

Typical Food Products in Europe: Consumer Preference and Objective Assessment



TYPIC

2003-2005 QLK1-CT-2002-02225

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Proceedings of the Final Conference

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SESSION 1

Typicality Assessment

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Welcome to Enita Clermont



Georges Gosset Director

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A few figures about Enita Clermont

- ◆ 1 300 engineering graduates (Master's degree)
- ◆ 400 students
- ◆ 35 teachers-researchers
- ◆ 93 teaching-research, administration & service staff
- ◆ 3 teaching departments
- ◆ 5 research units

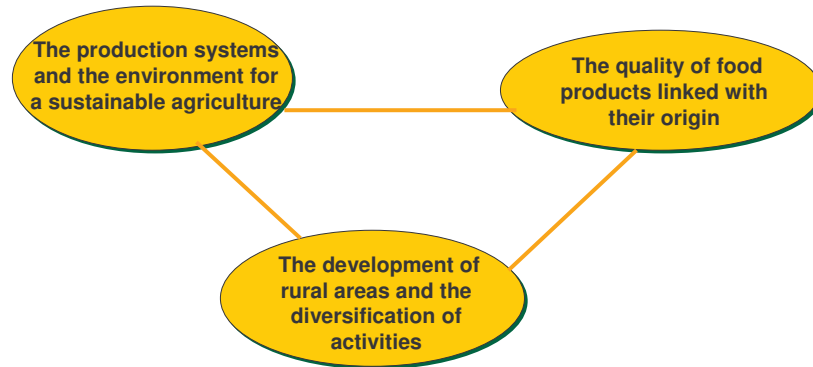
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The partners

- ◆ National Institute for Agronomic Research (INRA)
- ◆ Cemagref
- ◆ Universities
- ◆ Agricultural Chambers, Agro- food industry enterprises, Technical Institutes, Territorial communities, ...

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Domains of competences



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Typical Food Products in Europe: Consumer Preference and Objective Assessment

TYPIC

2003-2005 QLK1-CT-2002-02225

Final Conference

15^{pm} – 16^{am} December 2005

Project's Objectives and Implementation

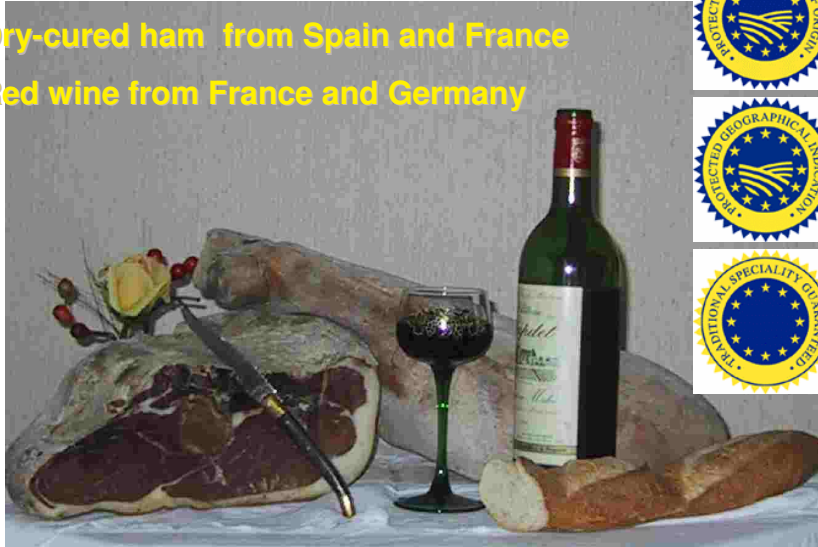
Pr G. Giraud

ENITA Clermont



TYPIC works on

- Dry-cured ham from Spain and France
- Red wine from France and Germany



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TYPIC works on

Consumer preference
and actual behaviour

Spain, France and
Germany



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Consortium

- # ENITA, Clermont-Fd, France, Pr. G. Giraud
- # IFR, Norwich, UK, Dr I. Colquhoun
- # DLR, Neustadt, Germany, Dr U. Fischer
- # CSIC, Sevilla, Spain, Dr R. Aparicio
- # INRA, Nantes, France, Dr D. Bertrand
- # INRA, Montpellier, France, Dr V. Cheynier
- # CITA, Zaragoza, Spain, Dr L.M. Albisu
- # FfM, Munich, Germany, Dr U. Enneking
- # CRAW, Gembloux, Belgium, Dr V. Bæten

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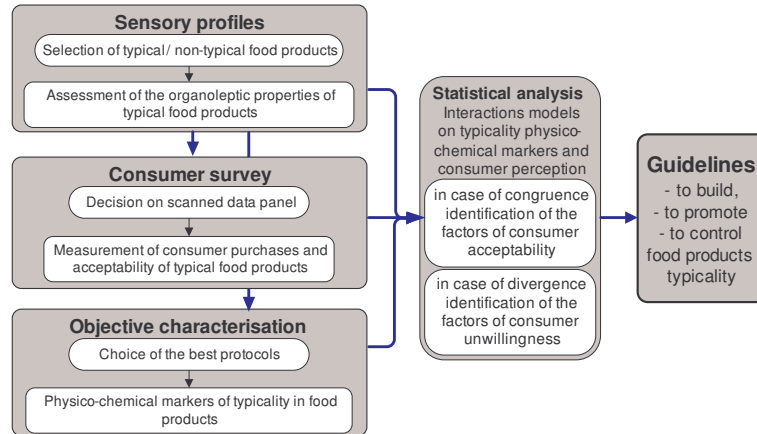


Associated

- # Veterinary Faculty of Saragossa, Spain, P. Roncales
- # SICAREX Beaujolais, Villefranche/Saône, France
- # Carrefour Group, Madrid, Zaragoza, Spain
- # Champion Supermarkets, Paris, Clermont-Fd, France
- # EcoZept, Munich, Montpellier, Germany
- # Meat Technical Centre, Rodez, France
- # Agricultural Council Pfalz, Germany

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Work-plan



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European added-value (EU-15)

✚ PDO/PGI price premium (x 2 higher)

- ✚ Consortium 63% EU Wine and Ham prod.
- ✚ Wine 174 billion hl. EU prod. PDO 42.1%
- ✚ Ham 17.5 million t. EU pork meat prod., Dry, salted or smoked ham 10.2% weight, 17.3% value, PDO/PGI 25.2%

Consumption of selected food products categories in the consortium's countries

1997	(Eurostat)	D	B	F	E	UK
Wine	<i>liter per capita</i>	22.3	19.7	61.6	40.7	12.3
Dry smoked ham	<i>kg per capita</i>	1.8	0.3	0.8	4.5	0.1

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Socio-economic implications

Safety, welfare and trust

- local foods and native traditional flavours

Authentication

- PDO labels: intelligible traceability by consumers
- barrier against unfair competition

The European consumer

- acceptability of PDO/PGI from foreign regions

Employment and sustainable development in lagging European regions

- PDO/PGI come from mountain or rural areas

Social role (EU-15)

- 780 000 farms, 260 000 agro-food SMEs

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Technical Committee 18 external members

Agricultural producers organisations

- Enrique **Bayona**, Rafael **Navarro**, Regulatory Council Designation of Origin Teruel
- Norbert **Weber**, German wine growers association
- Roland **Furrer**, Swiss association of Denomination of Origin & Protection of Origin
- Erik **Thevenod-Mottet**, Service Romand Vulgarisation Agricole, Lausanne
- Rafael **del Rey**, Spanish Wine Federation
- Armin **Göring**, German Wine Institute
- Bernd **Wechsler**, Center wine marketing Rheinland-Pfalz
- Edwin **Schrank**, Viticultural association Pfalz

Agro-Food Industry and Distribution representatives

- Javier **Salinas**, Carrefour, Zaragoza
- Jean-Pierre **Poma**, Meat Technology Center, Rodez
- Anne **Bouhour-Arnaud**, Champion, Consumer marketing, Paris

European consumer associations

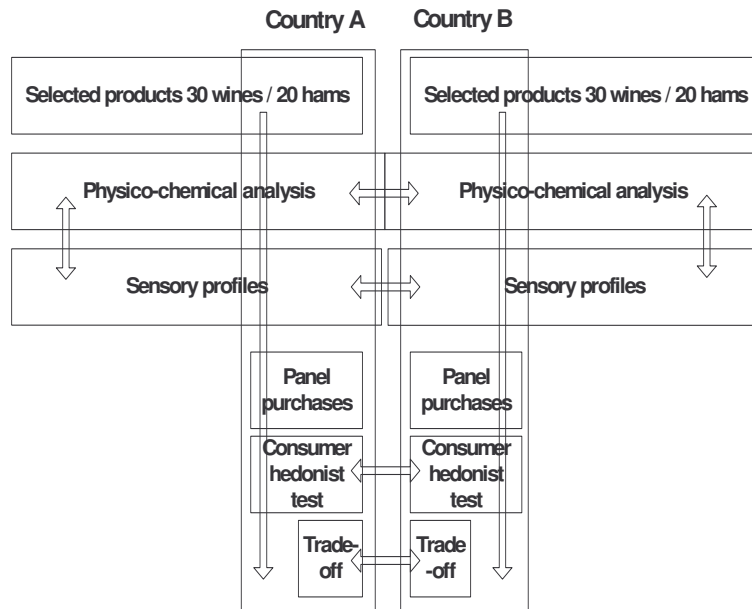
- Eleni **Alevritou**, EKPIZO Consumer association, Greece, BEUC

Food policy administrators

- François **Roncin**, Hervé **Briand**, National Institute Denomination of Origin, INAO
- Christine **Ton-Nu**, National Agency for Innovation and Research, ISEO-Anvar
- Richard **Balling**, Bavarian State Ministry Food Agriculture & Forestry
- Pilar **De las Heras**, Spanish Ministry of Agriculture

