

Importance of the sensory and consumer methods for food businesses

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Objectives

1. Highlight the role and best practice of Sensory Analysis
2. Overview of most frequently used sensory methods
3. Give a hint about novel approaches in consumer and sensory science

Sensory Evaluation - Definition

'scientific discipline used to evoke, measure, analyse and interpret reactions to stimuli perceived through the senses'. *

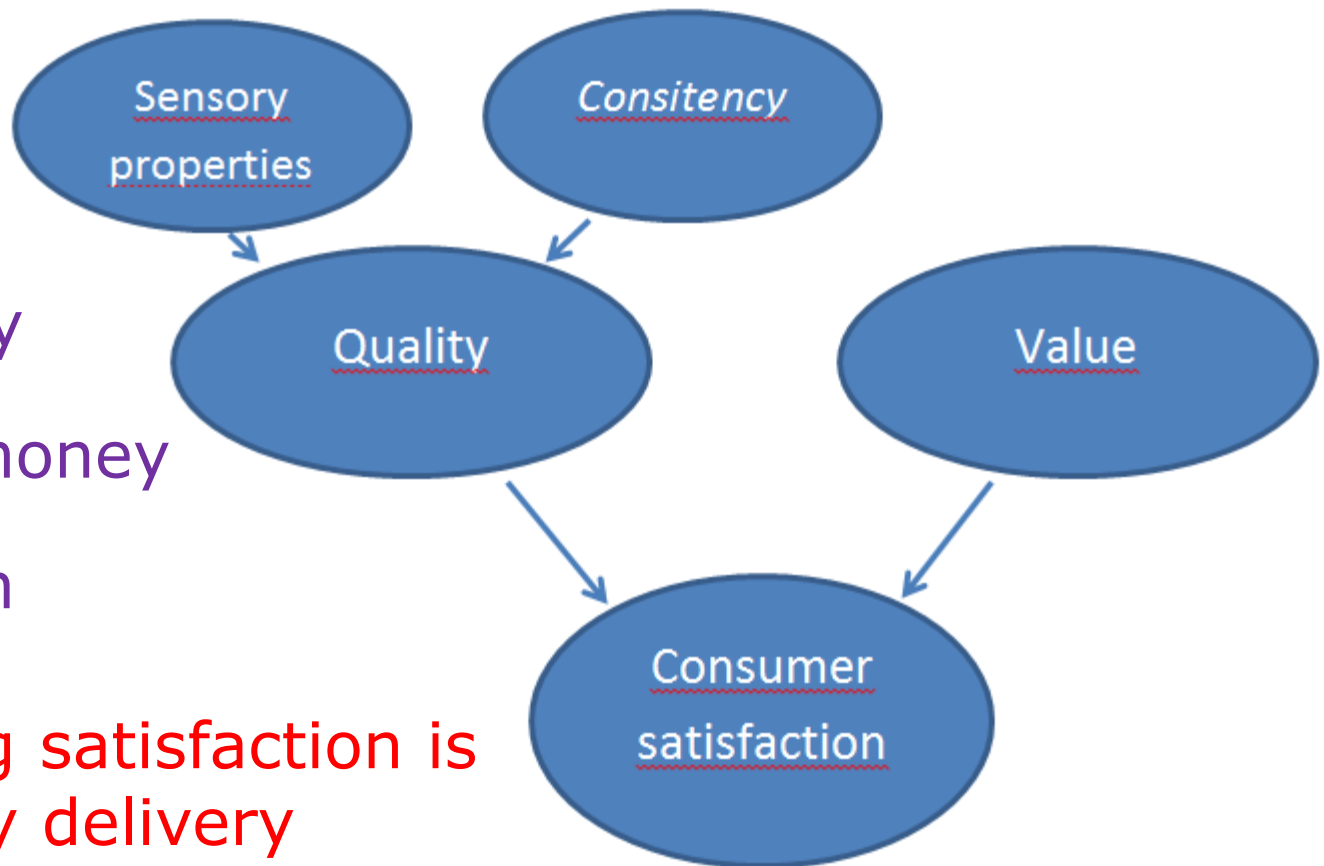
The sensory properties of food/drink products are a major factor in ensuring product success

* ASTM 253-04a, *Standard Terminology relating to Sensory Evaluation of Materials and Products*, 2000

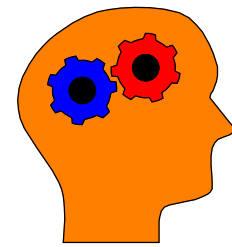
Why do consumers continue to purchase products?

