



Windsor Place
Faraday Road
Crawley
West Sussex
RH10 9TF

t: +44 (0) 1293 558955

f: +44 (0) 1293 534963

e: info@productperceptions.com

w: www.productperceptions.com

sensory research

the ladder to commercial success



Courtesy of:

product perceptions Ltd

Authored by:

Yvonne Taylor
Business Development Director
Tel: 01293 558956
yvonne.taylor@productperceptions.com

Dr Keith Greenhoff
Managing Director
01293 558958
keith.greenhoff@productperceptions.com

Introduction

product perceptions limited (ppl) has been working with blue chip manufacturers over the past 15 years helping you develop successful products.

Our independent, insight oriented, research and guidance helps shape some of the most successful food, drink and toiletries products you enjoy today. Don't just take our word for it, this is what some of our clients have to say:

'Good clear debrief with useful analysis. Superb response rate for follow up questions. Can't be faulted!'

source: Sarah Banks, Consumer Insight Manager, Manor Bakeries

'ppl's attention to detail really showed commitment and expertise' source: Insight Manager, oral care manufacturer

'The project was handled very well, the team was knowledgeable and we had confidence in the results'

source: Consumer Insight Manager, breakfast cereal manufacturer

'Happy with client service and level of expertise and professionalism from project team' source: Insight Manager, food manufacturer

Our pioneering expertise in the area of sensory research techniques can help you with successful product development, specifically:

Reducing the risk of making costly wrong decisions – our Eclipse product optimisation technique is reported to cut costs by around 50%

Accelerating **speed to market** – our Eclipse product optimisation technique is reported to cut development time by up to 1/3.

One thing you can be sure of is that your competitors are using sensory research to inform their successful business decisions – you should be to!

This white paper will demonstrate how independent sensory research from product perceptions can help you climb the ladder to commercial success.

ppl's ten steps to commercial success



Identifying a product's unique sensory DNA



Understanding consumer responses to sensory characteristics



Developing detailed language for product developers to use



Untangling the halo effect



Decode attribute dynamics – understanding inter-relationships



Identifying the sensory drivers for successful products



Determining USP claims



Monitoring product quality



Engineering for health



Sensory Fusion



Identifying a product's unique sensory DNA

If you understand your product's unique sensory DNA then you have a very powerful tool that can be used with key stakeholders:

Retailers:

- to help them with buying reviews
- to help them maintain unique and relevant choices for the consumer

Consumers:

- to help communicate to them the compelling sensory characteristics of a product
- to give them a 'reason to buy'

Product Developers

- to guide them in developing products optimized to consumer needs

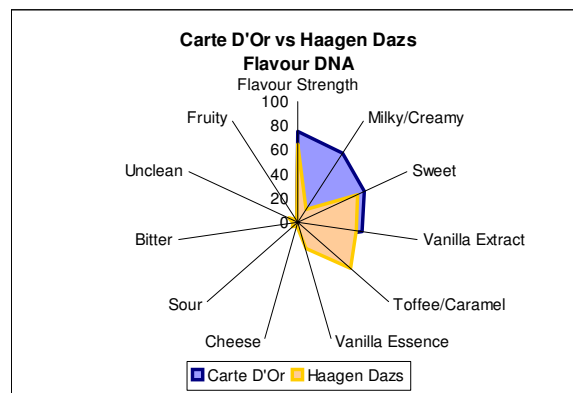
Quantitative Descriptive Analysis (QDA) can be used to identify product DNA. This technique utilises the skills of screened and trained consumers who have exceptional sensory acuity. Small groups of these trained consumers identify all of the sensory characteristics in a product under the key senses of; appearance, aroma, taste/aftertaste and texture.

Products are then assessed to determine the levels of intensity of each characteristic they have. The result is a clear picture of your product DNA.

Example 1 – Carte D'Or and Haagen Dazs vanilla ice-cream (taste characteristics)

SOURCE: internal research conducted by product perceptions Sensory Department

Looking at the flavour characteristics for Carte D'Or, we can see that it is strong tasting with a milky/creamy taste and a more natural vanilla extract rather than a vanilla essence flavour. By contrast, Haagen Dazs has a stronger toffee/caramel flavour and is less milky/creamy.



