Cognitive Renewal Strategies

Research Report

Center for Creative Leadership®

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Cognitive Renewal Strategies

The world of leadership has become increasingly volatile, uncertain, complex and ambiguous. The acronym that is often used is VUCA. The catch-22 of course is that the more VUCA the world becomes, the more difficult and challenging it can be to develop habits that promote renewal. Yet, if leaders want to thrive and be at the top of their game both cognitively and physically, they will need to create habits and rituals that allow for recovery and renewal. To quote a recent article in the Harvard Business Review, *"Resilience is about how you recharge, not how you endure."*

For athletes, recovery is the holy grail of improved performance. Enhance recovery and you enhance physiological adaptations. Thus in the athletic arena, there is a lot of interest and study on how to improve and implement recovery and renewal strategies. For leaders, however, this receives scant attention. Working harder and longer is rewarded, with little attention to the toll that this can take mentally, emotionally and physically. Burnout, health problems, and cognitive impairment can result. Personal and professional relationships, not to mention the ability to lead well, may also suffer over the long term.

Mental fatigue is the psychobiological state of tiredness that makes your brain foggy and slows you down in a number of different ways. It is a state caused by prolonged periods of demanding cognitive activity. This can come on gradually and is cumulative. It is not always easy to know when you have it, but eventually its impact will be felt. There is a decreased ability to react to things, reduced confidence, feelings of 'tiredness' and a 'lack of energy', and a decrease in mood and motivation. In other words, anything that requires effort, either mentally or physically, takes a hit. There is resistance against further effort and a decreased level of commitment to any task. Emotions can also take a turn for the worse as can the ability to focus, plan and be creative. In short, mental fatigue hurts cognitive performance. [1], [2]

So physiologically, what is happening when we are mentally fatigued? One proposed mechanism is that there is a buildup of adenosine in the brain and a reduction in dopamine. Adenosine is a byproduct of the breakdown of ATP or adenosine tri-phosphate. ATP is the energy currency of our bodies. It is the final step in the metabolic break down of fat and glycogen (or the storage form of glucose) and is what provides the energy for muscular and cognitive work. Without its production, well, we would be dead.

Adenosine accumulate within the brain during periods of wakefulness, during periods of intense physical exercise and during effortful brain activities, such as the daily grind of an executive's workday. [1] Adenosine dissipates during sleep, thus sleep is a critical component of cognitive renewal. Higher adenosine also inhibits dopamine release (via its binding to A1 receptors). Dopamine, known as the pleasure hormone, plays a role in improving mood states and is an important modulator of learning and motivation. [3] Thus, declines in dopamine also contribute to cognitive fatigue.

Increases in adenosine will occur over the course of a long day, but it can also go up in response to short intense bouts of cognitive effort. Strategically taking brain breaks following these bouts can help replenish substrates, such as glucose, and reduce adenosine levels. Thus, recovery can occur throughout the day in addition the important longer recovery of a good night's sleep.

Of interest is that caffeine has a similar structure to adenosine. Binding of caffeine to the A1 receptors therefore inhibits some of the fatigue inducing effects of adenosine. Thus, caffeine can provide a bit of a mental boost. While judicious use of caffeine can help and be a good thing on occasion, indiscriminate use is not helpful. Many people get into a downward spiral of fatigue, followed by use of caffeine to offset the fatigue. Overuse of caffeine will never allow for full recovery, rather it just masks the symptoms. The other concern is that the half –life of caffeine is 5-8 hours (some people are slower metabolizers and others are faster). Thus, if you have a strong cup of coffee in the morning, 5-8 hours later you still have 50% of that caffeine in your system, 5-8 hours later, you have 25% still in your system. This can create chronic levels of caffeine, which in turn will interfere with sleep, even when you do not think that it does. [4]

The term “wired and tired” has been used to describe this vicious cycle of poor sleep and caffeine stimulation. Of interest, if you want to accelerate the breakdown of caffeine in the liver, eat lots of broccoli (or other cruciferous vegetables); these are the detox foods of the plant kingdom.

But, back to the brain.

