



July 2020 Educational Meeting

Cognition

Claire McLean PT, DPT

Board Certified Neurologic Clinical Specialist

Outline

- Background and overview of what cognition is, and how it can be affected by Parkinson's
- Which healthcare professionals can be helpful
- What treatments are helpful
- Questions and Discussion

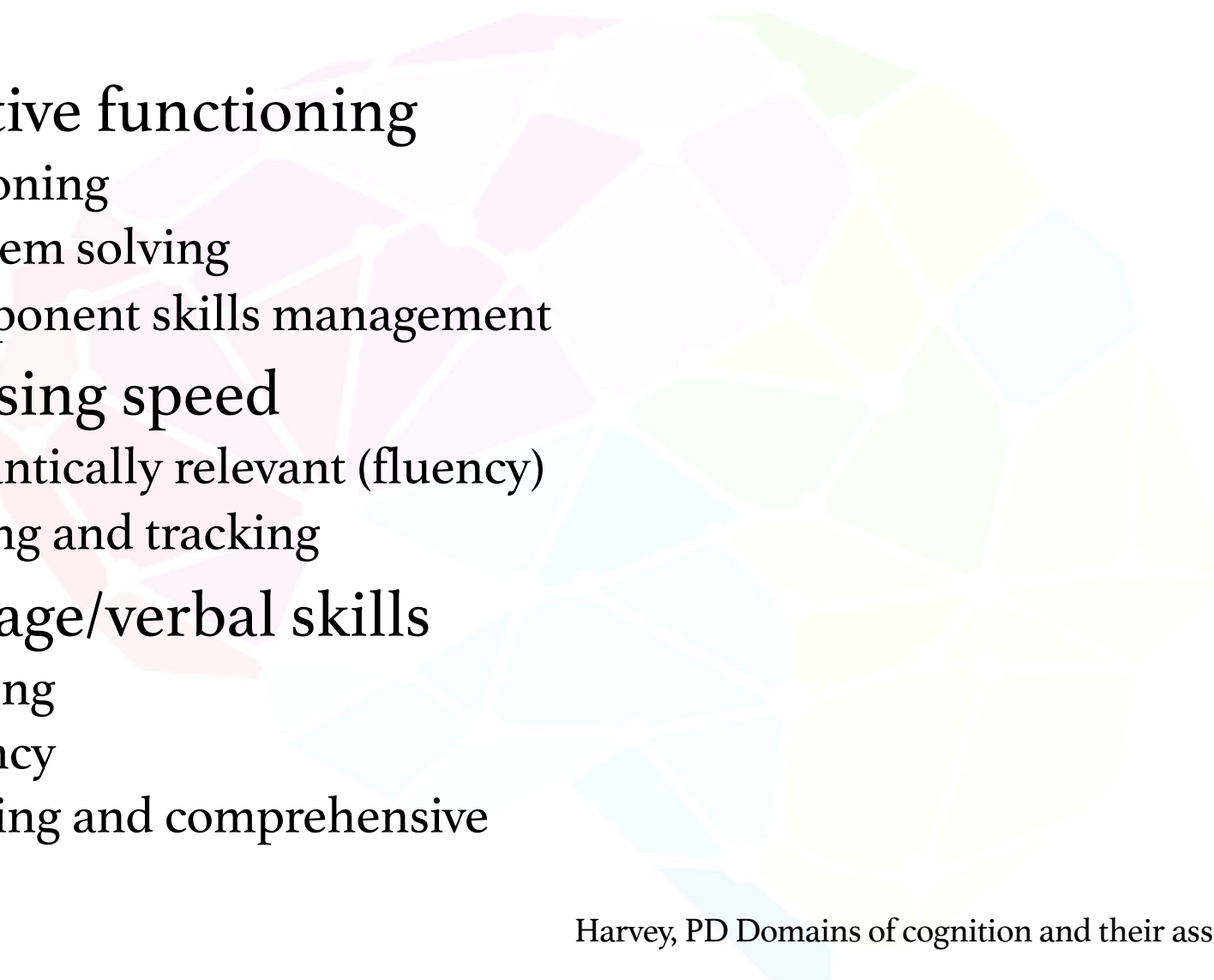
Cognition – what is it??

- Sensation (Multisensory)
- Perception (Object recognition, Organizational strategies)
- Motor Skills and Construction (Copying, Drawing, Other praxic skills)
- Attention and concentration (Selective attention, Sustained attention/vigilance)
- TBD...



- Memory

- Working memory (Verbal, Spatial, Object, Location)
- Working memory components (Central executive, Maintenance, Manipulation)
- Episodic/declarative memory
 - Verbal
 - Nonverbal
 - Encoding
 - Storage
 - Retrieval
 - Free recall
 - Cued recall
 - Forced-choice recognition
- Procedural memory
- Semantic memory
- Prospective memory
 - Time-based
 - Event-based

- 
- **Executive functioning**
 - Reasoning
 - Problem solving
 - Component skills management
 - **Processing speed**
 - Semantically relevant (fluency)
 - Coding and tracking
 - **Language/verbal skills**
 - Naming
 - Fluency
 - Reading and comprehensive

Can we simplify these categories and make them relevant for real life?

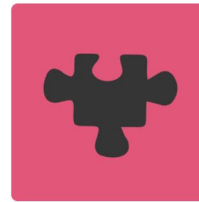
- Attention
- Brain Speed
- Memory
- People Skills
- Navigation
- Intelligence



Attention



Brain Speed



Memory



People Skills



Intelligence



Navigation

While we have organized the exercises into these categories, the truth is that many of them overlap. For example, an important component of creating strong memories that are easy to remember over time is attention. When your brain is able to pay attention to the nuances of what you see and hear, you create a clearer, more detailed memory. Brain speed is equally important: your brain has to be fast enough to keep up with all the details coming in to record them clearly instead of hazily. So if you want to remember better, the Memory category is a great place to start—but you'll also likely benefit from exercises in the Attention, Brain Speed, and other categories.