Extending this approach to a range of products within a category is even more powerful as it will clearly identify how your product is different (or similar!) to your competitors.

This information will help you understand whether you have a distinctive taste profile which you can 'own' and that matches your brand, your positioning and that can justify your price point.

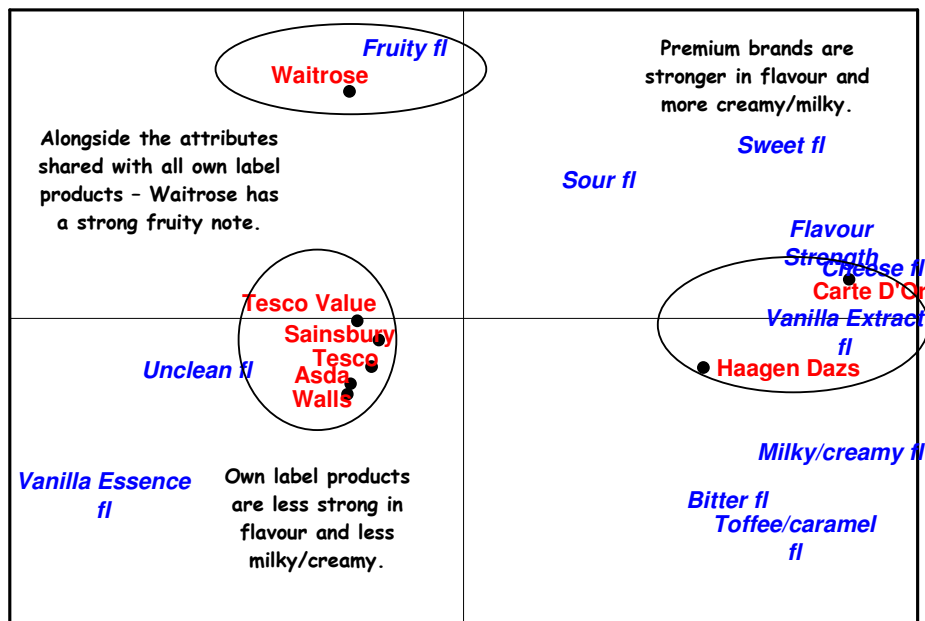
Example 2 – vanilla ice-cream (taste characteristics)

SOURCE: internal research conducted by product perceptions Sensory Department

In this example it is clear that the two premium brands Carte D'Or and Haagen Dazs are more similar (but not entirely the same as we saw above) to each other demonstrated by their closeness on the PCA map. By contrast, these two products taste very different to the own label brands (which all sit together on the left hand side of the sensory map).

With this information it is clear that retailers may consider very carefully whether they should be stocking both premium brands when from an unbranded taste point of view they are very similar. This only shows the unbranded picture, clearly, branded appeal will also have a major impact on this type of decision.

From the premium brand owners point of view there is clear product difference between premium vanilla ice-cream and the own label alternatives – thus helping justify the price differential.





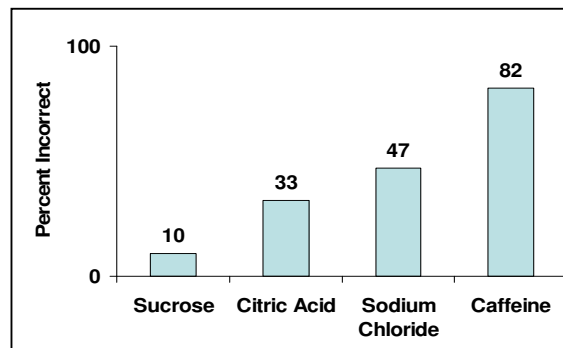
Understanding consumer responses to sensory characteristics

Most consumers have limited ability to discriminate between different taste characteristics. This has a direct impact on their ability to vocalise what it is about a product that they like or dislike.

