



Leading to Better

“Psychosomatic Sensory”

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Real- Imagined - Sensory - Experiences???

- “Psycho” = mind
- “soma” = body
- First place to start with the exercise in sodium reduction is the “psycho” part
 - In the marketing department
 - In the development department
- **Fear 1:** Na reduction = reduced taste = reduced preference/too much difference = risk of lost sales
- **Fear 2:** Salt is cheap filler = costly = higher price = risk of lost sales

Solve business attitude to salty taste first

- Can there be a taste difference or not?
 - 9/10 times there actually can...
 - In 2016 reduction in stocks, soups, and sauces we found consumer preference for reduced sodium formulations before deployment of any expensive sodium reduction technologies ...our food was just TOO SALTY

Solve consumer experience to salty taste next

- Offer the consumer a greater sensory experience
 - Don't just think about "saltiness" ...Think TOTAL SENSORY
 - Taste, Aroma, Colour, Texture

What is Taste?

Eating is a Critical Sensory and Intellectual Experience



Humans are judgemental at a higher reasoning level.....intellect leads to values

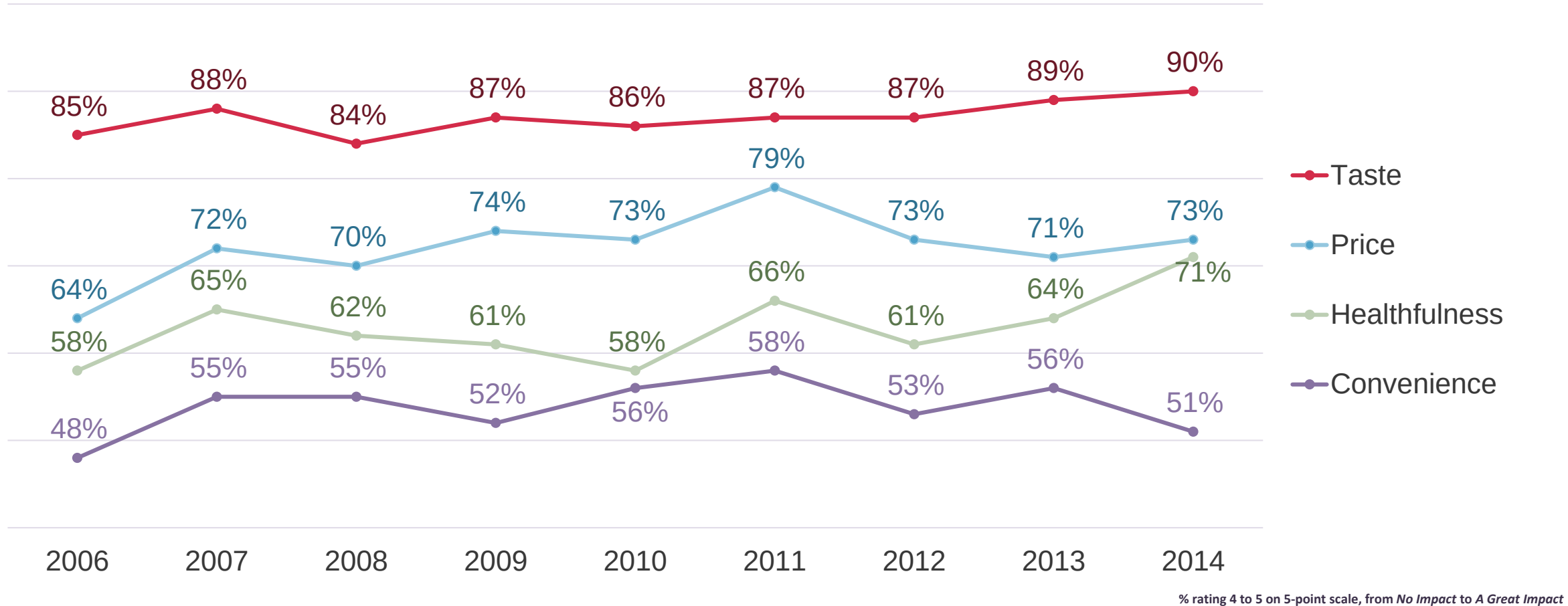
- Religious (Halal, Kosher, Vegetarian)
- Safety (GMO, artificial, allergies....)
- Ethics (environmental, fair trade, sustainability, carbon footprint...)

