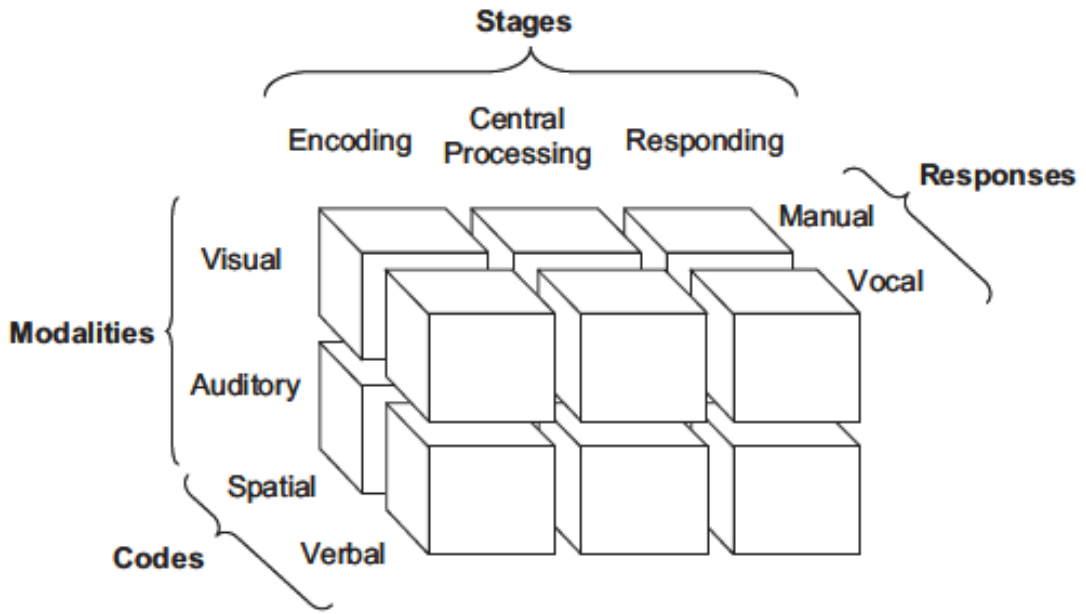
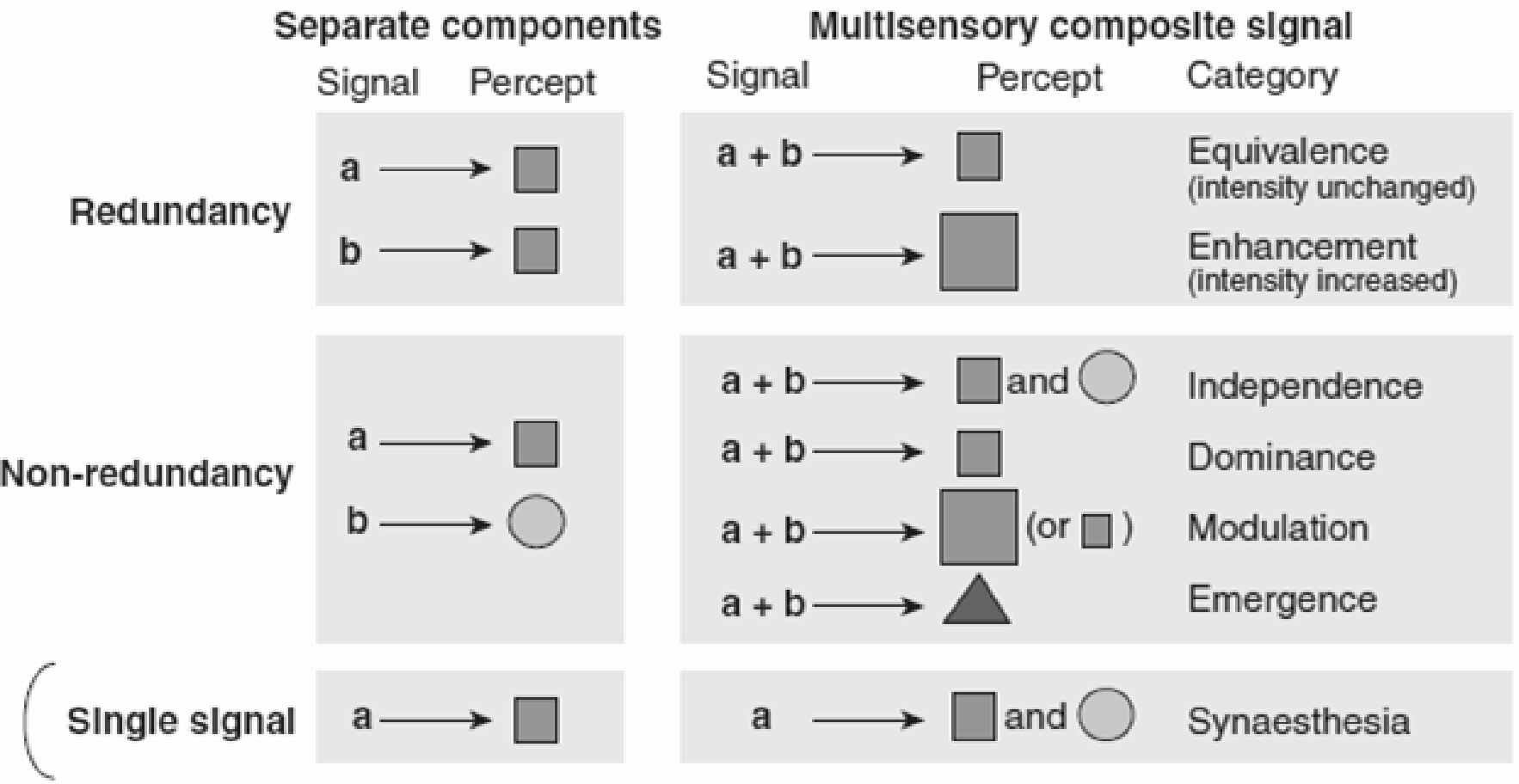
江南大学

