Strategies to Optimize Brain Health and Cognitive Fitness

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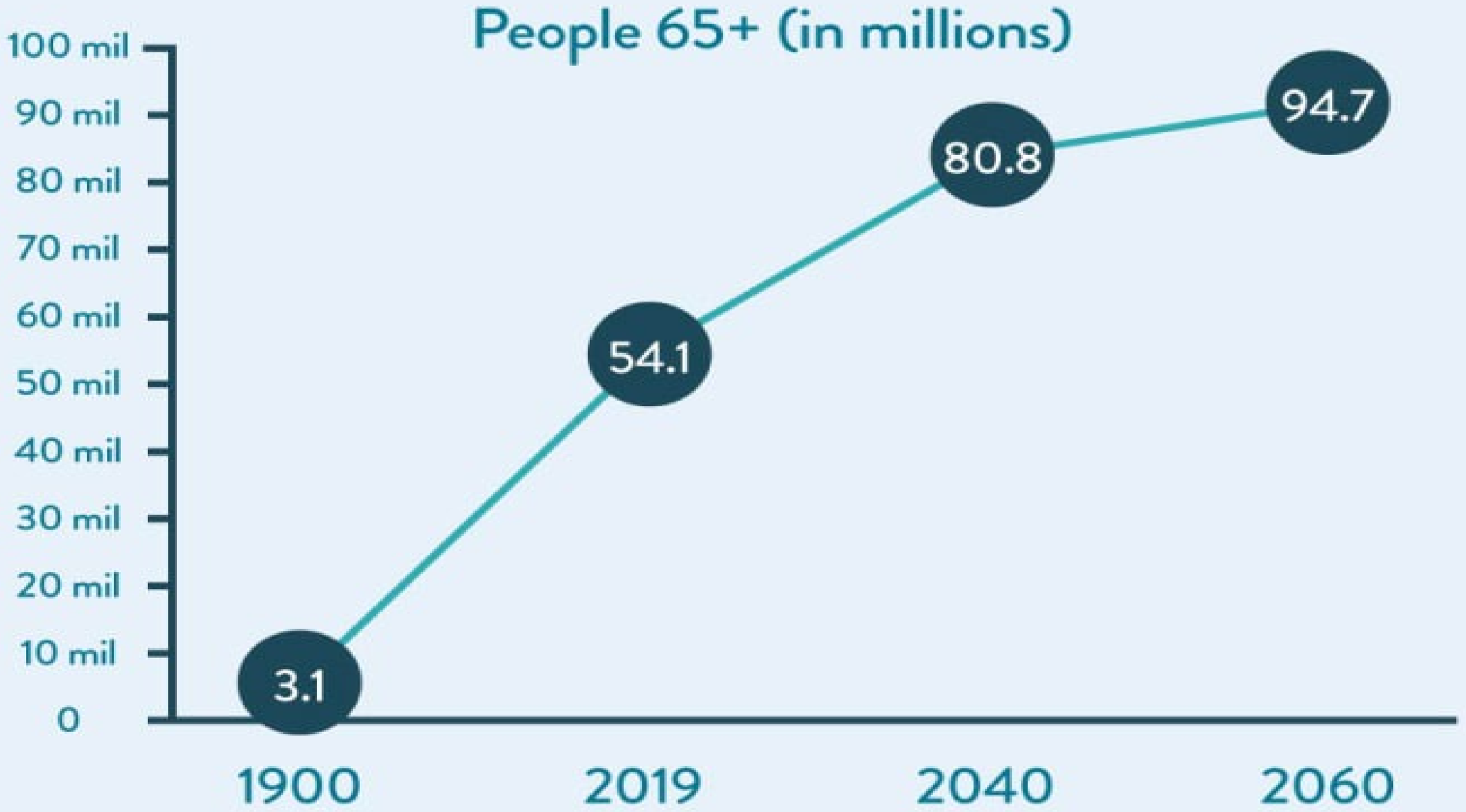
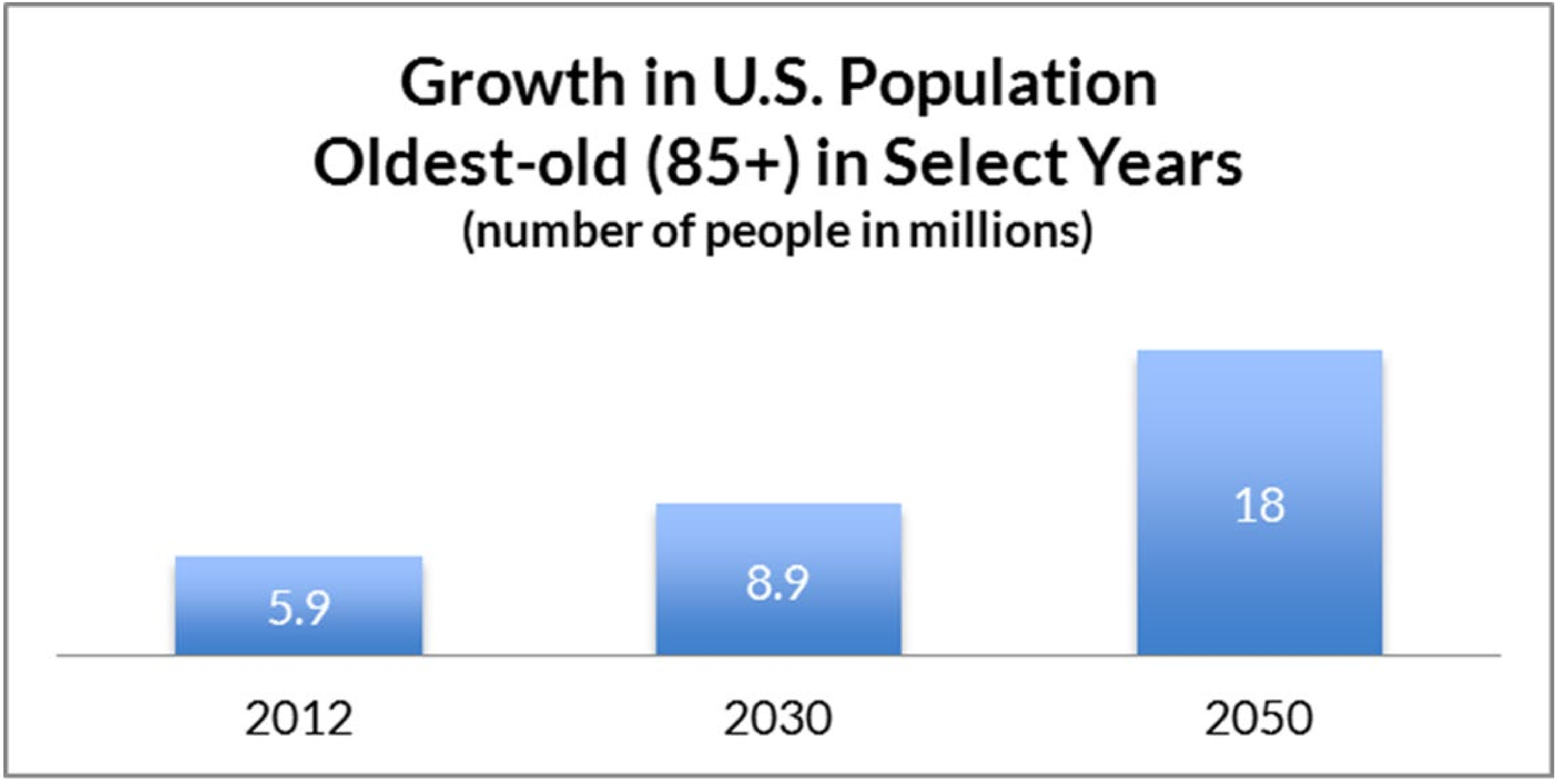
Co-Founder, FAI