Definitions for Cognitive Impairment

- **Subjective Cognitive Decline (SCD):** Cognitive Impairments are noted by the PWP, family members or health personnel, but cognitive test performance is in the normal range.
- **Mild Cognitive Impairment:** Problems with memory, language, thinking and judgement that are greater than normal age-related changes
- **Dementia:** an overall term for diseases and conditions characterized by a decline in memory, language, problem-solving and other thinking skills that affects a person's ability to perform everyday activities.



[Brain Pathol.](#) Author manuscript; available in PMC 2011 May 1.

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PMCID: PMC3049172

NIHMSID: NIHMS188149

PMID: [20522089](https://pubmed.ncbi.nlm.nih.gov/20522089/)

Profile of Cognitive Impairment in Parkinson Disease

[G. Stennis Watson](#)^{3,5} and [James B. Leverenz](#)^{1,2,4,5}

Journal List > HHS Author Manuscripts > PMC5643027

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[Nat Rev Neurol.](#) Author manuscript; available in PMC 2018 Apr 1.

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PMCID: PMC5643027

NIHMSID: NIHMS879316

PMID: [28257128](https://pubmed.ncbi.nlm.nih.gov/28257128/)

Cognitive decline in Parkinson disease

[Dag Aarsland](#)^{1,2} [Byron Creese](#)^{1,3} [Marios Politis](#)^{1,4} [K. Ray Chaudhuri](#)^{1,5} [Dominic H. ffytche](#)^{1,2} [Daniel Weintraub](#)^{1,6,7}
and [Clive Ballard](#)^{1,3}

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Some Stats – why does this matter?

- Cognitive Impairment (CI) in PWP has been associated with nursing home placement, mortality, and increased caregiver burden.
- PD with Dementia (PDD) has a cross-sectional prevalence of approximately 30% and life-long risk up to 80%.
- Mild CI is also common at the time of PD diagnosis. A study reported that 19% of their untreated PD patients CI at the time of diagnosis.
- Data shows sizeable proportion of PWP fall within the Mild CI group, the period of time someone lives with Dementia may be quite protracted.

More Stats

- Cognitive decline is among the most common and important non-motor symptom (NMS)
- PWP exhibit more rapid decline in a number of cognitive domains compared to age matched controls
 - Executive
 - Attentional
 - Visuospatial
 - Memory
- The full spectrum of cognitive abilities can be observed in PWP, from normal cognition through early mild subjective and objective decline (MCI), to mild, moderate and even severe dementia.

Aarsland et al Cognitive Decline in Parkinson disease 2017

Executive Function

- Executive functions are a set of processes that are necessary for the cognitive control of behavior: selecting and successfully monitoring behaviors that facilitate the attainment of chosen goals.
- Executive functions include basic cognitive processes such as attentional control, cognitive inhibition, inhibitory control, working memory, and cognitive flexibility.
- Higher order executive functions require the simultaneous use of multiple basic executive functions and include planning and fluid intelligence (e.g. reasoning and problem solving).

Why is this happening?

Box 1 | Mechanisms of cognitive decline

The following mechanisms are proposed to contribute to cognitive decline in Parkinson disease:

- Protein misfolding (α -synuclein, amyloid and tau)
- Neurotransmitter activity
- Synaptic dysfunction and loss
- Neuroinflammation and diabetes
- Mitochondrial dysfunction and retrograde signalling
- Microglial and astroglial changes
- Genetics
- Epigenetics
- Adenosine receptor activation
- Cerebral network disruption

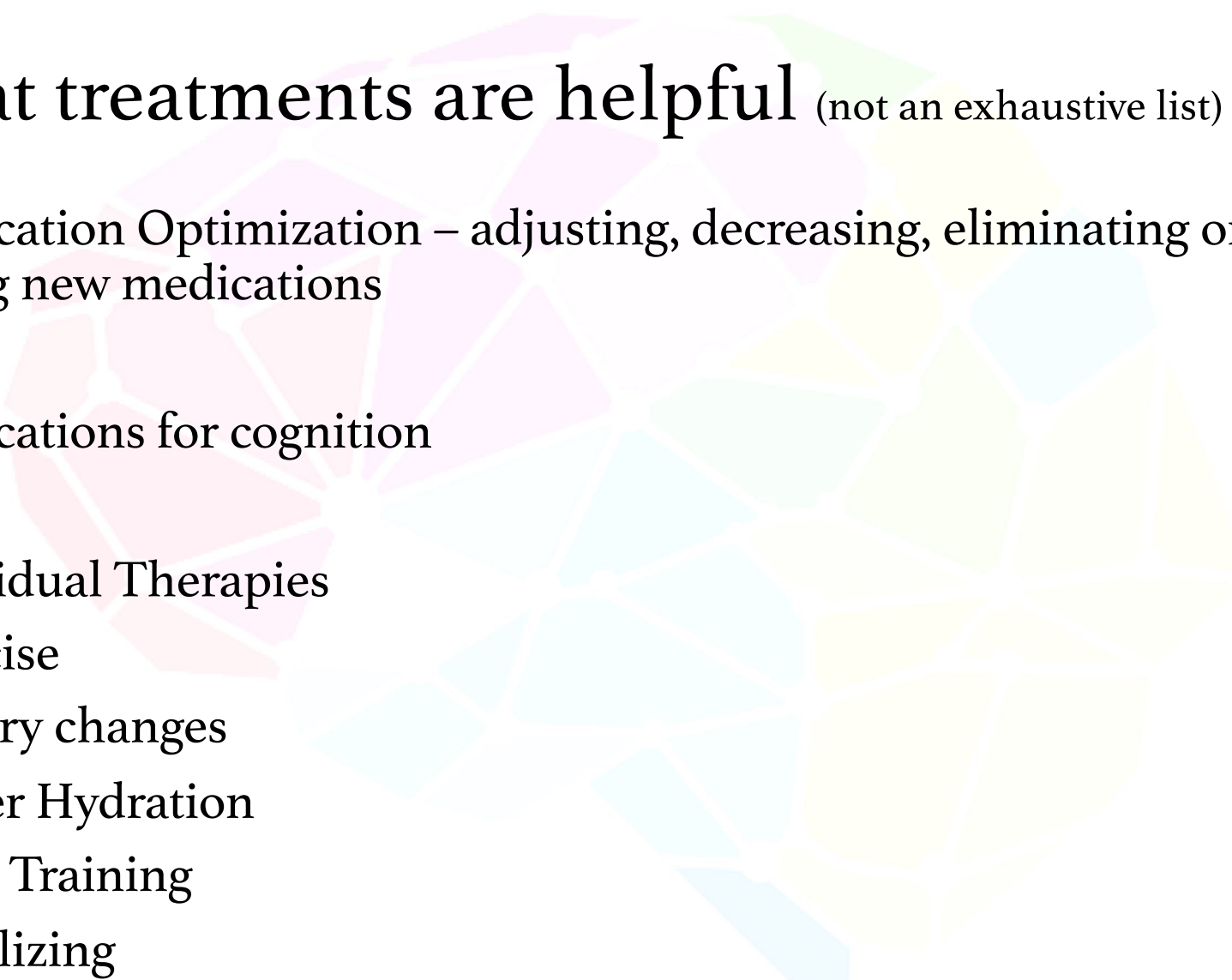
How to know if you have cognitive impairment?

