# Applying Sensory Science to the Dairy Development Process

Sue Purcell

© Campden BRI 2026

Campden BRI
food and drink innovation

# Definition

Sensory Evaluation is a

'scientific discipline used to evoke, measure, analyse and interpret reactions to the characteristics of food and materials as they are perceived by the senses of sight, smell, taste, touch and hearing'.

More scientific understanding than a 'journalistic' approach

# Why use People?

- Easy to train
- Same approach as consumers
- Rapid response – easy to interpret
- Provides quantitative and qualitative information





Campden BRI

# Why use People?

- Easy to train
- Same approach as consumers
- Rapid response – easy to interpret
- Provides quantitative and qualitative information



# Use of Sensory Analysis

Product development
Measuring shelf life
Competitor benchmarking
Quality control/assurance
Taint identification
Recipe/process change
New packaging effects
Link sensory & consumer data
Compare with analytical data

*Used by food and non-food industry alike*





Campden BRI

# Considerations for NPD

Health and safety

Health and diet

Food allergies

Legal ingredients

Volume of consumption / Portion size / Eat ability

Fullness

Use of Ethics Committees

Transportation of samples

Kitchen trials/pilot plant samples – test micro

Importing/sending from abroad - customs clearance

# Sensory Methods for NPD

© Campden BRI 2026

Campden BRI
food and drink innovation

# *Which test to use?*

*"The primary function of sensory testing is to conduct valid and reliable tests, which provide data on which sound decisions can be made."*

