

This is

Memorise

I would call this a discover - and- memorise strategy for generating adaptive novel behaviors . Obtaining new functionalities by a discover - and- memorise strategy should be compared to the more familiar way of obtaining novel .

Written by:

[Nahla](#)

[Ahmed](#)

[Islam](#)

Table of Contents

[Intro chapter \(Nahla\)](#)

Chapters

[1- A Map of the Brain \(Islam\)](#)

[2- Keeping the Brain Healthy \(Islam\)](#)

[3- Memory and the Brain \(Nahla\)](#)

Book Intro

Written by:

[Nahla](#)

As we drove by Starbucks one day, we couldn't help but chuckle. Starbucks Café reminded us of two stories that we've tucked safely in our memory: one story is about a young fellow who is a ghost writer and likes to bring along his lap top to the café where he could type away and gulp down mugs of his favorite cup of coffee – Americano, he called it.

“You can't blame me, it's soooooo good”, he'd say, and we felt compelled one day to warn him not to leave his lap top unattended when he went up to the counter to order his Americano, and to be careful about not spilling his Americano into his lap top. A ghostwriter could not afford to lose pages of written work. It would be difficult to reconstruct what he's written. Even with a photographic memory, he could not re-create the original. He'd have to start all over again.

The other story is that of a book written by a Dr. Dharma Singh Khalsa which he appropriately titled Brain Longevity. He trained in Creighton University School of Medicine, Harvard Medical School and the University of California in San Francisco. He is a diplomate of the American Board of Anesthesiology and member and secretary of the American Academy of AntiAging Medicine.

In Brain Longevity, Dr. Khalsa talked about patients in their 40s and 50s who would come to his office in a state of anxiety convinced that they were sure candidates for Alzheimer's. When he asked them why they believed that, they'd say that they're constantly forgetting things, not able to digest a brief as easily as when they were younger, alarmed that they couldn't remember names, and regularly misplacing car keys. What worried them more, however, was the decline in their mental alertness.

One of his patients admitted, quite embarrassed, that his daughter's soccer team asked him to stop being their referee because he was forgetting who last touched the ball when it went bouncing off. He was calling out scores that didn't make sense and his daughter, who was feeling the pressure from her team mates, had to ask him to give up his position as referee.

The frequent complaint was their “fuzzy brains.” Neurologists have a name for it. It's called “age-associated memory impairment”, a condition that is most common among people aged fifty and older. As Dr. Khalsa said, it is normal to lose brain capacity at 50 just as it is normal to experience diminishing eyesight at age 40.

It is a generation of frightened baby boomers, Dr. Khalsa says. All of a sudden they're losing their “endocrinological spark as their youth hormones dry up and sexual urges are flattening out. They're gaining weight, losing muscle and hair, and needing more and stronger coffee just to slog through the day. The boomers' loss was Starbucks' gain.”

Grin and bear it, if we should, but an increasing number of scientists – including Dr. Khalsa - believe that it is possible to defy the mental aging process. People in their 40s, 50s and 60s can have not only a perfect memory but also brain power.

The brain is a dynamic organ

Individuals who get older can retain their youthful minds so that their learning ability, creativity and emotional vigor remain intact. They are able to sustain the mental dexterity and sharpness they need as they reach their 70s and 80s.

Charles M. Schultz, the famous Peanuts creator once said that “life is like a ten-speed bicycle. Most of us have gears we never use.” We’ll disagree with this dithyramb a little. It’s not so much life having all these gears, but the mind. The mind possesses faculties that some people have not bothered about. We’ve heard of cases where individuals with exceptionally high IQs consistently fail in life. We tend to dismiss them as “intellectually lazy” beings who never harnessed the full power of their minds.

Or else we’ve heard of the oft-repeated complaint, “he’s got all sorts of PhDs up his sleeve, but he’s completely bereft of common sense.”

The mind is a mysterious abyss

What kind of mental make-up drives someone to open fire in a school cafeteria and shoot aimlessly at human beings with minds that one day would rule the earth? What happens to the creativity of a university freshman who decides to major in Quantum Physics even if his first love is music? How does a spelling bee champion remember the sequence of letters in a word like *bacillus thuringiensis*?

Or, as the songwriter asked, why do fools fall in love?

That was quite a mouthful that Steven Pinker wrote in *How the Mind Works* (1997). His book had 565 pages (small characters), 565 footnotes plus our rough estimate of 380 references. His main thesis focused on the human mind and the theories of evolution and computation. No wonder he teaches at noble institutions like Harvard and MIT. How much gray matter does a man like Pinker possess? More importantly, would you date him?

Knowing his intellectual prowess, you’d probably hesitate. You’d cringe in fear and dread to think that you could even engage in a mental sparring of sorts with him.

Yet scientists and zealous believers think that each of us has the innate ability to imitate a Pinker or a Darwin or a Christian Barnard if we wanted to. How much brain power – we prefer to call it horsepower – would we need to produce a 500-page treatise on the reproductive cycle of a chironomid or take out a healthy heart and transplant it on someone else?

We'll begin in first base. We'll map the brain for you in the next Chapter and how each area of the brain corresponds to something. We'll look at the hemispheres of the brain and what they're supposed to do for us, including a peek into neurotransmitters.

In Chapter Three, we'll ask ourselves the question, "How do we keep the brain healthy and how do mental and physical exercises whip our brains into shape? Memory – that elusive asset we're all supposed to possess – will be discussed in Chapter Four. Brain nutrition is tackled in Chapter Five where we look at certain foods for nourishment and see how fats, carbohydrates and micronutrients help the brain acquire more agility.

Some chapters will discuss mental processes – creative, critical and analytical thinking - and what exercises we can engage in to improve these processes. The role of aromatherapy in brain health will also be discussed (Chapter Nine), as well as the practices of visualization, meditation and streaming (chapters ten, eleven and twelve).

We'll revisit speed reading in Chapter Thirteen and then take the back seat as we linger back in history and examine a few of the greatest thinkers.

We'll wrap up the e-book with worksheets that you can use for waking up your brain and bringing out the colors of the mind.