- Self-Assessment
- Discussion with family/friends
- Brief Screening Tests i.e. Montreal Cognitive Assessment (MOCA)
- Neuropsychological Testing
 - Takes a few hours
 - Comprehensive
 - Comparison to age norms
- Do this testing before you need it! It will be better to compare to yourself over time

Which healthcare professionals are good resources?

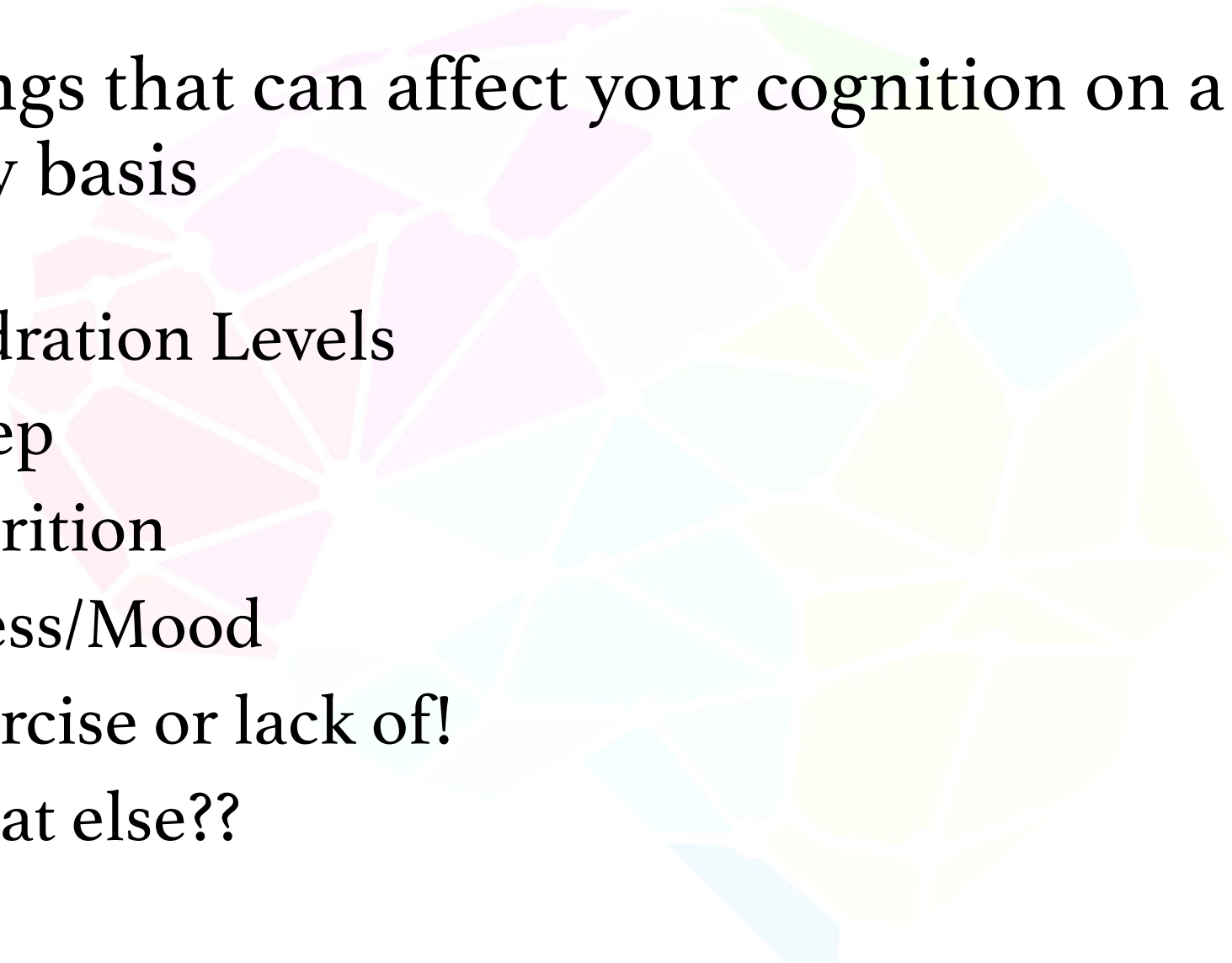
- Neurologist
- Geriatrician/PCP/Another Physician who will look at the big picture
- Neuropsychologist
- Speech Therapist
- Occupational Therapist
- Physical Therapist
- Psychologist/Counselor
- Dietician/Nutritionist
- Others??