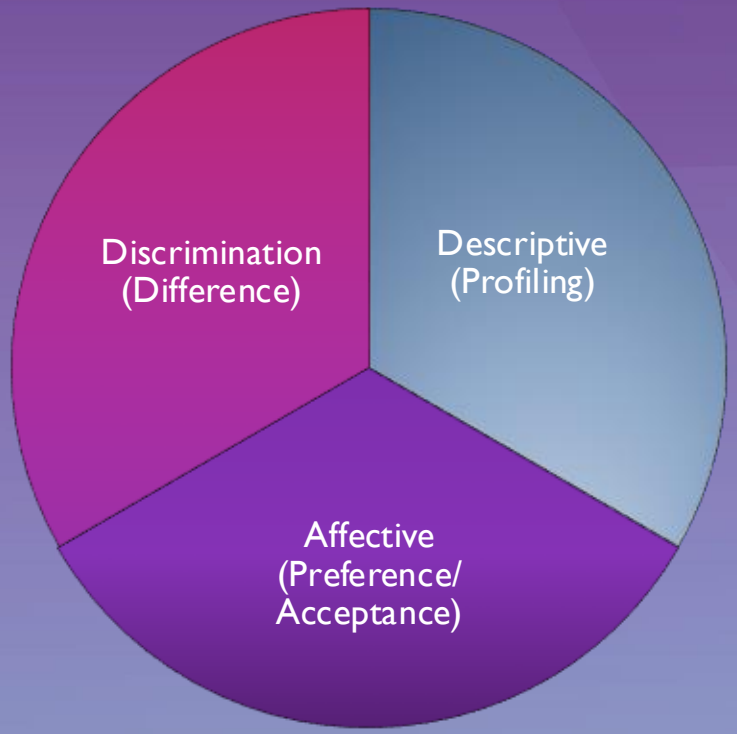
*(Meilgaard, Civille & Carr 1987).*





Campden BRI

# Types of Sensory Tests



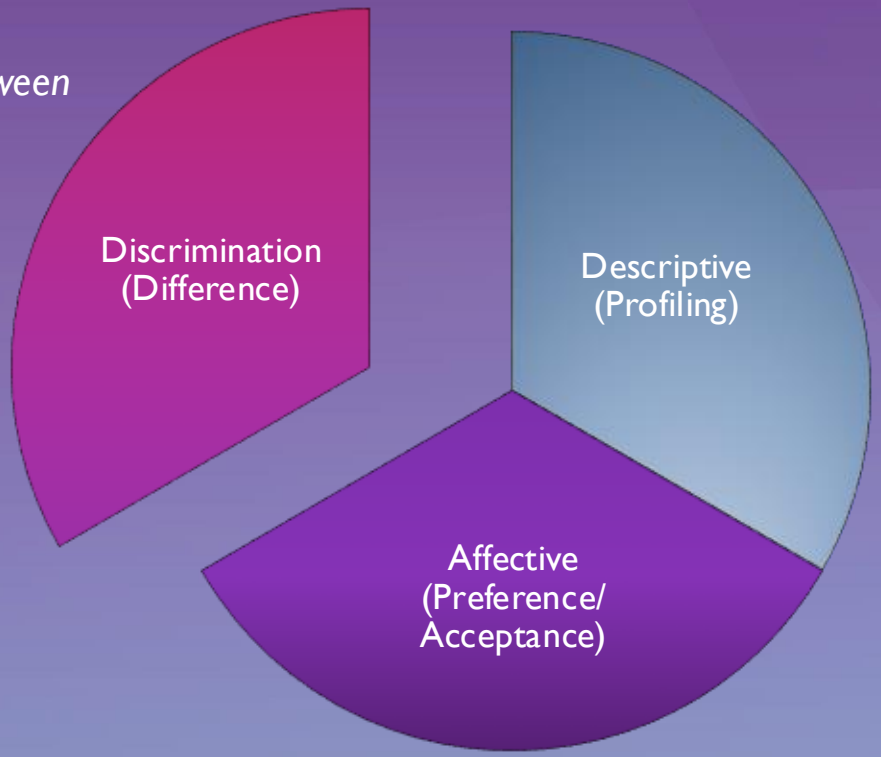



Campden BRI

# Types of Sensory Tests

*"Does a sensory difference exist between my samples ?"*

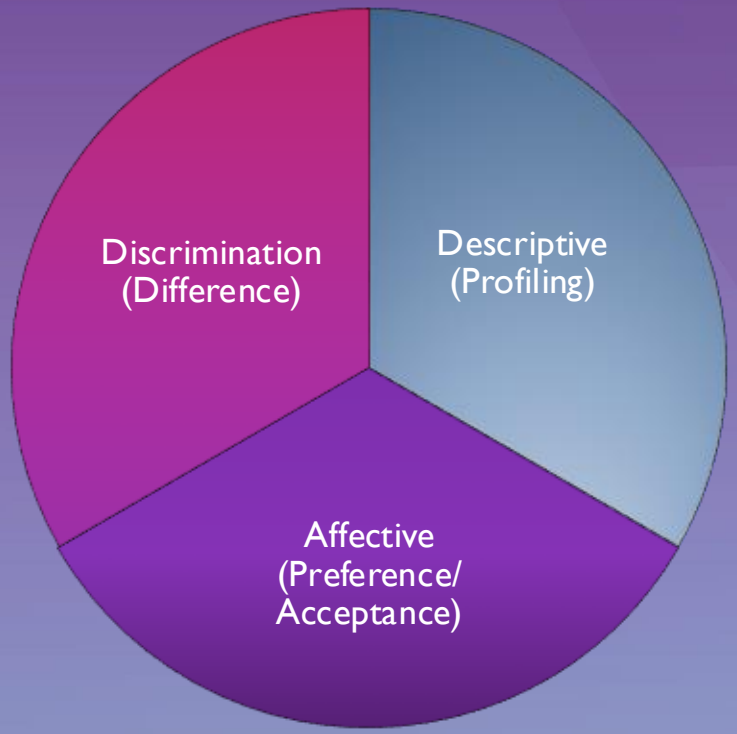
- *Directional*
- *Non-Directional*






Campden BRI

# Types of Sensory Tests



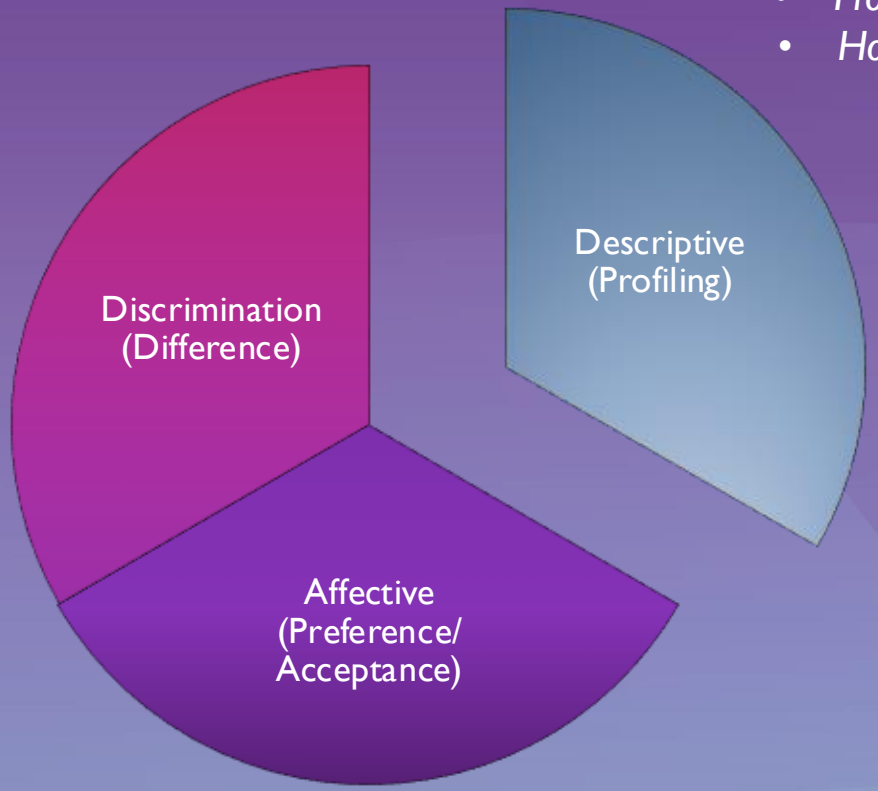



Campden BRI

# Types of Sensory Tests

*"What is the nature of the differences between my samples ?"*

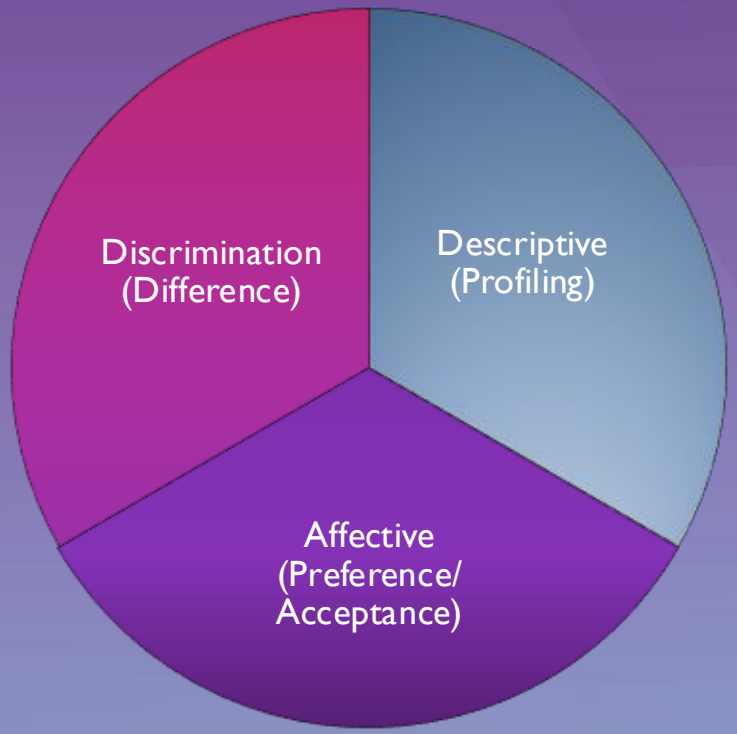
- *Profiling*
- *Holistic*






Campden BRI

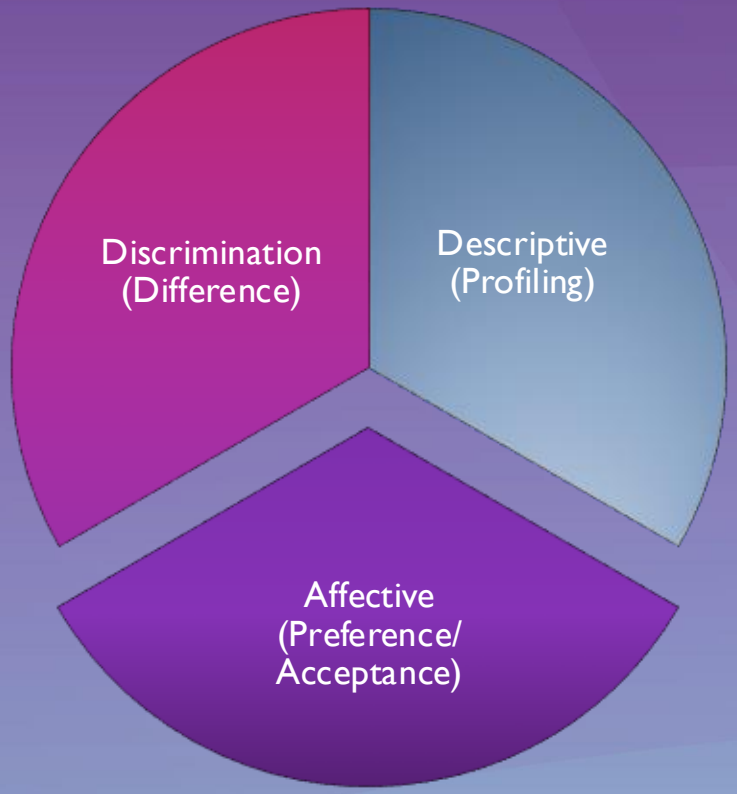
# Types of Sensory Tests






Campden BRI

# Types of Sensory Tests

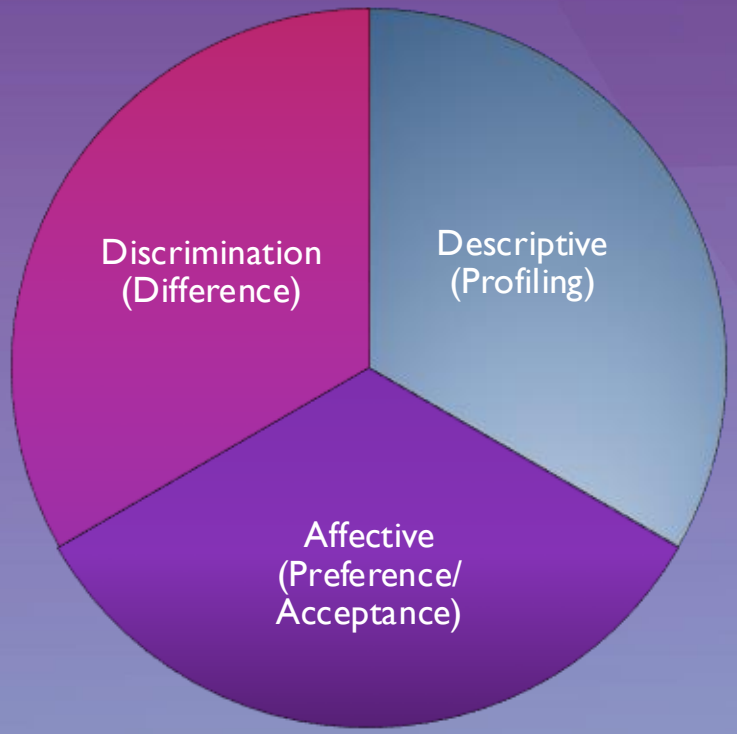



*"Which sample is most acceptable or most preferred?"*



Campden BRI

# Types of Sensory Tests






Campden BRI

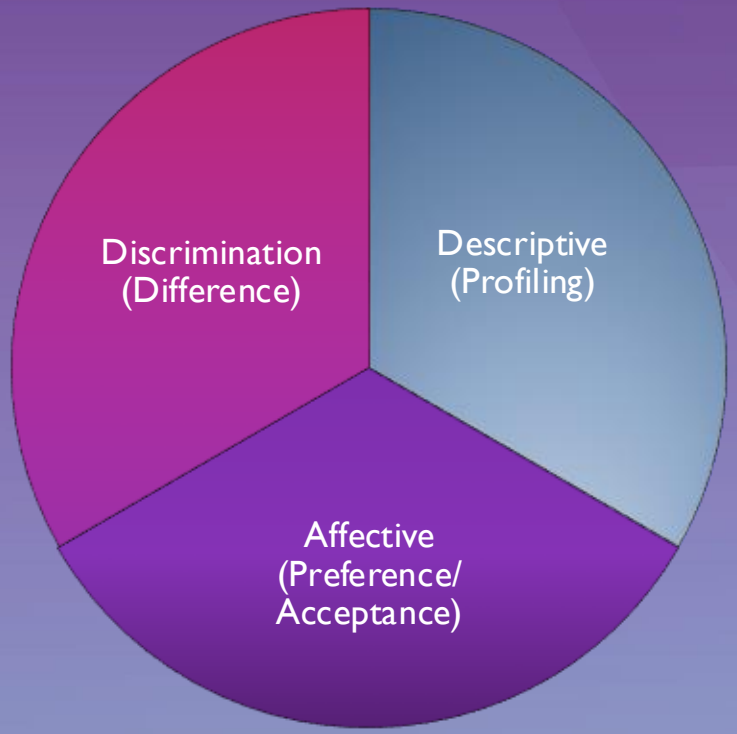
# Types of Sensory Tests

*"Does a sensory difference exist between my samples ?"*

- *Directional*
- *Non-Directional*

*"What is the nature of the differences between my samples ?"*

- *Profiling*
- *Holistic*




*"Which sample is most acceptable or most preferred?"*



Campden BRI

# Types of Sensory Tests

***Discrimination (Difference)***

- Triangle
- Duo-Trio
- Tetrad
- 2 out of 5
- Ranking
- Same Different
- Paired Comparison

***Descriptive (Profiling)***

- QDA
- Flavor Profile
- Texture Profile
- Free Choice Profiling
- Spectrum Descriptive Analysis
- Napping
- Pivot Profile

