



Sensory Research and its Role in Engineering Future Food Products

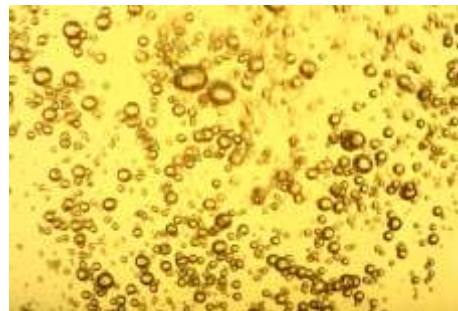


Applying Sensory Methodologies to sugar / salt reduction , label cleaning etc.



A significant proportion of our project work

- **Projects:**
 - FSA targets on sugar, fat and salt
 - Removal of E numbers and other banned substances
- **Research objectives**
 - Product matching
 - No change in consumer liking
 - Step change identification



There are two basic types of Sensory test:

DISCRIMINATION – only measures IF products are significantly different

DESCRIPTIVE – measures HOW products are different

what are the differences between the products, their magnitude and significance?



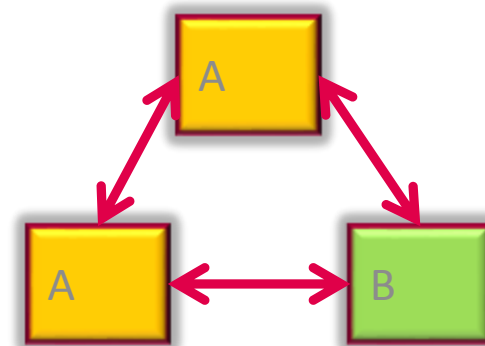
Used to determine if there is a perceived difference between products

Positives:

- Quick
- Easy to conduct
- Can be done with staff panel
- Needs relatively small panel

Drawbacks

- Does not indicate reason for difference



Triangle Test



Tetrad Test

DESCRIPTIVE SENSORY ANALYSIS or SENSORY PROFILING

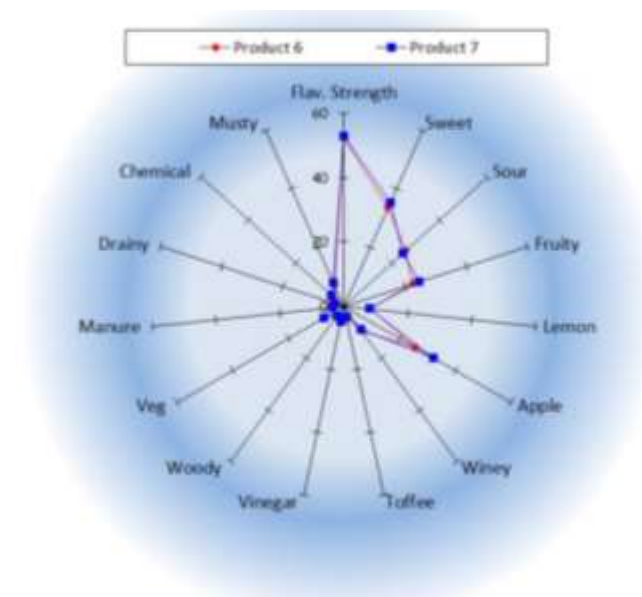
Uses a small number of trained panellists (not consumers) to identify and describe the different characteristics of products using the 5 senses.

Main methodologies that you will encounter are:

- Quantitative Descriptive Analysis (QDA)
- Spectrum Method

Sensory analysis provides a data print out or fingerprint of what a product looks, smells, tastes and feels like, and sometimes also what it sounds like.

- The panel DOES NOT tell us how much it is liked ... consumer research is required for this.



Quantitative Descriptive Analysis (QDA) : The Process

8-12 trained sensory panellists per panel

STAGE 1: Vocabulary generation : (Group)

STAGE 2: Vocabulary refinement/training sessions (Group)

STAGE 3: Product assessments (Individual)



Some products have what sound like very negative attributes. However, these may be key to a product's character. For example:

- Cider can have a manure note
- Mature cheeses often have 'farm-yard' notes.
- Beers have characteristics like cabbage water.
- Some coffees have a fish oil note.