The brain is particularly demanding in its use of resources. It consumes 15% of our total cardiac output, 20% of our oxygen uptake and 25% of our total glucose. [5] When it is working hard, it demands more energy than fully working quadriceps. It burns through a lot of glucose, and indeed, factors such as hypoglycemia or low blood sugar, limited glucose intake and/or glucose depletion, will profoundly increase adenosine levels and reduce cognitive abilities that require effort. [6]

Given all of this, what can one do to mitigate cognitive fatigue and renew cognitive function? Presented below are a number of strategies that will help. These will not prevent cognitive fatigue, as that is par for the course. However, these habits will help create greater cognitive resilience and allow for renewal of reserves. It will also serve to enhance certain types of cognitive function, such as creativity, executive function, and certain types of memory. These key strategies are not difficult to implement. They may require some changes in habit, some unlearning of other habits and some discipline (the greater environment is not conducive to implementing these), but done consistently will be worth the time and effort. The five areas discussed are sleep, nutrition, exercise, nature and meditation.

Sleep

Of all the possible renewal strategies, this is probably the most important, but also one that many leaders find most challenging. Travel and unpredictable schedules can wreak havoc on the best of attempts at good sleep.

Our bodies modulate sleep patterns in two ways, our circadian rhythm and our homeostatic systems. The circadian rhythm is regulated by the superchiasmatic nucleus, a small group of nerve cells found in the hypothalamus. [7] This is known as our central clock. However, we have peripheral clocks as well, as our other organs function on a circadian cycle (cira-around, dian-the day). [8, 9] This is known as chronobiology. The definition of jet lag is when our external cues do not align with our internal clocks.

The homeostatic system is the body’s attempt to balance wakefulness with sleep. As awake time increases, so does the drive to sleep. Thus, the sleep drive is lowest early in the day when adenosine levels are low and the drive to sleep increases as adenosine levels increase. The best way to reduce

adenosine levels is to get a good night's sleep. Lack of sleep or disrupted sleep will result in a stronger sleep drive during the day, especially during times when our circadian rhythm takes a dip, such as early to midafternoon.

It is also important that both the circadian rhythm and the homeostatic systems are aligned. Another definition of jet lag is when they are out of sync with each other. Misalignment can create chronic sleepiness and/or chronic sleep disruptions.

Most people recognize that getting 7-8 hours of sleep per night is the sweet spot. True some people need more, and a small percentage of others can get by on less. Most leaders we surveyed fall short of this, as average sleep times are around 6.6 hours per night.

However, consistently getting 7-8 hours a night can be challenging. Rather than stressing about this, a more practical approach may be to aim for a certain number of hours of sleep per week. If you are in the 50-60 hour range, than you are where you want to be. This can include naps and nights where you get more than 8 hours. Yes, ideally, you want to consistently aim for to 7-8 hours per night, but aiming to increase total sleep volume per week is also important if your nightly sleep hours are less than consistent.

To track your amount of sleep, the old-fashioned pencil and paper method is best. Most wearables are not research grade, are based on movement (so if you are lying very still, it counts as sleep) and certainly do not have the ability to measure deep versus REM sleep. So jot down about how much sleep you get each night and see what your weekly count is. As a side note, if you can get to bed earlier rather than sleep in later in order to catch up on some hours, this is a better approach. Remember the sleep before midnight is "money time" sleep.

What many people do not realize is that there is a strong connection between diet and sleep. Eating a more nutrient dense plant focused diet may help to improve sleep. Many plant foods such as walnuts, cherries, berries, and tropical fruits contain melatonin and have been shown to increase serum levels of melatonin. Studies show that tart cherry juice or kiwi fruit consumed prior to bedtime will improve sleep. [10] [11]

Increased gut microbial diversity is also linked to better sleep and less stress and anxiety. A healthy gut produces 90% of our serotonin, 50% of our dopamine and over 30 other neurotransmitters. Low fiber intake, too much alcohol, consumption of processed foods and artificial sweeteners, too much stress, lack of exercise and poor sleep all hurt gut health, which in turn hurts brain health. [12] The key to improving and maintaining gut health is to eat a wide variety of fibers and starches by eating a wide variety of minimally processed plant foods.

For more on the physiology of sleep and strategies to improve sleep, see the Caring and Feeding of the Leader's Sleep. http://www.sharonlarsen.org/papers.html

Exercise

The brain benefits of exercise are clear. Exercise enhances memory and learning, improves executive function, counteracts age-related declines in mental function and protects against age-related atrophy in those brain areas that are crucial for higher cognitive processes. [13] It is also therapeutic in that it

can help treat and prevent depression. Incidentally, depression is linked to cognitive decline, which by itself is a good reason exercise. [14]

The mechanisms behind these improvements are complex and beyond the scope of this paper. However, in short, exercise is anabolic to the brain. It increases our levels of brain-derived-neurotropic-factor (BDNF) and other growth factors like insulin-like growth factor and vascular endothelial derived growth factor (VEGF).