***Affective (Preference/ Acceptance)***

- Quant - Product Testing
  - CLT
  - HUT
- Qual
  - Focus Groups
  - Observation
  - Shadowing
  - Co-creation and rapid prototyping
- Concept Evaluation
- Usage and attitude assessment

**Discrimination (Difference)**

# *Triangle Tests - Non-Directional/Overall*

*Can be used to identify detectable differences between samples (but can also be used to test for similarity)*
*Uses a panel of trained assessors*

*526* *845* *179*






Campden BRI

# Definitions: Difference v Similarity (Taken from BS EN ISO 4120:2007)

Difference

- Situation in which samples can be distinguished based on their sensory properties

Similarity

- Situation in which any perceptible differences between the samples are so small that the products can be used interchangeably
- (A greater understanding of sensory principles will be needed)

*Discrimination (Difference)*

# Applications of Difference Tests

- Effect of changes in raw material - process - packaging on finished product quality
- Investigating off-flavours and taints
- Changes in product quality over shelf life
- Verifying changes during product development

Limitations:

Does not show the size of the difference or the nature of the difference between samples

Descriptive (Profiling)

# Descriptive Analysis Techniques

*There are several well established techniques that are known with the same underlying basic approaches. It is not uncommon for hybrid descriptive profile methods consisting of a combination of elements from two or more of the established methods to be used*

