of aducanumab may or may not be enough for FDA approval this year, data from its Phase 3 program solidified a broader signal across four different anti-amyloid antibodies that amyloid can be removed from the brain and that maybe—just maybe—this will also benefit cognition and function if given early at a sufficient dose.
- The prospect that the amyloid hypothesis is druggable, alone, was enough to reenergize the field.
- A boost in funding announced as the U.S. Congress headed for its holiday break also gave cause for celebration going into 2020, though the funding picture is less rosy in other countries.
- The NIH budget for AD research now stands at $2.8 billion, a $350 million increase over 2019.

2019—A Year of Hope for Alzheimer's Research

- **Exercise**

- New evidence from large observational studies further cemented the well-accepted idea that physical activity protects against all-cause dementia.
- Some new evidence supported the less accepted notion that exercise protects against AD specifically, as well.
- Among people older than 50, more physical activity associated with reduced AD biomarker and markedly less dementia over five to 14 years in U.S., U.K., and Chinese cohorts.

- Separately, a comparison of data from a personality survey of high school students taken in the 1960s with the same people's current medical records linked an adolescent trait—back then called "vigor"—with low dementia incidence now.
  - Vigor might be a proxy for physical activity.

Preventing Dementia

- Major challenge for researchers and clinicians.
- 2,578 clinical trials since 2001.
  - All failed.
- No new molecule approved in 30 years.

Prof Y Barak, MD, MHA.

Hot Health

Topics to engage, educate and inspire

Southern District Health Board
Piki Te Ora

Topics to engage, educate and inspire

University of Otago
Te Whare Wānanga o Otāgo
New Zealand

Dunedin School of Medicine
Te Kura Whaiora o Ōtepoti

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The Dunedin dementia risk awareness project: pilot study in older adults

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BrainHealth Literacy

- Beliefs about AD and scientific knowledge of AD influence the perceived threat of AD in older adults.
- Education programs and interventions that foster exposure to AD factual knowledge, particularly for those with limited education, can help reduce the negative view of AD.
- Moreover, data from the European Health Literacy Survey demonstrated an increased odds of exercising almost daily associated with understanding disease prevention and health promotion information.
- Public health policy should thus consider measures to improve health literacy in order to achieve positive behavioural change.

Aim

- A report issued by the CDC and the Alzheimer's Association in 2014 recommended with high priority to "determine how diverse audiences think about cognitive health and its association with lifestyle factors."
- We planned to use the LIBRA developed by Schiepers and colleagues to survey a representative sample of older adults (50 to 75 years old) living independently in the community in Otago, New Zealand.
- The results of this survey will be the basis for designing a dementia primary prevention effort for the benefit of New Zealand adults.
- Our ability to "personalize" future programmes according to the target population's brain health awareness will be a unique advantage compared to other available programmes.

Focus groups

- Part of the process of refining our survey was to target groups of older adults in order to ascertain that the modified LIBRA scale is easily comprehended by the target population.
- Surveying groups of older adults has traditionally been employed to study attitudes, beliefs, barriers and facilitators for health promotion as well as to develop health education programmes.
- In the present study we report results of participants from brain health awareness groups.

Participants

- A series of 5 public lectures was supported by the Dunedin Public Library. These were advertised in both the library itself, the library's Facebook pages and in the weekend edition of the Otago Daily Time (the most read newspaper in Otago, New Zealand).
- The talks were describes as:"…talks about brain health…knowledge of Alzheimer's disease and prevention." The talks were held fortnightly in the evening and were free.
- Prior to each talk the questionnaire was distributed.

Open ended questions

- What do you believe are the 3 most important risk factors for dementia?'
- -
- -
- -
- 'What do you believe are the 3 most important protective factors for dementia?'
- -
- -
- -

Prompted questions

‘Which of the following do you believe has a significant effect on whether or not the average person develops dementia?’

