Understanding consumer preferences for beef eating quality

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What does the consumer want from beef eating quality?

Prediction of overall acceptability of beef by tenderness and flavour

Grilled sirloin
German, Spanish and British consumers

Regression coefficients (P < 0.001)

Consumer Country	Tenderness coefficient	Flavour coefficient	R^2
German	0.50	0.50	0.99
Spanish	0.40	0.59	0.99
British	0.40	0.59	0.99

Oliver et al., Meat Science 2006
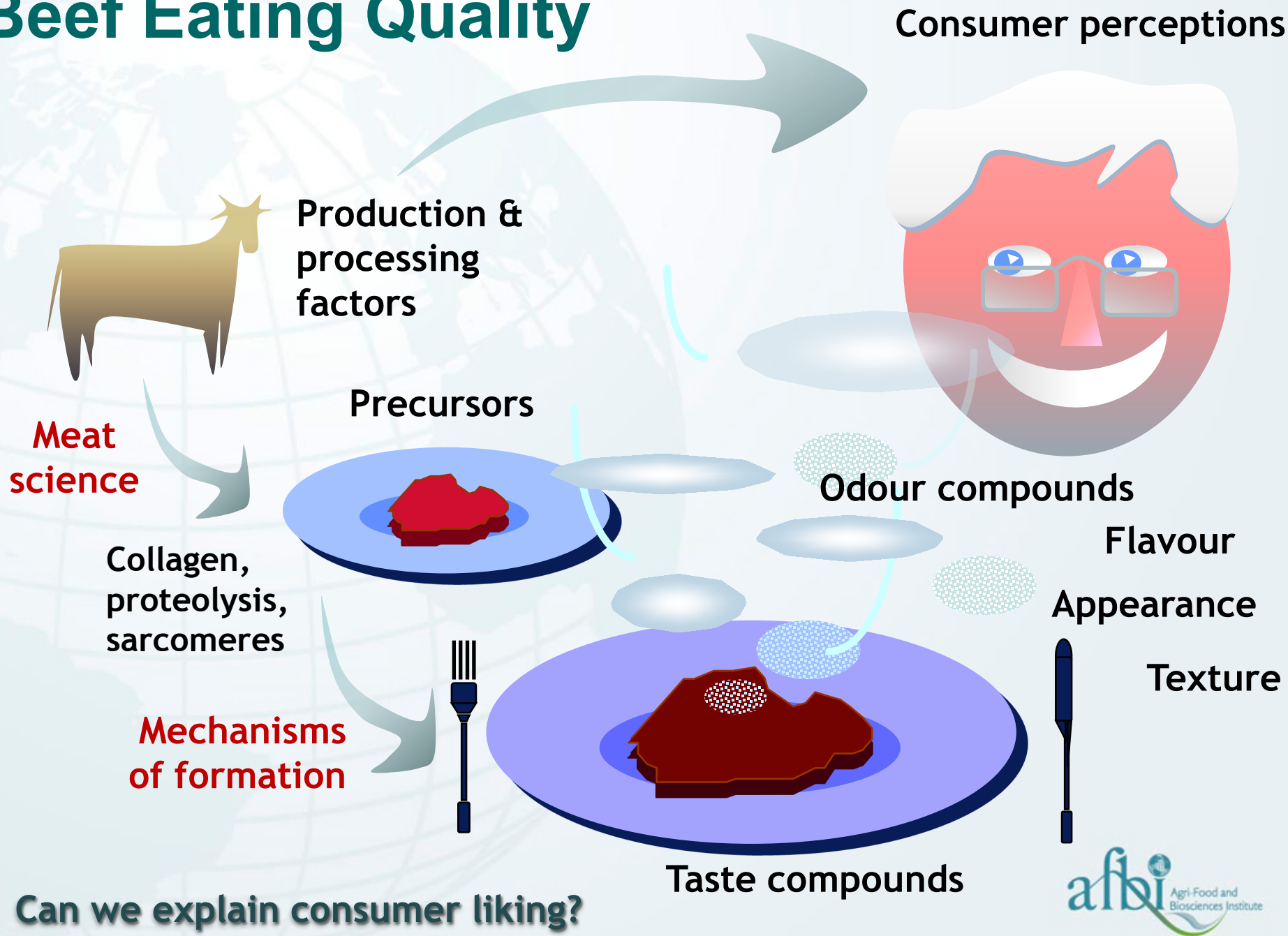
MSA consumer data from different countries

Relative contribution of flavour liking (FL) and tenderness (TE) to satisfaction in grilled beef for different consumer countries

FL > TE	FL = TE	FL < TE
N. Ireland	Australia	Japan
Ireland	France	
USA		
Poland		
S. Africa		

- Rare, medium or well done beef – same effect
- Cooking method – flavour liking even more important for RST than GRL

Polkinghorne personal communication

Beef Eating Quality

Consumer perceptions

Production & processing factors

Meat science

Precursors

Collagen, proteolysis, sarcomeres

Mechanisms of formation

Odour compounds

Flavour

Appearance

Texture

Taste compounds

Can we explain consumer liking?