Flavor Profile®

Texture Profile®

Quantitative Descriptive Analysis (The QDA Method)®

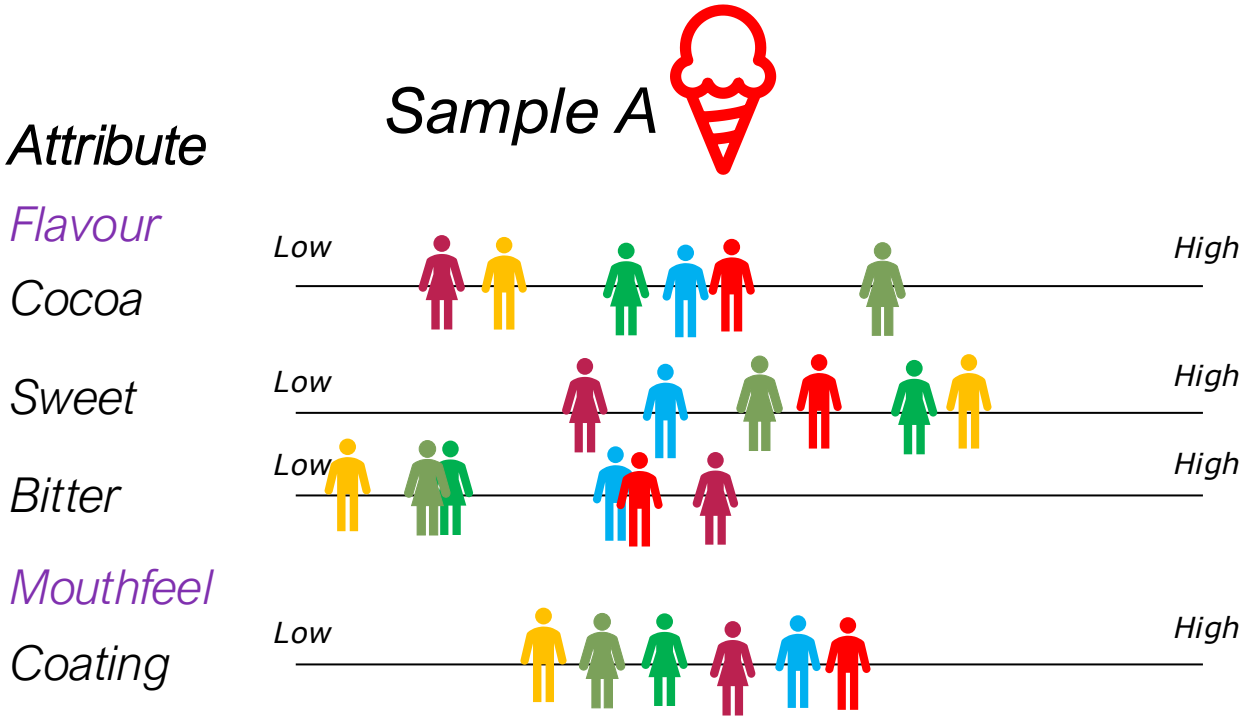
Free Choice Profiling (FCP)

Spectrum Descriptive Analysis™

*Each method has limitations*

Descriptive (Profiling)

# Sensory Profiling



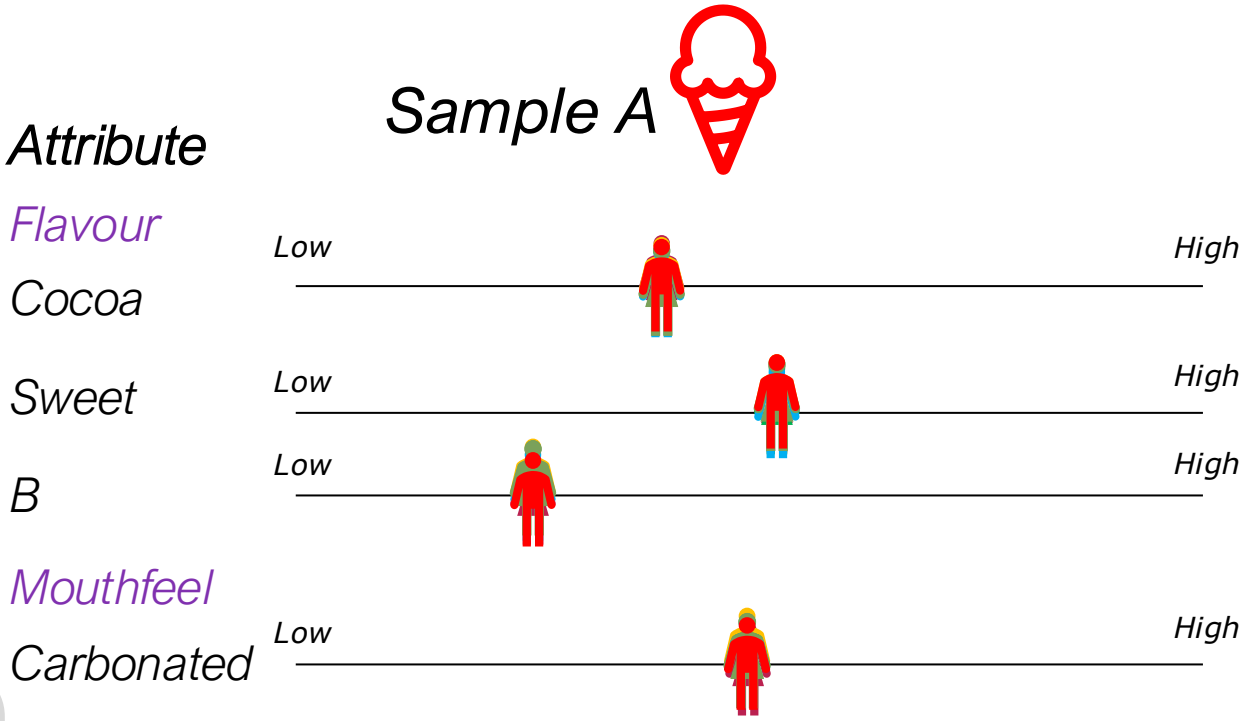


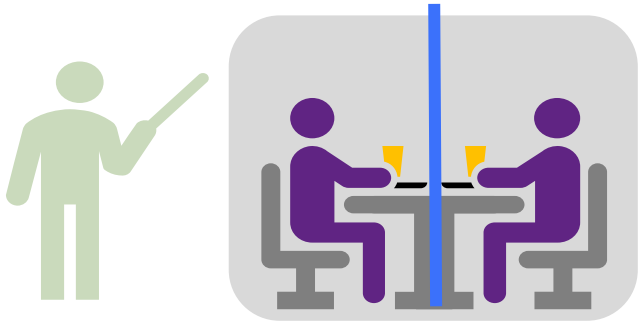



Campden BRI

Descriptive (Profiling)