People love to say that the brain is a muscle and therefore needs to be stretched. There are specific exercises to help us with this task.

And maybe – just maybe – we'll be able to answer the question of why fools in love.

In the meantime, let's look inside the brain – yours and mine – and find proof that we too can join the ranks of great achievers one day. After all, as Donald Trump used to say, "as long as you're going to be thinking anyway, think big."

Chapter 1

A Map of the Brain

Written by:

[Islam](#)

A Map of the Brain

Chapter One: A Map of the Brain

Writers who describe the brain tend to use the phrase “architecture of the brain.” We can see why. To use the term “architecture” suggests that like a skyscraper or an urban piece constituted of concrete slab, the brain is a complex system of beams, columns and walls that rests on the most fundamental elements of graph theory or plane geometry with a dozen or so engineering equations intertwined.

But that’s too fancy for our taste. If we have to sound hip about the brain, we’d much rather compare it to the Los Angeles freeway during rush hour. Now that’s much better, isn’t it? You have movement, dynamism and complexity – so unlike a static architectural production, cold and unforgiving.

If a surgeon peeled off the skin and hair off a human being to expose his brain, we would probably reel and turn away from such a grotesque sight – lumps of raw ground beef held together by a fragile piece of glue. If we had the courage to look inside, however, we’d probably be entranced, marveling at how it does sort of resemble the LA freeway. To be able to see the brain in action would be like watching shooting stars and passing comets in the universe.

Peeking into the Brain

If you read about the brain, you’ll come across terms that you may have already learned in high school, so this section will be a quick review of the parts of the brain.

To better explain what the brain consists of and which parts are responsible for certain functions, we’ll take a hypothetical situation. Imagine that you’re in the cockpit of a 747, seated beside the chief pilot. In this scene, you are an invisible observer; the pilot does not know you’re there. He has an emergency situation to deal with but for as long as there is no immediate danger he sees no need to announce it to the passengers.

The pilot has just received news that there is a deadly storm heading towards the aircraft. He has about 20 minutes to think of a set of maneuvers to either (a) avoid the

path of the storm or (b) maintain his present course so he could land at the intended destination on time.

As he communicates with the air traffic controllers, he begins to realize the seriousness of the situation and his mind literally goes on overdrive. There are 274 lives he is responsible for. The kinds of decisions he makes will either save those lives or cut them short. The traffic controller's words were "you can try to weather the storm, but it has a wind velocity which we're not sure the aircraft can withstand."

The pilot's brain goes to work. Right beneath each statement is the part of the brain that's working (in bold) as he's thinking and deciding – and reacting.

The pilot is informed he's got 20 minutes to make a decision: he either changes his trajectory completely or stays the course hoping the aircraft is strong enough to withstand battering from the storm. He's breathing faster and his heart rate is pounding: **HINDBRAIN**

He steers the plane a little to the left, presses some controls on the panel to increase altitude. He does these steps almost by rote: **CEREBELLUM (located in the hindbrain)**

His eyes are focused in the vast darkness before him. He blinks constantly making sure his path is clear: **MIDBRAIN**

At this point, the pilot is analyzing his fuel capacity. If he changes trajectory to avoid the storm completely, that means a three hour delay. Does he have sufficient fuel? His mind races as he tries to remember other emergency procedures. What are the pros and cons? He recalled a fellow pilot who had to make the same kind of decision and almost didn't make it: **FOREBRAIN**

Pilot is now arguing with himself. He keeps saying "what if" and then answers it himself. His abstract reasoning has never been this sharp before. These emergencies are making him think at double the speed. Looking for answers...imagining the alternatives...evaluating scenario A versus scenario B: **RIGHT HEMISPHERE (located in the cerebrum)**

Pilot re-establishes communication with air traffic control. "I'll change course." He outlines his plan in detail, talks to the control tower and assures them he has sufficient fuel: **LEFT HEMISPHERE (located in the cerebrum)**

Pilot thinks about his wife back home. If he doesn't make it, did he update his will? If he makes it, he'll ask for a month's leave, take his wife to the Caribbean for a much needed vacation. It's been a heck of a month, he says to himself. They hardly saw each other. Is she seeing someone else? **FRONTAL LOBE**

Two hours and twenty minutes later, pilot taxis into runway 8B. “Ladies and gentlemen, welcome home. We apologize for the delay. We needed to change direction because of a storm brewing over Hokkaido Island in Japan. We’ll be pleased to make alternatives for those who have been inconvenienced by this delay. Thank you for flying with Brainwave Airlines, your thinking airline.”



Pilot walks into the pilot executive lounge and is greeted by a warm round of applause. “What’s this, he asks. “Your reward for thinking and planning well”, says his boss. Someone told us you love sushi and kimchi – well, here’s a plate. No charge. Enjoy it.” His colleagues shake his hand as they exit the lounge saying “well done, kiddo. Thank goodness, cabin air didn’t shrink your brain. Brilliant maneuvering!” Seeing the sushi, he had almost forgotten how famished he was. He sat down and devoured the meal, relishing every morsel. The best meal he’s had in months!

PARIETAL LOBE

As he drives to his hotel, he made a note that he’d have to reconstruct the events of the night and input it into the database of the emergency manual for pilots. He’ll do that first thing in the morning while it’s still fresh in his mind and can remember every detail and maneuver he executed in the last three hours: **HIPPOCAMPUS**

End of film clip. Let’s summarize what we’ve just learned about the components of the brain.

One incontestable fact we must accept: the brain is the most complex part of the human body. We’d like to add our bit: some brains are more complex than others; this is why we have individuals who are more complicated than others and hence difficult to understand.

The brain weighs only three pounds but this lightweight mass holds our intelligence, puts some sense to all five senses, sets our bodies in motion and directs our behavior.

Taking all the brains of our fellow human beings and putting them together would enable us to define civilization and encapsulate the story of humanity.

Since much knowledge has been gained from the study of the brain in the last two to three decades, Steven Pinker says that the United States government thought it appropriate to designate the 1990s as the Decade of the Brain. He quips, “But there will never be a Decade of the Pancreas.”[4] This is because the brain enjoys special status. That special status resides in the brain’s ability to make humans see, feel, think, choose and act – and calls it information processing.