Example 3 - % of UK population able to identify the four basic tastes

Source: product perceptions Sensory Department – panel screening data

In this example we can see that more than 80% of the UK population fail to identify at least one of the basic taste characteristics. This leaves fewer than 20% of the population who have sufficient sensory acuity to be considered for sensory research projects.



No wonder consumers are great at assessing how much they like a product but are less able to explain why they like products. In consumer research, typical responses to the 'why do you like this product?' question are:



This kind of comment is not helpful to product developers because they're just not specific enough. Sensory helps us understand what exactly it is about the taste that is 'nice' and how sweet is 'sweeter'.

Furthermore, consumers can use vocabulary interchangeably so that it is not clear which specific aspect of the product they are describing. For example, consumers might refer to a product as 'creamy' – we can't tell if they meant creamy appearance, taste or texture, or indeed all three.

Indirectly, sensory research can help identify what it is about products that consumers actually like and dislike.

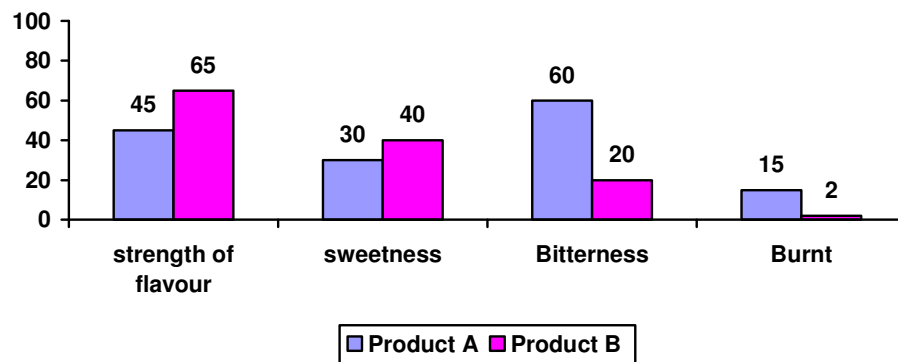
Example 4 – identifying the key discriminating sensory characteristics to determine consumer preferences.

SOURCE: example output from product perceptions Sensory Department

In this example, product B was identified to be better liked in consumer research. Consumers said they liked it because it was 'sweeter'.

Sensory analysis shows that it does indeed deliver a stronger, sweeter flavour BUT importantly it has low levels of bitterness and burnt flavour notes which has enhanced consumers' perceptions of how sweet the product actually is.

Based on consumer response the product developer might be encouraged to try and make product A sweeter when in fact it would be more advisable to reduce the bitter and burnt notes in this product – products A & B do not differ as widely in terms of sweet taste.





Developing detailed language for product developers to use

Sensory research is focused on providing a rich lexicon of descriptive language. Sensory experts are trained in descriptive skills - generating a large number of product descriptors for each sample being profiled.

The value of detailed descriptive analysis is to provide clear direction for product developers and NPD experts so that the product development process is efficient and effective.

Sensory definitions can also be used for 'on pack' product descriptions and in advertising. For example;

'taste of fresh lemons'
'crispiest biscuit base'
'melts in the mouth'

Contributing to the currency of brand and product discrimination.

Example 5 – sensory vocabulary

Source: independent research conducted by product perceptions Sensory Department

Flavour strength	An impression of intensity of flavour delivery or impact regardless of quality, ranging from very weak to very strong.
Sweet	One of the four basic tastes, reminiscent of sugary materials such as syrup and sucrose
Bitter	The taste imparted by caffeine/quinine, perceived at the back of the tongue
Cooked fresh milk	Refers to the characteristic flavour of fresh whole milk that has been brought to the boil
Cooked UHT milk/caramel	Describes the flavour of UHT milk, with a caramel-y note
Sour	Describes a general lactic sourness as expected in milk based products

This kind of vocabulary helps product developers by:

1. providing a description of the end points of the scale thus defining the scope of the scale
2. using reference products to anchor the product descriptor, in this example fresh whole milk.
3. distinguishing between different characteristics of similar products e.g. whole milk and UHT milk