# Sensory Profiling



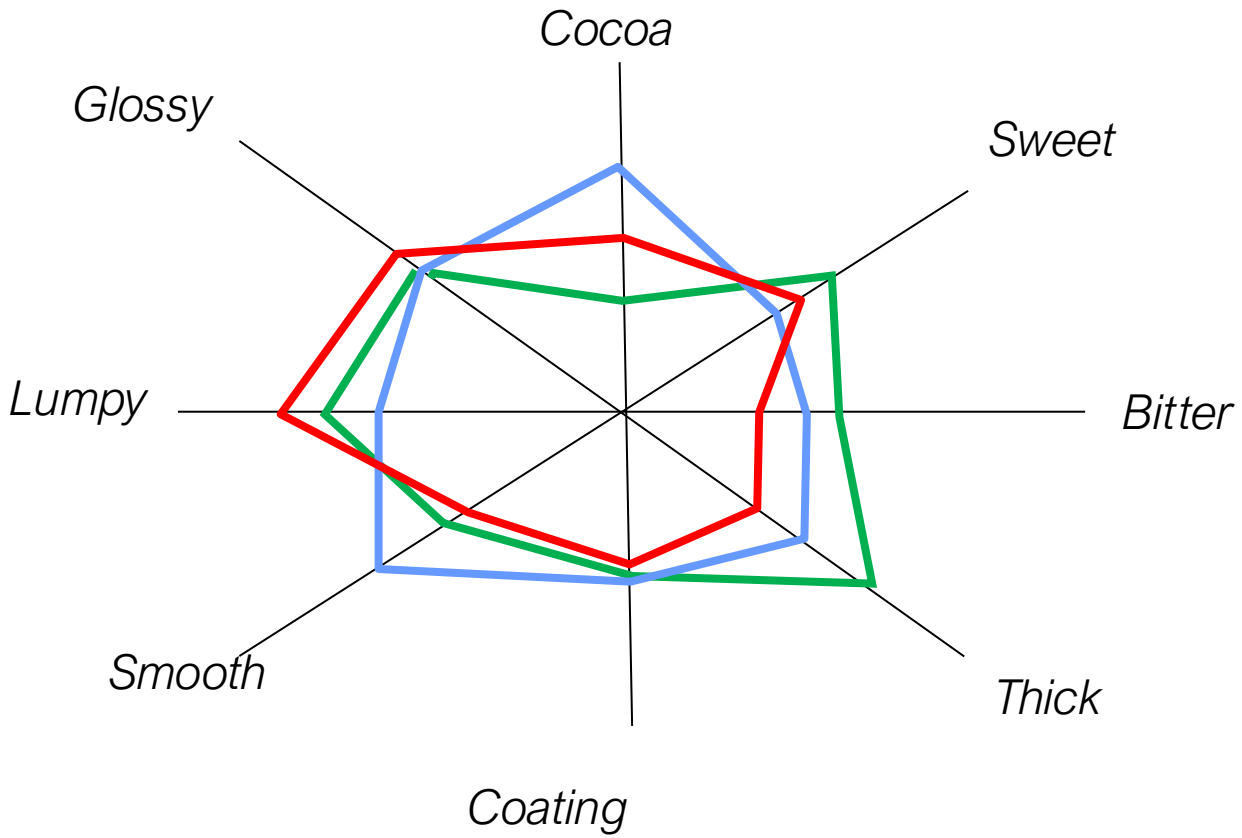





Campden BRI

Descriptive (Profiling)

# Sensory Profiling



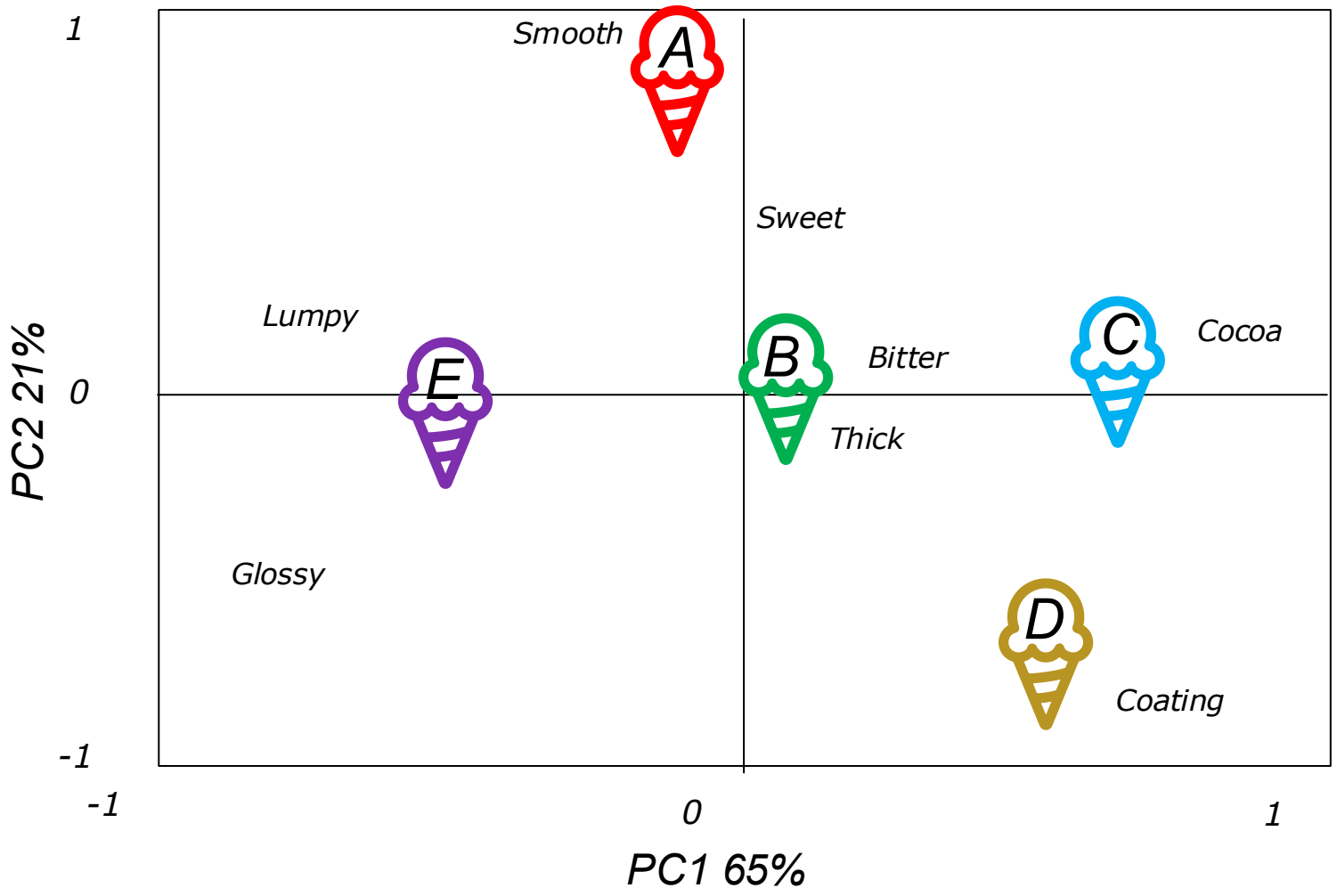






Campden BRI

# Combining Consumer & Sensory Data






Campden BRI

*Descriptive (Profiling)*

# Rapid Methods

These are usually desired for faster data capture for project work to be more cost effective, so decision making can be quicker.

- Napping
- Partial Napping
- Sorting
- Hierarchical Sorting
- Data analysis is more complex than conventional profiling

*Descriptive (Profiling)*

# Temporal and Dynamic Methods

*Perception can be measured over time*

- TI - Time Intensity
- TDS – Temporal Dominance of Sensation
- Progressive Profiling
- TCATA – Temporal Check All That Apply
- TOS – Temporal Order of Sensations

# Instructions - TCATA

1. Click **Start** when you place the piece of chocolate in your mouth.

2. Continuously **check** *and* **uncheck** words to describe the flavour of the sample as it changes throughout the assessment. During the test it is possible to select or deselect any attribute, some attributes may never be selected and some may remain selected throughout the assessment, others may be selected and deselected multiple times.

3. Continue with this until you have swallowed the sample. If you have not swallowed the sample when the timer ends please do so at this point. Then click ***next***.

**Sample: BC111**



Cocoa ???