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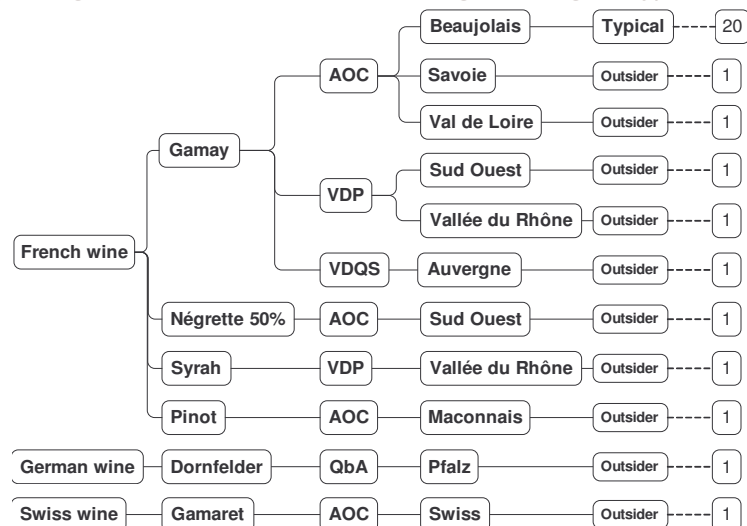
Cross-tabulated measurements



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French red wine segmentation

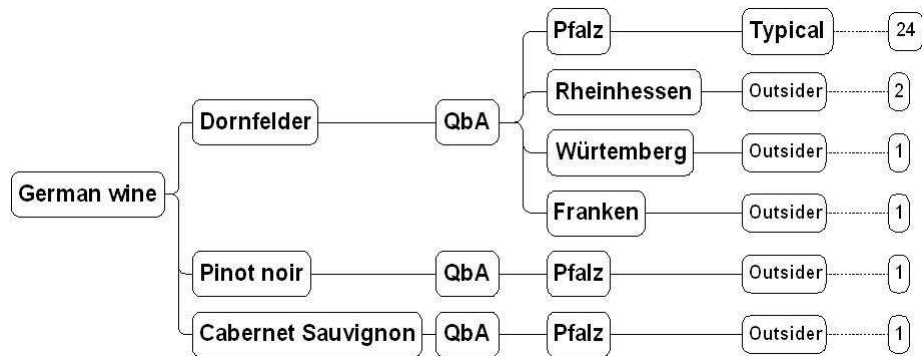
Country of origin - Cultivar - Label, no label - Region of origin - Type - Number



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German red wine segmentation

Cultivar - Label, no label - Region of origin - Type - Number

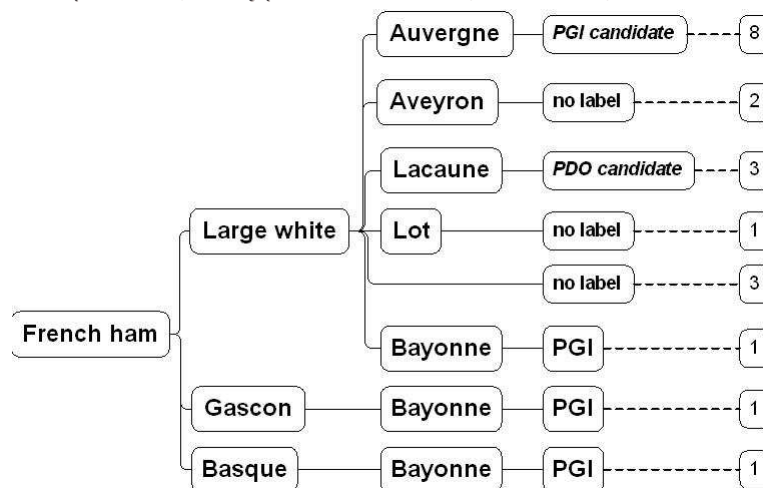


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French dry-cured ham segmentation

Breed - Region of origin - Label, no label - Number

On-farm processed, factory processed / Private-, commercial-, distributor-brand

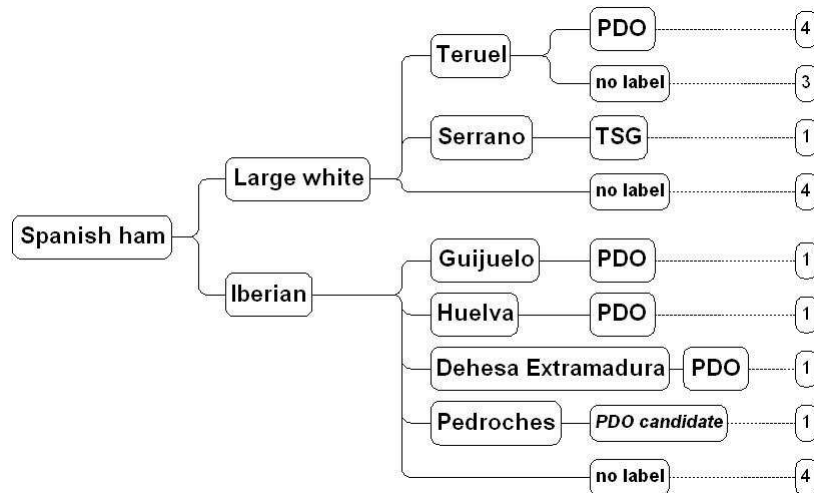


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Spanish ham segmentation

Breed - Region of origin - Label, no label - Number

On-farm processed, factory processed / Private-, commercial-, distributor-brand



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Sensory analysis session, wine

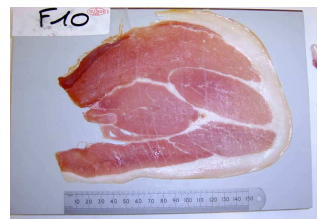


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Spanish Hams



French Hams



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WHAT IS TYPICALITY? A marketing and consumer approach



Categorization during consumer
decision-making process

G. Giraud ENITA Clermont

TYPICALITY

from psychology, used in categorisation, means both

ARCHETYPE

- Genuine type
- Very different
- Singularity attributes
- Atypical
- Difference
- Connoisseurs
- Labelled
- Producer-oriented
- Cognitive loaded

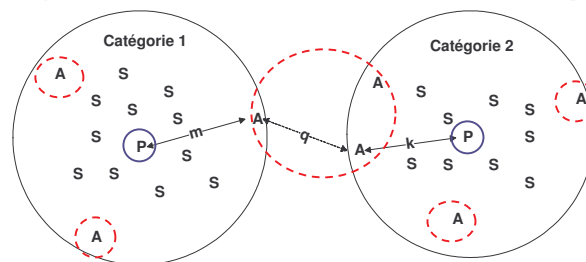
STEREOTYPE

- Most frequent exemplar
- Representative /category
- Similarity attributes
- Central
- Resemblance
- Tourists
- Branded
- Consumer-oriented
- Cognitive shortcut

**Potential for consumer orientation
of origin labelled food products?**

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**A typical food product is representative of a
category different from standardised products**



Caption: P prototype ; S stereotype ; A archetype
m, k, q: distance between objects ($m > q > k$)

Objects categorisation according to their similarity

- Which object is representative, salient of category 1?
- Which object is different but still belongs to category 1?
- Which object is different from category 1 and belongs to category 2?
- What is the meaningful size of category?

**Typicality assessment in order to better justify food diversity and
to avoid standardisation to an unique prototype**

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Typicality as stereotype



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Typicality as archetype



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Typicality and brand



And now let's
go to the
presentation
of methods
and results!

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SENSORY ANALYSIS OF HAM

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FACULTAD DE VETERINARIA
UNIVERSIDAD DE ZARAGOZA

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SAMPLING OF HAMS

41 DRY-CURED HAMS

COUNTRY – BREED		ORIGIN		MATURATION	
Es – White	13	Es – Teruel	7	≤ 7 months	5
Es – Iberian (acorn)	8	Es – SouthWest	8	8 – 12 months	17
Fr – White	18	Es – miscell.	6	13 – 17 months	10
Fr – Black	2	Fr – Auvergne	8	≥ 18 months	9
		Fr – Lacaune	5		
		Fr – Bayonne	4		
		Fr – miscell.	3		
QUALITY LABEL				PRODUCTION SCALE	
No	26			In farm	3
Yes	15			Small	9
				Medium	17
				Large	12

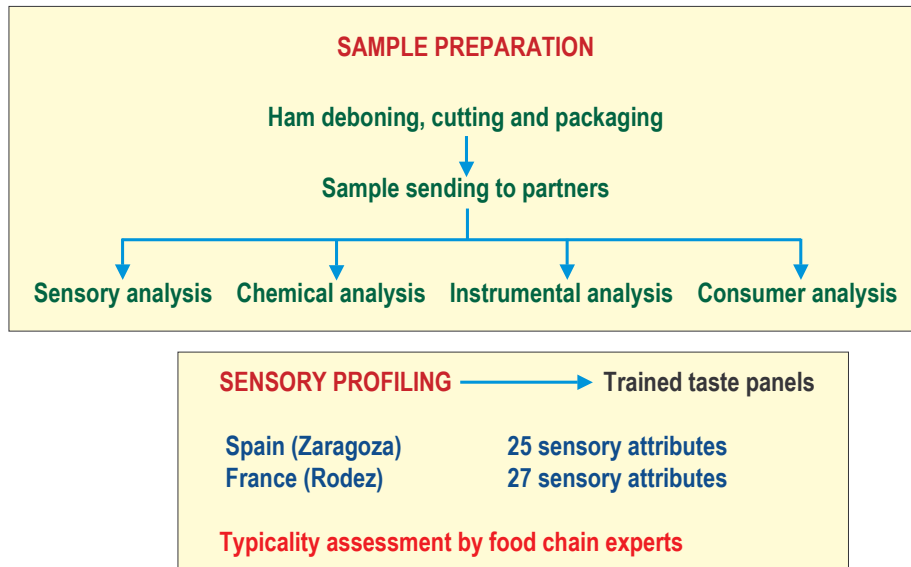
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SAMPLING OF HAMS



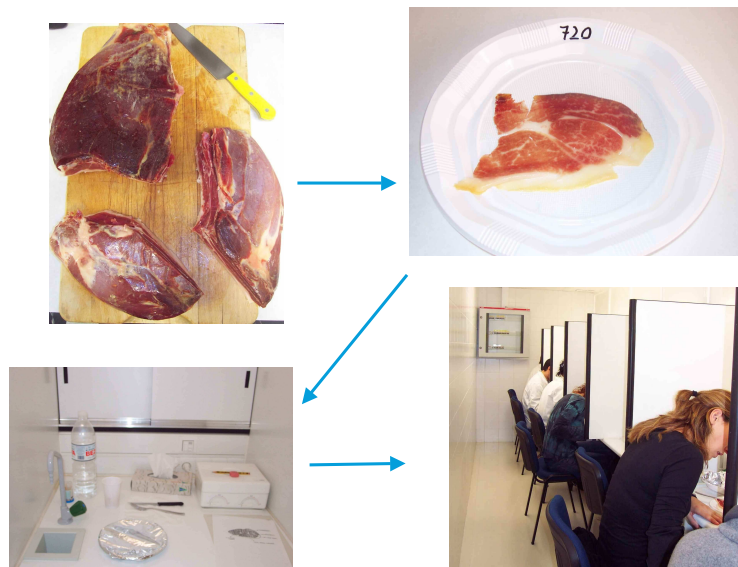
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METHODS



