

Creativity & The Brain

Imagination, Daydreaming & Intuition

A Multi-Media Mini-eBook



Mark Waldman

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Money, Happiness, and Success

Part 8: Creativity, The Third Pillar of Wealth

Mark Waldman
& Chris Manning, PhD



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Creativity: Imagination, Daydreaming, and Intuition



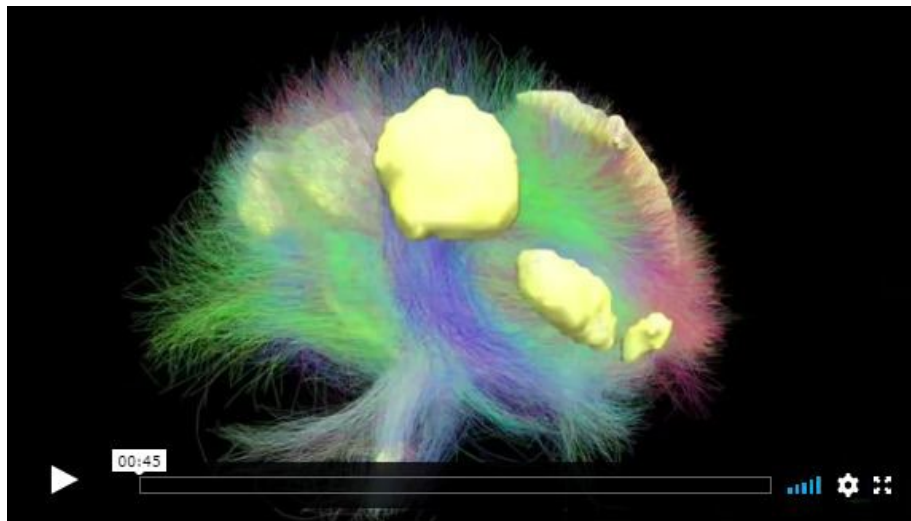
Audio: Taming Your Creative Brain

Although the study of the brain dates back to ancient Egypt, it wasn't until the 1800s that scientists began to understand how neurons influenced a person's thoughts, emotions, and behavior. Only within the last decade have scientists turned their attention to intuition and sudden moments of insight—key neurological processes associated with human creativity. We now know that creative imagination is essential for learning, enhancing personal development, and maintaining a healthy brain.

To understand the distinction between decision-making (Pillar #2) and creativity (Pillar #3), it's important to clarify the difference between consciousness and awareness. Quite often the terms are

used interchangeably, but for the purposes of this book, we define awareness as the bigger picture, one that includes different forms of conscious behavior. For example, you may be barely conscious of the contents of your dreams, but when you wake up, you are often *aware* of the fact that you were dreaming.

The images below exemplify this. Figure 15 shows the location of the motivation-and-reward circuit—the M-Drive—and how the release of dopamine spreads into the lower portions of the frontal lobe to initiate conscious decision-making processes. Figure 16 shows the small areas in the frontal lobe that activate when you are consciously focusing on a goal or task. Figures 17 and 18 (front and side views of the neocortex) show much larger increases in activity throughout your brain when your mind slips into semiconscious states of imagination, daydreaming, and creative problem solving.



Video: When your mind loses focus, you slip into a daydream-like state that governs your imagination, intuition, creativity, and fantasies (Figures 17 and 18). This activates the large yellow areas in the 3D picture above, which is called the Default Mode Network (DMN). The green fibers show the location of the Saliency Network which helps to regulate your emotions

and balance the other areas involved with motivation, decision-making, and creativity. The practice of mindfulness strengthens that network.