Dairy ???

Caramelised ???

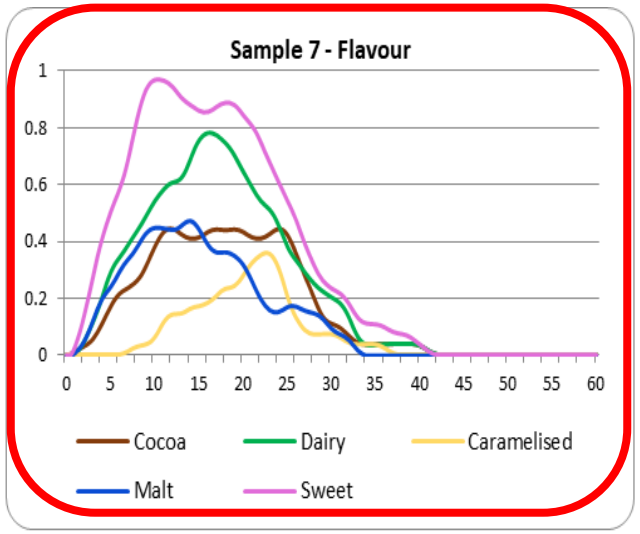
Malt ???

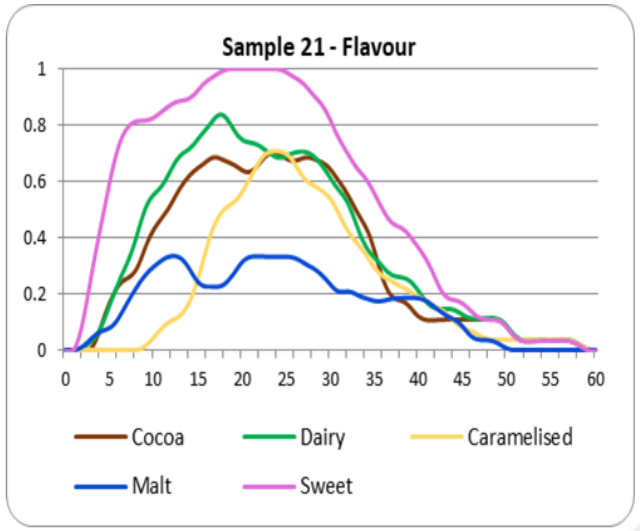
Sweet ???

