

The neuroscience of mindfulness

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We generally think of mindfulness as an idea that has been around for thousands of years, originally emerging out of Buddhist traditions. Many Buddhist researchers are doing great studies showing that mindfulness has an impact on many aspects of human experience.

I have a bit of a problem with that. When you understand the underlying physiology of mindfulness, you begin to see that any discussion about human change, learning, education, even politics and social issues, ends up being about mindfulness. That's because mindfulness, in some ways, is simply the opposite of mindlessness. And mindlessness is the cause of a tremendous amount of human suffering.

I have a problem with something as important as deeper thinking being linked to any religion. Not because I have anything against Buddhism or against any religion at all. (Of all the organized religions, Buddhism appears to be one that generates a minimum of human conflict.) The reason I have a problem is it's hard enough getting across the idea that being mindful is useful, without activating a threat response from the billions of non-buddhists who could benefit from it.

The value of a secular approach

One of the reasons mindfulness can be difficult to talk about, in particular when discussing mindfulness with the busy people who run our companies and institutions, is that these people tend to spend little time thinking about themselves and other people, but a lot of time thinking about strategy, data, and systems. As a result, the circuits involved in thinking about oneself and other people, the medial prefrontal cortex, tend to be not too well developed. I write more about this in a paper called 'Managing with the brain in mind' recently.

Speaking to an executive about mindfulness therefore can be a bit like speaking to a classical musician about jazz. It might look like they could play a little Coltrane, because they deal in sounds, but they don't really have the circuits for it. We don't take well to learning new skills, especially in later life, and any reason to not focus on a new skill, like it being linked to a religion other than yours, doesn't help.

I have taught mindfulness to deans of medical schools, to senior executives at major technology firms, and to MBA students from dozens of countries. When you explain step by step, how it works and how it effects your brain, and give people a chance to experience it, even the most cynical, anti-self-awareness agitator can't help but see that they will be better off practicing this skill. The key is to be able to explain the actual neuroscience involved. Here's some of the highlights of how mindfulness impacts the brain, from Your Brain at Work:

Mindfulness and the brain

A 2007 study called "Mindfulness meditation reveals distinct neural modes of self-reference" by Norman Farb at the University of Toronto, along with six other scientists, broke new ground in our understanding of mindfulness from a neuroscience perspective.

Farb and his colleagues worked out a way to study how human beings experience their own moment-to-moment experience. They discovered that people have two distinct ways of interacting with the world, using two different sets of networks. One network for experiencing your experience involves what is called the "default network", which includes regions of the medial prefrontal cortex, along with memory regions such as the hippocampus. This network is called default because it becomes active when not much else is happening, and you think about yourself. If you are sitting on the edge of a jetty in summer, a nice breeze blowing in your hair and a cold beer in your hand, instead of taking in the beautiful day you might find yourself thinking about what to cook for dinner tonight, and whether you will make a mess of the meal to the amusement of your partner. This is your default network in action. It's the network involved in planning, daydreaming and ruminating.

This default network also become active when you think about yourself or other people, it holds together a "narrative". A narrative is a story line with characters interacting with each other over time. The brain holds vast stores of information about your own and other people's history. When the default network is active, you are thinking about your history and future and all the people you know, including yourself, and how this giant tapestry of information weaves together. In this way, in the Farb study they like to call the default network the 'narrative' circuitry. (I like the 'narrative circuit' term for every-day usage as it's easier to remember and a bit more elegant than 'default' when talking about mindfulness.)

When you experience the world using this narrative network, you take in information from the outside world, process it through a filter of what everything means, and add your interpretations. Sitting on the dock with your narrative circuit active, a cool breeze isn't a cool breeze, it's a sign than summer will be over soon, which starts you thinking about where to go skiing, and whether your ski suit needs a dry clean.

The default network is active for most of your waking moments and doesn't take much effort to operate. There's nothing wrong with this network, the point here is you don't want to limit yourself to only experiencing the world through this network.