Flavour strength

Sweet

Sour

Fruity

Lemon

Apple

Winey

Toffee

Vinegar

Woody

Veg

Manure

Drainy

Chemical

Musty

What does the data look like?

		Cadbury	Galaxy	Sainsbury's	Tesco	Tesco Everyday Value	Tesco EV (Duplicate)	Waitrose	Waitrose (Duplicate)	LSD	Significance
Sweet	fl	53	55	50	50	48	49	52	51	3.09	3*
Milky / Creamy	fl	43	52	43	36	32	34	44	45	3.39	3*
Cocoa	fl	30	27	36	33	37	36	34	34	3.52	3*
Acidic / Sour	fl	3	2	5	4	5	5	3	4	1.29	3*
Musty / Stale	fl	0	0	0	2	2	2	1	1	0.95	3*
Bitter	fl	2	1	6	6	9	8	5	4	1.91	3*
Caramel	fl	5	9	0	0	0	0	2	2	2.01	3*
Sweet	at	45	46	41	42	39	40	43	44	3.49	2*
Milky / Creamy	at	36	43	34	30	24	26	35	35	3.39	3*
Cocoa	at	24	22	30	28	33	32	28	28	3.03	3*
Acidic / Sour	at	3	2	6	4	4	5	3	4	1.45	3*
Bitter	at	3	1	6	6	9	9	4	3	2.33	3*
Caramel	at	3	5	0	0	0	0	2	2	1.64	3*
Drying / Astringent	at	52	49	55	55	58	58	55	54	3.07	3*
Lingering	at	54	54	55	53	55	56	54	55	3.00	ns

- Client looking to produce a salt reduced version of its Current product.
- Objective : produce as close a match as possible.
- Result :
 - NPD 1 is the closest match. Only significant difference is a slight reduction in Roasted Chicken Flavour.
 - NPD 2 and 3 are significantly different to Current – Weaker flavour, less salty, more stale etc.
 - NPD 1 to go forward into consumer test vs Current

	CURRENT	NPD 1	NPD 2	NPD 3
Flav. Strength	56	54	52	51
Savoury	35	34	31	33
Chicken Stock	24	23	23	24
Roasted Chicken	26	23	21	22
Boiled Chicken	9	8	7	6
Salty	15	13	9	9
Onion	4	5	5	4
Offal	6	5	4	5
Peppery	4	5	5	5
Vegetable Stock	9	8	7	5
Celery	6	6	4	5
Earthy	5	4	3	5
Stale	4	3	6	6