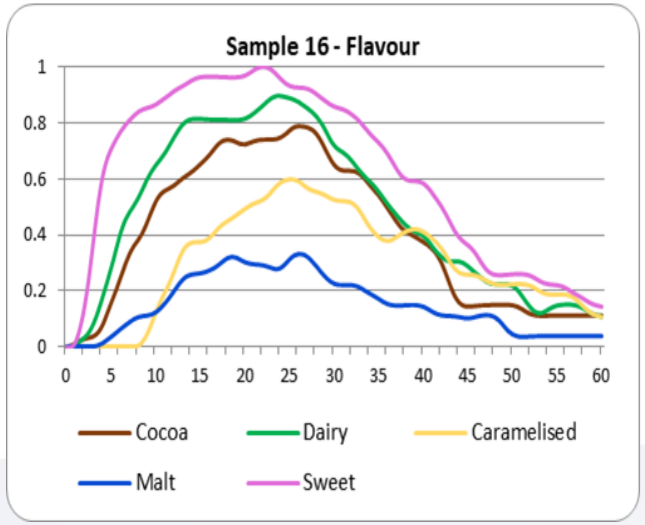


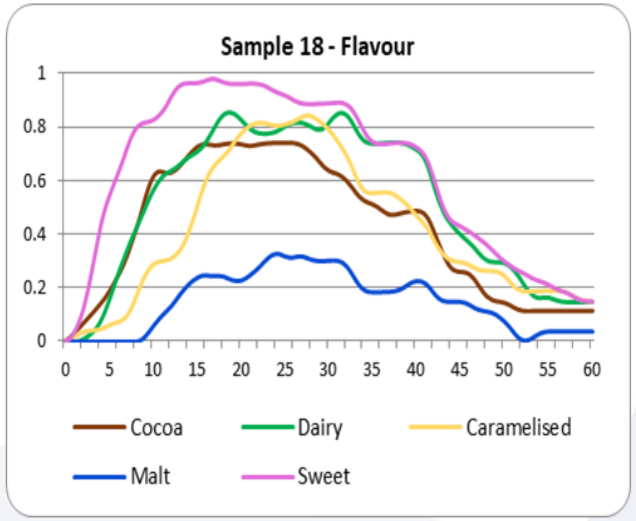
Campden BRI

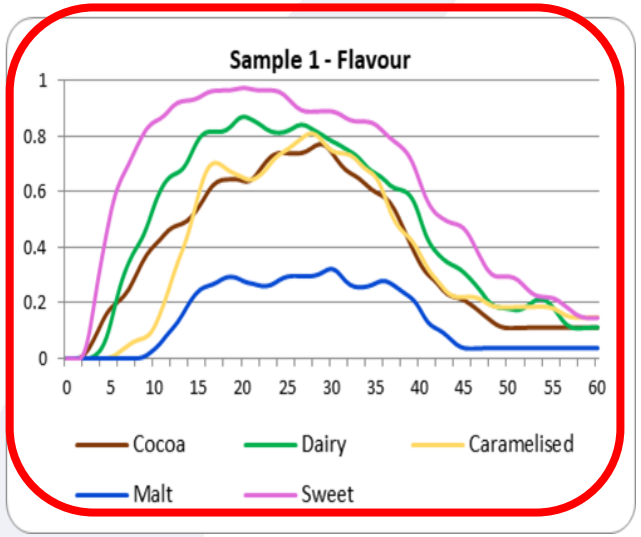
# Results



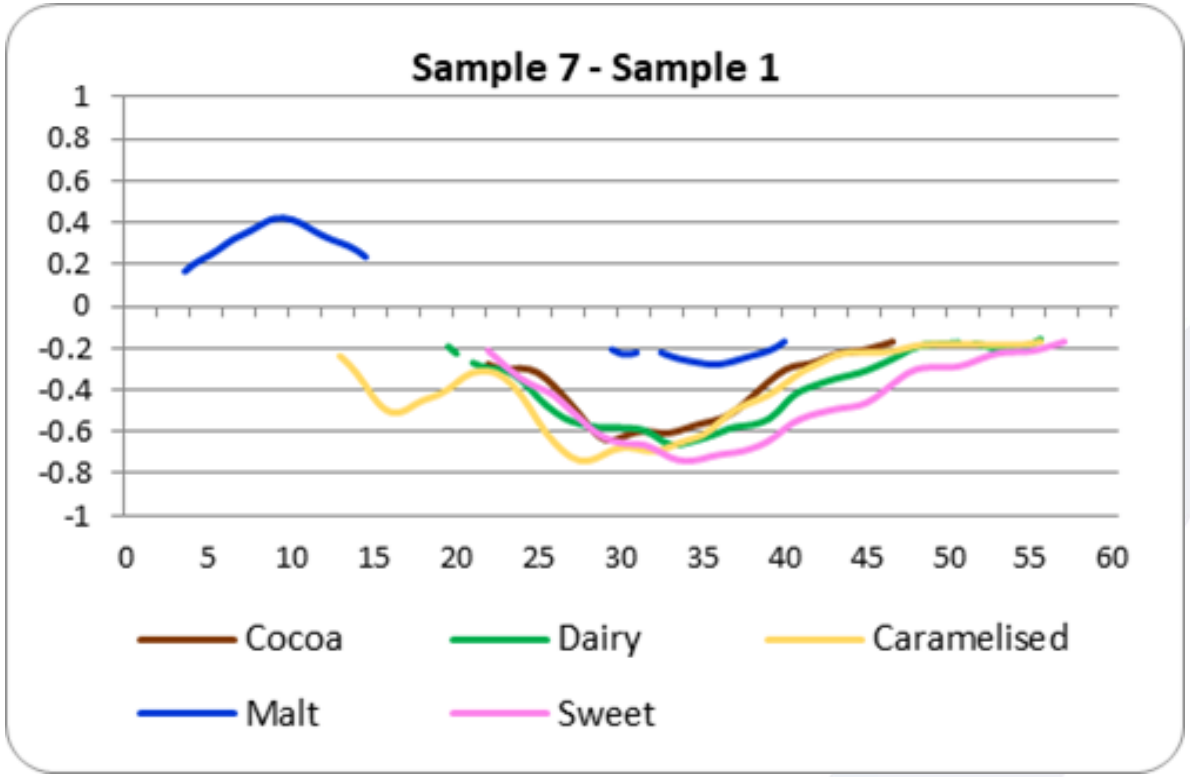






Campden BRI

# Results




Sample 7 has, compared to sample 1, significantly more malt flavour in the beginning, and significantly less of all attributes from the middle of the eat and onwards.



Campden BRI

*Descriptive (Profiling)*

# Applications of Descriptive Profiling

- Detailed understanding of the differences between similar samples
- Detailed understanding of the differences between competitor samples
- Defining the sensory properties of a target product
- Defining the characteristics for QA/QC and R&D applications – QAS development
- Describing product attributes prior to consumer testing

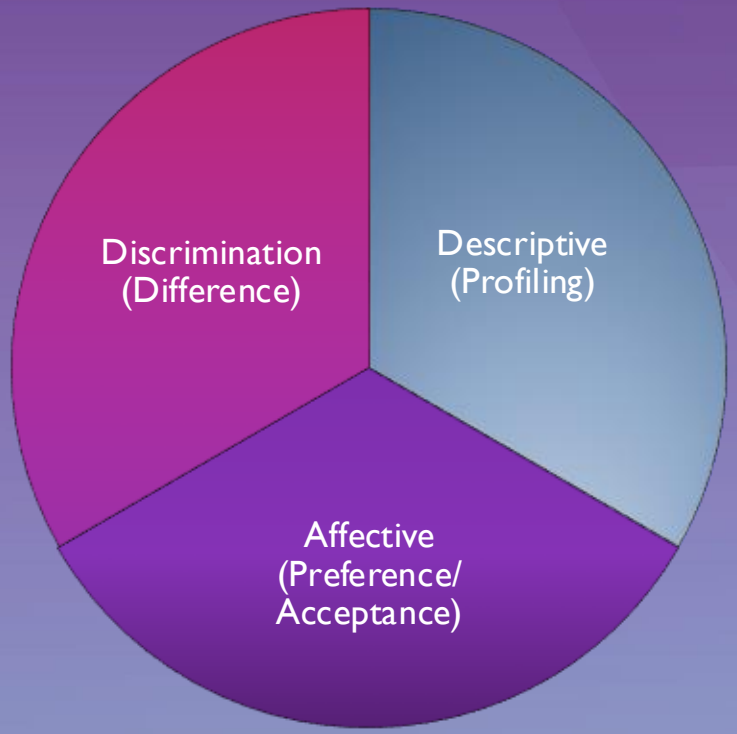
# Types of Sensory Tests

*"Does a sensory difference exist between my samples ?"*

- *Directional*
- *Non-Directional*

*"What is the nature of the differences between my samples ?"*

- *Profiling*
- *Holistic*




*"Which sample is most acceptable or most preferred?"*



Campden BRI

# Key consumer methods to reduce risk within NPD

Co-creation & Focus Groups

- Identify unmet needs, consumer frustrations and emerging opportunities.
- WHY? - Reduces the risk of developing products that fail to solve a meaningful consumer need.

Concept Evaluation (Product and/or Packaging )

- Quantifies consumer appeal, relevance, uniqueness and purchase intent.
- Assesses whether product claims / health benefits are clear, credible and motivating.
- WHY? Reduces the risk of progressing weak concepts with limited market potential.

