

Train Your Brain: An Evidence Based and Holistic Approach to Optimal Brain Health

Dr. Rob Winningham
Western Oregon University



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Today's Presentation

- We will take a very holistic and interconnected approach, discussing a myriad of factors that affect cognition as we age (e.g., cognitive exercise, physical exercise, social support, and nutrition).
- We will discuss numerous and practical ways older adults can maintain their cognitive and social well-being.
- Bottom line is that numerous behavioral and lifestyle interventions seem to have a significant impact on the likelihood of developing dementia.

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A Holistic Approach

Besides age, what determines whether or not we have good memory abilities in older adulthood?

- Genetics (50%)
- Cognitive stimulation
- Meditation
- Other health conditions
- Stress
- Good sleep
- Social support and engagement
- Proper nutrition
- Adequate physical exercise
- Yoga
- Tai Chi

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Dementia Prevalence is Declining

- Matthews et al. (2013) reported in the journal *Lancet* that dementia rates among people 65 and older have plummeted by 25 percent over the past two decades, to 6.2 percent from 8.3 percent, a trend that researchers say is probably occurring across most developed countries. Why?

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Good News: Dementia Prevalence (or % of population with dementia) is Declining

- 2016 study:
- Overall dementia risk dropped from 20 cases of dementia for every 1,000 people in the early 1990s to less than 17 cases per 1,000 people.
- However, looking at figures for men and women separately, the most dramatic drops in incidence were among older men.

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Dementia Prevalence is Declining

- Possible reasons for the 25% reduction:
 - Controlling cardiovascular risk factors
 - Cholesterol
 - Blood pressure
 - Better education and possibly more cognitive stimulation
 - Greater awareness of the importance of physical exercise

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Computer Based Cognitive Stimulation Led to Significant Improvements

- Lee et al., (2013) published a paper in PLOS ONE describing the results of an 8 week (24 session) computer training intervention group relative to a waitlist control group. Significant improvements observed in:
 - Immediate memory
 - Attention
 - Visual spatial memory

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2013 Article in the Journal *Neurology*

- Wilson et al. found that people who participated in more mentally stimulating activities had a slower rate of decline in memory. Mental activity accounted for nearly **15 percent** of the difference in decline beyond what is explained by brain changes associated with dementia.

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A Multimodal Approach May Be Best

- Nishiguchi et al. (2015) reported that a 12-week program that combined physical and cognitive exercise yielded not only improvements in executive functioning performance (e.g., attention) but also led to more efficient brain activity (in the pre-frontal cortex) as measured by fMRI.

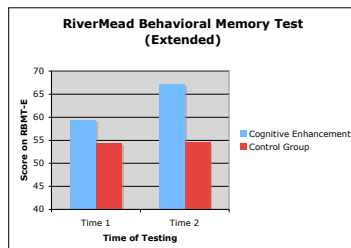
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More Empirical Evidence for Memory Enhancement

- Participants in 7 different communities were tested on many different memory and mental tests. Then 1/2 of the participants engaged in the cognitive enhancement program and the other 1/2 (the control group) did not. Three months later all participants were retested on the same tests. Changes over the three months were analyzed.

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Memory Ability Increased after Three Months of Cognitive Enhancement Training



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Empirical Evidence for Memory Enhancement

- “If older adults can maintain their cognitive ability, they will require less care and possibly delay or even eliminate the need to go to a nursing home. Cognitively stimulating activities may also postpone symptoms of dementia, which could also delay the need for more intensive care.”

Dr. Winingham, Journal of Mental Health and Aging

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Cognitive Stimulation

1	6			5				
				9	1	4		
		4		5	7	3		
			8	7	3			
2	5				9	7		
	8	9	5					
9	4	5		8				
5	7	1						
	2				8	6		

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Great Resources

- www.robwinningham.com
Click on “Crossword Puzzles Are Not As Good as Sudoku Puzzles...” to download mini-sudokus and get access to hundreds of 9 X 9 puzzles.

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Recommended Apps for Cognitive Stimulation

- Fit Brains
- Lumosity
- Tetris
- Sudoku2
- Memory Block
- Stroop Effect
- Visual Attention
- Brain Lab

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Recommended Apps for Cognitive Stimulation

- Word Search+
- Word Jigsaw
- Brain Challenge
- Words Chain Challenge
- Chain of Thought
- This is to That
- Watch That!