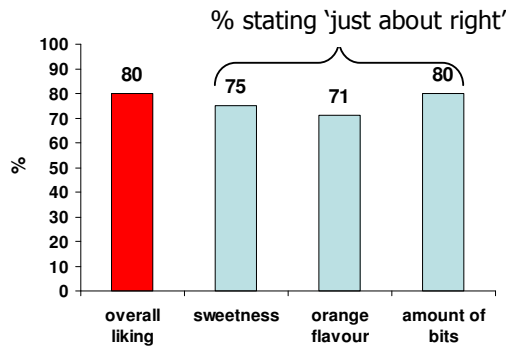
Untangling the halo effect

A common finding in consumer research is the halo effect. If a consumer really likes a product they have a tendency to rate it as 'just about right' on all of its sensory qualities. Similarly, if they really dislike a product they tend to criticize it on all of its sensory qualities.

So how do product developers untangle which of these likes or dislikes are 'real' and which are simply due to a halo effect?

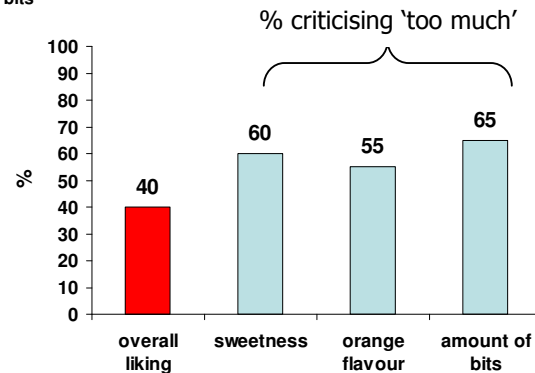
Example 6 – halo effect

Source: example data product perceptions Consumer Department



In the example on the left, there is a very high level of liking (80% of consumer stating a like) and consumers are equally highly satisfied with the sweetness, orange flavour and amount of bits.

In the example on the right, there is a very low level of liking (only 40% express a like). This product is criticised for being too sweet, having too much orange flavour and too many bits.



Sensory profiles can help untangle these halo effects. For the two products shown above sensory profiling showed:

	Liked product	Disliked product
Sweetness	50	50
Orange flavour	35	50
Amount of bits	25	40

Sensory profiling has shown that both products are equally as sweet - despite 75% of consumers finding the sweetness just right in the product they liked and 60% finding the product they disliked as too sweet. However, the disliked product needs to reduce its orange flavour and the amount of bits. Sensory research has uncovered true differences in the product which the consumer halo effect covered up.



Decode attribute dynamics, decode relationships

Often when product DNA is revealed there are attributes which work against each other or attributes which, when changed, impact significantly on other attributes.

This becomes an issue when a consumer is looking for the two key aspects in a product which are working against each other e.g. softness and strength in toilet tissue.

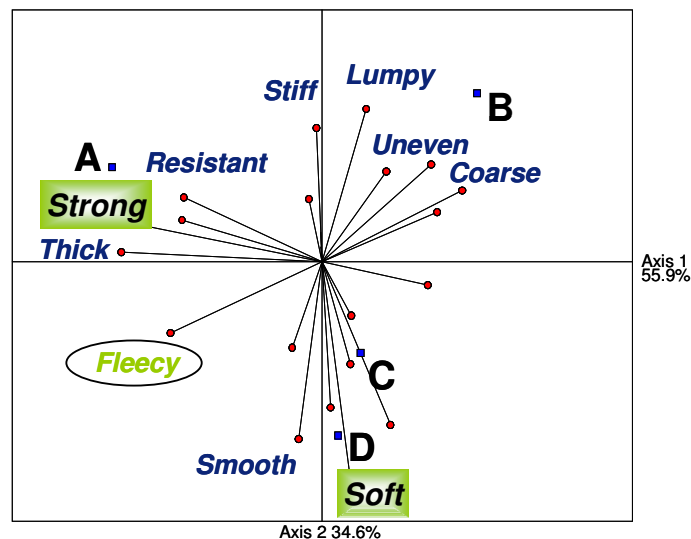
Sensory research can help decode what the relationship is between the two aspects and suggest ideas to solve the dilemma.

