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MYNDPROJECT

OUTSIDE YOUR MIND WHERE IS THE PROBLEM?

Rewire Your ANXIOUS BRAIN



WHAT'S IN IT FOR ME?

Overcome anxiety with the help of neuroscience.

“ You're driving to work one morning, and your mind starts to wander. Did you turn the stove off before leaving the house? You think back through your routine – making an omelet, brushing your teeth, grabbing your keys. You believe you turned it off. But what if you forgot?

Your heart starts pounding; your face gets flushed. The anxiety builds as you picture the pan catching on fire. Then, suddenly, the person in the car ahead slams on their brakes. Something takes over your hands, and you manage to steer your way out of a collision.

This situation perfectly demonstrates a key facet of anxiety. There are actually two types at work, and they act very differently on your mind and body. Each is associated with a different region of the brain: the amygdala and the cortex.

The amygdala produces that primal fight, flight, or freeze response and is activated subconsciously. In the car scenario, it allowed your hands to react quickly and avoid a crash. By contrast, the cortex is the center of worry and rumination. This is the anxiety produced from imagining your house burning down after leaving the stove on.

Recent research in neuroscience has helped us better understand these two anxiety pathways and how they form in the brain. Once a pathway is set, it becomes more easily activated, keeping you caught in the anxiety cycle.

The good news is that the brain is quite malleable and can change – even in adults. But reducing anxiety requires different strategies and approaches for each brain region. Most strategies, like cognitive behavior therapy, tend to focus on the cortex pathway while ignoring the amygdala.

In this MYNDSET, we're going to take an in-depth look at both amygdala-based anxiety and cortex-based anxiety. And we'll explore practical strategies and techniques for reducing each.

So let's dive in!



The following applications are now being studied, either clinically or via community / citizen science

THE AMYGDALA COMMUNICATES THROUGH EMOTIONAL MEMORIES.

Humans have evolved with a strong fear response that protects us from potential danger. But these responses may not be well suited to situations we face today. For example, speaking in front of a large audience poses no inherent danger, so why does the anxiety response kick in beforehand?

The answer lies in a region of the brain called the amygdala, which comes from the Greek word for almond – because that's its shape. There are actually two amygdalas, but we refer to them as one.

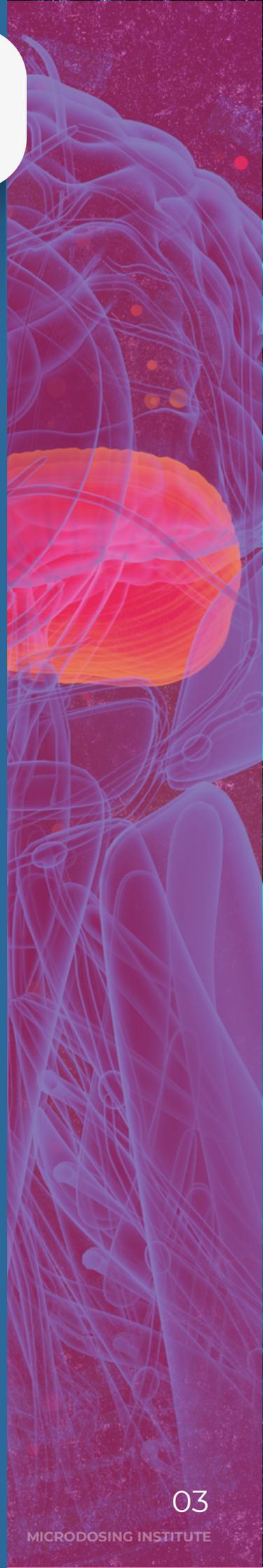
The amygdala is the brain's alarm system; it constantly scans for threats and dangers. When switched on, it has direct access to other parts of the brain that can push the body into flight, fight, or freeze mode. These include the hypothalamus, which releases cortisol and adrenaline hormones that prepare the body for action. It also activates the sympathetic nervous system, or SNS, which causes physiological changes like fast breathing, a rapid heart rate, dilated pupils, and sweating.

What's key about the amygdala-anxiety pathway is that it operates outside of language and logic. Those are cortex-related things, which we'll explore later.