Just as the cell is the basic unit of human life, the brain is made up of three major units:

Forebrain

Midbrain

Hindbrain

Forebrain - this is the most highly developed section of the brain. It contains the cerebrum and other structures. When people look at pictures of the brain, the first thing they usually see is the cerebrum which is located at the top of the brain where most of a person’s intellectual activities come from. It houses your memories, makes you capable of planning, imagining and thinking. It is the part that assists you in recognizing your friends and family, enjoying a movie and playing solitaire.

Midbrain – this is located in the topmost part of the brainstem and controls our eye movements and other voluntary movements. If you recall our film clip, when the pilot kept blinking his eyes to look out in the dark skies and adjusting his glasses, his midbrain was called to task.

Hindrain – you will find the hindbrain right above your spinal cord. This is where the cerebellum is located. It resembles a wrinkled ball of tissue. It is the hindbrain that directs the body’s respiratory and heart rates. It coordinates bodily reflexes and is also responsible for movements you make automatically or by rote. For example, when you play the violin or run a marathon, the cerebellum located in the hindbrain goes to work.

Looking deeper into the brain, we now focus on the cerebrum which has two hemispheres. As we said earlier, the cerebrum is located in the forebrain. These hemispheres are separated by a deep dividing line; this division does not prevent the two hemispheres from sending messages to and from each other. They look similar in appearance but differ in their functions.

Hemispheres of the Brain

Left hemisphere – when an individual utters words, it is the left hemisphere that is working.

Right hemisphere – when an individual engages in abstract reasoning or logic, it is the right hemisphere that enables him to practice these skills.

The brain and the body send signals to each other and when they do, these signals cross over. This means that the right hemisphere controls the left side of the body, while the left hemisphere controls the right side. Therefore, when one side of the brain is affected or is hurt, the opposite side of the body is affected. To put it more clearly, if an individual has had a stroke in the right hemisphere of the brain, his left arm and leg are paralyzed.

As we explore our thoughts and how they get processed in the brain, we will need to know about the brain's other components. Note that each hemisphere is divided into sections – more commonly called lobes. These lobes – frontal, parietal, occipital and temporal - have their own respective functions.

Frontal lobes – there are two frontal lobes located behind the forehead. When you sit down and make a shopping list, plan an itinerary or argue with your boss, these are the two lobes that enable you to perform these functions. The frontal lobes are what the Neurological Institute of the NIH calls a “shortterm storage site”; that is, keeping one idea on standby while you weigh other ideas. The left frontal lobe is where you'll find Broca's area, which processes your thoughts into words.

Parietal lobes – remember our airline pilot who loved sushi and kimchi? When he ate every bite and cleaned out his plate, his parietal lobes were at work. The pilot's smell, texture and taste for sushi were processed by his parietal lobes and more specifically by the primary sensory areas. These areas are information receptors especially when the information has to do with temperature, touch and taste. The parietal lobes, however, are not limited to taste and smell but also process reading and arithmetic functions.

Occipital lobes – these lobes are located at the back of the brain. They receive images that the eyes see and send those images to be stored in the memory. If the occipital lobes are damaged, blindness can occur.

Temporal lobes – these are found in the visual areas of the brain and are located just underneath the parietal and frontal lobes. Are you a fan of Eminem? Do you swoon over Tom Jones when he sings “What's New Pussycat?” Your temporal lobes are at work. The temporal lobes process information received by the ears; these lobes contribute to

memory functions – including anything to do with music, as well as sensations associated with taste, sound, light and touch.

Venturing into the deeper recesses of the brain, we find three distinct components:

Hypothalamus

Thalamus

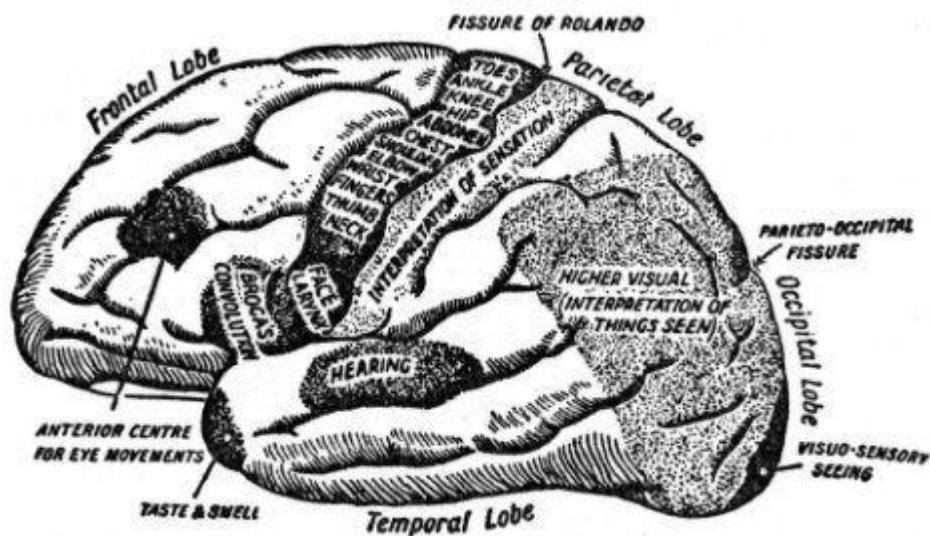
Hippocampus

The NIH describes these three parts as the “gatekeepers” that lie in between the spinal cord and the hemispheres of the brain. These three elements orchestrate our emotions and the manner in which we respond to such emotions.

Hypothalamus – this serves as the center of vital functions. It drags you out of bed, makes you nervous and your hands clammy when you’re about to break the news to your parents that you failed Physics, and it works every time you’re ecstatic, frustrated or raving mad.

Thalamus – the thalamus is located close to the hypothalamus and acts as a traffic coordinator between data to and from the spinal cord and the cerebrum.