Multisensory Perception



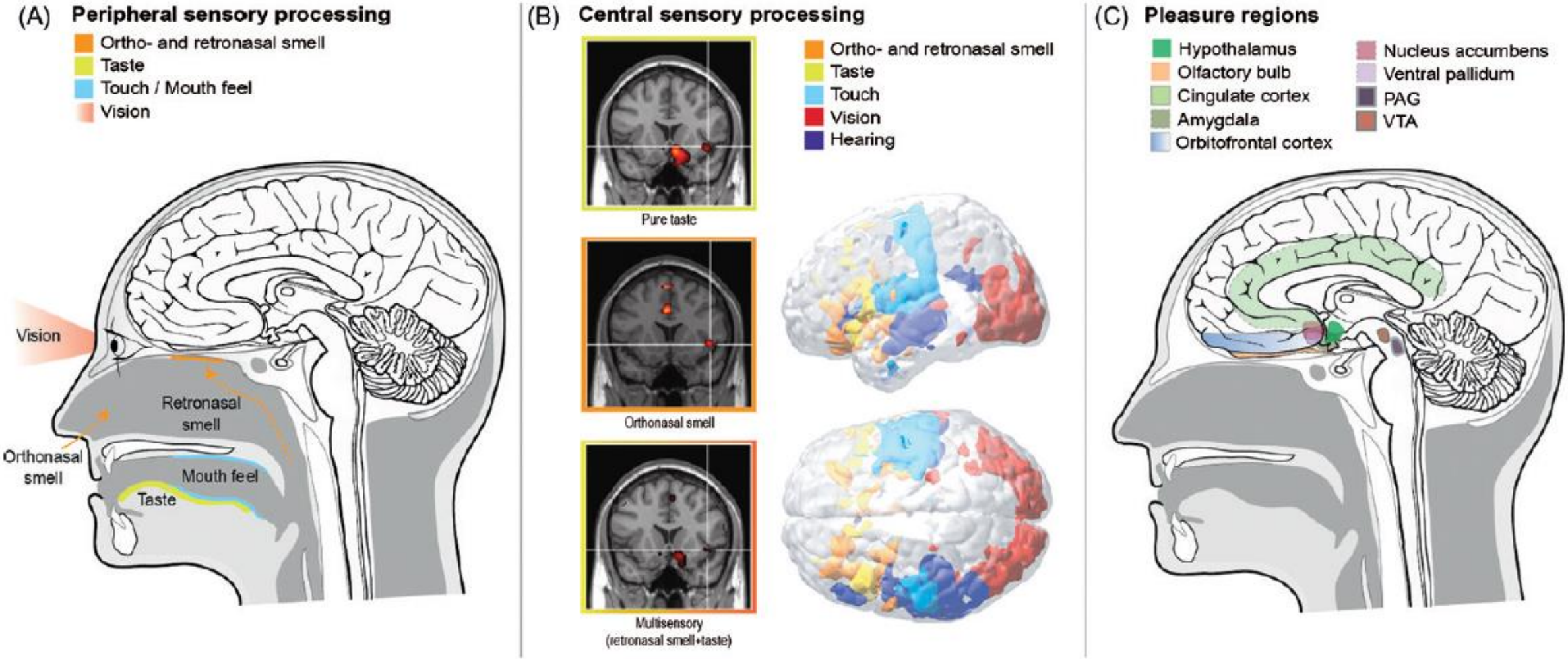
Multisensory perception



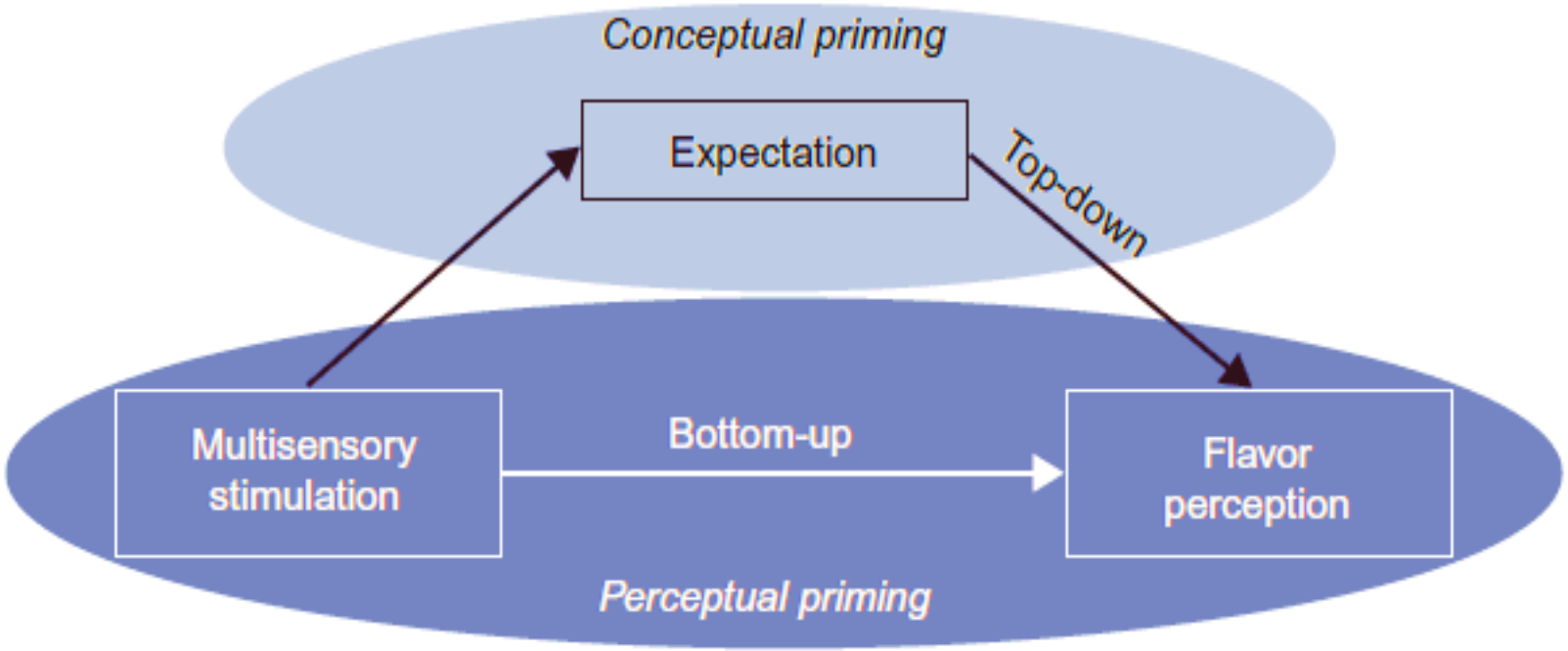
Multiple sensory inputs that humans (other species) are bestowed with provide a rich variety of different kinds of sensory information and these interact in complex and adaptive ways.

Multisensory perception

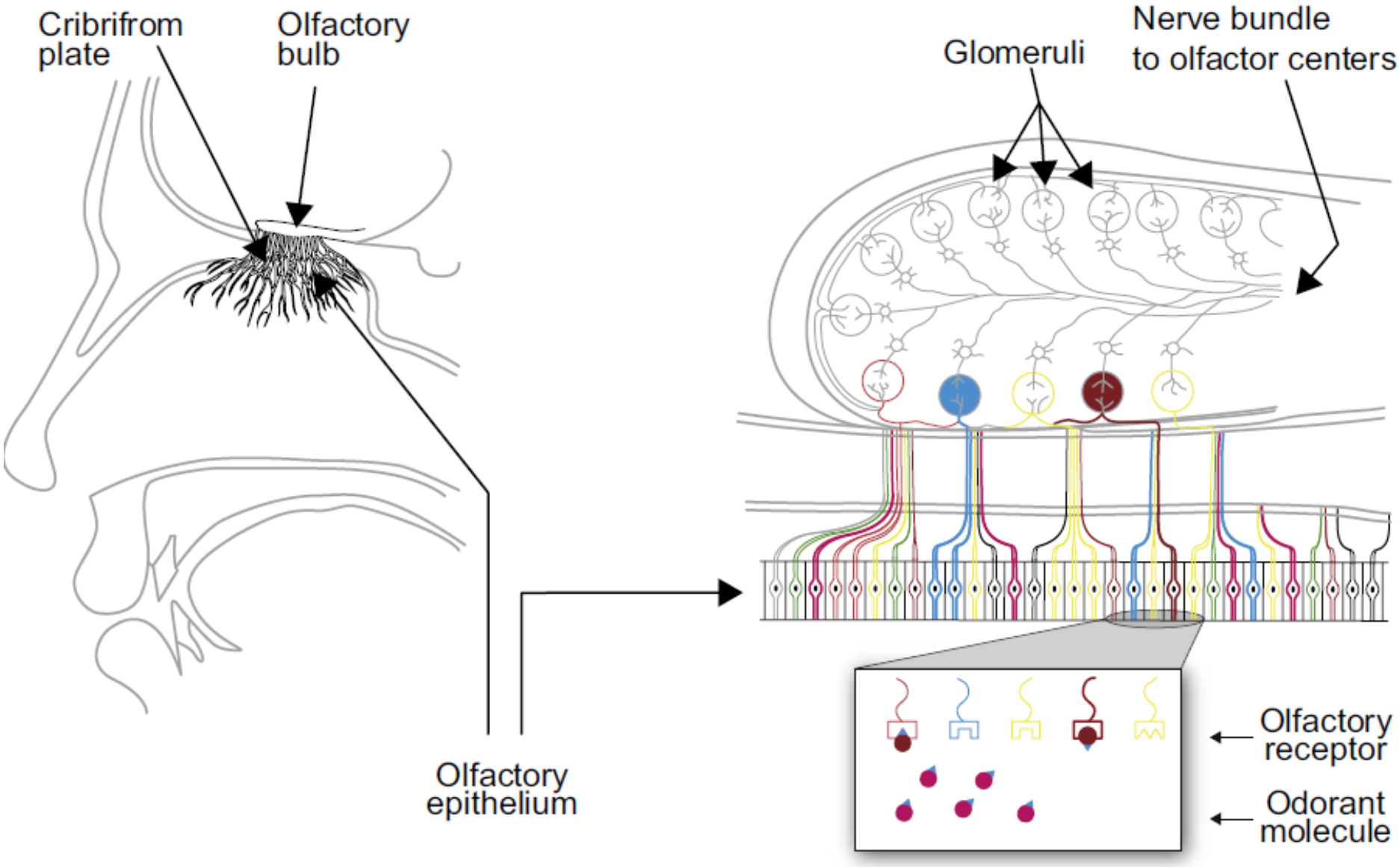
OF our everyday experiences with food or drinks.



