

Neuroscientist discusses fear and anxiety in the era of the coronavirus

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Credit: AI-generated image ([disclaimer](#))

If you were walking through the jungle and a tiger came lunging toward you, you would probably run. But if you spotted a tiger way off in the distance, your brain would take the time to imagine possible dangers and hatch an escape plan. It is this innate ability of humans to plan for future threats that leads to anxiety.

According to Dean Mobbs, assistant professor of cognitive neuroscience at Caltech and a Chen Scholar, the coronavirus pandemic has put these anxiety-producing [brain circuits](#) into overdrive. He calls the coronavirus an "invisible threat" and says that it causes us to seek out information on media sites about how to prevent it, but that this can lead to information overload and make us anxious.

Mobbs, along with his students and colleagues, studies fear and anxiety under a variety of circumstances; for example, in previous research, they used a video game that simulates a virtual predator. One recent study of this sort showed that people already prone to anxiety were quicker to flee danger.

Now, Mobbs and his group are turning their attention to the novel coronavirus causing the COVID-19 pandemic and asking how people respond to the threat of an unseen virus. We talked with Mobbs about his latest research.

How does the current pandemic fit with what you typically study?

Our lab is interested in dissecting the human fear and anxiety circuits using a variety of unique models and approaches. Fear occurs when a threat is right upon us. The tiger is here, for example, and we are using different defensive strategies, including fight and flight. Anxiety, on the other hand, happens when a threat is in the future. I can plan for it, build a wall, acquire weapons, etc. We can avoid threats and protect ourselves, which is a very adaptive strategy, but it gets us in trouble because we become anxious about things that we have not experienced before. Certain regions of our brain—the hippocampus, parts of the amygdala, and parts of the medial prefrontal cortex—seem to play a role when the threat is distant or abstract.

How does this relate to what's going on with the coronavirus? Our brains in some respects have not really evolved to see viruses as a threat. It's actually only been a couple of hundred years that we've really known about viruses on a biological level. We are having to cope with an unseen enemy. This anxiety system is ramped up even higher when there's a lot of uncertainty. When we encounter uncertainty, we search for information. We want to find information about that threat so we can combat it. What do we do? We go on the internet and get news from a variety of reliable and unreliable media sources.

What happens to our brains when we seek news stories?

We are getting a lot of information, and that information is not just coming locally but from all over the world. I'm not just learning what's going on in my environment now but about what's going on in everybody else's environment around the world via the media. We filter it, and our brains preferentially attend to negative stories because they allow us to learn about those threats without actually encountering them. But when we're getting so much negative information, it becomes overwhelming. For example, on March 24, it was reported that a child died of coronavirus. This is actually a very rare event, but now all of a sudden, in our mind, coronavirus becomes a threat to anyone under 18.

If we didn't have the internet, we wouldn't know that. So, mass communication allows us to be bombarded with information, and we have to sort through that information to find the truth. In some respects, this increases the amount of uncertainty again, because we're not getting answers, we're getting lots of different answers.

Are our anxiety circuits still doing their job of protecting us in this situation?

The coronavirus is tapping into our highly adaptive systems, which does help us to defend ourselves. But the problem is that those systems are being put into overdrive. We have this wonderful ability to think about future threats and to vicariously learn about threats in the world, but given the [mass communication](#) channels that we use, it's not surprising that many of us are feeling much anxiety. That anxiety is translated into behaviors, such as panic shopping.

Do you have any recommendations for how to handle this?

I would say focus on the moment, or what they call mindfulness. Try not to think too much about what will or might happen in the future. My family has been isolated, and we have focused on what we can do to stop the spread of COVID-19. This gives us control over the situation. And when looking for information, go to reliable news sources. For example, the CDC [Centers for Disease Control and Protection] and WHO [World Health Organization] websites provide expert opinion and the latest updates on the spread of the virus.

Finally, the uncertainty of COVID-19 comes from the novelty of the situation. Like the Spanish flu more than 100 years ago, COVID-19 will be devastating for some families, yet we humans are survival machines, resilient, and once this is over, we may just appreciate each other a little more.

How do you think our brains will adapt to this threat over time?

We think there is going to be a peak of the fear and anxiety, and then even though the danger of the threat of the virus is higher, I think we're going to see people habituate to the threat and become less anxious. This

idea of threat habituation has been shown many times before in the form of anxiety extinction. Basically, the more you are presented with a threat, the more you get used to it, so you don't react as strongly. You can only keep anxiety levels high for a certain period of time.

I had a friend who was in the Croatian military during the War of Independence in the early '90s, and I remember him saying that in the beginning of the war everyone was scared, but then when it became more of a day-to-day thing, the planes would come over with bombs, and they would just walk down the street like everything was normal. This is an example of threat habituation.

We have one coronavirus-focused [longitudinal study](#) in progress where we are following up with the same 500 people over time. We might, in this data, see the habituation of the [anxiety](#).

What other studies are you working on?

One of our studies, led by my postdoc, Toby Wise, was just submitted for publication and shows that people, at the start of the coronavirus outbreak in the U.S., felt they that were at less of a risk of becoming ill than other individuals. This is something we call optimism bias. For instance, research in the past has shown that if you ask people who smoke about their likelihood of getting lung cancer, they will think they are less likely to get it than somebody else who smokes. We showed that people had this optimism bias in the [coronavirus](#) outbreak but that it started to shift over the time period when people were being advised to practice social distancing. These same people started to see that they had more of a risk than before and, as result, adjusted their behaviors and started practicing social distancing.

We also have other studies in the works, for example, on how people will react to the social isolation of being at home. In general, there have been

very few psychological studies on the effects of viruses as a [threat](#). Several groups, including ours, now have a lot of new data to keep us busy.

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