Hippocampus – this component is small in size and yet acts as a warehouse of memories. It’s like the hard disk of your computer. It stores your files and then when you need them, retrieves them for you. It also has nerve cells that come in clusters called basal ganglia, responsible for triggering movement.



No discussion on the brain is complete without mentioning neurotransmitters. These are the chemical messengers of the brain that carry thoughts back and forth from cell to cell. The health of our brain depends to a significant degree on the proper balance of neurotransmitters. So when people are diagnosed with Alzheimer's, it means that there is widespread death of brain cells. The brain is flesh and blood. This is one thing that people have to remember. It is NOT the mind. The brain is the organ and like any organ of the body, it needs nutrition and rest. The mind is WHO we are – the software that carries out the functions of the hardware – the brain.

Brain Neurotransmitters

Acetylcholine – this substance is the principal memory carrier. People with Alzheimer's show lower levels of acetylcholine. It dictates if our muscles have to contract or make our glands secrete hormones.

GABA – this is gamma-aminobutyric acid and is referred to as a neurotransmitter that inhibits because it calms down cells. It regulates muscle movements and is an essential part of the visual system. Epileptic and Huntington patients usually take drugs to increase GABA levels in the brain.

Serotonin – this is another inhibitory neurotransmitter that acts on blood vessels and promotes sleep and regulates the body's temperature. Together with norepinephrine, it keeps individuals in a good mood. It is therefore likely that crankiness in older men and women have a biological basis. Out of 40 million Americans aged sixty five and older, more than six million could be candidates for depression, and most of them consider it as part of the aging process. Dr. Khalsa, however, says that it is possible to overcome shortages of these mood neurotransmitters through nutritional and pharmacological solutions.

Dopamine – another neurotransmitter that influences mood and body reflexes. Examples of low dopamine levels are seen in Parkinson's patients who suffer from rigid muscles and lose control over their movements. This indicates that dopamine levels have decreased in some segments of the brain.

Scientists have discovered at least 100 neurotransmitters and they all have their individual chemical activities. The above are some of the key neurotransmitters that preserve some of the more important functions of the brain.

In the next Chapter, we'll talk about how to keep the brain healthy, banishing the myth that it can potentially “disintegrate” with age.

Chapter 2

Keeping the Brain Healthy

Written by:

[Islam](#)

Keeping the Brain Healthy

Chapter Three: Keeping the Brain Healthy

Next to worrying about your car's wear and tear and the sagging muscles in your body, how often do you think of keeping your brain fit and in the best of health?

When you consistently forget things and are unable to think creatively about your daily activities, do you simply shrug your shoulders and attribute this to the aging process?

A member of your family has been diagnosed with Alzheimer's. Do you consider this disease the same way people think of cancer – that is, as an aging disease?

How much time do you allocate for mental and physical exercise?

Regardless of age, these questions should be gnawing at you because the sooner you take care of your brain, the better your chances of becoming alert and productive in your post-retirement years.

Does Age Have Anything to do with Brain Health?

Nonsense. The thinking that brain health declines with age is a misleading belief and closes the door to exciting opportunities and research about age and the brain. If you read the web sites of the American Society of Aging and the American Association of Retired Persons, you will realize that there exists overwhelming evidence that older individuals can have as much brain power as teenagers.

Thanks to Princeton University researchers and others who have been studying the science of the brain, a “renewing” mechanism was discovered in mature brains; this renewing mechanism creates neurons that travel towards the cerebral cortex and become a part of the brain's processing system.

When a fetus is formed, the brain begins to develop at just three weeks old. This pattern of growing, developing, expanding and adapting continues throughout its

lifetime. Over 100 billion neurons are formed in a baby. In the next three years of the baby's life, these neurons will develop trillions of what Dr. Gary Nulls calls "synaptic connections." With the passage of time, those synapses that are exposed to constant stimulation become stronger and spread out, while those that are seldom used are discarded.

Scientists have a name for this period of adaptive growth: "plasticity." The Center for Brain Health in the University of Texas in Dallas takes the phenomenon of plasticity seriously. The Center has been conducting research for the last fifteen years which involves the close relationship of brain research and clinical care. Their primary objective is to promote the discovery and application of new interventions (e.g., cognitive-linguistic, pharmacological, social) to maximize mental functioning.

Up until a decade ago, physicians were telling patients who were complaining of memory loss and mental slowdown that this was something that comes as a result of the aging process: old neurons would die and nothing could replace them.

In a broad sense, brain health relies on constant stimulation, mental activity and challenge, thus confirming the popular expression, "use it or lose it."

Age, therefore, should not be our excuse. Our bodies, when taken care of conscientiously, will continue to serve us well. The same is true for the brain - if given the same proper attention, it will not abandon us. There is a price tag that comes with this. That price tag is our vigilance about the negative factors that contribute to unhealthy brains: environment, nutrition and diet, stress and emotion. An ounce of neglect in any of these factors could translate into a pound of trouble later on.

[How to Keep the Brain Healthy](#)

We used to think that if we read six books a year, did crossword puzzles on the subway, and add and subtract numbers without using a calculator, we were doing our share of keeping mentally fit. These days, a lot has changed. Mental exercises like these are still excellent exercises and are being used by thousands, but new studies indicate that there are other mental – as well as physical - exercises that we can do to keep our gray matter in tip top form.

Remember those innocent days of our youth when we had fertile imagination and could easily conjure up situations and play pretend? When we ask our friends, "do you want to play with me today", we're actually extending an invitation for them to join us in whatever fantasy that's



brewing in our minds (“you’re the doctor, I’m the nurse, and we have to cure little Sue because she has a stomach ache”). It was a wonderful time of life – our curiosity and our sense of discovery filled us with challenges.

Our entire childhood was like a burst of lightning and an amusing upward learning pattern that cultivated our minds and fortified our brains.

Mental Exercises

As we said earlier, one way of keeping the brain healthy is by doing some mental exercises. If you do crosswords or calculate numbers in your head, that’s great, keep it up.

We’d also like to suggest the following that you can do whether in school, at the office, in the restaurant, in the parking lot, etc.