- Quality
- Consistency
- Value for money
- Satisfaction

Underpinning satisfaction is sensory delivery

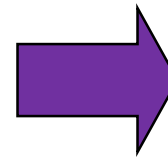


Introduction



- Tasting sessions are carried out in almost every food company e.g.:

- Quality control
- Product development
- Research



It has numerous applications, provides input into a lot area!



- Informal tasting environment may provide ad hoc opinions, observation and comments.
 - But lack of structure and right methodology makes it quite wrong environment for collecting reliable information.
- Can it support major decisions????

Achieving scientific control – Apply GLP



- Define test objective
- Define test type
- Select right assessors
- Ensure right test area (light & air quality, noise, space)
- Handle and prepare the sample in appropriate way
- Pay attention to test set-up, written test method and procedure
- Store your and archive documents safe and in logical order.

Rules

Resources

Quality assurance

**Test and
reference items**

Documentation

*This will help you to
eliminate biases*

Why use People?



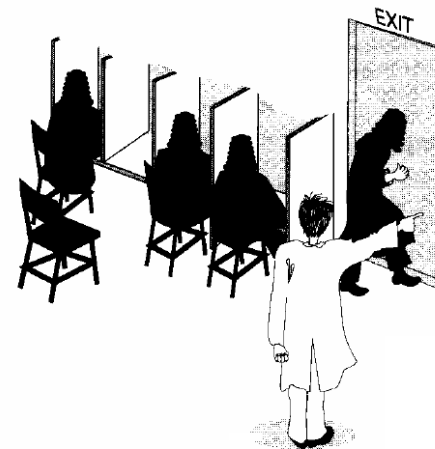
- No instrument available to measure sensory quality
- Relatively easy to train
- Rapid response, easy to interpret
- Provides quantitative and qualitative info



All drawings: Ulla Dymes - Matforsk

Why Screen Assessors?

- People are all different
 - physiologically and psychologically
- To identify impairments (*ISO 8586:2012*)
 - training cannot correct deficiencies
- To determine sensitivities (*ISO 3972:2011.*)
 - especially with regard to taint identification
- To evaluate ability (*ISO 8586:2012*)
 - to verbalise perceptions and to communicate them



All drawings: Ulla Dymes - Mattforsk

A large, light grey, curved swoosh that starts from the left edge and curves upwards and to the right, framing the central text.

TEST YOURSELF!

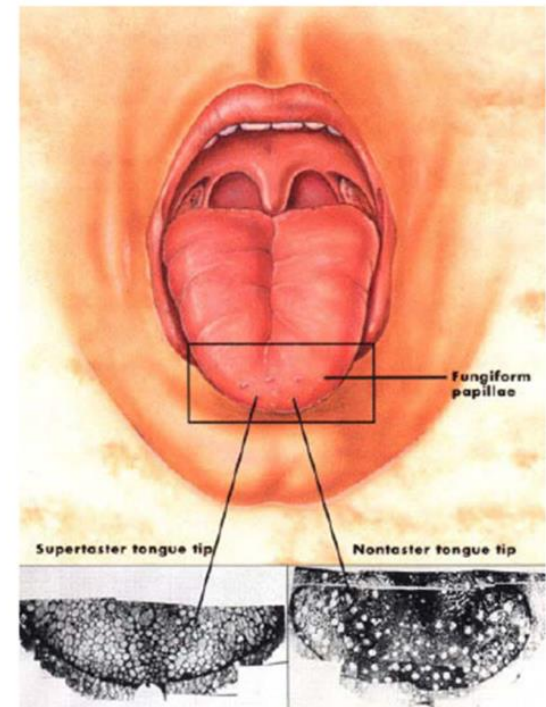
PROP test

Based on Propylthiouracyl (PROP) the people can be categorized as:

- Non-tasters
- Medium tasters
- Super-tasters

„Supertasters”:

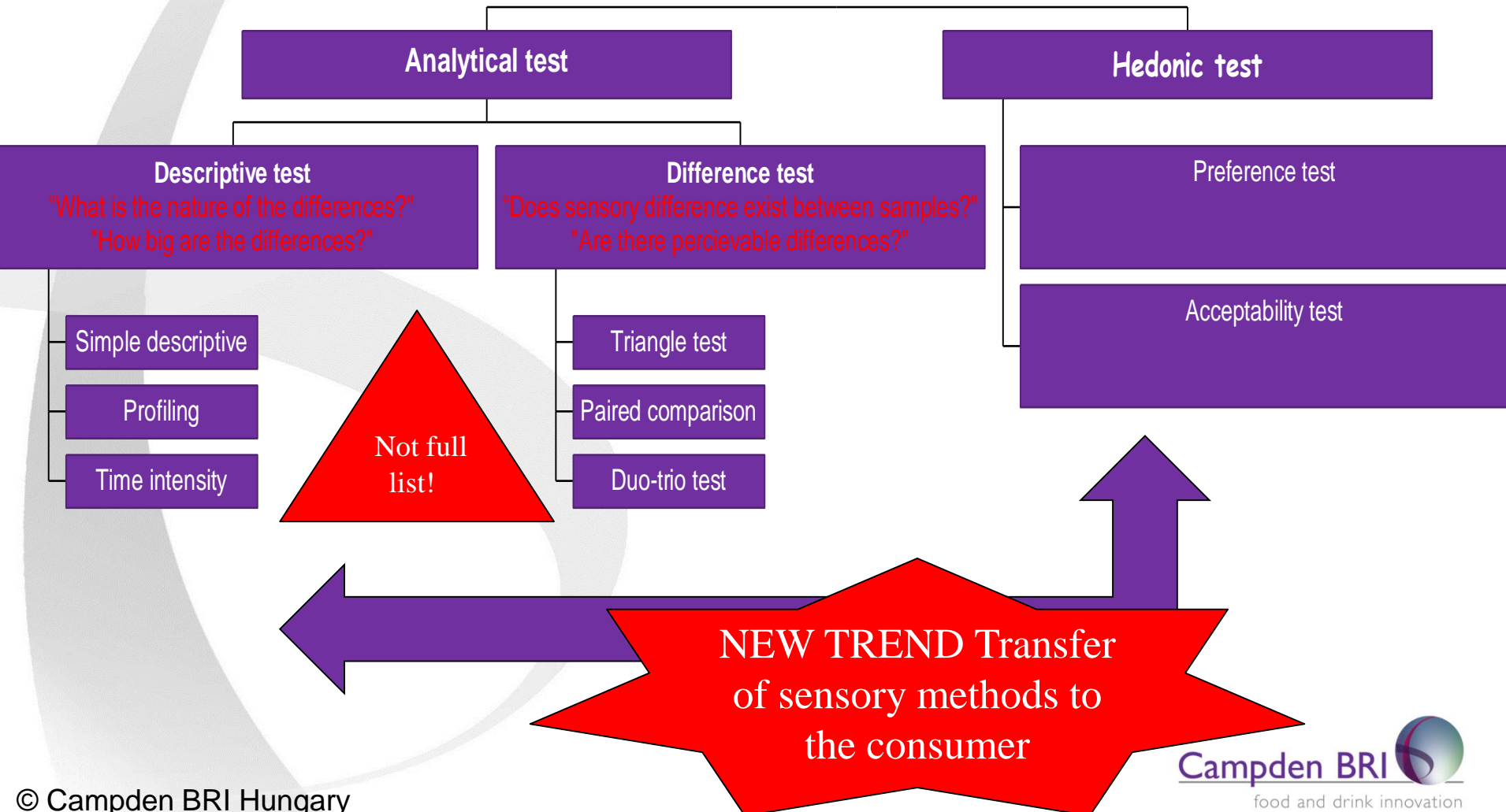
- Has more papillae
- In Europe the 25% of the people are PROP Taster
- Women & Children are more sensitive



Photos courtesy of Linda Bartoshuk, Ph.D. Yale. Illustration by Lydia Kibiuk.