What treatments are helpful (not an exhaustive list)

- Medication Optimization – adjusting, decreasing, eliminating or trying new medications
 - Medications for cognition
 - Individual Therapies
 - Exercise
 - Dietary changes
 - Proper Hydration
 - Brain Training
 - Socializing
- 

Things that can affect your cognition on a daily basis

- Hydration Levels
- Sleep
- Nutrition
- Stress/Mood
- Exercise or lack of!
- What else??



Medication Optimization

- Do a medication assessment, what are you on?
- Ask ALL your doctors if any of your medications can cause cognitive side effects
- Read Side Effects!
- What about interactions of medications?
- What if it has to do with your Parkinson's Medication?

Medications that have been shown to affect cognition

- Psychotropic drugs:
 - Amitriptyline, benzodiazepines, topiramate, paracetamol, quetiapine, levetiracetam, benzamides, carbamazepine, fluoxetine, gabapentin, lamotrigine, levetiracetam, mirtazapine, olanzapine, opioids, risperidone, sertraline, trazadone, valproic acid
- Non-psychotropic drugs
 - Amlodipine, calcium-channel blockers, diabetes drugs, iron, proton-pump inhibitors, sulfonamides, nifedipine, anticholinergics, beta-blockers, contact laxatives, corticosteroids, first-generation antihistamines, H₂-receptor-antagonists, insulin, osmotic laxatives, second generation antihistamines, stool softeners, sulfasalazine, sulfonamides, sulfonylureas, vitamin B₁

Medications for cognition

- Medications used to treat dementia in PWP have been for the most part based on FDA-approved treatments for Alzheimer's disease (AD), even though these are different diseases.
- Medications in this group include donepezil (Aricept), rivastigmine (Exelon), and galantamine (Razadyne). Memantine (Namenda) is another medication that has FDA-approval for AD but requires further study in PDD.
- To date, only rivastigmine (Exelon) is FDA-approved for the treatment of dementia in PWP.
- The cognitive effects of these medications in clinical research studies have been modest.
- At present, these medications have not been studied in PWP with MCI.

<https://www.apdaparkinson.org/what-is-parkinsons/symptoms/cognitive-changes/>

Individual Therapies

- Physical Therapy
 - Complex motor exercises, dual tasking, problem solving, aerobic exercise, cognitive training as it relates to walking/balance, etc. Safety awareness training.
- Occupational Therapy
 - Activities of daily living, fine motor, household/work tasks, fully implementing into real life! Cognitive training as it relates to daily activities, hobbies, etc.
- Speech Therapy
 - Speech practice, cognitive training as it relates to communication and more!

Exercise

RESEARCH ARTICLE

Effects of physical exercise programs on cognitive function in Parkinson's disease patients: A systematic review of randomized controlled trials of the last 10 years

Franciele Cascaes da Silva^{1*}, Rodrigo da Rosa Iop¹, Laiana Cândido de Oliveira¹, Alice Mathea Boll¹, José Gustavo Souza de Alvarenga², Paulo José Barbosa Gutierrez Filho², Lídia Mara Aguiar Bezerra de Melo², André Junqueira Xavier³, Rudney da Silva¹

1 University of State of Santa Catarina, Center for Health Sciences and Sports, Adapted Physical Activity Laboratory, Florianópolis, Santa Catarina, Brazil, **2** University of Brasilia, Faculty of Physical Education, Brasilia, Brazil, **3** University of Southern Santa Catarina, Medicine Course, Florianópolis, Santa Catarina, Brazil

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The Effect of Different Exercise Modes on Domain-Specific Cognitive Function in Patients Suffering from Parkinson's Disease: A Systematic Review of Randomized Controlled Trials

Cite

- Overall study quality was modest (mean 6 ± 2 , range 3–8/10). In 5 trials a significant between-group effect size (ES) was identified for tests of specific cognitive domains, including a positive effect of aerobic exercise on memory (ES=2.42) and executive function (ES=1.54), and of combined resistance and coordination exercise on global cognitive function (ES=1.54).
- Two trials found a significant ES for coordination exercise (ES=0.84–1.88), which led to improved executive function compared with that of non-exercising control subjects.
- Conclusion: All modes of exercise are associated with improved cognitive function in individuals with PD. Aerobic exercise tended to best improve memory; however, a clear effect of exercise mode was not identified.

The effects of exercise on cognition in Parkinson's disease: a systematic review

Danielle K Murray^{1*}, Matthew A Sacheli¹, Janice J Eng² and A Jon Stoessl¹

- Overall, this systematic review found that in animal models exercise results in behavioral and corresponding neurobiological changes in the basal ganglia related to cognition.
- The clinical studies showed that various types of exercise, including aerobic, resistance and dance can improve cognitive function, although the optimal type, amount, mechanisms, and duration of exercise are unclear.
- With growing support for exercise to improve not only motor symptoms, but also cognitive impairments in PD, health care providers and policy makers should recommend exercise as part of routine management and neurorehabilitation for this disorder.