# Key consumer methods to reduce risk within NPD

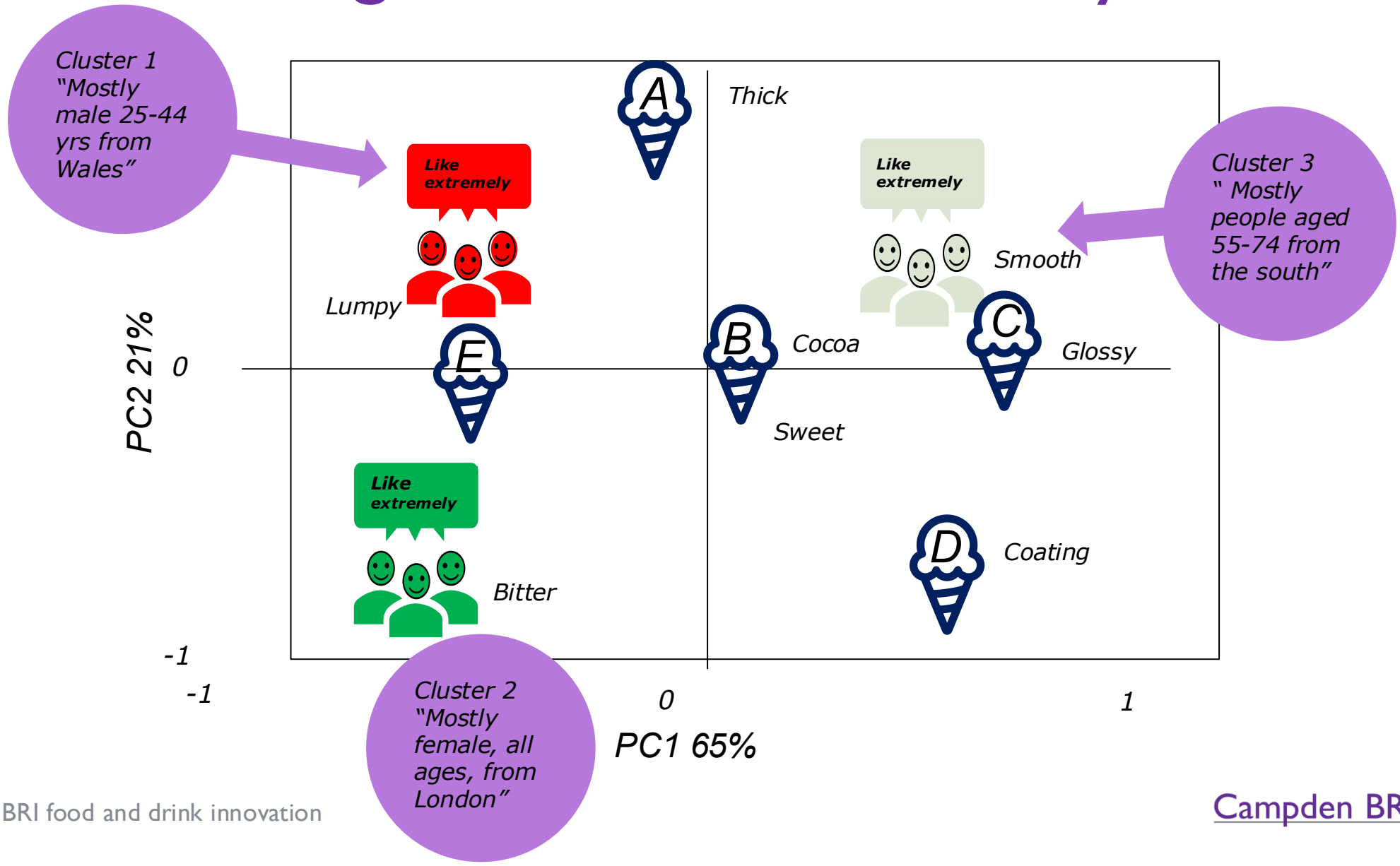
Consumer Taste Testing

- Confirms that sensory performance, functionality and overall product experience meets consumer expectations.
- Comparison of existing Vs new Vs competitors.  Controlled Vs real-world conditions.
- WHY? Reduces the risk of poor consumer acceptance at launch.

Drivers of Liking

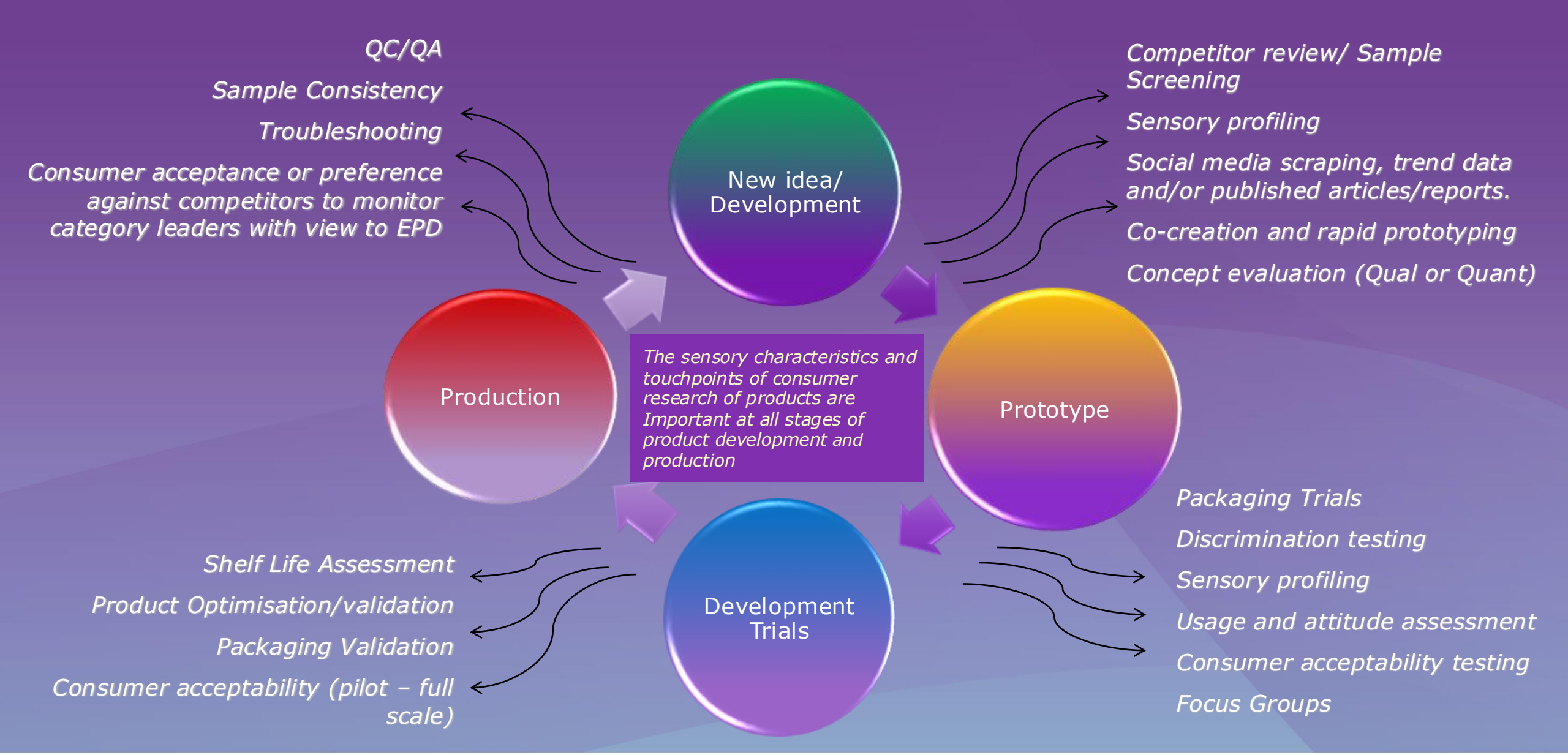
- Identifies which sensory attributes most strongly influence consumer liking and satisfaction.
- Provides clear direction for product optimisation.  **Consumer & sensory combined.**
- WHY? Reduces the risk of developing recipes/products that do not drive consumer choice or differentiate in the marketplace.

# Combining Consumer & Sensory Data






Campden BRI


QC/QA
Sample Consistency
Troubleshooting
Consumer acceptance or preference against competitors to monitor category leaders with view to EPD
New idea/ Development
Competitor review/ Sample Screening
Sensory profiling
Social media scraping, trend data and/or published articles/reports.
Co-creation and rapid prototyping
Concept evaluation (Qual or Quant)
Production
The sensory characteristics and touchpoints of consumer research of products are Important at all stages of product development and production
Prototype
Shelf Life Assessment
Product Optimisation/validation
Packaging Validation
Consumer acceptability (pilot – full scale)
Development Trials
Packaging Trials
Discrimination testing
Sensory profiling
Usage and attitude assessment
Consumer acceptability testing
Focus Groups



Campden BRI

# Any questions?

sue.purcell@campdenbri.co.uk

© Campden BRI 2026

Campden BRI
food and drink innovation