Methods for sensory analysis

Most frequently used sensory test procedures



Applications of Difference Tests

- Assessing the **effect of changes** in raw material, process and or packaging on finished product quality
- Investigating the **presence of off-flavours and taints**
- Determining changes in product **quality over shelf life**
- Verifying **changes to formulations** during product development

Applications of Descriptive Profiling

- The effect of a **manufacturing process change** (e.g. ingredients, temperature) on the sensory characteristics of the product
- Defining the **sensory properties** of a target product for **new product development**
- **Describing product attributes** prior to consumer testing
- Defining the **characteristics (specification)** of a control or standard, for QA/QC and R&D applications

Example for Descriptive Profiling

BG



Residue in mouth

Hardness

DHA



Crispiness

Fish flavour

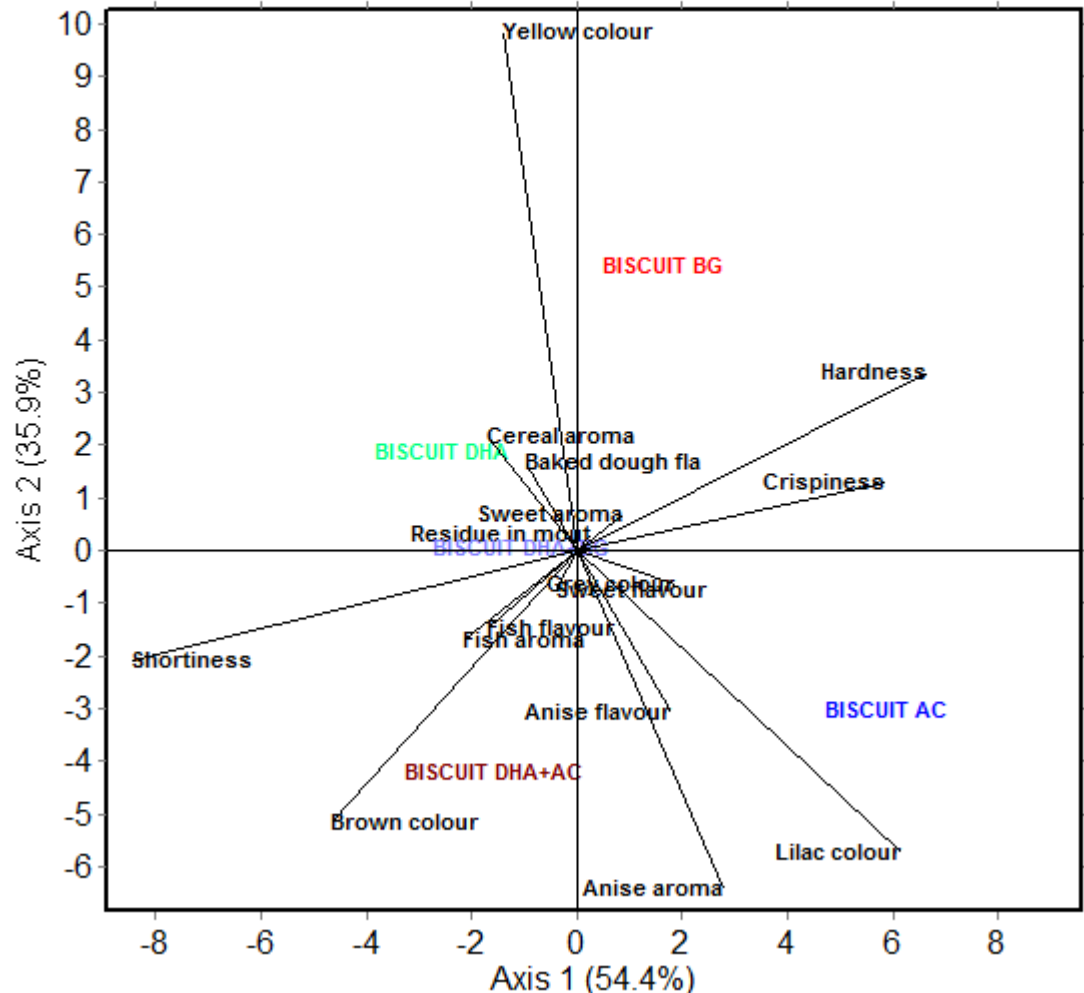
Anise flavour

Balanced

Tukey HSD, 5%

Sample	Mean	Groups
BISCUIT DHA	4.57	A
BISCUIT DHA+AC	3.93	BC
BISCUIT AC	3.79	BC
BISCUIT DHA+BG	3.29	C
BISCUIT BG	2	D

P.C.A. of means Pdt./Att.
Plane 1 - 2 BiPlot constant: 15.46582



The Role of Sensory in Quality Control

- How does the **product** meet the company specifications with respect to sensory quality?
- How does the **sensory quality** fit in with the total quality of the product?
- What **variation in quality** is to be expected?

