MILITARY MENTAL HEALTH FOLLOW UP

VIDEO TRANSCRIPT FROM TEDX COCONUT GROVE
"TAMING YOUR WANDERING MIND"
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Consider the following statement: Human beings only use ten percent of their brain capacity. Well, as a neuroscientist, I can tell you that while Morgan Freeman delivered this line with the gravitas that makes him a great actor, this statement is entirely false.

The truth is, human beings use 100 percent of their brain capacity. The brain is a highly efficient, energy-demanding organ that gets fully utilized. And, even though it is at full capacity being used, it suffers from a problem of information overload. There's far too much in the environment than it can fully process. So to solve this problem of overload, evolution devised a solution, which is the brain's attention system.

Attention allows us to notice, select and direct the brain's computational resources to a subset of all that's available. We can think of attention as the leader of the brain. Wherever attention goes, the rest of the brain follows. In some sense, it's your brain's boss.

And over the last 15 years, I've been studying the human brain's attention system. In all of our studies, I've been very interested in one question: If it is indeed the case that our attention is the brain's boss, is it a good boss? Does it actually guide us well? And to dig in on this big question, I wanted to know three things.

First, how does attention control our perception? Second, why does it fail us, often leaving us feeling foggy and distracted? And third, can we do anything about this fogginess? Can we train our brain to pay better attention, to have more strong and stable attention in the work that we do in our lives?

So, I wanted to give you a brief glimpse into how we're going to look at this, a very poignant example of how our attention ends up getting utilized, and I want to do it using the example of somebody that I know quite well. He ends up being part of a very large group of people that we work with, for whom attention is a matter of life and death.

Think of medical professionals, or firefighters, or soldiers, or marines. This is the story of a marine captain, Captain Jeff Davis. And the scene that I'm going to share with you, as you can see, is not about his time in the battlefield. He was actually on a bridge in Florida. But instead of looking at the scenery around him, seeing the beautiful vistas, and noticing the cool ocean breezes, he was driving fast and contemplating driving off that bridge. And he would later tell me that it took all of everything he had not to do so.

You see, he'd just returned from Iraq, and while his body was on that bridge, his mind, his attention, was thousands of miles away. He was gripped with suffering. His mind was worried and preoccupied, and had stressful memories, and really dread for his future, and I'm really glad that he didn't take his life. Because he as a leader knew that he wasn't the only one, that was probably suffering, many of his fellow marines probably were too.

And in the year 2008, he partnered with me in the first of its kind project that actually allowed us to test and offer something called mindfulness training to active duty military personnel. But before I tell you about what mindfulness training is or the results of that study, I think it's important to understand how attention works in the brain.

So what we do in the laboratory is that many of our studies of attention involve brainwave recordings. In these brainwave recordings, people wear funny looking caps that are sort of like swimming caps that have electrodes embedded in them. These electrodes pick up the ongoing brain electrical activity. And they do it with millisecond temporal precision. So we can see these small yet detectable voltage fluctuations over time.

And doing this, we can very precisely plot the timing of the brain's activity. About 170 milliseconds after we show our research participants a face on the screen, we see a very reliable, detectable brain signature. It happens right at the back of the scalp, above the regions of the brain that are involved in face processing.

Now, this happens so reliably, and so on cue as the brain's face detector, that we've even given this brainwave component a name. We call it the N170 component, and we use this component in many of our studies. It allows us to see the impact that attention may have on our perception.

So I want to give you a sense of the kind of experiments that we actually do in the lab. We would show participants images like this one. You should see a face and a scene overlaid on each other. And what we do is we ask our participants as they're viewing a series of these types of overlaid images, to do something with their attention.

On some trials, we'll ask them to pay attention to the face. And to make sure they're doing that, we ask them to tell us by pressing a button if the face appeared to be male or female. On other trials, we ask them to tell us what the scene was, was it indoor or outdoor. And in this way we can manipulate attention and confirm that participants were actually doing what we said. Our hypotheses about attention were as follows: If attention is indeed doing its job and affecting perception, maybe it works like an amplifier.

And what I mean by this is that when we direct attention to the face, it becomes clearer and more salient, right? It's easier to see. But when we direct it to the scene, the face becomes barely perceptible as we process the scene information. So what we wanted to do is look at this brainwave component of face detection, the N170, and see if it changed at all, as a function of where our participants were paying attention – to the scene or the face, and here's what we found.

