

## **Taking Care of Our Brains**

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Good morning! Here are some fun facts about the brain. The average human brain weighs about 3 pounds. The brain is made up of about 75% water. The brain contains 100 billion neurons or nerve cells.

The brain is definitely an interesting organ. After all, the brain is the source of our thoughts and feelings and emotions. These are things that we know exist but that we can't literally put our fingers on. An entire scientific field is dedicated to measuring these things that we "know" exist but that we can't put our fingers on. That field is called psychology. For example, we know that love exists; yet, *how* do we know that love exists? We know that love exists because it exists as a concept in our minds. Most of us would say that love exists even though there is no physical object that we can hold in our hands that we call love. However, we can look at people's actions and say, "ok, that was an expression of love" or "what she did shows that she loves her." Doing nice things for someone, being affectionate with someone, staying up all night with a sick child – those are expressions of love. We know that love exists because people do those things.

Compared to other organs, the brain is special because it creates a reality that guides our thoughts, beliefs, feelings, and decisions. This reality is based on perceptions and emotions that are both real and imaginary. They are real in the way that emotions are real to us. We feel happy or sad or stressed or relaxed or loved or unloved. Yet, they are imaginary in that these perceptions and emotions do not exist as physical objects that we can touch and examine in the physical world. They exist only in our minds, and other people do not see them in exactly the same way that we do.

Maybe because of these intangible aspects of the brain, we tend to make things a bit more complicated than they need to be when we think about how to take care of our brains. Let's step back and think of our brains from a biological standpoint. Let's think of our brains as biological organs and what might be good for these organs from a biological standpoint. Taking care of our brains can perhaps be a lot simpler than we expect, and when we take care of our brains in a biological sense, there are many positive effects, both tangible and intangible.

The field of industrial and organizational psychology provides a good example of how we might make brain care a little more complicated than it needs to be. The field of industrial and organizational psychology applies psychology to the workplace. It uses basic psychological principles and theories of psychology to help improve the workplace, to help employers choose which job applicants to hire, to help leaders become better leaders, to help teams become more effective, to provide training to employees, and to help people perform their jobs better. Industrial and organizational psychology uses all kinds of fancy psychological theories, such as social exchange theory, leader – member exchange theory, goal setting theory, trait activation theory. This is just the tip of the iceberg. Really, there is an almost endless list of theories that psychologists have applied to the workplace in the service of understanding people at work.

While these theories might be valid in their own ways, many of them often fail to take into account a fundamental truth that affects all workers no matter the job or the location: sleep-deprived, depressed workers are not very good workers. If we spent our time figuring out how to help workers get enough sleep and if we dealt with the reasons that people are depressed, then we by default might address many of the chronic almost comically persistent workplace problems that have vexed managers and psychologists for years: people showing up late or not showing up at all, people performing their work poorly, people getting into conflict with coworkers, people being disengaged and unmotivated, and so on.

Today we will think about brains from a biological perspective, and explore the biological basis for good brain functioning. We will briefly review the stages of brain development from childhood through adulthood and the specific brain needs within each life phase. Then we will talk about stress and sleep. Hopefully, this message will not put you to sleep, but if you want to fall asleep, go right ahead! Sleep is one of the best things that we can do for our brains.

The fundamental building block of the brain is neurons. Learning experiences connect neurons to one another. Neurons fire and when two neurons connect, that creates an information pathway. The connection for these neurons is called the synapse. Our life experiences create all kinds of synapses, or connections, from one neuron to the other. As we experience life, we create more and more and more of these connections in our brains. That enables information to flow more quickly from one part of the brain to another. When we're young, we don't have a whole lot of synapses. Infants don't know how to ride a bicycle or write their name or cook dinner. However, as infants develop into people, they eventually learn how to do these things.

The way that they are able to do these things is through repetitive practice. The more you do something, the better you are able to do it. And the reason why is because you create more connections between neurons, so information is able to flow through your brain and allows you to do things like ride a bike or paint or check your email.

In this respect, the brain is the amalgamation of everyone's life experiences. No two brains are identical because everyone on this planet has had different life experiences. The pattern of connections that make up the structure of our brains is unique to each one of us. We can think of these experiences that we have in our lives as feeding directly into our brains, as affecting both the structure of our brains as well as how our brains function.

Our brains are dynamic and constantly changing. If we don't use a synapse or connection, then the brain eventually removes it. But we can create new connections and information pathways based on the experiences that we choose to have in life. We can unlearn bad habits, even those that were formed in childhood and that seem hard-wired, by doing things differently. The new ways of doing things change the structure of our brains. We create new synapses that send information through new pathways. The bad habits, the ones that we want to get rid of, can eventually disappear because we don't use those synapses any more. The brain has a "use it or lose it" policy. If you don't use those synapses that formed the biological basis for a bad habit, then the brain literally deletes those synapses, and we can replace a bad habit with a good habit.