In fact, the amygdala is capable of completely overriding your cortex – especially in moments of danger, so you may not consciously realize what you're doing. It's that out-of-body experience when reacting quickly behind the wheel to avoid a crash. It's all adrenaline and amygdala.

So why does all this matter? Because when anxiety is activated in the amygdala, logic is useless against it. That's why it never works to tell someone who's panicking to just calm down. Instead, the amygdala operates in emotional memories, which you experience directly – not through images or conscious cues.

Once the amygdala associates a situation or object with the emotion fear, then the neurons wire together, fusing into a memory. When faced with a similar object or situation next time, the emotional memory triggers an anxiety response. So rewiring amygdala-based anxiety requires learning to communicate in the language of emotional memories.



REWIRE AMYGDALA-BASED ANXIETY WITH EXPOSURE.

Neurons that fire together, wire together. This means that when anxiety is triggered by a certain event or object, those neural pathways forge in the brain and strengthen over time. If you want to reduce amygdala-based anxiety, then you have to change the activation patterns.

But emotional memories created by the amygdala are difficult to access consciously. And they can't be erased. Instead, you have to form new associations that compete with the old ones. You do this by exposing the amygdala to your anxiety triggers.

Think of it like swimming in a lake. At first, the water might feel too cold for you. But after a while, your body adjusts to the temperature and you're able to comfortably swim around.

Exposure-based treatment is a similar process, except you're being exposed to the object or event that induces anxiety. The authors call it "activate to generate" – you have to activate anxiety to generate new neural pathways. Exposure can be gradual, steadily desensitizing you to the trigger, like slowly wading into water. Or it can be abrupt, like diving in.

Here's how it works. By exposing yourself to the trigger, your body enters a state of anxiety. While in that state, the amygdala must receive corrective information so it can learn that this trigger is actually not dangerous.

Unfortunately, exposure can be quite uncomfortable – especially if the anxiety level is high. But it's only effective if you let the anxiety response run its course without cutting it short. That is, you need to let it build, peek, and then taper off. Otherwise, you risk reinforcing those pathways and worsening your anxiety.

So, what do you do when you've intentionally exposed yourself to a trigger and you're in the grip of anxiety? The key is to engage in actions that will immediately calm the amygdala.

To begin, focus on the physiological responses of your body – your fast heart rate, heavy breathing, nerves, nausea, whatever you may feel. Try to just observe without judgment.

Next, slow and deepen your breath. It's especially helpful to meditate on your breathing, which can help you break free from loops of anxious thoughts.

Then, bring awareness to your muscles. Most people caught in anxiety and panic hold a lot of tension in their muscles, especially the neck, shoulders, back, jaw, and forehead. Try to observe where you're holding tension, and consciously let those muscles soften.

This process provides the corrective information to your amygdala, allowing different neural pathways to forge. Repetition is a must. The more you do it, the stronger those new pathways become – and eventually outcompete the old ones that induce fear.



THE CORTEX CREATES THOUGHTS AND IMAGES THAT CAN INDUCE ANXIETY.

The cortex is the wrinkled, outer layer of the brain – what we often picture when we imagine the organ. It's the thinking and perceiving part that helps you interpret situations and anticipate future events. And it operates in a very different way from the amygdala.

Remember that the amygdala initiates physiological responses and creates emotional memories. Anxiety produced there is directly experienced and isn't consciously controlled. The cortex, on the other hand, operates in thoughts, images, and language.

On its own, the cortex doesn't produce anxiety – the amygdala is still required for that. But certain thinking processes can provoke the amygdala's fear and anxiety response. There are two ways this can happen.

First, the cortex can receive sensory information from the world around you that's interpreted as alarming. For example, if you're walking home one night and a fire truck speeds by with its siren on, you might start to worry that your house is on fire. This activates the amygdala's panic response, and you may find yourself running home.

The second way the cortex prompts anxiety is independent of sensory information. This means it can come from your own thoughts (produced by the left hemisphere), or images that pop into your mind (produced by the right hemisphere).