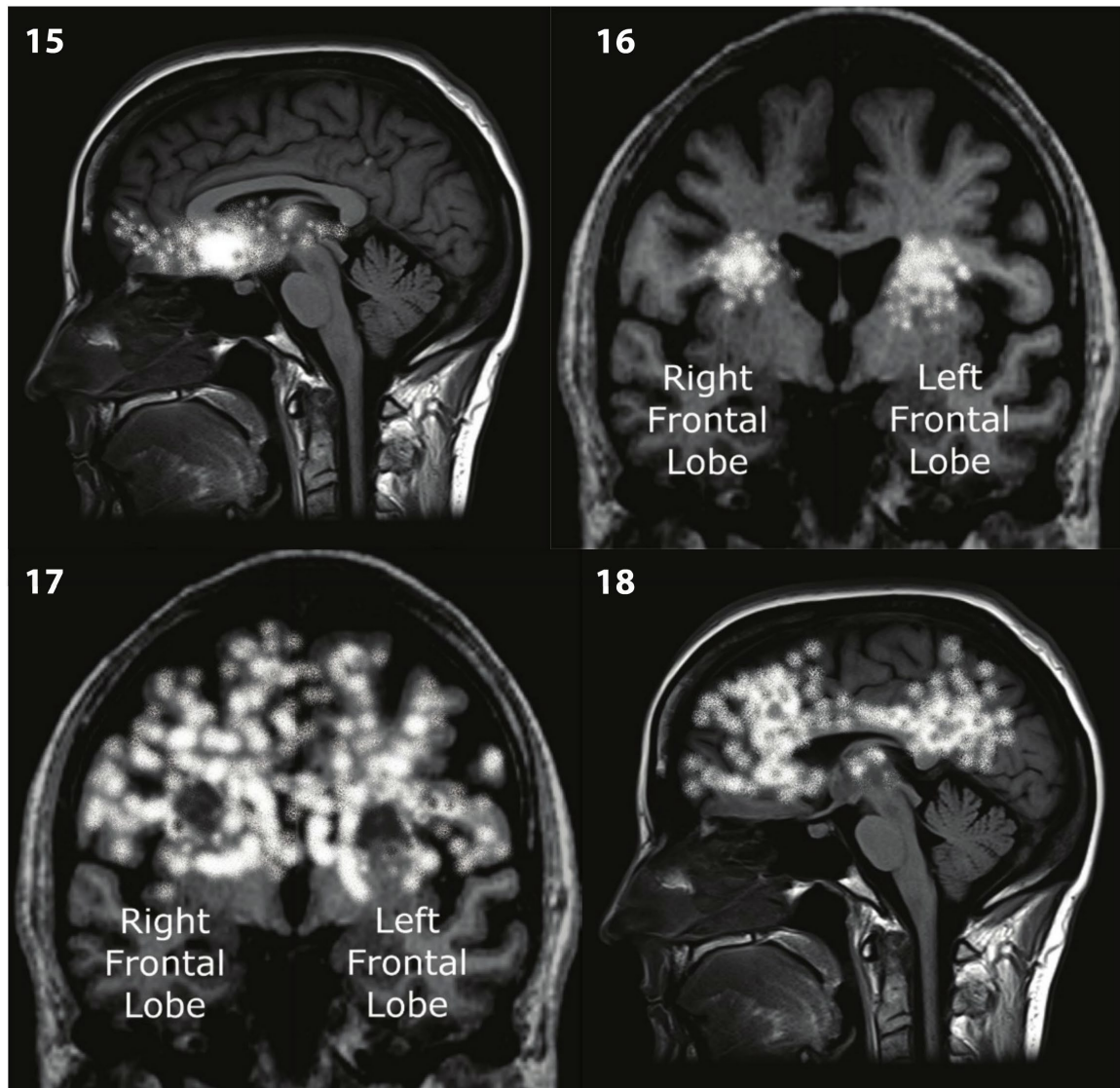


Figure 15: Awareness begins when the nucleus accumbens (the M-Drive) releases dopamine that travels into the frontal lobe.

Figure 16: Conscious decision-making activates a very small area in the front part of your frontal lobe. Other brain areas become less active.

Figure 17: When you relax, the decision-making areas turn off as other frontal-lobe areas activate. Daydreaming, fantasies, and awareness increase.

Figure 18: Creative imagination involves many areas of the frontal and parietal lobes, including the insula and anterior cingulate.

Consciousness (Figure 16) is primarily a language-driven process, whereas awareness (Figures 17 and 18) is more of a wordless “felt” sense, an experience of what is happening in the present moment. Your brain is aware of many things going on around you and inside of you, but consciousness is more limited, a frontal-lobe activity that selectively ignores any detail that could distract you from performing a particular task or pursuing a specific goal. Here’s an example: as you focus on reading these words, you are probably not aware of what you are sitting on. But the moment you shift your conscious attention to the feelings of your body pressing against the chair, your ability to focus on these words rapidly fades. If you then shift your attention to your feet or the background noises occurring in the present moment, you’ll become less cognizant of the chair.