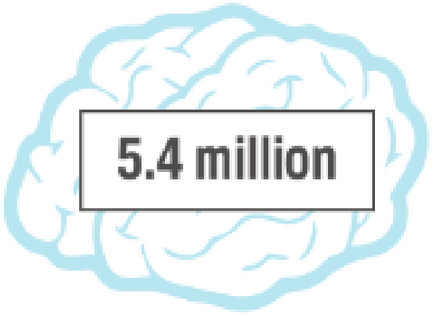
MARBLES
BRAIN BODY FITNESS


People 65+ (in millions)
100 mil
90 mil
80 mil
70 mil
60 mil
50 mil
40 mil
30 mil
20 mil
10 mil
0
3.1
54.1
80.8
94.7
1900
2019
2040
2060

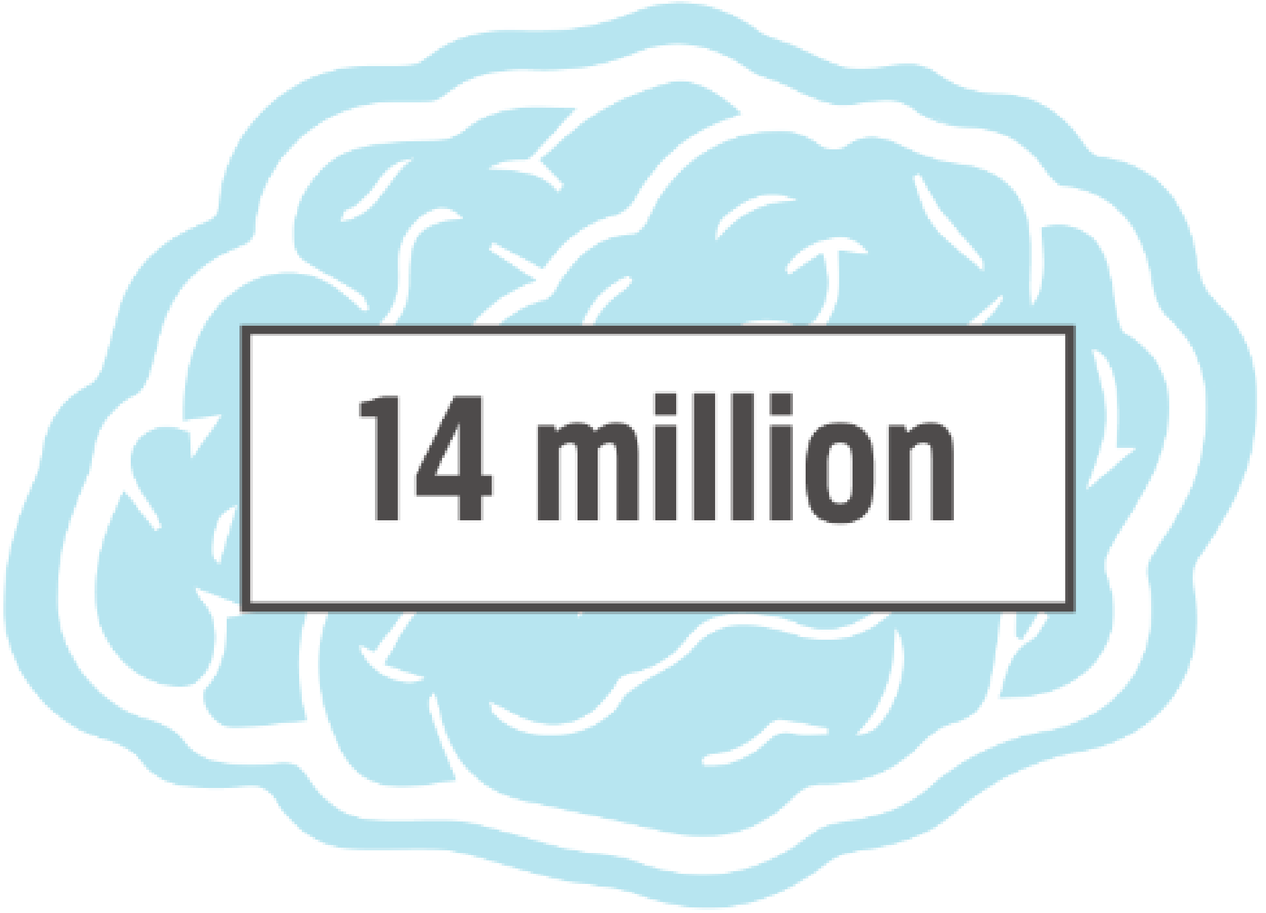

Growth in U.S. Population
Oldest-old (85+) in Select Years
(number of people in millions)
5.9
8.9
18
2012
2030
2050

Projections of Cases of Alzheimer's Disease from 2020 to 2050

2020



2050



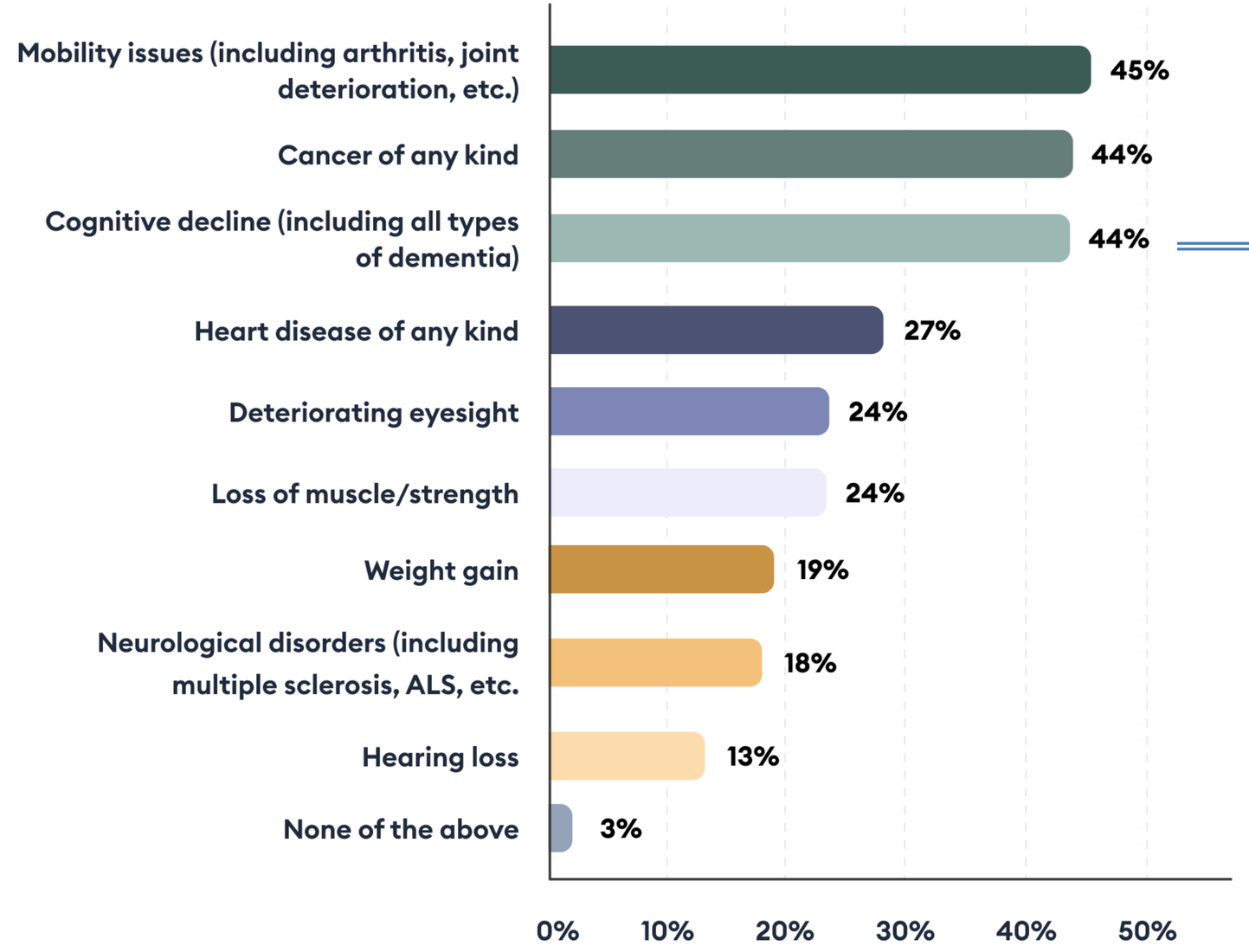
MARBLES
BRAIN BODY FITNESS

Generation Alzheimer's

"Most of America's baby boomers will spend their retirement years either with Alzheimer's or caring for someone who has it."