Requirements of any system that is going to be applied to a production environment:

Rapid, Uniform, Simple, Reliable, Valid



Key Stages

- Define a **realistic target product** -Consumer or in-house focused
 - Key sensory characteristic
- Establish a viable **acceptance range**
 - Limits of consumer tolerance
- Select and **train assessors**
- **Standardize and document procedures**, action plan in place

Example for Quality Control



Eyes

Cornea: Clear

Score = 0

Form: concave

Score = 0



Gills

Colour : Blood red

Score = 0

Mucus: Clear

Score = 0



Eyes

Cornea: milky

Score = 2

Form: sunken

Score = 2



Mucus:

Discoloured, clotty

Score = 2

Quality Index Method

Sensory Evaluation of Fish Freshness,
Emilía Martinsdóttir, Kolbrún Sveinsdóttir,
Matis, Iceland

Appearance	Depth of Colour	0	1	2	3	4	5	6	7	8	9
	Gloss	0	1	2	3	4	5	6	7	8	9
	Presence of Cracking	0	1	2	3	4	5	6	7	8	9
	Presence of air bubbles	0	1	2	3	4	5	6	7	8	9
Odour	Intensity of chocolate aroma	0	1	2	3	4	5	6	7	8	9
	Intensity of nut filling aroma	0	1	2	3	4	5	6	7	8	9
	Off odour	0	1	2	3	4	5	6	7	8	9

Quality ratings methods with targets



New approaches

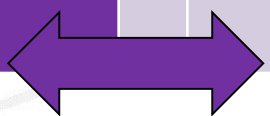
Transfer of sensory methods to the consumer

- Product characteristics from the consumers' perspective
 - Penalty analysis
 - Napping –rapid method
 - Temporal methods
- Measuring product shelf-life with consumers
 - Survival analysis

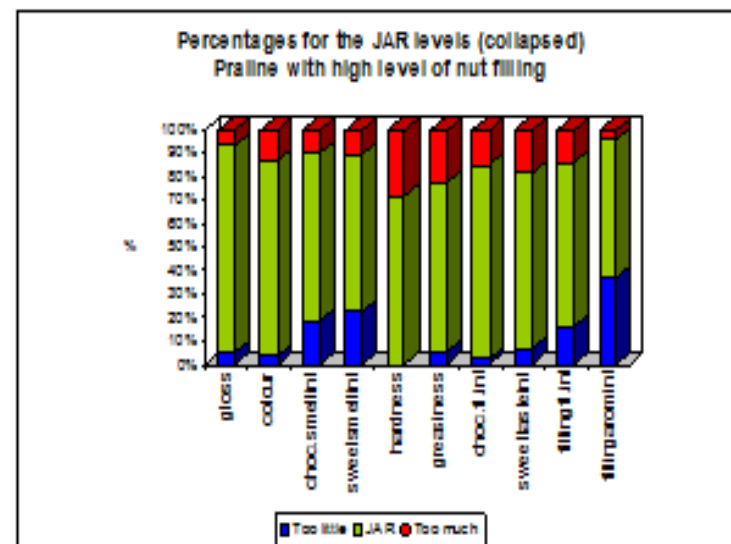
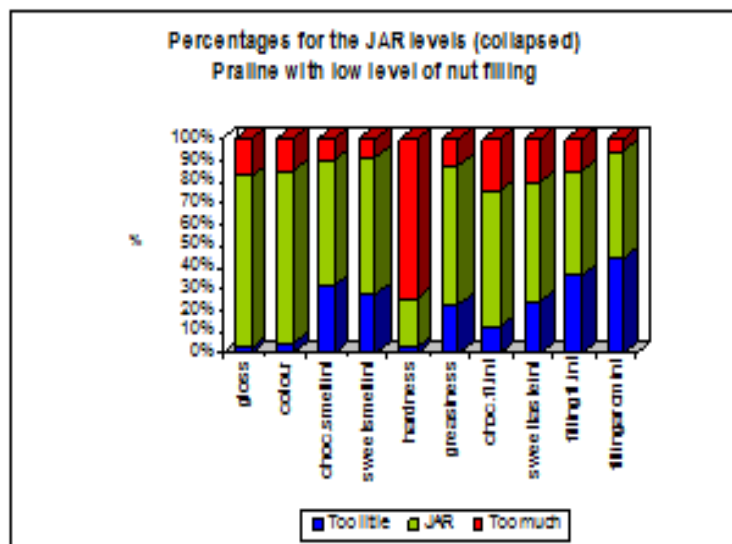
Penalty Analysis – Attribute diagnostics