If we think of our brains as an amalgamation of our life experiences, then that begs the question “how much control do we have over what we experience in life?” We can probably all agree that we want our brains to function as well as possible for as long as possible. Therefore, we owe it to ourselves to think about the experiences that we have in life and to think of these experiences as brain food. We can think about what we want to feed our brains.

We can interpret today’s Thought for Contemplation, Walt Whitman’s poem “A child went forth every day,” from a biological perspective. This poem describes how a child experiences the world and that the impressions that the world makes upon the child become part of the child. These experiences are encoded in the neurons and the connections in the child’s brain.

One thing that we perhaps reminisce about most when it comes to our childhood is that intense sense of curiosity. The simplest things, such as an earthworm, or bread dough, or bathtub water, were intensely interesting to us.

The brain is constantly developing and changing throughout our lives. At different times in our lives, the brain needs different things. In early childhood, from approximately two to six years old, the brain grows rapidly, especially the front of the brain. During this time, language, memory, and thinking skills improve. Children need love and warmth from their parents. It is important for parents to respond to their children appropriately, especially when the child is doing the exact opposite of what we want the child to do. In particular, parents must differentiate between love and limits. Children must know that their parents love them, even if the parents must enforce rules. Parents should allow children to explore safely, and should also provide children with structure and routines. Parents should talk, read and sing to their children every day. As we all probably know by now, it is important to limit screen time, and to ensure good health and nutrition.

In late childhood and the early teens, so at around age 10 or 11, the brain begins its final growth spurt. The growth spurt starts at the back of the head and moves toward the front. The cerebellum, which controls physical and motor coordination, develops first.

During the teenage years, the mid-brain develops quickly. The mid-brain relates to motivation and emotional control. During this stage of brain development, teenagers appear lazy. It’s probably not because they are intrinsically lazy; rather, they appear lazy because their mid-brain is developing and that’s what makes them lazy. Because of changes to the mid-brain, teenagers often have trouble reading the emotions of others, which can cause them to become moody and irritable.

During the teenage years, the front of the brain, called the prefrontal cortex, also begins to develop. The prefrontal cortex develops until about age 25. The prefrontal cortex handles a long list of executive functions. These executive functions include focusing attention, problem solving, weighing consequences, making predictions about the future, balancing short-term rewards with long-term goals, impulse control, delay of gratification, modulation of intense emotions, and inhibiting inappropriate behavior. The prefrontal cortex of a teenager is not fully developed, which explains why teenagers tend to take risks and to engage in dangerous behaviors.

For late childhood and the teenage years, the brain needs physical exercise and nutrition. Parents should monitor their teenager's stress level, and provide support as needed.

In adulthood, most of our abilities remain fairly stable until about age 60. Between ages 40 and 60, we have become especially good at problem solving due to the expertise that we have acquired over our lifetimes. Starting at about age 40, our brain weight tends to decline by about 5% every decade. In middle age and older, taking good care of our brains requires physical exercise, good nutrition, mental stimulation, and meaningful social connections.

We have just had a sort of 30,000 overview of brain development over the lifespan and some of the needs of our brains.

We can think of our life experiences as the food that we feed our brains. Like the food that we consume for calories and nutrition, brain food can also be healthy or unhealthy, or good for us or bad for us. On some level, we know which experiences are good for us and which experiences are bad for us. It would be ideal if we had complete control over all of the experiences that we have in our lives so that we would always have good experiences and we would never have bad experiences. However, that is not the world in which we live. Because bad experiences are a fact of life, we have to deal with them. Bad experiences can create stress. When we experience stress, we have to figure out how we're going to cope with stress. How we cope with stress determines many of the life experiences that we have. These experiences affect the structure of our brains. There are different types of coping strategies. Even if we don't have control over what is stressing us out, we do have control over how we cope with it.

We can cope with stress in a productive way or we can cope with stress in a dysfunctional way. We can probably guess what productive and dysfunctional coping strategies are, but here is what the research literature tells us anyway. Productive ways of coping with stress are considered emotion-focused and problem-focused approaches. Productive coping approaches include taking steps to remove the stressor, planning a systematic method to cope with the stressor, asking for help, getting moral support from others, using humor to make fun of the stressor, and using religion as a source of support. Then we have a list of dysfunctional approaches to coping with stress. Dysfunctional coping includes denying that the stressor exists, distracting ourselves so that we can avoid thinking about the stressor, engaging in substance abuse, giving up any hope of dealing with the stressor, blaming ourselves for the existence of the stressor, and venting about the stressor.

Many of the stressors in our lives are structural and real. We need to differentiate between the stressors we can change and the stressors that are out of our control. We need to do this so that we can take care of our brains, so that we can function at our best, and so that we can make good decisions.

One of the things that can be especially stressful is something called impression management. Impression management is when we present ourselves in such a way as to influence how others think about us. We want to control the impression that we make upon people. We want the impression that we make upon people to be good. We want people to think well of us. Keeping

up appearances, if you will, can be extremely stressful because there can be a disconnect between what you want people to think about you and how things actually are. Of course, we want people to think that our lives are great and that we're doing well and that we're happy, but the reality might be very different from that. It can be incredibly stressful when there's a gap between how we want people to perceive us and how we're actually doing.

