

 SCIENCE

# THE SCIENCE BEHIND THE SCREAMS

Phobias are irrational by definition. So why do we have them, and can they be cured?

WORDS DEAN BURNETT

**DID YOU KNOW?** Doctors recognise over 500 distinct phobias – they're classified as a type of anxiety disorder



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If you're still holding this copy of **How It Works**, presumably you're not an arachnophobe. It's likely that many readers, when confronted by the image overleaf, will have let out a horrified scream, hurled the magazine across the room and possibly burned it. This may seem like an extreme reaction to something that is, after all, just a picture. But then a lot of people are deeply afraid of spiders – especially when not expecting them.

This is nothing to be ashamed of. Everybody is afraid of something. Most people are actually afraid of multiple things, to varying degrees. As counterintuitive as it may seem, fear is actually a good thing. The natural world is filled with dangers and hazards, and human society has served to introduce more complex and unpredictable ones on a daily basis. So it's right to fear things.

It's not just life-threatening danger that provokes a fear response; it can easily be much more mundane things, ranging from becoming unemployed to eating unfamiliar foods. But there is a difference between sensible fear and fear that has no basis in logic. Our examples make sense: unemployment can lead to destitution and loss, whereas strange or unfamiliar foods can produce damaging biological responses if

they contain something that your body doesn't react well to. These are things to be avoided.

But what if you fear something that doesn't pose any danger or threat? This is what's known as a phobia. Countless people suffer from phobias, and they manifest themselves in a wide variety of ways. But what are they? Where do they come from? And what can we do about them?

It's important to note that phobias, almost by definition, don't make any sense, so trying to talk a sufferer into 'seeing sense' is unlikely to work. Indeed, one of the criteria for diagnosing phobias is that the sufferer is aware of the illogical,

irrational nature of them, but continues to experience them regardless. The human mind is incredibly complex, and there are numerous ways for a seemingly innocuous thing to be thought of as dangerous or scary – whether it's based on actual experiences, misinformation or simply an unusual connection between neurons.

The logic of the fear may be absent, but the biological reaction is very real. Fear triggers physiological reactions, most of which are concerned with the well-known 'fight-or-flight' response. The adrenal glands pump

**Did you know?**

People with emetophobia are less likely to vomit

**“The adrenal glands pump adrenaline through your bloodstream and the sympathetic nervous system signals that danger is imminent”**



The fear of flying is known as pteromerhanophobia

**FIVE UNUSUAL PHOBIAS**

They seem strange, but there may be a reason for these odd fears

**1 COULROPHOBIA  
FEAR OF CLOWNS**

Many people fear clowns. Humans have evolved to be very sensitive to others' faces, so it may perhaps be the grotesquely exaggerated made-up features of clowns that unsettle people.



**2 EMETOPHOBIA  
FEAR OF VOMITING**

Vomiting is the brain's go-to response for dealing with poisoning, which is obviously dangerous. Some people's brains may be oversensitive to this threat, and thus fear vomiting as a proxy.



**3 PEDIOPHOBIA  
FEAR OF DOLLS**

Dolls are often recognisably human but with exaggerated or shrunken features. As with clowns, people tend to react badly to representations of humans that are noticeably unreal.



**4 HYLOPHOBIA  
FEAR OF FORESTS**

Forests often feature in stories as dangerous and scary places. Does this stem from humans evolving on the open plains of the savannah, where enclosed spaces would be rare and treacherous?



**5 PARASKAVEDEKATRIAPHOBIA  
FEAR OF FRIDAY THE 13TH**

Friday the 13th has become so commonly referenced as a day when bad things happen that it's hardly surprising some people may begin to fear it on a fundamental level.



**DID YOU KNOW?** 'Phobia' is the Greek word for 'fear'. Phobophobia is a fear of having phobias, or the fear of fear itself

## KNOW YOUR FEAR RESPONSES

When we encounter a trigger, our bodies react in several pronounced ways

### AROUSAL

Our adrenal glands and sympathetic nervous system cause our bloodstream and nerves to be flooded with signals that activate the fight-or-flight response, preparing us to deal with imminent danger.