- Low/Moderate Alcohol Consumption
- Coronary Heart Disease
- Oral Hygiene
- Physical Inactivity
- Renal Dysfunction
- Diabetes
- High Cholesterol
- Curcumin
- Smoking

‘Which of the following do you believe has a significant effect on whether or not the average person develops dementia?’

- Obesity
- Hypertension
- Mediterranean Diet
- Depression
- Prescription Drugs
- High Cognitive Activity
- Low Unsaturated Fat Intake
- Hearing Impairment
- Loneliness

Health Belief Model

Please answer 'Yes/No' for the following statements:

- 'I am more than likely than the average person to suffer from dementia in the future'
- 'If I were to suffer from dementia my whole life would change'
- 'Changing lifestyle behaviours will reduce the risk of dementia'
- 'Taking preventive measures will be too resource intensive'
- 'I know how to initiate dementia prevention'
- 'I want to start dementia prevention early'

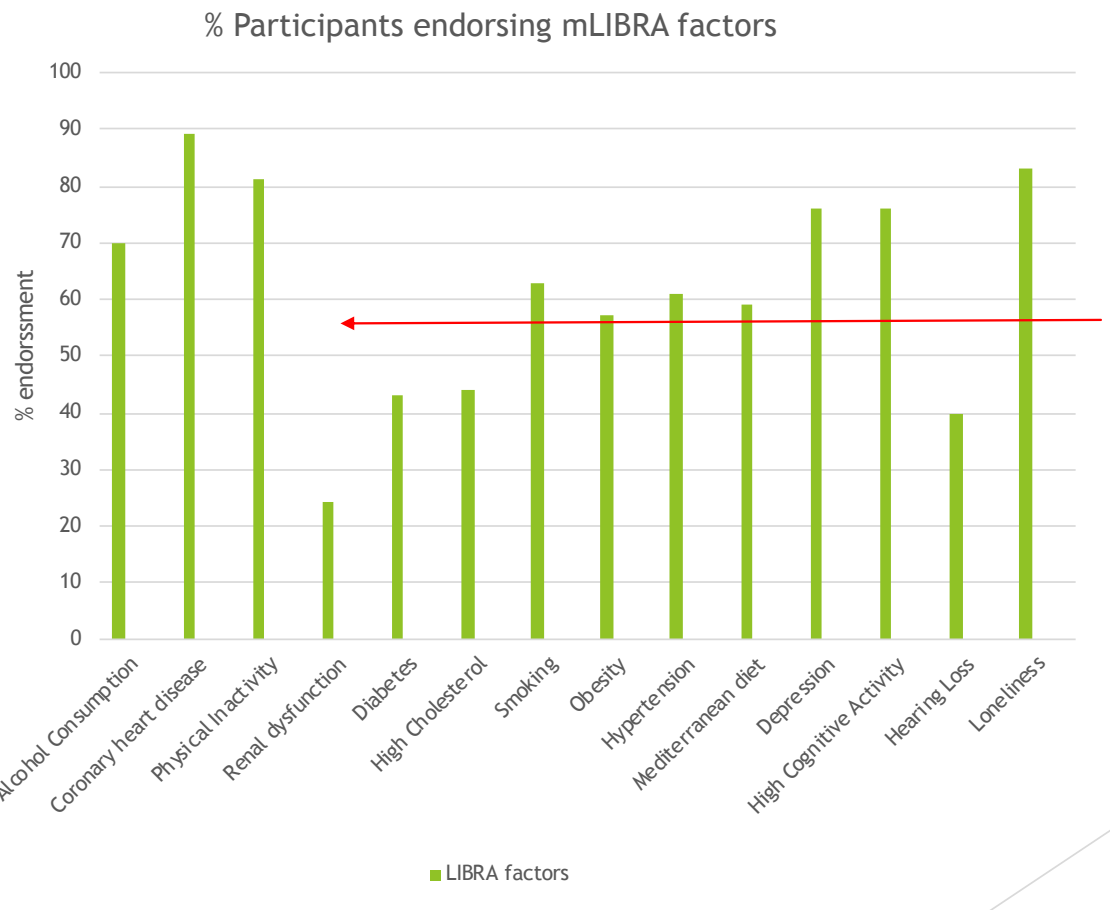
Participants

- Four hundred and one people attended the series of public lectures.
  - Of these 304 were aged 50 years or older.
    - We focused on the responses of the older adults and of these 216 consented to complete the survey questionnaire (71% response rate).
- Two hundred and sixteen older adults ($\geq$50 years)
  - mean age 65.5 $\pm$ 11.4 years (range: 50-93)
  - 172 women and 44 men.
  - The great majority - 95.4% - were NZ Europeans.
  - Education levels in this group was as follows:
    - school only, (primary and secondary school), 37.9%
    - post-secondary education, (BA, BSc or tertiary learning), 53.7%
    - post-graduate, (MA, MSc and PhD), 8.4%.

Risk and Protective factors:

- ‘What do you believe are the 3 factors that will **increase** the chances of a person experiencing memory problems in older age?’