Exercise 1: In School

If your school cafeteria has a signboard describing the menu for that day, make an effort to read it in full and try to memorize the items on the menu. We tend to stare absent-mindedly at bulletin boards and not really absorb anything because the information is either irrelevant or unimportant. Make it a daily habit to read the menu and try to think of ways to remember what you read. For instance, if the menu has a list:

Quiche Lorraine

Clam Chowder Soup

Fish and Chips

Vanilla Pudding, Chocolate Chip Cookies

Herbal Tea

As you read each item, imagine yourself eating these and identifying what each item tastes like. And try this: take the first letters of each item and keep repeating them to yourself. So you have QCFVH. Repeat: QCFVH. One more time: QCFVH. It's no harder than memorizing the acronym of your favorite radio station, isn't it?

If a fellow student ever asks, "hey, does anyone know what the cafeteria is serving today? I'm starving mad." Be the first to tell him.

Exercise 2: At the Office

This should be a fun exercise if you're into languages. You know the saying, it's better to have two brains than one! Most bilingual people have an edge over their unilingual friends and associates. They stretch their brains and make them work harder as they find the equivalent word in a foreign language. In the US, Spanish is becoming the second most frequently used language while in Canada, it is French.

Throughout the day, as you meet people and see objects in the company, think of the Spanish or French equivalent. For instance, you take a break and get up from your desk. You head for the washrooms. You see the following on your way

Continue this exercise and watch your bilingual vocabulary grow. By putting the words into objects and persons you meet along your way, you are making a conscious effort to work your brain more.

Exercise 3: In the Restaurant (or any public place)

You can take a good look at your waiter (or waitress) and take in his features, any special moles, hand or eye movements, or if he's got a ring on his finger. This is like practicing a bit of detective work, although it may not be a good exercise to do if you are dining with your spouse. Another exercise would be to look around the restaurant and make a guess as to how many customers there are. An alternative would be to spot unusual objects in the restaurant and pretend you've got a photographic mind and memorize their place. This way you sharpen your sense of vision and hearing.

Making a conscious effort to know what is around you helps you define your place in relation to all the persons and objects that share the same space.

Exercise 4: In the Parking Lot

You may have complained a few times about forgetting where you parked the car or getting the feeling that your car had been stolen. This happens frequently in a large shopping mall where the parking lots are located in different quadrants of the building. When you park your car, make a mental note of all possible “aid locators”: you’re in row #, facing a building (or highway or a large sign), the make and color of the car to your left and right, etc. This way, when you’re done with your shopping and ready to leave, you’ll know exactly where to go and what to look for. Instead of looking for your car in particular, you’ll be locating the signposts, buildings, and other cars that will help you pinpoint the location of your car.

By doing this exercise regularly, we’ll doubt you’ll be complaining about the same thing again!

A writer who shared a few mental exercises on a web site said that “any routine of exercises which causes you to think is of value. You will be amazed to find how quickly the mind will respond, and in a very short time you’ll notice marked improvement in your ability to think quickly, logically and creatively.”

This writer also suggested this exercise. While driving, concentrate on the license plate of the car ahead of you. Take the license number and reduce it to a single digit by adding all the digits together. If the result you obtain has more than one digit, add them. Continue the addition until you arrive at one digit. The writer provides the example below.

$$978 = 9+7+8 = 24 = 2+4 = 6; 164 = 1+6+4 = 11 = 1+1 = 2;$$

$$899 = 8+9+9 = 26 = 2+6 = 8$$

If you come across quizzes in newspapers and magazines, do them as well. After some time, you’ll discover how much faster your brain handles information.

Neurobics

Neurobics™ is a registered trademark involving a system of exercises for the brain. These exercises make use of all five physical senses as well as the emotional sense that are intended to inject life into your old routines. According to the professor who created this concept, Dr. Lawrence C. Katz, neurobics can be practiced anywhere and can be

done for fun. These exercises can stimulate underused pathways and nerve connections, thus making your mind fit and flexible.

Dr. Katz based his exercises on findings obtained by neurobiology labs here and abroad. His reasoning is that just as individuals engage in fitness exercises to be fit and healthy, they can also perform exercises that will keep their minds vigorous and youthful as they grow older. He explains that brain cells develop by connecting with one another. The belief a decade ago was that these connections were only possible during childhood and young adulthood; new research suggests, however, that even in our maturing years, the brain still has that quality of re-wiring itself.

Since technology has “suppressed” the number of movements we make when doing a task (for example, the act of getting up to turn on the TV has now been replaced by a remote control), the different sensory structures of the brain have to be kept on “working mode”; otherwise, these abilities fade over time. Note that a large area of the brain processes information sent by all five senses. By doing some neurobics, we enable the brain to process these pieces of information more efficiently and more rapidly. A well-exercised brain trains us to remember names and dates more easily, learn a new computer skill or putting some creativity in our problem-solving and working lives.

A neurobic exercise, according to Dr. Katz, must involve more than one sense and used in a new way that would engage our attention and add a fresh component to our everyday routine.

We’ll list some of the neurobic exercises that Dr. Katz recommends. It is what he calls “cross-training” our brain.

[Physical Exercises \(Neurobics by Dr. Lawrence Katz\)](#)

Here’s a fun exercise. Shower with your eyes closed. With slow, deliberate movements, locate the shower handle, shampoo bottle and soap. Regulate the water temperature. Also, close your eyes as you get into the car and locate the ignition. By shutting your vision off, you allow your tactile sense to get to work.

Take in new smells and flavors. Instead of going to your usual supermarket, try an ethnic or farmer’s market. You will experience new sights and new aromas. Instead of Starbucks coffee, perhaps the Lebanese stall in the ethnic market has excellent coffee beans. Use your least active hand – the non-dominant one – to perform your daily rituals: combing, brushing your teeth, putting on make-up, zipping up, eating your cereals or toast, clicking on the mouse.

Wake up to vanilla instead of freshly-brewed coffee. We all like to get out of bed and reach out for our first morning cup. Instead, we ought to try smelling something different aromas – peppermint, vanilla or cacao. Dr. Katz says that by linking a different aroma to our morning routine, we activate new pathways in our brain.

