Each nostril has a unique sense of smell, intracranial electroencephalogram study finds

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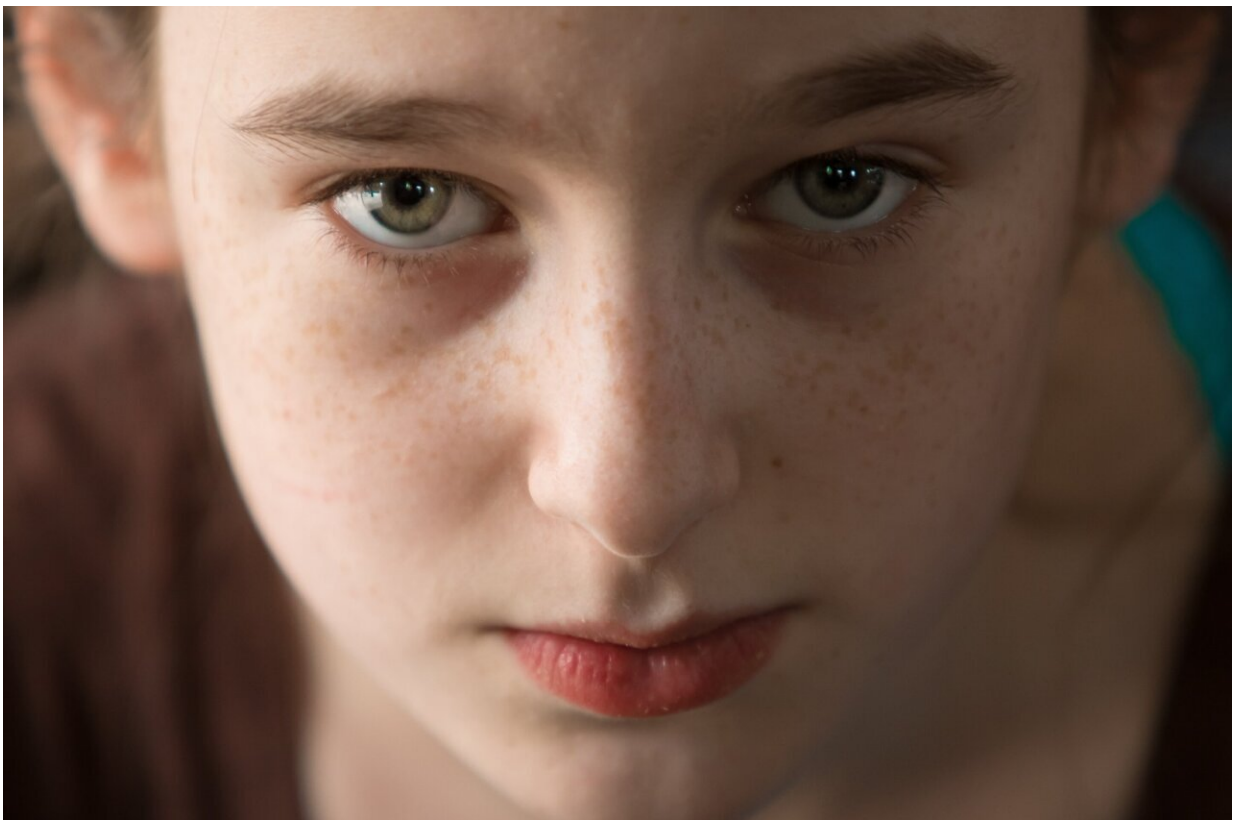

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Research led by the University of Pennsylvania, Philadelphia, and the Barrow Neurological Institute, Phoenix, has examined the neural

processes underlying odor processing in the human olfactory system and how the brain handles odor information from different nostrils.

In a new paper titled "Odor representations from the two nostrils are temporally segregated in human piriform cortex," published in *Current Biology*, the team details the finding that each nostril has its own sense of smell, recording a distinct representation of the odor information it encounters.

The study involved 10 subjects with intracranial depth electrodes in an odor identification task where odor stimuli were delivered to the left, right, or both nostrils through an olfactometer device designed to deliver odors by computer control.

Subjects had to identify the odor and indicate which nostril the odor came from. Subjects performed better in detecting and identifying odors in the bi-nostril condition compared to uni-nostril conditions, with no significant efficiency preference observed between the left and right nostril conditions.

Odor identity could be decoded from oscillations in the piriform cortex brain region via neural activity recorded from an intracranial electroencephalogram. The researchers observed that odor identity was encoded in two distinct, temporally segregated epochs in the bi-nostril condition, suggesting a separate smell interpretation occurs via each nostril.

Stimulating either nostril with the same odor elicited similar yet distinguishable representations during their encodings. This suggests that while each nostril can identify a distinct smell as the same, there are subtle differences in how they perceive the odor.

Odor representations were achieved faster in the bi-nostril condition,

suggesting a possible computational advantage in processing odors in stereo.

Understanding these processes is essential for gaining a deeper understanding of how humans perceive and identify odors and may have broader implications for sensory neuroscience and cognitive science.

More information: Gülce Nazlı Dikeçligil et al, Odor representations from the two nostrils are temporally segregated in human piriform cortex, *Current Biology* (2023). DOI: 10.1016/j.cub.2023.10.021