This exemplifies the four to seven chunks of working memory information we discussed in Part 6—our neurological definition of consciousness. With practice, you can expand your consciousness to become more aware of what your brain is constantly processing (Figures 16 and 17, above). Try it right now: see if you can simultaneously be aware of these words, the chair you are sitting on, your feet, and the background noises in the room. It’s not difficult to do, but you’d probably have a hard time describing to someone else what you actually did in your mind. Instead of focusing your attention on just one or two things (called convergent thinking), you allow your mind to become aware of as many

different thoughts, feelings, and sensations as possible. You neither select, judge, nor focus on anything in particular. This is our formal definition of mindfulness. Psychologists and neuroscientists call it open monitoring, or divergent thinking, a unique state of mind that has been shown to generate new creative ideas.ⁱ

Creative Imagination

Many animals and insects also have varying degrees of consciousness that allow them to make decisions and take voluntary action in the world.ⁱⁱ For example, bees can analyze a problem, predict future outcomes, and avoid making decisions that would interfere with achieving specific goals.ⁱⁱⁱ Even mollusks and squid exhibit limited degrees of awareness and consciousness.^{iv}

Most neurobiologists agree that some degree of awareness exists in almost every living organism, and as brains evolve, consciousness slowly emerges, giving some animals greater abilities to learn new behaviors that will help them thrive in a competitive world. As the human brain matures, humans become more aware of their own cognitive and emotional processes, and that is what we are calling consciousness, a neurological state of mind that is dependent on—and mostly limited to—small areas in the frontal lobe (Figure 15, above). You can have awareness without consciousness, but you cannot have consciousness without awareness.

Consciousness keeps you focused on the present moment, but awareness gives you the ability to tap into your

imagination and creativity, processes that involve some of the newest evolutionary structures in your brain.^v Whimsical reveries, autobiographical memories, elaborate visions about the future, imaginary social interactions, and vague feelings are all mixed together in a dreamlike state of awareness that often defies description.^{vi}

Creativity is a form of spontaneous cognition, or mind-wandering, and it's the default state that your brain goes into when you are mentally and physically passive. Your focus softens and your mind turns inward. It is, in essence, a semiconscious form of dreaming.^{vii} You can enter this state of exceptional awareness by deliberately interrupting the normal decision-making processes you use when working. It's neurologically similar to what a musician does when he or she improvises.^{viii} The more you open yourself to new experiences, with the willingness to suspend old belief systems, the more you will stimulate the creativity circuits in your brain.^{ix}



Audio: Creative Daydreaming

Daydreaming And Creative Problem Solving

Physically, your brain is constantly changing as billions of neurons slowly rearrange their connections in a vast soup of neurochemical and neuroelectrical activity. Different electrolytes migrate through the envelope of each neuron, telling it when to rest or take action, and as the activity changes so do your thoughts and feelings. Throughout your day, different patterns of brain activity occur that generate different states of mind.

But what happens when you encounter an unusually difficult problem, one you can't solve with your current knowledge? Initially, your decision-making processes begin to slow down as your prefrontal cortex gets tired. When this occurs, the creativity circuits (Figure 17) in your brain begin to light up.^x Your mind begins to daydream and your prefrontal cortex refreshes itself so that the rest of your brain can engage in creative problem solving.^{xi} You are literally thinking outside the box of everyday consciousness and decision-making.

This is when you are most likely to have sudden insights that allow you to see a problem in a new way. During these “aha” moments—as neuroscientists refer to them—there is a rapid shift of neural activity throughout the brain.^{xii} The rational mind is interrupted and your sense of self is altered as a different form of awareness emerges. You'll see problems differently and you'll intuitively find solutions in ways that often feel mysterious.^{xiii} Most people unconsciously slip in and out of these daydreaming states hundreds of times a

day, never realizing how useful they can be for consciously evaluating problems and making wiser decisions.