Humans are judgemental at a primal level of physical

- “Hedonic” (rejection, acceptance, enjoyment)
- There are 25 genes encoding bitter receptors but only 2 for Sweet and 2 for Umami, 2 ‘ion channel’ types for salty and sour
- We are physiologically wired to “detect the fakes”

Taste is the #1 Driver of Consumer Purchasing Decisions

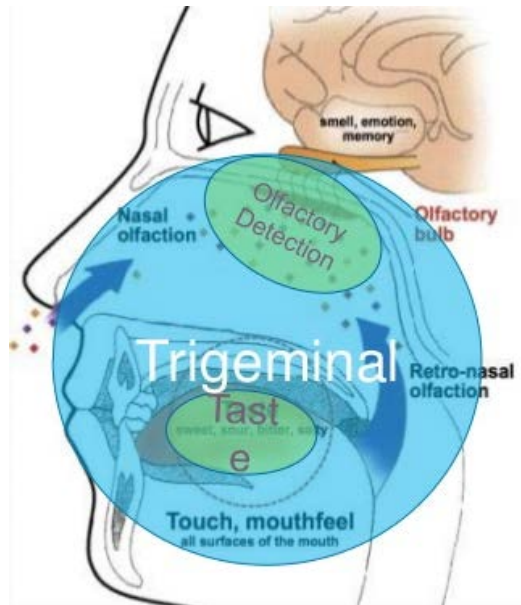
How much impact do these have on food/beverage purchase decisions?



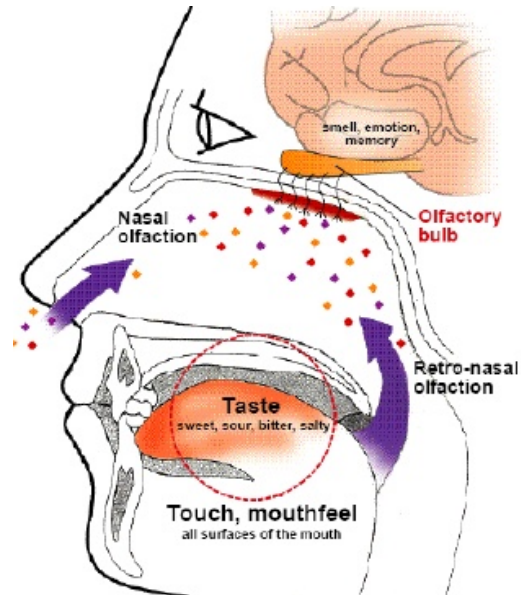
ConsumerCentric Approach to “Taste”

