The Effects of Depression on the Brain

What Is Depression?

Depression is a mood disorder that affects the way you think, feel, and behave. It causes feelings of sadness or hopelessness that can last anywhere from a few days to a few years. This is different than being upset about a minor setback or disappointment in your day.

Some people may experience mild depression only once in their lives, while others have several severe episodes over their lifetime. This more serious, long-lasting, and intense form of depression is known as major depressive disorder (MDD). It may also be referred to as clinical depression or major depression.

The symptoms of MDD significantly interfere with daily activities, such as school, work, and social events. They also impact mood and behavior as well as various physical functions, such as sleep and appetite. To be diagnosed with MDD, you must display five or more of the following symptoms at least once a day over the course of two weeks:

- Persistent feelings of sadness and hopelessness
- Lack of interest in doing most activities, including those you once enjoyed
- Decrease or increase in appetite accompanied by extreme weight loss or weight gain
- Sleeping too much or too little
- Restlessness
- Fatigue
- Excessive or inappropriate feelings of guilt or worthlessness
- Difficulty making decisions, thinking and concentrating
- Multiple thoughts of death or suicide
- A suicide attempts

People of any age may develop MDD, but the average age of onset is 32. According to the Depression and Bipolar Support Alliance, approximately 14.8 million American adults,

or 6.7 percent of the United States population over age 18, are affected by MDD every year. The disorder also occurs in about one in 33 children and one in eight teens. In both children and adults, MDD may be treated with psychological counseling, antidepressant medication, or a combination of both therapies.

Researchers don't know exactly why some people develop MDD, but they believe the following factors may play a role:

- Genetics: It appears that people with a family history of MDD are more likely to develop the disorder than others.
- Stress: A stressful life event, such a divorce or death of a loved one, can trigger an episode of MDD.
- Biochemical reactions: Chemicals in the brains of people with MDD seem to function differently than those in the brains of those without the disorder.
- Hormone imbalances: Changes in hormones' balance may trigger MDD in certain people, especially during menopause or during and after pregnancy.

How Does Depression Affect the Brain?

Three parts of the brain appear to play a role in MDD: the hippocampus, amygdala, and prefrontal cortex.

The hippocampus is located near the center of the brain. It stores memories and regulates the production of a hormone called cortisol. The body releases cortisol during times of physical and mental stress, including during times of depression. Problems can occur when excessive amounts of cortisol are sent to the brain due to a stressful event or a chemical imbalance in the body. In a healthy brain, brain cells (neurons) are produced throughout a person's adult life in a part of the hippocampus called the dentate gyrus. However, in people with MDD, the long-term exposure to increased cortisol levels can slow the production of new neurons and cause the neurons in the hippocampus to shrink. This can lead to memory problems.

The prefrontal cortex is located in the very front of the brain. It is responsible for regulating emotions, making decisions, and forming memories. When the body produces an excess amount of cortisol, the prefrontal cortex also appears to shrink.

The amygdala is the part of the brain that facilitates emotional responses, such as pleasure and fear. In people with MDD, the amygdala becomes enlarged and more active due to constant exposure to high levels of cortisol. An enlarged and hyperactive amygdala, along with abnormal activity in other parts of the brain, can result in disturbances in sleep and activity patterns. It can also cause the body to release irregular amounts of hormones and other chemicals in the body, leading to further complications.

Many researchers believe high cortisol levels play the biggest role in changing the brain's physical structure and chemical activities, triggering the onset of MDD. Normally, cortisol levels are highest in the morning and decrease at night. In people with MDD, however, cortisol levels are always elevated, even at night.

How Can Treatment Change the Brain?

Experts have found that balancing the amount of cortisol and other chemicals in the brain can help reverse any shrinkage of the hippocampus and treat the memory problems. Correcting the body's chemical levels can also help reduce symptoms of MDD.

Several common medications can fight the negative effects of depression on the brain by balancing the chemicals in the brain. These include:

- Selective serotonin uptake inhibitors (SSRIs): These drugs can help alleviate symptoms of MDD by changing the levels of a chemical called serotonin in the brain. Examples of SSRIs include fluoxetine (Prozac), paroxetine (Paxil), and citalopram (Celexa).
- Serotonin-norepinephrine reuptake inhibitors (SNRIs) and tricyclic antidepressants: When used together, these medications can relieve MDD symptoms by altering serotonin amounts and norepinephrine in the brain. These chemicals help boost mood and energy levels.