BDNF is like fertilizer for the brain in that it promotes production or proliferation of new neurons and promotes survival of these neurons. Studies show that BDNF does its best work when we sleep. Regular exercise in turn is associated with improved sleep. Here is a perfect example of the synergy that occurs between different health promoting behaviors. As you will see below, there are also synergies between exercise and food when it comes to enhancing brain function.

VEGF helps to increase both the size and number of blood vessels within the brain, which in turn improves blood flow. [13] Given that the brain is such a blood hungry organ, anytime you can increase blood flow to the brain you will see an uptick in brain performance and long-term brain health.

From a recovery perspective, increased blood flow is critical. Increased delivery of nutrients, oxygen and removal of waste products will all serve to enhance brain resiliency and recovery.

Exercise can also boost production of dopamine. Remember, dopamine levels go down as adenosine rises. Dopamine plays an important role in motivation and learning. Motivation "looks forward" to future reward serving to energize current behavior. Learning "looks backward" at states and actions in the recent past. Dopamine appears to prompt both at the same time. [15] Dopamine plays a key role in determining whether it is worth exerting effort towards something, including tasks that require cognitively demanding, decision-making strategies. It can also speed up the time it takes to make decisions and take action. Thus, increasing dopamine via exercise can come in handy in a fatigued state when motivation to do difficult tasks is low.

Exercise, however, is a double-edged sword. Exhaustive exercise can increase adenosine levels, increasing mental fatigue and motivation to do cognitively demanding tasks. By exhaustive, I mean long bouts of exercise that are quite intense. If you are training for a marathon, save that 20-mile run for the weekend and try not to schedule demanding work afterwards. Doing more moderate exercise or shorter bouts of exercise with some intensity during the week is the way to go. Finding the right balance between exercise that is restorative and exercise that exhausting is important and likely different for different people.

That said, light exercise such as doing household and occupational activities may not help that much, at least over the long-term. One study found that these activities resulted in no improvement in Alzheimer's biomarkers whereas activities that required the repeated use of large muscle groups, like jogging or swimming did. [16] It is likely that a threshold of intensity needs to be achieved in order to reap the benefits of exercise.

Another study found that even a single 20 min session of moderate aerobic exercise (70% of age predicted max heart rate) was able to improve the brain's functional connectivity in young healthy adults. [17] Increased connectivity is good for cognitive performance and long-term brain health.

Numerous studies support this finding and show that there are immediate benefits to the brain post-exercise, in addition to the long-term benefits. [18]

Executives are increasingly aware of the beneficial effects of exercise. When we compared executives attending the Leadership at the Peak program prior to 2006, to those attending more recently, we found that the percentage of those who exercised in a regular basis had increased in males from 46% to 53% and from 36% to 49% in females. This represents a major shift in the number of executives who are exercise regularily. The amount of time spent exercising has also increased from an average of 3.8 hours per week to 5 hours per week on average.

In conclusion, short bouts of movement and reduced sitting time will go a long way to improve and renew cognitive function. Taking hourly exercise breaks like vigorous stair climbing or a 20 min brisk walk outside at lunch, are relatively easy ways to incorporate daily exercise.

Food

Food and exercise also work synergistically to improve cognitive function. Similar to exercise, certain foods can increase and improve blood flow to the brain, especially in critical areas that are prone to hypoxia. In fact, intense exercise can create acute hypoxia, which can be offset by the consumption of certain foods.

However, before we go there, there are certain foods and constituents of foods that hurt blood flow to the brain. If you have ever experienced a "food coma", below is one of the reasons why that happens.

When we eat high fat foods, like ice cream (sorry), burgers, deep fried foods, butter, cream, pizza or even foods soaked in vegetable oils we get something called "dietary fat-induced postprandial lipemia". [19] In other words, we get a lot of fat flowing in our blood stream post meal. The effects of this are not good for a number of reasons, increased risk for atherosclerosis (or arterial plaque) for one. Another term for this postprandial increase in blood lipids is plasma lactescence. Lactescence is what happens when the plasma becomes milky and cloudy due to high levels of fat in the blood. [20]

From a brain performance perspective, this is not good. For starters, it impairs cognitive functions such as reaction time, attention and alertness. [21] It also results in something called red blood cell aggregation, where the red blood cells lose their ability to repel each other and they clump together. In fact, the red blood cells actually absorb fat in their membranes. This has the effect of significantly slowing blood flow and reducing oxygen availability. [22] In one study where they fed subjects some cream, their blood flow was reduced by 20% at peak lactescence. [20] Incidentally, a cornstarch-based meal did not have the same effect. [19]