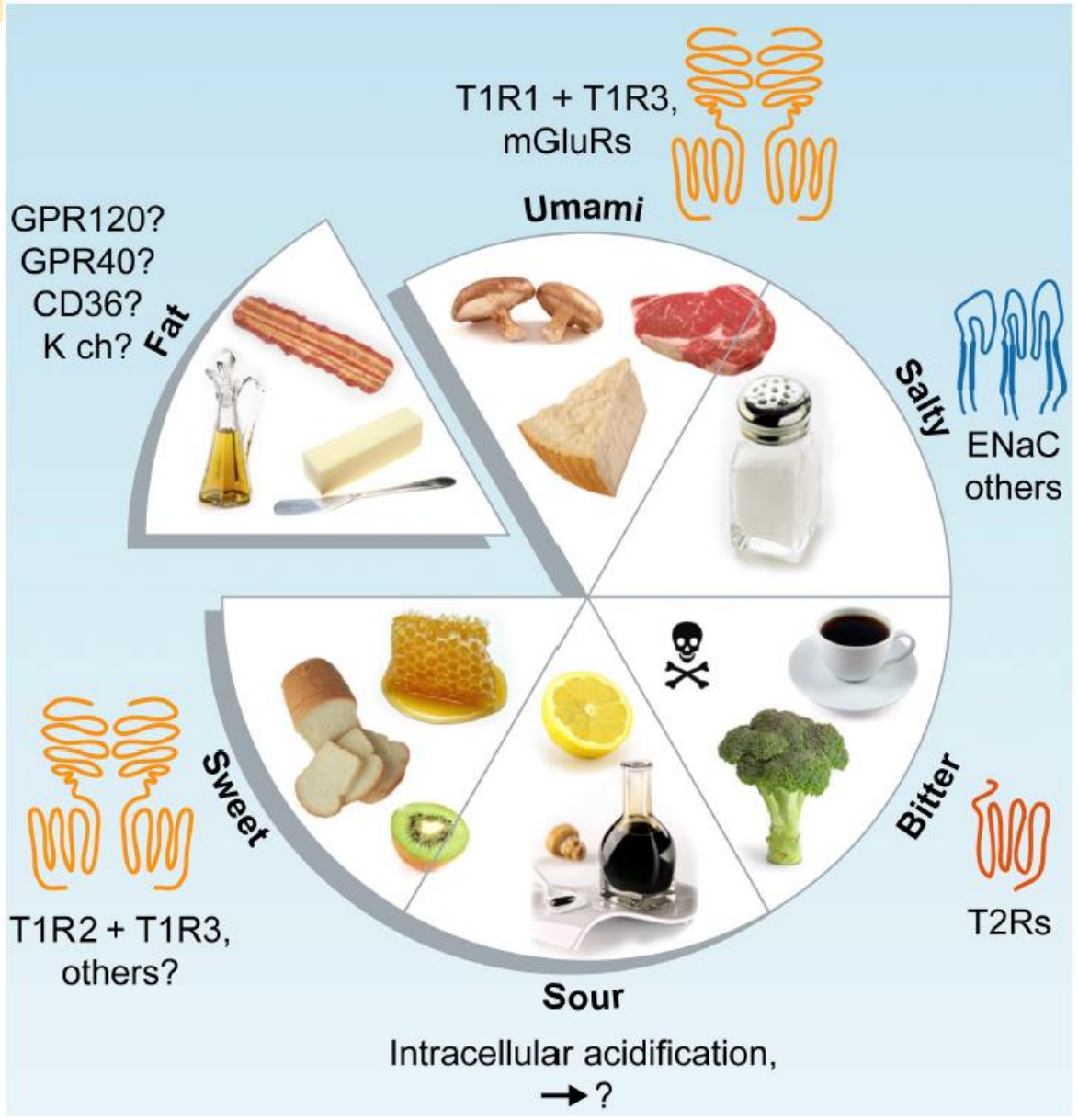
Multisensory perception

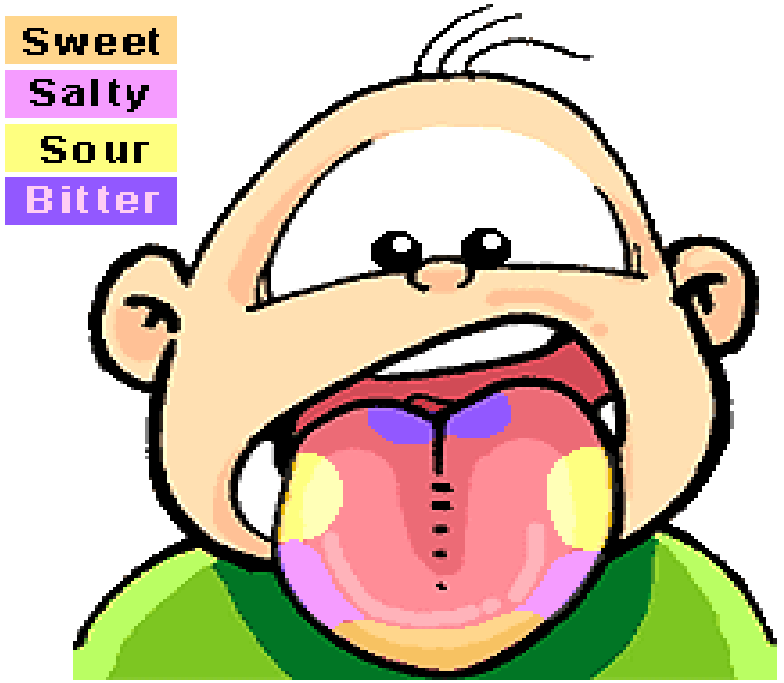


- **The Perception Of Flavor** is perhaps the most multisensory of our everyday experiences with food or drinks.



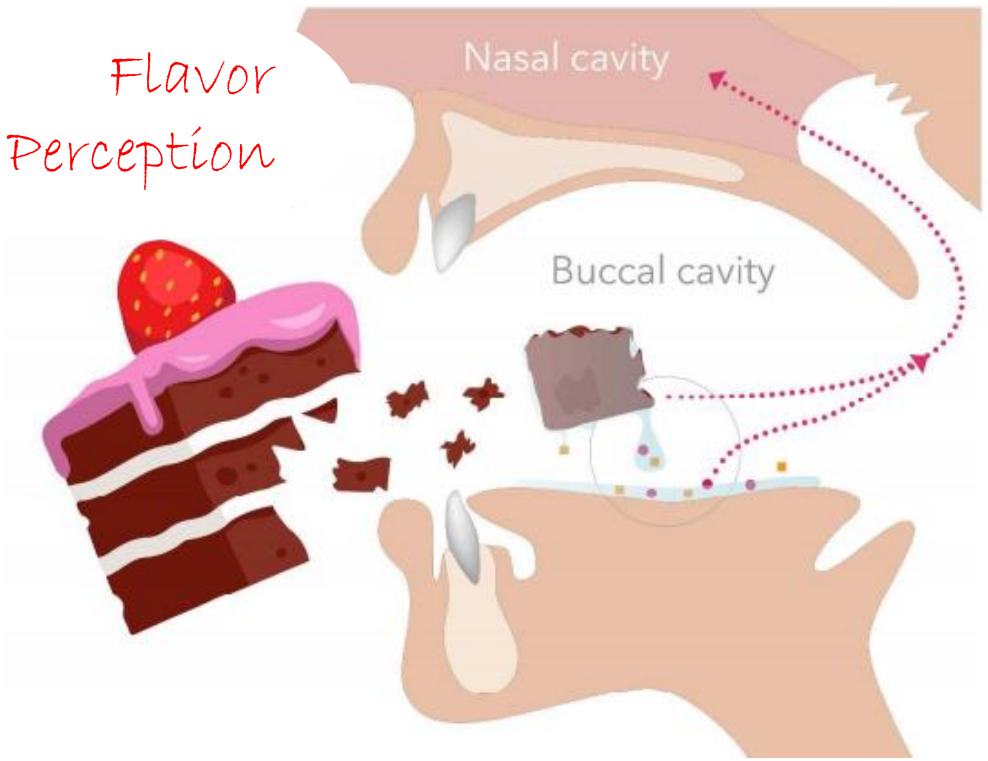
Schematic illustration of the olfactory system

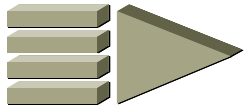


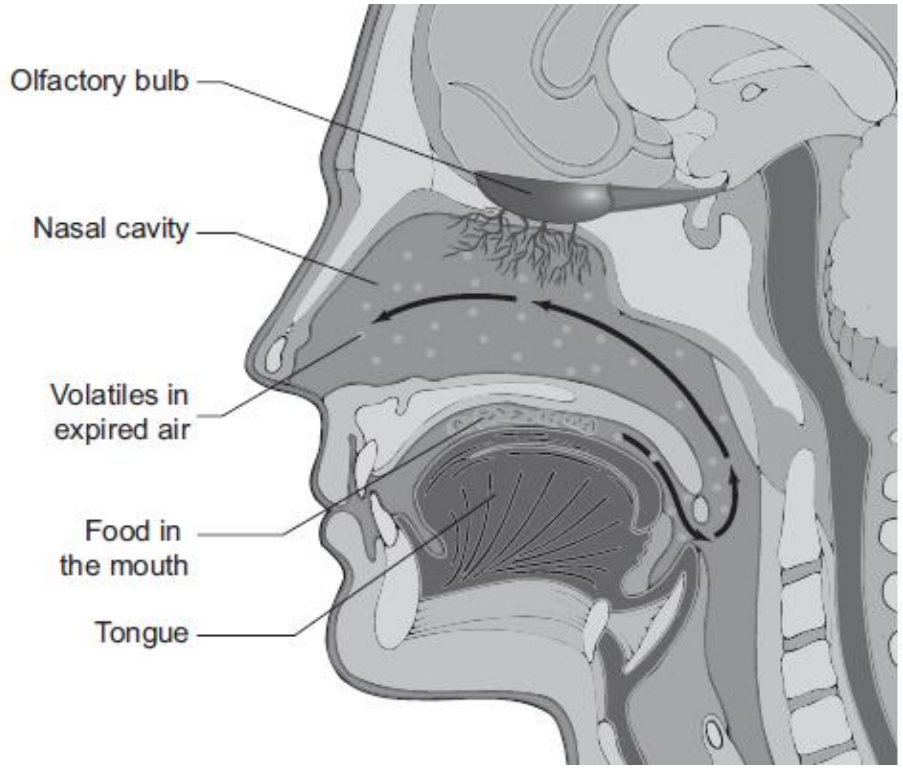


Taste qualities, the taste receptors that detect them, and examples of natural stimuli.