- Alzheimer's Association

Which of the following health concerns do you fear most about aging?



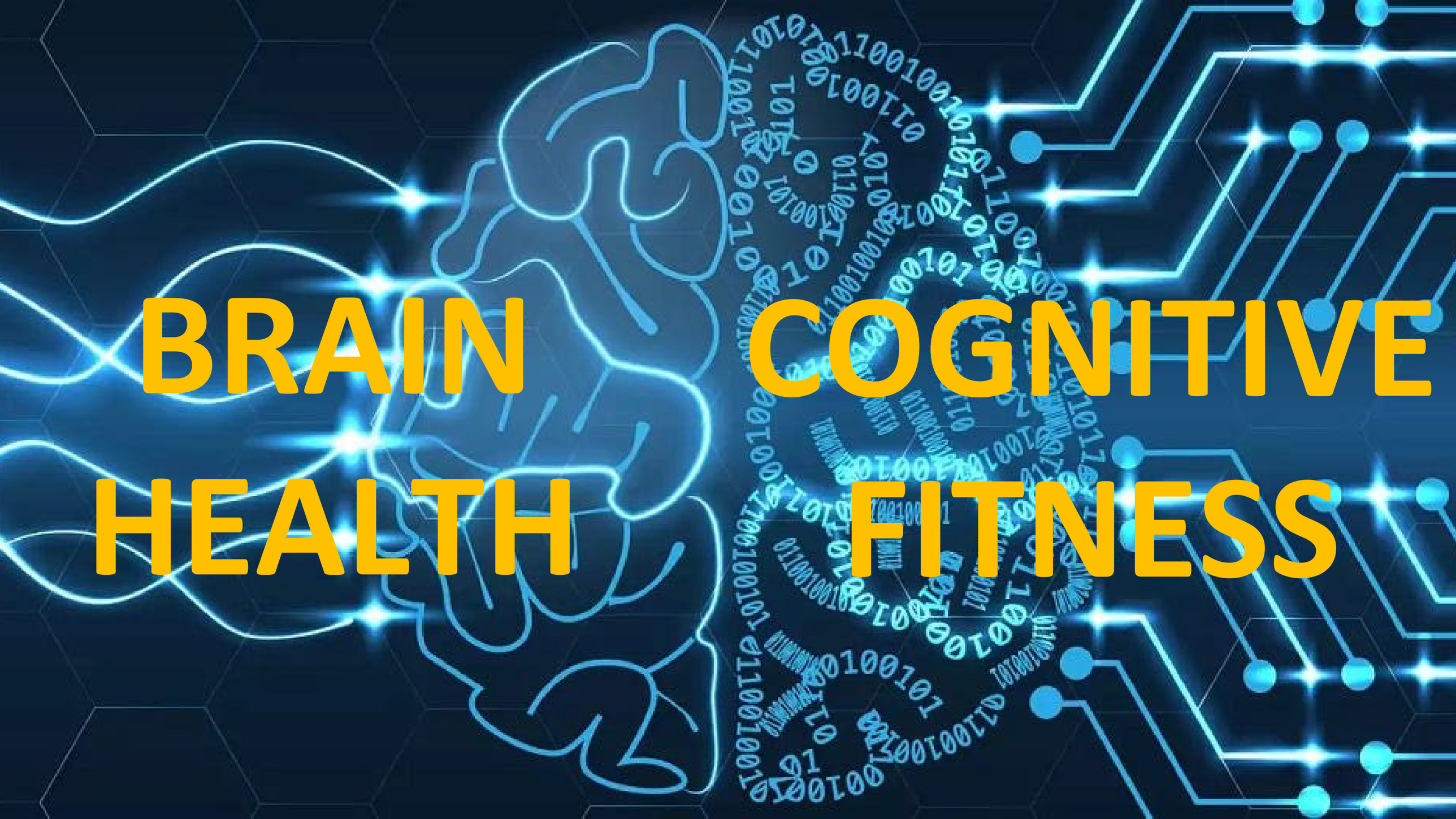
66-76: 55%
77+: 80%

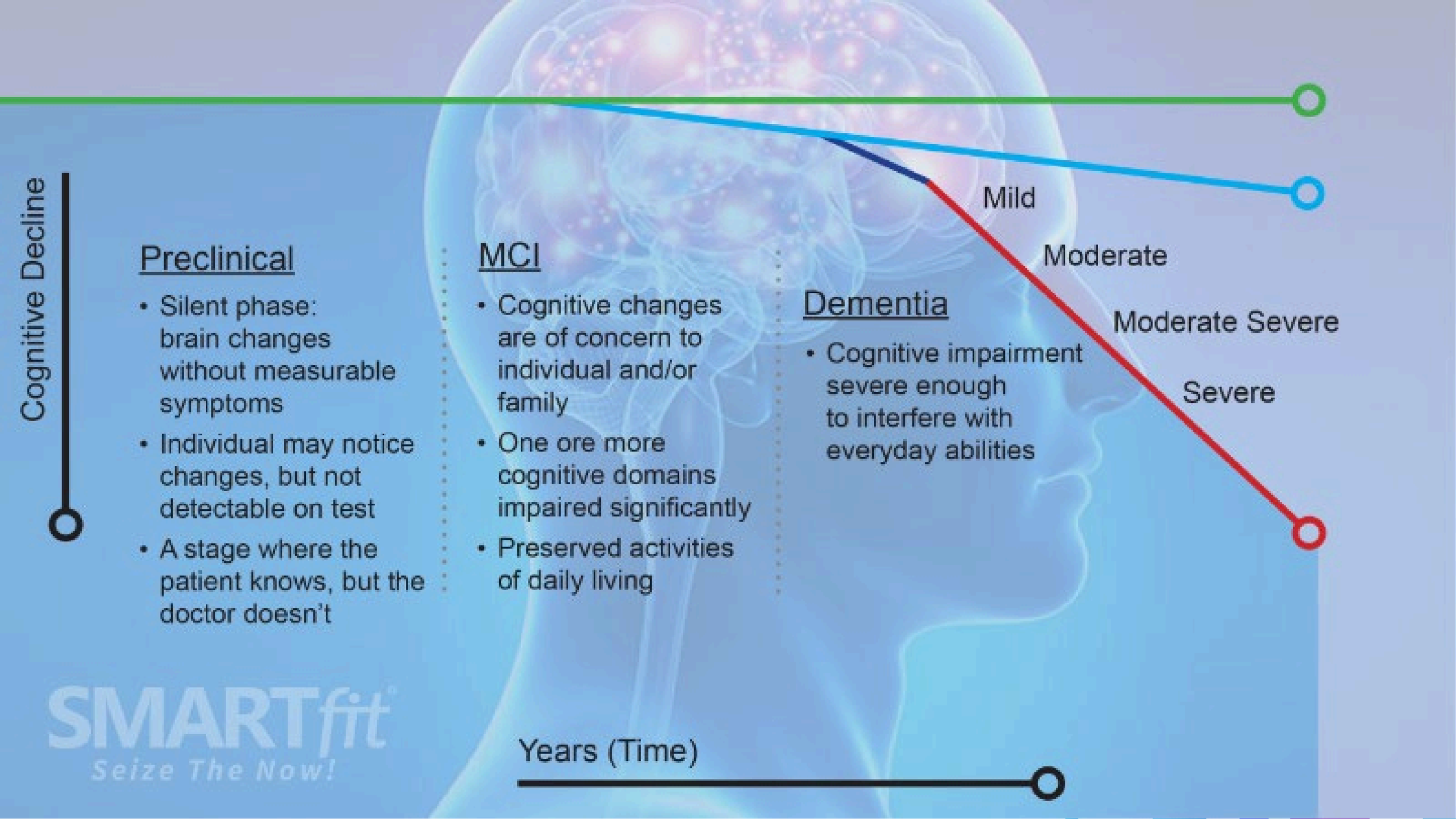
We ARE a Brain Gym Franchise

Priority on Older Adults
Focus on Prevention
Screening/Assessment
Individualized Programming
Holistic Brain Health
High Tech – High Touch

