

# Anxiety boosts sense of smell

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Anxious people have a heightened sense of smell when it comes to sniffing out a threat, according to a new study by Elizabeth Krusemark and Wen Li from the University of Wisconsin-Madison in the US. Their work<sup>1</sup> is published online in Springer's journal *Chemosensory Perception*. The study is part of a special issue<sup>2</sup> of this journal on neuroimaging the chemical senses.

In animals, the [sense of smell](#) is an essential tool to detect, locate and identify predators in the surrounding environment. In fact, the olfactory-mediated defense system is so prominent in animals, that the mere presence of predator odors can evoke potent fear and [anxiety](#) responses.

Smells also evoke powerful emotional responses in humans. Krusemark and Li hypothesized that in humans, detection of a particular bad smell may signal danger of a noxious airborne substance, or a decaying object that carries disease.

The researchers exposed 14 young adult participants to three types of odors: neutral pure [odor](#), neutral odor mixture, and negative odor mixture. They asked them to detect the presence or absence of an odor in an MRI scanner. During scanning, the researchers also measured the skin's ability to conduct electricity (a measure of arousal level) and monitored the subjects' breathing patterns. Once the odor detection task was over, and the subjects were still in the scanner, they were asked to rate their current level of anxiety. The authors then analyzed the brain images obtained.

They found that as anxiety levels rose, so did the subjects' ability to discriminate negative odors accurately - suggesting a 'remarkable' olfactory acuity to threat in anxious subjects. The skin conductance results showed that anxiety also heightened emotional arousal to smell-induced threats.

The authors uncovered amplified communication between the sensory and emotional areas of the brain in response to negative odors, particularly in anxiety. This increased connectivity could be responsible for the heightened arousal to threats.

Krusemark and Li conclude: "This enhanced sensory-emotional coupling could serve as a critical mechanism to arouse adequate physiological alertness to potential insults."

**More information:** 1. Krusemark EA & Li W (2012). Enhanced olfactory sensory perception of threat in anxiety: an event-related fMRI study. *Chemosensory Perception*. [DOI:10.1007/s12078-011-9111-7](https://doi.org/10.1007/s12078-011-9111-7)  
2. *Chemosensory Perception*, Special issue: *Neuroimaging the Chemical Senses*, Vol. 5, No. 1, March 2012, [www.springerlink.com/content/1936-5802/5/1/](http://www.springerlink.com/content/1936-5802/5/1/)

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