Perspectives

Nature Reviews Neuroscience **9**, 58-65 (January 2008) | doi:10.1038/nrn2298

SCIENCE AND SOCIETY

Be smart, exercise your heart: exercise effects on brain and cognition

Charles H. Hillman¹, Kirk I. Erickson² & Arthur F. Kramer² [About the authors](#)

An emerging body of multidisciplinary literature has documented the beneficial influence of physical activity engendered through aerobic exercise on several aspects of brain function. Human and non-human animal studies have shown that aerobic exercise can improve a number of aspects of cognition and performance. Lack of physical activity, particularly among children in the developed world, is one of the major causes of obesity. Exercise might not only help to improve their

Exercise: An Active Route to Healthy Aging

Aerobic Exercise Training Increases Brain Volume in Aging Humans

Stanley J. Colcombe,¹ Kirk I. Erickson,¹ Paige E. Scalf,¹ Jenny S. Kim,¹ Ruchika Prasad,¹ Edward McAuley,² Steriani Elavsky,² David X. Marquez,² Liang Hu,² and Arthur F. Kramer²

¹Beckman Institute & Department of Psychology and ²Department of Kinesiology, University of Illinois, Urbana.

VIEWS & REVIEWS

Does vigorous exercise have a neuroprotective effect in Parkinson disease?



J. Eric Ahlskog, PhD,
MD

ABSTRACT

Parkinson disease (PD) is progressive, with dementia and medication-refractory motor problems com-

Trends in Neurosciences

Volume 30, Issue 9, September 2007, Pages 464–472



Review

Exercise builds brain health: key roles of growth factor cascades and inflammation

Carl W. Cotman , Nicole C. Berchtold, Lori-Ann Christie



Aerobic Exercise: Evidence for a Direct Brain Effect to Slow Parkinson Disease Progression

J. Eric Ahlskog, PhD, MD

ARTICLE HIGHLIGHTS

- Parkinson disease is a slowly progressive neurodegenerative condition; after many years, dementia or medication-refractory motor symptoms may develop.
- A myriad of animal studies document a direct, favorable effect of aerobic-type exercise on the brain; this includes liberation of neurotrophic hormones and enhancement of a variety of neuroplasticity mechanisms. Exercise tends to protect animals from neurotoxins that induce parkinsonism.
- Long-term exercise and fitness in healthy humans is associated with greater volumes of cerebral cortex and hippocampus and less age-related white matter pathology.
- Midlife exercise is associated with a significantly reduced later risk of Parkinson disease.
- Conclusion from this evidence: Regular aerobic-type exercise tending to lead to fitness is the single strategy with compelling evidence for slowing Parkinson disease progression. All patients with Parkinson disease should be encouraged to engage in regular such exercise.

POTENTIAL MOTOR/NONMOTOR TARGETS OF AEROBIC EXERCISE IN GENERAL!


- Prevention of cardiovascular complications
- Arrest of osteoporosis
- Improved cognitive function
- Prevention of depression
- Improved sleep
- Decreased constipation
- Decreased fatigue
- Improved functional motor performance
- Improved drug efficacy
- Optimization of the dopaminergic system

Speelman, AD *et al.* *Nature Reviews Clinical Neurology* 7, 528-534 (September 2011)

NutritionFacts.org

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4.7 (93.94%) 165 votes

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4.7 (94.16%) 157 votes

Diet/Nutrition

Research on Diet & Nutrition

- There is not a lot of research about diet and cognition, because it is a very complex topic and it is difficult to research!
- I would recommend these 2 books related to nutrition and brain health (not specific to Parkinson's).
 - "Power foods for the brain" by Neal D. Barnard MD
 - "The Alzheimer's Solution" by Dean and Ayesha Sherzai MD **I totally understand that Alzheimer's is a different diagnosis, but their program is specifically for cognition, and not only relevant for a certain diagnosis.
- There is research showing dietary patterns and how they influence PD progression, which likely will influence cognition over time as well.

Complementary & Alternative Medicine Care in Parkinson's Disease (CAM Care in PD)

Complementary & Alternative Medicine Care in Parkinson's Disease (CAM Care in PD)

Project Overview

Parkinson's Disease is often said to be an incurable, progressive, and degenerative disease. It is our hypothesis that some of you do not, or will not, have a progressive disease. The goal of this PD study is to collect as much data as possible over a five-year period with the hope of finding dietary and lifestyle factors associated with a slower disease progression.

TO
PARTICIPATE

First:

[Download and read the](#)


Articles


Dietary antioxidants associated with slower progression of parkinsonian signs in older adults

Puja Agarwal  , Yamin Wang, Aron S. Buchman, Thomas M. Holland, David A. Bennett & Martha C. Morris

Published online: 22 May 2020

 Download citation

 <https://doi.org/10.1080/1028415X.2020.1769411>

 Check for updates

Research Article

Role of Diet and Nutritional Supplements in Parkinson's Disease Progression

Laurie K. Mischley,¹ Richard C. Lau,² and Rachel D. Bennett¹

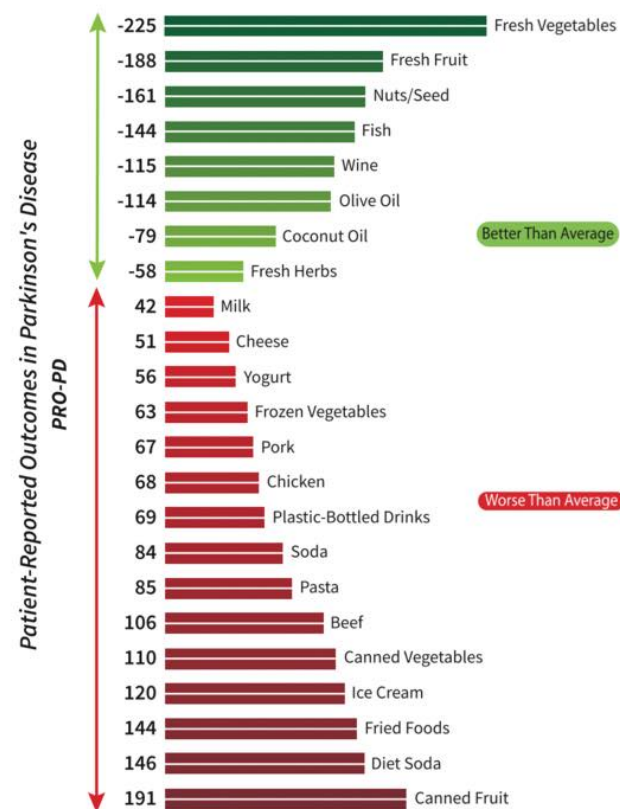
¹Bastyr University Research Institute, 14500 Juanita Dr. NE, Kenmore, WA 98028, USA