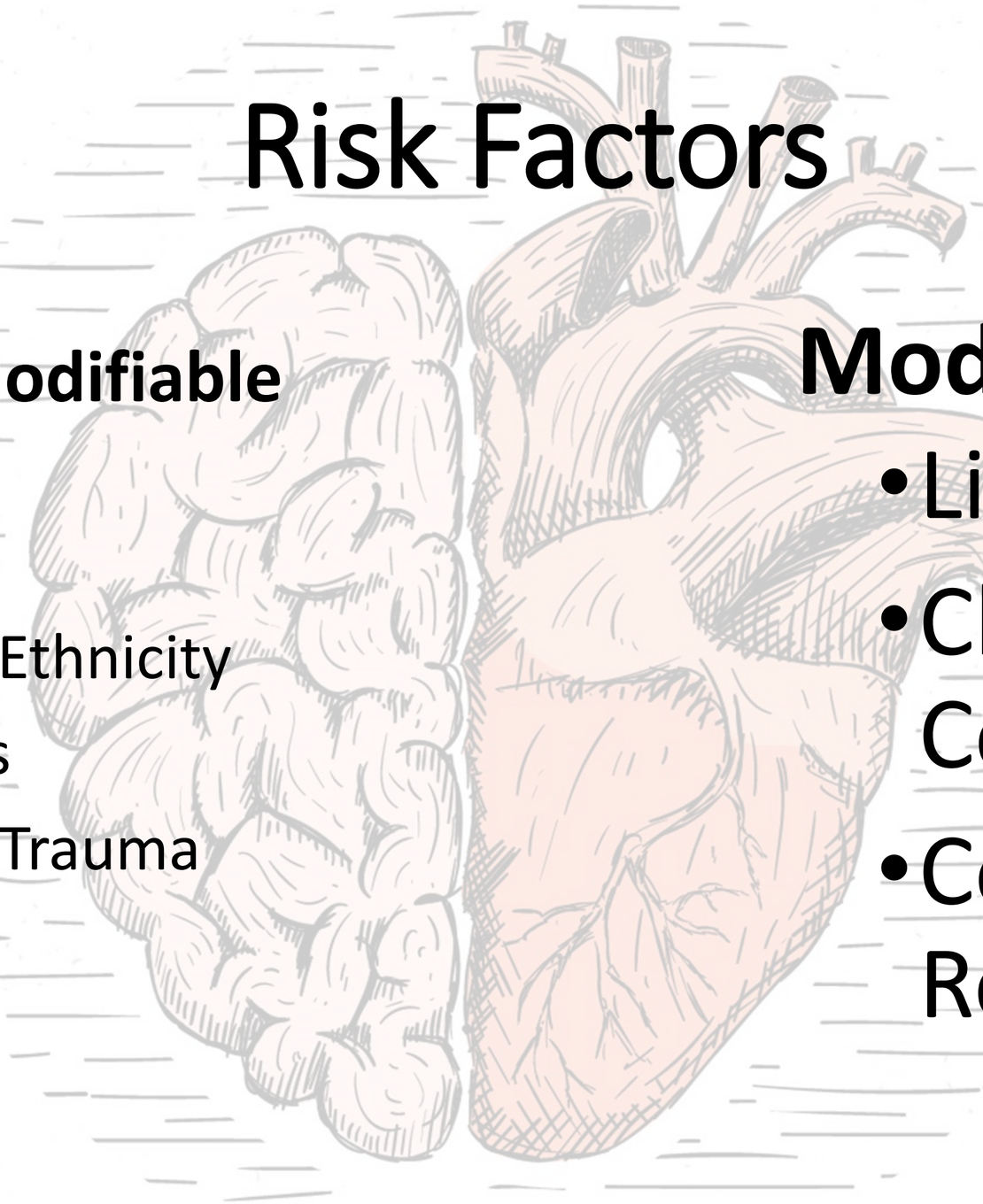
OUR AUDACIOUS MISSION

To reduce the prevalence of cognitive impairment and dementia in the 55+ population by making evidence-based brain fitness programming accessible and affordable


BRAIN
HEALTH
COGNITIVE
FITNESS


Cognitive Decline
Preclinical
• Silent phase: brain changes without measurable symptoms
• Individual may notice changes, but not detectable on test
• A stage where the patient knows, but the doctor doesn't
MCI
• Cognitive changes are of concern to individual and/or family
• One ore more cognitive domains impaired significantly
• Preserved activities of daily living
Dementia
• Cognitive impairment severe enough to interfere with everyday abilities
Mild
Moderate
Moderate Severe
Severe
Years (Time)
SMARTfit
Seize The Now!