We found that when they paid attention to the face, the N170 was larger. And when they paid attention to the scene, as you can see in red, it was smaller. And that gap you see between the blue and red lines is pretty powerful. What it tells us is that attention, which is really the only thing that changed, since the images they viewed were identical in both cases, attention changes perception. And it does so very fast, within 170 milliseconds of actually seeing a face.

In our follow-up studies, we wanted to look to see what would happen, how could we perturb or diminish this effect? And our hunch was that if you give people or put people in a very stressful environment, if you distract them with disturbing, negative images, images of suffering and violence, sort of like what you might see on the news, unfortunately, that doing this might actually affect their

attention, and that's indeed what we found. If we present stressful images while they're doing this experiment, this gap of attention shrinks, its power diminishes.

So in some of our other studies, we wanted to see, okay great, not great, actually bad news that stress does this to the brain, but if it is the case that stress has this powerful influence on attention through external distraction, what if we don't need external distraction, what if we distract ourselves?

And to do this, we had to basically come up with an experiment in which we could have people generate their own mind wandering. This is having off-task thoughts while we're engaged in an ongoing task of some sort. And the trick to mind wandering, is that essentially, you bore people. So hopefully there's not a lot of mind wandering happening right now.

When we bore people, people happily generate all kinds of internal content to occupy themselves, right? So we devised what might be considered one of the world's most boring experiments – all the participants saw were a series of faces on the screen, one after another.

They pressed the button every time they saw the face. That was pretty much it. Well, the one trick was that sometimes the face would be upside down, and it would happen very infrequently. On those trials they were told just to withhold the response. Pretty soon we could tell they were successfully mind wandering because they'd press the button when that face was upside down, even though it's quite plain to see that it was upside down.

So we wanted to know here, what happens when people have mind wandering? And what we found was that very similar to external stress and external distraction in the environment, internal distraction, our own mind wandering, also shrinks the gap of attention, it diminishes attention's power.

So, what do all of these studies tell us? They tell us that attention is very powerful in terms of affecting our perception. Even though it's so powerful, it's also fragile and vulnerable. And things like stress and mind wandering diminish its power. But that's all in the context of these very controlled laboratory settings.

What about in the real world? What about in our actual day-to-day life? What about now? Where is your attention right now? To bring it back, I'd like to make a prediction about your attention for the remainder of my talk. You up for it?

Here's the prediction: You will be unaware of what I'm saying for four out of the next eight minutes. It's a challenge, so pay attention please. Now, why am I saying this? I'm surely going to assume that you're going to remain seated and graciously keep your eyes on me as I speak, but a growing body of literature suggests that we mind wander, we take our mind away from the task at hand, about 50 percent of our waking moments. These might be small, little trips that we take away, private thoughts that we have, and when this mind wandering happens, it can be problematic.

Now, I don't think there'll be any dire consequences with you all sitting here today. But imagine a military leader missing four minutes of a military briefing. Or a judge missing four minutes of testimony. Or a surgeon or firefighter missing any time. The consequences in those cases could be dire.

So one question we might ask is why do we do this, why do we mind wander so much? Well, part of the answer is that our mind is an exquisite time-travelling master. It can actually time travel very easily. If we think of the mind as the metaphor of a music player, we see this. We can rewind the mind to the past to reflect on events that have already happened, right? Or we can go in fast future, to plan for the next thing that we want to do. We land in this mental time-travel mode of the past or the future very frequently, and we land there often without our awareness, most times without our awareness, even if we want to be paying attention.

Think of just the last time you were trying to read a book, got to the bottom of the page with no idea what the words were saying, right? This happens to us. And when this happens, when we mind wander, without an awareness that we're doing it, there are consequences. We make errors. We miss critical information sometimes, and, we have difficulty making decisions. What's worse is when we experience stress, when we're in a moment of overwhelm, we don't just reflect on the past when we rewind, we end up being in the past ruminating, reliving or regretting events that have already happened.

Or under stress, we fast-forward the mind. Not just to productively plan, but we end up catastrophizing or worrying about events that haven't happened yet, and frankly may never happen. So at this point you might be thinking to yourself, okay, mind wandering's happening a lot. Often it happens without our awareness. And under stress, it's even worse, we mind wander more powerfully and more often.