²Oregon State University, 101 Milam Hall, Corvallis, OR 97331, USA

Good: Fresh Vegetables, Fresh Fruit, Nuts/Seeds, Non-fried Fish, Wine, Olive Oil, Coconut Oil, Fresh Herbs

Bad: Canned Fruit, Diet Soda, Fried Foods, Ice Cream, Canned Vegetables, Beef, Pasta, Soda, Plastic-Bottle Drinks, Chicken, Pork, Frozen Vegetables, Yogurt, Cheese, Milk

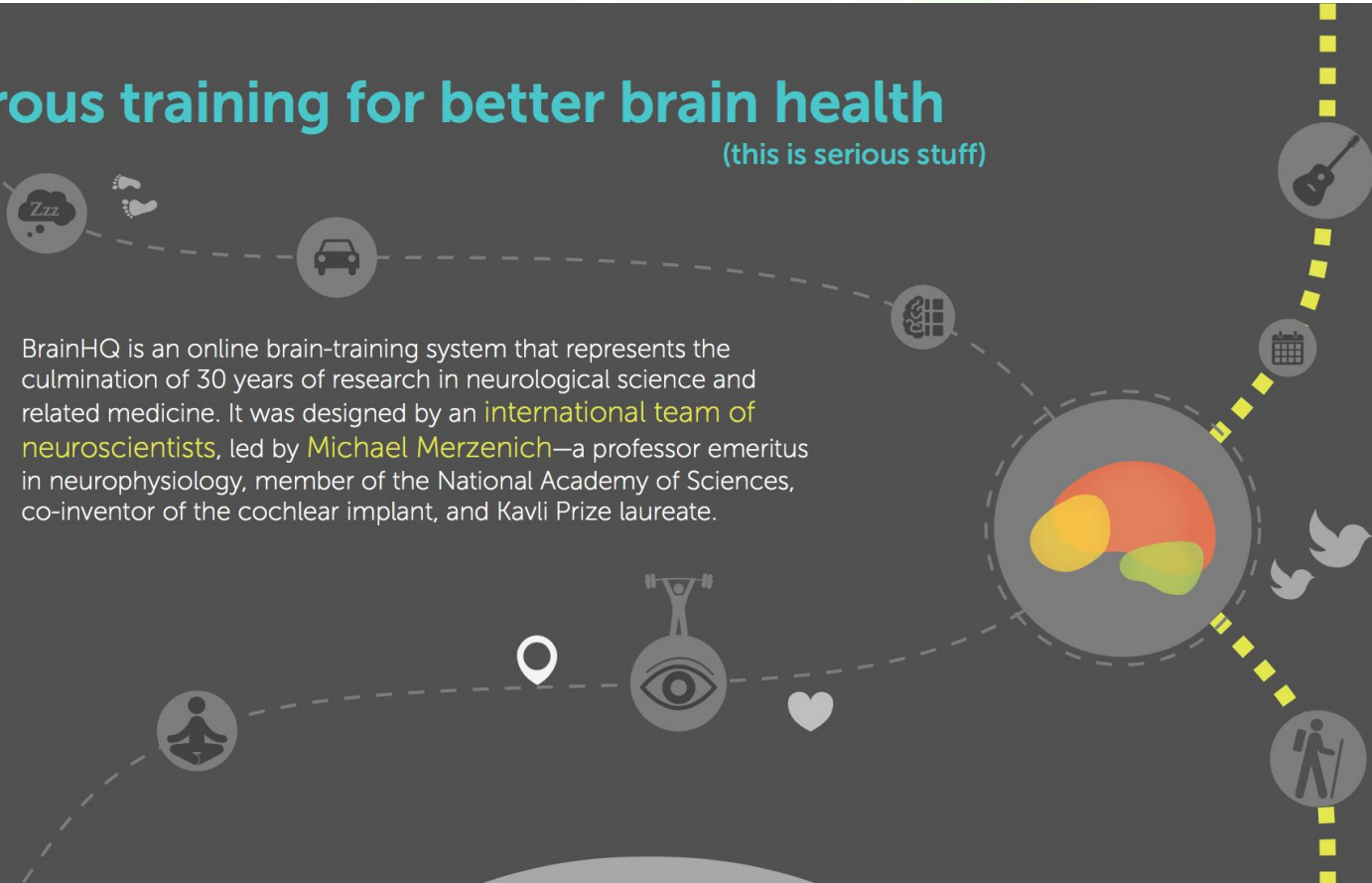
Impact of 2-4 Servings Per Week on Symptom Severity



Rigorous training for better brain health

(this is serious stuff)

BrainHQ is an online brain-training system that represents the culmination of 30 years of research in neurological science and related medicine. It was designed by an **international team of neuroscientists**, led by **Michael Merzenich**—a professor emeritus in neurophysiology, member of the National Academy of Sciences, co-inventor of the cochlear implant, and Kavli Prize laureate.



A collage of four images illustrating cognitive training activities. The top image shows a man with curly hair meditating in a lotus position with his hands in a mudra. The middle-left image shows a woman smiling in a hot tub. The middle-right image shows a woman driving a car. The bottom image shows a woman in a classroom setting, possibly a teacher or student.

Cognitive training that's tailored to you

(since no two brains are the same)

Changing your brain takes some work—so while the [BrainHQ exercises](#) are sometimes fun, they can also be difficult. But they always give a useful, meaningful workout to your unique brain. Using a special algorithm, each exercise adapts in difficulty as you work so that you always train at the optimum level for you—where you are most likely to make cognitive improvements.