Example 7 decoding attributes dynamics

Source: example data product perceptions Sensory Department

This can be explained by looking at an example in the tissue market. In this market, manufacturers are looking to deliver the twin benefits of softness and strength. In the sensory map below, product A clearly delivers on strength but falls down on softness, an attribute that product D 'owns'.

The sensory map shows that product A could increase its fleeciness rather more easily than trying to deliver softness and thus get closer to delivering a perceptually softer product whilst retaining its strength.





Identifying the sensory drivers for successful products

We've already seen that consumers are great at saying how much they like a product but are more limited in their ability to describe why they like products. By combining consumer and sensory research using preference mapping and other modelling techniques we can identify, in detailed sensory terms, why products are liked and disliked.

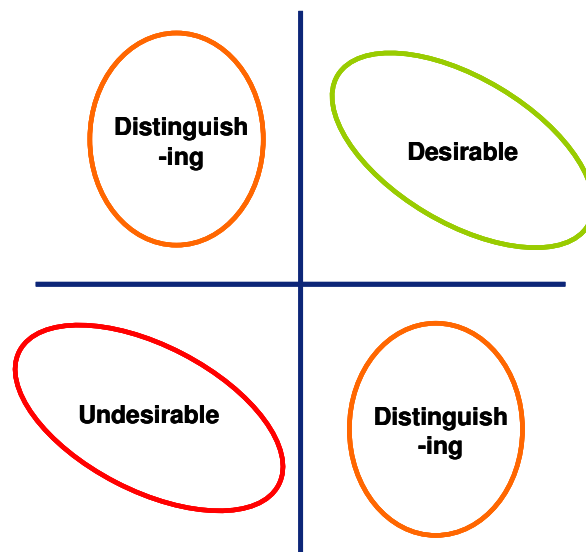
This provides a very powerful tool for NPD as it identifies which attributes are key to a product's success within a specific category and which can be used to avoid creating a 'me too' product.

For existing products the same techniques can be used to understand how to create the optimal product for a category, getting you ahead of the competition.

Example 8 – identifying the key drivers for success

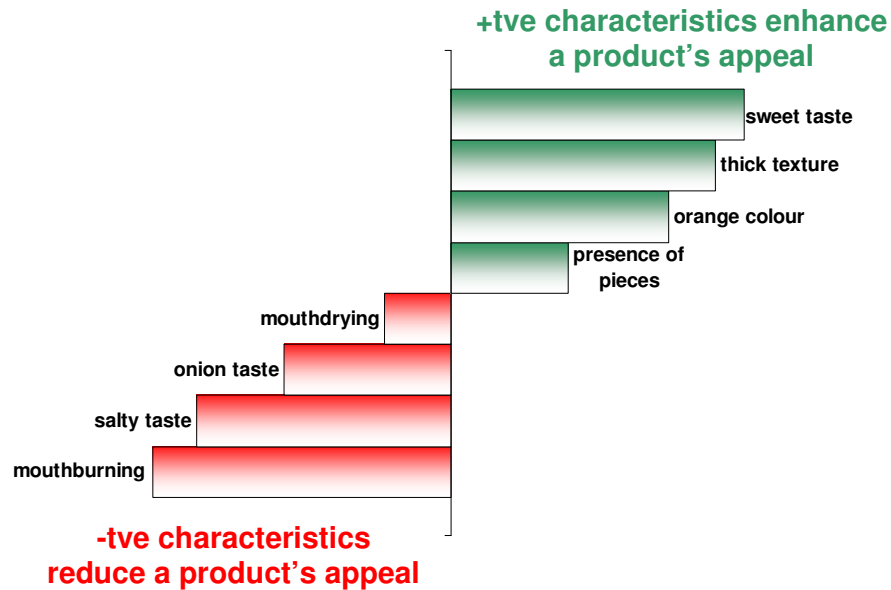
Source: example data product perceptions Sensory and Consumer Departments

A typical preference map will place products and sensory characteristics in relation to each other, so that we can understand which products are the most liked and what characteristics are desirable (top right quadrant). Products which fall into the distinguishing quadrants are liked but different in character to those in the desirable quadrant. This allows scope for product differentiation without compromising consumer liking.