Tasting involves Three neural systems

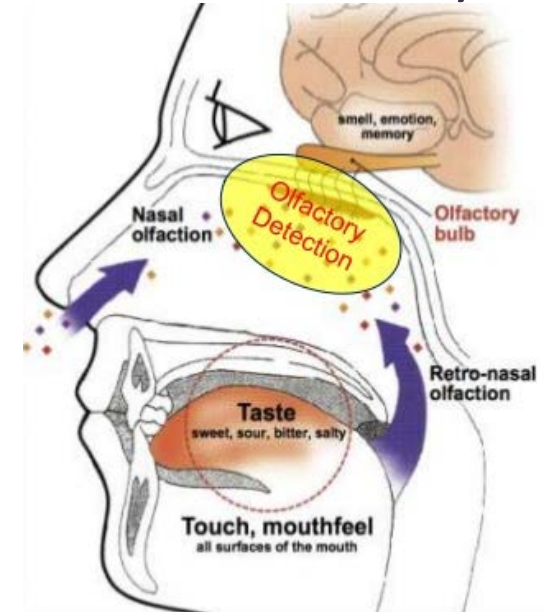
Trigeminal



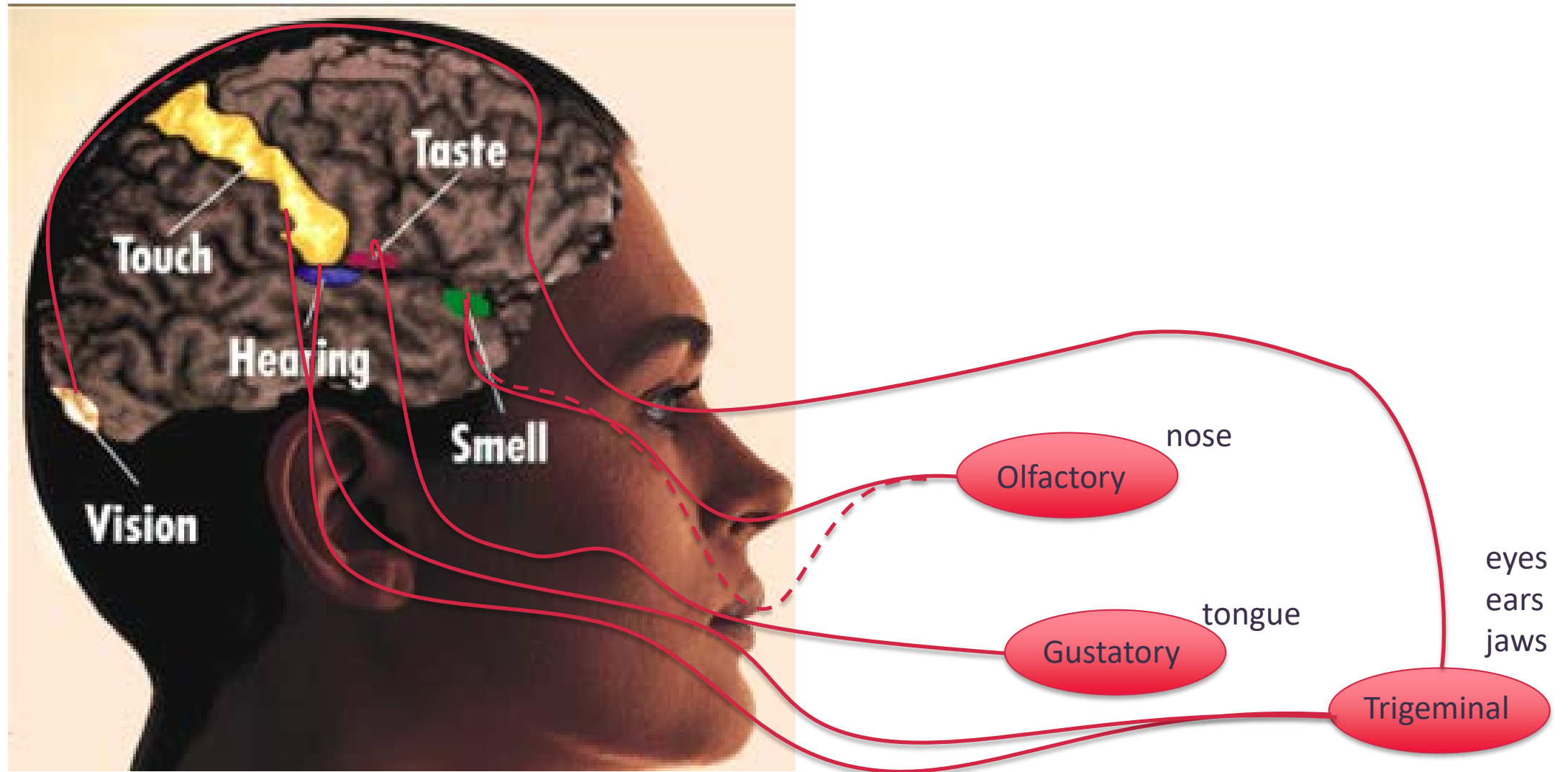
Gustatory



Olfactory



Eating involves all the senses...