Go to your local library and borrow a book on Braille. Dr. Katz recommends an exercise learning the Braille numbers for the various floors of your office or school building. You can also obtain Braille numbers information on Wikipedia.org.



Traveling abroad soon? How about forgetting the tour bus and the five-star hotel and instead renting a car, figuring out the map, and heading for a small town where you don't speak the language?

Dr. Katz and Manning Rubin published a book, *Keep Your Brain Alive*, published by Workman Publishing Co. If you need further information, you can also call Duke, at 1-888-ASK-DUKE.

[Physical Fitness and Brain Health](#)

You may have wondered about actual fitness exercises. Does being physically fit help the brain?

Definitely, says the Harvard article published for Women's Health Watch. In laboratories using rodents for experiments, scientists have discovered that rodents who spend most of their time running on exercise wheels have better brains than their more sedentary mates. Similar studies in the past have not found any conclusive evidence that fitness improves brain functions, but a breakthrough study – the first of its kind – was conducted by the University of Illinois (Urbana-Champaign campus) wherein 55 subjects aged 55-79 were measured for their aerobic capacity during walking and treadmill tests. The subjects were a mixture of sedentary and physically active individuals. The conclusion, published in the *Journal of Gerontology* three years ago, revealed that “physically fit subjects had less age-related brain tissue shrinkage than less active subjects.” With the use of an MRI machine, researchers spotted distinct differences in the frontal, temporal and parietal regions of the brain – where tissues in these regions were vital for memory, learning and cell communication functions.

A related experiment also showed that aerobic fitness training largely influenced the cognitive abilities of women and men aged 55-80. It was learned that exercise benefited human abilities such as attention, organization and planning, and that a combined program of aerobics and strength training were more effective than aerobics alone. Finally, it was also discovered that exercising for less than 30 minutes per session did not have any significant impact on cognitive functions.

In the next Chapter, we will discuss...er...hmmm....oh yes, memory!

Chapter 3

Memory and the Brain

Written by:

[Nahla](#)

Memory and the Brain

Chapter Three: Memory and the Brain

“Nothing is more responsible for the good old days than a bad memory.”

(Franklin P. Adams or Robert Benchley?)

Why the question mark after Benchley’s name? The answer is not that our memory is failing us – it does look as if we don’t remember who said that line. The truth is, we had clipped that quotation from a newspaper which credits Franklin P. Adams as the owner of the quote, but in a book about memory written by Robert Allen, the same quote appeared but cites Robert Benchley instead.

Thanks to our memory, we remembered seeing that line before and all we had to do was go to our quote file and there it was. Either both men did utter the same sentence (highly unlikely) or it’s a mere typographical error (more likely).

A bad memory is the last thing we’d want. We scold ourselves for forgetting to buy an important ingredient after we’ve come back from the supermarket. We scold ourselves because we forgot our wedding anniversary and hence got a severe reprimand and a cold shoulder in return. We scold ourselves because we forgot our dental appointment and then got fined \$50.00 for a no-show. Unfortunately, even dentists act like policemen nowadays. One fines you for speeding, and the other penalizes you for not showing up. If we had to pay fines for everything we forgot, we’d be bankrupt by now. That does not bode well for our financial future; nor does it bode well for the future of our mind.

Brief Visit to Memory Lane

What exactly is this thing called memory?

It depends from what perspective we look at it. In Psychology, memory is a human being's ability to store and remember bits and pieces of information and eventually to use such information when the need arises. Memory used to fall under the field of philosophy, but in the early 20 century, it was integrated into cognitive psychology. Today, memory now properly belongs to a branch of science that combines cognitive psychology and neuroscience. Thus, it is now under the realm of cognitive neuroscience.

Given that the study of memory in cognitive neuroscience is complex, we shall not attempt to dissect it and examine its numerous facets. This complexity has resulted in a multi-classification system wherein memory has been classified by duration, by information type and by temporal direction.

For our purposes, we will take the first classification – by duration – and explain it briefly before we deal with ways to improve our memory. Under memory by duration, we have three types:

[Sensory memory](#)

[Short-term memory, and](#)

[Long-term memory](#)

According to Wikipedia, sensory memory corresponds to the first instant that a person or object is noticed. This observation sometimes moves into the sensory store, and qualifies as short-term memory. Sensory memory means that the observation or perception lasts from milliseconds to seconds. Short-term memory, in turn, corresponds to memory that occurs from seconds to minutes. Immediate interaction with things, objects and persons constitute our sensory memory as they are information produced by our five senses. Touching, smelling or seeing are faculties that enable us to remember more easily.

Long-term memory is memory that is stored and then retrieved after days and years.

An example may help us understand this system of classification better: supposing someone gives us his number. We remember it for a few seconds – maybe even up to a minute or two, but soon forget it. This is short-term memory at work. On the other hand, we remember certain phone numbers that we use frequently. Our baby sitter's number, the pharmacist's, our husband's office – these numbers are stored in our long-term memory.

[Memory Improvement Techniques](#)

Robert Allen wrote a useful manual on improving your memory and certainly does not read like a technical manual similar to those you receive when you purchase computer hardware. With craft and imagination (and lots of color), he sets out some techniques and actual practices on how to maintain horsepower for your brain. This section will cover general techniques that generate benefits for us in the short and long term, and in the worksheets in Chapter Fifteen, we describe some exercises that you can do. You don't have to adopt all of them. Choose a couple or at least one exercise that you can do consistently to develop your memory. One exercise is better than none. As Robert Allen said, "If you start today and practice, practice, practice, soon your memory will be as retentive as flypaper (though what gets stuck to it will, with luck, be more useful)."

It's a pity that our memories don't act the same way as computers. A computer-like brain would be a boon to our daily lives wouldn't it? The human brain, although not as dazzling a performer as a Pentium IV, is far more complex; however, while it may not be able to spew out chunks of data in minutes, the human mind has been responsible for how humanity and civilization evolved. This makes memory a very valuable asset and tool. It is not mechanical; it's the stuff we're made of.