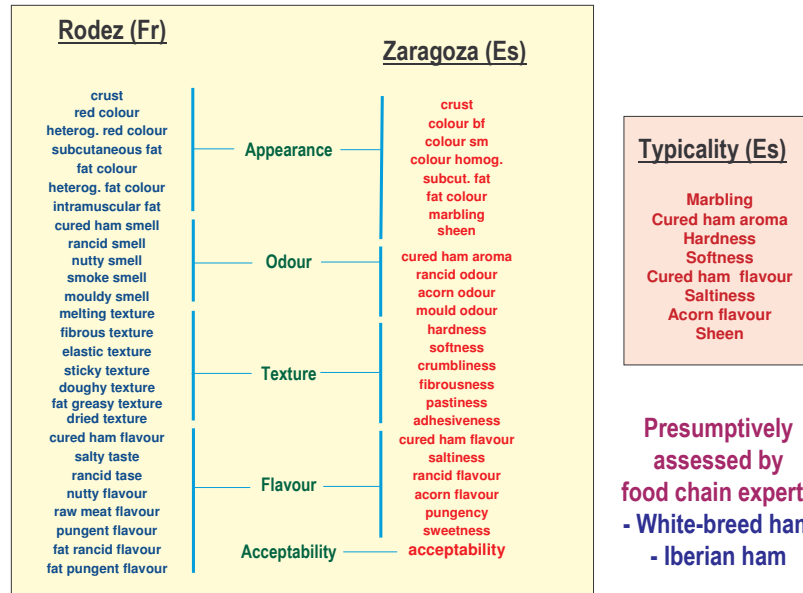
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METHODS: sensory evaluation



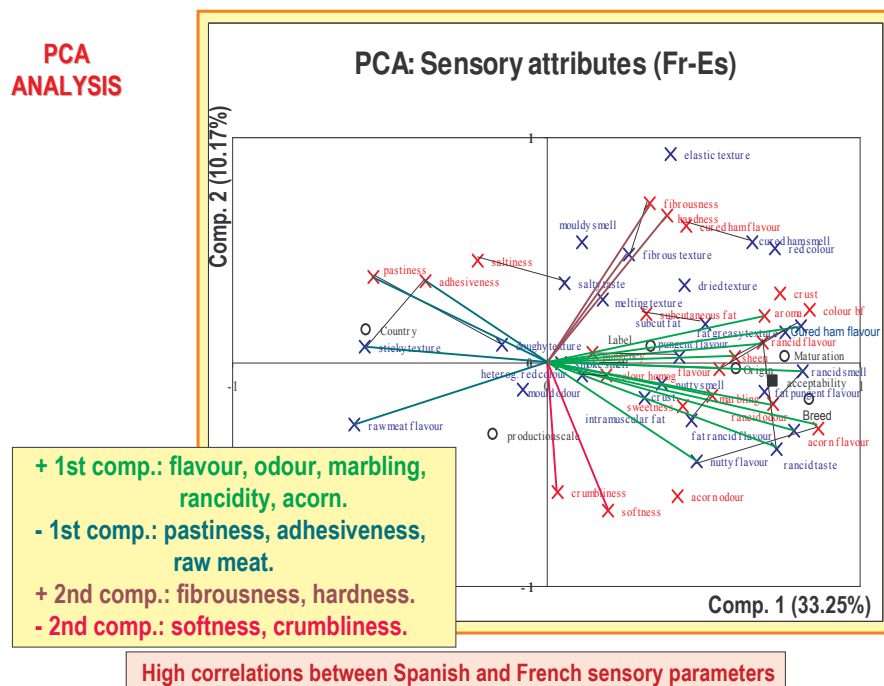
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METHODS: sensory attributes



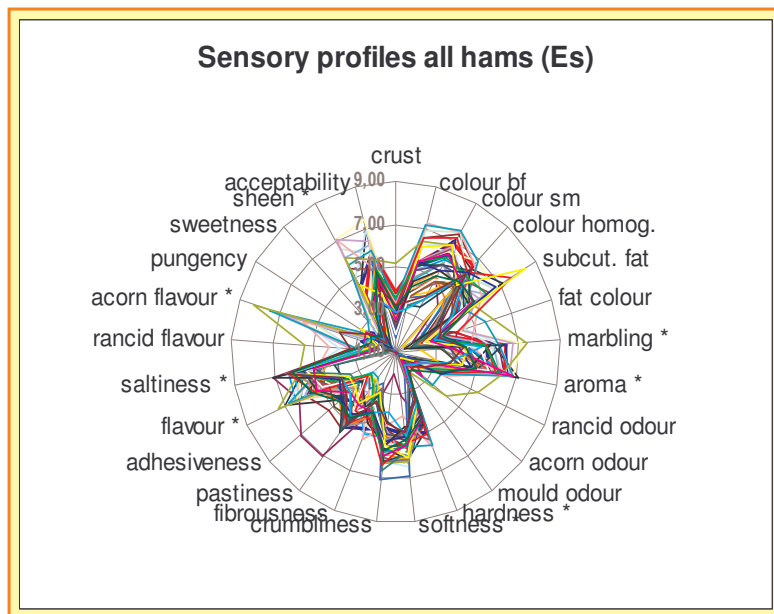
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PCA ANALYSIS



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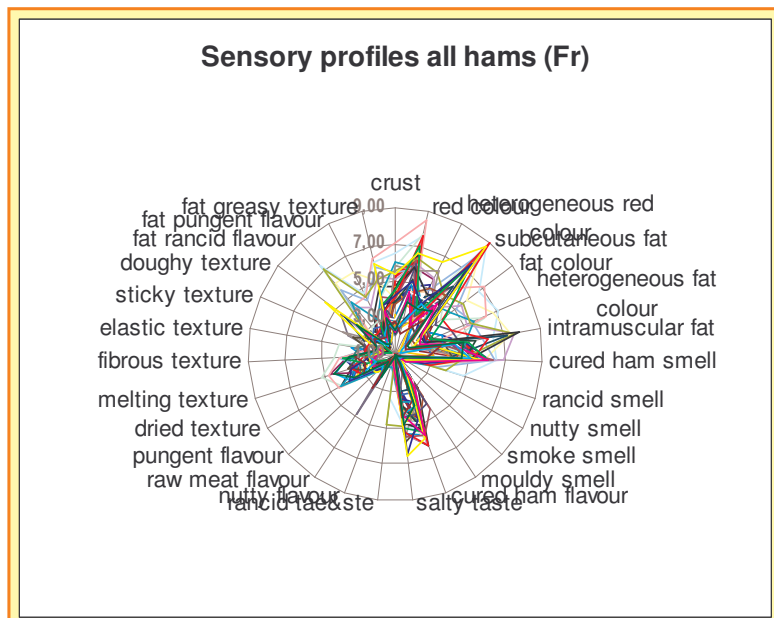
**SENSORY
PROFILES**



Large variability among ham samples

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**SENSORY
PROFILES**



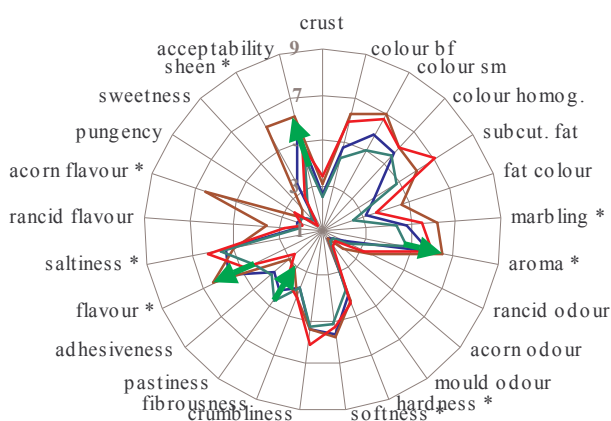
Large variability among ham samples

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SENSORY PROFILES

Country-Breed

Es – Iberian (acorn) Es – White Fr – Black Fr – White



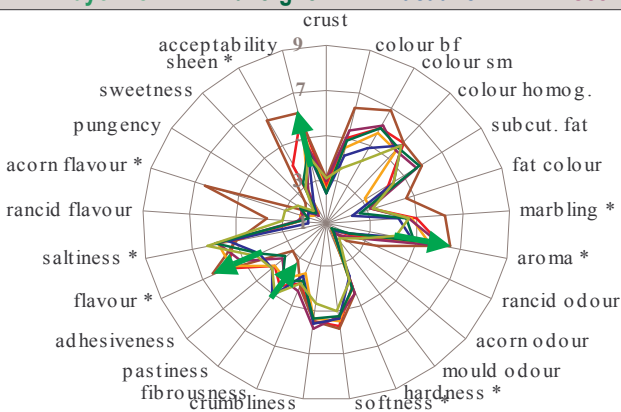
Es – I: highest aroma, flavour and acceptability; lowest pastiness and saltiness
 Es – W: high aroma, flavour and acceptability; medium pastiness and saltiness
 Fr – B: medium aroma, flavour and acceptability; low pastiness; high saltiness
 Fr – W: low aroma, flavour and acceptability; high pastiness, medium saltiness

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SENSORY PROFILES

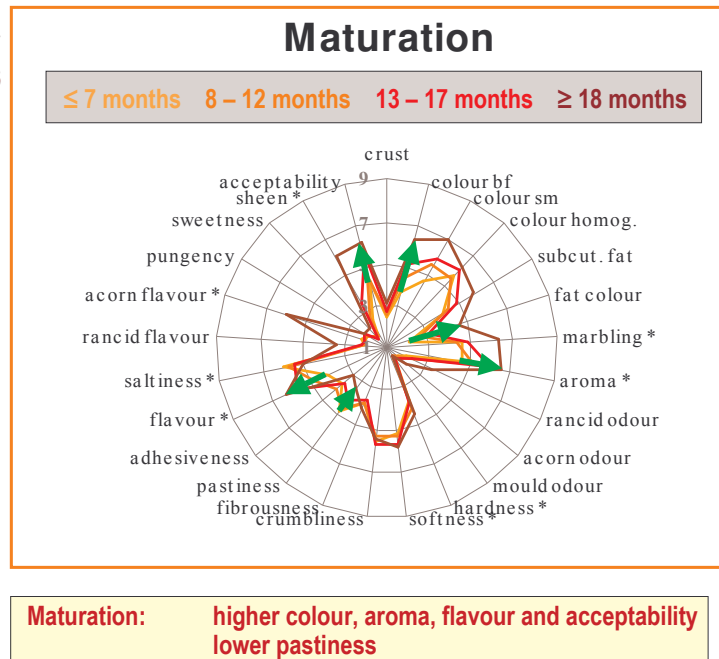
Origin

Es – SouthWest Es – Teruel Es – miscell.
 Fr – Bayonne Fr – Auvergne Fr – Lacaune Fr – miscell.