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Recommended Apps for Cognitive Stimulation

- Brain HQ
- Peak
- 1010!
- And, many others

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Apps for Cognitive Stimulation

Do you have other app ideas?

- Please post them on the website www.robwinningham.com
- Under the post titled “Apps for Cognitive Stimulation”
- You can also find much more information about our experience using iPads and even download a powerpoint file

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Exercise and Cognition

- Colcombe and Kramer (2003) reported the results of an 18-study meta-analysis on the effects of exercise on cognition.
- They found that, on average, exercise programs lead to a .5 standard deviation increase in cognitive abilities (e.g., I.Q. of 100 versus 108).

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Exercise and Cognition

- Kramer et al. (2001) found that participating in a six month walking program led to increased attention in 60-75 year old adults.
- Colcombe & Kramer (2003) found that executive functioning improved more than straight memory functioning.
- The ability to pay attention to relevant stimuli is correlated with cognitive ability in older adults. It appears that exercise affects this ability.

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Exercise and Cognition

- The ability to pay attention to relevant stimuli is correlated with cognitive ability in older adults. It appears that exercise affects this ability.
- Scarmeas et al., (2009) found that older adults (mean age 77 years) who were in the top third in terms of getting physical exercise were 61% less likely to get dementia.
- A mixture of aerobic and strength (or resistance) training is best.

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What type of exercise is best?

- Liu-Ambrose et al. (2010) reported that either once-a-week or twice-a-week resistance training sessions for 12 months led to improvements in older adults' cognition and attention.
 - 11% improvement for once-a-week
 - 13% improvement for twice-a-week

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What type of exercise is best?

- Nagamatsu et al. (2012) found that twice a week resistance training in 70 to 80 year old women, with Mild Cognitive Impairment, led to significant improvement in attention and memory ability.

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Tai Chi

- Wayne et al. (2014) combined data from 20 studies looking at the effects of Tai Chi on cognition and memory ability in older adults and concluded that Tai Chi has the potential to improve **executive functioning** (i.e., attention, memory, reasoning). Other researchers have shown executive functioning predicts ability to care for oneself and chance of falling.

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Tai Chi

- Zheng et al. (2015) conducted a meta-analysis based on 9 randomized controlled studies assessing the effects of Tai Chi.
- They concluded “could significantly improve the majority of outcomes of global cognitive ability, attention, learning and memory, language, emotion and perception, and execution in healthy adults.” (p. 94)

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Yoga can improve cognition

- Gothe and McAuley (2015) combined data from 15 studies assessing the effects of yoga on cognition. The improvements were significant.

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Why might Yoga help?

- Increased attention and focus
- Reduced stress
- Physical exercise (both resistance and aerobic)

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Nutrition and Cognition

- Fats
- Antioxidants

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“Good Fat”

- Omega-3 fatty acids or “good fat” has been linked to improved cognitive functioning in older adults.
- Fish, nuts, olive oil, canola oil, and green leafy vegetables are high in Omega-3 fatty lipids.

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Research

- Research has found a positive correlation between Omega-3 fatty acids levels (e.g., DHA) and cognitive functioning in older adults.
- Individuals with dementia often have lower levels of DHA than non-demented controls.
- The more fish people eat, the less likely they are to show signs of Alzheimer’s Disease.

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The American Journal of Clinical Nutrition (2009)

Albanese et al., (2009) studied 15,000 people in Latin America and Asia found that those who ate fish nearly every day were 20% less likely to get dementia as compared to those who ate it only a few times a week. Those that ate fish a few times per week were 20% less likely to get dementia than those who rarely ate fish.

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Research

- Recent research has also shown that fish oil tablets can decrease the number of depressive symptoms in people diagnosed with major depression. Some studies have found that fish oil tablets are as effective as modern antidepressants.

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Research

- The omega-3 fatty acids might reduce inflammation in the brain. Inflammation might be one of the causes of Alzheimer's disease.
- It also may be that myelination of the axon is affected by our dietary intake of fat.

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Antioxidants

- Over time, our brain cells experience wear and tear from various oxidants known as free radicals (as well as cell division).
- Our bodies use antioxidants to combat the effects of free radicals.