- - Loneliness was most commonly emphasized (24%) followed by genetics and smoking.
- ‘What do you believe are the 3 factors that will **reduce** the chances of a person experiencing memory problems in older age?’
- - Exercise was most commonly emphasized (48%) followed by dietary changes and cognitive training.

Prompted questions



Health beliefs

- ‘I am at risk to suffer from dementia in the future’ 47%
- ‘If I were to suffer from dementia my whole life would change’ 95%
- ‘Changing lifestyle behaviours will reduce the risk of dementia’ 91%
- ‘Changing lifestyle will be too difficult’ 12%
- ‘I feel confident that I could make lifestyle changes to help prevent dementia’ 87%
- ‘I want to start lifestyle changes soon’ 74%

Discussion

- The growing attention to cognitive health promotion among older adults emphasizes the importance of scrutinizing public understanding of risk and protective factors for dementia.
- Health beliefs have long been recognized as an important factor in risk self-management.
- Perceived threat of disease - personal susceptibility – is associated with willingness to seek out preventive options whereas beliefs about causes influence self-management

Brain health literacy

- Mental health literacy has received increasing attention as a useful strategy to promote early identification of mental disorders, reduce stigma and enhance behaviours promoting prevention.
- Low health literacy exacerbates struggles of older adults and contributes to a variety of adverse health behaviours and outcomes.
- Limited health literacy can be a barrier to older adults' access to information and quality of care.

CONCLUSIONS

- Older adults are not adequately knowledgeable about dementia risk and nutritional factors.
- However, they are reporting optimism in their ability to modify risks through lifestyle interventions.

