New Insights Into Boosting Memory

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If You Would Like The Slides:
Big Take Home Message:

There are things that can be done at any age to improve memory.....
You Have Two Types of Memory:

You will learn 5 tips for each today.

1. Artificial Memory

2. Natural Memory
5 Factors For Healthy “Natural” Memory

Recent Study

Neuroscientists identified 5 factors for maintaining healthy memory and for avoiding memory decline in those over age 55.

1. G. Peggy McFall, Kirstie L. McDermott, Roger A. Dixon. 
   Modifiable Risk Factors Discriminate Memory Trajectories in Non-Demented Aging: Precision Factors and Targets for Promoting Healthier Brain Aging and Preventing Dementia? 
   Journal of Alzheimer's Disease. 2019; 1 DOI: 10.3233/JAD-180571
Is There Such Thing as A Photographic Memory?
Photographic Memory???

• Elizabeth, a Harvard student who passed a series of tests that convinced even skeptics that eidetic memory existed in 1970.

• Studied by scientist Charles Stromeyer III, who published the results of his findings in Nature.

• Then what happened?
But, There Are People With Amazing Memories

They fall into 3 main categories.

What we can learn from them?
Kim Peek (Savants)

• Rain Man

• Memorized every word of every book he had ever read, estimated at around 9000. It took him 12 seconds to read one page

• What couldn’t he do?
Hyperthymesia

• Superior autobiographical memory.

• Mental Calendar

• Does it carry over?
Mnemonists: Memory Champions: Solomon Shereshevsky At work? Memory champions use strategies.
Pop Quiz!
Six Random Things

1. Magnet
2. Chocolate
3. Blanket
4. Chapstick
5. Apple
6. Pants
Memory of Loci
How Much Information Can The Human Brain Remember?
The Human Brain Can Remember About 2.5 Petabytes of Data

• What’s that?
That’s about 300 million hours of television

• What’s 300 million hours of television?
About 34,000 Years of Television
Yet.....
No matter where I look, I just can't find my car keys.
Take Home Tip:
Minimize These Types of Memory:
Where You Put Your Keys and That Important Piece of Paper
Save Mental Energy:
Focus Is A Limited Resource In The Brain
Routines Save Mental Energy For More Important Tasks
If We Forgot, Sometimes It’s Because We Never Really Learned It

• 1. Focus
• 2. Short Term Memory
• 3. Long Term Memory
In order to remember we need to focus. How do we boost focus in the brain?
Dopamine and Focus: How To Give It A Boost? Think of your ancestors:
Brain Needs “Newness”
5 Factors For Healthy Memory

• 1. Engage in learning new things (Second language, new subject, musical instrument, new sport)

• 2.

• 3.

• 4.

• 5.
Memory Blur: What Day Is It?

Tips?:
To Maximize Memory We Must Understand How Memory Works In The Brain

Let’s Make a Memory
What Was Happening In Your Brain?
Review vs. Rusty?  Cognitive Reserve Theory
How Many Brain Cells and Connections?
The Most Famous Patient In Neuroscience. H.M.’s Story....
Short Term Memory

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Short-term memory holds about seven items for no more than seconds at a time.

Strategies to get around that........
Right Now Your Hippocampus Is Making A Decision
Your Hippocampus and

• Where did I park my car?
• Where did I put my keys?
• What was that person’s name?
• What was I just doing?
Hippocampus

• Moving information from short term memory to long term memory takes time and energy.

• Learning something while emailing, texting, cooking

• Any multitasking disrupts the process.
Where Do You Store Your Memories?
If It’s Worth Remembering You Are Encoding This Information In Your Brain: Where?

This is Neuroplasticity
We can learn and change
Question?
How To Improve Memory:
The Secrets of Memory Champions and Those With Incredible Memory
Examples of Memory Feats by Johannes Mallow

Memorized:

• 400 play cards in 10 minutes
• 501 numbers in 5 minutes
• 132 Historical Dates out of 140 in 5 minutes
What Are Their Tricks?

• They train like athletes.

• It takes effort and energy to have information leave the hippocampus.
Stop and Say It Out Loud: Actively Recruit Multiple Parts Of Your Brain
2. Learning From A Savant (*Daniel Tammet*)

- **Holds the European record for reciting 22,514 decimal points of the mathematical constant Pi.**

- Learned ten languages, including Romanian, Gaelic, Welsh, and Icelandic which he learned in a week for a TV documentary.

- **High functioning autistic. Asperger’s**
Synesthesia: Fivefold?
2. Associate it

- What’s happening in the brain?
3. Visualize It (Location Based)
Think of Memory of Loci
4. Make It Emotional
Your Brain Is **Not Designed** To Remember Your Password!