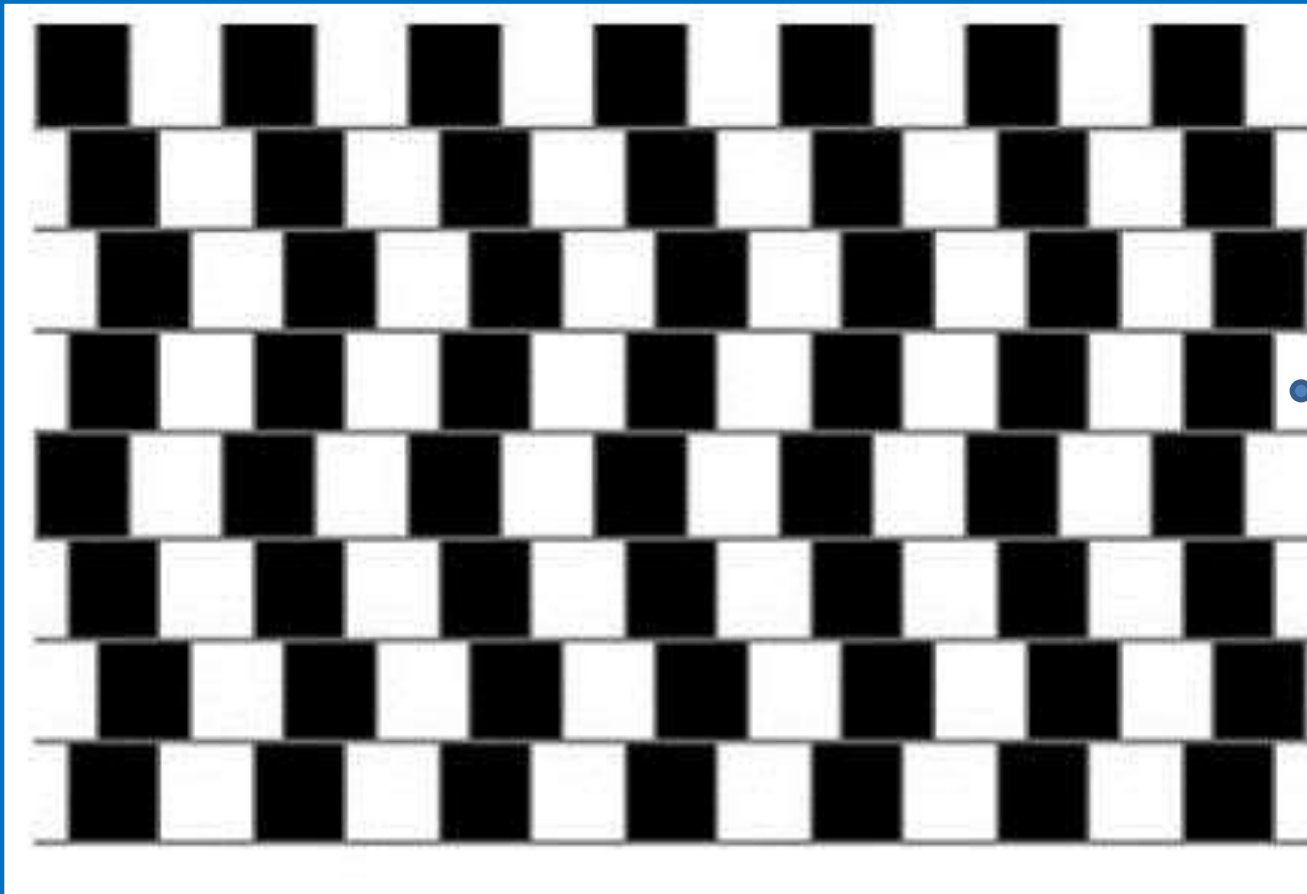
	Significantly higher than CURRENT
	Significantly lower than CURRENT

NEVER UNDERESTIMATE THE SENSITIVITY OF YOUR CORE CONSUMERS

... especially, if your product is consumed very regularly (i.e. daily or several times a week)

- Getting sensory results that indicate 'No Significant Difference' in a difference test or in sensory profiling does not always guarantee that your core regular consumers will not detect a change.
 - They will be consuming a larger serving than would be used in sensory analysis.
 - They may detect residual flavours 20 or 30 minutes (or even longer) after consuming.
- Therefore, signing off with a validating piece of consumer research can be a vital part of your programme.

Understanding Consumer Understanding



Things may not always be what they seem

- **Consumers latch onto simple messages:**
 - E.g. in the 1980s, milk products were identified as the main contributor of fat to the UK diet.
 - The consumer out-take was that liquid milk was the culprit leading to a drop in milk consumption and the rapid growth of low fat milks.

- **The rise of Gluten Free fuelled by misconceptions:**
 - Only 1% of UK population suffer from Coeliac's Disease
 - 96% awareness with 15% claiming to follow a Gluten Free Diet
 - Many consumers are simply adopting gluten free as a 'healthier diet'
 - Some even think it is 'low fat'

“Consumers have become increasingly confused about what is not healthy. We need to step in and ensure that we delivery the transparency they say they are looking for”