Olfactory-gustatory interaction

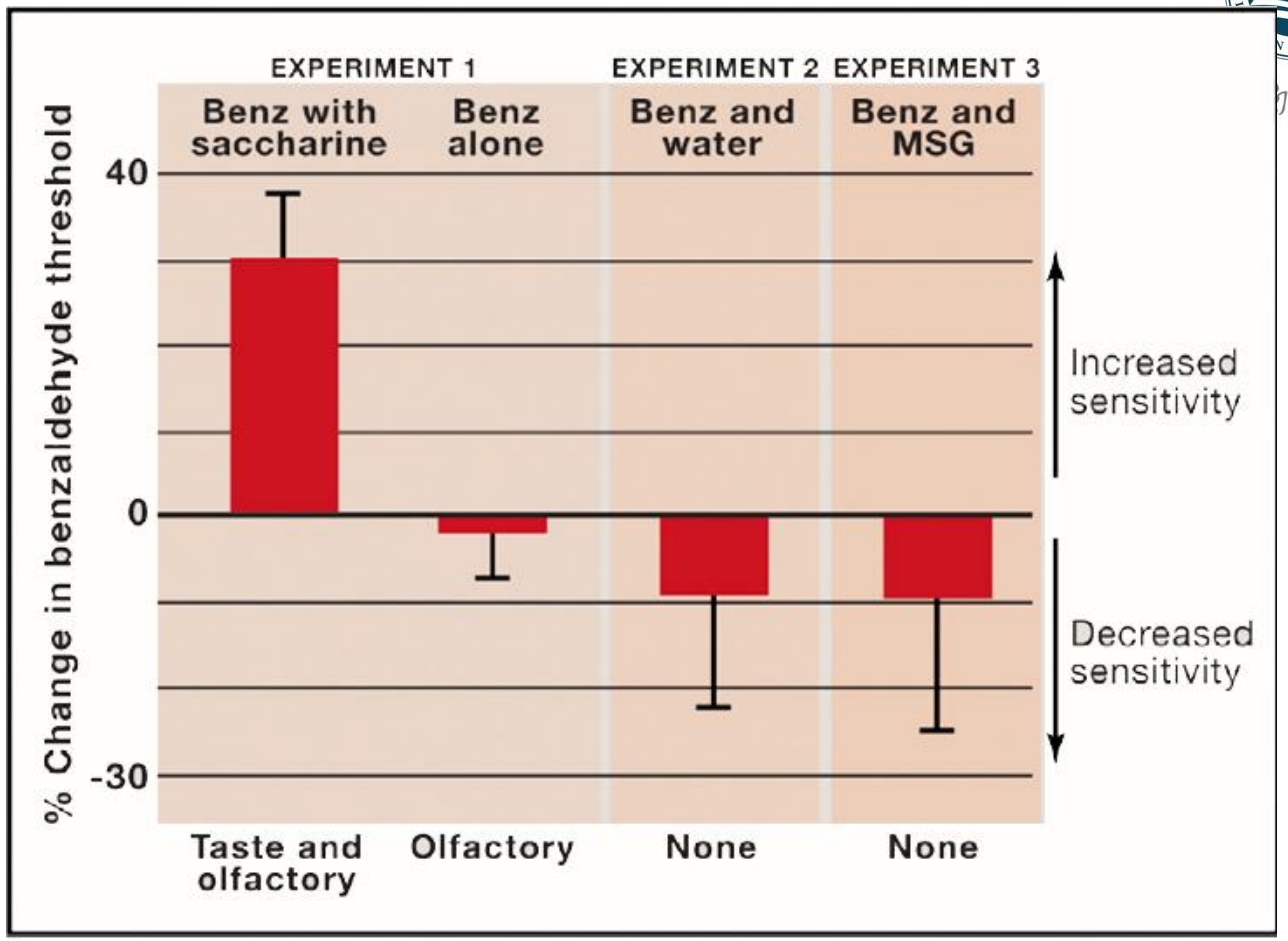






Flavor = Smell + taste

Evidence for the multisensory integration of orthonasal olfactory and gustatory cues

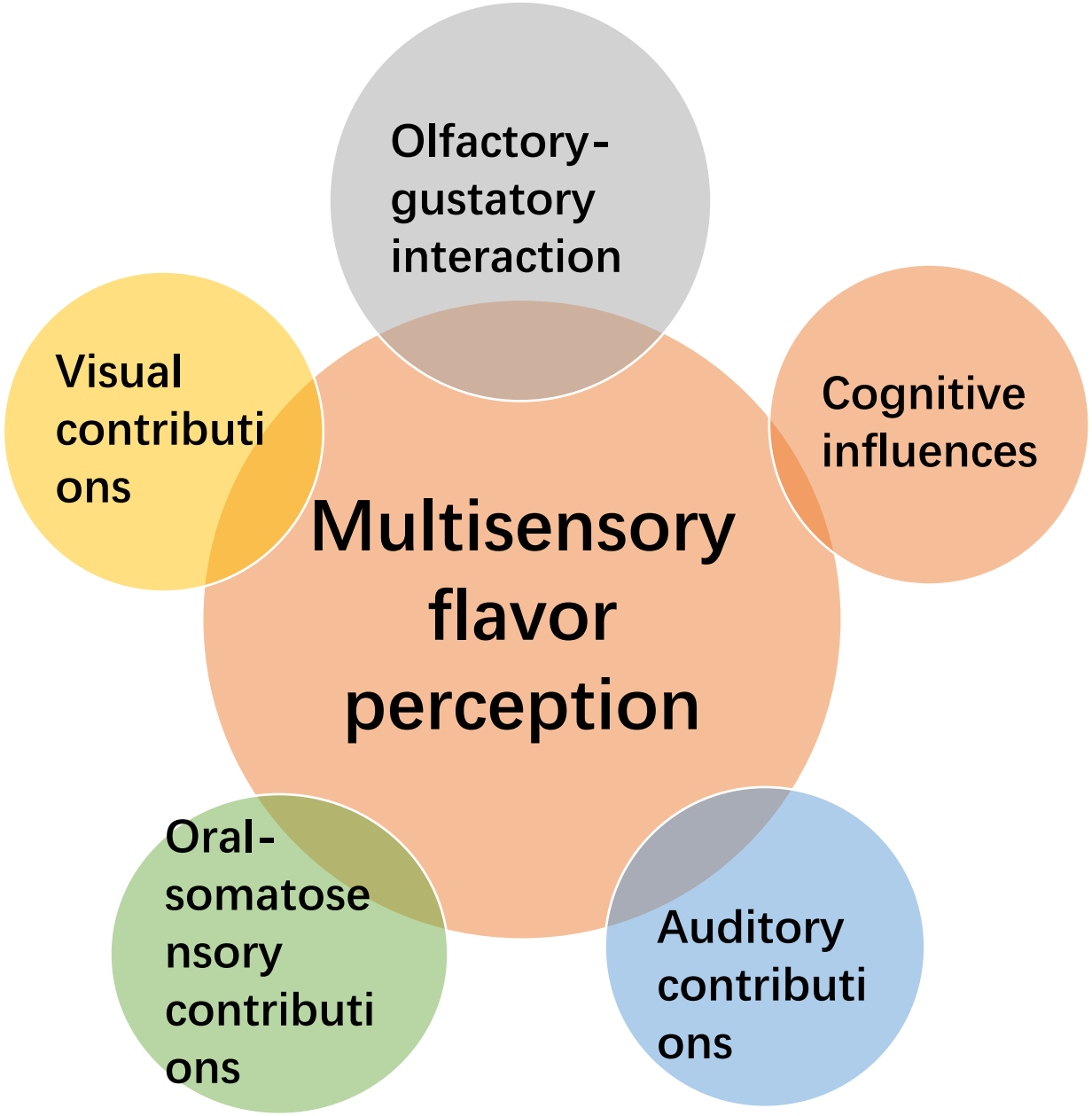


- A sub-threshold solution of saccharin boosted the cherry-almond smell significantly, but no effect from water or MSG.

Opposite to this, for Japanese participants, MSG worked but no effect from water or saccharin.

Dalton, P., Doolittle, N., Nagata, H., and Breslin, P.A.S. (2000). The merging of the senses: integration of subthreshold taste and smell. Nat. Neurosci. 3, 431–432.

Multisensory flavor perception

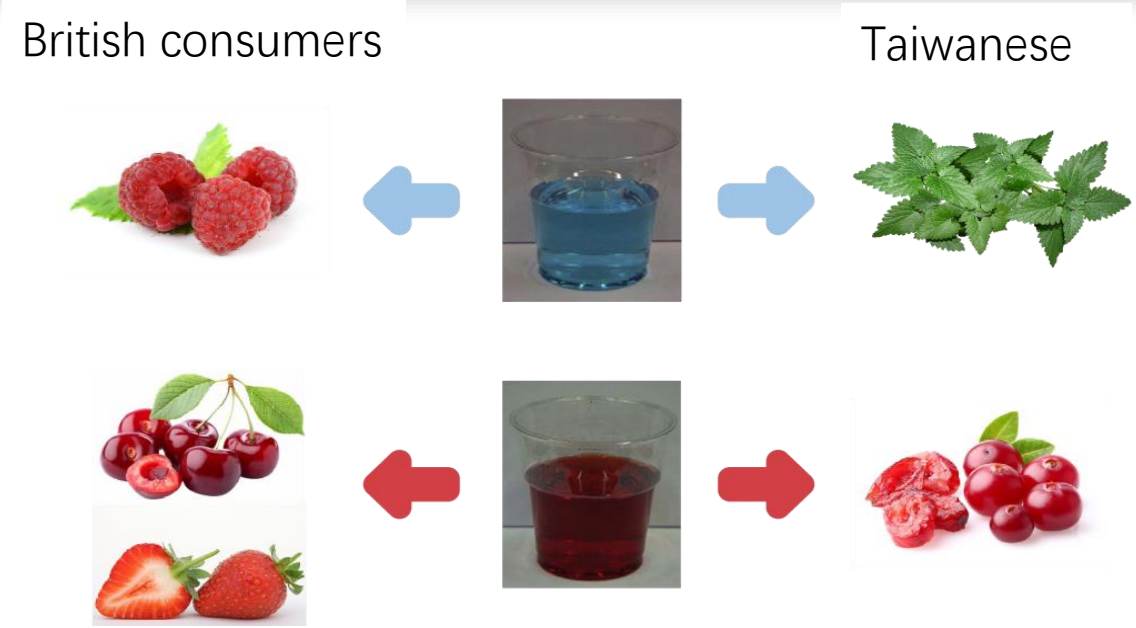


Visual contributions

As Apicius, the Roman gourmand, is once purported to have said, "The first taste is always with the eyes."