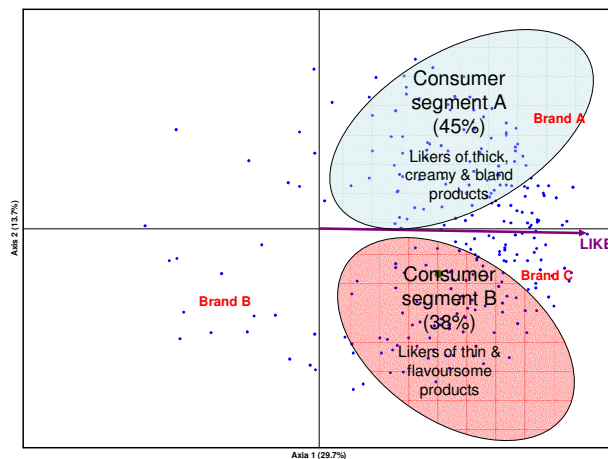
As well as understanding where products sit in relation to each other we need to have a detailed understanding about what is and isn't desirable in terms of the sensory characteristics of the product. Overleaf is a typical list of positive and negative drivers of appeal.

In this example, we can see that there are four attributes which enhance a product's appeal (green bars), with sweet taste being the most influential. Conversely, a mouthburning delivery (red bar) is the most negative driver of liking and this should be reduced to increase product appeal.



Using this technique we can also identify consumer segmentation based on patterns of liking. This means that you can understand, when you have a portfolio of products - where your products sit in relation to the different consumer groups identified. Or you can identify the characteristics that drive liking in specific consumer groups and determine how you can develop a product which can appeal to that group.

In this example, brand A is appealing to the largest consumer segment, brand B needs to amend its formulation so that it moves closer to either consumer segment A or B. The smaller blue dots indicate the consumers who fall outside the limits of the segmentation.





Determining USP claims

Sensory profiling can be used to support USP claims on products. For example, you might need to know:

- is there is a unique set of characteristics that define your products distinctive flavour 'signature' which you can own and use in marketing that product?
- in which sensorial ways your product is different to the competition?

and

- are these attributes which are of value to consumers?

and

- what claims can I make as a result of understanding the sensory profile of my product?

Example 9 – extract from a range of sensory profiles

Source: example data product perceptions Sensory Department

In this example, the manufacturer wanted to know which claims they could make about their product on pack. Sensory profiling of the competitor set was undertaken and the profiling revealed that product A was;

- thicker
- smoother
- and had a stronger fruity flavour

	Product A	Product B	Product C	LSD
Thicker	40	25	27	10
Smoother	30	19	21	7
Strength of fruity flavour	25	20	19	4

The sensory profile of product A clearly shows it has a significantly different profile than the competition. This can be used to support a product claim under the ASA rules. It can also be used to refute a competitor claim.

Further consumer research would be required to determine if these attributes were motivating purchase and relevant to the brand.



Monitoring product quality

Sensory research is ideal for monitoring product quality. The very nature of an objective, trained panel of consumers, with high levels of acuity, means that comparison of product profiles over time is both replicable and reliable.

Often manufacturers have in-house sensory panels, based at factory locations. These panels are trained in identifying a standard product profile and then determining if it significantly differs on key attributes on a regular basis.