Impression management is especially common in the workplace. We care what our coworkers think about us. We care what our clients think about us. We care what our boss thinks about us. Therefore, we engage in impression management in order to shape people's impressions of us so that we can make money, obtain a desirable job assignment, receive a promotion, advance our careers, or achieve some other workplace goal.

One of the areas of life where you could say that impression management has gone off the rails is Facebook. Think of a person whom you know quite well in real life and then think about how they present themselves on Facebook. The person could be going through a divorce or dealing with some challenging life issue, something that anyone could be going through, and yet when you pull up their Facebook page it appears as though everything in their life is perfect. Not everyone does this, but many people do this on Facebook.

There has been research on false self-presentation on Facebook. False self-presentation can take two forms. It can be stating things about yourself that are not true. Or it can be "liking" things that you really don't like. Research shows that the more people lie on Facebook, the lower their self-esteem tends to be, the more depressed they tend to be, and the more anxious they tend to be. You can imagine that presenting yourself in a certain way, in a way that is actually untrue, could make you anxious or depressed because you're not being your authentic self. You're not being true to yourself.

Regardless of whether we are talking about our online or offline lives, being ourselves, being our authentic selves, is associated with higher self-confidence, higher self-esteem, and less stress, anxiety, and depression. Our brains are an amalgamation of our life experiences. Those neurons fire based on our experiences in life and then they become coded in our brains through synaptic connections. It is ok to be our authentic selves. It is ok to be who we are. We still need to use our judgment and to adapt our behavior to the situation at hand. But we can still be authentic and we can still be true to ourselves. When we do so, we are taking care of our brains.

In addition to stress, another aspect about how to care for our brains, which probably hasn't received quite as much attention as it should, is sleep. Sleep is a physiological need that the brain has. Recent studies have shown that up to a third of Americans are chronically sleep-deprived. There are all kinds of reasons why so many Americans are chronically sleep-deprived. People who have full-time jobs are more likely to be sleep-deprived these days because in today's economy, people are often expected to work longer hours. People who are especially sleep-deprived tend to be people who have full-time jobs and familial responsibilities. These people are sleep-deprived because they are using hours that they should be sleeping for family obligations or for personal time, such as watching television. And yes, binge-watching until 4am is a constant temptation. We know that we will pay for it the next day, but sometimes we can't help ourselves.

Sleep deprivation essentially slows down our brains. We talked about how our brains are composed of billions of neurons and synapses, and information flowing from one to another. If you are sleep-deprived, then you essentially slow the entire process down. Your synapses are not firing on all cylinders. It's harder for you to make decisions and you tend to make poorer decisions. You have trouble recognizing emotions in other people. So when people talk to you when you're sleep deprived, you have a harder time figuring out if they are angry, or just annoyed, or if they're joking or being sarcastic. Misreading people's emotions can lead to misunderstandings and interpersonal conflict. If you're sleep-deprived, you also tend to be irritable. You are also more likely to make emotion-based decisions, so your decisions are not as good.

When we are sleep deprived our brains don't work as well. We make errors in judgement and perception, our reaction times are slower, and it takes us longer to process information. Driving while sleep-deprived can be as dangerous as driving under the influence of alcohol. A recent study found that fatal car accidents increase 6% during the first 6 days after "spring ahead" in which we lose an hour of sleep. There is no increase in fatal car accidents when we fall back in the fall. So don't forget that something as simple as sleep can have a huge effect on our work, our relationships, and our safety. Sleep deprivation essentially slows down our brains, which makes it harder for us to function.

In his poem "A child went forth every day," Walt Whitman describes how a child experiences the world every day and how that child becomes the sum of his experiences in the world, whether good bad or somewhere in between. Walt Whitman ends with a note that it's not just the child who experiences this, but it is also the reader, and the reader becomes the sum of his or her life experiences. During today's meditation, you thought of something that you loved to do as a child. There was something about that experience that you loved. What was it that you loved so much? We should seek out those experiences, that feeling of excitement and curiosity, whatever it was that made you excited and interested. Maybe you can rediscover something that you loved to do as a child. Or maybe there is something new that you can do that reminds you of that childhood feeling. Think of something to do because you think it will be fun. When you do so, you will be changing the structure of your brain, creating new synapses and new information pathways. Be your authentic self and don't worry quite so much about what other people think. Take a little vacation from Facebook. One night this week, get to bed a little earlier than normal and see if you can get a bit more sleep.

The experiences of our lives shape who we are, not just in an intangible sense, but also in a tangible, biological way. Our life experiences change the physical structure of our brains. Our life experiences create connections among neurons in our brains to help information flow from one neuron to another, from one part of our brains to another. Positive life experiences are good, not just in some intangible sense, but in a real, tangible, biological way. This week, serve your brain a seven-course meal of brain food.