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The Top Antioxidant Fruits and Vegetables*

Food	Antioxidant Power**
• Prunes	5770
• Raisins	2830
• Blueberries	2400
• Blackberries	2040
• Cranberries	1750
• Strawberries	1540
• Spinach	1260
• Raspberries	1230
• Brussels Sprouts	980
• Plums	950

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The Top Antioxidant Fruits and Vegetables*

Food	Antioxidant Power**
• Broccoli Florets	890
• Beets	840
• Avocados	780
• Oranges	750
• Red Grapes	740
• Red Bell Peppers	710
• Cherries	670
• Kiwis	600

* - Based on Small (2002), p. 141-142
** - Oxygen Radical Absorbency Capacity (ORAC) per 3.5 ounces

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CRANIUM CRUNCHES WORKBOOK

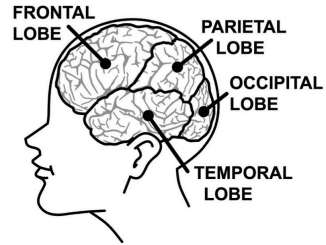
brain exercises to maximize memory ability

Brain Maps - Get to know your way around your brain

The Cranium Crunches in this book are largely organized based on the region of the brain that is primarily exercised and the cognitive ability that is engaged. The goal is to provide a full brain workout, just as you might want to engage in a full body workout when doing a physical exercise program. When doing physical exercises, many people have their favorite exercises, but those exercises become less effective at burning calories, building muscle, and increasing heart rate as the body becomes more efficient. Fitness trainers try to get people to change their exercises and not just focus on one muscle group. Similarly, this workbook is designed to encourage brain exercisers to engage and use different parts of their brains and strengthen their *entire* brain, not just one region. With all that said, research has shown that improving attention and concentration can lead to real-world improvements in the things we all need to do to stay active and independent (e.g., making new memories and remembering to do things in the future).

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Memory and the Brain



Cranium Crunches Workbook: Brain Exercises to Maximize Memory Ability

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CRANIUM CRUNCHES WORKBOOK

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Letter Symbols Activity Explained

Letter symbol activities exercise attention, concentration, and visual search. These abilities fall under the broad category of cognitive functions called executive functions. As the term implies, executive functions control and manage other cognitive skills. You might think of executive functions as the "control center."

Improved executive function can affect many daily activities—from organizing tasks, to prioritizing, to managing time and decision-making. In addition, improved visual search abilities (which letter symbol activities exercise) can be useful in driving or walking through environments with potential trip hazards.

The letter symbol activity is similar to the widely used Symbol Digit Modality Test (SDMT), which is used to identify deficits in executive functioning. The SDMT involves a simple substitution task. Using a reference key, the examinee has 90 seconds to pair specific numbers with given geometric figures.

The letter symbol activity is also a substitution exercise, except letters are used instead of numbers. When the letters and symbols are matched up, a phrase or quote is revealed.

Letter symbol activities exercise the prefrontal area of the brain.



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Letter Symbols Exercises



Letter Symbols #1

Use the key to decode the Benjamin Franklin quote, substituting letters for the symbols.

A	B	C	D	E	F	G	H	I	J
☹️	👁️	👁️	👁️	👁️	👁️	👁️	👁️	👁️	👁️
👁️	👁️	👁️	👁️	👁️	👁️	👁️	👁️	👁️	👁️
👁️	👁️	👁️	👁️	👁️	👁️	👁️	👁️	👁️	👁️
👁️	👁️	👁️	👁️	👁️	👁️	👁️	👁️	👁️	👁️



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CRANIUM CRUNCHES WORKBOOK

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- Turn to Page 53
- Alphabet Code Instructions
- Today's Puzzle on Page 55

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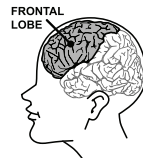
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Alphabet Code Exercises Explained

This Cranium Crunches activity requires fairly intensive **frontal lobe** engagement and attention. The activity requires not only selective attention as one determines the letter that is between the letters shown but it also requires sustained attention over a period of time in order to complete the puzzle.

To crack the code, fill in each blank with the letter that comes between the two letters below the line. **HINT:** The letter A comes between Z and B.