Fatty foods also negatively impact the endothelial cells, or the cells which line our arteries. Our arteries are not just rigid pipes; they are living, breathing organs that actively dilate or constrict, thinning or thickening the blood and releasing hormones. A single layer, the endothelium, comprised of endothelial cells, controls all of this. [23] Eat a fatty meal and endothelial dysfunction occurs. Arteries stiffen; inflammation and oxidative stress goes up. To quote one paper, *"the Western diet has been advocated as a most tough villain against endothelial health because of the concept that repeated exposure to high-fat meals per se may damage the endothelial cells, hence promoting atherosclerosis. This issue,*

"post prandial endothelial dysfunction" has been a major topic in the field of clinical research for a decade." [24]

One way to study this is to measure something called flow-mediated dilation (FMD), or the ability of the arteries to vasodilate in response to increased blood flow. Eat a fatty meal and you will see a significant decline in the ability of the artery to dilate. [25] The fatty meal makes the arteries stiff and much less responsive or less vasoactive. [26] Fortunately, this effect is transient, lasting for only a few hours, but eat another high-fat meal in a few hours and the damage starts to accumulate.

One study found that when rats consumed a high-fat diet, there was an immediate and dramatic decline in cognitive function and working memory, regardless of whether they had exercised or not. [27] Additionally, physical performance declined by as much as 50% in those eating a high-fat diet. One reason is that using fat for energy is less efficient, i.e. it takes more oxygen to produce the same amount of energy when fat is used. The brain is also an obligate glucose user. Fatty acids, and in particular saturated fats, can also damage the blood brain barrier. [28] Studies have shown that diets high in saturated fats also reduce levels of BDNF. Reduced BDNF, in turn, hurts learning and memory processes. [29] [30]

Fats that come packaged with fiber, antioxidants, and phytonutrients, however, such as walnuts are good for the brain and improve endothelial function. [31]

Antioxidant rich foods also help to improve FMD. Italian researchers compared FMD on a low antioxidant diet (but similar in macronutrients and calories) to a high antioxidant, diet and FMD improved significantly on the antioxidant rich diet. [32]

Even a high carbohydrate, high fiber meal (all-bran and whole grain bread) that was low in fat, was shown to improve FMD. [33]

As importantly, however, brain scans show that consumption of antioxidant rich foods such as blueberries improve blood flow or perfusion within the brain. One study compared chronic consumption of 30mL of blueberry concentrate to an isogenic placebo. Those on the blueberry juice had significant increases in brain perfusion as well as improved brain activity. There was also evidence of improved memory as well. [34] Another study found that high flavanol intake from cocoa resulted in an increase in cerebral blood volume compared to a low flavanol group. [35] Dentate gyrus function (a region in the hippocampus whose function declines with aging) also improved in healthy older adults who consumed the flavanols.

Plant polyphenols also enhance angiogenesis, or increased production of blood vessels in the brain, probably even more so than exercise. However, exercise serves to enhance this effect. [36] Of interest is that those who exercise show increased absorption of nutrients such as antioxidants, by as much as nine fold. So here again, we see a nice synergy between diet and exercise. [37] The sum of the whole is greater than the sum of the parts.

An important point to make however is that just adding some blueberries to your diet while a good thing is not going to cut it. What is most helpful is to eat across the spectrum of plant foods. Different plant foods provide different types of antioxidants and nutrients and there is a synergistic effect when we eat a variety of plant foods. One study, for example, found higher cognitive function when a variety of fruits and vegetables were consumed compared to just the total intake of fruit and vegetables. [38]

Another study found a dose dependent relationship between cognitive function and increased fruit, vegetable, mushroom and whole grain consumption. [39]

Other foods also shown to improve blood flow to the brain are foods that are high in nitrates. However, when people hear nitrate rich foods they think of processed meats like lunchmeat and bacon. Alas, the nitrates in these foods convert to nitrosamine, a class 1 carcinogen also found in cigarettes, (it is the most cancer-promoting carcinogen found in cigarettes). The phytonutrients in plant foods (like vitamin C) prevent this conversion from taking place. Thus, eating more nitrate rich foods like leafy greens and beets, or in the case of a number of studies, beet juice increases production of nitric oxide and improves blood flow and arterial health.