Masterchef!....Judging our Food for Fit for Consumption

At least 3 stages of the eating experience, perhaps 4?

1. Sight, touch, smell



2. Oral cavity – texture, basic tastes, mouthfeel, retronasal aromas



3. Ingestion – the act of swallowing and introduction of food into the stomach. Gut has taste receptors and somatosensory receptors



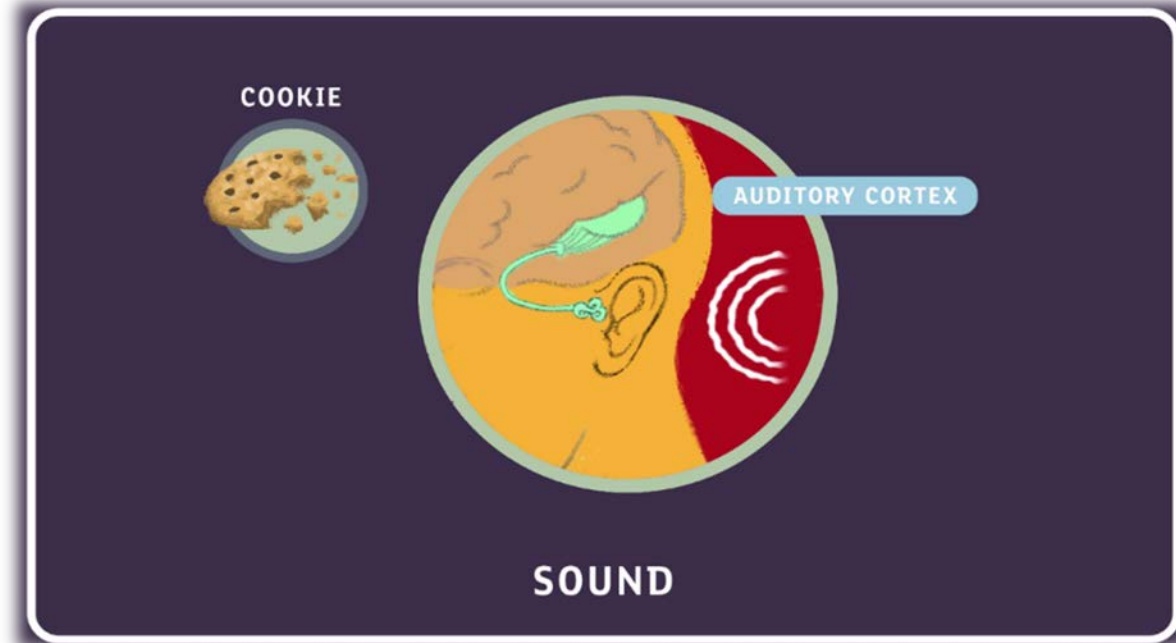
4. Digestion - Can our bodies distinguish after eating whether they really buy into the previous meal? (gastric purging, association with bad flavour memories)

Oral cavity - Sound

TRIGEMINAL

When the start of our eat experience passes the tests of sight, touch (and aroma) we allow the more intimate experience of putting the food into our mouths

