

Sensory research for the food industry

- what's new?

“Key Customer Day” - 20 April 2018

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Sensory research for the food industry

Whats new?



- Sensory Research Unit
- Examples
 - Beef Benchmarking Project
 - Lamb Benchmarking Project
- Future directions



Sensory science at AFBI

- Trained, lay and consumer panels
- BS and ISO methods and ISO 9001 accreditation.
- Biometrics
- Links to instrumental analyses of flavour, texture and appearance



Practical applications

For industry:

- **Product development**
 - new products/recipes, changes in formulation, etc.
 - New lamb recipes, novel health drinks, etc

Practical applications

For industry:

- **Quality control**
 - products, raw materials
 - Assessing and training of Q/A staff
 - Development of Q/A product sheets
 - Dairy industry and fruit and vegetable sector

Practical applications

For industry:

- **Problem solving**
 - off-flavours, production problems
 - Identifying possible taint sources
 - Dairy, meat and beverage companies
 - Packaging industry



Practical applications

For industry:

- **Benchmarking**
 - Comparing with the competition
 - Major multiples and Lamb and Beef industry

Example 1: Beef Benchmarking Project

Commissioned by a major retailer

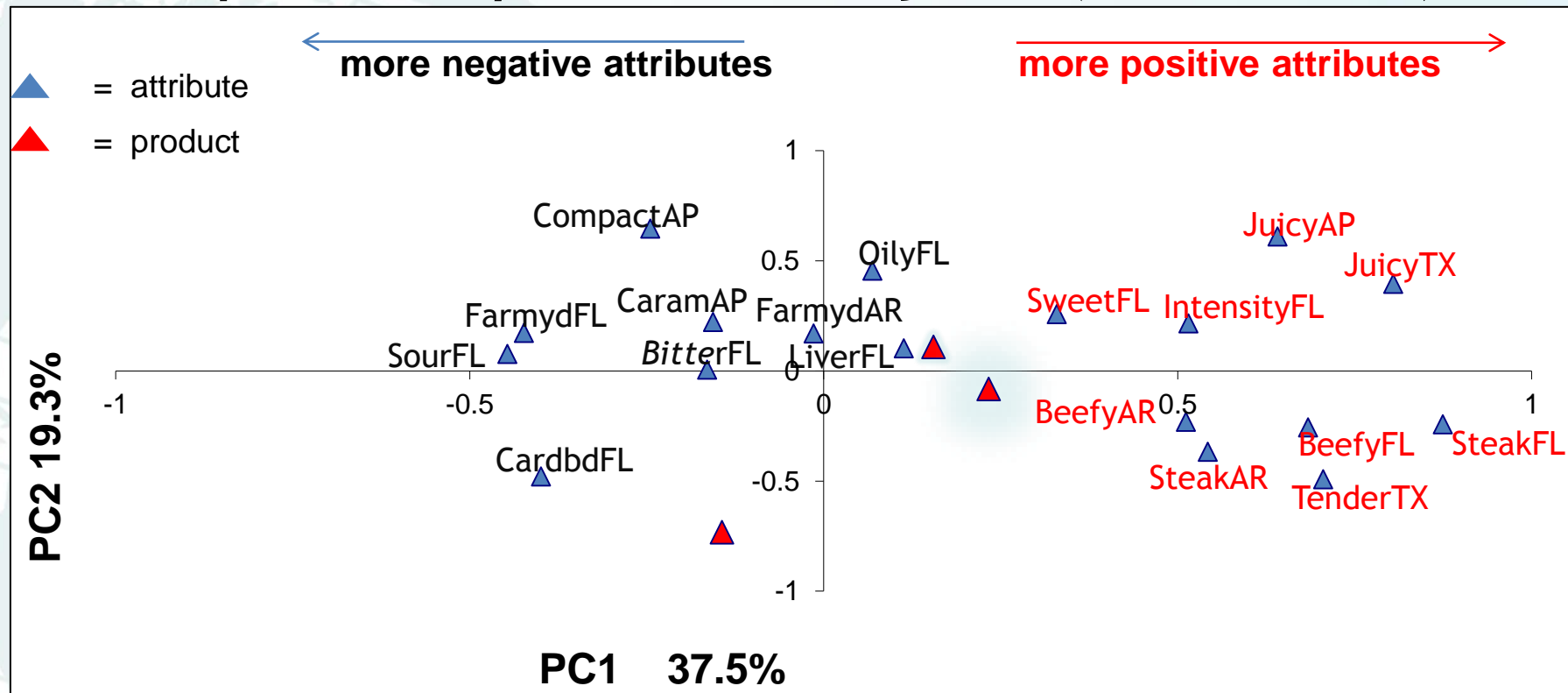
Customer Objectives:

- To **externally** benchmark their current sirloin steak products with three of their competitors
- To **internally** benchmark three of their own suppliers