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Alphabet Code Exercises 

Alphabet Code Exercise #1

Below is a Jerry Lewis quote. Crack the code by putting the letter in the blank that comes between the two letters in the alphabet.

L

HU FH DP SU OQ ZB HK CE


EG NP QS VX GI ZB SU

LN NP RT SU JL HU CE RT


FH DP SU OQ TV MO HU RT GI DP CE

EG NP QS

- Jerry Lewis



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Process of Elimination Exercises 

Skiing by Process of Elimination

Follow the instructions to cross off words in the table. What do the remaining words say?

- Cross off all words that are names of winter sports.
- Cross off all one syllable words that rhyme with skate.
- Cross off all types of Olympic medals.
- Cross off all words with eight letters.
- Cross off all words that end with -le.
- Cross off all words that mean the same as unhappy.
- Cross off all words that are names of countries.

Answer:

silver	I	date	do
not	ice hockey	blue	skiing
fabulous	rattle	participate	little
in	late	any	sport
snowboarding	with	Canada	ambulances
gold	abrasive	Germany	Belgium
at	luge	the	medicore
bottom	sad	of	bronze
late	low	France	curling
cattle	the	mate	hill

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Exercise Solutions

Skiing by Process of Elimination

silver	I	date	DO
NOT	ice-hockey	blue	skiing
fabulous	rattle	PARTICIPATE	little
IN	late	ANY	SPORT
snowboarding	WITH	Canada	AMBULANCES
gold	abrasive	Germany	Belgium
AT	luge	THE	medicore
BOTTOM	sad	OF	bronze
late	low	France	curling
cattle	THE	mate	HILL


Remaining Words:
"I do not participate in any sport with ambulances at the bottom of the hill."
- Erma Bombeck

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- Mini Letter Sudoku
- Page 77 for Instructions
- Page 79 for Puzzle

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Mini Sudoku Exercises 

Mini Letter Sudoku #2

Fill in the blank boxes so that each row, each column, and each 2 X 3 block contains the letters A, B, C, D, E, and F.

	B				F
E		C		B	
	E	D	A		
A				F	D
B				D	C
C		F		A	

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Anagram Exercises 

Anagram Exercise #6

Unscramble each set of letters to make a common word. Then transfer the circled letters to the bottom of the page and unscramble them to answer the riddle.

- A K R O K A E
- G D O H U
- Z R D A H A
- D F O U N E

What jumps when it walks and sits when it stands?

(A) ○ ○ ○ ○ ○ ○ ○ ○

A _____

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Proper Noun Exercises

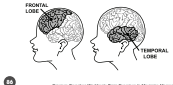
Proper Noun Exercises Explained

One of the most common complaints older adults have about their memory is forgetting the proper nouns associated with people, places, and things. This is often due to a decline in the ability to recall proper nouns, which is a normal part of aging. This workbook is designed to help you improve your ability to recall proper nouns by using a technique called "Cranium Crunches".

Being able to recall a proper noun is often associated with a knowledge of some of the words, phrases, and facts that are associated with a person, place, or thing. This workbook is designed to help you improve your ability to recall proper nouns by using a technique called "Cranium Crunches".

One of the best ways to exercise this ability is to try to come up with a word or proper noun associated with every letter of the alphabet. Consider a category (like names, places, animals, countries, etc.) and then participate in this exercise by trying to come up with a word or proper noun associated with every letter of the alphabet. This workbook is designed to help you improve your ability to recall proper nouns by using a technique called "Cranium Crunches".

The activity exercises the memory storage part of the temporal lobe and parts of the frontal lobe.




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Proper Noun Exercises

Proper Noun Exercise #1

Fill in each blank with a name (male or female) that begins with that letter of the alphabet. Some letters have very few names that begin with them, so you are not expected to think of a name for every letter.

A	P
B	Q
C	R
D	S
E	T
F	U
G	V
H	W
I	X
J	Y
K	Z
L	
M	
N	
O	



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Summary

- Participation in cognitively stimulating activities is associated with decreased likelihood of developing dementia.
- Cognitively stimulating activities may delay the need for more intensive care.
- Proper food and exercise is good for the brain and memory.
- For more information and resources go to:
 - www.robwinningham.com

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