Risk Factors



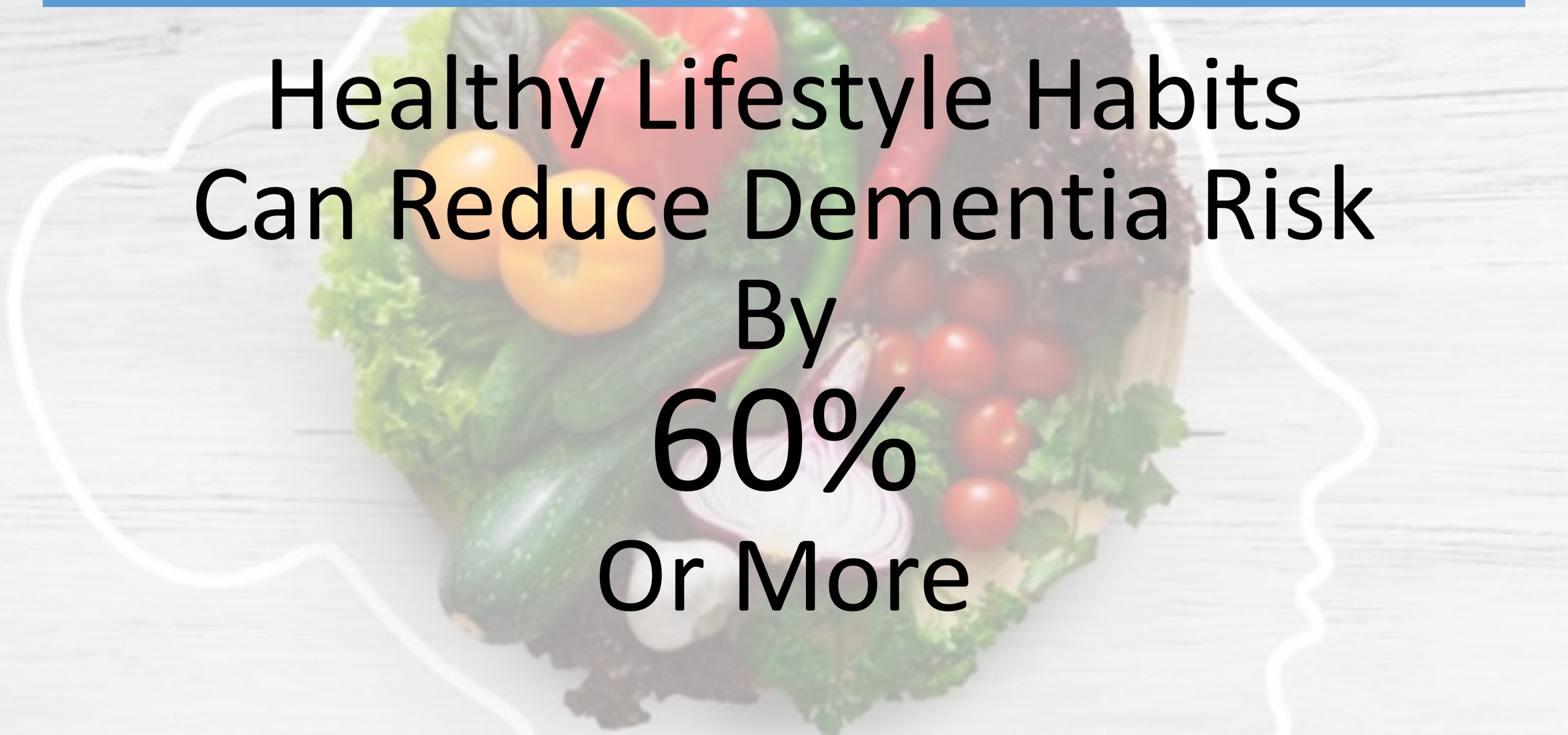
Non-Modifiable

- Age
- Sex
- Race/Ethnicity
- Genes
- Head Trauma

Modifiable

- Lifestyle
- Chronic Health Conditions
- Cognitive Reserve

PROMOTE – Brain Health



Healthy Lifestyle Habits
Can Reduce Dementia Risk
By
60%
Or More

Ornish *et al. Alzheimer's Research & Therapy (2024) 16:122*
https://doi.org/10.1186/s13195-024-01482-z
Alzheimer's Research & Therapy

Effects of intensive lifestyle changes on the progression of mild cognitive impairment or early dementia due to Alzheimer's disease: a randomized, controlled clinical trial

Dean Ornish[1,2*], Catherine Madison[1,3], Miia Kivipelto[4,5,6,7], Colleen Kemp[8], Charles E. McCulloch[9], Douglas Galasko[10], Jon Artz[11,12], Dorene Rentz[13,14,15], Jue Lin[16], Kim Norman[17], Anne Ornish[1], Sarah Tranter[8], Nancy DeLamarter[1], Noel Wingers[1], Carra Richling[1], Rima Kaddurah-Daouk[18], Rob Knight[19], Daniel McDonald[20], Lucas Patel[21], Eric Verdin[22,23], Rudolph E. Tanzi[13,24,25,26] and Steven E. Arnold[13,27]

PROMOTE - Brain Healthy Lifestyles

Nutrition

Exercise

Unwind

Restorative Sleep

Optimize

THE BRAIN DOCS

LOWER YOUR BRAIN AGE

BRAIN GAMES

CROSSWORDS

LOWER YOUR BRAIN AGE

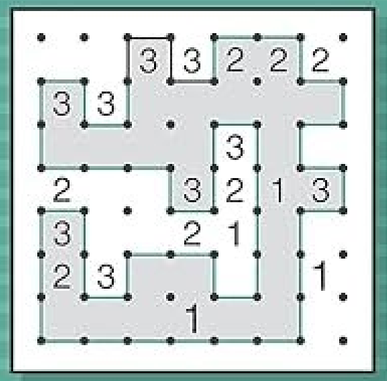
BRAIN GAMES

FILL IN THE BLANK

LOWER YOUR BRAIN AGE

BRAIN GAMES

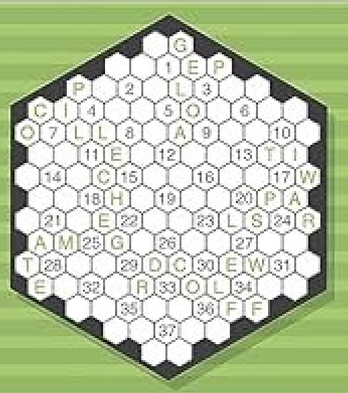
MIND STRETCHERS



LOWER YOUR BRAIN AGE

BRAIN GAMES

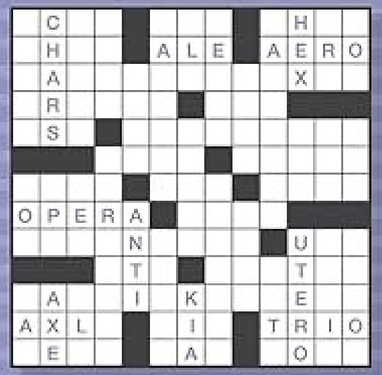
WORD PUZZLES



LOWER YOUR BRAIN AGE

BRAIN GAMES

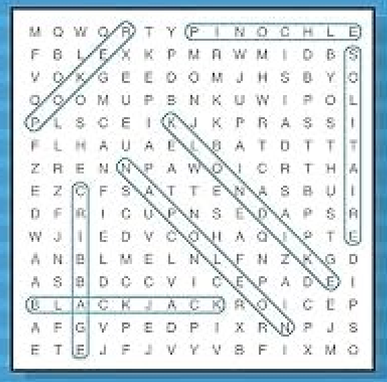
ACROSS & DOWN



LOWER YOUR BRAIN AGE

BRAIN GAMES

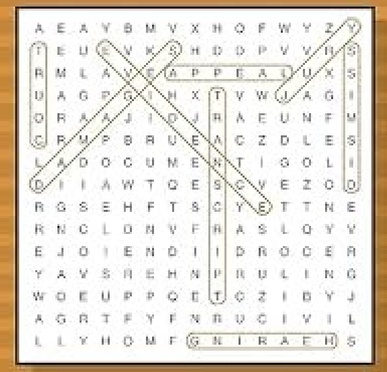
WORD SEARCH



LOWER YOUR BRAIN AGE

BRAIN GAMES

CIRCLE WORDS



LOWER YOUR BRAIN AGE

BRAIN GAMES

ANAGRAMS

Computerized Brain Training

"Cognitive training interventions based on repetitive practice on cognitive processes have been effective in improving the trained process but not so much for other untrained cognitive functions."

Ballesteros et al, 2015

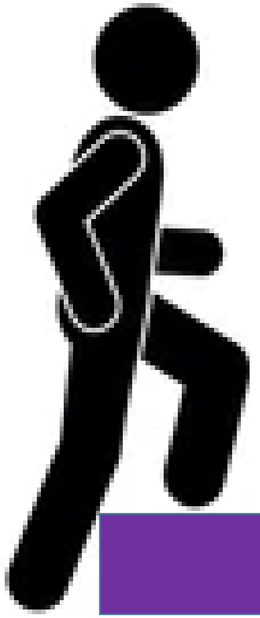
✓ Direct Effect

✗ Near Transfer

✗ Far Transfer

✗ Reduced Risk

The Evidence Hierarchy



Executive Dual-Tasking

General Dual-Tasking

Exercise + Cognitive Separately

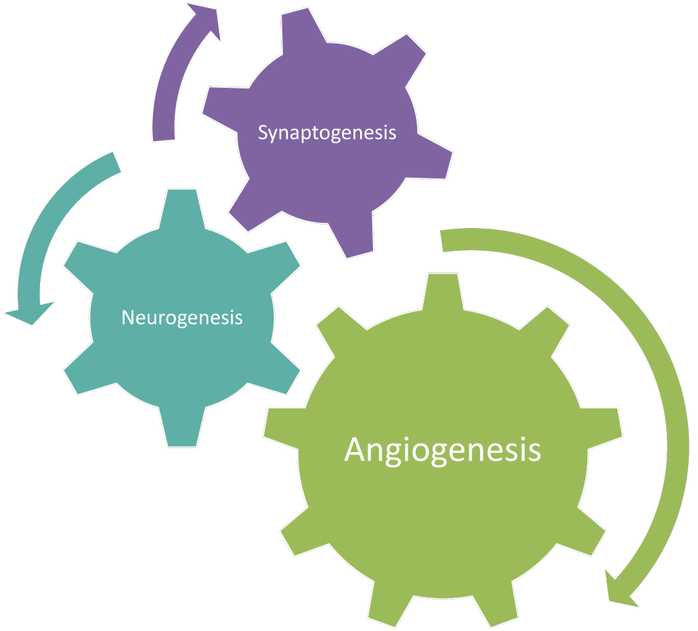
Physical Exercise

Cognitive Training/Brain Games

EFFECTIVENESS

Exercise Induces Neuroplasticity

Neuroplasticity: The brain's ability to reorganize and rebuild itself by forming new neural connections.