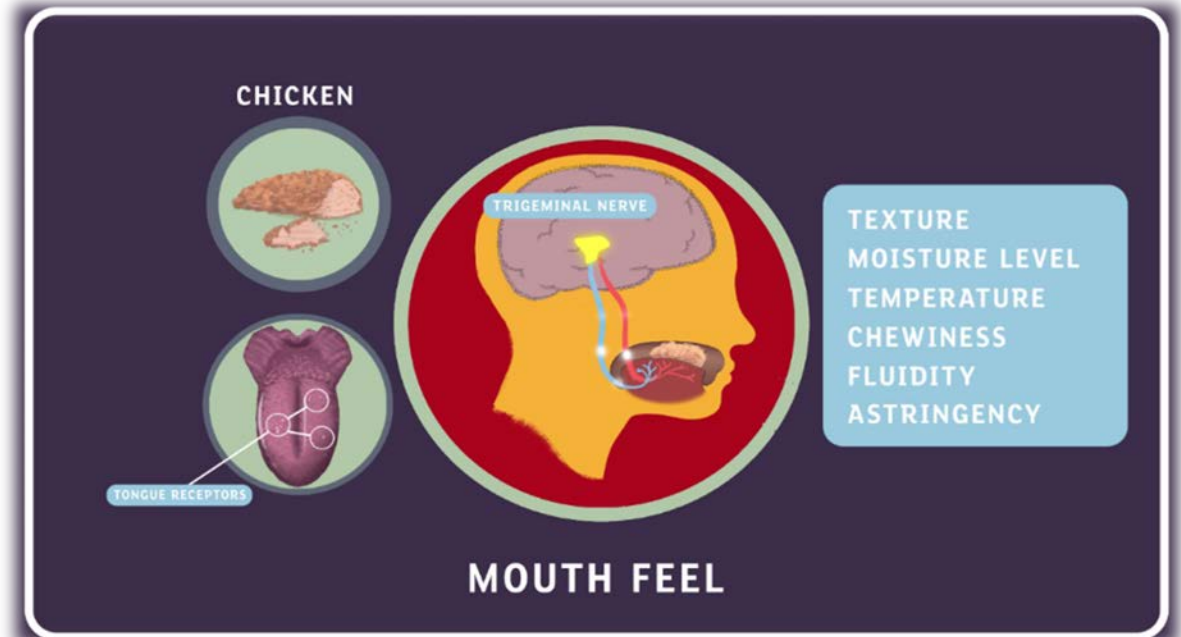
- Snaps, crackles, crunches, pops, fizzes...
- Eating a cookie can be an explosive sensory experience as sound waves are translated into neural signals that ignite our auditory cortex
- Research shows that high pitched sounds tend to boost the perception of sweet, while low pitched sound tend to enhance more bitter characteristics



Oral cavity - Mouthfeel

- Part of the trigeminal system, effects amplify **6x** the number of brain sites activated when combined with taste
- The **textural** experience of the food will influence the **swallowing** decision
- Very appealing or very detracting to **acceptance** of the food stuff
- A negative textural experience can negatively affect flavour **preference forever**

