

INTRODUCTION

In a sensorial Quantitative Description Analysis (QDA) of several products, each descriptor have to be defined as they are free from hedonism.

The categorisation consists in making groups with different products. In this methods, as in other holistic methods, each judge compares the products **globally**, using their own criteria, thus we might wonder about the importance of its link with hedonism.

We envisage 2 main questions:

- Individual approach:** Are groups made by a given judge linked to the hedonism?
- Global approach:** Are groups, all judges taken together, homogeneous or differentiated by hedonism?

DATA COLLECTION

67 judges made a sorting task and gave an hedonic rate on 16 labels made according to the opposite experimental design 2⁷⁻³.

➤ **Sorting task:** the instructions were: "Regroup the 16 labels as:

- Two labels set in the same group confer to wines similar images;
- Two labels set in different groups confer to wines different images."

the amount of groups and the amount of labels per group were free: the only constraint was to make between 2 and 15 groups.

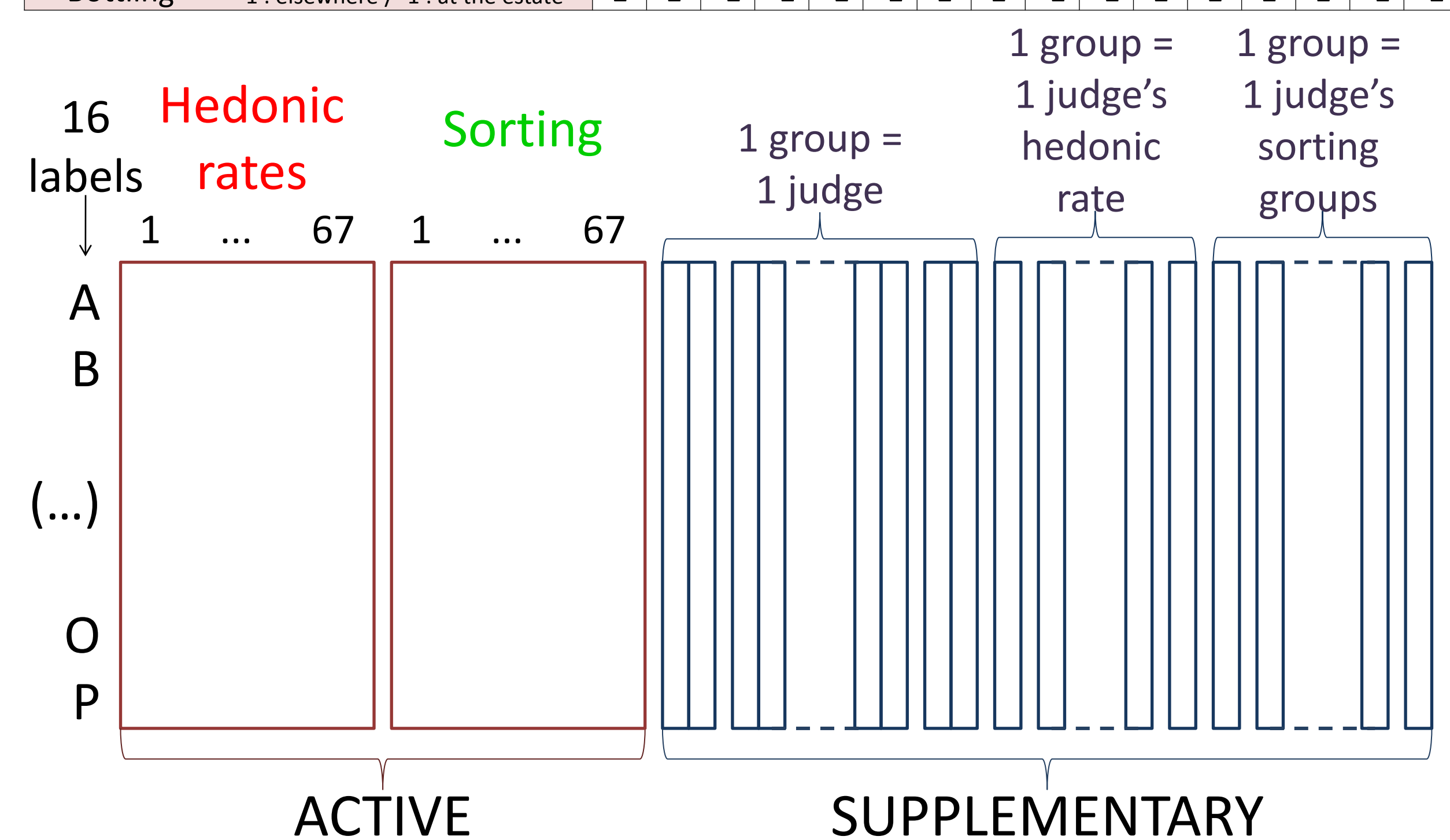
➤ **Hedonic rate:** the instructions were: "place all the labels on a two-meter ruler according to the quality you are expecting from the wine". The coordinate is the hedonic rate.