- In consumer surveys **diagnostic attributes** frequently applied
- Penalty analysis is a way to analyse the JAR data in order to **quantify and hierarchize the impact of sensory characteristics** on the overall liking of the product..

Hedonic Liking Scale		Just About Right Scale „DIAGNOSTIC ATTRIBUTES”		Collapsed Scale Definition
9 Like extremely 8 Like very much 7 Like moderately 6 Like slightly 5 Neither like or dislike 4 Dislike slightly 3 Dislike moderately 2 Dislike very much 1 Dislike extremely		5 Much too much/too strong 4 A little too much/too strong 3 Just about right 2 Not quite enough 1 Not enough		Too much/too strong Just about right Not enough



Example of Penalty analysis

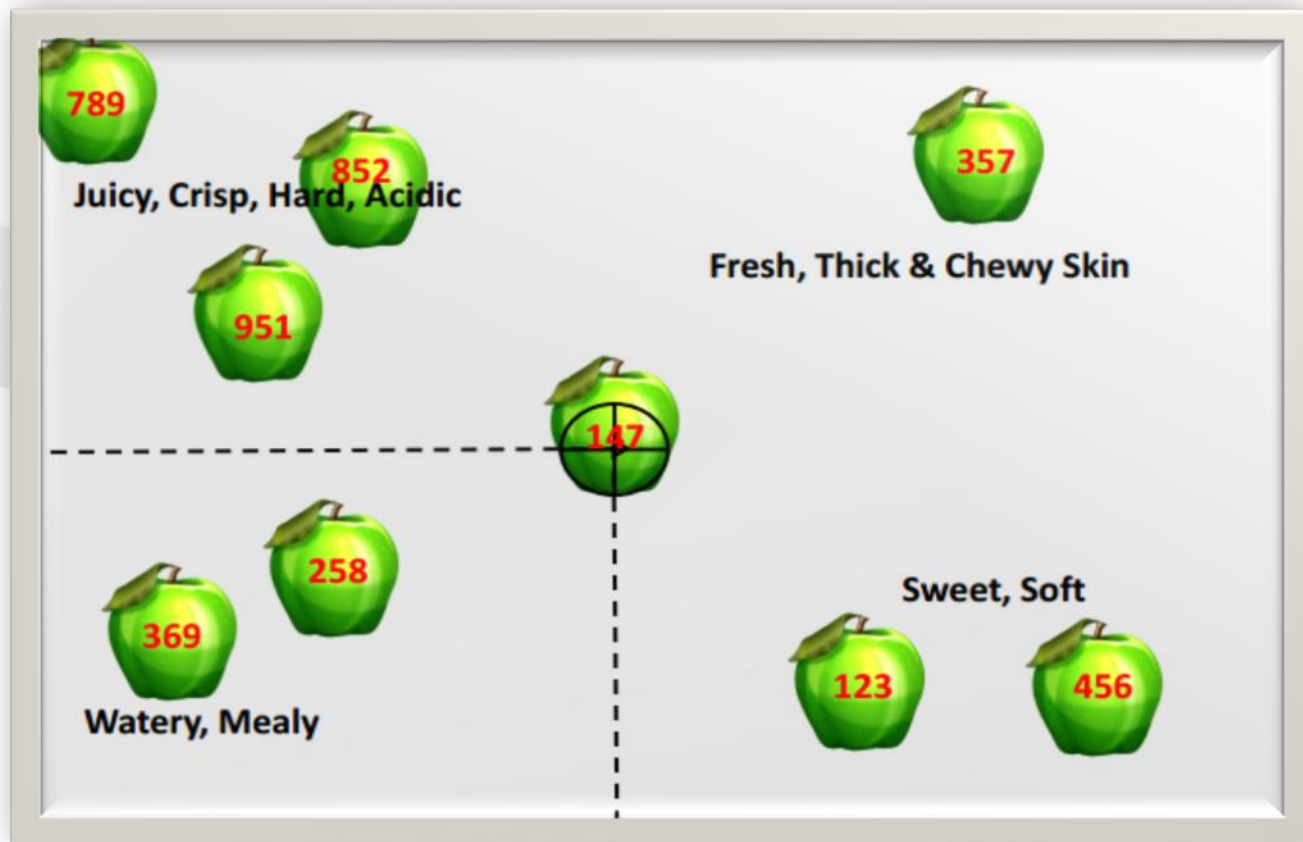