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Beef Eating Quality

Consumer perceptions

Meat science

Production & processing factors

Preference mapping
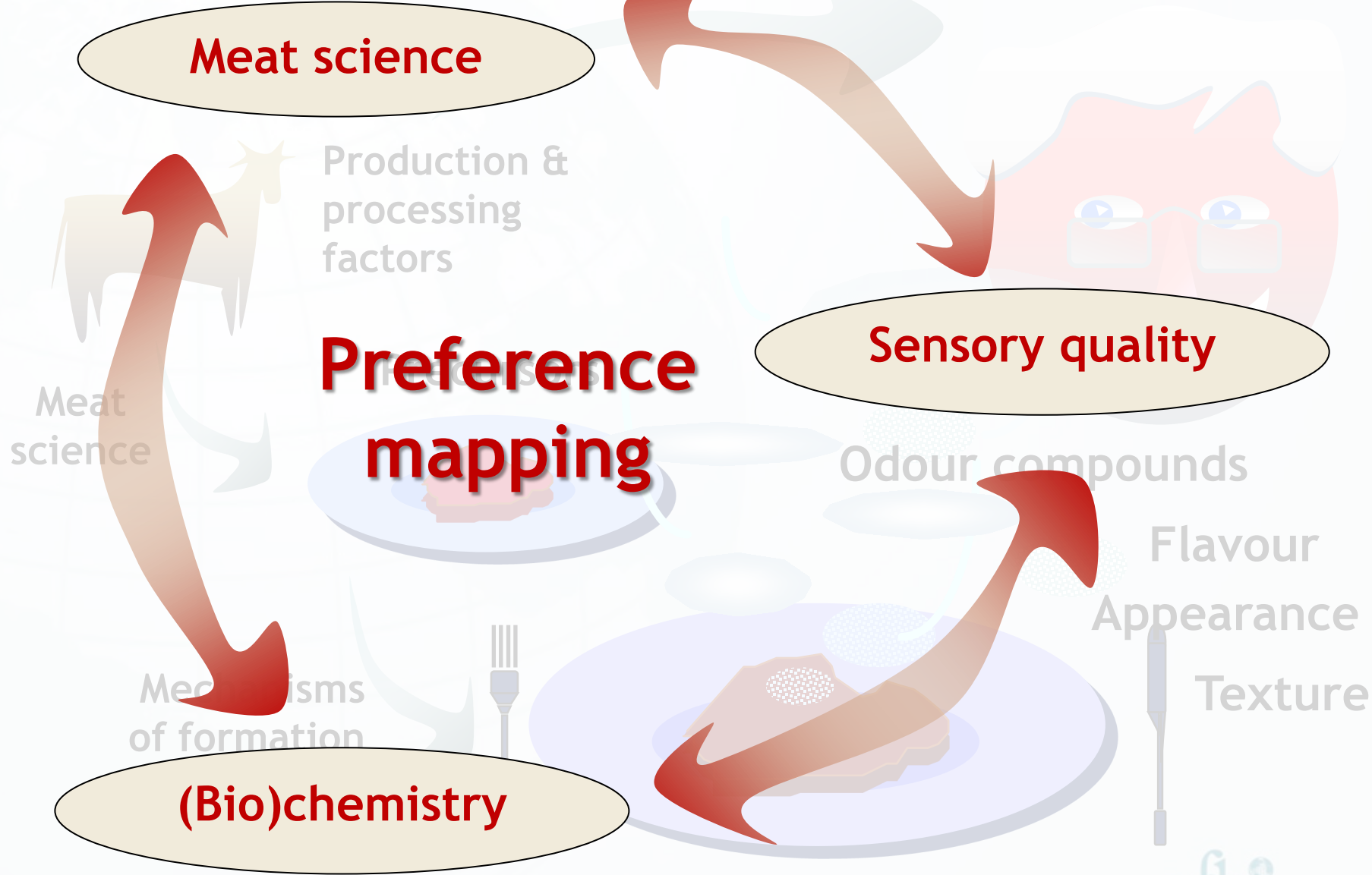
Sensory quality

Meat science

Odour compounds

Flavour

Appearance

Texture

Mechanisms of formation

(Bio)chemistry

Can we explain consumer liking?

Understanding consumers
preference mapping

Beef from range of production /processing methods
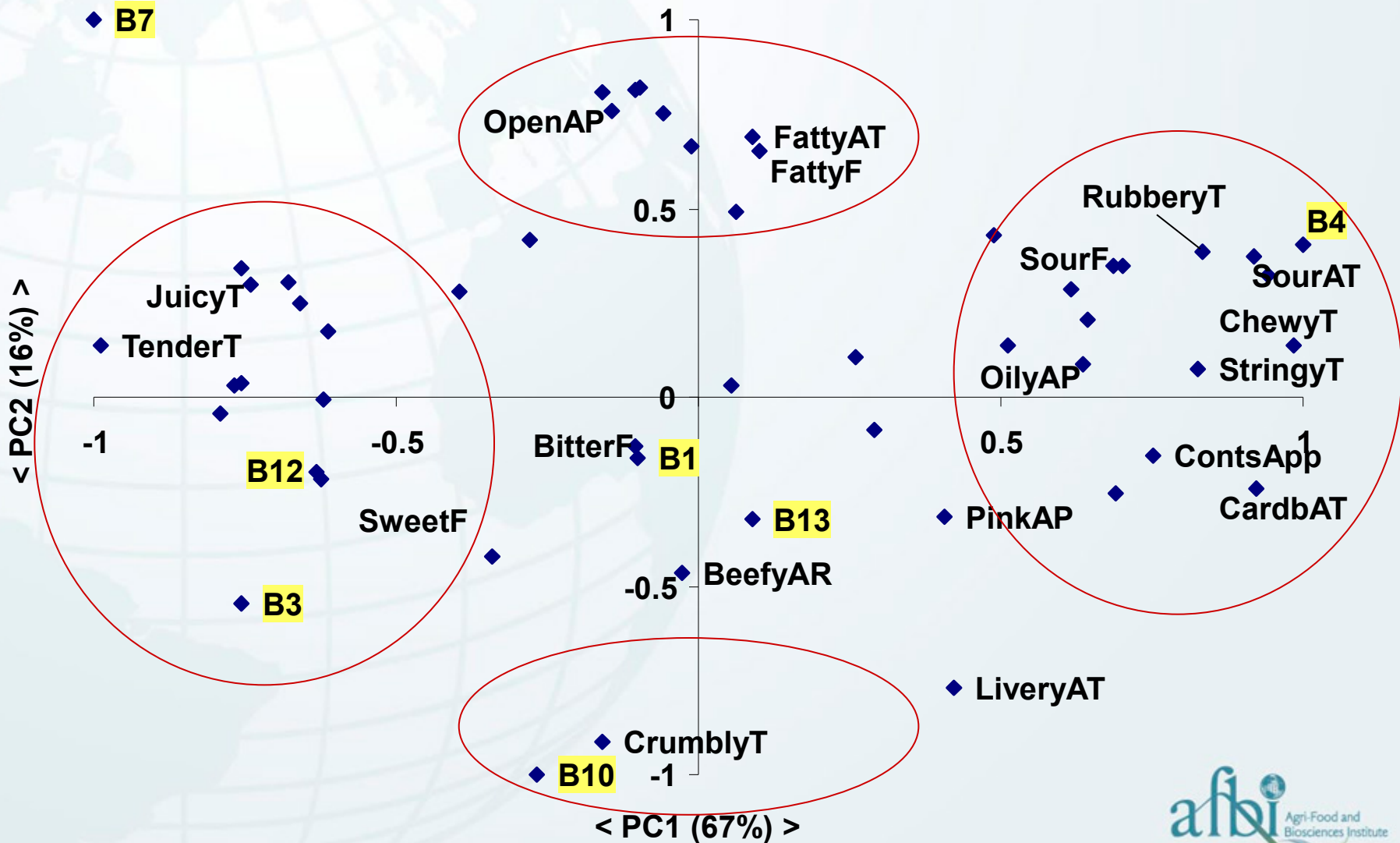
Consumer panels

Sensory profiling panels

Meat quality Measurements
pHu, shear force…

Chemical Measurements
Sugars, amino acids

Multivariate statistics
External and internal preference mapping, heirarchical cluster analysis

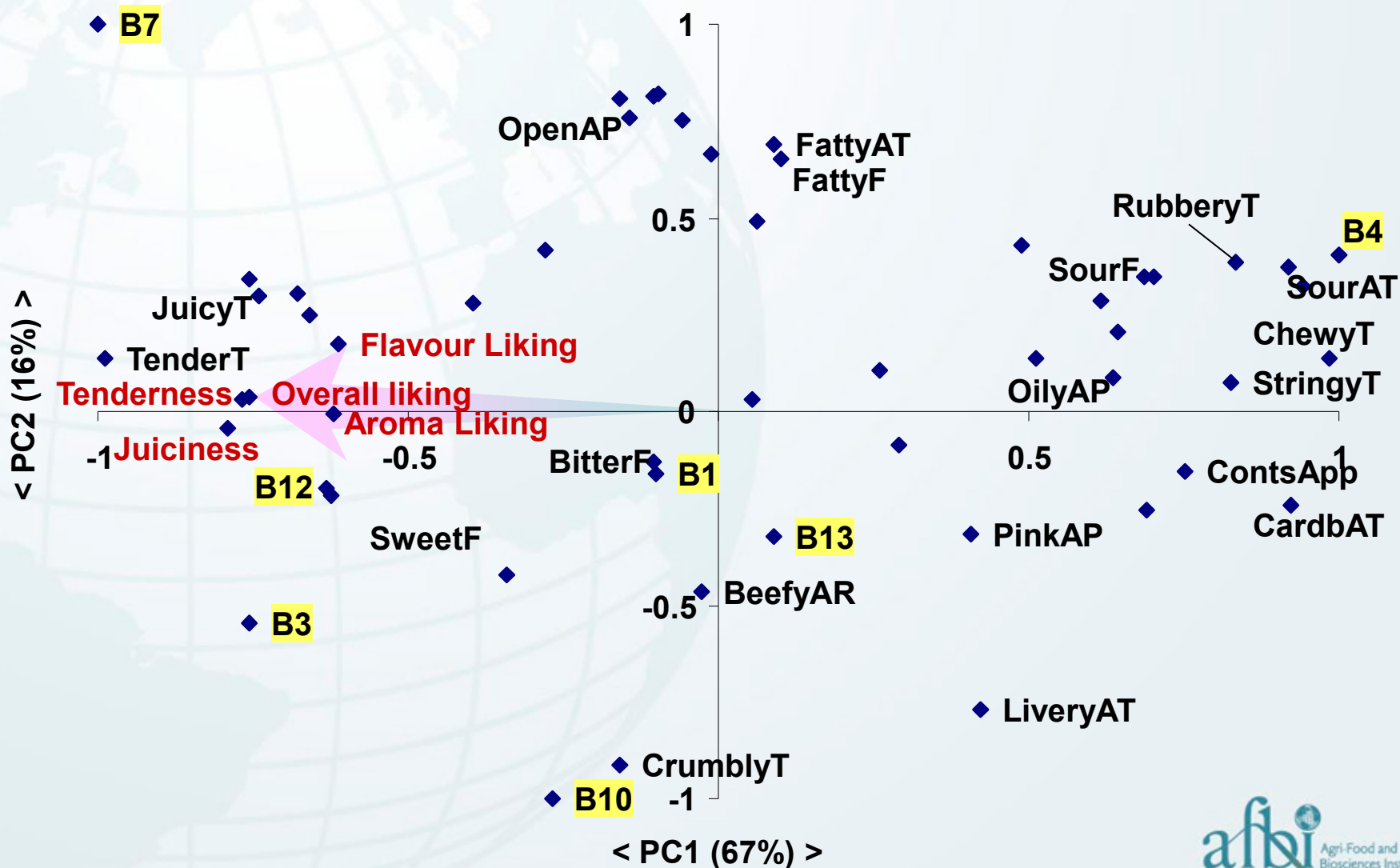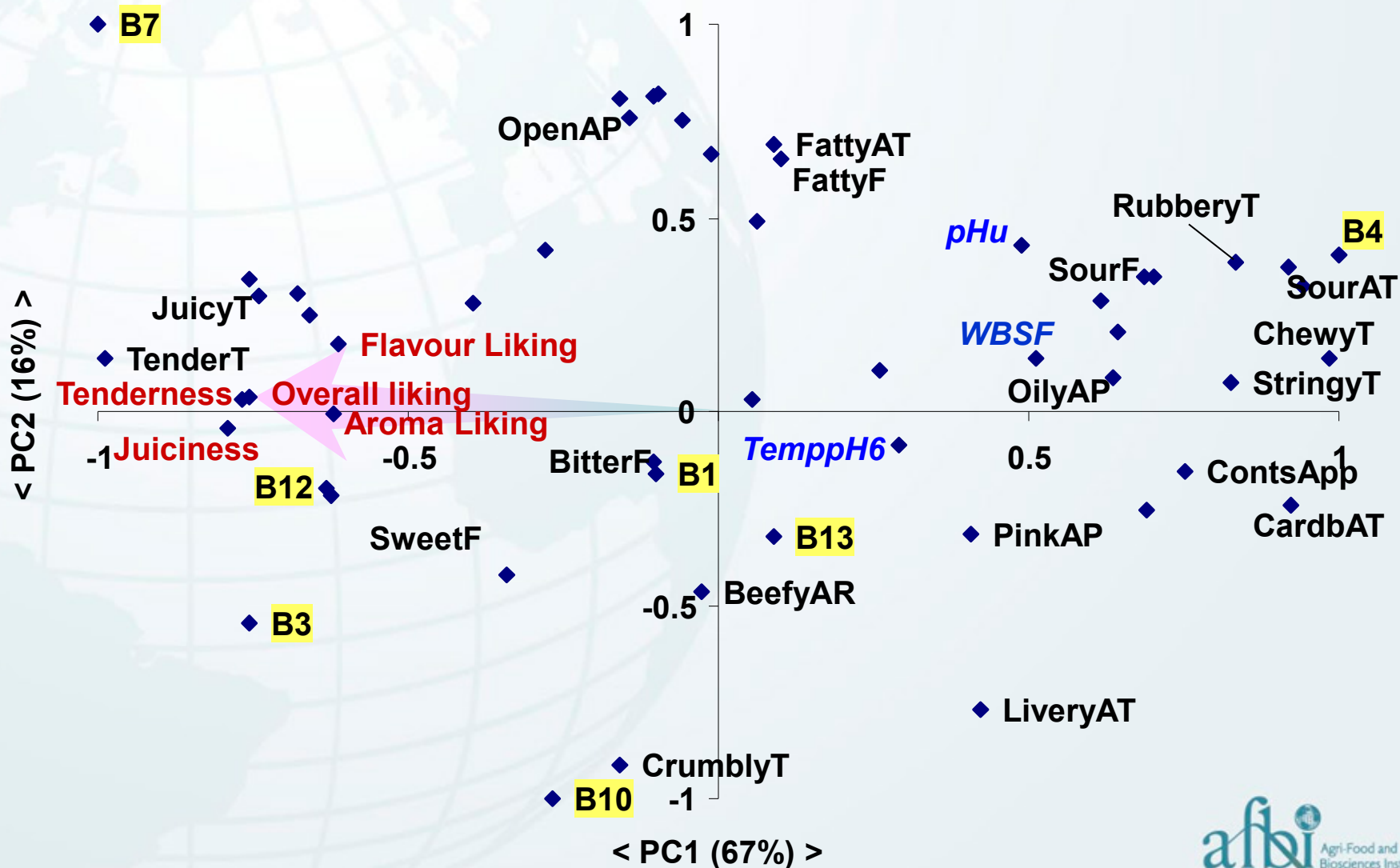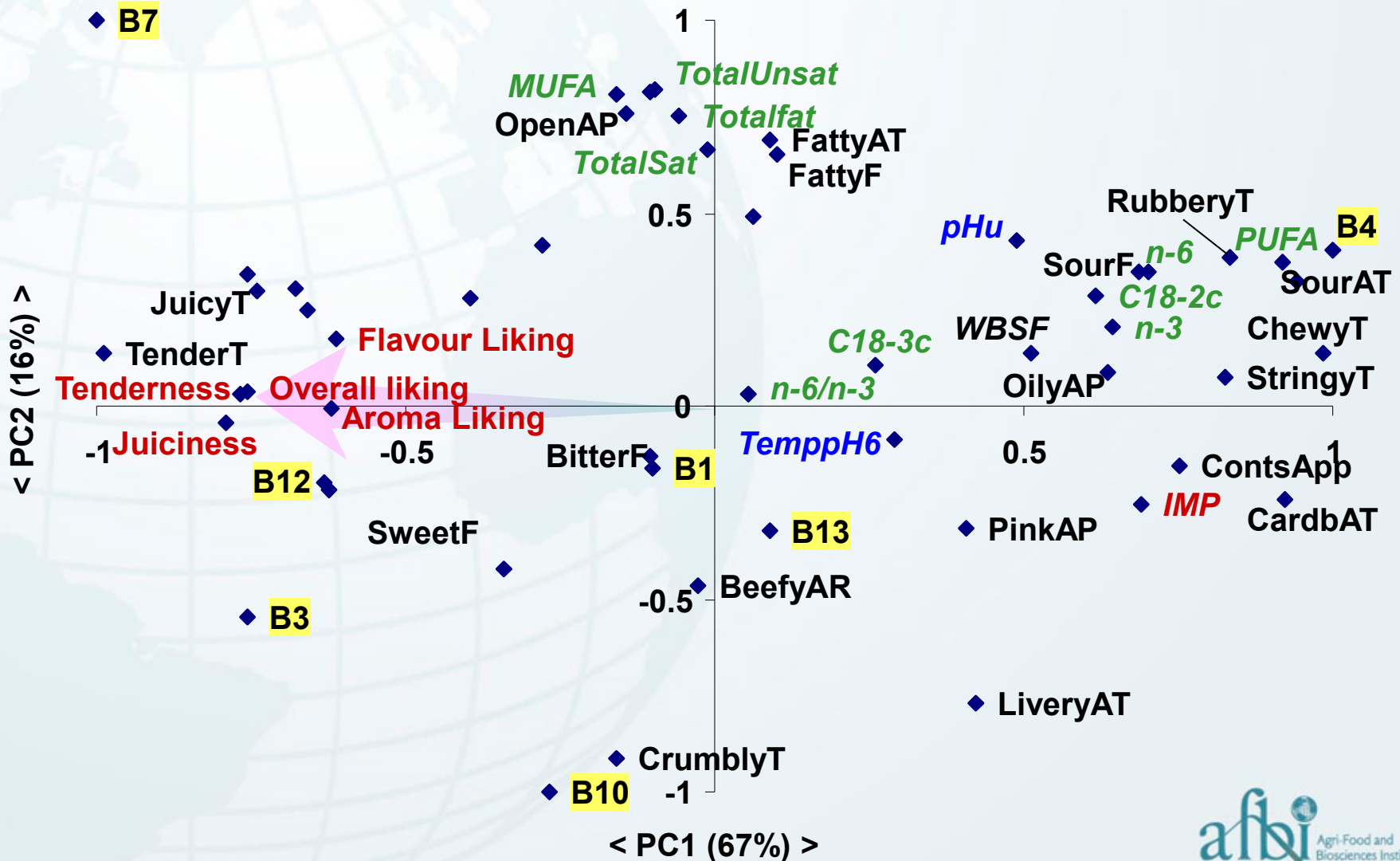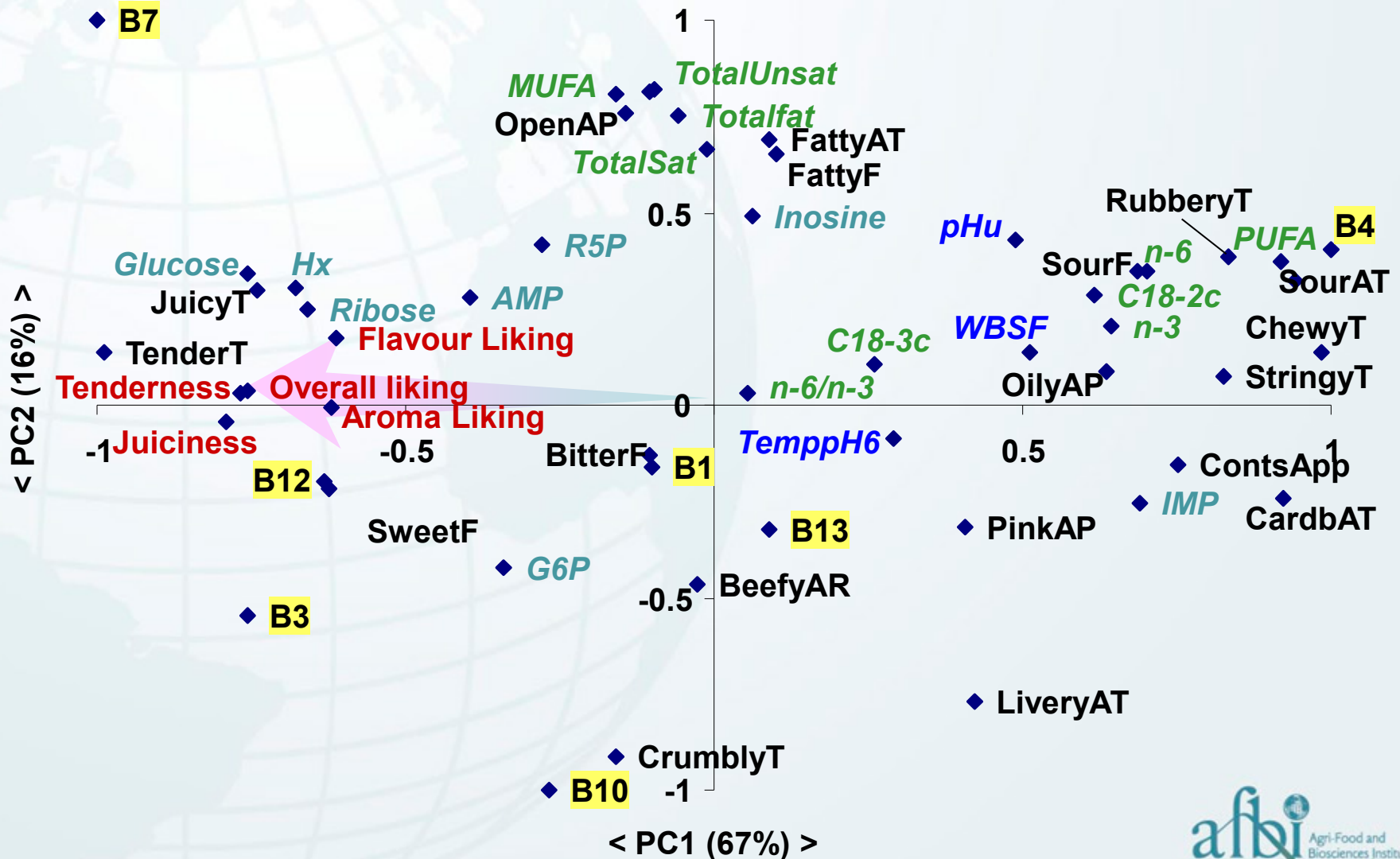*Farmer et al., ICOMST 2010*

Understanding consumers

External preference map for grilled beef sirloin for principal components, PC1 and PC2

Understanding consumers
External preference map for grilled beef sirloin for principal components, PC1 and PC2

With consumer liking scores

Understanding consumers

External preference map for grilled beef sirloin for principal components, PC1 and PC2

PC2 (16%) > (vertical axis)

< PC1 (67%) > (horizontal axis)

Labels: B7, OpenAP, FattyAT, FattyF, RubberyT, B4, pHu, SourF, SourAT, JuicyT, Flavour Liking, WBSF, ChewyT, TenderT, Tenderness, Overall liking, OilyAP, StringyT, Juiciness, Aroma Liking, BitterF, B1, TemppH6, ContsApp, SweetF, B13, PinkAP, CardbAT, B3, BeefyAR, LiveryAT, CrumblyT, B10, B12

With meat quality measurements

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Understanding consumers

External preference map for grilled beef sirloin for principal components, PC1 and PC2

With fatty acid data

Understanding consumers

External preference map for grilled beef sirloin for principal components, PC1 and PC2

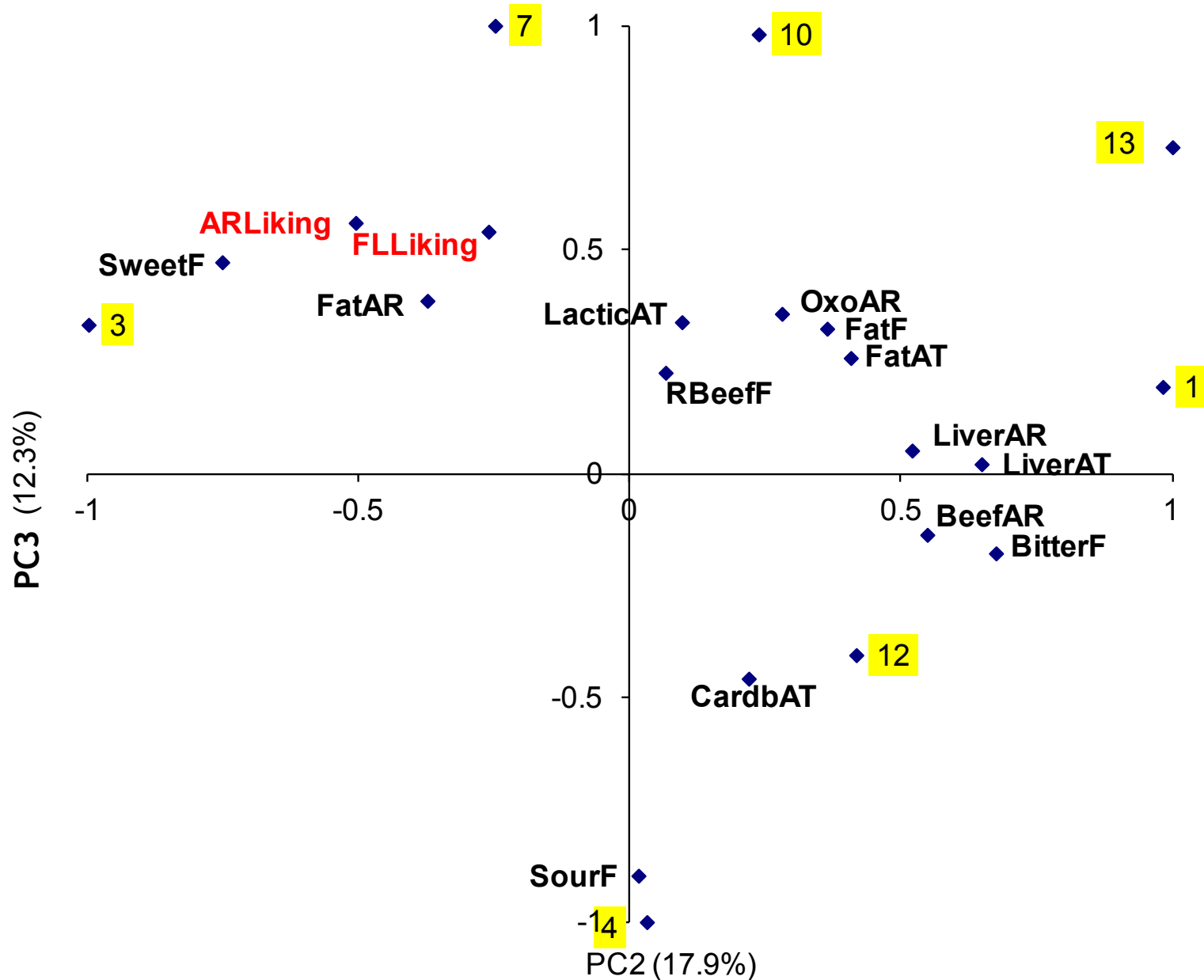*With other flavour precursors*

a lot of information ...

We can also look at just selected data ...

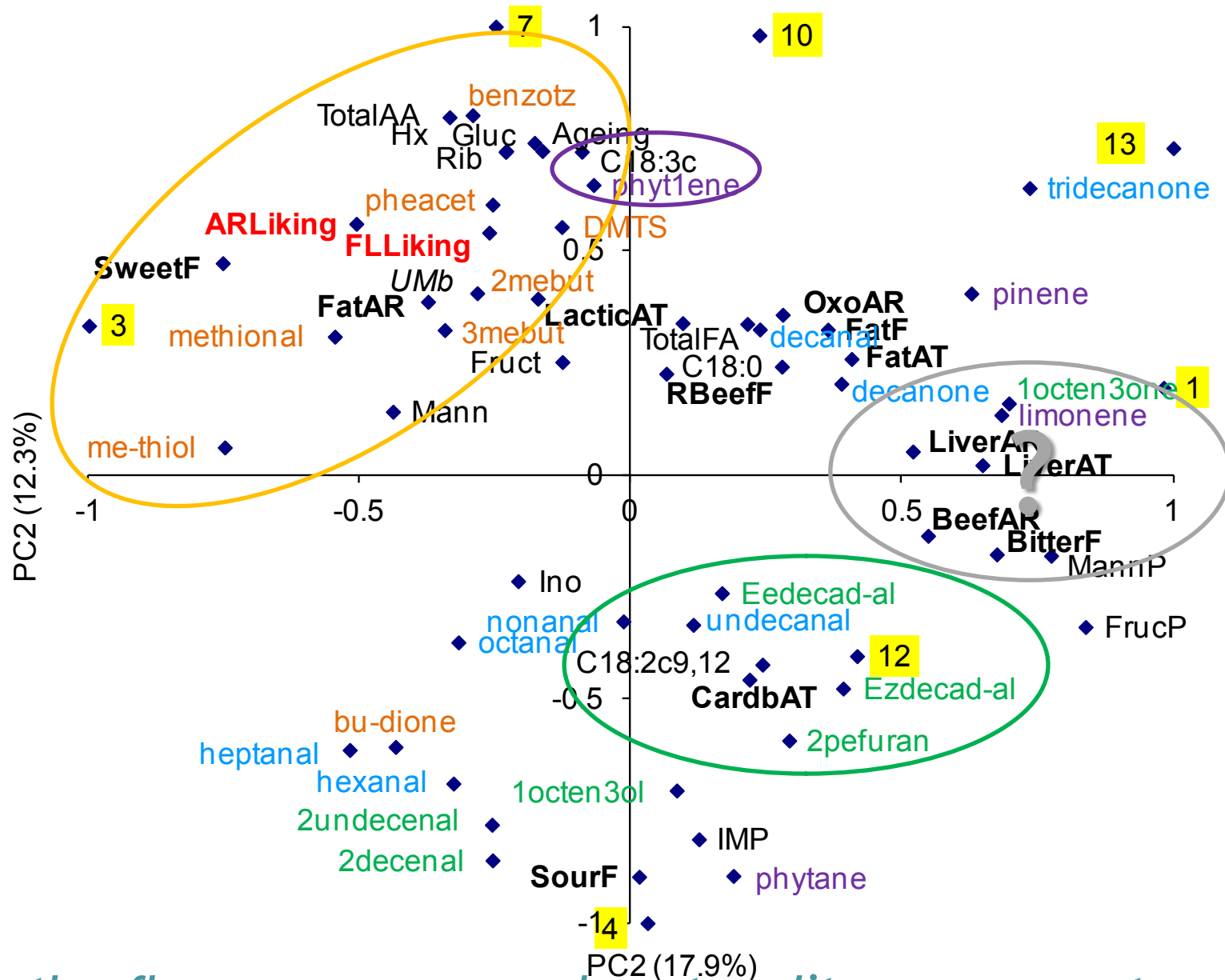# **Focusing on flavour**

Flavour, odour and aftertaste only

Using flavour and aroma terms only
- trained panel and consumers

Using flavour and aroma terms only
- adding classes of volatiles

With other flavour volatiles

Aroma, Flavour and Aftertaste - External Preference Map (PC2 vs PC3)

With other flavour precursors and meat quality measurements

Confirmed by independent data

Jerrad Legako et al, Meat Science 2015

Texas Tech University and AFBI

Conclusions

Consumer liking is linked to:

- tenderness, juiciness, sweet flavour

- "Maillard" odour compounds

- Sugars and amino acids in raw meat

Consumer liking is NOT linked to:

- chewy, sour, cardboard

- High pHu, lipid-derived volatiles

Consumer liking can be explained!