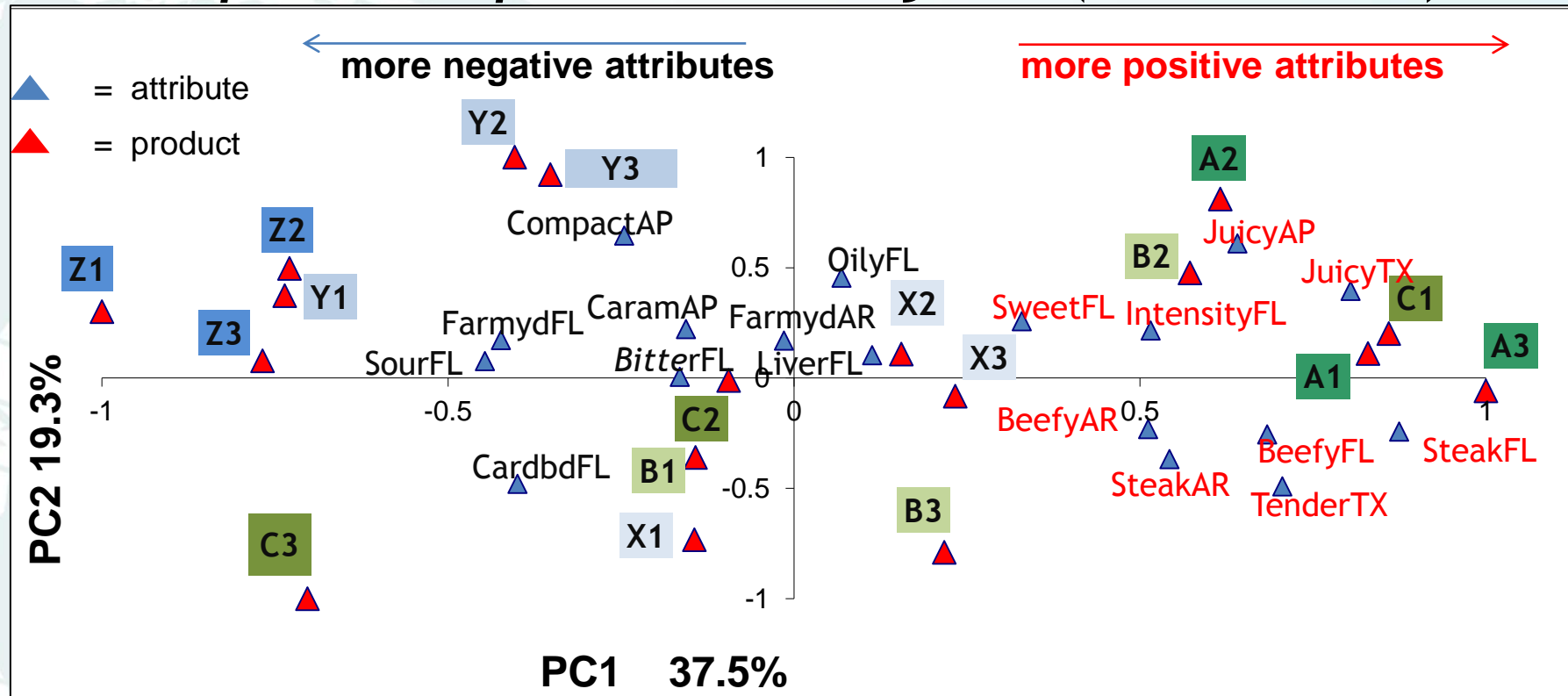
Experimental

- Three processors from within their own supply chain (A, B, C)
- ... and one from each of three competitors (X, Y, Z).
- Trained sensory profiling panel.
- Development of product lexicon.

Principal Component Analysis (PC1v PC2)



Principal Component Analysis (PC1v PC2)



A - C and X - Z are different sources of beef

Findings:

- There were significant differences between the customer's product and their competitors
- There were significant differences within the customer's own suppliers
- The quality of the meat from one supplier varied significantly over a 3 week sampling period.