Before describing specific memory improvement techniques, we'll take a quick refresher on two aspects of memory: learning and concentration.

Each person has his own way of learning and concentrating. These two stages are prerequisites to memory building. Learning is the acquisition of data and actual skills, while concentration is the mind's ability to focus well on something with the least amount of distraction.

Learning

Robert Allen says that individuals learn in three ways: looking, listening and doing. There are individuals who rely mostly on sight, others on their sense of hearing and still others who learn by doing. Certain measurements exist to gauge one's most predominant learning style. We'll deal briefly with some of these practical tests:

For instance, after watching a movie, which part do you remember most - the dialogue, the action sequences, or the things you did, like driving to the cinema, buying the movie pass and popcorn? If you answered "dialogue", that makes you a listener. If you answered "action sequences", you are a looker, and if you answered the "things you did", that makes you a doer.

Another example: if you moved to a new city, how would you find your way around: (a) ask people for directions, (b) buy a map, or (c) walked around the neighborhood to

familiarize yourself with the layout of the city? If you answered (a), you are a listener, if you picked (b), you're a looker and if you chose (c), you are a doer.

Of course we need more scientific tests to determine how a person learns and what type of learner he is – a listener, a looker or a doer. Two or twenty two questions will not result in an accurate assessment, but Allen's examples at least give you an idea of his learning theory; and as we said earlier, learning is an essential ingredient of memory.

A learner who listens is one who enjoys sounds – especially words – and finds powerful meanings in them. Listeners tend to remember best what they've absorbed through their sense of hearing, rather than from any other sensory perception. Lookers, on the other hand, react best to visual stimuli so anything they see is understood and retained more efficiently. The doers are individuals who like to roll up their sleeves and dig into the trenches. They put emphasis on practical experience; to them, doing things hands-on holds more meaning.

Allen believes that it is rare for anyone to learn things exclusively in one style. He says the best form of attack would be to combine all three learning styles and adapt each one to a given situation.

Concentration

You can have the best tutor for memory building, but if you can't concentrate, it would be difficult to have much of an efficient memory. Concentrating is a difficult art to master; look how much technology has taken over our lives. In the mind-training courses he took throughout his life, Allen says there is one technique that might help some individuals develop their concentration skills. This one is adopted from a Far Eastern culture, he says, and is a century-old practice, but is still valuable. It sounds easy enough but your initial efforts at actually doing it may seem futile:

Light a candle and set it on a table where you can see it clearly;

Stare at the candle for two minutes and take in every detail: color, wax, size, the flickering of the flame, etc.;

Close your eyes and keep the image of the candle in your mind's eye – hold this image for as long as you can;

Don't be discouraged by your first or second attempt. Keep trying until you can hold the image of the candle as long as you can.

Now that we've dealt with the two indispensable ingredients for memory building, let's "concentrate" on the ways to improve our memory:

What do you think is the most fundamental tenet for improving your memory? Allen states it clearly. Take care of yourself!

Body and mind are one. Don't kid yourself thinking that you can set about your merry way doing things you want to do and neglect your physical self. The following rules, Allen says, are things you hear repeatedly. They still have their weight in gold – old advice but good advice, so pay heed to them:

1. Sufficient sleep

Not having enough sleep is a barrier to concentration and learning. On those days where you had insufficient rest and sleep, were you as productive at work or in school? Did you remember more and retain more, or did your brain feel fuzzy?

2. Balanced Meals

The experts have stressed, over and over again, that a good, balanced meal is therapy for stressed-out and burned-out lives. Good, healthy eating is essential for our memory to function at an optimal rate. Without the fuel our body needs, how can we expect our mind to be at its peak performance? Fresh fruits and vegetables should fill your plate. According to researchers, those who eat breakfast have heightened powers of recall than those who skip this important meal of the day.

3. Fresh Air

To benefit from fresh air, learn to breathe properly, and to be concerned about the air quality in our homes and offices. This means that as much as possible, we should have a window open while working, maintaining a comfortable temperature in the room. Stale air that is not allowed to circulate properly affects our concentration and mental processing abilities.

4. Physical Exercise

Not many people appreciate aerobics or weight-lifting. If you're one of them, go for long walks or swim laps. The idea is to exercise at least 30 minutes per session most days of the week.

5. Alcohol and Smoking

Big NO! The famous “hang-over” we talk about after a night of partying and “boozing-up” can impair our thinking, concentration and memory. For our memory to work, eliminate alcohol and smoking from your routine especially if you do it to excess. An occasional slip-up may “produce a mere memory blip, but long-term abuse can mess up your mind in various unpleasant ways. Loss of memory will certainly be one of them.”

In Chapter Fifteen of this e-book, we have prepared a worksheet for memory building exercises, culled from a few works from recognized experts on the subject.

Memletics: Hype or Truth?

Memletics should not be confused with mnemonics, although the two are closely linked. Mnemonics has been in use for several decades but it won’t hurt to “refresh our memory” a bit: mnemonics is a memory helper and serves an educational purpose. Most of it is verbal and special words or phrases (and sometimes even poems) to help an individual remember something – as in lists.

Mnemonics presupposes that there are two kinds of memory: natural (the one we’re born with) and artificial (the mind training tools we learn, practice and use to remember a considerable amount of data). Some people have advanced the idea that memory feats could be achieved with a properly-trained mind that the natural memory may be incapable of achieving.

Memletics is an offshoot of the revolution that gave rise to many memory and learning techniques that have been created, designed and marketed by individuals and companies.

The entrepreneurs who came up with Memletics – which they define as an accelerated learning program – say that it is really all about mental fitness. Memletics comes from two words: “memory” and “athletics.” It rests on the principle of mental fitness as the triggering factor for better learning and better memory through the use and application of several approaches. The developers call it an integrated learning system that enhances brain performance. The brain has a vast reserve of “raw material” and the course aims to help individuals process this raw material, so that unused powers of the brain come to the forefront.

The company who developed Memletics claims that it is a unique program because it compiles the research findings from different undertakings involving human performance. An improved memory is one that is mentally fit. And it is this degree of

mental fitness that determines a person's ability to learn and remember new information.

