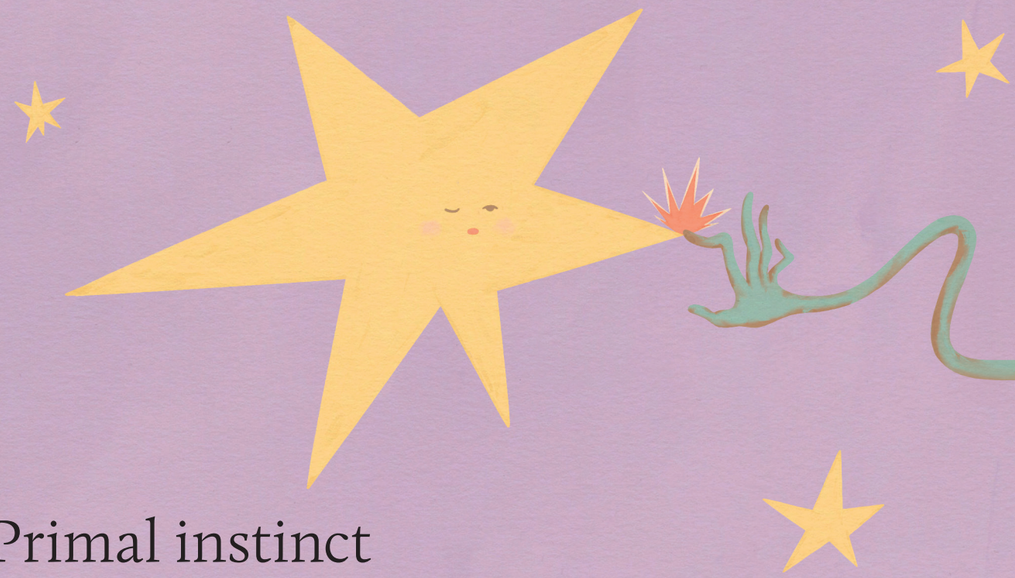

Primal instinct

Responsible for some of the most primitive responses in the brain, the amygdala has been crucial to survival since humans first evolved. In the modern world, it can also be problematic, overreacting to everyday stresses, but there are ways to manage those situations

Once upon a time, the small almond-shaped structure deep inside the brain had an important function – to keep humans alive. When contending with threats such as hungry tigers and poisonous snakes was a day-to-day occurrence, the amygdala was the part of the brain responsible for those life-saving fight-flight-or-freeze reactions. It also contributed to urges to feed and breed – keeping the species alive. You might have heard of it referred to as the 'lizard brain'. This theory was developed by neuroscientist Paul MacLean in the 1960s, after he identified similarities between the brains of humans and their common vertebrate ancestors. It led him to propose that the human brain had evolved from the reptilian one and still had the old lizard brain within it. This theory has since been disproved, however.

Fast-forward to the 21st century and the amygdala is sometimes blamed for those instinctive or trigger responses that can increase stress levels or even get you into trouble, because this part of the brain can't always differentiate between the threat posed by a dangerous animal or, say, being stuck in a traffic jam. It is possible, however, to learn to understand and calm these conditioned responses. And it's worth remembering that the amygdala still has an important function – working hard to keep you safe.

Primitive response

Sometimes thought of as the 'fear button', even though other areas of the brain are responsible for this emotional processing, the amygdala's function is simpler. Joseph LeDoux, professor of neuroscience and psychology at New York University, director of NYU's Brain Science Institute, and author of books including *The Four Realms of Existence: A New Theory of Being Human*, explains: 'It's not about fear – it's about responding to danger.' The amygdala is responsible for detecting and responding to threats, by releasing neurotransmitters that cause other neurons in the brain to respond. Joseph says it 'generates behavioural responses and physiological arousal', as well as the secretion of brain chemicals, such as dopamine and serotonin, and hormones including adrenaline and cortisol.

Susan Saunders, from London, is a brain health coach, author of *The Power Decade: How to Thrive After Menopause*, and co-author of *The Age-Well Project*. She says a simple way to think of the amygdala is as your body's 'on switch', adding: 'It's the GO button for your fight-flight-or-freeze response.'