At the beginning of this MYNDSET, we described a situation of panic when you're driving to work and start worrying that you forgot to turn the stove off. This is cortex-based anxiety.

Worry is essentially about anticipating negative outcomes, even if there's little evidence that they'll transpire. It's a consequence of your ability to predict future events and make plans. Your pet cat, for instance, doesn't have this issue. She can sleep all day without worrying about what will happen tomorrow.

But what you spend the most time thinking about will be strengthened in the cortex. So the more you worry or ruminate, the deeper the neural grooves become. That's why obsessing over something, like repeating thoughts or conversations in your mind, usually doesn't help. It will just worsen your anxiety. In addition to worry, there are other kinds of thoughts that can easily induce anxiety. These include catastrophizing, perfectionism, negative and pessimistic thinking, and obsessions or compulsions that keep you stuck in anxiety through repeating thoughts or behaviors.

Take some time to reflect on your own experience. Which types of cortex-based thoughts and images tend to ignite your anxiety?

REDUCE CORTEX-BASED ANXIETY BY CHANGING YOUR THOUGHT PATTERNS.

Jenny is a high school senior. One day, an envelope arrives from the college she applied to. She starts to imagine it contains a rejection letter and can't bring herself to open it. Over the next few days, the letter sits on her desk – and Jenny starts to worry about her future. But when she finally opens the envelope, she realizes it's not a rejection. They're offering her admission. It's often the case that the things we anticipate are much worse than the actual situation. There's a danger in getting so caught up in our thoughts that we start to mix them up with the facts – just like Jenny did with her college acceptance letter. Scientists call this cognitive fusion, where we take thoughts and feelings as absolute truth and confuse them with reality.

That's why one of the most powerful strategies you can use to reduce cortex-based anxiety is to learn to relate to your worries differently. For example, you can start to develop a healthy skepticism toward them, and not always take them so seriously. They're just thoughts, after all – not reality.

Mindfulness is another strategy that teaches you to observe your thoughts more objectively without trying to change them. This loosens their power over you. Rather than being caught up in negative thinking, you can learn to simply let the images pass.

A helpful way to think about all this is to imagine your cortex as cable television. There are infinite channels you could watch, but you tend to get stuck on Anxiety Channel. Focusing so much on these anxiety-inducing thoughts, and arguing with them, keeps you stuck on the same channel. A great way to change the channel is by distracting yourself from the thoughts – listen to music, read, watch a funny show, exercise, or play a game. These are all easy and enjoyable activities that can take your attention off the anxiety-producing thoughts.

The last strategy you can try is replacing your anxious thoughts with something more helpful or productive. It's actually very difficult to stop or erase thoughts entirely. If you're told not to think of pink elephants, for example, a pink elephant is likely the first image that'll pop into your mind. Instead of trying to stop a thought, replace it with something positive – what the authors call coping thoughts. Say you're thinking, "There's no use trying, I'll just fail anyway." Rather than telling yourself not to think that way, you can replace it with something like, "I'm going to try anyway, because there's a chance I'll succeed."

Over time, these strategies – mindfulness, distraction, and replacing negative thoughts – can help you change the thought patterns that keep you stuck in a state of anxiety.

FINAL

SUMMARY

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Reducing anxiety requires different approaches and strategies, depending where in the brain it is produced. Anxiety originating in the amygdala is experienced directly in the body, activating your fight, flight, and freeze responses. It is beyond the reach of conscious control or reasoning. The most effective strategies for this anxiety involve calming the amygdala through slow breathing, relaxing tense muscles, meditation, and exercise. Rewiring this amygdala pathway requires exposing yourself to the trigger repeatedly, and applying these relaxation techniques while in the grip of anxiety. This way, your amygdala can learn that you're safe and form new emotional memories.

The cortex, on the other hand, produces worrying thoughts, negative interpretations, and alarming images that can also activate the amygdala's anxiety response. It is the conscious mind stuck in rumination, trying to anticipate future events or prepare for the worst. To reduce this type of anxiety, you must learn to change your thought patterns through mindfulness, distraction, and play – and replace anxious thoughts with something productive and positive, like coping thoughts.

Actionable advice:

Mind your triangles.