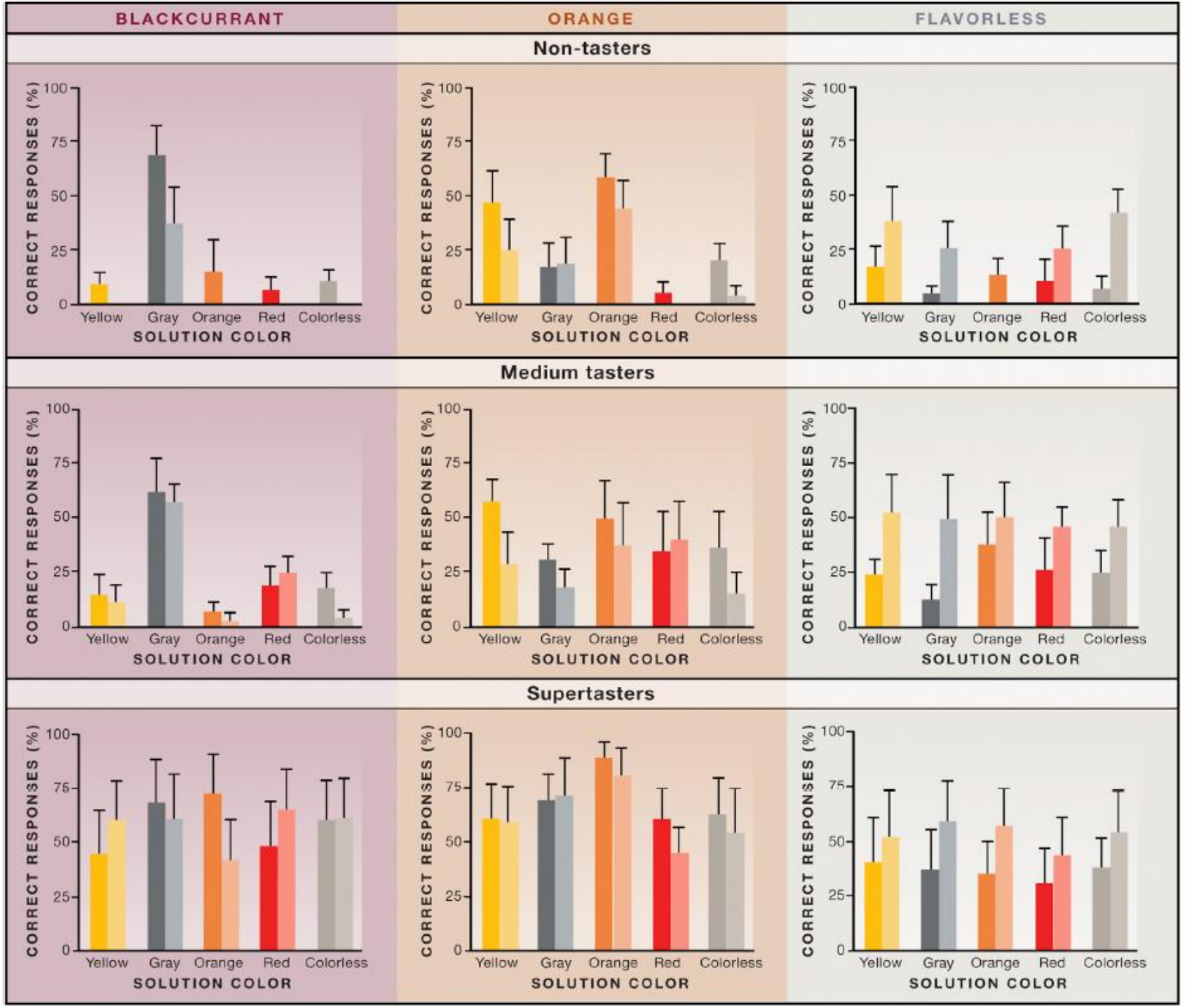
Visual flavor :

The description of a food plays a particularly important role when the expectations upon seeing a dish



The Influence of Color on Flavor Identification as a Function of Taster Status.

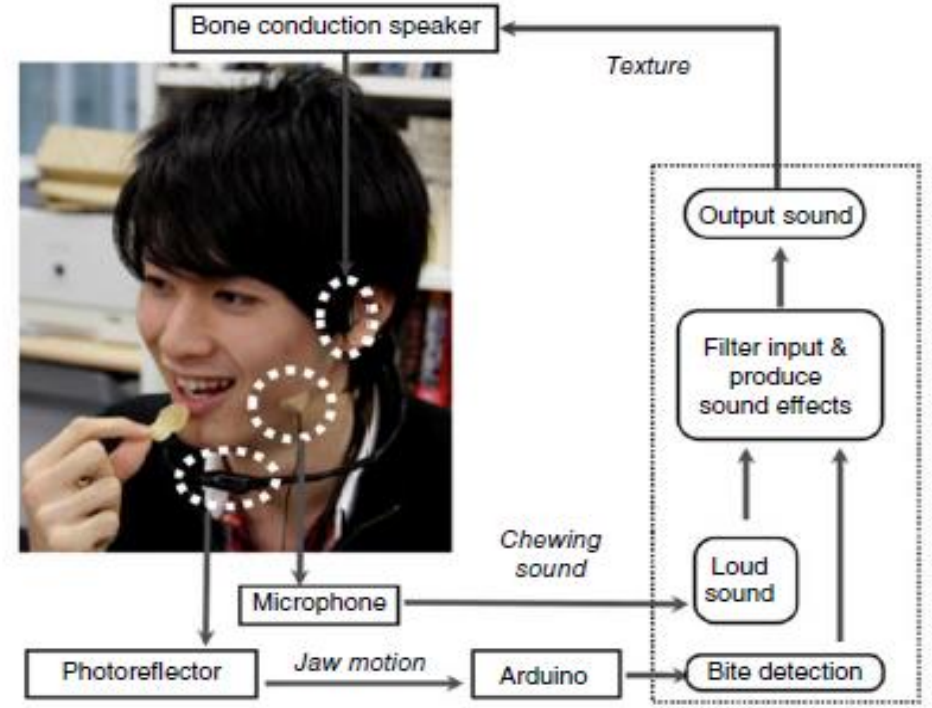
(the darker/ lighter columns represent solutions with / without fruit acids).



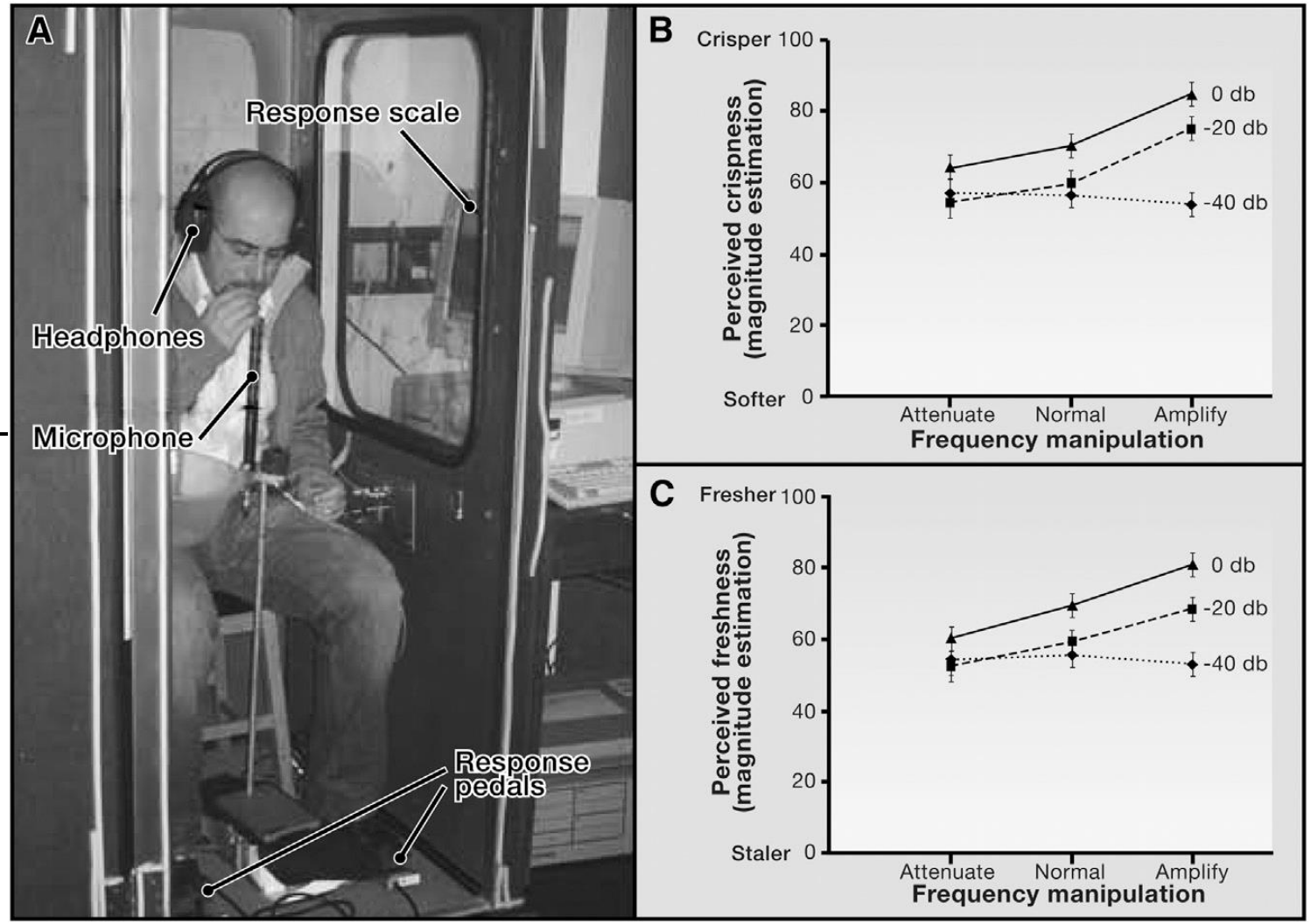
Auditory contributions

The famous British chef Heston Blumenthal to say of sound that it was "the forgotten flavor sense."