Angiogenesis: process of creating new blood vessels

Neurogenesis: process of creating new neurons

Synaptogenesis: process of creating new neural connections

The Importance of BDNF

BDNF (Brain-Derived Neurotrophic Factor) is the key protein – a hormone in your blood - that influences brain cell growth

- prevents death of existing brain cells,
- induces the growth of new brain cells (neurogenesis) and supports cognitive functioning (thinking).

Low levels of BDNF are linked to:

- Alzheimer's and accelerated aging
- obesity, depression, and schizophrenia.

Aerobic exercise: 60-75% HRmax for 30min several times per week

Evidence-Based Exercises

Aerobic

Resistance

Tai Chi

Neuromotor

Sports

Dance

Cognitive Activity + Physical Activity

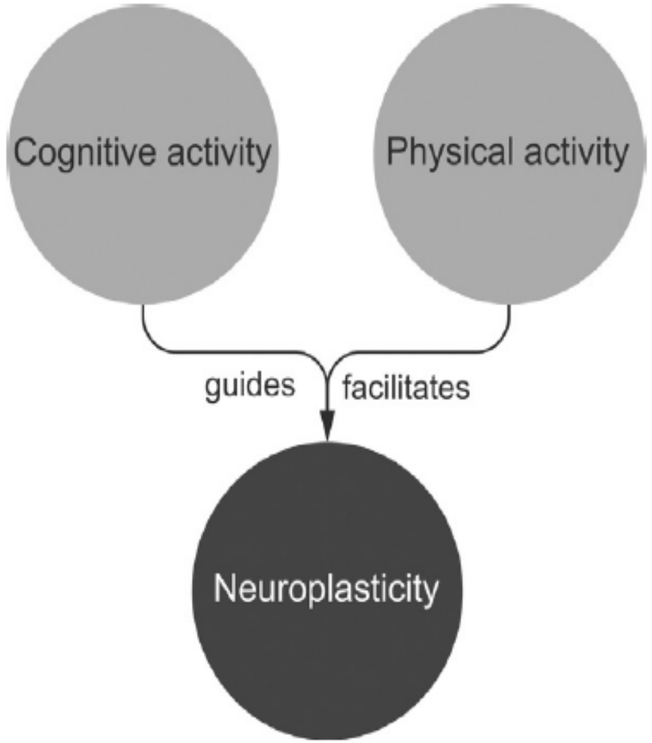


Fig. 1. Guided plasticity facilitation framework.

"We assume, that physical exercise increases the potential for neurogenesis and synaptogenesis while cognitive exercise guides it to induce positive plastic change."

Bamidis et al, 2014

Dual Tasking

Dual tasking is doing a motor and cognitive task simultaneously whereas multitasking is generally attempting to engage in two cognitive tasks at (almost) the same time.

Multitasking by definition will disrupt performance (increased errors and slows reaction time), especially in complex and challenging situations, such as those that occur in military professions.

Literature Review on the Effectiveness and required Dosages of Cognitive Interventions for Older Adults

Robert G Winningham; Alexis J Pacheco

In a 20-study meta-analysis…researchers reported that the dual tasking intervention had superior long-term cognitive benefits, with a large effect size (SMD = .61).

Based on the above findings, it appears that dual tasking may be one of the most effective interventions in improving cognitive performance.

Dual tasking may have one of the largest effect sizes of all of the interventions reviewed in this paper. And, dual tasking may also have the benefit of helping people learn new procedural and motor memories.

The required dual tasking dose for improvements in cognition appears to be mediated by age, given that research shows older participants experience greater cognitive benefit from dual tasking compared to younger people.

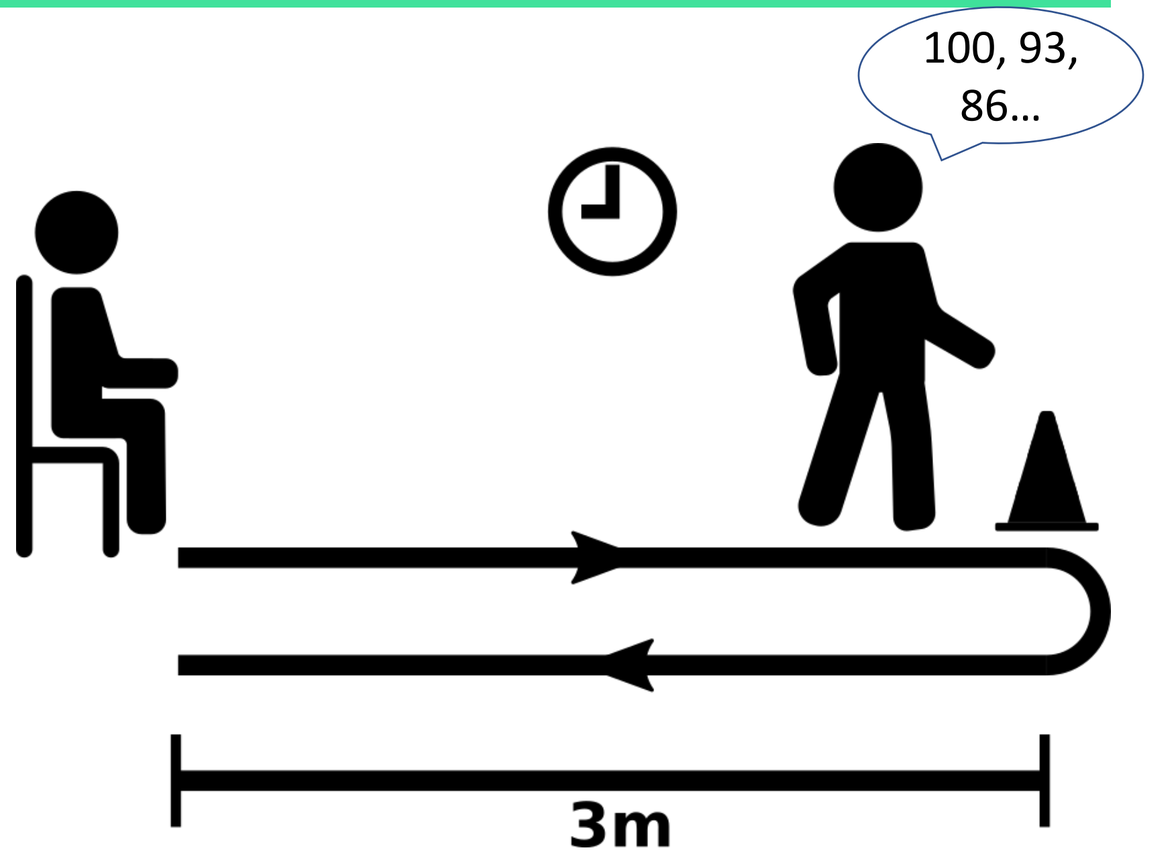
Topics in Geriatric Rehabilitation; Volume 00, Number 0, 1-8; 2024