Is there anything we can possibly do about this? And I'm happy to say the answer is yes. From our work, we're learning that the opposite of a stressed and wandering mind is a mindful one. Mindfulness has to do with paying attention to our present moment experience with awareness and without any kind of emotional reactivity of what's happening. It's about keeping that button right on "play," to experience the moment-to-moment unfolding of our lives. And mindfulness is not just a concept, it's more like practice, you have to embody this mindful mode of being to have any benefits.

And a lot of the work that we're doing, we're offering people programs that give our participants a suite of exercises that they should do daily in order to cultivate more moments of mindfulness in their life. And for many of the groups we work with, high stress groups, like I said, soldiers, medical professionals, for them, we know that mind wandering can be really dire, so we want to make sure we offer them very accessible, low time constraints to optimize the training so they can benefit from it. And when we do this, what we can do is track to see what happens, not just in their regular lives but when we offer it in the most demanding circumstances that they may have.

Why do we want to do this? Well, we want to, for example, give it to students right around finals season. Or we want to give the training to accountants during tax season. Or soldiers and marines while they're deploying. Why is that? Because those are the moments in which their attention is most likely to be vulnerable, because of stress and mind wandering. And those are also the moments in which we want their attention to be in peak shape so they can perform well.

So what we do in our research is we have them take a series of attention tests. We track their attention at the beginning of some kind of high stress interval, and then two months later we track them again, and we want to see if there's a difference.

Is there any benefit of offering them mindfulness training? Can we protect against the lapses in attention that might arise over high stress? So here's what we find. Over a high stress interval,

unfortunately, the reality is if we don't do anything at all, attention declines, people are worse at the end of this high stress interval than before.

But if we offer mindfulness training, we can protect against this. They stay stable, even though just like the other groups – other individuals in their group, they were experiencing high stress. And perhaps even more impressive is that if people take our training programs over, let's say, eight weeks, and they fully commit to doing the daily mindfulness exercises that allow them to learn how to be in the present moment, well, they actually get better over time, even though they're in high stress.

And this last point is actually important to realize because of what it suggests to us is that mindfulness exercises are very much like physical exercise: if you don't do it, you don't benefit. But if you do engage in mindfulness practice, the more you do, the more you benefit. And I want to just bring it back to Captain Jeff Davis. As I mentioned to you at the beginning, his marines were involved in the very first project we ever did offering mindfulness training. And they showed this exact pattern which was very heartening.

We had offered them the mindfulness training right before they were deployed to Iraq. And upon their return, Captain Davis shared with us what he was feeling was the benefit of this program. He said that unlike last time, after this deployment they were much more present. They were discerning. They were not as reactive.

And in some cases, they were really more compassionate with the people they were engaging with, and each other. He said in many ways, he felt that the mindfulness training program we offered gave them a really important tool to protect against developing post-traumatic stress disorder, and even allowing it to turn into post-traumatic growth. To us, this was very compelling. And it ended up that Captain Davis and I – this was about a decade ago, in 2008, we've kept in touch all these years – and he himself has gone on to continue practicing mindfulness in a daily way. He was promoted to Major.

He actually then ended up retiring from the Marine Corps. He went on to get a divorce, to get remarried, to have a child, to get an MBA And through all of these challenges and transitions, and joys of his life, he kept up with his mindfulness practice. And as fate would have it, just a few months ago Captain Davis suffered a massive heart attack, at the age of 46. And he ended up calling me a few weeks ago.

And he said, "I want to tell you something I know that the doctors who worked on me, they saved my heart, but mindfulness saved my life. The presence of mind I had to stop the ambulance that ended up taking me to the hospital," himself, the clarity of mind he had to notice when there was fear and anxiety happening but not be gripped by it – he said, "for me, these were the gifts of mindfulness." And I was so relieved to hear that he was okay. But really heartened to see that he had transformed his own attention.

He went from having a really bad boss – an attention system that nearly drove him off a bridge – to one that was an exquisite leader and guide, and saved his life. So I want to end by sharing my call to action to all of you. And here it is Pay attention to your attention. All right? Pay attention to your attention, and incorporate mindfulness training as part of your daily wellness toolkit, in order to tame your own wandering mind, and to allow your attention to be a trusted guide in your own life.