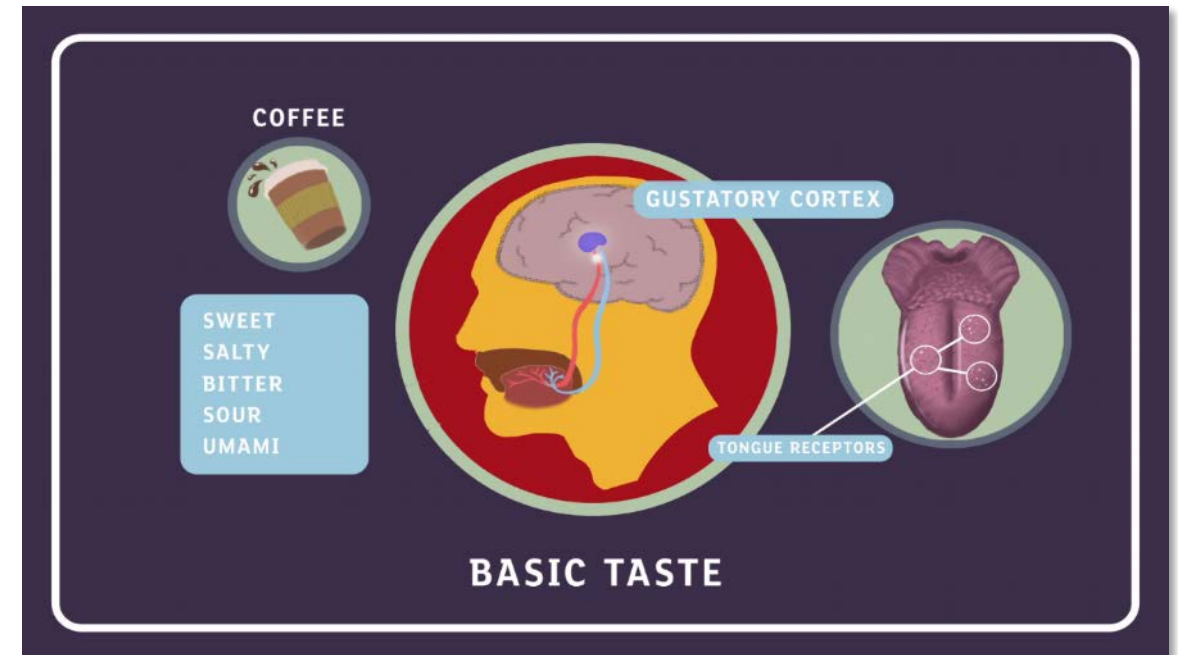
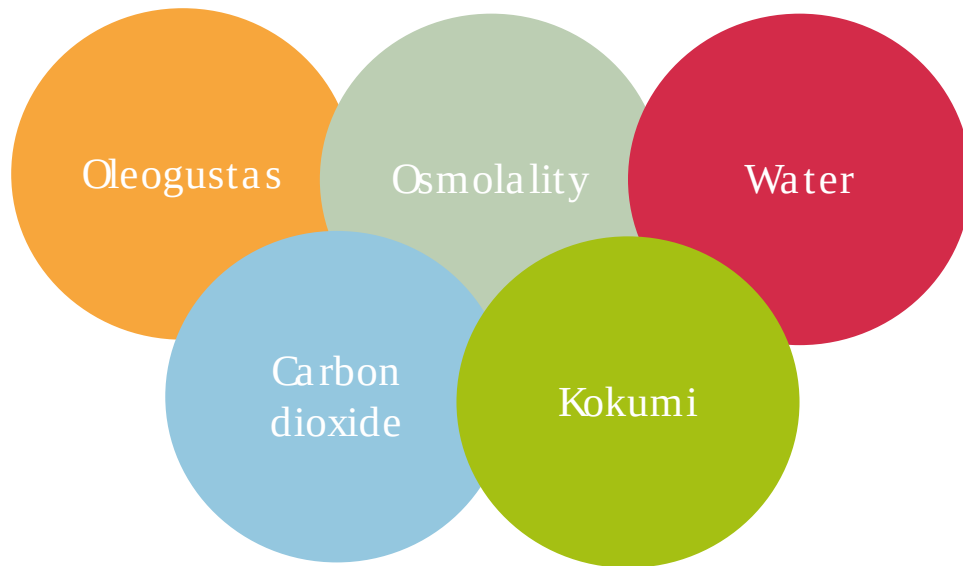
TRIGEMINAL