### DISTRACTION

Our brains become geared towards dealing with the oncoming threat. This means it's more difficult to address smaller issues or other, less pronounced stimuli vying for our attention.

### POUNDING HEART

Our heart rate and blood pressure increase. This is to provide greater amounts of energy and resources to our muscles faster. It helps us physically deal with the perceived threat.

### WIDE EYES

Our pupils dilate, letting more light in and giving us a better chance of seeing more of our environment – and hopefully spotting the imminent threat or some avenue of escape before it's too late.

adrenaline through your bloodstream and the sympathetic nervous system starts signalling to the rest of the body that a dangerous situation is imminent, causing numerous changes to your body. This response is the same whether the cause of the fear makes sense or not, which is why phobias can be so powerful.

Identifying phobias is one thing, but uncovering the cause is quite another. As with many things, there's a question of nature versus nurture. Are we preprogrammed to develop strong fears, or are they simply something we learn and pick up as we develop, the result of traumatising events or other unpleasant experiences?

Research suggests that humans and other primates have evolved to fear certain things. Studies with chimpanzees revealed

that a chimp that witnesses another chimp showing a fearful response to a snake will quickly develop similar responses. However, when chimps are trained to be afraid of

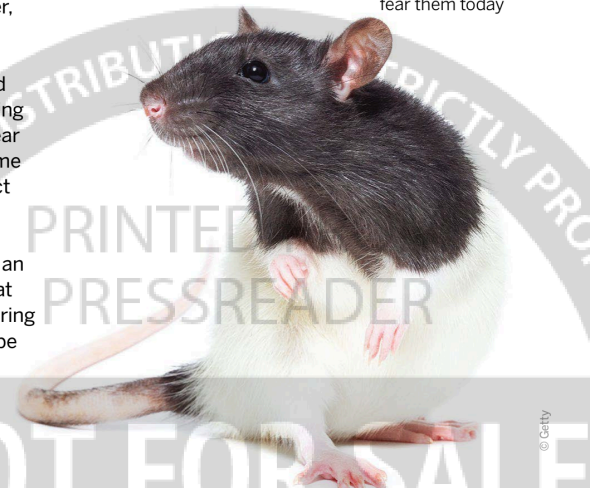
something more innocuous, such as flowers, something that happened in one experiment, other observing chimps rarely if ever copy this fear reaction. The situation is the same – the only difference is the object causing the fear. So why would chimps react more fearfully to snakes? It's likely that primates have an evolved tendency to fear snakes, given that they would have been a constant threat during the species' development. The same may be said of spiders.

The brain also has a specific area seemingly dedicated to processing the fear response. This is the amygdala, a

Rats often carried diseases in the past, but many people still fear them today

### Did you know?

Around 10 million people in the UK have a phobia



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A fear of snakes is a common phobia

## GRADUALLY OVERCOMING OUR FEARS

It's all very well exposing someone to a phobia source so they learn that nothing bad happens. However, they still experience a biological fear response – and as far as the brain is concerned, this is a negative sensation. This response can be avoided by gradual exposure. For an arachnophobe the progression might be: see a picture of a spider; see a real small spider; hold a plastic spider; see a bigger spider; hold a small spider and so on. This process is known as systematic desensitisation.



Gradual exposure to a phobia can slowly ease the fear associated with it

small nucleus of the temporal lobe that encodes the emotional component of memories, particularly fear. Organisms with a damaged or missing amygdala don't learn to fear dangerous or unpleasant things, even if they're repeatedly harmed by them. Other regions called the insula and putamen play a similar role in processing disgust responses, helping us avoid poisons.