Attribute	%	Mean drops	Total penalty
Too hard	74.2	1.1	81.2
Too weak filling fl.	36.7	2.1	77.2
Too weak filling ar.	44.2	1.5	65.9
Too weak sweet fl.	24.2	1.99	48.2
Not greasy enough	22.5	1.8	41.4
Too weak choc ar.	31.7	1.2	39.3
Too weak sweet ar.	27.5	0.8	20.8

Attribute	%	Mean drops	Total penalty
Too weak filling ar.	36.7	1.2	42.9
Too hard	28.3	0.7	19.0
Too greasy	22.5	0.9	20.9

Rapids methods - napping

Projective napping with consumers for **quick identification overall differences and similarities** between a set of product samples.



Ref: Sarah Gough , June 2011, Sensory Dimensions

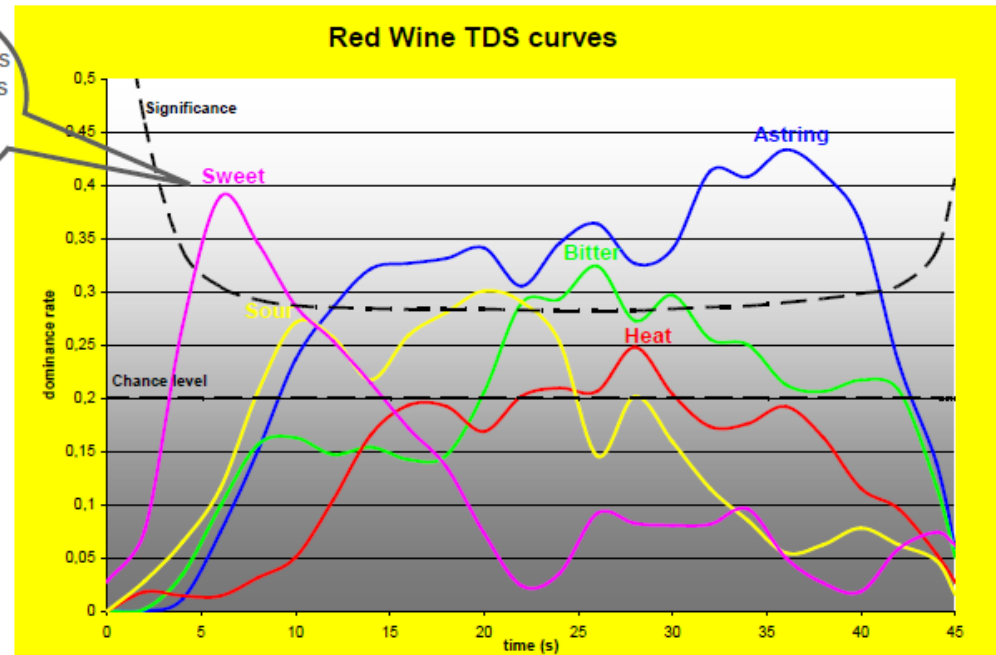
Temporal –methods -Temporal dominance of sensation (TDS)



Complex profile?
Changing with
time?