Oral cavity - Basic Tastes

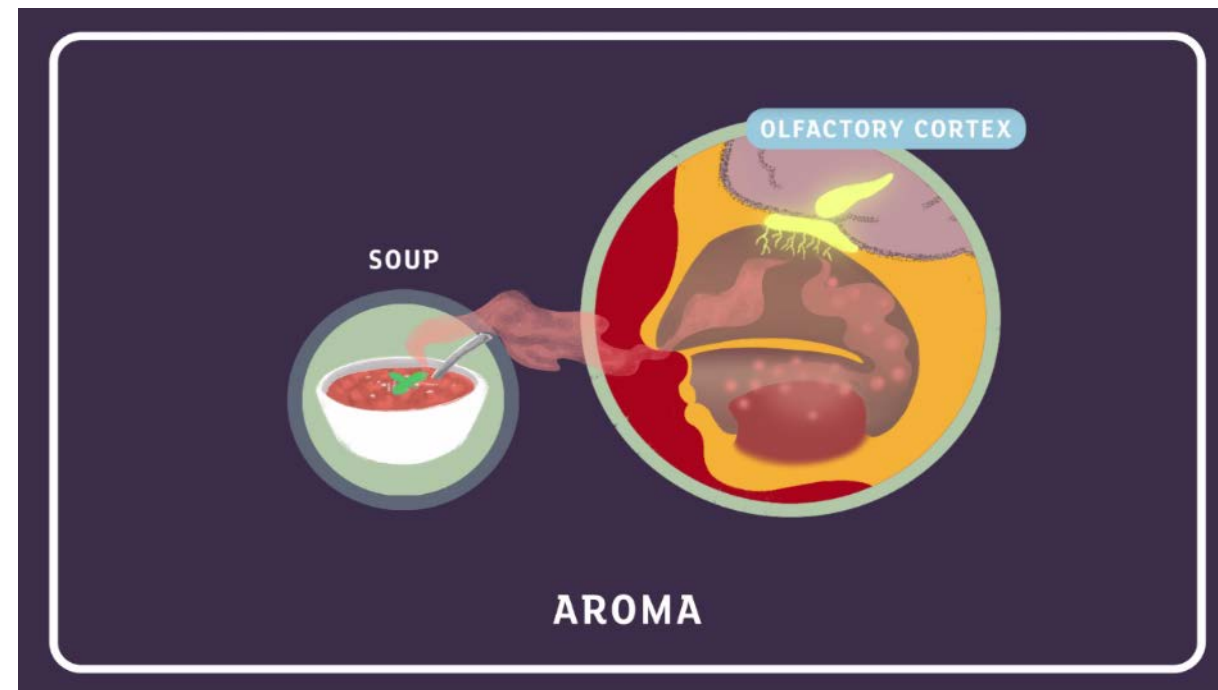
GUSTATORY

5 basic tastes and the list is growing...



Oral cavity - Aroma

- The aroma we perceive through our nasal cavity, especially **retronasally**, sends signals to our olfactory cortex
- 25% gustatory information and **75% olfactory**
- Smell activates **more** brain sites than any other sense
- Aromas acquire **significance** through food ingestion (programmed!)
- Aroma preference is learned and **resistant to extinction**
- Bad aroma memories **more powerful** than good



Neuroscience leading to better understanding of sensory perceptions

Painless injections. Dental Vibe Tool



- **Gate Control Theory** of pain...motion, pain, temperature and pressure travel nerves fibres running parallel
- yields a “summary signal”...
- can overwhelm pain sensation by enhancing motion and pressure

Immersive Technologies for Sensory

- Chris Simons
 - Get very different outcomes closer approximating real market behaviours with Immersive Technologies that simulate environments where particular foodstuffs are consumed
 - Point being..there is more to taste than the papillae on the tongue with the specific receptors!
 - Neural connectivity is a powerful tool to use to manipulate perceptions or the "volume" of sensory inputs

Tapping into the Subconscious: New Sensory Science Lab to Explore Mysteries of Flavor, Aroma, Appetite



The lab will allow researchers to gather physiological data, including heart rate, respiration and skin perspiration, to help measure unconscious reactions to various food-related stimuli including flavors, packaging or visual images of company logos

2 dimensions: **arousal** and **liking**

What did we learn from 2016
sodium reduction work?