The cognitive benefits are proven

More than 100 published scientific papers show the benefits of BrainHQ exercises and assessments. Most of these were independently conducted by scientists at respected universities, such as the University of California, Stanford, and Johns Hopkins. Click any benefit below to learn more about related studies.

 **more self-confidence**

10 +++
years
in memory

38% fewer
dangerous driving moves 

reversal
of age-related
slowing 

less likely to develop
depressive
symptoms 

\$ **lower**
\$ **medical**
\$ **costs**

better
self-rated
health 

better
hearing in
noisy
places 

 **faster**
neural timing

protection against health decline

 **better** mood

improved
"locus of control"

 **63%**
improvement in
useful field of view

87% improve
cognitive
function

48%
fewer
at fault
car crashes 

2X faster visual 
processing speed

improved
visual AND
spatial
attention

more
happy
days 

135% faster auditory
processing

 **increased brain**
activation



100+ Published Research Studies

All brain training is not created equally. BrainHQ sets the gold standard. Simply put, no other brain-training program comes close to BrainHQ's level of scientific proof. Our exercises and assessments have been rigorously tested and scientifically proven to be beneficial in more than 100 independent, peer-reviewed research papers published in scientific journals—and many more studies are underway. BrainHQ has been shown to bring substantial improvements in each of these categories:

PARKINSON'S DISEASE

- Chou KL, Cronin-Golomb A. Feeling the need...the need for speed (of processing training) in Parkinson disease. *Neurology*. 2013 Oct 8;81(15):1278-9.
[View abstract](#)
- Classen S, McCarthy DP et al. Useful field of view as a reliable screening measure of driving performance in people with Parkinson's disease: Results of a pilot study. *Traffic Injury Prevention*. 2009; 10(6): 593-98.
[View abstract](#)
- Edwards JD, Hauser RA et al. Randomized trial of cognitive speed of processing training in Parkinson disease. *Neurology*. 2013 Oct 8;81(15):1284-90.
[View article](#)





Breaking News: More Brain Training is Better in Parkinson's Patients

A recent study has found that when it comes to Parkinson's patients, how much brain training the average person does directly relates to results. The study is a follow-on to an earlier study that found that Parkinson's patients could improve their "Useful Field of View" (UFOV)—an important measure of processing speed—by training on five exercises currently available in BrainHQ. The new study shows that more training is better: each hour of training resulted in faster processing on the UFOV assessment. The study also showed that gains persisted over six months.

For more information, see the [press release](#) or the [study text](#).


"This is the first evidence that **more is better** when it comes to training people living with Parkinson's, as well as the first evidence in this population that these changes persist."

- Henry Mahncke, PhD
CEO of Posit Science




More is Better!

- Over the course of 6 months:
- “The researchers found that each hour of training, on average, resulted in a 3.53 millisecond improvement in the UFOV (useful field of vision) assessment, such that 20 hours of training to lead to an average gain of 72.6 milliseconds faster performance on the UFOV assessment. Other studies have shown that healthy older adults decline at a rate of 15.6 milliseconds per year in the UFOV assessment, as they age.”



MILD COGNITIVE IMPAIRMENT (MCI)

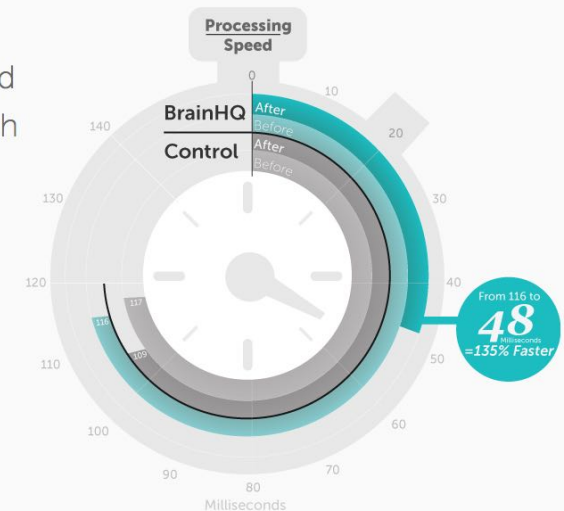
- Barnes DE, Yaffe K et al. Computer-based cognitive training for mild cognitive impairment: Results from a pilot randomized, controlled trial. *Alzheimer Disease and Associated Disorders*. 2009 Jul-Sep;23(3):205-10.
[View article](#)
 - Gooding AL, Choi J, Fiszdon JM, et al. Comparing three methods of computerised cognitive training for older adults with subclinical cognitive decline. *Neuropsychological rehabilitation*. 2015:1-12.
[View abstract](#)
 - Li H, Li J et al. Cognitive intervention for persons with mild cognitive impairment: A meta-analysis. *Ageing Research Reviews*. 2011 Apr;10(2):285-96.
[View abstract](#)
 - Rosen AC, Sugiura L et al. Cognitive training changes hippocampal function in mild cognitive impairment: A pilot study. *Journal of Alzheimer's Disease*. 2011;26 Suppl 3:349-57.
[View article](#)
 - Styliadis C, Kartsidis P et al. Neuroplastic effects of combined computerized physical and cognitive training in elderly individuals at risk for dementia: An eLORETA controlled study on resting states. *Neural Plasticity*. 2015;2015 Article ID 172192.
[View article](#)
-
- 

Processing Speed

Many of the BrainHQ exercises are designed to increase processing speed—how quickly (and accurately) the brain can process information coming in from vision and hearing. To date, 20 scientific papers have shown faster processing after training with BrainHQ exercises. This includes [the ACTIVE study](#), one of the largest and most respected studies ever conducted on brain training in adults. Among other things, individual studies have shown:

- An average **increase in auditory processing speed of 135%**
- **A doubling, on average, in visual processing speed**, with some benefit of training still evident at 5- and 10-year follow-ups
- A partial **reversal of age-related neural slowing** and an improvement in temporal precision, as measured through brain imaging

[Learn more >](#)



Memory

Seventeen scientific papers have measured memory performance in people before and after using BrainHQ exercises. Among other things, researchers have shown:

- An average improvement of **10 years** in memory
- **“Generalization”** beyond trained tasks to standard memory tests
- **Increased activity** in areas of the brain associated with memory

[Learn more >](#)





Attention

The ability to appropriately focus your attention is very important to feeling sharp. Not only do you have to pay close attention to what matters to you; it's equally important to be able to filter out the distractions. Seven published papers have shown that training with BrainHQ exercises can hone attentional focus including:

- Significantly changing brain behavior in ways that improve selective **visual attention**
- Improving **spatial attention**

[Learn more >](#)



Vision and Hearing

Many people think vision depends on the eyes, and hearing on the ears. That 's only partly true. The brain is responsible for processing what they eyes and ears take in. Training with BrainHQ exercises has been shown to:

- Improve the ability to **hear in noisy or crowded places**
- Enhance **accuracy and attention** in vision and hearing
- **Speed up neural timing** and improve the function of multiple sensory processing areas in the brain

[Learn more >](#)



Physical Brain Change

Training to improve performance is a good thing, but does it actually change the brain? In seventeen imaging studies (including fMRI and EEG), researchers have measured changes in the brain itself after training with BrainHQ. Among other things, they have shown that BrainHQ training can:

- **Speed up neural responses** to speech and other sensory information
- **Increase white matter** in the attention network of the brain
- **Increase activation** in brain areas associated with attention

[Learn more >](#)



Everyday Cognition

A common question is: Does BrainHQ brain training make things easier or better in everyday life, or does it just “teach to the test”? In addition to improvements in memory and other key skills, BrainHQ training has now been shown in 18 published research papers to help people perform activities of daily living more efficiently and accurately. Among other things, studies have shown:

- People **perform better on tests** of “instrumental activities of daily living” – they can do tasks (such as handling money and medications) more quickly after training than before.
- People **feel more capable** in daily activities—things like remembering a shopping list, hearing better in crowded places, and more.

[Learn more >](#)

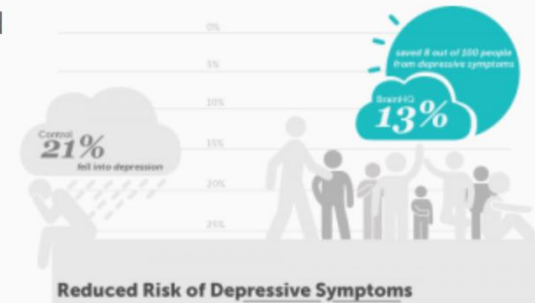


Mood and Control

Six research papers have examined the effects of using a BrainHQ exercise on mood and control. These have shown that people who used that exercise:

- Felt **more confidence** and **greater control** over their lives
- Were **less likely** to experience the onset of or an increase in depressive symptoms

[Learn more >](#)



Medical Costs

To date, two studies have demonstrated that using exercises in BrainHQ can reduce average health care expenditures. The larger of the two, based on [the ACTIVE study](#) data, showed that using BrainHQ significantly reduced healthcare costs one year post-training. Costs continued to be lower 5 years later.

[Learn more >](#)

Health

It might seem like a stretch, but better brain fitness may, in some cases, actually lead to better health. Several studies have shown that using BrainHQ exercises can help protect health over time:

- Two papers have shown that people who used a BrainHQ exercise were **protected against declines** in health-related quality of life two and five years later.
- One paper showed that people's **self-rated health was higher** among people who used BrainHQ's training as opposed to memory or reasoning training not from BrainHQ.

[Learn more >](#)



Balance and Fall Risk

Did you know that when you fall or have another mobility issue, the fault is as much your brain's as your body's? That's because balance relies on multiple cognitive and sensory systems, including the visual-spatial and visual-motor systems. BrainHQ's visual training exercises are designed to improve these systems. To date, five studies have been one on fall risk and mobility using BrainHQ exercises and assessments. These have shown that:

- Poor performance on a BrainHQ exercise correlates to a higher number of collisions and falls.
- Using a set of BrainHQ exercises for 20–30 hours resulted in significantly higher scores on measures of balance and gait.

[Learn more >](#)

Driving

Safe driving requires a lot of brainpower. 18 published papers have shown that BrainHQ exercises—particularly Double Decision—are great tools for assessing and improving driving safety. Among other things, these studies have shown that after training, drivers:

- Make **38% fewer** dangerous driving maneuvers
- Can **stop 22 feet sooner** when driving 55 miles per hour
- Feel **more confident** driving in difficult conditions (at night, in bad weather, in new places)
- **Cut their at-fault crash risk** by 48%

[Learn more >](#)

Safer Driving



Ready to start?

- www.BrainHQ.com
- Training with friends helps a lot. Share the challenge with others! Organize a time/place to get together once a week and you will likely experience more success!

References

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Reversal of cognitive decline: A novel therapeutic program

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What does that program look like?

- Optimize diet – minimize processed foods, increase whole foods, especially plant based foods
- Enhance autophagy – Fast 12 hours each night, including 3 hours prior to bedtime
- Reduce Stress – personalized: meditation, music, yoga, etc
- Optimize Sleep – 8 hours per night
- Exercise 30-60 minutes/day 4-6 days/week
- Brain Stimulation – BrainHQ
- Lab values, homocysteine, B12, A1c levels, Hormone balance, GI health, supplements

Resources

- <https://www.parkinson.org/Understanding-Parkinsons/Symptoms/Non-Movement-Symptoms/Cognitive-Changes>
- There is even more to cover! This is all we will include for now 😊



Questions?

Discussion!



Thank you!!