Even a single 450 ml dose of beetroot juice resulted in improved cerebral blood flow and cognitive performance compared to a nitrate free placebo in healthy adults. [40] A similar study where participants consumed a high nitrate versus a low nitrate meal also found increased perfusion to critical areas of the brain that were most prone to hypoxia. In particular, those associated with executive function were affected the most positively. [41] Thus, we should be eating these foods throughout the day.

In addition to beets and beet juice, foods highest in nitrates are leafy greens like arugula (or rocket lettuce), spinach, beet greens and Swiss chard. These have been shown in studies to increase nitrate plasma concentrations. [42]

However, how do these nitrate rich foods work to improve blood flow?

Nitrates from these foods are converted to nitrites by your friendly mouth bacteria. These in turn get absorbed from the intestine into the circulation, which become bioactive nitric oxide in tissues and blood. In addition to protecting the arteries from plaque deposition, nitric oxide is a potent vasodilator. It is also important for mitochondrial biogenesis (the creation of new mitochondria, the energy factories of the cell), glucose uptake and muscle contraction and relaxation. [43] An important point is that when you do eat these foods it is best to not use mouthwash as that hurts the mouth bacteria and the conversion to nitrites. All in all, protection of the endothelium and an improved ability to vasodilate is good for blood flow.

The final study I want to share looked at the combination of aerobic exercise training and beetroot juice consumption. What they found was there was slightly enhanced connectivity between parts of the brain with just the exercise, but there was an even bigger effect in the exercise plus beetroot juice intervention group. To quote, *"The exercise plus [beetroot juice] group developed brain networks that more closely resembled those of younger adults, showing the potential enhanced neuroplasticity conferred by combining exercise and [nitrate-rich vegetables]."* [44] Thus, the combination of exercise and healthy eating is particularly powerful tools to keep our brains young and highly functioning.

In conclusion, food can profoundly affect brain performance and renewal, either for the positive or the negative. The effect of plant polyphenols on the ability to improve blood flow to the brain might even be superior to exercise. However, eating a plant-based, antioxidant rich diet that is naturally low in saturated fat and cholesterol, in combination with exercise could be even more powerful. [45] However, as it turns out, exercising in a natural environment is also a good idea.

Nature Breaks

Our environment plays a significant role in how we think and behave. The modern environment that most people experience living in urban areas is characterized by a dramatic decrease in exposure to nature and an increase in exposure to technology. The vast majority of people spend about 90% of their time inside with little to no exposure to natural settings. Urban living is also associated with increased stress and related diseases.

The ability of nature to improve creativity, mood and attention is so powerful that a number of companies are now creating biophilic environments. Biophilic design incorporates natural elements into the workspace. Studies indicate that exposure to nature reduces stress, rumination, and improves cognition, affect, creativity and productivity. [46] Companies such as LL Bean have created outdoor workspaces for their employees. Other companies such as Amazon have “The Spheres” which are packed with plant life into which they have incorporated workspaces. Apple headquarters have unabated views of the outside with a forest at the center of its “spaceship” ring.

However, can nature breaks help with cognitive recovery? At the heart of the research on nature and the brain is an idea called ART or Attention Restoration Theory. ART is based on research showing that there are two types of attention.

The first is voluntary or directed attention where attention is directed by cognitive-control processes. In other words, this type of attention takes some energy, requires focus and is what we use throughout the workday. It also helps us to manage our emotions.

The other type of attention is involuntary attention where attention is captured by inherently intriguing or important stimuli. According to ART, interacting with environments rich with inherently fascinating stimuli such as looking at a sunset or mountain views, allows directed-attention to replenish. Thus, after spending time in nature we perform better on tasks that require focus and directed attention. [47]

Thus, being in nature is both restorative, and can be used as a vehicle to improve cognitive function. One study found a 50% increase in creativity after an extended time spent in nature. [48] Another study compared walking outside in nature to walking on a treadmill. Walking outside produced the most novel and highest quality on tests of creativity. [49] Interestingly there was a residual effect on creativity after being outside, in that creativity received a boost once seated back inside. Walking outside in a natural environment has the double benefit of exercise and being in nature. This is of particular interest when one considers the difficulty of discovering training regimens that can improve cognitive performance in any way.

Being in nature is also mood elevating and can benefit health and reduce sick days. If there are no parks or tree-lined streets nearby bring nature into the office by adding potted plants. Even just looking at pictures of nature is beneficial. [46]

Meditation, Mindfulness, and the Importance of Being Quiet

The final strategy is to take some quiet time for the brain. One tried and true method to do this is to engage in activities that relax the brain such as nature and meditation. Meditation, however, seems a bit counterintuitive. How can something that requires such focus be restorative, especially if, like me, you are not very good at it. Nevertheless, the data are quite compelling.