The Farb study shows there is a whole other way of experiencing experience. Scientists call this type of experience one of direct experience. When the direct experience network is active, several different brain regions become more active. This includes the insula, a region that relates to perceiving bodily sensations. The anterior cingulate cortex is also activated, which is a region central to switching your attention. When this direct experience network is activated, you are not thinking intently about the past or future, other people, or yourself, or considering much at all. Rather, you are experiencing information coming into your senses in real time. Sitting on the jetty, your attention is on

the warmth of the sun on your skin, the cool breeze in your hair, and the cold beer in your hand.

A series of other studies has found that these two circuits, narrative and direct experience, are inversely correlated. In other words, if you think about an upcoming meeting while you wash dishes, you are more likely to overlook a broken glass and cut your hand, because the brain map involved in visual perception is less active when the narrative map is activated. You don't see as much (or hear as much, or feel as much, or sense anything as much) when you are lost in thought. Sadly, even a beer doesn't taste as good in this state.

Fortunately, this scenario works both ways. When you focus your attention on incoming data, such as the feeling of the water on your hands while you wash up, it reduces activation of the narrative circuitry. This explains why, for example, if your narrative circuitry is going crazy worrying about an upcoming stressful event, it helps to take a deep breath and focus on the present moment. All your senses "come alive" at that moment.

Let's recap these ideas. You can experience the world through your narrative circuitry, which will be useful for planning, goal setting, and strategizing. You can also experience the world more directly, which enables more sensory information to be perceived. Experiencing the world through the direct experience network allows you to get closer to the reality of any event. You perceive more information about events occurring around you, as well as more accurate information about these events. Noticing more real-time information makes you more flexible in how you respond to the world. You also become less imprisoned by the past, your habits, expectations or assumptions, and more able to respond to events as they unfold.

In the Farb experiment, people who regularly practiced noticing the narrative and direct experience paths, such as regular meditators, had stronger differentiation between the two paths. They knew which path they were on at any time, and could switch between them more easily. Whereas people who had not practiced noticing these paths were more likely to automatically take the narrative path.

This isn't just a theory. A study by Kirk Brown found that people high on a mindfulness scale were more aware of their unconscious processes. Additionally these people had more cognitive control, and a greater ability to shape what they do and what they say, than people lower on the mindfulness scale. If you're on the jetty in the breeze and you're someone with a good level of mindfulness, you are more likely to notice that you're missing a lovely day worrying about tonight's dinner, and focus your attention onto the warm sun instead. When you make this change in your attention, you change the functioning of your brain, and this can have a long-term impact on how your brain works too.

Why we need to keep being reminded about mindfulness

John Teasdale, recently retired, was one of the leading mindfulness researchers.

Teasdale explains, "Mindfulness is a habit, it's something the more one does, the more likely one is to be in that mode with less and less effort... it's a skill that can be learned. It's

accessing something we already have. Mindfulness isn't difficult. What's difficult is to remember to be mindful." I love this last statement. Mindfulness isn't difficult: the hard part is remembering to do it.

Practice, but you don't have to sit down and breathe.

So practicing mindfulness is important, as you're more likely to then remember to do it. The key to practicing mindfulness is just to practice focusing your attention onto a direct sense, and to do so often. It helps to use a rich stream of data. You can hold your attention to the feeling of your foot on the floor easier than the feeling of your little toe on the floor: there's more data to tap into. You can practice mindfulness while you are eating, walking, talking, doing just about anything, with the exception of drinking a beer in the sun, which works for only a limited time before your attention leaves to go and party (the neuroscience of all that will have to wait for another book.)

Building mindfulness doesn't mean you have to sit still and watch your breath. You can find a way that suits your lifestyle. My wife and I built a 10 second ritual into the evening meal with my kids, which involves just stopping and noticing three small breaths together before we eat. The added bonus is it makes a great dinner taste even better.

What ever practice you do develop, practice it. The more mindful you become, the better decisions you will make, and the more you will achieve your own goals, rather than other people's goals for you.

Next week I am going to post on why it's so hard to stop ourselves doing and thinking certain things: the neuroscience of our (rather weakly) mental braking system.

Commercial Plug: if you like the insights and tone of this post, check out my new book Your Brain at Work, just out last week. The post this week is an edited excerpt of one of 14 chapters explaining complex neuroscience insights in everyday language.