- ✓ **Correlate flavor to sound track;**
- ✓ **Influence flavor perception by acoustic cues:** i.e. sour-related sound stimulate more salivary secretion



The "Sonic Chip" Experiment



Source from Zampini and Spence (2004)

(A) Schematic view of the apparatus and participant in study demonstrating the influence of biting sounds on crispness and freshness perception.
(B) Mean responses for the soft-crisp and
(C) fresh-stale response scales for the three overall attenuation levels (0 dB, 20 dB, or 40 dB) against the three frequency manipulations (high frequencies attenuated, veridical auditory feedback, or high frequencies amplified) are reported.

Oral-Somatosensory Contributions

- Mouthfeel
- Temperature
- Trigeminal sensation
- Somatosensory stimulation outside the mouth
- …

Mouthfeel

Viscosity:

Decrease flavor intensity

- Inhibit flavor compounds release?
- Neural effects?

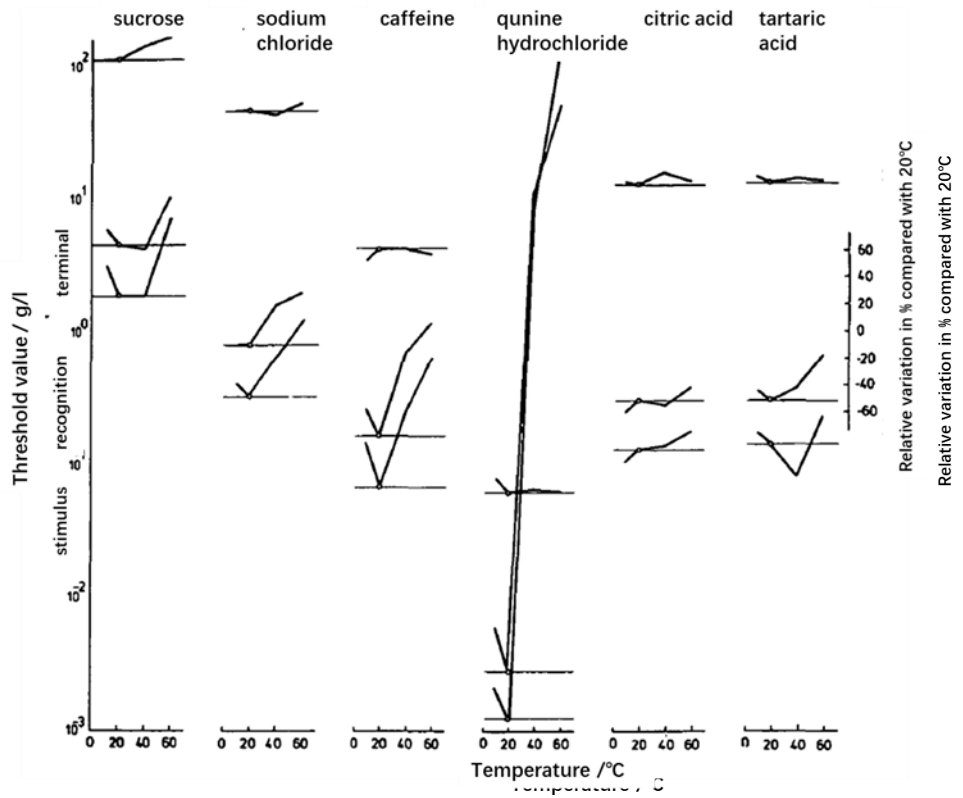
Temperature

The threshold for the detection of bitter, sweet, salty, and sour stimuli shows a U-shape response as a function of temperature

Thermal tasters:

"Thermal-taste Illusion?

The influence of temperature on the threshold values of primary tastes

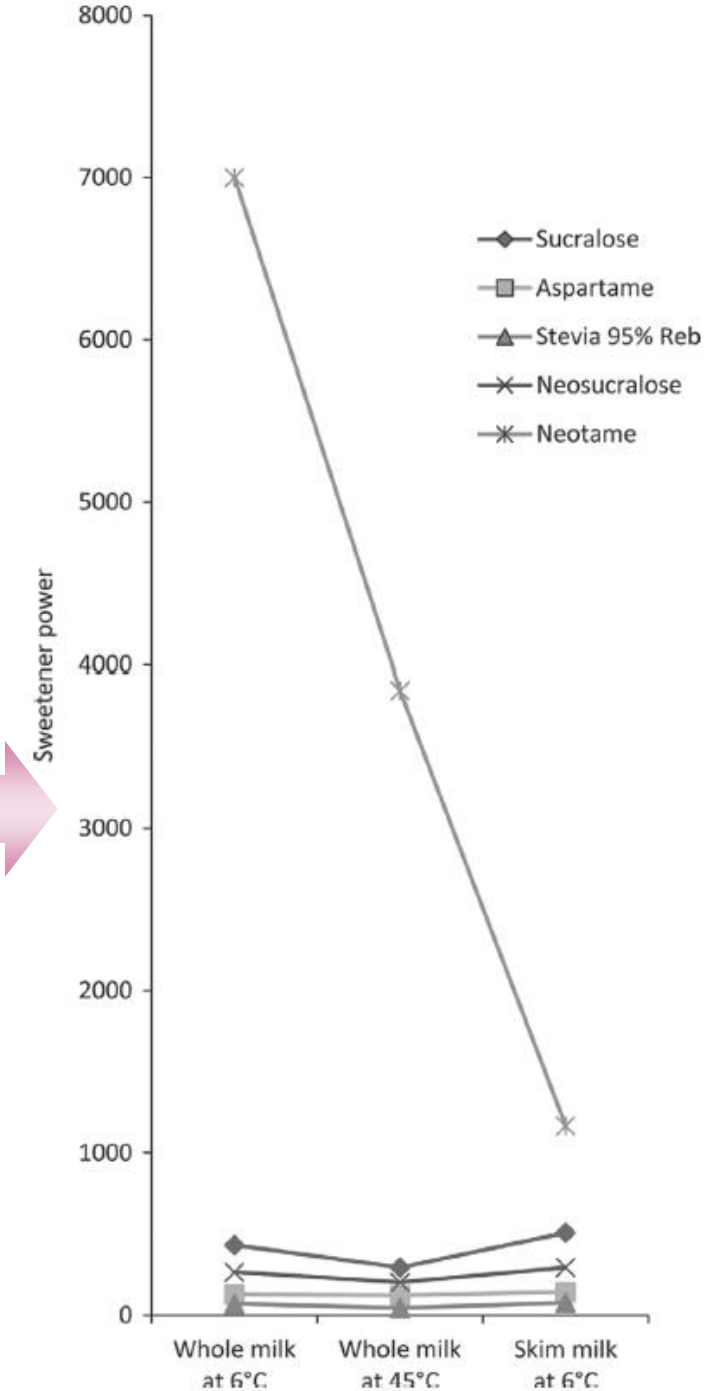


In real product:

the effect might

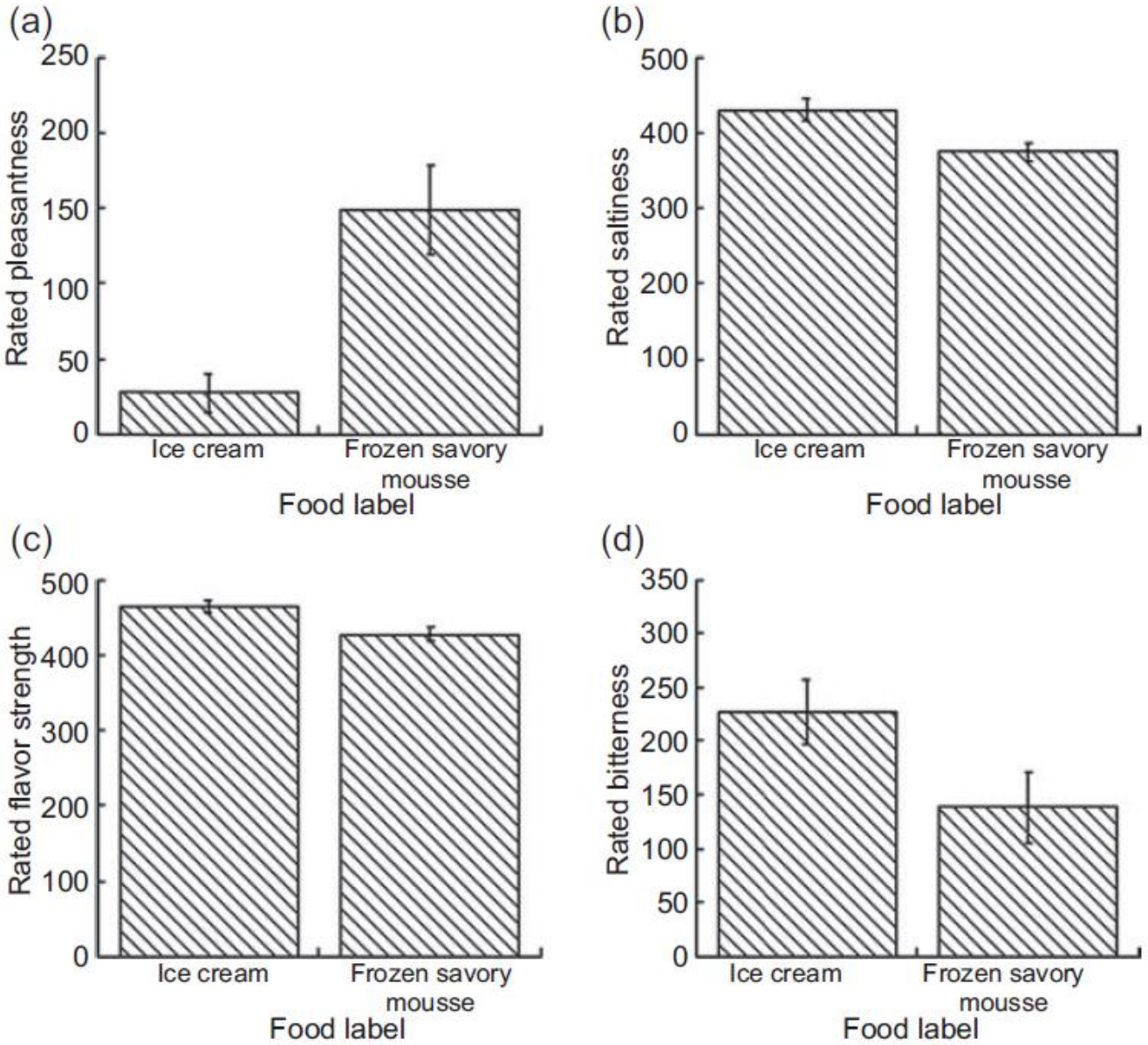
vary from product

to product



Cognitive Influences

- Expectation
- Visual flavor

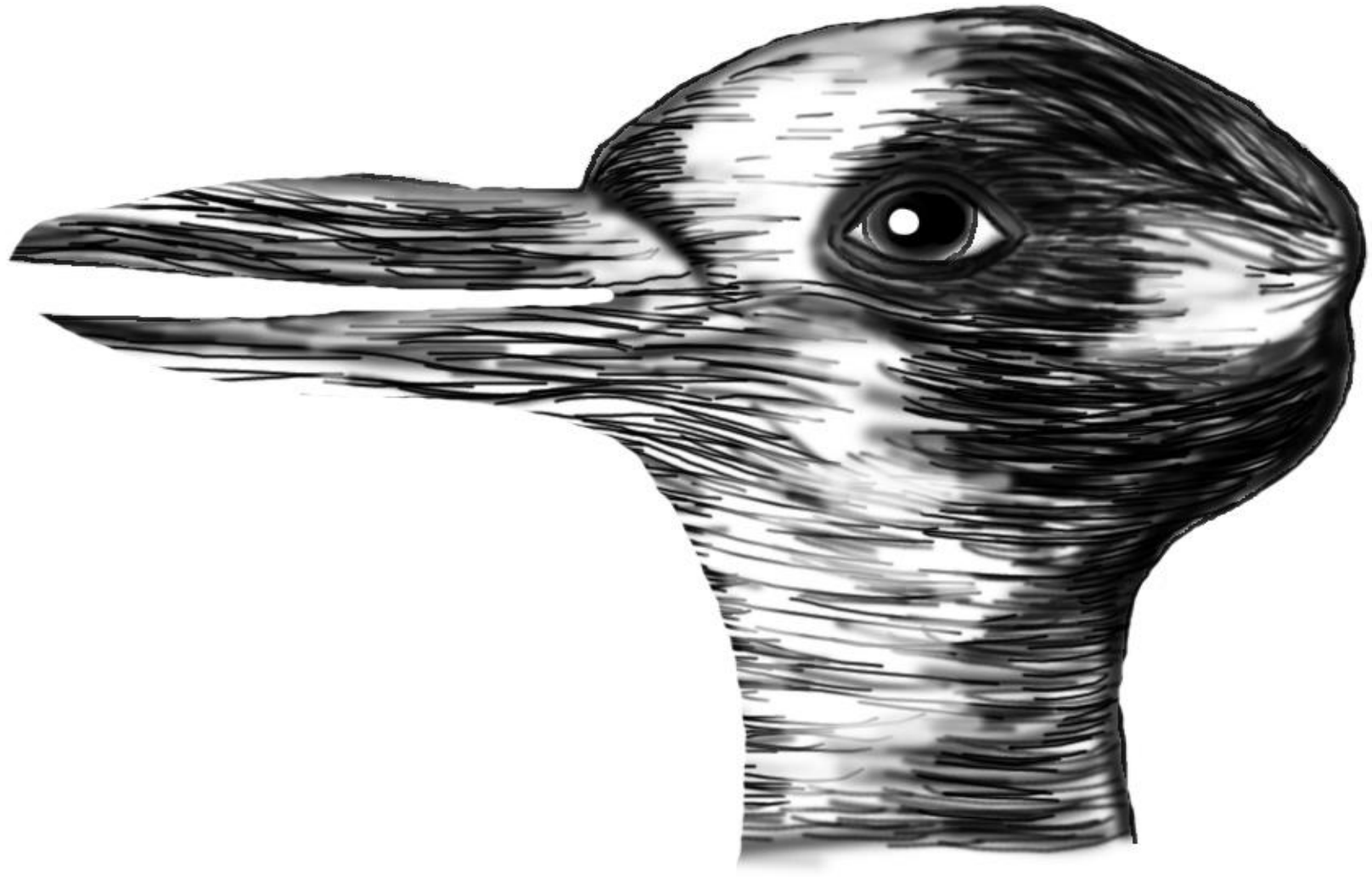


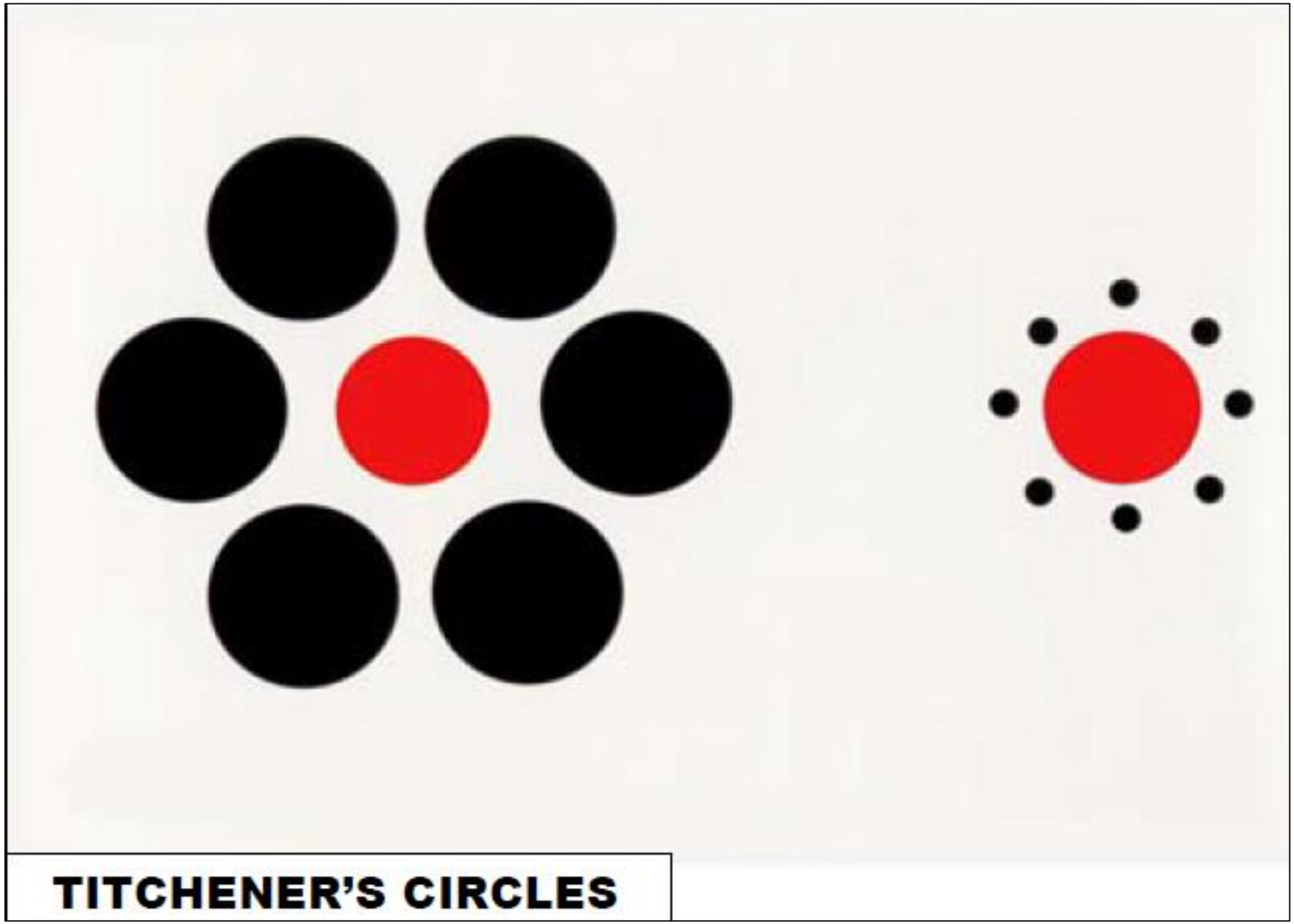
HARD TO EXPLAIN THESE MULTISENSORY INTERACTIONS

Lots of other factors involving human being's sensory perception development:

- ✓ VARIATIONS IN PERCEPTIONS
- ✓ ILLUSIONS,
- ✓ TASTE ADAPTATIONS

...