We have read a few testimonials from people who have taken the Memletics program – some have praised it for producing a marked improvement in their memory. The Memletics developers explain that just as you don't expect to run a marathon after having jogged a week, you can't expect these mindtraining techniques to instantly endow you with a photographic memory. Your muscles take time to develop, and for them to reach their full potential, you have to use them consistently over a sustained period of time.

The same holds true for your brain, which as you know, is also a muscle which needs to be trained.

This is one testimonial that was obviously written by a student:

“I was searching for study tools. I was randomly googling for learning tools, accelerated learning, memory techniques etc. Suddenly I came across one site <http://www.learning-styles-online.com>. This site has a learning styles inventory test. It is a 70 questions test with simple questions. I did that test and they showed my inclination about how my learning abilities are less in some areas and how they can be improved. On this site I got the link site <http://www.memletics.com> which they explain as Memory Athletics.”

Two more testimonials (this time from individuals who purchased the manual/book from Amazon:

“I am a professional investment advisor with a national firm (for 12 years) and have a four year degree from a major university in Finance. My advice to you is to NOT invest your dollars here!

I bought this book because I am studying for the CFP (Certified Financial Planner) exam. I fell for the hype from the back page of the book, and I am embarrassed because I should have known better than to trust these sources I'd never heard of; hokey testimonials. I also failed to really evaluate that Amazon average "5 star" customer review. Ouch. It must've been late that night.

If you want slightly above juvenile writing ability, a couple hundred pages of hackneyed phrases, goofy charts and pictures, and pathetic documentation, you'll find these attributes in "Memletics." At \$50 a copy, this book is a real rip-off! It represents little more than slick marketing (legit looking cover/techy-sounding title) of a hodge-podge of information that is, for the most part, at least twenty years old.

The index to this book was my first clue that the author is at best a hack (it is out of sync with the book...if it says "noise and concentration" p 34, it's really on pg 32...). Basic errors like this set the tone for worse things to come (like the horrible writing). It's like one of those "vanity press" cookbooks only worse."

We had to extract only the relevant comments for the book review but we have provided the link in the footnote so you can read the entire review, if you wish

Here is the last testimonial from a Chinese student who is studying to be a doctor and who also bought it from Amazon.

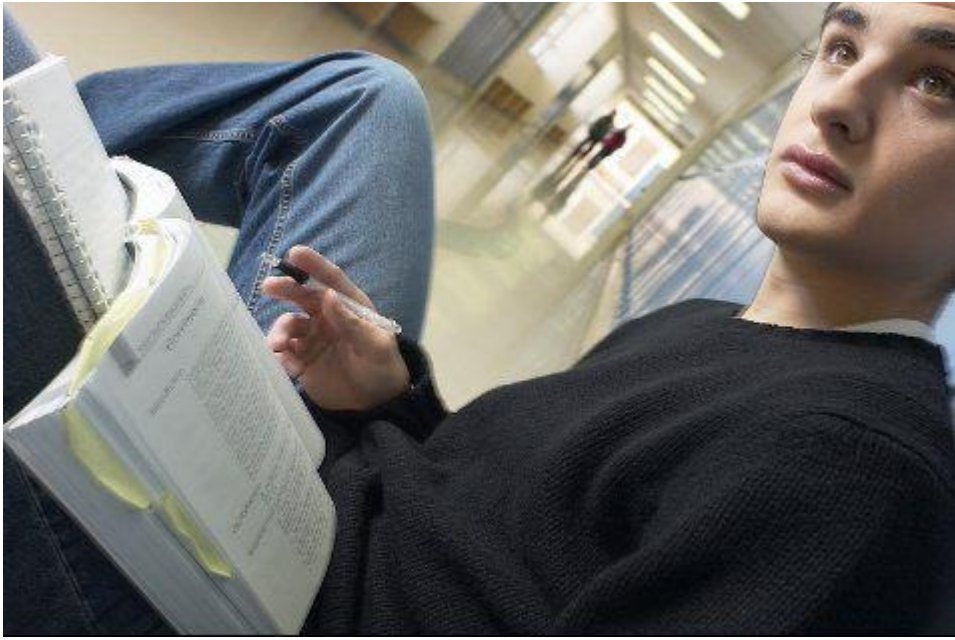
"FYI, it did not seem to be a great book when I first skimmed it. I'm skeptical. But, then I made straight A's. Now I need to go back and pay attention to it! This book changed my life. I was getting stressed out. I'm middle aged, back in school and working. I know I'm trying to do too much. But, I want to go to school and I have to work. I want to do it all. But it was clear I could not keep it up, I was stressing. Then, finally, a system that works. So I can get good grades, and more importantly learn! I just knew there had to be a better way, and this is it. Before this book, I was struggling. I'm in Chinese medical School. It is fact intensive, complex and intense. Classes are 'taught' by Doctors who are not teachers. My grades were good, but I was working too hard, and spending hours and hours at re-learning things I kept forgetting. I had no time to question, what I was being told, or to understand. Worse, tests were full of questions that expected me to see relationships. Now, I can get thru it all. Now, I know what to do and how to do it. Memletics is especially good when there are just too many facts to cram in my brain. So far, it is a great book, but I've just started to use it. It has more to offer, that I have not tried yet.

In reading the description of the Memletics course program, it does say that without much mental effort on the part of the user, their product cannot improve memory. They warn people to stay away from a product that promises to improve memory without effort. They compare it to taking a weight pill without exercising.

Therefore, based on the testimonials we came across, one individual out of three gave a negative review. No doubt it has helped improve the learning and memory abilities of individuals; and these individuals most likely performed the exercises asked of them.

People who seek treatments for their illness report improvement while others lament the side effects of the treatment. It is the same with mind-training tools and approaches. One program may work for some and it may fail for others. The trick is to use your judgment and assess your own progress and skills.

So to answer the question: is Memletics hype or truth? We would have to say, it depends how much you **want** to gain from it.





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AUTHORS

Hari Shankar | Gouri Krishnan | AR Rahman
Linson Mathews | Sara Johson | Reddy Roy