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Don’t feel bad!
Password Memory Tips

• Make it emotional
Back To H.M.
(Removed Hippocampus)
Landmark Study with HM
2nd Form of Memory Discovered
Draw It: Dual Coding

Cake

Study from University of Waterloo: Representing images and pictures, are mostly intact in normal aging, and in dementia. Drawing is particularly relevant for people with dementia because it makes better use of brain regions that are still preserved, and could help people experiencing cognitive impairment with memory function.

Being investigated as a therapy option for those with dementia to hold onto memories
Make Silly Mnemonics so it’s SAVED

• Say It Out loud
• Associate it
• Visualize it
• Emotional
• Draw it
SHO ME or Roy G Biv
Review It

- Say it out loud
- Associate It
- Visualize
- Emotional
- Draw it
But I just want to remember....

- I don’t want to use these techniques.
- That’s like saying.....
Remember Our 5 Factors for Keeping Memory

• 1. Engage in learning new things (Second language, new subject, musical instrument, new sport)
• 2. ???
• 3.
• 4.
• 5.
Heart Problems

- High Blood Pressure: narrows arteries in brain too.
- High cholesterol
- AFib: Almost 10% of population over 65.

Take home message:
- Treat these conditions to protect memory.
Low Consumption of a Surprising Specific Food Linked To Memory Loss In Those Over the Age of 80:

• Data from 139,000 older Australians and found strong links between certain food groups, and memory loss.

• High consumption of **fruit and vegetables** was linked to **lowered odds** of memory loss and its comorbid heart disease.

• High consumption of **protein-rich foods** was associated with a better memory.

• People aged 80 years and over with a **low consumption** of what food are at the highest risk of memory loss and its comorbid heart disease.....

Cereal!!!  Why???

- Study also found fruits and vegetables and protein also protected against memory loss.
10 Year Study: Lower Risk of Dementia: Which part of Mediterranean Diet Had Biggest Impact on Memory?

- whole fruits
- vegetables
- whole grains
- nuts, legumes
- fish
- olive oil
- reduced consumption of red meat

Tiarnán D. Keenan, Elvira Agrón, Julie A. Mares, Traci E. Clemons, Freekje van Asten, Anand Swaroop, Emily Y. Chew. Adherence to a Mediterranean diet and cognitive function in the Age-Related Eye Disease Studies 1 & 2. Alzheimer's & Dementia, 2020; DOI: 10.1002/alz.12077
Remember Our 5 Factors for Keeping Natural Memory

1. Engage in learning new things (Second language, new subject, musical instrument, new sport)
2. Healthy heart rate
3. Fewer symptoms of depression
4. 
5. 
Depression
Remember Our 5 Factors for Keeping Memory

1. Engage in learning new things (Second language, new subject, musical instrument, new sport)
2. Healthy Heart Rate
3. Fewer Symptoms of Depression
4. Faster gait (walking)
5.
What Type of Exercise Improves Memory Most In Those Ages 60 to 88?

• Monitored over a 12-week period and participated in three sessions per week.

• High-intensity interval training (HIIT): The HIIT protocol included four sets of high-intensity exercise on a treadmill for four minutes, followed by a recovery period.

• Moderate-intensity continuous training (MICT) The MICT protocol included one set of moderate-intensity aerobic exercise for nearly 50 minutes.

• Control group engaged in stretching only.

• Tested memory of new events:

Seniors who exercised using short, bursts of activity saw an improvement of up to 30% in memory performance while participants who worked out moderately saw no improvement, on average.

- Author of studies take home message:
  - It’s never too late to gain benefit.
  - Important to tailor exercise to current fitness levels, but adding intensity can be as simple as adding hills to a daily walk or increasing pace between street lamps.
Remember Our 5 Factors for Keeping Memory

• 1. Learn New Things (Second language, new subject, musical instrument, new sport)
• 2. Healthy Heart Rate
• 3. Fewer Symptoms of Depression
• 4. Faster gait
• 5. Socially engaged.
Hyperthymesia: As Amazing As These People’s Memories Are...
Embrace Some Forgetting.... Allows us to focus on the good....
Anterograde Amnesia
Retrograde Amnesia
Clive Wearing Lives In Perpetual Present:
Wearing suffers from both antero and retrograde amnesia.
Clive Wearing Can Still Play The Piano
Clive Wearing
Is Married....
Thanks!
Artificial and Natural Memory

• **S**ay It Out loud
• **A**ssociate it
• **V**isualize it
• **E**motional
• **D**raw it

1. **Learn New Things:** (Second language, new subject, musical instrument, new sport)

2. **Healthy Heart**

3. **Fewer Symptoms of Depression**

4. **Faster gait**

5. **Socially engaged**