- Norepinephrine-dopamine reuptake inhibitors (NDRIs): These medications aid people with MDD by increasing the mood-boosting chemicals norepinephrine and dopamine in the brain. Bupropion (Wellbutrin) is a type of NDRI that may be used.
- Monoamine oxidase inhibitors (MAOIs): These drugs help ease symptoms of MDD by increasing the amount of norepinephrine, serotonin, and dopamine in the brain. They can also improve brain cell communication. Typical antidepressants: This group of medications includes tranquilizers, mood stabilizers, and antipsychotics. These drugs can block brain cell communication to relax the body.

Besides medications, certain medical procedures can also affect the brain to help ease symptoms of MDD. These include:

- Electroconvulsive therapy (ECT), which involves passing electrical currents through the brain to boost communication between brain cells
- Transcranial magnetic stimulation (TMS), which involves sending electrical pulses into the brain cells that regulate mood

Researchers also believe that psychotherapy can alter brain structure and help relieve MDD symptoms. Specifically, psychotherapy appears to strengthen the prefrontal cortex. There are other ways to boost brain health and help recover from MDD without medical intervention. These include:

- Eating healthful foods and staying active, which stimulates brain cells and strengthens communication between brain cells
- Sleeping well, which helps grow and repair brain cells
- Avoiding alcohol and illegal drugs, which can destroy brain cells

What is an Amygdala Hijack?

Different parts of your brain perform different functions. To understand the amygdala hijack, you need to know about two of these parts:

Amygdala

The amygdala is a collection of cells near the base of the brain. There are two, one in each hemisphere or side of the brain. This is where emotions are given meaning,

remembered, and attached to associations and responses to them (emotional memories). The amygdala is considered to be part of the brain's limbic system. It's key to how you process strong emotions like fear and pleasure.

Fight or Flight

Early humans were exposed to the constant threat of being killed or injured by wild animals or other tribes. To improve the chances of survival, the fight-or-flight response evolved. It's an automatic response to physical danger that allows you to react quickly without thinking. When you feel threatened and afraid, the amygdala automatically activates the fight-or-flight response by sending out signals to release stress hormones that prepare your body to fight or run away. This response is triggered by emotions like fear, anxiety, aggression, and anger.

Frontal lobes

The frontal lobes are the two large areas at the front of your brain. They're part of the cerebral cortex, a newer, rational, and more advanced brain system. This is where thinking, reasoning, decision-making, and planning happen. The frontal lobes allow you to process and think about your emotions. You can then manage these emotions and determine a logical response. Unlike the amygdala's automatic response, the response to fear from your frontal lobes is consciously controlled by you.

When you sense danger is present, your amygdala wants to activate the fight-or-flight response immediately automatically. However, at the same time, your frontal lobes are processing the information to determine if danger really is present and the most logical response to it.

When the threat is mild or moderate, the frontal lobes override the amygdala, and you respond in the most rational, appropriate way. However, when the threat is serious, the amygdala acts quickly. It may overpower the frontal lobes, automatically triggering the fight-or-flight response.

The fight-or-flight response was appropriate for early humans because of threats of physical harm. Today, there are far fewer physical threats, but there are many psychological threats caused by the pressures and stresses of modern life.

When stress makes you feel strong, anger, aggression, or fear, the fight-or-flight response is activated. It often results in a sudden, illogical, and irrational overreaction to the situation. You may even regret your reaction later.

A psychologist named Daniel Goleman called this overreaction to stress the "amygdala hijack" in his 1995 book, "Emotional Intelligence: Why It Can Matter More Than IQ."

It happens when a situation causes your amygdala to hijack control of your stress response. The amygdala disables the frontal lobes and activates the fight-or-flight response.

Without the frontal lobes, you can't think clearly, make rational decisions, or control your responses. Control has been "hijacked" by the amygdala.

Goleman also popularized the concept of emotional intelligence (EI) and its use to help manage your emotions and guide your behavior and thinking. EI refers to recognizing, understanding, and managing emotions and recognizing, understanding, and influencing others. You can improve your EI with regular practice of controlling your emotions and staying calm when they overwhelm you. To do this, you must first be aware of your emotions and the feelings of others.

What are the Symptoms of an Amygdala Hijack?

The amygdala hijack symptoms are due to the effects of the two stress hormones: cortisol and adrenaline. Both hormones are released from your adrenal glands to prepare your body to flee or fight.

Cortisol is a steroid hormone that affects many of your body's functions, including preparing it for the fight-or-flight response. The main job of adrenaline, also called epinephrine, is to stimulant your body systems, so they're ready to respond to a threat.

Stress hormones, primarily adrenaline, do several things you may not notice, including:

- Relax your airways, opening them up so you can take in more oxygen
- Increase the blood flow to your muscles for maximum speed and strength
- Increase your blood sugar for more energy
- Dilate your pupils to enhance your vision

Symptoms you may notice include:

- Rapid heartbeat
- Sweaty palms
- Goosebumps on your skin

How can you Stop an Amygdala Hijack?

The amygdala hijack's symptoms can be eased or stopped by consciously activating your frontal cortex, the rational, logical part of your brain. This may take some practice and persistence.

The first step is to acknowledge that you feel threatened or stressed and that your fight-or-flight response has been activated. Become aware of how your emotions and body react to significant stress. Reviewing an episode after it’s over can help.

When you notice the fight-or-flight response has been activated, your goal is to calm down and take control. Remind yourself that what you’re feeling is an automatic response, not necessarily the best or most logical one. When you’re calm, consciously engage your frontal lobes by thinking about the situation and finding a thoughtful, rational solution. Become aware of your triggers and warning signs, and notice when they’re present. A good way to stay calm is to pay attention to your breathing.

Breathe slowly and evenly. Think about the speed and rhythm of your breaths, and focus on what's going on in your body as you inhale and exhale.

How to Prevent an Amygdala Hijack?

The first step in preventing an amygdala attack is to identify what triggers it. When you feel the amygdala hijack symptoms starting, try to pause for a moment to notice what triggered it. Anything that causes emotional, physical, or mental stress can be a trigger. There are general categories of stressors that affect everyone to some degree, but specific triggers will be different for everyone. It's also helpful to identify other things that trigger the onset of the amygdala hijack for you. When you feel threatened or afraid, pause and look for behaviors, bodily changes, or warning signs that are happening simultaneously.

Mindfulness- this refers to staying in the present and being aware of what you're feeling and thinking, your bodily sensations, and stimuli from your environment.

Don't try to judge or label the situation as good or bad. Focus only on the current moment, not future tasks or past problems.

Mindfulness takes practice, but it can be done at almost any time. When you're waiting in the car or going for a walk, take time to focus on what you're thinking and feeling and what's happening around you.

Another way to stay present is to focus on your breathing. Focus on the air moving in and out of your nose and how it changes between inhaling and exhaling. Notice which parts of your body move when you take a breath.

There are two main ways to prevent the amygdala hijack. Using these techniques, you can stop the shutdown of your frontal lobes, override your amygdala's automatic response, and consciously control your response.

TECHNIQUES TO STOP AMYGDALA HIJACK

- Reasoning. This means you use your frontal lobes to think the situation through, review the possible options, and choose the most rational and logical way to respond.
- Meditation. By relaxing your body and mind through meditation or deep breathing, you can change your brain's focus from responding to a threat or stress to inner peace and calmness.
- Practice these techniques when you're not experiencing an amygdala hijack to use them the next time you are in a stressful situation.

The above articles are compiled resources to help you to understand and cope with stress better. The modern world is full of stress. We often feel this psychological stress when we see things on the news or social media, such as dangerous events and natural disasters. Your amygdala can respond to this stress as if it's a physical threat to you. It can take control of your brain and trigger your fight-or-flight response.

You can prevent or stop an amygdala hijack by breathing, slowing down, and trying to focus your thoughts. This allows your frontal cortex to regain control. You can then live more calmly with fewer drugs and medicine.

Written By: Mind-Stream Int'l
www.mind-stream.co