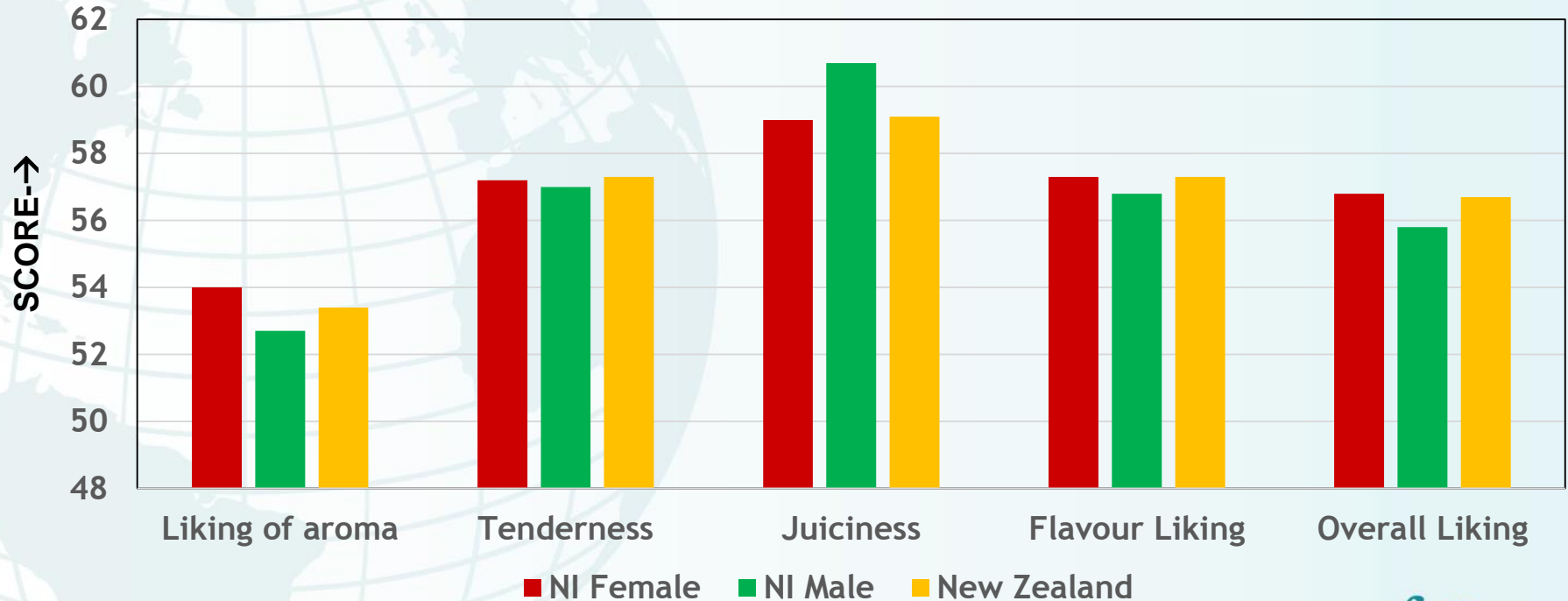
Example 2: Benchmarking of lamb

Commissioned by Northern Ireland Livestock and Meat Commission.

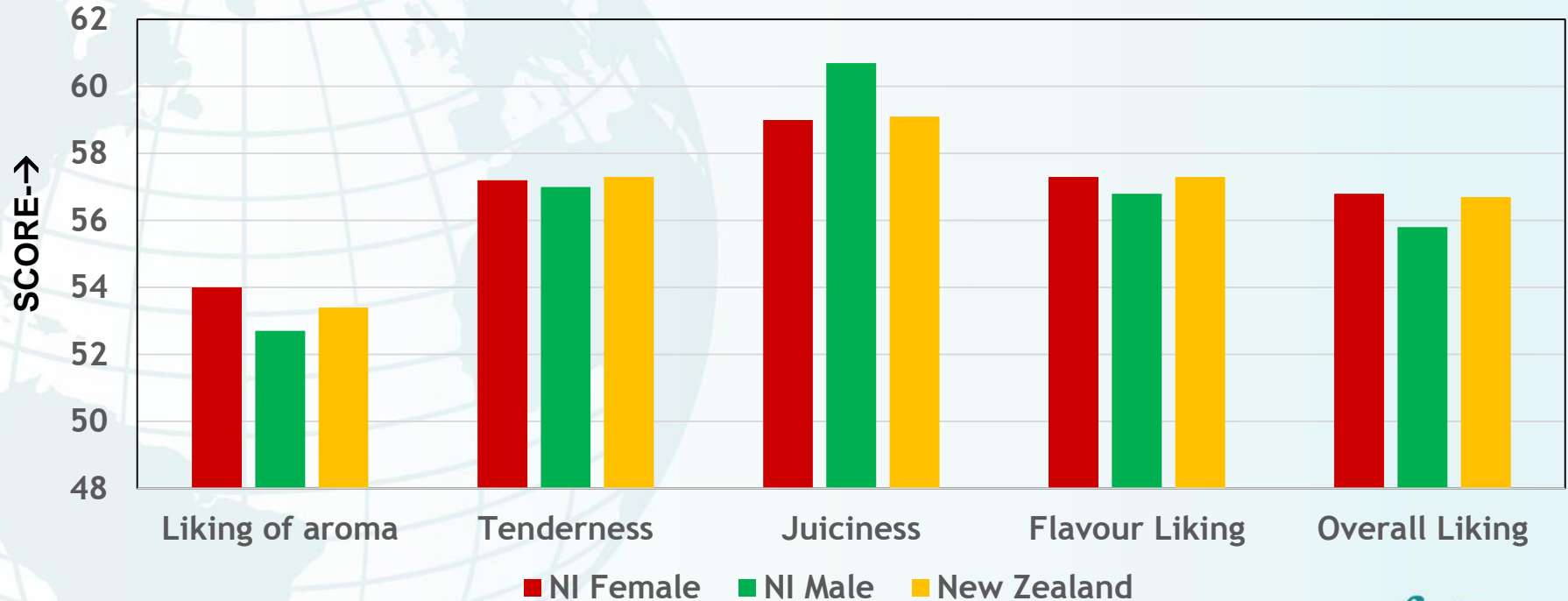
Objective: To compare the eating quality of lamb loin from Northern Ireland female lambs, entire male lambs and younger New Zealand sourced lambs.