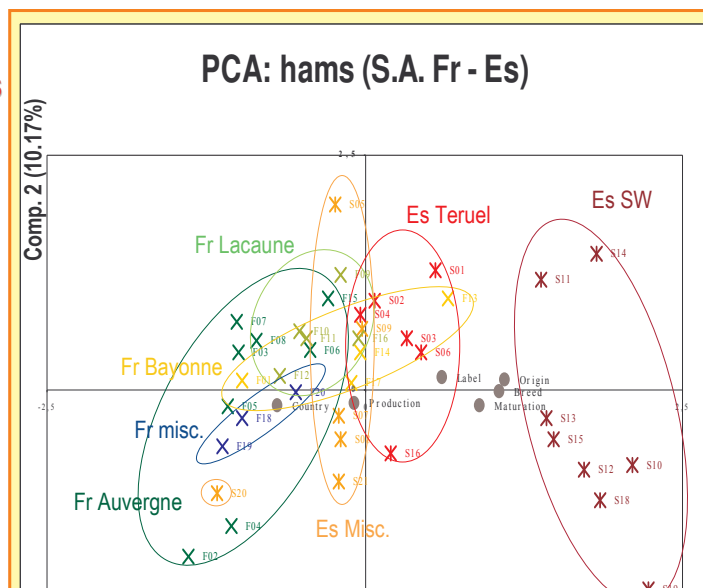
Es – SW: highest aroma, flavour and acceptability; lowest pastiness and saltiness
 Es – Teruel: high aroma, flavour and acceptability; low pastiness: medium saltiness
 Fr – Auvergne: low aroma, flavour and acceptability; medium pastiness; high saltiness
 Fr – Bayonne: medium aroma, flavour and acceptability; high pastiness, high saltiness

SENSORY PROFILES



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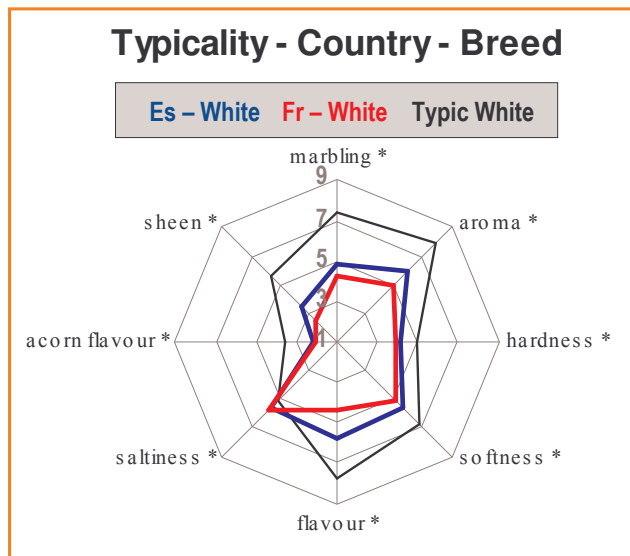
PCA ANALYSIS



Sensory profiling of hams allows discrimination of:
 Es – SW from the rest
 Es – Teruel from Fr – Auvergne and Fr – miscellaneous
 Es – miscellaneous, Fr – Bayonne and Fr – Lacaune have low values on PCA

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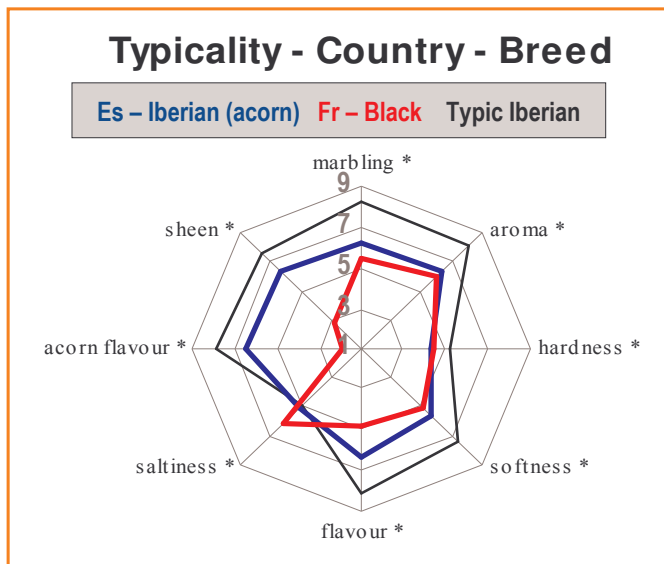
SENSORY PROFILES



Es – W: Profile is quite similar in form to the typical assessed by experts
 Scores are 1-2.5 points lower → Archetypic profile?
 Fr – W: Profile is not so similar
 Scores are even lower (exc. saltiness)

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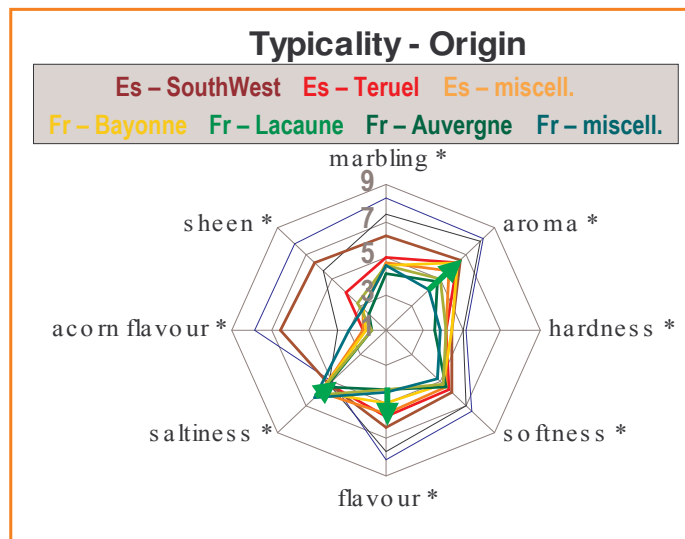
SENSORY PROFILES



Es – I: Profile is quite similar in shape to the typical assessed by experts
 Scores are 1-2.5 points lower → Archetypic profile?
 Fr – B: Profile is not so similar
 Scores are even lower, particularly sheen and acorn (ex. saltiness)

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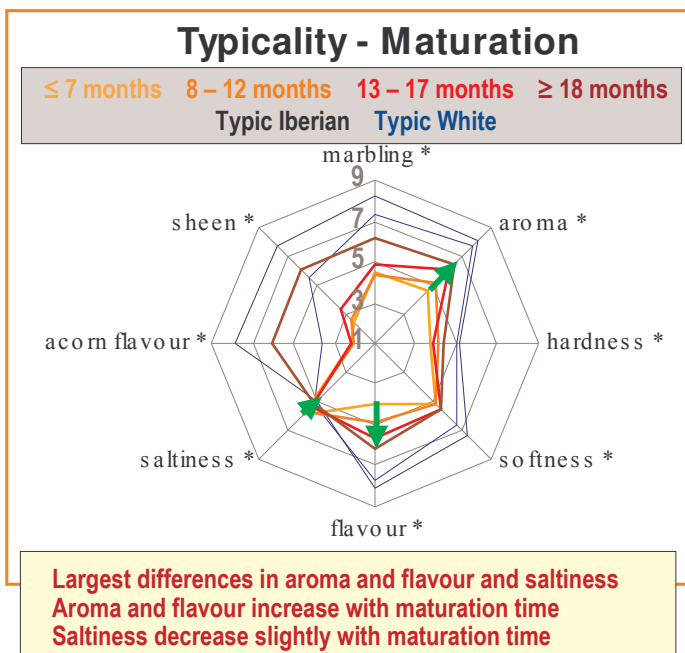
SENSORY PROFILES



Largest differences in aroma and flavour and saltiness
Es – SW = Es - I
Es – Teruel: most similar to Typic-White
Fr – Bayonne: most similar to Typic-White of French hams
Fr – Miscell.: most different from Typic-White

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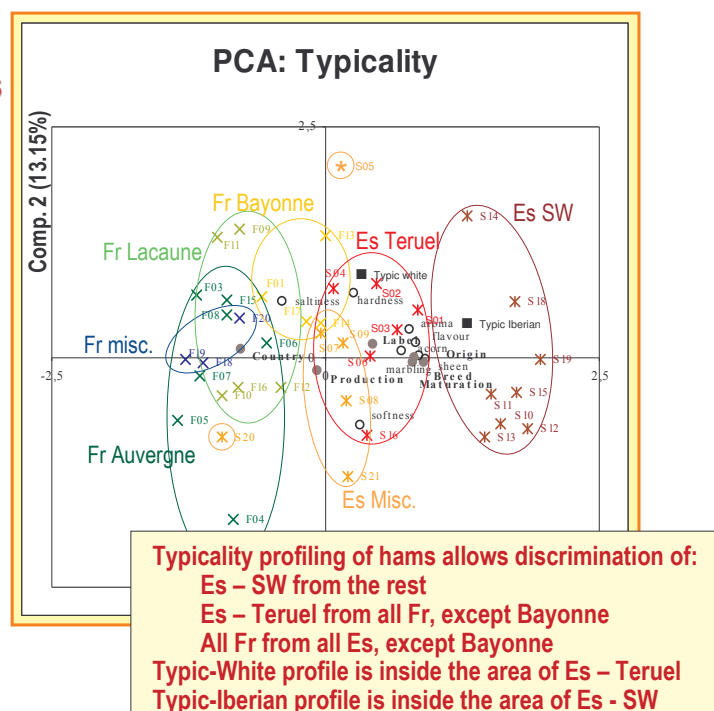
SENSORY PROFILES



Largest differences in aroma and flavour and saltiness
Aroma and flavour increase with maturation time
Saltiness decrease slightly with maturation time

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PCA ANALYSIS



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CONCLUSIONS

Sensory profiling of hams by Spanish and French panels was highly consistent. Sensory profiling of hams allows discrimination of Es – SW hams (Iberian) from the rest:

- They are characterized by high maturation, aroma, flavour, acorn flavour, shoen and rancidness.
- All other hams are hardly discriminated.