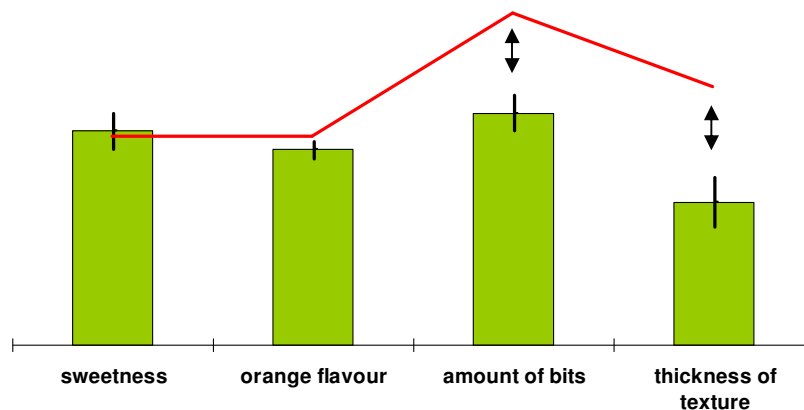
However, some manufacturers need outside help in this area. Monitoring quality is particularly important when manufacturers are embarking on a cost reduction programme, changing raw ingredient supplier or changing production bases, all of which can have an impact on product quality.

Additionally in-house sensory panels can be too sensitive to changes in their own products (because they are so close to them), which can lead to significant differences being identified between products that the majority of consumers wouldn't even notice.

Example 10 – ad-hoc monitoring of product quality

Source: example data product perceptions Sensory Department

The main way to monitor quality is to identify an acceptable standard profile and map this out with the statistical variation included. All future product profiles are then monitored against this standard profile. Outlying attribute scores are reported. In this example, the green bars show the acceptable profile including variation. The red line is a subsequent profile, at a later date, showing that the product has significantly too many bits and as a consequence is thicker. These need to be addressed in future production runs.





Engineering for Health

Manufacturers have been challenged to make their products healthier and better for you; this typically involves reducing the amount of salt, saturated fats, trans-fatty acids, sugar and other ingredients, which have been identified by the FSA and other government bodies as bad for you in large amounts.

Sensory research is the perfect tool for guiding this process. Sensory research can identify whether a difference can be detected between two products and at what level. It can then be used to describe those differences so that manufacturers have an understanding of what happens to the sensory qualities of their products when they make changes.

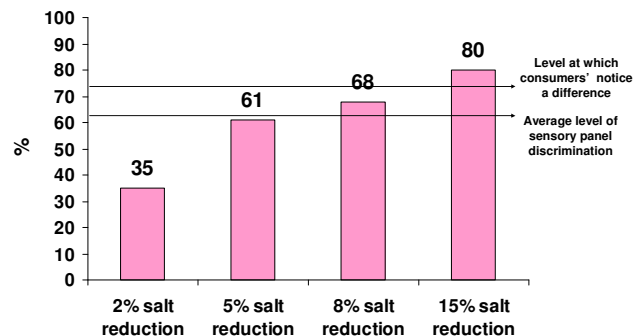
Example 11

Source: example data product perceptions Sensory Department

A manufacturer wants to make a big impact on reducing the salt in their products. Initially, they want to understand at what level they can decrease salt by without changing the fundamental product characteristics.

In this instance we would use our sensory panel to undertake an R-Index difference test, identifying if there is a difference and the magnitude of that difference between the current product and the salt reduced version(s). If a sensory panel cannot detect difference between products then it is unlikely that consumers would be able to detect a difference.

In this example, only at the 15% salt reduction level is it likely that consumers would be able to notice a difference. Therefore the manufacturer would probably want to target a 8% salt reduced product so that consumers won't be able to detect a discernible difference between the current and salt reduced product.



Once we have this information we can compare the sensory profiles of the current product and the 8% salt reduced product to determine what impact this change has on the product delivery. In this example, for a breakfast cereal the differences are:

- Texture becomes more dry and crumbly
- Appearance is affected as cereal breaks up
- Overall flavour becomes milder / more bland
- Salt change is specifically detected

Temporal Dominance testing can also be used to determine the primary flavour characteristics that dominate the palate over time.



Sensory Fusion

Sensory Fusion provides a rich, descriptive consumer focussed language for products. It combines sensory product characteristics with emotional imagery to provide a differentiating and motivating way of describing and marketing products.