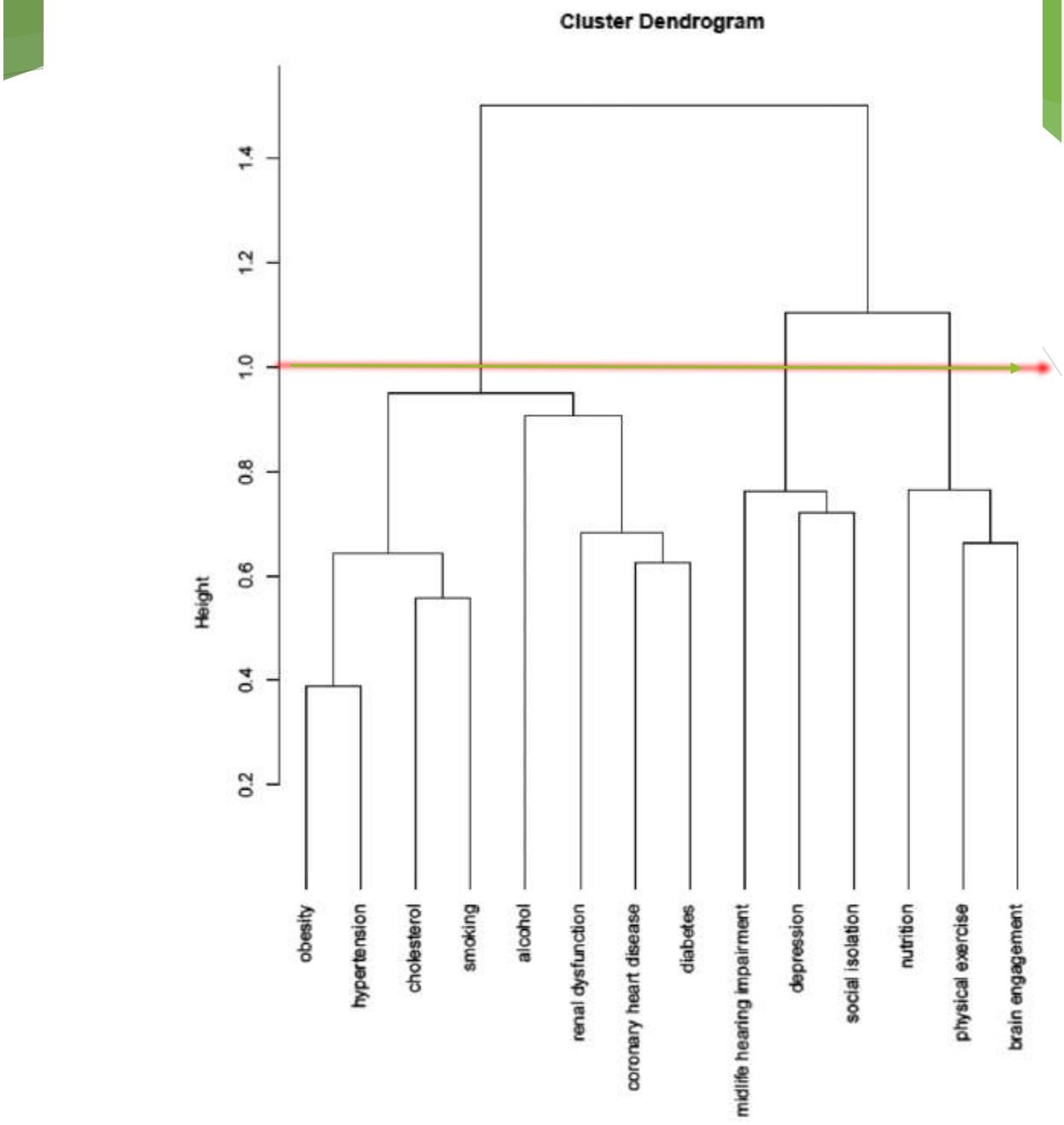


Figure 2. Dendogram of Literacy Clusters.

Cluster Dendrogram

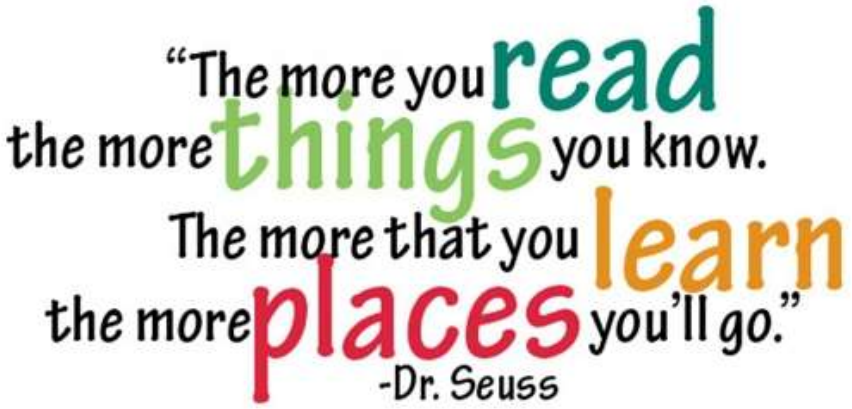
- Using binary versions of the prompted risk and protective factors a dendrogram illustrating the clustering of the variables revealed three clusters:
- ***"Medical"*** health concepts - respondents identified the following as associated with brain health: Obesity, Hypertension, Cholesterol, Smoking, Alcohol, Coronary Heart Disease and Diabetes.
- ***"Modifiable"*** variables - respondents identified the following as associated with brain health: Nutrition, Physical Exercise and Brain Engagement.
- ***"Psychosocial"*** awareness - respondents identified the following as associated with brain health: Midlife Hearing Impairment, Depression and Social Isolation.