Spanish food chain experts agreed archetypical typicality profiles for Iberian and white-breed hams.

Typicality profiling of hams allows discrimination of:

- Es – SW from the rest.
- Es – Teruel from all French, except Bayonne.
- French from Spanish, except Bayonne.

Es – Teruel and Es – SW fit the best to Typic-White and Typic-Iberian profiles, respectively. Bayonne and Es – miscellaneous are close to Typic – White profile.

P. Roncalés, S. Del Río and I. Cilla.

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Sensory typicality assessment of wine Beaujolais and Dornfelder red wines

U. Fischer¹, J. Schröder¹, A. Samson²,
V. Cheynier², V. Lempereur³, B. Labarbe³,
P. Courcoux⁴, D. Bertrand⁴

¹ DLR-Rheinpfalz, Dept. Viticulture & Enology, Neustadt, Germany

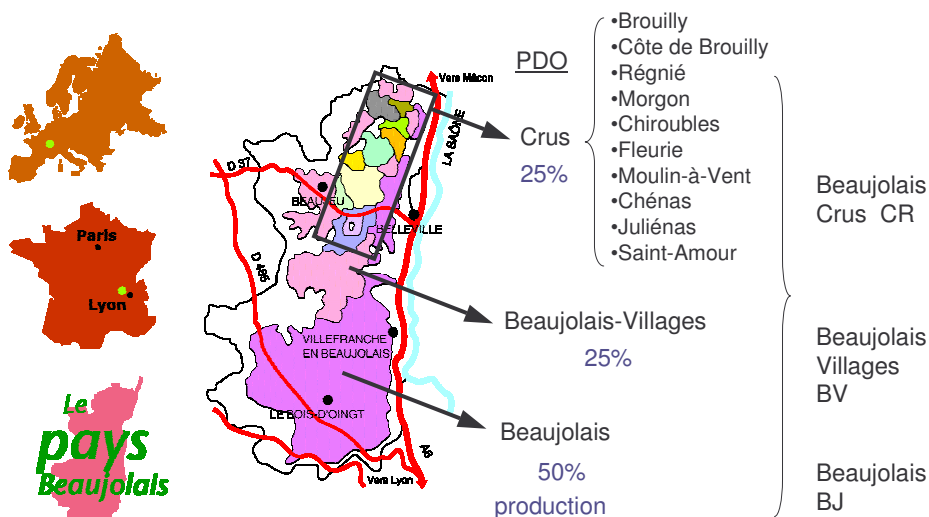
² INRA - Sciences pour l'Oenologie - Montpellier, France

³ Sicarex Beaujolais, Villefranche sur Saone, France

⁴ ENITIAA-INRA, Unité de Sensométrie et Chimiométrie, Nantes, France

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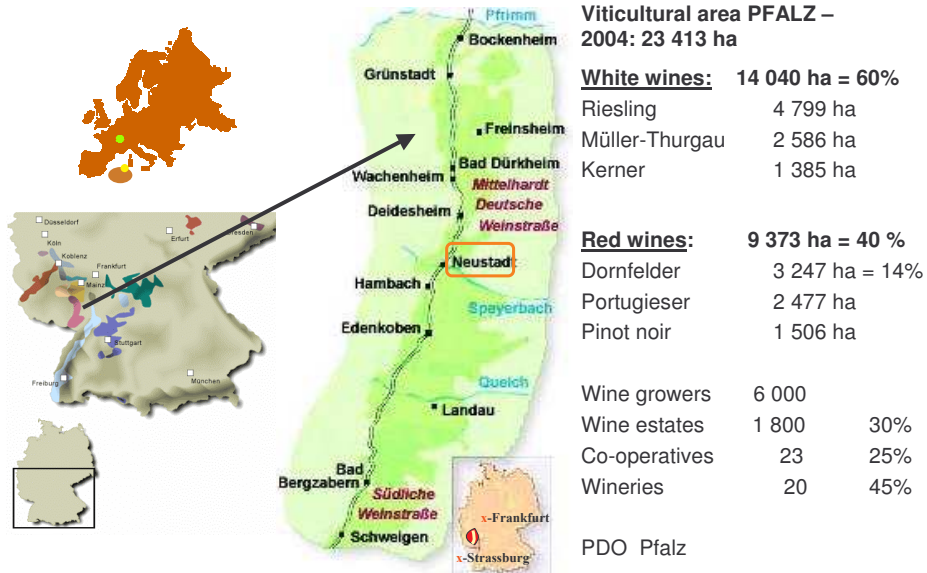
Beaujolais wines



SICAREX Beaujolais
Société de Commerce et de Distribution
de Vins et de Spiritueux de France

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German wine region PFALZ



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Questions which will be addressed

- ✦ Experimental design in the TYPIC project for wine
- ✦ How do the wines differ by descriptive analysis?
- ✦ How reproducible are sensory panels?
- ✦ Assessment of typicality by food chain actors
- ✦ What determines typicality - drivers of typicality

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Beaujolais and Dornfelder data sets

Common: 30 wines, two vintages, typic versus outsider
all were dry wines

✦ Differentiation due to quality hierarchy	✦ Differentiation due to producer type
✦ 5 Beaujolais Crus (CR)	✦ 10 wine estates (estate)
✦ 10 Beaujolais AOC (BJ)	✦ 7 co-operatives (co-op)
✦ 5 Beaujolais Villages (BV)	✦ 4 wineries (winery)
	✦ 3 discount chains (discount)
✦ 5 outsiders variety (OC)	✦ 2 outsider variety
✦ 5 outsiders region (OG)	✦ 4 geographic outsider (estate, 2 co-op, discount)
	✦ 10 Beaujolais wines
✦ 10 Dornfelder wines	
✦ QDA 2003 vintage 1999-2002	✦ QDA 2003 vintage 2002
✦ QDA 2004 vintage 2000-2003	✦ QDA 2004 vintage 2003

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3 Levels of sensory analysis

- ✦ Quantitative Descriptive Analysis (QDA) = trained panel
80 wines at INRA Montpellier, 80 wines at DLR Rheinpfalz
- ✦ Typicality assessment = Food Chain actors
60 wines at SICAREX, France,
60 wines at LWK Neustadt, Germany
- ✦ Preferences = 194 consumers in Germany
= 77 consumers in France

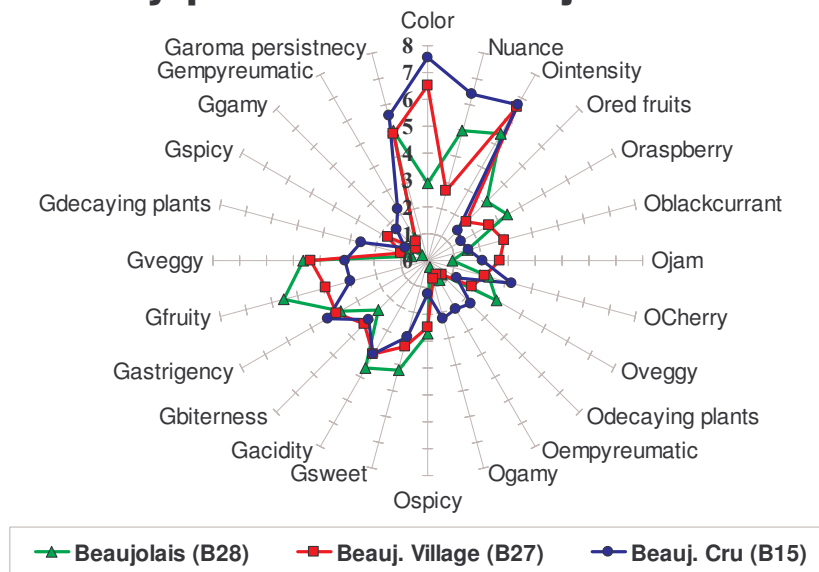
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Work place for Quantitative Descriptive Analysis (QDA)



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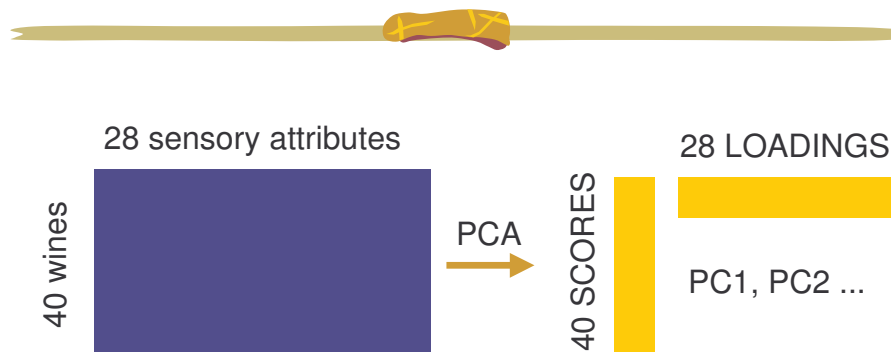
Sensory profile of 3 Beaujolais wines



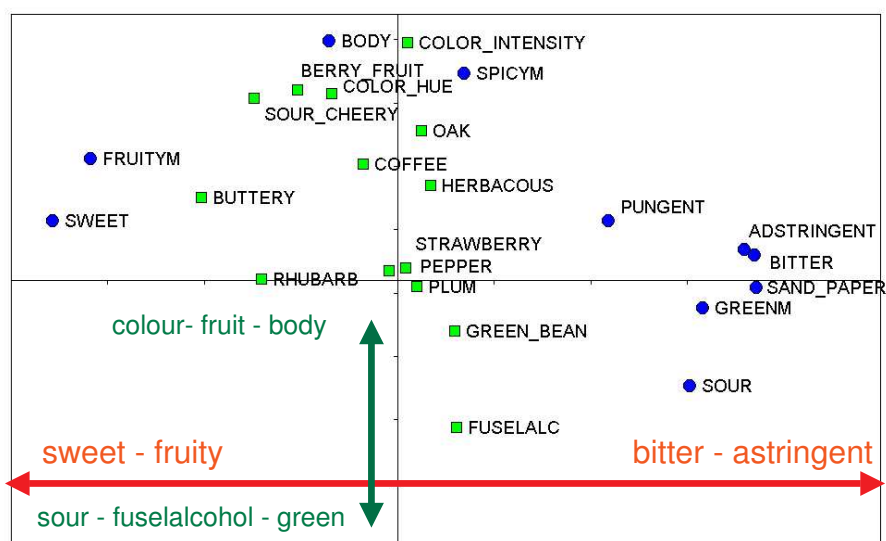
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What is the structure in the whole data set?