Researchers from Harvard found that a calm or quiet brain with less neural activity could lead to a longer life while excitation of neuronal activity hurt cognition and reduced lifespan. Scientists have discovered a transcription factor called REST that serves to maintain neural homeostasis and buffer against neural excitation. Boosting REST led to lower neural activity and longer lifespans while suppressing it did the opposite. [50] So does meditation boost REST? Good question, to my knowledge, that has not been studied, but meditation can help to slow brain activity leading to synaptic downscaling. Synaptic downscaling aims to renormalize synaptic loads after a waking period and helps to prepare the brain to receive new information during subsequent wakefulness. [51]

Meditation refers to a variety of techniques that encourage mental self-regulation and the purposeful focusing of attention, with the goal of promoting relaxation and inducing a particular state of consciousness. [52] While it does require focus, it is a focus on the present in a non-judgmental way, relieving us of worrying about things that may happen in the future and anxiety about things that have happened in the past. Its practice may therefore serve to increase cognitive reserve, enhance cognitive function and alter neurological pathways. Indeed studies of meditation have found that the practice of mindfulness and meditation helps to improve one's focus, attention, and improvements in regional cerebral blood flow and white matter connectivity. It can also induce theta brain waves, which help to confer a state of relaxed wakefulness. Theta waves are increased in almost all relaxing activities, even if they involve complex actions like playing the piano or skiing. This is also referred to as being in the "flow" or "in the zone". [53]

One group of researchers employed a 16-week meditation program of 10-minutes of daily practice. They observed improved focus, attention and efficiency of cognitive processes. [54] Another study by Harvard researchers found that meditation can change the expression of genes that regulate inflammation, apoptosis (or programmed cell death, a good thing) and oxidative stress in only a few weeks. They found a dose response, in that the more trained people became in meditation, the more it beneficially changed these genes. [55] Another thing that happens is that meditation can send inhibitory signals to your amygdala (the emotional part of the brain where fear and anger are triggered). Those who meditated for about thirty minutes a day increased the size of their hippocampus, but also decreased the size of their amygdala (resulting in less anger and fear). [56]

There are many ways to meditate, relax, and practice mindfulness and quietness. For a complete list and tips on how to practice these techniques, I recommend Dr Dean Ornish's book "Undo It" and his chapter on reducing stress. [9] He provides some great tips on how to incorporate this into your life.

Here is a short list.

1. Gentle stretching. This can be doing some yoga or just some gentle seated and floor stretching. Focusing on the movements, the breathe and relaxing as you do it is beneficial in a number of ways. Gentle stretching can be done prior to bedtime or in short bouts throughout the day. Go

to my website for some 5 min yoga/stretching videos if you need some guidance. http://www.sharonlarsen.org/workout-videos/5-min-movement-breaks.html

2. Breathing techniques. When you are feeling tired, taking a few deep, full-body breaths creates a stimulating effect. Just by inhaling and exhaling deeply and slowly can help you feel more relaxed, and calm. There are a number of different techniques, like alternating nostril breathing, abdominal breathing or three-part breathing. The idea is to break the chain of everyday thinking and to focus on the breath; to deepen it and slow it down. Counting to four or five for each inhale, then four to five for each exhale is a good breathing pace.
3. Meditation. There are many types of meditation, breathe focused meditation, guided meditation, gazing on a picture or object, repeating a word, sound or phrase, or engaging in repetitive movements like yoga, Tai Chi or even walking. The idea is that you practice bringing your mind to focus on one thing, a sound, a phrase, a movement or an image. However you do it, your attention is on the present, without any goal or outcome. Yet it should be gentle, not forced.
4. Deep relaxation. This is one of the most healing practices of all. It is the progressive letting go of tension and stress allowing you rest and restore. [9] One way to do this is to progressively engage and contract your muscles and then relax. Start with your feet, then legs, hips on up to your arms and shoulders. As you relax, breathe deeply as well.

In Conclusion

Getting adequate sleep, incorporating daily exercise and movement breaks, eating a variety of nutrient rich plant foods, reducing intakes of foods high in fat, taking nature breaks and doing some form of meditation are key strategies for optimal cognitive renewal and improved brain function. These strategies have also been shown to have synergistic effects. Long-term brain function and health are also enhanced.

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