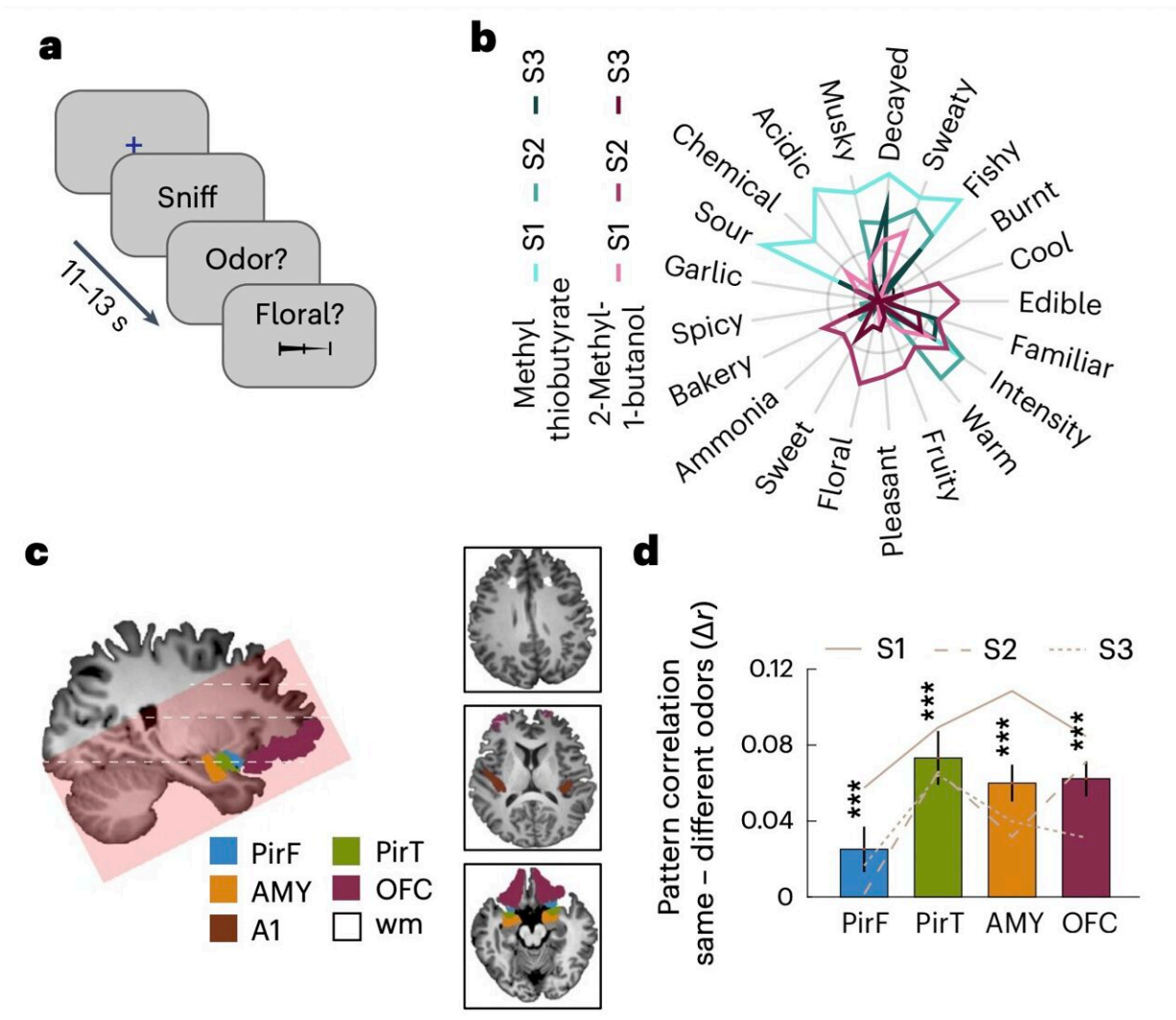


Study sheds light on the neural underpinning of subjective odor perceptions

September 19 2023, by Ingrid Fadelli



Neural activity patterns in olfactory brain areas represent odor stimuli. a, Trial structure. During fMRI, subjects were cued to sniff on each trial. If they reported detecting an odor, they rated the odor on one of the perceptual

descriptors listed in b. Odors were presented 27–30 times in pseudo-randomized order across multiple sessions and only one descriptor rating was obtained on each trial (Methods). b, Perceptual ratings for two example odors (methyl tributyrate and 2-methyl-1-butanol). Subjects rated odors on 18 perceptual descriptors (note that these were drawn from a total of 21 descriptors; see Methods for details). S1 rated 2-methyl-1-butanol as sweaty and decayed, but S2 found the same odor to be pleasant and floral, highlighting the substantial variability in odor perception across individuals. c, Anatomical ROIs shown for subject S1. In each of the olfactory ROIs, significant odor-evoked activity was observed with similar temporal signal:noise ratio in the voxel time series. The shaded area shows the field of view for scanning. d, Difference between pattern correlation (Δr) among activity patterns evoked by the same minus different odors in different fMRI sessions. Multi-voxel patterns were more similar (across sessions) when comparing responses evoked by the same odor versus different odors in all four ROIs ($\Delta r > 0$, $P = 0.0000$ in all areas, $n = 3$ subjects, 12,720 odor pairs per subject, two-tailed percentile bootstrap; $P = 0.0000$ in all areas, $n = 3$ subjects, 12,720 odor pairs per subject, two-sample Student's t-test). Bars depict mean correlation difference and error bars depict 95% CIs. S1, S2 and S3 indicate subjects 1, 2 and 3. ***P

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