This wine is first **sweet**,
than **sour** and finally
dominated by a strong
astringency and some
bitterness

At 6 seconds,
39% of the subjects
perceived sweet as
the dominant
sensation in this
wine



Ref.: Pascal Schlich (INRA), Centre des Sciences du Goût et de
l'Alimentation
schlich@dijon.inra.fr

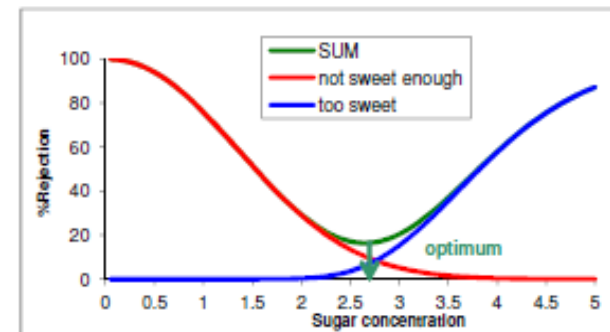
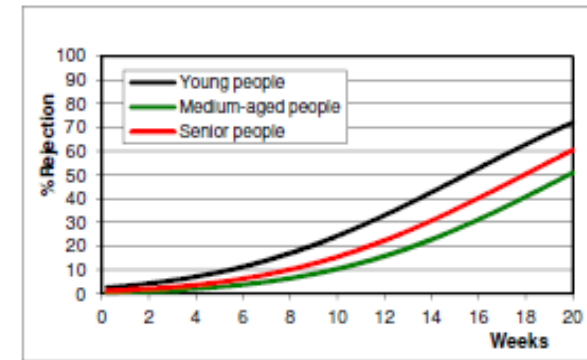
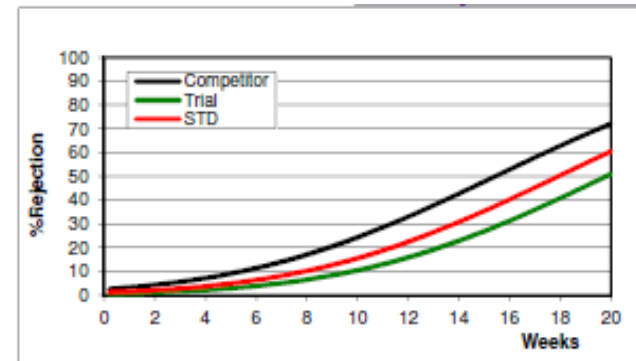


Survival analysis – measurement of shelf life with consumers

- How much can my product change before consumers reject it???
- Shelf-life estimation of 1 or several formulations of a product using consumers
- Modelling/predicting the % of rejection by consumers, from production to end of life
- Applicable when quality changes rather than microbiological safety are the deciding factors

Examples of survival analysis

- Advantages
 - Taps into direct consumer experience, with simple questions
- Applications
 - To confirm current shelf-life
 - When relying on consumers is preferred or when trained panel is not available
 - Can distinguish between various formulations



Ref: Marleen Chambault, Campden BRI
(Chipping Campden, UK)

Take home messages -Minimise biases and calibrate your instrument!




- For assessing the sensory quality of the products the reliable and objective sensory analysis is essential.
- Invest into the training of you assessors because are our measuring instruments! – The invested money, time and energy will pay back!

Take home messages – Get to know your consumers and their needs!



- The new consumer evaluation techniques contribute to the better understanding of consumers' needs
- Make use of the opportunities of new sensory and consumer research techniques!
- For the successful implementation of consumer tests it is essential to follow standardized & controlled protocol.

Conclusion

- For each testing situation is very important:
 - To identify right objective
 - To choose the right method.

Or your results will not be meaningful!
- Keep the all variables under control
 - To ensure that differences detected during sensory test, coming from the product.

Thank you for your attention!



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References and further readings

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