Method: 120 consumers assessed six samples on the acceptability of aroma, flavour texture and overall acceptable.

Mean scores for hedonic assessments of lamb loin from three sources



Mean scores for hedonic assessments of lamb loin from three sources



No Significant Differences

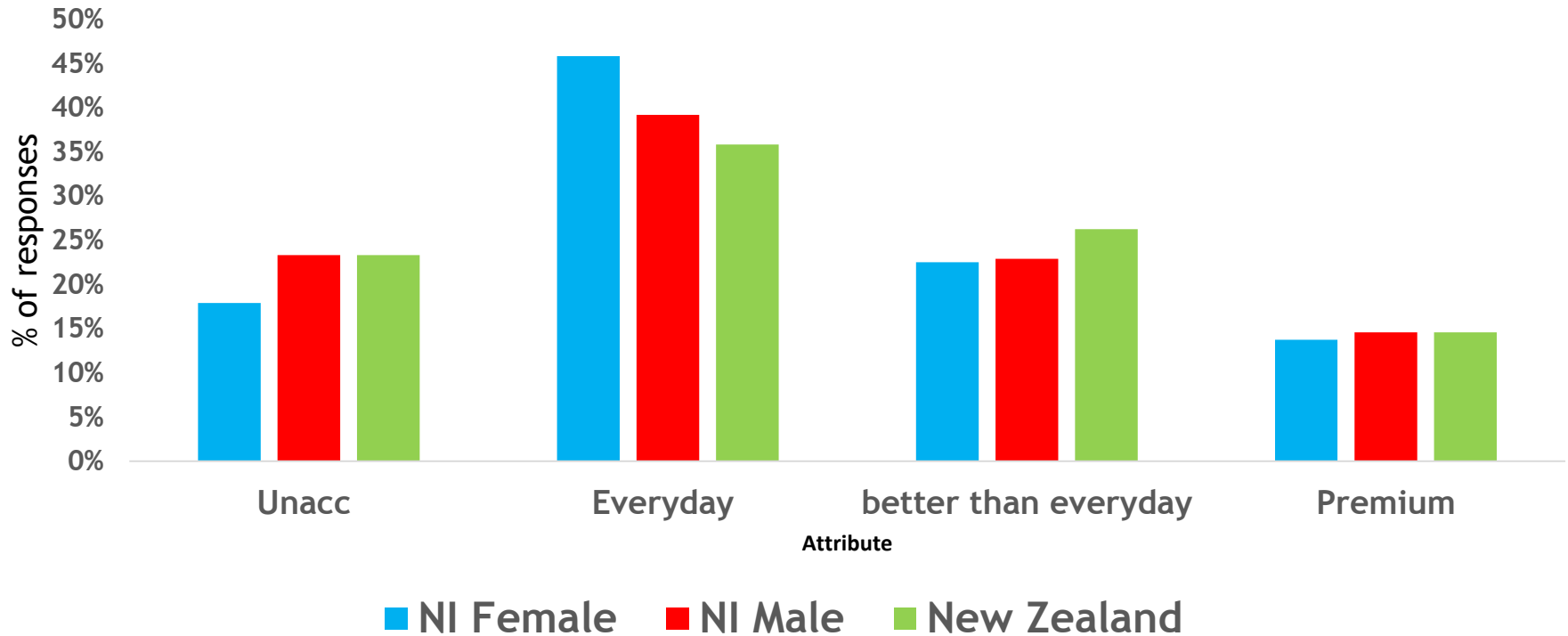
Percentage scores for each of the four satisfaction categories

A bar chart comparing the percentage of responses for four satisfaction categories across three groups: NI Female (blue), NI Male (red), and New Zealand (green). The Y-axis represents the percentage of responses, ranging from 0% to 50% in 5% increments. The X-axis lists the satisfaction categories: Unacc, Everyday, better than everyday, and Premium. The legend indicates that blue bars represent NI Female, red bars represent NI Male, and green bars represent New Zealand.