TITCHENER'S CIRCLES

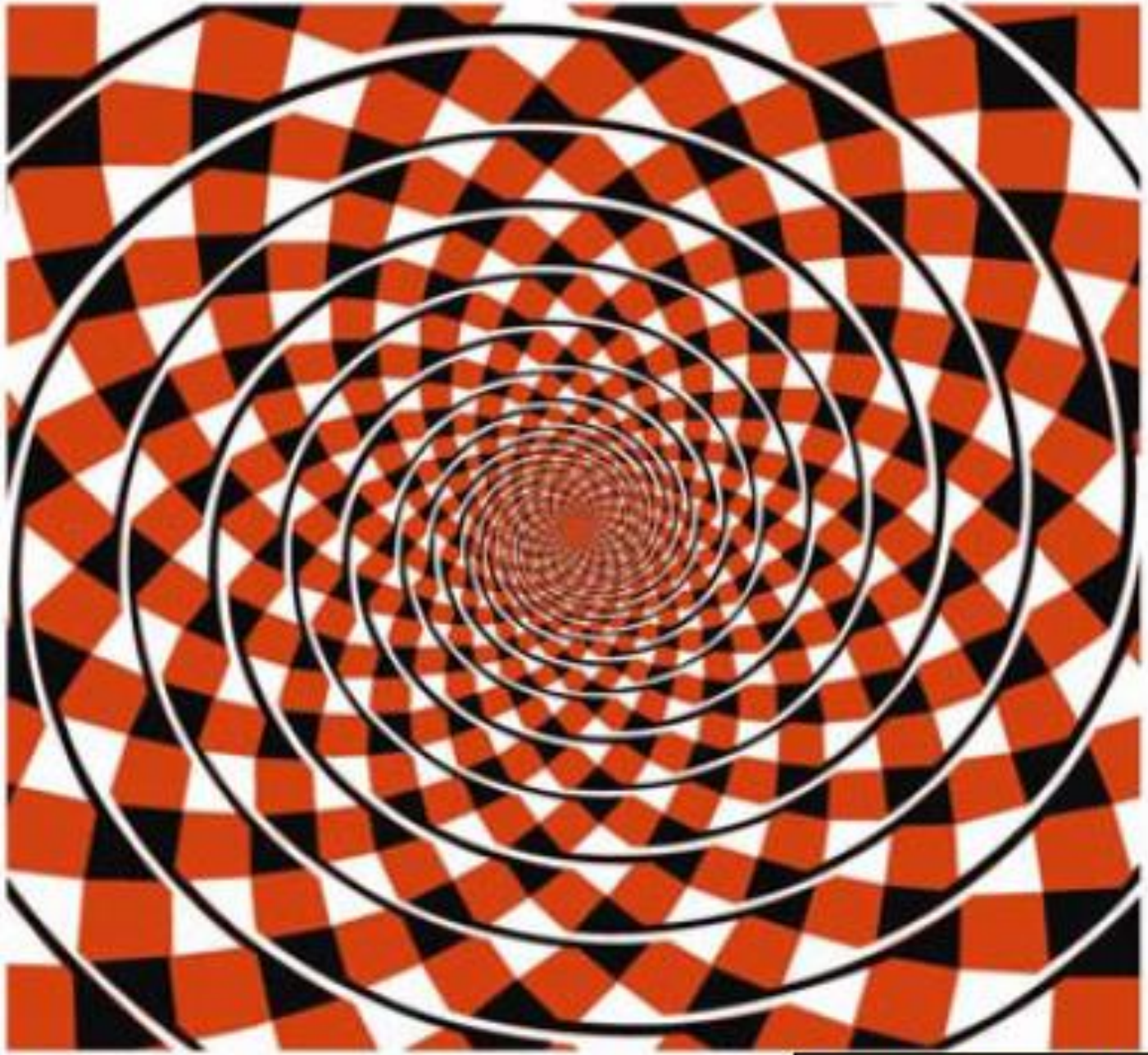
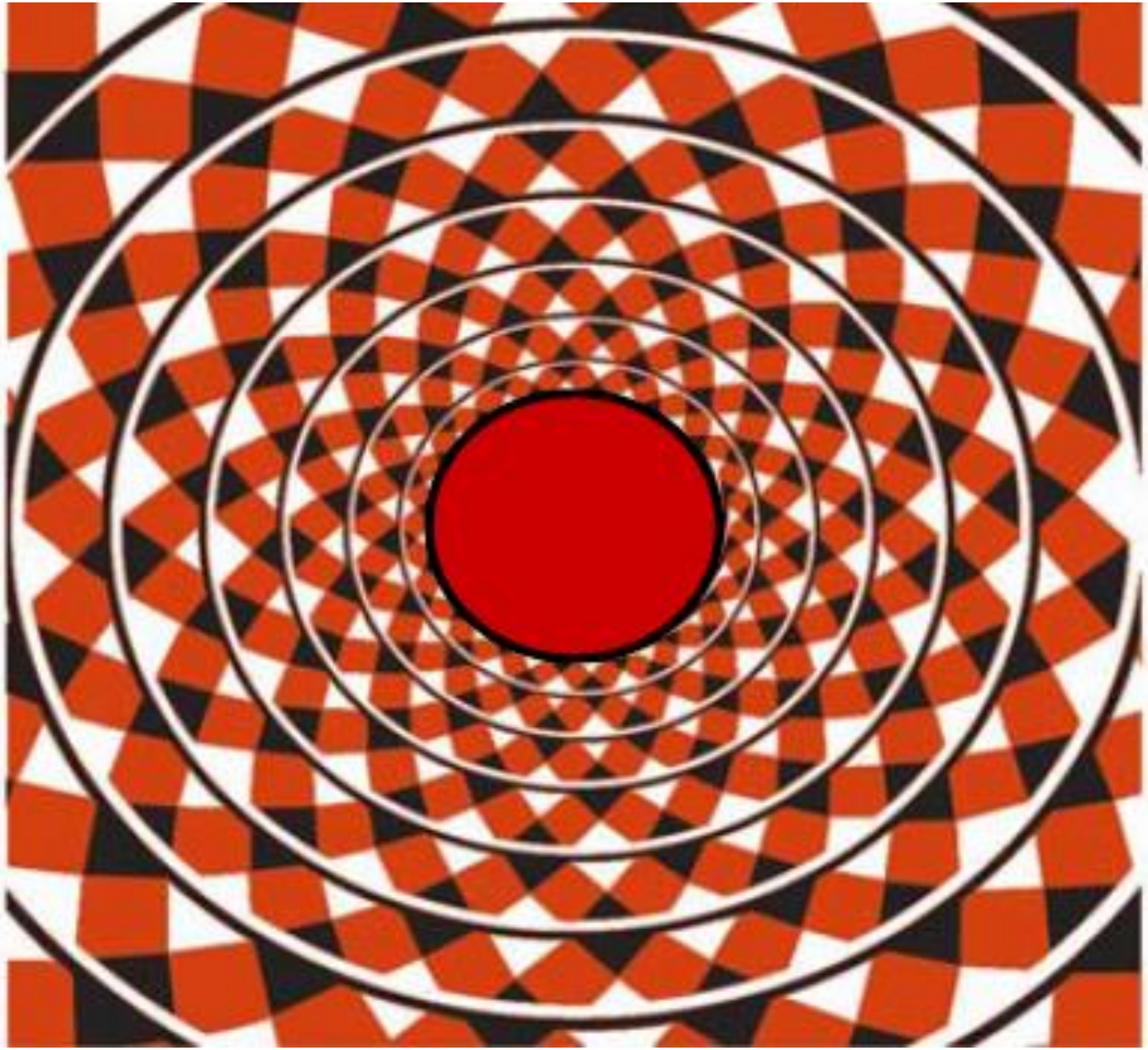
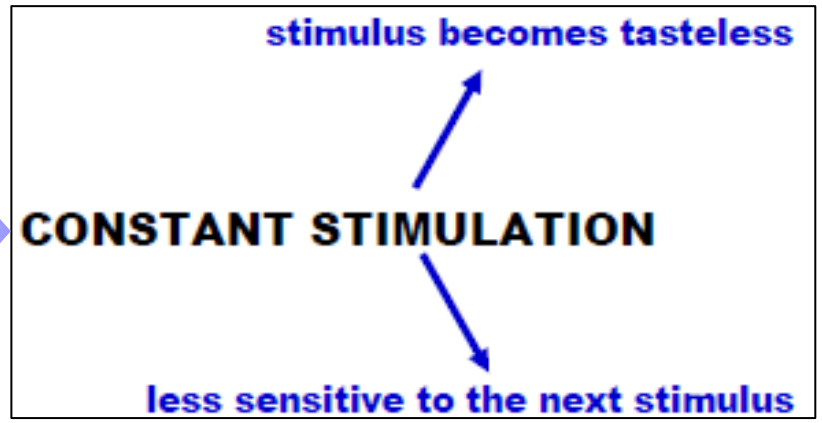


FIGURE #18 B

FRASER'S SPIRAL



SMELL & TASTE


stimulus becomes tasteless
CONSTANT STIMULATION
less sensitive to the next stimulus


DREAM