The future

- Randomized
- Representative
- Sample size

- We have recruited 1,004 participants, aged 50-75 years in Otago and all have completed our survey.
- Preliminary analysis supports the existence of 3 distinct literacy subgroups.
- This will be the basis for designing “tailored” psychoeducational packages.

Thank you for your attention…



Your mind matters. Here's how to stay sharp.

The secret to increasing brain function is growing neurons. 'More neurons means a better ability to learn and to remember,' says Max Cynader of Vancouver's Djavad Mowafaghian Centre for Brain Health.

Get quality rest

One way to grow neurons? During the day, while you learn, you grow neural connections in your brain. Then at night, you replay the day's memories while you sleep, helping neurons to wire and fire together.

How Long to Nap

10 to 20 Minutes

This power nap is ideal for a boost in alertness and energy, experts say. This length usually limits you to the lighter stages of non-rapid eye movement (NREM) sleep, making it easier to hit the ground running after waking up.

30 Minutes

Some studies show sleeping this long may cause sleep inertia, a hangover-like groggy feeling that lasts for up to 30 minutes after waking up, before the nap's restorative benefits become apparent.

60 Minutes

This nap is best for improvement in remembering facts, faces and names. It includes slow-wave sleep, the deepest type. The downside: some grogginess upon waking up.

90 Minutes

This is a full cycle of sleep, meaning the lighter and deeper stages, including REM (rapid eye movement) sleep, typically likened to the dreaming stage. This leads to improved emotional and procedural memory (i.e. riding a bike, playing the piano) and creativity. A nap of this length typically avoids sleep inertia, making it easier to wake up.

Take the blues seriously

A 2010 study published in Cognitive, Affective & Behavioral Neuroscience showed people with depression performed worse on cognitive tasks than their non-depressed counterparts. 'Treat the depression and you can improve the cognitive function,' says Aaron Newman, a neuroscientist and associate professor at Halifax's Dalhousie University.

Manage stress

When we're agitated, our bodies flood our brains with cortisol. The hormone attaches to receptors in our neurons, which allows more calcium to pass through their membranes. Neurons overloaded with calcium fire too rapidly. That hyper firing kills neurons.

Play

Research from the Berlin-based Max Planck Institute for Human Development and two other German institutions showed that regularly playing Super Mario 64 increased study participants' brain volume in the regions that control memory and spatial thinking.

Break a sweat

One-hour weightlifting sessions, twice a week, have been shown to slow the progress of mild cognitive impairment

Drink your coffee

Coffee contains polyphenols, antioxidant compounds that may protect the hippocampus and the cortex, areas that are important for memory. Three to five cups a day is ideal.

Brush up

A study published in the Journal of the American Geriatrics Society found that people with none of their own teeth performed 10 per cent worse on memory tests than those with some natural teeth. Researchers have yet to determine why.

Monitor your hearing

A 2013 Johns Hopkins study concluded that cognitive decline progressed 30% to 40% faster for people with hearing loss than for those with normal hearing. Treating impairment can improve cognitive ability.

Don't count on superfoods

Studies have shown that turmeric, for example, breaks up brain plaque (which has been linked to Alzheimer's), but it's no cure-all. 'It's not the food that's beneficial; it's the chemicals in it,' says Newman. It's impossible to get a high enough concentration of those chemicals in your diet to recreate lab results.

Avoid smoking

The cortex, the bumpy surface layer of the brain, naturally thins as we age. Smoking hastens this thinning, which is associated with cognitive decline.

Build friendships

As little as 10 minutes of socializing a day improves cognitive performance.

Get Zen

Meditating for half an hour a day, for eight weeks, has been shown to grow grey matter in the hippocampus, which may improve memory and learning.