Modern problem

The amygdala's responses can become problematic depending on a person's conditioning and learned experiences of what constitutes a threat. Joseph gives the example of being in a car accident involving a red car, and thereafter experiencing those physiological responses caused by the amygdala perceiving other red cars on the road as a threat. Chemicals and hormones are produced to help you respond to danger – even though there is no danger – and messages are sent to other parts of the brain, which create feelings of stress or anxiety.

Susan adds that the amygdala can sometimes work against you because the response is 'not necessarily a rational one'. This might explain irrational behaviour or knee-jerk reactions when under pressure. She says: 'It's the primal response that protected your ancestors from sabre-toothed tigers. But when you're

stressed, the amygdala is putting you in fight-or-flight mode all the time. Even when it's bad traffic or a nasty boss – your amygdala can't differentiate.'

When stress becomes chronic, rather than acute, it causes a rise in the production of stress hormones, glucose levels and blood pressure, which in turn can lead to stress-related health problems. 'There are a lot of modern triggers that you can't fight or run away from,' says Susan. She also points out that hormone fluctuation can impact the amygdala, which is one of the reasons women experience increased anxiety and fearfulness during periods of hormonal change such as perimenopause.

Calming measures

Thankfully, an understanding of why you're responding in a certain way to perceived threats can help you to manage that reaction. 'There's an override button,' says Susan. One way to do this, she suggests, is by trying to create a gap between the perception of threat and your reaction. This will allow the more rational parts of the brain to come into play and perhaps suggest a more appropriate response. This could be taking five deep, slow breaths if you're stuck in a queue, asking for time to process negative feedback at work or going for a walk before making a difficult phone call. 'It's about taking a moment and trying to create a small gap between the stressor and your response,' says Susan. 'You can't change external situations, but you can always change your response.'

Joseph says that when the amygdala becomes overstimulated it can lead to 'hyper-arousal', pointing out that people who have problems with fear or anxiety can have an overactive amygdala. He talks about 'taming the amygdala' by using techniques such as meditation, breathing exercises and cognitive behavioural therapy (see opposite page for more on this).

Power for good

The amygdala is described by Joseph as an automatic system 'keeping you alive in the atypical situations you might encounter in life'. He's been studying the amygdala for more than 30 years and is even the lead singer and songwriter in a rock band called The Amygdaloids. 'We've created our own genre – "heavy mental,"' he says. 'Our songs are about the mind and brain.'

Susan says that people need their amygdala's survival response, even in the modern world. There might still be moments of real danger – perhaps a violent encounter or during a high-risk sport. 'In those times when you're relying on a primitive response to get you out of danger, the amygdala will do its job,' says Susan. 'It's like a computer program running in the background, questioning "Are we safe?" all the time, as you're doing things like crossing the street.' She also points out: 'I feel grateful to my amygdala for enabling my ancestors to survive.'

Words: **Jade Beecroft**

Find Susan Saunders on Instagram @susansaundershealth or susansaundershealth.com and Joseph LeDeux at joseph-ledoux.com. Follow The Amygdaloids on YouTube or Spotify

ILLUSTRATIONS: TZU-CHUN CHANG

HOW TO HACK YOUR AMYGDALA

Activities that engage the parasympathetic nervous system – the body's rest-and-digest mode – can help reassure the amygdala that there isn't a threat. Try these suggestions

Safety in numbers. Susan suggests that being in the positive company of others can be reassuring to your body's defence system, because humans 'evolved to be part of a tribe to ward off those sabre-toothed tigers'.

Be mindful. Focusing on the here and now and engaging all your senses or performing a body-scan exercise can help downregulate the body's stress responses and encourage relaxation.

Name the emotion. If you're experiencing intense feelings in response to a stressful situation where you're not immediately under threat, try naming the emotions. Thinking about them objectively can help create space to consider your reaction.

Practise breathing exercises. This can help to communicate to your amygdala that all is well. You could try box breathing, where you take a deep breath and then follow this pattern while picturing the sides of a box:

- *Breathe in for a count of four.*
- *Hold the breath for a count of four.*
- *Breathe out for a count of four.*
- *Hold for a count of four.*

Repeat this four-step pattern for a few minutes. You can also lower or increase the count. Susan, for example, likes to practise with a longer exhale. Equally, however, you could count to two on all sides instead, if that feels more comfortable.