

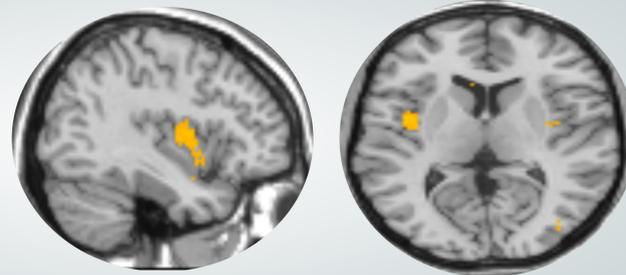
TASTANT-SPECIFIC RESPONSES IN HUMAN INSULA TO FOOD PICTURES

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Objective

Previous imaging studies [1] on visual food processing have reported enhanced fMRI-responses to food pictures in the human gustatory cortex (insula).



Our aim: Mapping the representation of taste in the human insula [2] as a response to images of common food characterized by different tastes.

Materials and methods

Participants

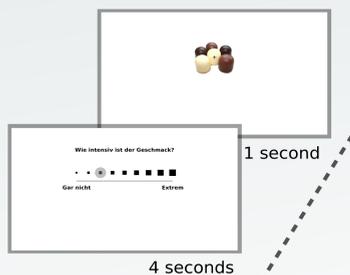
Sample size N = 12, fasted for at least 3 hours prior to the experiment.

Stimulation

30 images of food (sweet, bitter, sour, umami, salty) and 30 images non-food [3]. Matched for low level features such as spatial frequency, luminance and size

Task

Event related design
Participants were asked to rate intensity of flavour and hue for food and non-food images, respectively.
Conditions: 5 food categories (sweet, bitter, sour, umami, salty)
5 non-food trials per condition = 36



Data acquisition

High resolution fMRI 1.5 mm² in-plane resolution
Acquisition = multislice,
TR = 2 seconds, N. slices = 252, Runs = 6
Run duration = 8 minutes,
Inter-trial intervals = 1250, 1360, 1500, 1600 ms

Results

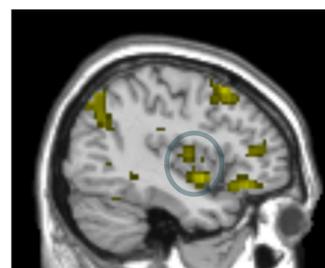
Univariate analysis (SPM) revealed stronger insula activation for food vs non-food images. Remarkably, it showed non-overlapping taste-specific representations at the group level.

Coordinates for highest taste specific activation

Taste	x	y	z	t
sweet	-39	-7	8	2.95
bitter	-39	-1	5	1.97
sour	-36	-4	20	2.98
umami	-39	-7	5	2.28
salty	-30	-10	14	3.56

p < .05, uncorrected, contrasted with food vs. mean non food items

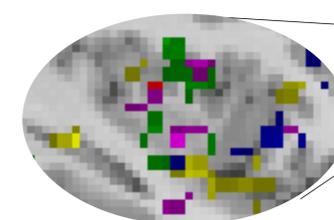
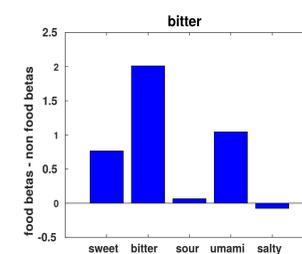
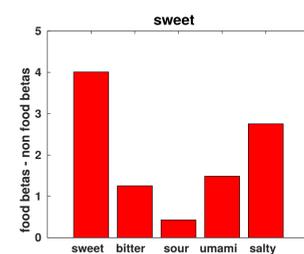
Food > Non-Food response



x = -39, y = 2, z = -7

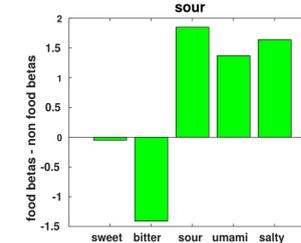
All fMRI images are in MNI coordinates

Maximum BOLD response pattern across taste categories

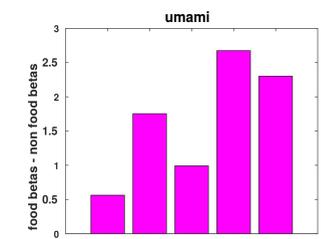
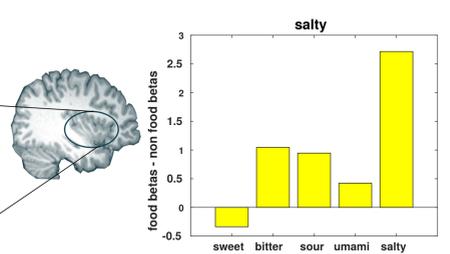


Left hemisphere

x = -36



Individual taste vs mean non-food stimulation



Conclusions

The present results suggest that food images associated with specific tastes elicit distinct representations in the insula, contrary to matched non-food images.

References

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- Schoenfeld, M. A., et al. "Functional magnetic resonance tomography correlates of taste perception in the human primary taste cortex." *Neuroscience* 127.2 (2004): 347-353
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