Fiona Dawson – Global President
Mars Food



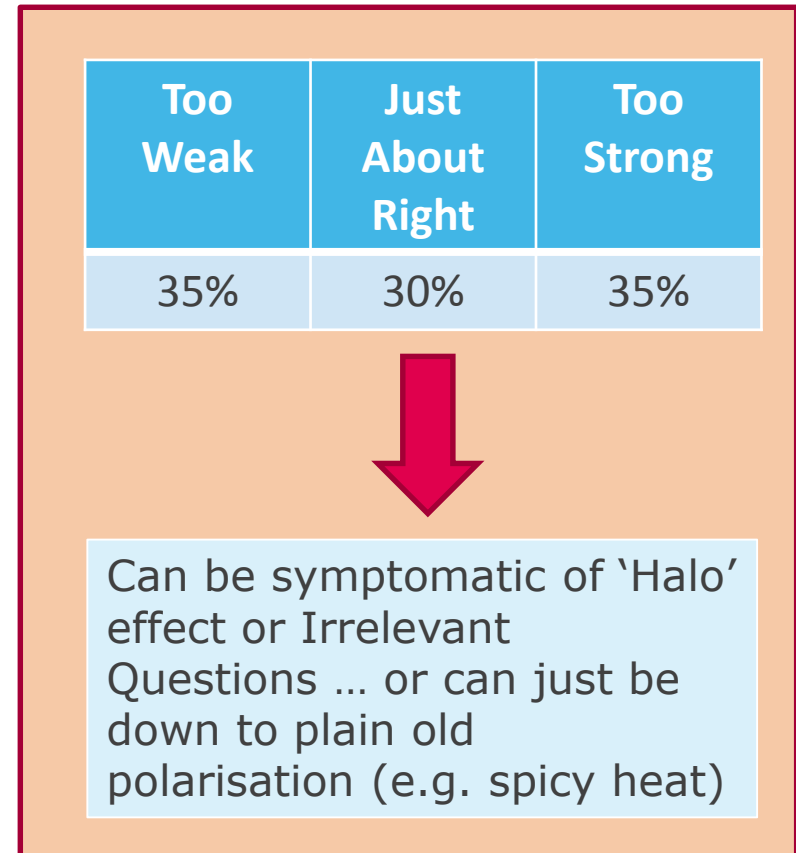
- **Obvious statement alert :**
“MAKE SURE THAT YOUR PRODUCT AND CONCEPT ARE WORKING IN HARMONY AND MEETING CONSUMER NEEDS”
- **Quite often these 2 elements are worked on separately.**
- **Whether your NPD project is Concept-led or Product-led ... Maintaining the flexibility to change the concept or product during development is essential.**
- **I have regularly worked on projects where:**
 - **a ‘winning concept’ has been developed and the client is now trying to develop the product to fit it.**
 - **... and have been told that the concept is set in stone (and that we are not to give feedback on it)**
- **Remember : Consumers will try their best to help you in research but that they can only react to the stimulus that you put in front of them.**
 - **A concept may be working well and be raising all sorts of expectations about a product that come crashing down to earth once they try the actual physical product.**

Consumer research is an excellent tool BUT it can have limitations depending on the product being tested:

- Most consumers have a limited vocabulary
 - Our experiences of screening people for sensory panels shows the following correct levels of identification:
 - 90% sweet
 - 67% acid
 - 53% salt
 - 18% bitter
 - We assume that respondents understand all attributes that we ask them about.
 - Respondents will usually give us an answer regardless!
 - Open ended questions yield hedonic focused top answers:
 - e.g. tastes nice, tastes horrible, very tasty etc.
 - Some attributes can be ambiguous
 - E.g. Creaminess : Even if you ask respondents about creaminess of flavour their answers will typically correlate more strongly with the sensory data for thickness of texture.

Limitation of Consumer Research (Cont.)

- **'Halo' effects**
 - “I don't like this product therefore I can't say that anything is Just Right”
- **Irrelevant / Impossible Questions**
 - If I dislike the perfumed strawberry flavour of a French strawberry yogurt, how do I answer the following questions:
 - What do you think about the overall strength of flavour?
 - What do you think about the strength of the strawberry flavour?
 - What do you think about the level of sweetness?
- **Fatigue**
 - Too many attributes can results in respondents 'scoring on autopilot'.



Using Sensory Profiling to De-code Consumer Responses

Consequently, while Product and Insight Managers are happy that consumer research has provided an answer ... R&D can still be left with major questions to resolve.



**Product Manager
/ Marketing**

Consumers didn't like it.
The flavour is too strong, too sharp and
not sweet enough and it has a funny
taste.
The texture is also too powdery.