PRACTICE – Brain Booster

Brain Body activities performed without the need for high-tech equipment

- Cognitive-Motor OR
- Motor-Motor

Dual-Task Cost



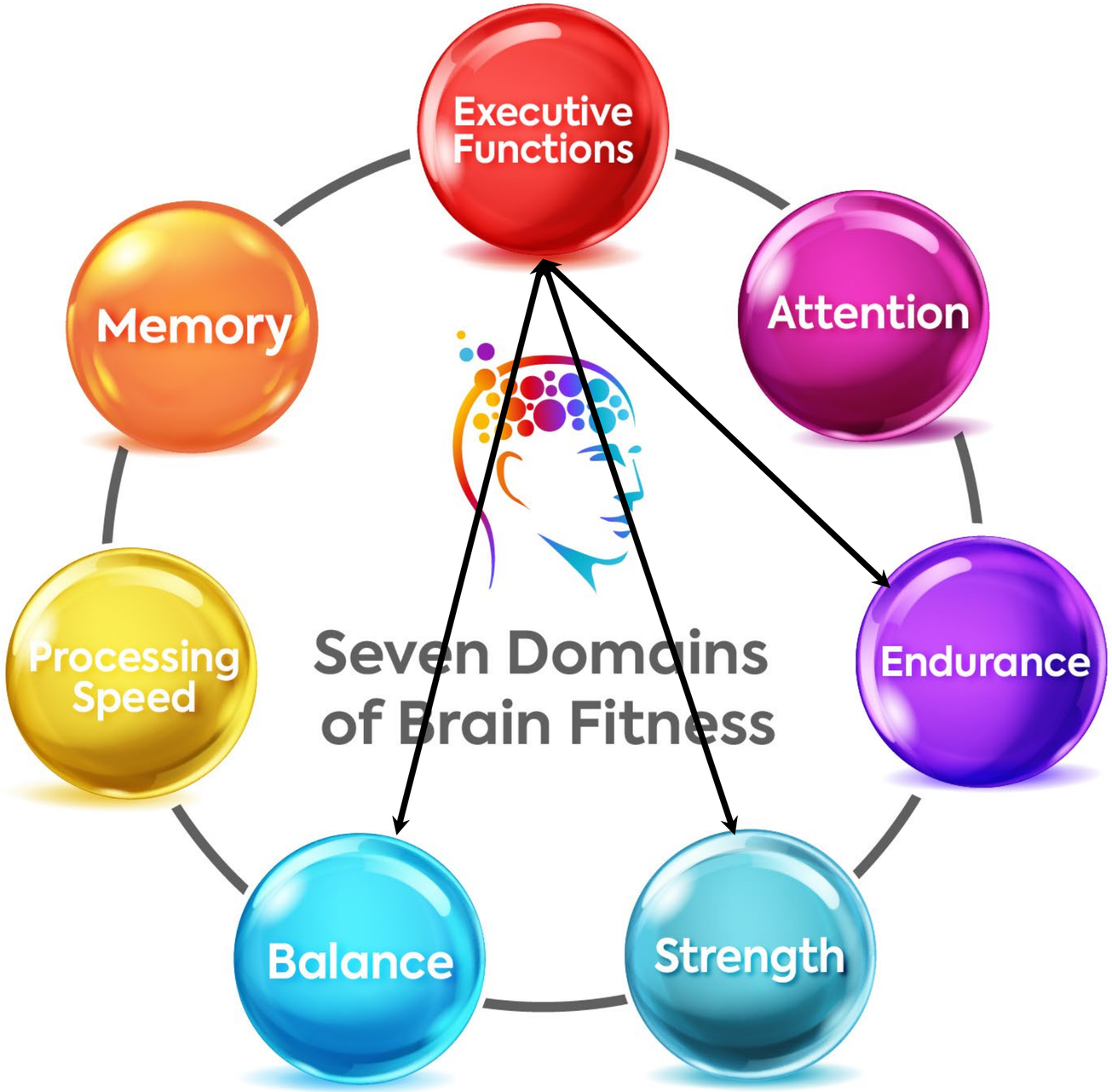
PRACTICE – Brain Booster

Physical

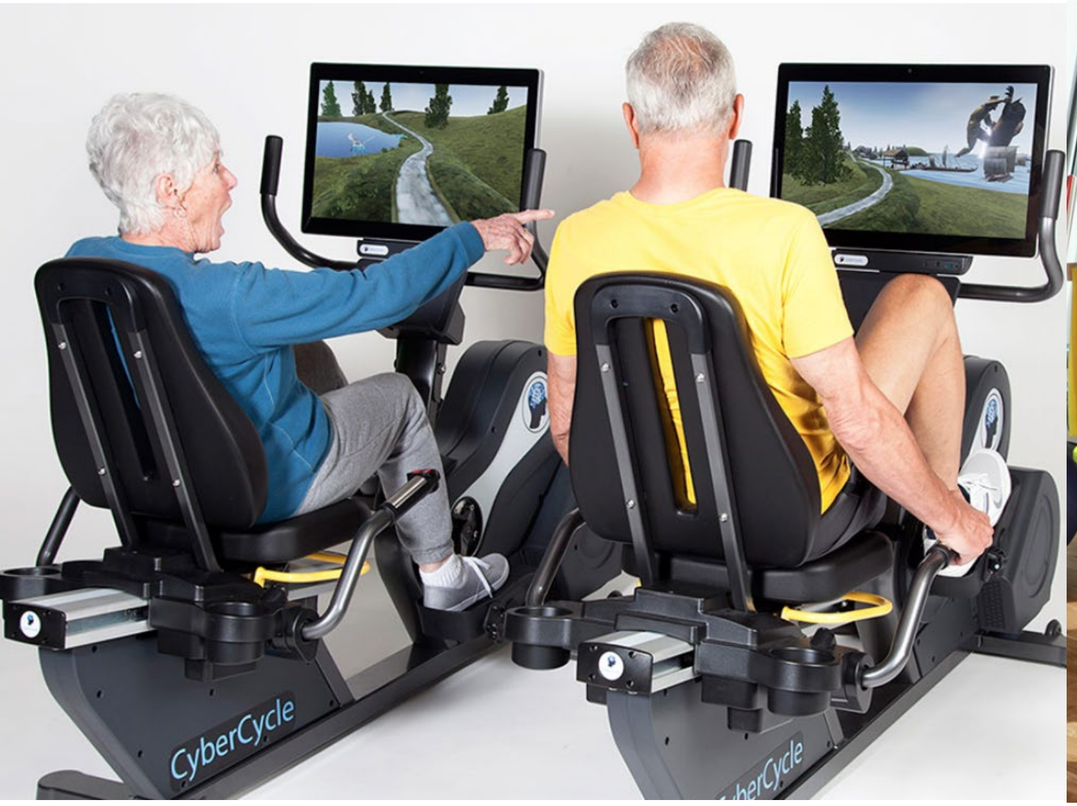
- March
- Squat
- Lunge
- Step-Up/Over
- Balance
- Shuffle
- Turn

Cognitive

- Spell
- Math Equations
- Recall/Remember
- Answer
- Respond to Cues/Commands:
  - Verbal
  - Visual
  - Auditory


Executive Functions
Attention
Endurance
Strength
Balance
Processing Speed
Memory
Seven Domains of Brain Fitness