Attribute	NI Female	NI Male	New Zealand
Unacc	18%	23%	23%
Everyday	46%	39%	36%
better than everyday	22%	23%	26%
Premium	14%	15%	15%



Percentage scores for each of the four satisfaction categories



No Significant Differences



Findings:

Northern Ireland lamb harvested at just under 12 months, without ageing, was of equal acceptability to 4-6 month New Zealand lamb imported at the same date.



Future Directions

1. Multiple locations
2. e-Sensory
3. Temporal Dominance of Sensations

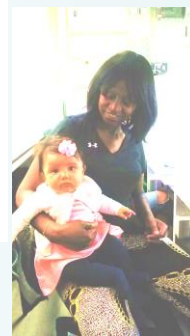
Future Directions 1: Multiple Locations

Development of links with University College Cork, Reading University and Harper Adams University

Consumer panels can be conducted at differing locations

- ☀ 3 x 120 consumers beef panels
- ☀ 2 X 128 consumers chicken panels





Future Directions 2: e-Sensory

The way forward ?

- Traditionally conduct “central location panels”
- Using controlled preparation and cooking procedures
- What if consumers assess samples in their home environment, preparing it the way they like it ?

e-Sensory trial on cheese.



Two cheese samples (T1+T2) were assessed using both

- AFBI Sensory Evaluation Unit (SEU)
- Home Use Testing (HUT).

Using an eight point scale from:

1 = extremely acceptable to

8 = extremely unacceptable

Acceptability scores comparing both SEU and HUT for the two cheese treatments

	SEU (40 Responses)		HUT (64 responses from 92)	
Acc of	T 1	T 2	T 1	T 2
Appearance	2.30	2.25	2.57	2.60
Aroma	2.34	2.46	2.81	3.19*
Flavour	2.44	2.75	2.88	3.63*
Texture	2.81	2.86	3.05	3.29
Aftertaste	2.42	2.65	2.96	3.51
Overall acc	2.54	2.71	3.01	3.57*

Findings:

Interestingly the results of the “home” assessors showed significant differences whereas there were no significant results with the central location test.

However the response rate was only around 66%

E-sensory would require a large number of consumers?



Future Directions 3:

“Temporal Dominance of Sensations” or TDS

A time intensity method which develops a
“*flavour release profile*” of the product.



Temporal Dominance of Sensations on a selection of chocolate bars

- 90% Cocoa
- 70% Cocoa
- Extra creamy
- Dark Chocolate with chilli

Response of 40 students

As you taste the sample click on the dominant attribute:

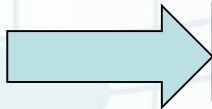
12-19s



Bitter

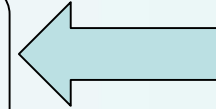
Creamy

19-30s



Spicy

Sweet



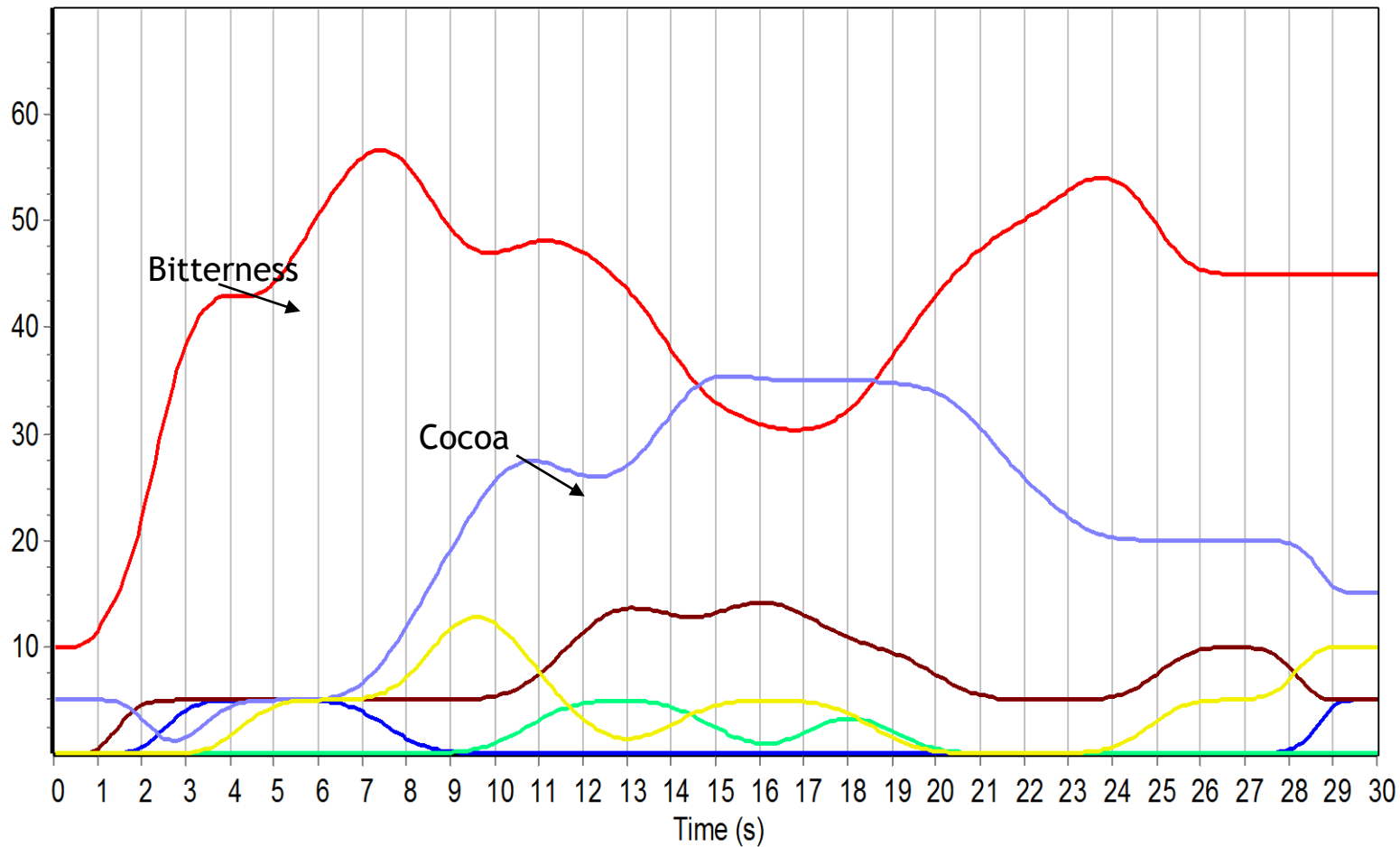
0-12s

Cocoa

Smooth

Panel Dominance
Product: 90% COCOA

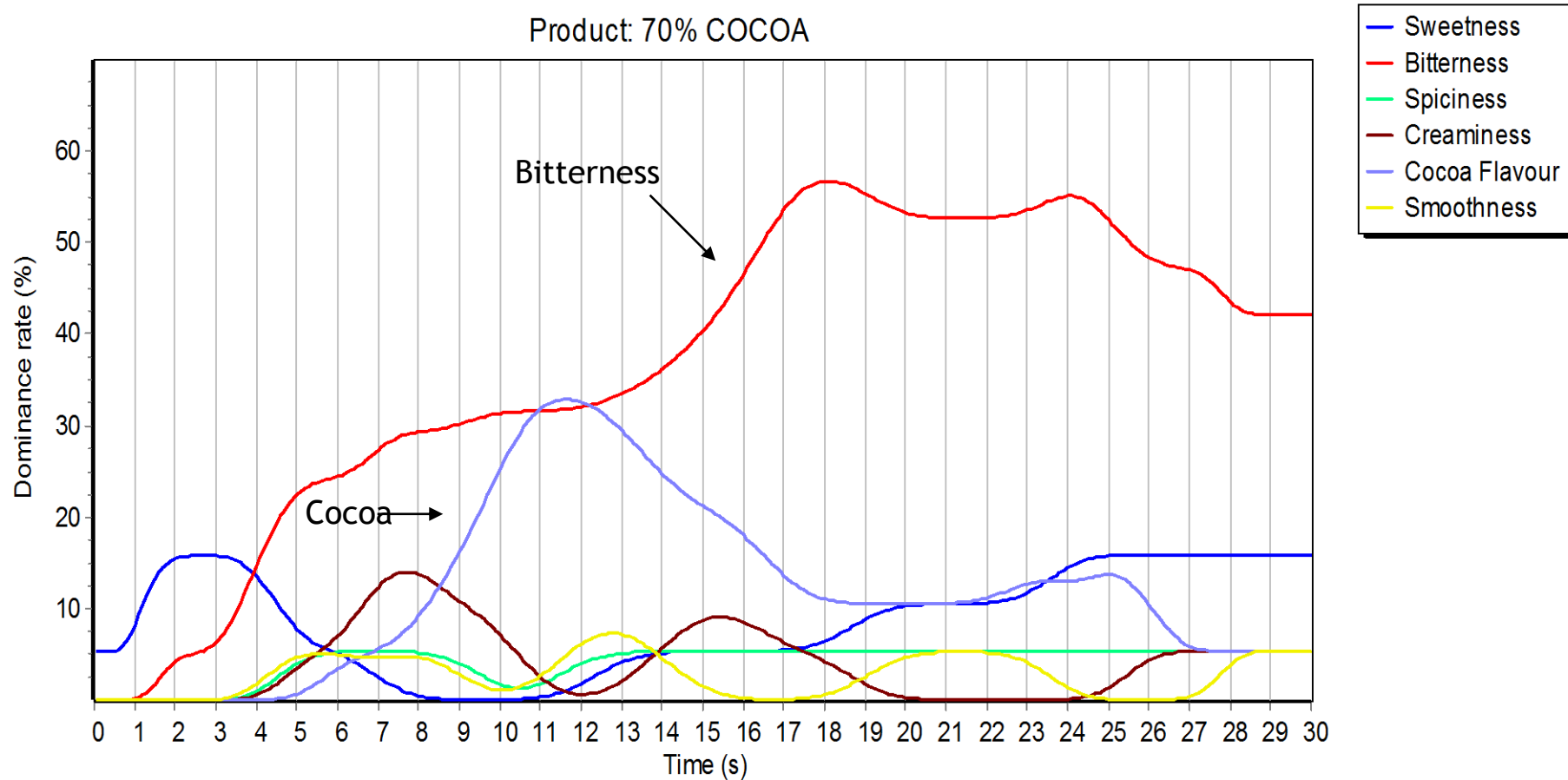
- Sweetness
- Bitterness
- Spiciness
- Creaminess
- Cocoa Flavour
- Smoothness



Time Intensity TDS File: TDS chocolate.frs

Panel Dominance

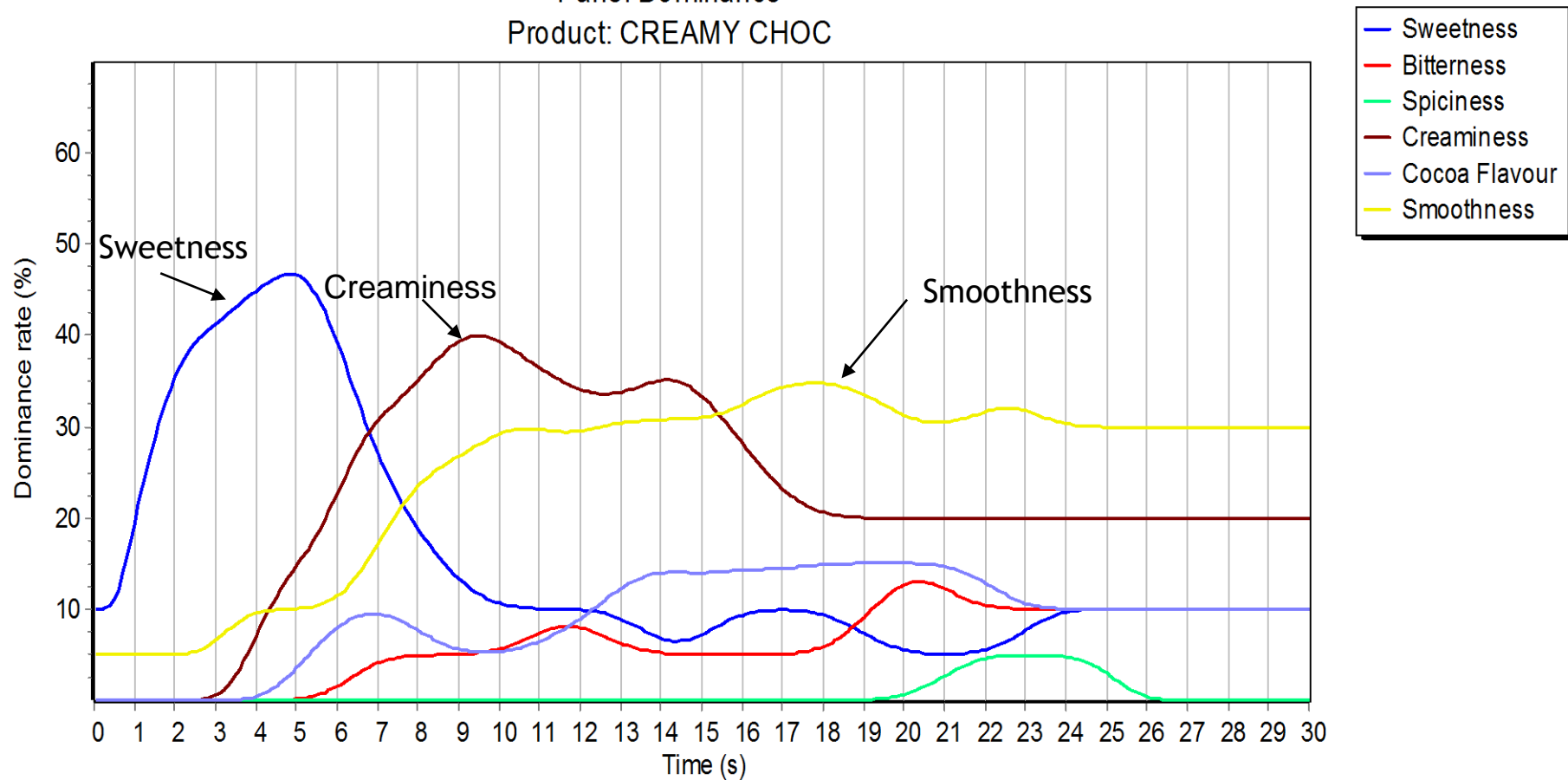
Product: 70% COCOA



Time Intensity TDS File: TDS chocolate.frs

Panel Dominance

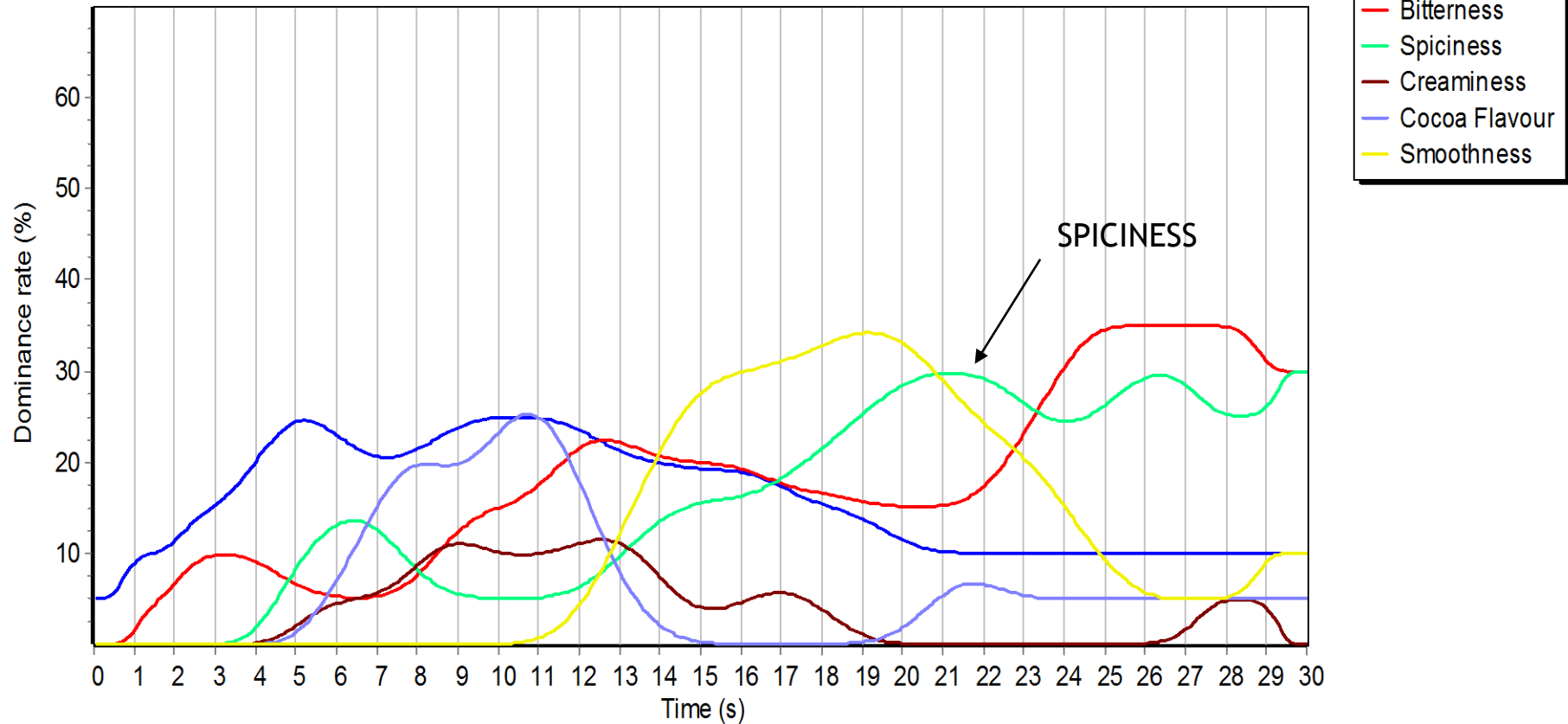
Product: CREAMY CHOC



Time Intensity TDS File: TDS chocolate.frs

Panel Dominance

Product: CHILI CHOC





Findings:

Temporal Dominance will be especially useful for assessing the flavour release of dairy products, beverages, low fat products and beef, lamb chicken etc.....

Conclusions

- Sensory methods provide valuable information about products, ingredients and consumers
- AFBI can utilise a wide range of sensory methodologies and techniques, both simple and complex, to enhance and develop customer products, staff and awareness of consumer preferences



Acknowledgements:

Janeen Speers, David Sanderson and Irene Chong

Tom Currie and Mabel Hawthorne

Alison White

Alan Gordon (Biometrics)

Tom Keatings, Richard McKee and Alistair Blumson (IT)