But this isn't the whole story. These evolved responses take millions of years to develop. And obviously people acquire fear associations by more rapid means. Humans, like all animals, learn to fear things. A famous experiment in associative learning studies concerns 'Little Albert', in which Albert, a baby, was shown a white rat for the first time. At the same time, the experimenter made a terrible din by banging metal pipes, causing the poor child to become very scared – a fear he associated with the rat. From then on, Little Albert acquired a serious phobia of rats, as well as other fluffy white objects – a phenomenon that's known as 'stimulus generalisation'. This is technically the same process – called classical conditioning – used by Pavlov to

train his famous dogs to salivate at the sound of a bell.

Many people may wonder how a scientist was able to do such a thing to an innocent baby. In fact, the scientist was 20th-century behaviourist John Watson, and Little Albert was his own son. Albert's mother apparently pulled him out of the experiment before Watson could undo this conditioning – or possibly make it worse.

But although it's thankfully rare for people to be subjected to psychological experiments by their parents, it's still likely that our parents are the cause of numerous phobias. As well as inheriting the evolved fear tendencies in our genes, if parents have a phobia then it's likely their children will develop it too.

Humans have the impressive ability to learn by observing without directly experiencing the events or occurrences we're witnessing. Children are especially good at this, so if we see our mother or father – who are the basis of much of our early developmental knowledge – screaming when they see a wasp or a clown, we'll likely fear those things without question too.

### Did you know?

There is a phobia of peanut butter sticking to your mouth

**DID YOU KNOW?** Around 25 per cent of the US population report a fear of at least one social situation



A fear of falling seems rational, but one of heights alone may not be. Sufferers have a physiological fear response regardless

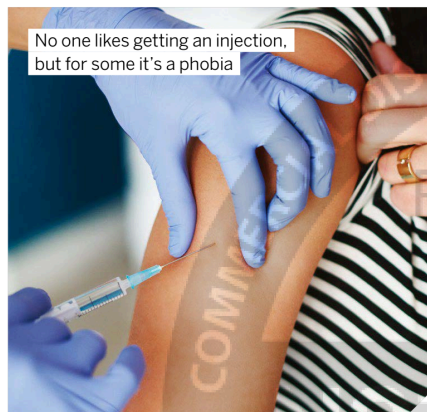
**“A large proportion of what humans know and learn comes from other people”**

A large proportion of what humans know and learn comes from other people. They are a constant and potent source of information, and we regularly calibrate ourselves with regard to the views of others around us. This is why a whole subcategory of phobias is based around fear of others’ reactions.

What can be done about phobias? The obvious solution is to avoid the cause, which is easy enough in most cases, but can be debilitating if the trigger is an everyday thing. However, it would have to be a particularly extreme example of a phobia for it to require medication being prescribed. Counselling and therapy are the main approaches, of which there are many forms.

Phobias are the result of numerous disparate processes, from evolution to

classical conditioning to observation to trauma to neuroses to social psychology and more. Any or all of these could contribute to someone developing a phobia. But it’s important to remember that there’s nothing ‘wrong’ with a phobia sufferer – they’re perfectly normal people, albeit with one idiosyncrasy that perhaps not everyone shares or understands. But all in all, phobias are a part of life, and are nothing to be afraid of.



No one likes getting an injection, but for some it’s a phobia

**THREE CLINICAL TYPES OF PHOBIAS**

Phobias can be split into a trio of distinct groups, all of which have the capacity to be debilitating

**SPECIFIC PHOBIAS**

These are phobias triggered by particular things. Spiders, rats, knives and blood are all examples.

**SOCIAL PHOBIAS**

These are a fear of anything that could result in negative reactions from others, such as public speaking or party conversation. They appear at an early age in most cases.

**AGORAPHOBIA**

A fear of any situation where escape would be difficult or help wouldn’t be forthcoming. This applies to most places outside the sufferer’s home, and so they remain there – resulting in the common ‘fear of open spaces’ misunderstanding.

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