Video: Resistance And Intuition

The Two Minds in Your Brain: Conceptual Creativity vs. Decision-Making

Creativity, imagination, and daydreaming all share similar neural circuits that involve many parts of the brain. For example: your parietal lobes might generate fanciful images of people and places,^{xiv} your visual cortex can construct otherworldly images,^{xv} and different areas of your frontal and temporal lobes can work together to produce improvisational masterpieces.^{xvi}

But it's the *conceptual* creativity of abstract thinking that is truly remarkable, giving your frontal lobes the power to turn

new ideas into original strategies that can greatly increase your income, happiness, and health. Conceptual creativity allows you to build new neurological circuits that bring long-term satisfaction and fulfillment.^{xvii} What this means, in practical terms, is that everyone has two separate “minds” that are constantly struggling to achieve desired goals: your “creative mind” (Pillar #3) and your “decision-making mind” (Pillar #4). Your decision-making mind is the mind you associate with your thoughts, and is illustrated in Figure 16, above. In this logical and rational process, you are recalling past memories and planning future events. You are concentrating on different tasks, fully aware of how your actions are affecting the outside world. You use your decision-making mind to notice how you feel, to talk with other people, and to evaluate your degree of success. These are conscious processes that you can manipulate at will.

Conceptual creativity, a part of your creative mind, is very different, and it appears to be actively engaged in an unconscious dialogue with the decision-making processes taking place in your prefrontal lobes.^{xviii} It is governed by a vast network that can interact with many parts of the brain that are illustrated in Figures 17 and 18, above. Conceptual creativity functions independently from external stimuli and it is filled with *self-generated thoughts, a unique and often mysterious cognitive process that integrates spontaneous perceptions with feelings, memories, fantasies, and aspirations.*

These creative thoughts and concepts are formed without any conscious effort, and they often seem meaningless, which explains why most people don't recognize the potential value of their inner creativity. But if you take the time to mindfully observe this strange landscape of your inner, conceptually creative mind, you'll often find novel solutions that can resolve some of the most difficult problems in your life. But there's a hitch: many neuroscientists believe that these creative thoughts can disrupt normal decision-making, causing serious distress and unhappiness.^{xi} We believe, based on the research presented in this book, that the mindfulness and NeuroWisdom exercises you are learning will teach you how to tap into the healthy side of conceptual creativity.

Creativity Is a Double-Edged Sword

Mind-wandering and daydreaming also play crucial roles in planning and innovative problem solving.^{xx} But creativity also has a dark side: after 40 years of investigation, psychologists and neuroscientists agree that too much can make you crazy.^{xxi} Creative fantasies are like a drug, and they can cause the M-Drive to release so much dopamine that your conscious mind becomes delusional.^{xxii} In other words, you can become so immersed in your specific desire that you lose perspective, and even lose touch with reality. Greed is a perfect example—when monetary temptations are great enough, the M-Drive becomes overly active, interfering with the neural circuits governing social cooperation and ethical behavior.^{xxiii} Money becomes an addictive drug instead of a beneficial tool, so when it comes to creativity, moderation is

the best choice. Too much and you'll be governed by the primitive impulses of pleasure and greed; too little, and your ability to change will be impaired.

Concentrate, And Then Take a Creativity Break

Uncontrolled creativity can have detrimental effects on a person's mood, but controlled creativity appears to have many positive effects.^{xxiv} You can take control over your creative circuits by consciously shifting back and forth between periods of high work productivity and brief periods of intense imagination. The first and most important step is to relax. As researchers in the Department of Cognitive Science at Case Western University point out, a relaxed mental state (when you are not focused on any task, goal, or problem) “plays a central role in emotional self-awareness, social cognition, and ethical decision-making. It is also strongly linked to creativity and openness to new ideas.”^{xxv}

When you are fully relaxed, the next step is to mindfully observe the way your thoughts and feelings constantly change. This increases your ability to gain intuitive insights into problems,^{xxvi} and the more you practice mindful awareness the more you'll increase your creative performance.^{xxvii}

Mindfulness will also give you the ability to weed out negative fantasies that undermine the healthy aspects of mind-wandering and creative daydreaming.^{xxviii} Close your

eyes and yawn about 10 times, noticing how each yawn changes your awareness. You'll notice afterwards that it becomes difficult to focus on anything specific, allowing you to become more aware of what is happening in the present moment.

