

The fear factor

- 1 Palms sweat, heartbeat quickens, muscles tense. Your skin prickles and your stomach churns. When fear subsides, we can be left with feelings of pleasure. Is this just the relief of having survived – or is it something more?
- 2 “Although we have an understanding of some aspects of neural fear networks and how they coordinate behaviour, there are still many unknowns,” says Dr Charlotte Lawrenson, a neuroscientist at Bristol University. When we are exposed to sensory stimuli or an environment that is potentially threatening, she says, two pathways are activated in the brain. The first is fast. Information is transferred to the sensory thalamus and then to the amygdala, allowing for immediate action on the threatening stimuli. The second is a slower, indirect route. Information is sent from the thalamus to the cortex, the outermost layer of the brain, associated with consciousness, reasoning and memory. This analyses the threat and allows us to determine whether we are in real danger.
- 3 “We do not know exactly where the feeling of fear occurs in the brain,” says Lawrenson, “but it is likely to be from the coordinated activation of a fear network involving multiple brain regions.” If the threat is determined to be real, other areas of the brain will be activated to initiate a whole-body response to the danger. “The memory of the danger will be transferred and stored in the hippocampus,” adds Lawrenson’s co-researcher, Dr Elena Paci, “so that we are able to remember and identify the threat at the next encounter.”
- 4 Fear is an ancient emotion and scary stories are ingrained in human history. In early societies, fear-inducing tales were used to teach children about dangers they might encounter, such as wolves and other predators. Today, cinema offers a window into society’s collective fears. Prof Marc Malmdorf-Andersen and his colleagues think that horror films have learning potential for uncertainty management.



- 5 As an associate professor at Denmark's Aarhus University, Malmdorf-Andersen researches the cognitive processes involved in play and learning. "Spending time in these fictional realms can almost be thought of as an opportunity to draft up your own instruction book for worst-case scenarios," he says.
- 6 A study on horror fans during the Covid pandemic found that people who enjoyed watching scary films were more psychologically resilient than non-horror fans. "They have, in some ways, been exposed to similar scenarios and might use that experience for navigating new, uncertain realities," says Malmdorf-Andersen. "It is possible that recreational forms of fear in general can help improve emotion regulation and coping skills." Enjoyment of fear, says Malmdorf-Andersen, makes sense if you look at it as a "form of play". "Enjoyment of scary stimuli seems to be related to getting a grip on unpredictable situations," he says. "In much the same way, children's play is characterised by seeking out moderate amounts of uncertainty, moderate surprises, in an effort to make sense of them."
- 7 To investigate the relationship between enjoyment and fear, Malmdorf-Andersen and his colleagues at Aarhus University's Recreational Fear Lab studied a group of people who went to a haunted house visitor attraction. The researchers filmed the guests, monitored their heart rates and asked them how they felt at various points during the experience.
- 8 The findings indicated that humans don't enjoy being too far from their normal physiological state, but they do enjoy being just a little bit out of their comfort zone. "Our results suggest that there might be a 'sweet spot' between fear and enjoyment," says Malmdorf-Andersen. "A just-right spot where the context is not too terrifying, but not too tame either. This sweet spot seems to be 19."
- 9 However, it is important to keep in mind that everyone is different. We all have a unique sense of what we find scary – and it's a fine line between harmless fun and genuine terror. Too much fear can lead to distress and dysfunction. Globally, about 275 million people suffer from anxiety disorders, which can become chronic and debilitating and affect a person's life trajectory. "Different people have a different level of activation of certain areas of the brain" says Paci. What can be a thrill for one person can be truly terrifying for another. So dare to be scared this Halloween – 21.

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