**Insight /
MR**

R&D



Hmm ... Was it the
type of flavour or
was it just too much
flavour? How much
should I reduce it by?
What's causing the
funny taste?

Example : STRAWBERRY YOGURTS



NPD



CURRENT

Consumer Research Says that NPD

Flavour is too strong

Flavour is too sharp

Flavour is not sweet enough

Artificial flavour /tastes funny/chemical

Texture is too powdery / not smooth enough



Provides a list of areas to target for change but gives no idea of scale.

Using Sensory Profiling to De-code Consumer Responses

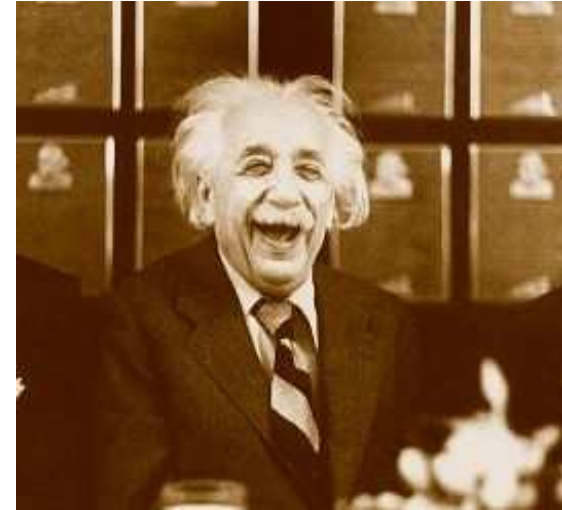
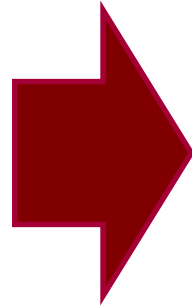
	Sig. higher than Current
	Sig. lower than Current

	NPD	CURRENT	LSD
FLAVOUR			
Overall Flavour Strength	37.3	39.4	3.3
Overall Fruit Flavour Strength	22.8	23.1	3.2
Overall Strawberry Flavour Strength	20.4	25.2	2.3
Tinned Strawberry/cooked strawberry	13.2	12.7	2.8
Fresh Strawberry Flavour	8.8	12.0	1.6
Overripe Strawberry	3.3	4.9	1.2
Artificial Strawberry	12.2	8.1	2.5
Artificial Chemical Fruit Flavour	12.2	5.6	2.1
Milky/Creamy	22.8	33.6	4.7
Lemon/Citric	16.2	9.8	2.2
Sweet	25.4	23.7	3.0
Bitter	7.0	3.6	1.4
Perfumed	6.4	3.8	1.6
Vanilla	1.9	3.7	1.4
Sharp	16.9	11.0	2.7
Stale	7.8	1.7	2.5
TEXTURE			
Starchy	17.4	10.8	2.5
Smooth	34.4	40.3	3.9
Powdery	19.7	13.2	3.1
Thickness	35.4	35.7	4.1

How can sensory profiling help?

Consumer Says	Sensory Says
Flavour is too strong	Wrong : flavour strength is no different to current
Flavour is not sweet enough	Wrong : sweetness is same as in competitor product.
Flavour is too sharp	Sensory agrees : Flavour is significantly more sharp / citric
Artificial flavour /tastes funny/chemical	Sensory agrees : Strawberry flavour is more artificial. Sensory also detects that the flavour is more bitter, stale and perfumed.
Texture is too powdery / not smooth enough	Sensory agrees : Texture is more powdery and starchy / is much less smooth
<p>Consumers are reacting against the high level of sharpness and the artificial, bitter, stale and perfumed notes. Because they dislike the flavour they are complaining that it is too strong and is lacking in sweetness.</p>	

Therefore, Sensory Profiling has the power to do this ...



... by

- providing a deeper understanding of the products tested
 - a sense of scale of the levels of difference
 - a picture of the relative balance of flavours
- disentangling what appear to be 'clear' findings from consumer research
- simply providing more clues

And therefore

- Improving the chances of getting the product right first time, next time
- Saving time and money



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