Principal Component Analysis

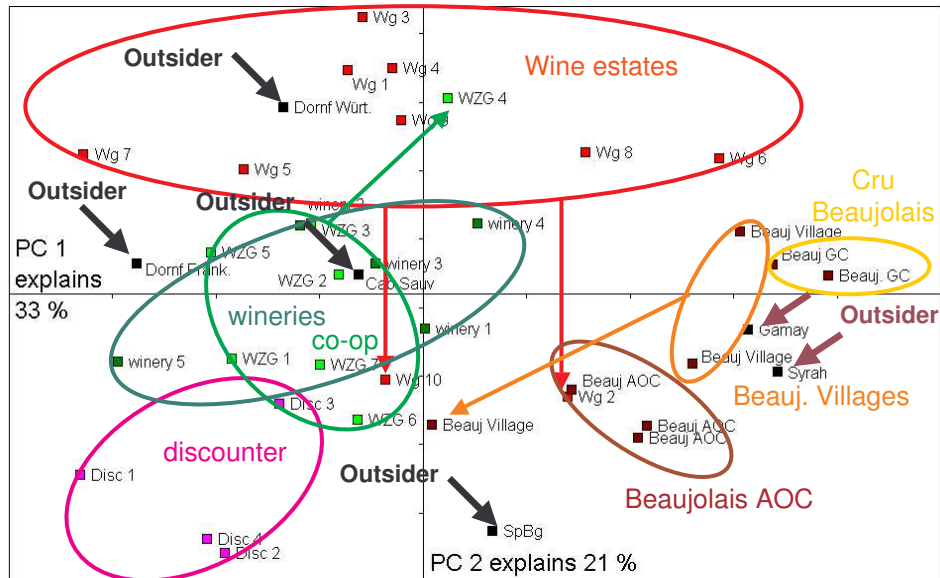


PCA Dornfelder + Beaujolais QDA 2003 - LOADINGS



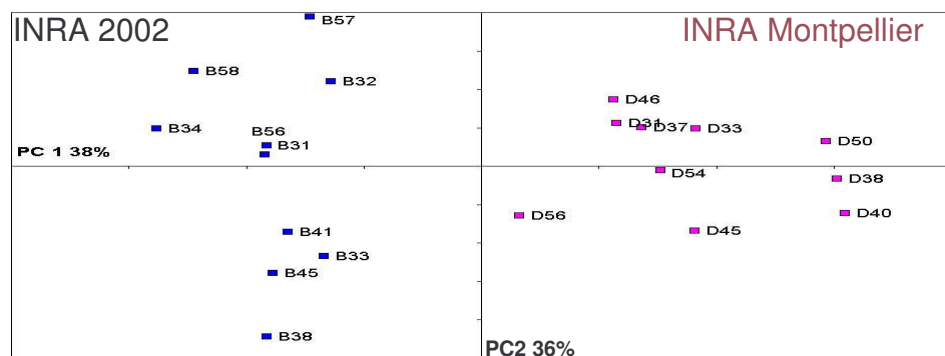
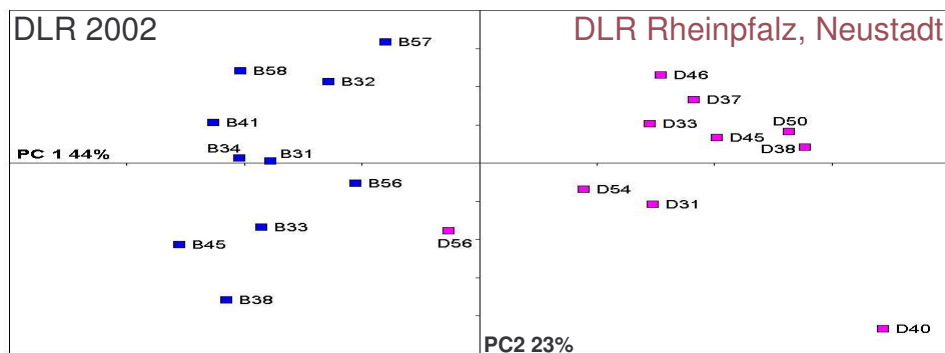
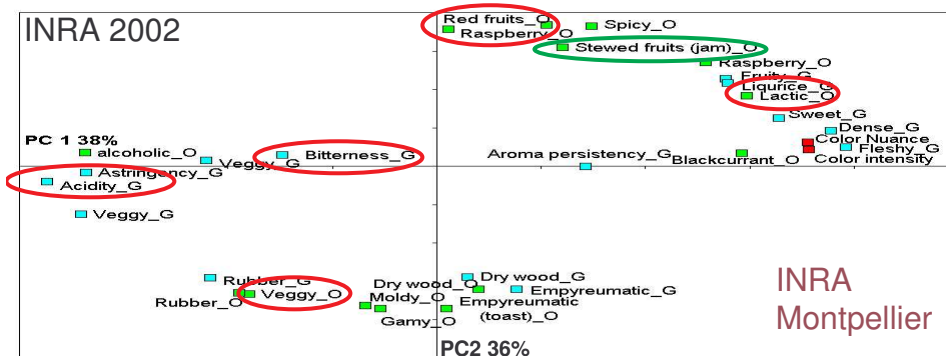
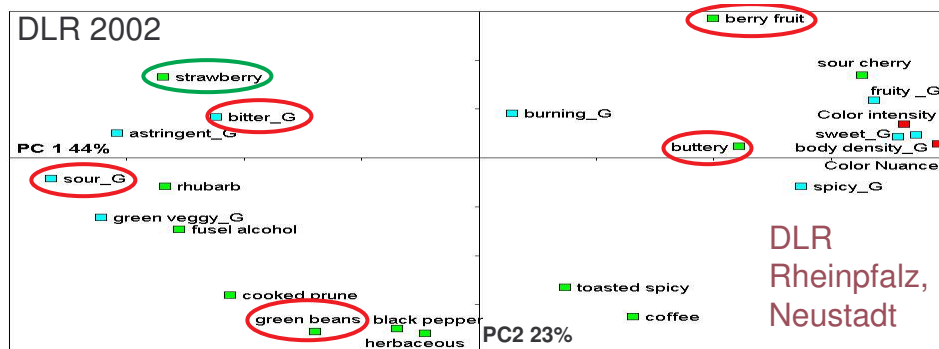
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PCA Dornfelder + Beaujolais QDA 2003 - SCORES



Is QDA a reliable
analytical method?

Congruence between two
trained panels



Development of a typicality assessment methodology

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**Focus group
discussion with
Food Chain Actors**

„Typicality“

**in rooms of
subcontractor**

**Landwirtschafts-
kammer
Rheinland-Pfalz
Neustadt**



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Typicality Assessment 08.04.2003 name:

Please assess the typicality of the presented 2002 dry Dornfelder redwine. The typic mark in the middle of the scale refers to a Dornfelder which is purchased by an average consumer. The more the evaluated Dornfelder deviates from this stereotype, the more you have to place your mark to the left or right side. The assessed typicality does not refer to your personal ideal of a Dornfelder, but to the stereotype offered to consumers.

Wine Number:

colour intensity	typical
too light	too dark

The **assessed typicality** does not refer to your personal ideal of a Dornfelder, but to the **stereotype** offered to the consumer.

green vegetative	typical
too weak	too strong

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Typicality Assessment through Food Chain actors



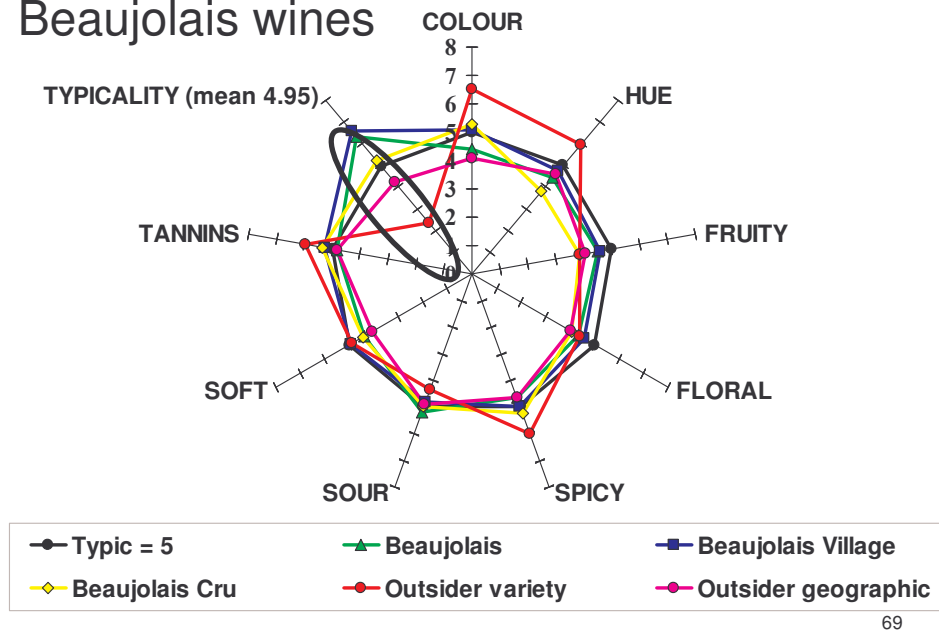
Landwirtschaftskammer
Rheinland-Pfalz in Neustadt

at the SICAREX,
Beaujolais

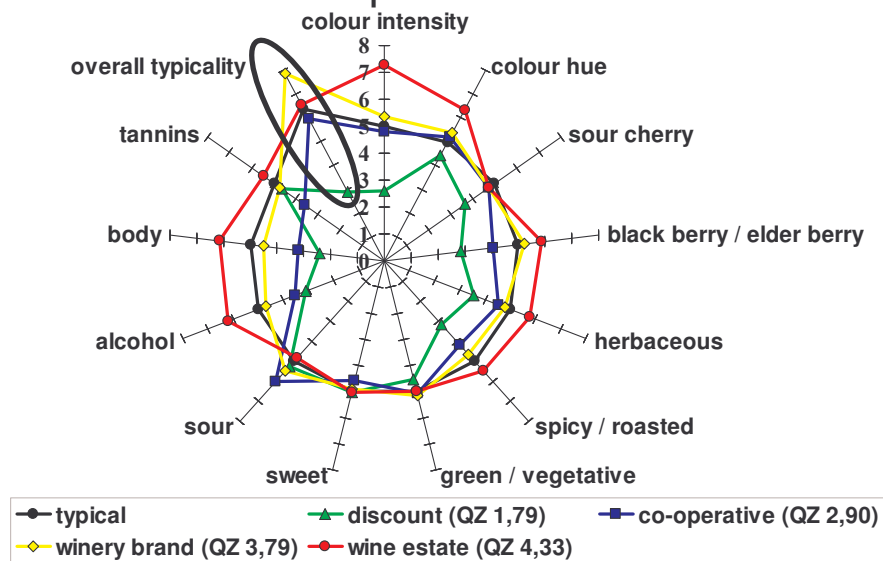


68

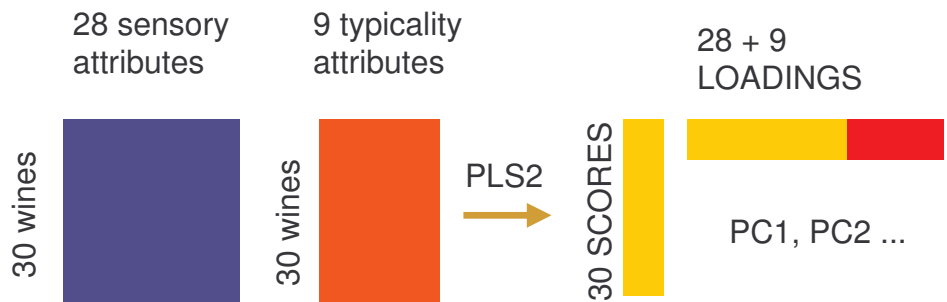
Typicality profile of 2004 evaluated Beaujolais wines



Typicality profile of 2002 Dornfelder wines of 4 producers

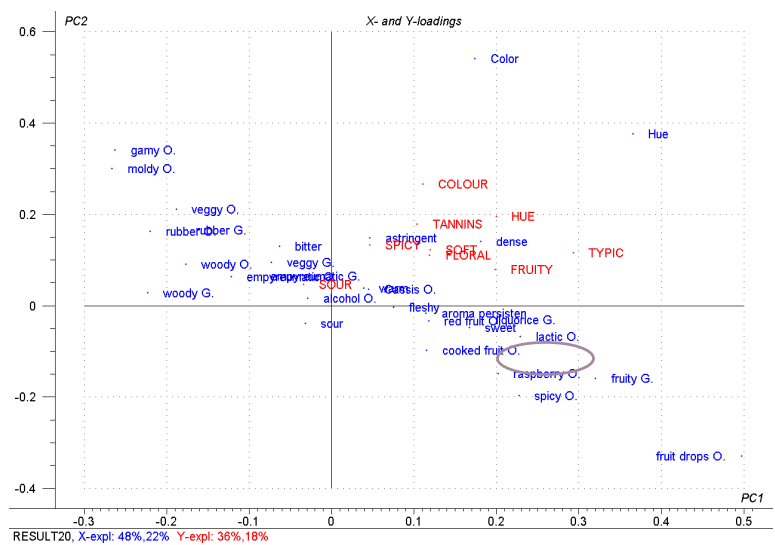


Congruence between trained panel (QDA) and expert assessment (Typicality)



71

PLS2 Beaujolais only, no outsiders: QDA regressing on expert typicality 2004 – LOADINGS

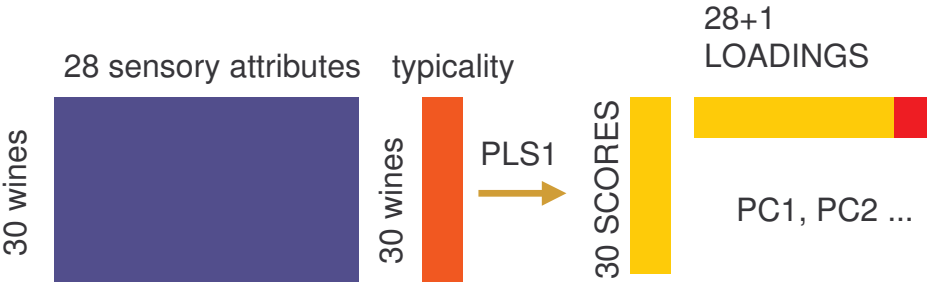


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Which sensory properties are linked with high typicality rating ?

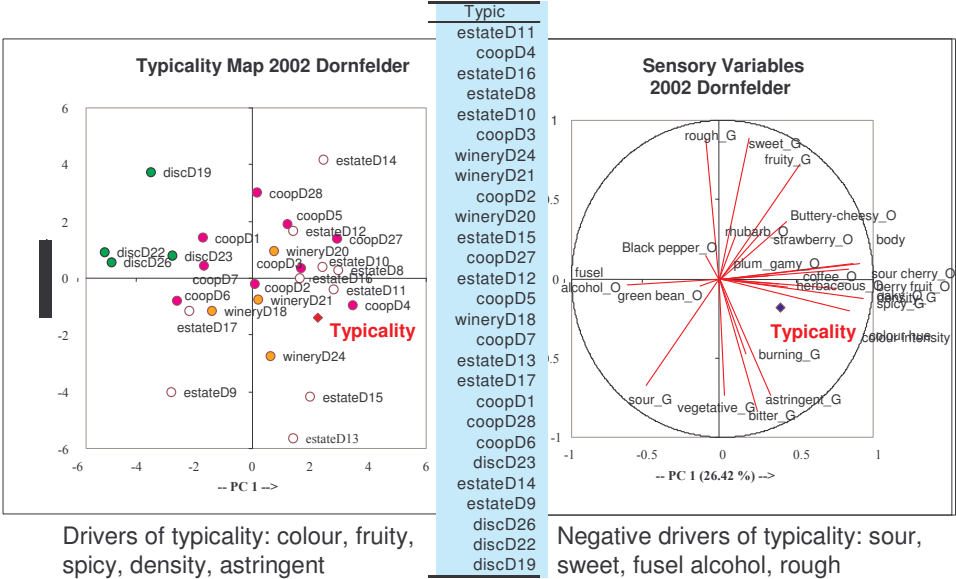


Drivers of Typicality for Dornfelder and Beaujolais



73

External Typicality Mapping Dornfelder 2002

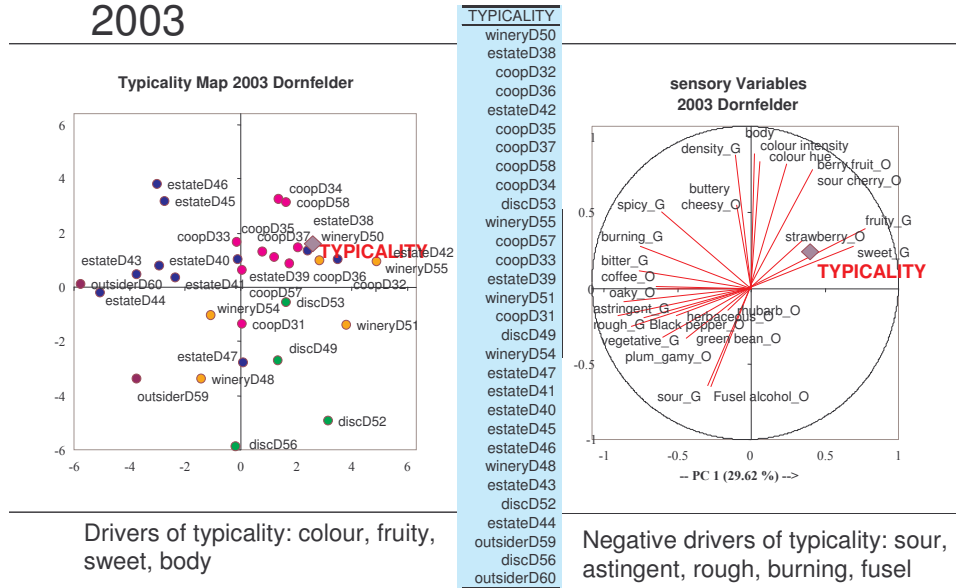


Drivers of typicality: colour, fruity, spicy, density, astringent

Negative drivers of typicality: sour, sweet, fusel alcohol, rough

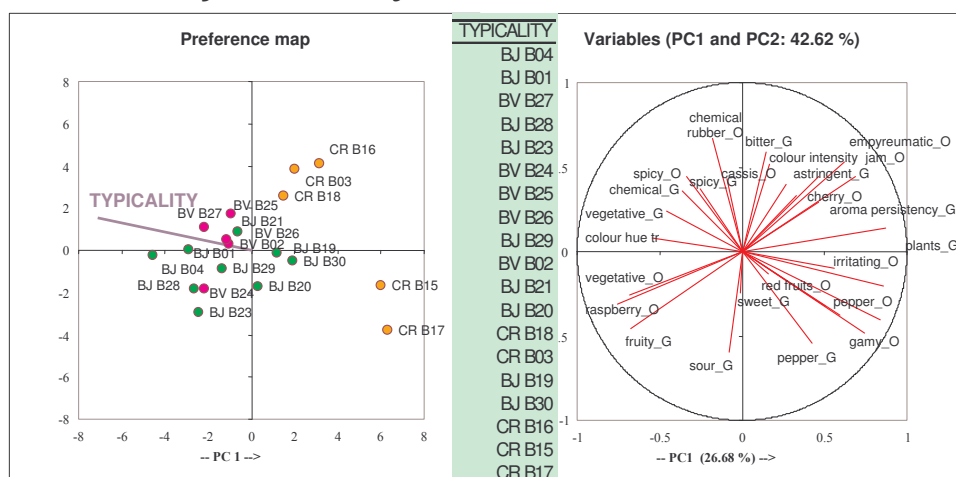
74

External Typicality Mapping Dornfelder 2003



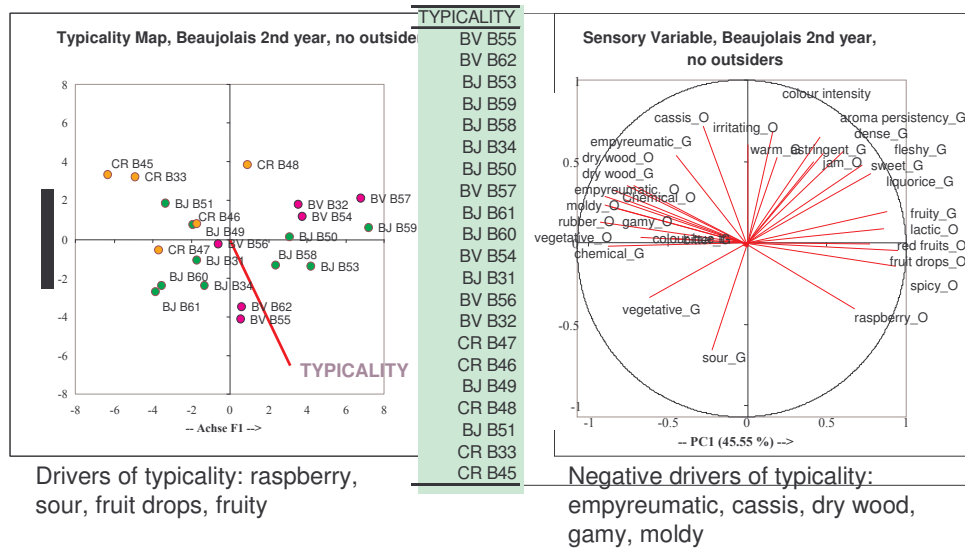
75

External Typicality Mapping Beaujolais 1st year



76

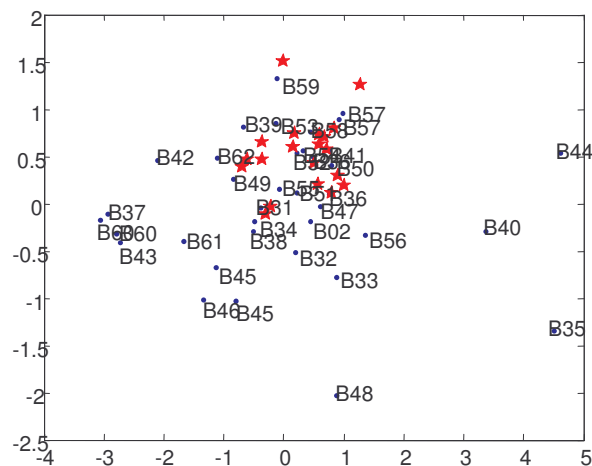
External Typicality Mapping Beaujolais 2nd year



77

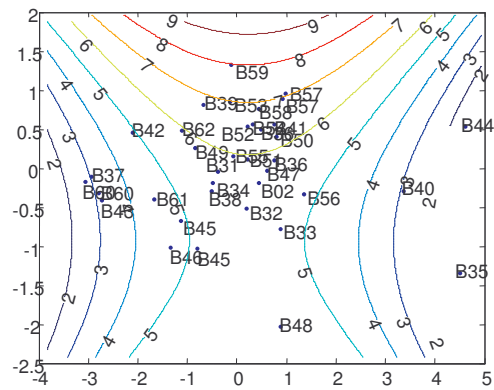
Are we able to predict typicality?

For each expert, projection of the 'ideal typical point'
(rating of 5 for each attribute)



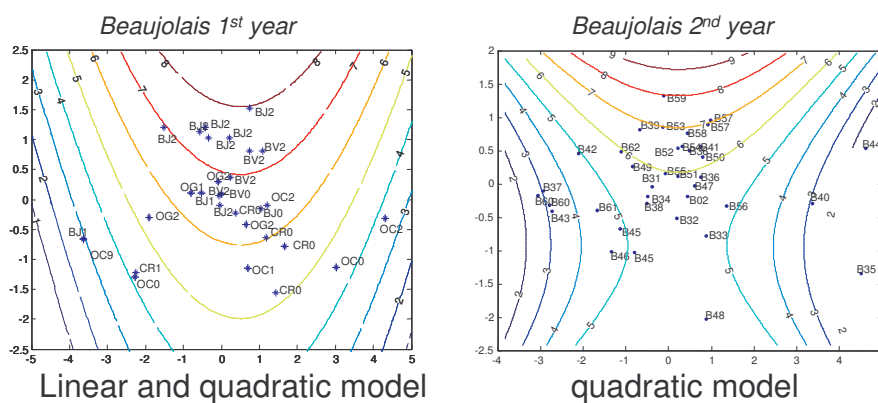
78

Prediction of typicality by CVA dimensions (quadratic model)



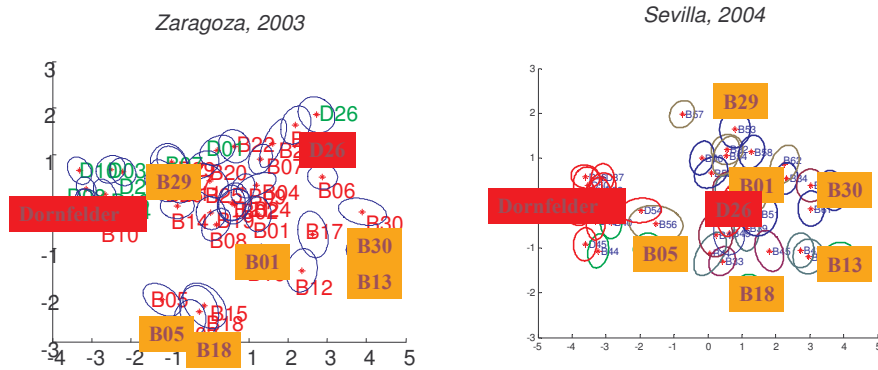
79

Perception of typicality for Beaujolais wines (prediction using quadratic models)



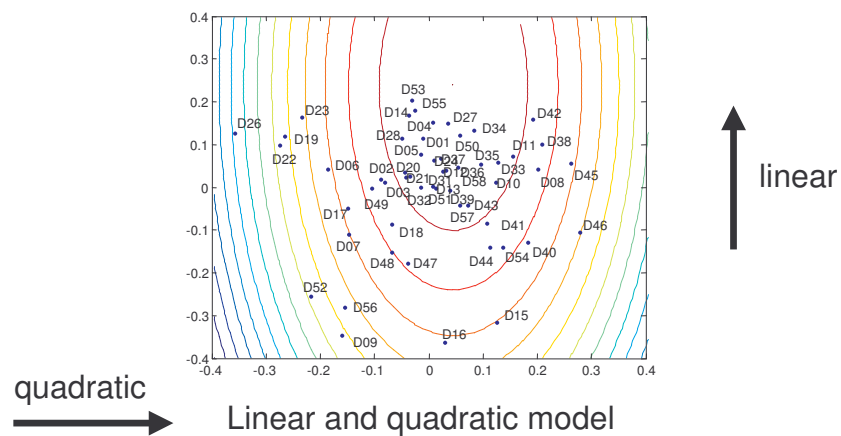
80

Example of the durability of typicality of wines (Sensory profile experiment)

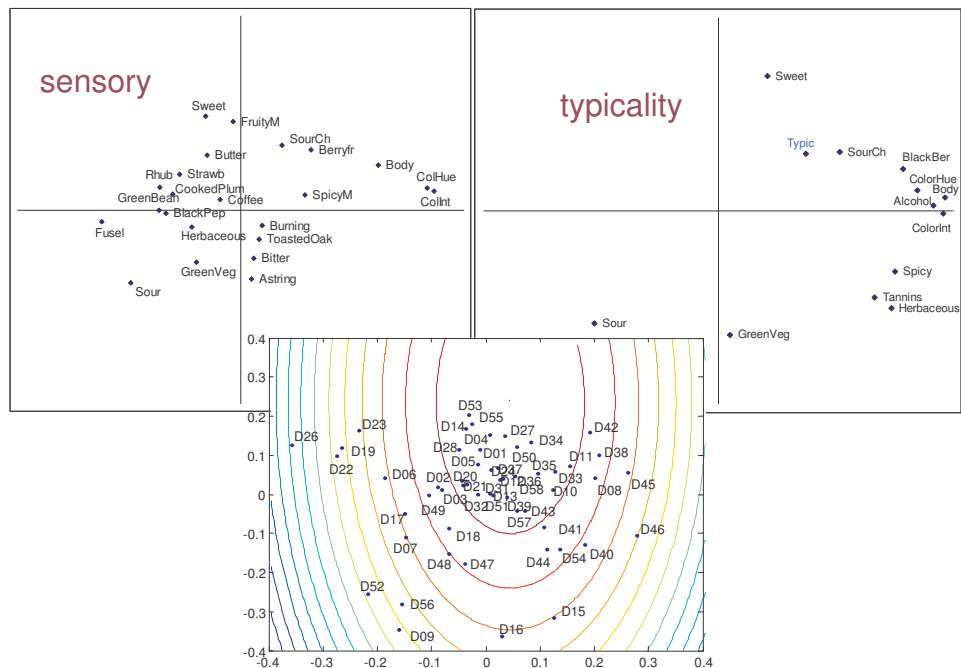


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Prediction of typicality of Dornfelder from 2002 and 2003 (quadratic model)



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Conclusion

- ✂ For Beaujolais, a good separation was observed between typical wines and outsiders, however less between quality levels.
- ✂ For Dornfelder, the type of producer and production for distinct distribution channels had a stronger impact on sensory and typicality properties than the geographic origin of the grapes.
- ✂ The QDA of the same 20 wines gave very similar results from both panels.
- ✂ Food chain experts gave consistent and reproducible results over two vintages, using the developed typicality scale. However, drivers for typicality differed strongly between both varieties and both countries.
- ✂ For Dornfelder positive drivers of typicality were colour, fruity and body, negative drivers were fusel alcohol, vegetative, sour and rough mouth feel.
- ✂ For Beaujolais positive drivers of typicality were fruity aspects like raspberry, vegetative, spicy notes; negative drivers were empyreumatic, gamy, but also sweet and fruity notes like cherry and cassis.

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