Sweeping Statements (from “yours truly”)

- 80% of the salty tasting products can be adjusted with salty taste differences
 - because they are cooking aids or food solutions that can be manipulated in-home for salt adjustment..and probably won't be much
 - portion size can be reduced when salt is decreased to keep price points
- 20% tend to be in products eaten “as is” eg. Snacks, processed meats, bread
 - taste profiles tend to be more critical here
 - textural/visual qualities lost from sodium reduction critical

Strong brands can carry off “radical changes”

- Example in Stock cubes
 - Unilever reduced sodium without trying to compensate for lost salty taste
 - removed “flavourings” as part of the formulation
 - offered consumers a different taste experience under exactly same brand
 - preserved margin, maintained price points to acceptable
 - usage increased (made possible with lower salt)
 - Stock cubes an “ingredient” and salt can be added if deemed necessary

2016 Na reduction gave better tasting products

- Most of the work we did in soups, sauces and stocks gave preferred products
- Savoury culinary offerings were just TOO salty (*turns out*)

2019 Na reduction ?

- not the same case
 - Critical salt level for savoury balance, more of a need for taste modulation tools balanced against cost
 - Critical functional level leading to textural/visual changes eg. bread

But...necessity in mother of invention!

- Example bread:
 - sodium ions strengthen the gluten protein for gassing volume and number of gas-cells for whiteness
 - there are other factors that affect these dimensions ie. emulsification and carbohydrate structure
 - can address gassing and gas-cell number by modifying these aspects using enzymes and/or emulsifiers
 - will cost more but fluctuating exchange rate does worse things than this
 - **everyone** is in the same boat!
 - think outside the box! ..is a four square-sided loaf the only way?

Think of taste like “frames” in
a movie...



Practical considerations

- “Matching” a sodium reduction product to the original standard is HARD and is a lengthy and highly iterative process
- “Improving” is a lot easier and there are basic rules around tastant interactions eg. Salt vs sugar, sour vs salty, umami balance that need to be done first
- Snack seasonings in big branded companies require extremely hard work because a lot of work goes into selecting them in the first place..no getting away from this! Tools are very NB here
- The sheer volume of work means compromise for many marketing/business leads
- No-one makes much money out of selling the tools, they get approved by a customer for internal use by a flavour house supplying a flavouring/seasoning

Instant Spicy Beef & Tomato Soup

Ingredients	Taste Base	Functional Base	Visual Base	Meatiness	Species Specific	Balance	
Salt	2.168	2.168	2.168	2.168	2.168	2.168	umami
MSG	0.278	0.278	0.278	0.278	0.278	0.278	
I+G	0.014	0.014	0.014	0.014	0.014	0.014	
White Sugar	2.451	2.451	2.451	2.451	2.451	2.451	sweet
Acids	0.026	0.026	0.026	0.026	0.026	0.026	
Creamer		2.790	2.790	2.790	2.790	2.790	functional
Gum		0.327	0.327	0.327	0.327	0.327	
Instant Starch		3.268	3.268	3.268	3.268	3.268	
Vegetable Fat		0.297	0.297	0.297	0.297	0.297	
Caramel			0.185	0.185	0.185	0.185	appearance
Ponceau Supra			0.001	0.001	0.001	0.001	
Sunset Yellow Supra			0.011	0.011	0.011	0.011	
Textured Vegetable Protein			0.350	0.350	0.350	0.350	
Meatymart S8sd				0.083	0.083	0.083	meatiness, beefiness, cooking method
Meatymart Chicken				0.930	0.930	0.930	
Beef Flavour					0.108	0.108	
Spice Blend						2.640	"Chefiness"
Total	4.937	11.619	12.166	13.179	13.287	15.927	

Ingredients: thickener (E1412), creamer, sugar, spices, salt, thermal process flavours, texturised vegetable protein, gum (E412), vegetable fat, MSG (E621), caramel (E150c), acids (E262), flavourings, I+G (E631, E627), artificial colourants (E124, E110)

Instant Spicy Beef & Tomato Soup



Taste
Base

Functional
Base

Visual
Base

Meatiness

Species
Specific

Balance



Thank you...