Sensory fusion aims to learn from the World of Wine, where wines typically have a descriptor which incorporates functional descriptors such as provenance and grape varieties with more emotive and sensorial descriptors, such as;

This full bodied and robust wine delivers a big
earthy taste. (Merlot)

Racy and crisp on the palate. (Sauvignon Blanc)

The same approach can be used for other markets which have a complex mix of taste and textures. This can be particularly helpful in differentiating products in markets where branding is fairly low key and clever ways to describe products will help with differentiation and discriminating products.

Example 12 – sensory language generation

Source: example data product perceptions Sensory Department/qualitative research

In this example we have applied the sensory fusion approach to the cheese market. Initially, motivating consumer led descriptors are identified for the cheese market as a whole and these are then honed down to the key motivating language.

Key Cheese Words				
Milky	Firm	Delicate		
	Melt in the mouth	Buttery	Rustic	
Crumbly	Tangy	Rich	Flavoursome	
	Mellow	Creamy	Soft	
	Close-textured	Earthiness	Full-bodied	
Fruity-sharpness	Deep	Delicate-veining		

Consumer descriptors are then built up in phases for specific products, starting with a simple descriptor and then adding and amending until we have a more fulsome description.

Simple descriptor: *"Rich, very creamy with a balanced taste that develops well in the mouth."*

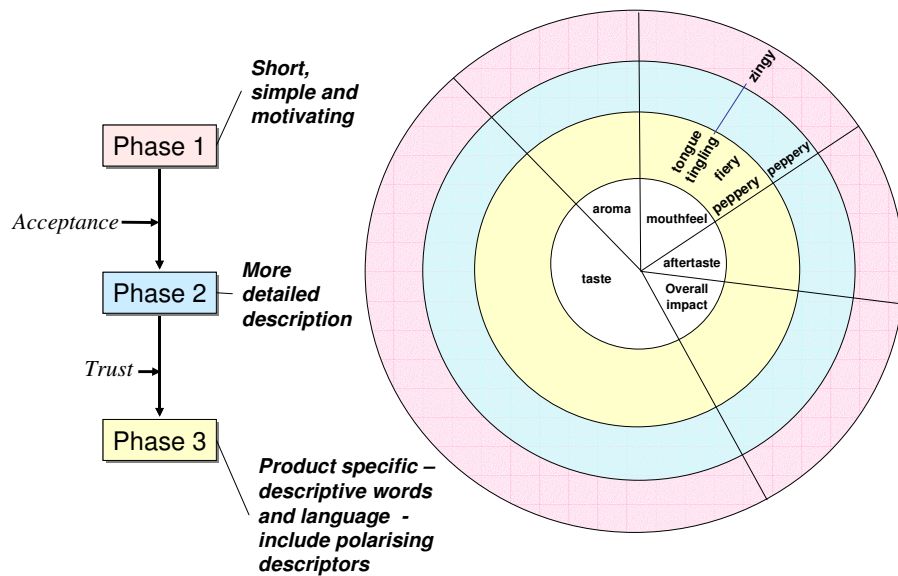
Intermediate descriptor: *"Firm, slightly crumbly cheddar. Rich, very creamy and balanced taste develops well in the mouth. Clean aftertaste"*

Full descriptor: *"Smooth but slightly crumbly texture. Rich, very creamy and balanced taste develops well in the mouth. Quite drying on the palate with a clean aftertaste"*

Consumers conduct product mapping exercises to group and describe the common functional and emotional characteristics of products.

Finally, sensory profiling is used to identify the more functional aspects of a product and tie this back to the consumer descriptors. This last step is vital so that product developers can use sensory language to develop products.

We can express the combination of consumer and sensory language in a flavour wheel. The outer circle starts with the simpler descriptors and we work through to the circle centre the descriptors become more detailed.



Who are product perceptions limited?

product perceptions have 15 years experience of helping manufacturers and retailers with the successful development of their products. We have products and services that can be used to aid market, consumer and product understanding.

Clients we have partnered on product development include:

