

The holidays and your brain—a neuroscientist explains how to identify and manage your emotions

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Just as the shift to shorter days and colder weather can bring with it mood swings and other [emotional challenges](#), the holiday season can also

bring about somewhat predictable changes in mood and behavior.

Around this time of year, many of us experience more stress, anxiety and frustration than usual. These stressors have been linked to [higher levels of heart failure](#) and [alcohol poisoning](#) and an increase in [deaths from stroke](#).

Learning how to recognize what brings about stress and what parts of the [brain](#) are actively involved can help with managing the [stress response](#).

As a neuroscientist, I am often curious about the [dynamic connection between behavior and the brain](#). I've learned that, biologically speaking, there are ways to manage your responses to holiday stressors through awareness of why they happen.

Harnessing the hypothalamus

Delays in itineraries, crowded airports and congested highways can easily lead to [frustrations for those traveling](#) to spend time with family or friends.

One region of the brain involved in your response to these types of stresses is the [hypothalamus](#), a structure deep in the brain that is involved in trying to keep the body in a stable state, known as homeostasis. The [hypothalamus works to regulate](#) the [autonomic nervous system](#), a system that coordinates involuntary responses such as heart rate, blood pressure and respiration. It is the key component of the [fight-or-flight](#) response to real or perceived threats.

When you are under stress, such as when you learn that your flight has been delayed or even canceled, your hypothalamus stimulates the release of stress hormones such as cortisol and epinephrine. These hormones in turn trigger physiological responses like increased heart rate,

perspiration and feelings of irritation and frustration.

When you experience these stressors, [deep breathing exercises](#) can help stimulate the body's parasympathetic nervous system. This is known as the "rest and digest" system because it is responsible for helping your body relax and recover from stress. By taking slow, deep breaths, you can engage the parasympathetic nervous system, which can in turn [calm your nerves](#) and reduce frustrations.

Family dynamics and interactions

Getting together with family during the holidays can bring about complicated emotions when there are conflicting personalities, unresolved issues or [awkward family dynamics](#).

Frustrating or aggravating conversations with relatives often trigger a region of the brain known as the [anterior cingulate cortex](#). The [anterior cingulate cortex](#) has a unique position in the brain, establishing connections with both the "[emotional](#)" limbic system and the "[cognitive](#)" [prefrontal cortex](#).

This brain region is involved in monitoring and regulating [cognitive processes](#), [conflict resolution](#) and error detection. It plays a role in processing frustration by signaling when there is a conflict between expectations and outcomes. The anterior cingulate cortex is also involved in what's known as [action-outcome learning](#), where you evaluate the consequence of an action and adjust your behavior based on feedback.

When you are feeling overwhelmed or frustrated, [taking short breaks](#) to step away from the situation can provide a fresh perspective and allow you to return with a clearer mindset. This break will allow you to reinforce this action-outcome learning, helping you learn to associate an action—a short break—with the outcome of the action, which is more

relaxed breathing and a clearer mind.

Financial worries

The [holiday season](#) can put an unnecessary burden on those who are [experiencing economic or financial hardship](#). The cost of hosting a holiday meal, buying gifts or traveling can contribute additional financial strain during an already stressful time.

The brain region [primarily associated with memory and learning](#) is the [hippocampus](#). When you recall [past experiences](#), such as how much you spent last year during the holidays or remember that the credit card bill is coming soon, you activate your hippocampus. The hippocampus is critical in the interplay of memory formation and recall and retrieval of individual episodic memories.

Some ways to reduce stress may be to make gifts for friends and family instead of purchasing them. To help cut down on travel costs, perhaps take a virtual holiday visit now, followed by an in-person visit later when it is less expensive or when financial strains have eased. When reminded of [stressful experiences](#), the hippocampus sends signals to the hypothalamus and other brain regions to help restore balance in your mind. The hippocampus also aids in your adaptation to these stressors by helping you learn how to [adjust your expectations](#). In the end, you have to remind yourself that it truly is the thought that counts most.

Loneliness and isolation

Feelings of [isolation and loneliness](#) can arise for those of us who may not have family or friends to celebrate with, or perhaps are unable to travel to see those we love.

This is where the "[default network](#)" of the brain plays a role. This

network, made up of brain regions including the amygdala, is involved in thoughts of future planning, reminiscing and imagining. The [amygdala](#) is a part of the limbic system and is associated with processing of negative emotions to stimuli, such as the irritation from not being able to travel, and how you react.

Studies have shown that you can help improve your mood and reduce feelings of frustration and irritation by having a [regular exercise routine](#). Physical activity can be an effective outlet for releasing built-up tension and stress. Aerobic exercise can also modulate [connections between and within the amygdala](#) and help reduce feelings of depression. As an added bonus, if you work out in a gym or park, you have an opportunity to be around others, which can help you feel more connected with communities of people with similar interests.

Political discussions

Family gatherings can lead to [discussions about current events or politics](#), which can result in heated debates and disagreements among family members. These conversations can be very frustrating and even upsetting, especially in [today's polarized world](#).

The [prefrontal cortex](#) is an area of the brain involved in [impulse control](#), decision-making and emotional regulation. It plays a crucial role in assessing certain situations, such as supercharged conversations, and it helps you evaluate and consider your potential actions and temper your emotional responses. Understanding what triggers your frustration in these situations is crucial to developing proactive strategies to manage or avoid them.

For instance, this might take the form of [empathizing with the opposing side](#) or perhaps stepping away from the table when voices start to rise or you feel your emotions building. The [prefrontal cortex plays a dual role](#)

in regulating the relationship of your initial emotional reaction and the shift to your empathetic emotion. Your ability to build empathetic perspectives and increase cognitive control helps to further develop your [prefrontal cortex](#), potentially making it easier to de-escalate the next time around.

One step at a time

Reducing frustration is a gradual process, and different strategies work for different people.

It is important to identify the root cause of your stress and frustration so that you can develop your own targeted coping strategies. Some examples include engaging in a hobby, listening to music, going on a walk or run, or simply practicing relaxation techniques. It is essential to experiment with various techniques and not be afraid to move away from ones that don't work and toward ones that do.

The most important thing to remember is that retraining your brain is more of a marathon and not a sprint. It will include trial and error and open-mindedness, but if you focus on identifying your triggers and adapting your own coping strategies, it will almost certainly get better with time.

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