Marbles Technology Partners




TIME TO
THINK & MOVE
BLUE
TIME FOR
GAME PLAY
LETS GET
WARMED UP
THE BRAIN GYM


TIME TO
THINK & MOVE
BLUE

Programming Principles

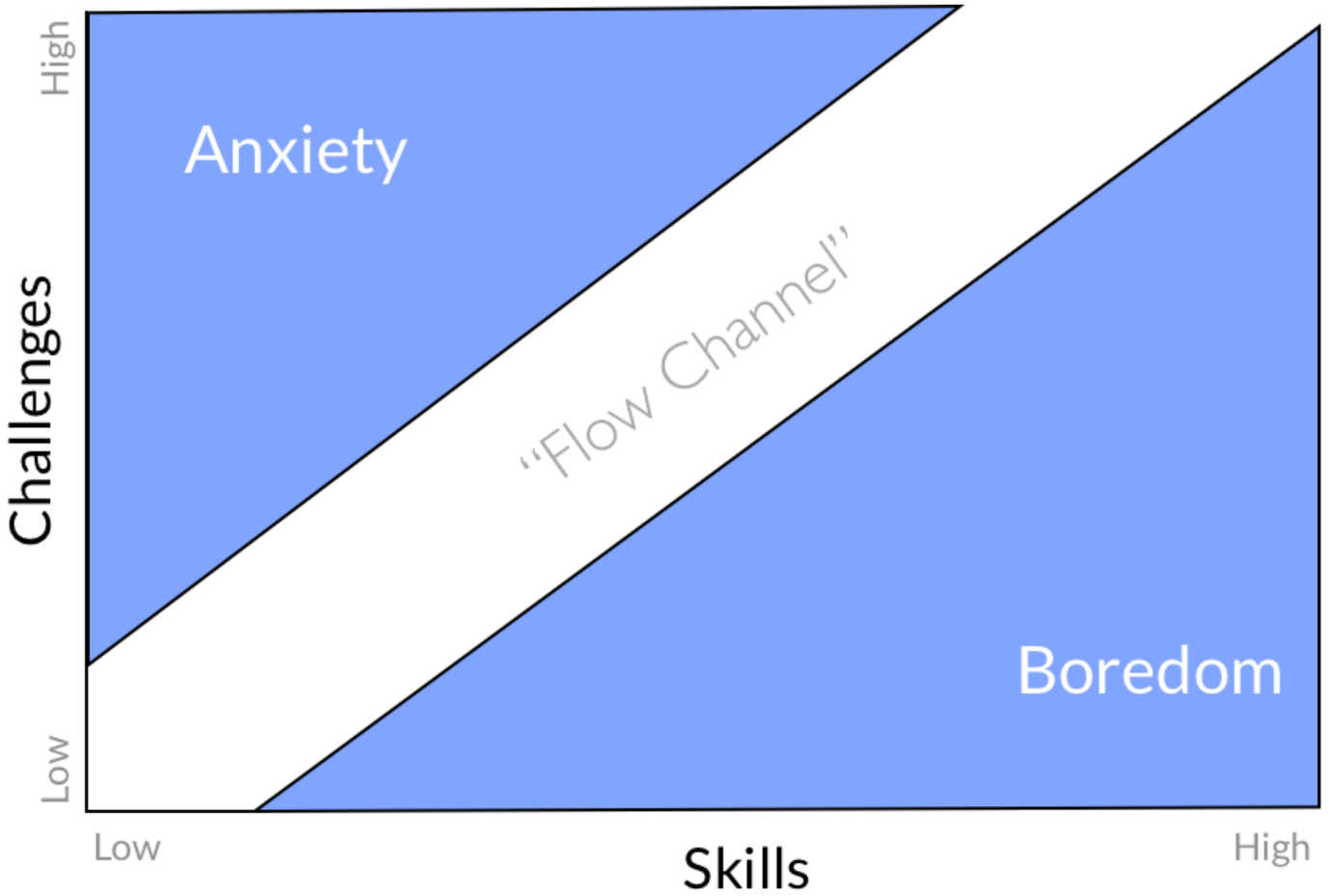
Intensity

Novelty vs. Mastery

Variability

Frequency

Activity is Challenging but Doable and Enjoyable



Physical AND Cognitive

Initial Client Evaluation and Programming

Cognitive Screen

Physical Screen

Dual-Task Screen (optional)

	PHYSICAL				
COGNITIVE	LEVEL	VERY LOW	LOW	AVERAGE	HIGH
	VERY LOW				
	LOW		LL	LA	LH
	AVERAGE		AL	AA	AH
	HIGH		HL	HA	HH

Novelty

…helps to expedite procedural memory formation

…causes us to pay greater attention, elevating our interest and engagement

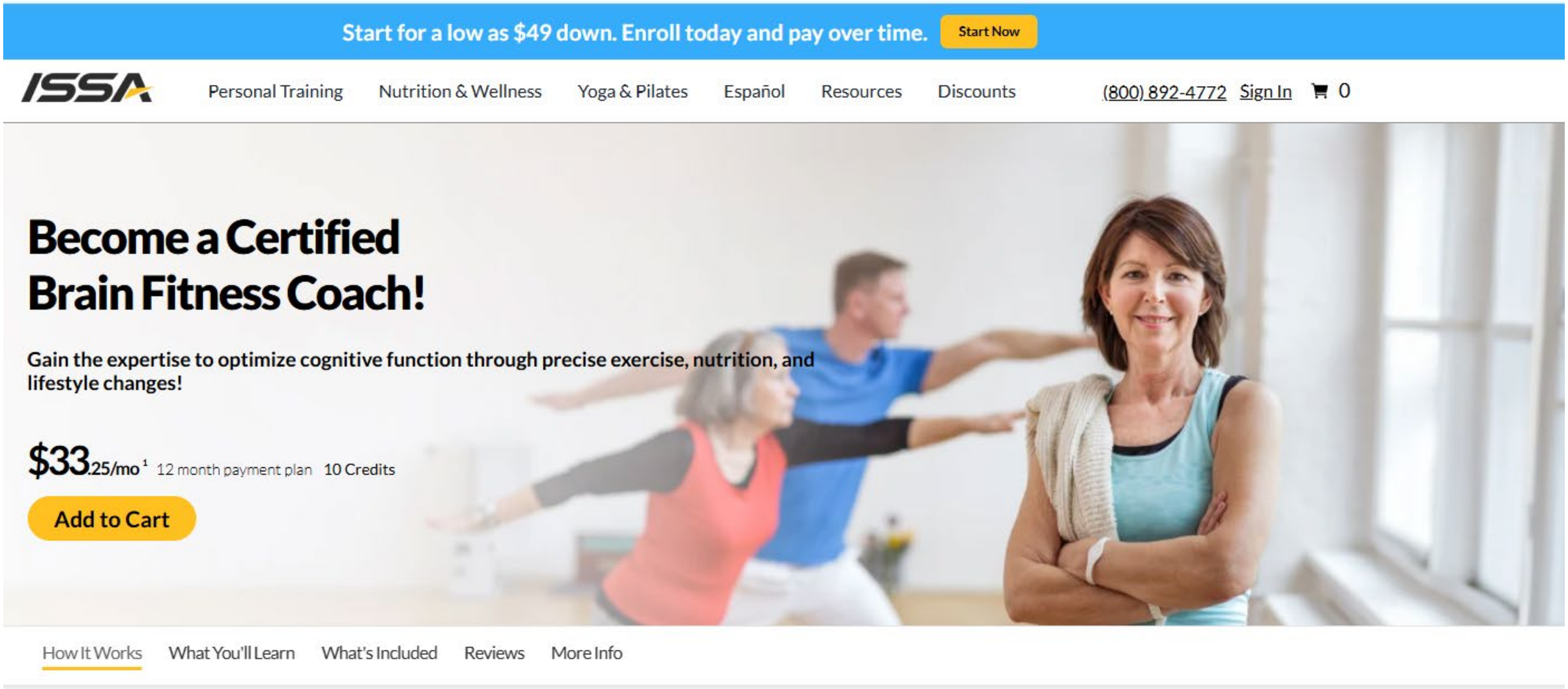
…stimulates reward systems when successful in novel tasks


LINE DANCE
TUTORIAL
COTTON EYE JOE

Next Steps

- Begin implementing simple dual-task activities in your 1-1, small group and large group training
- Become better educated in dual-task principles and strategies
- Become certified in Brain Fitness
- Open a “brain gym”

Issaonline.com/certification/brain-fitness-coach



OPEN A “BRAIN GYM”

MARBLES

BRAIN BODY FITNESS

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