Now allow your mind to wander wherever it wants to go. If you have trouble doing this, recall a time from childhood when you used to daydream, or imagine yourself falling asleep, entering that twilight state where fleeting images occur.

Next, bring yourself back into everyday consciousness and deliberately think about a problem you've been struggling with. Notice how your mind analytically studies the problem, and then deliberately shifts back into a restful state of daydreaming. Going back and forth like this allows you to grasp these subtly different states of mind. In the resting state, thoughts are fragmentary, images are fleeting, and feelings are constantly changing.

Once again, think about that problem you've been struggling with. Re-immense yourself in that dreamlike state of relaxation and ask your intuition for an insight. Internally watch and listen to your intuition. The longer you remain calm and observant, the more likely it is you'll discover something new. Most insights will occur in the first five minutes of this exercise, and the research shows that it leads to better decision-making when you resume work.^{xxix}

The Neuroscience of Learning

Want to change a behavior or develop a new skill? It doesn't matter if you are a person or a snail, for as Nobel Laureate Eric Kandel discovered, all you need is "repeated training interspersed with periods of rest."

Repeated exposure to any new activity or thought process (even if for just a few days) will form neural habits that will last for weeks. Select a new behavior you'd like to develop (staying focused, remaining optimistic, etc.) and commit to four days of conscientious practice, 20 minutes per day. After each round of practice, close your eyes, yawn a few times, and slowly stretch. In his book, *In Search of Memory*, Kandel explains how the learning circuits in your brain need those periods of relaxation "to establish long-term memory." However, if you don't keep practicing the new skill, the learned behavior will fade away.

A Presummary Quiz!

Creativity is one of the most important tools we have, but it's one of the least studied areas in business, psychology, and neuroscience. This is due in part to the fact that creative problem solving is a largely unconscious process that relies on your view of the world and subliminal perceptions of your inner reality. In contrast, conscious decision-making is heavily dependent on language, conceptual reasoning, and paying attention only to those details related to carrying out specific tasks and achieving desired goals.

Learning is significantly dependent on the creativity circuits in your brain, but the process is unique for each person. We want you to take a moment, right now, and try this little experiment before you read the following summary. Get some paper and a pen, and write down the most important insights you gained from this part. First, close your eyes and deeply relax, letting your mind-wander and daydream for a minute or two. Then use your imagination and intuition to answer these questions:

1. What, for you, were the most interesting points made in this part?
2. How might you use this information to lower stress and increase your performance level at work?
3. Can you visualize the areas in the brain that control decision-making and creativity?

Answering these questions *intuitively* will increase the value of the material you just read, and since you're not going to be tested on it, your brain is free to choose the most useful information and reject the rest. This strategy helps you to embed important information into your long-term memory.^{xxx}

The next time you encounter a difficult problem, or fumble while pursuing a desired goal, put yourself into a deep state of relaxed mindfulness and ask yourself these questions: "What am I missing? What have I overlooked? What can I do differently?" Self-reflective questions such as these will enhance your cognitive skills and increase future chances of success.^{xxxi} And don't forget to ask your intuition, which is

the creative problem-solving mechanism that operates outside of the everyday decision-making strategies you normally use!



Summary

1. Consciousness is the limited part of your awareness in which you pay attention to details as you perform a particular task. When the decision-making circuits in the frontal lobe tire, your brain briefly defaults to a dreamlike resting state enabling neural activity to increase throughout your brain as logic and reason give way to spontaneous imagination. This enhances the brain's natural creative problem-solving process, which can bring surprising moments of insight, clarity, and intuitive inspiration.
2. You can deliberately enter a state of enhanced awareness by relaxing and mindfully observing the constant flow of your fragmentary thoughts, feelings, images, and sensations.
3. By shifting back and forth between conscious decision-making and creative imagination, you improve the cognitive functioning of your brain in ways that allow you to make better decisions.

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- *Your creative brain network.*
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- *How to stimulate your creative brain.*



Part 8: Creativity—The Third Pillar of Wealth

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