Factor	Label															
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Design	1	-1	1	-1	1	-1	1	-1	1	-1	1	-1	1	-1	1	-1
Designation	1	1	1	1	1	1	1	1	1	-1	-1	-1	-1	-1	-1	-1
Vintage	1	1	1	1	-1	-1	-1	-1	-1	1	1	1	1	1	1	1
Price	1	-1	1	-1	1	-1	1	-1	1	-1	1	-1	1	-1	1	-1
Medal	1	-1	-1	1	1	-1	-1	1	1	-1	1	1	-1	-1	1	-1
Aging	1	-1	-1	1	-1	1	1	-1	1	-1	-1	1	-1	1	1	-1
Bottling	1	1	-1	-1	-1	-1	1	1	-1	-1	1	1	1	1	-1	-1

METHODOLOGY

- Individual approach:** Analysis of Variance is made with the model: hedonic rate ~ sorting group: 37% (± 8%) of judges have a significant η^2 (their sorting is linked to their hedonic rates).
- Global approach:** Multiple Factor Analysis (MFA) is performed with the database opposite: 1 - First active group is the whole hedonic rates (quantitative variables); 2 - Second active group is the whole sorting groups (categorical variables); 3 - The database is duplicated but with a different structure: each judge is considered as a group containing one categorical variable (his sorting groups) and one quantitative variable (his hedonic rates); 4 - In a second duplication, each variable (hedonic and sorting) is considered as a group.



RESULTS

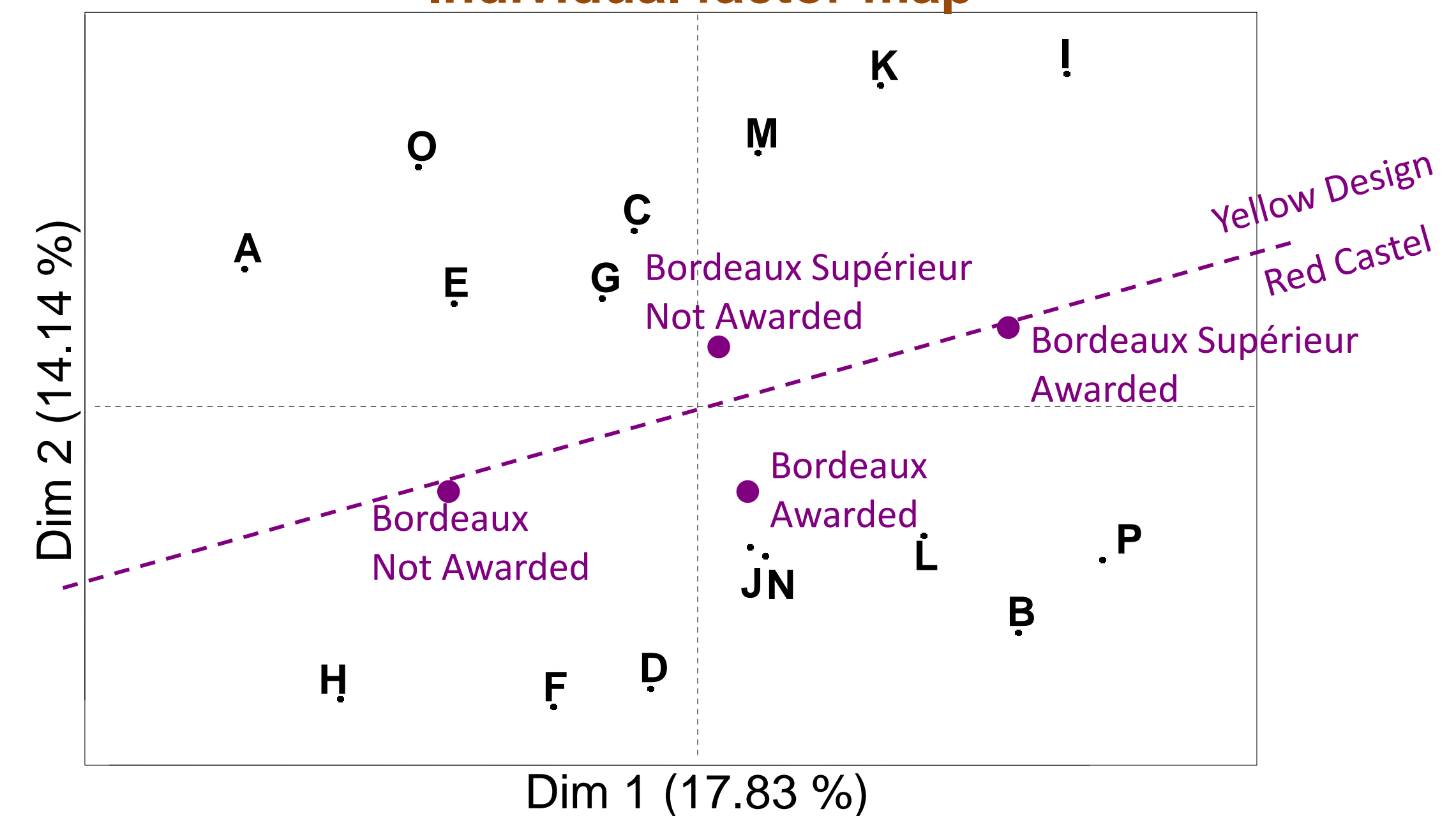
Performed with FACTOMINER

	Eigenvalues of separate analyses of each group				
	Dim 1	Dim 2	Dim 3	Dim 4	Dim 5
PCA	26,71	9,33	8,79	7,29	6,18
MCA	0,47	0,42	0,32	0,26	0,24

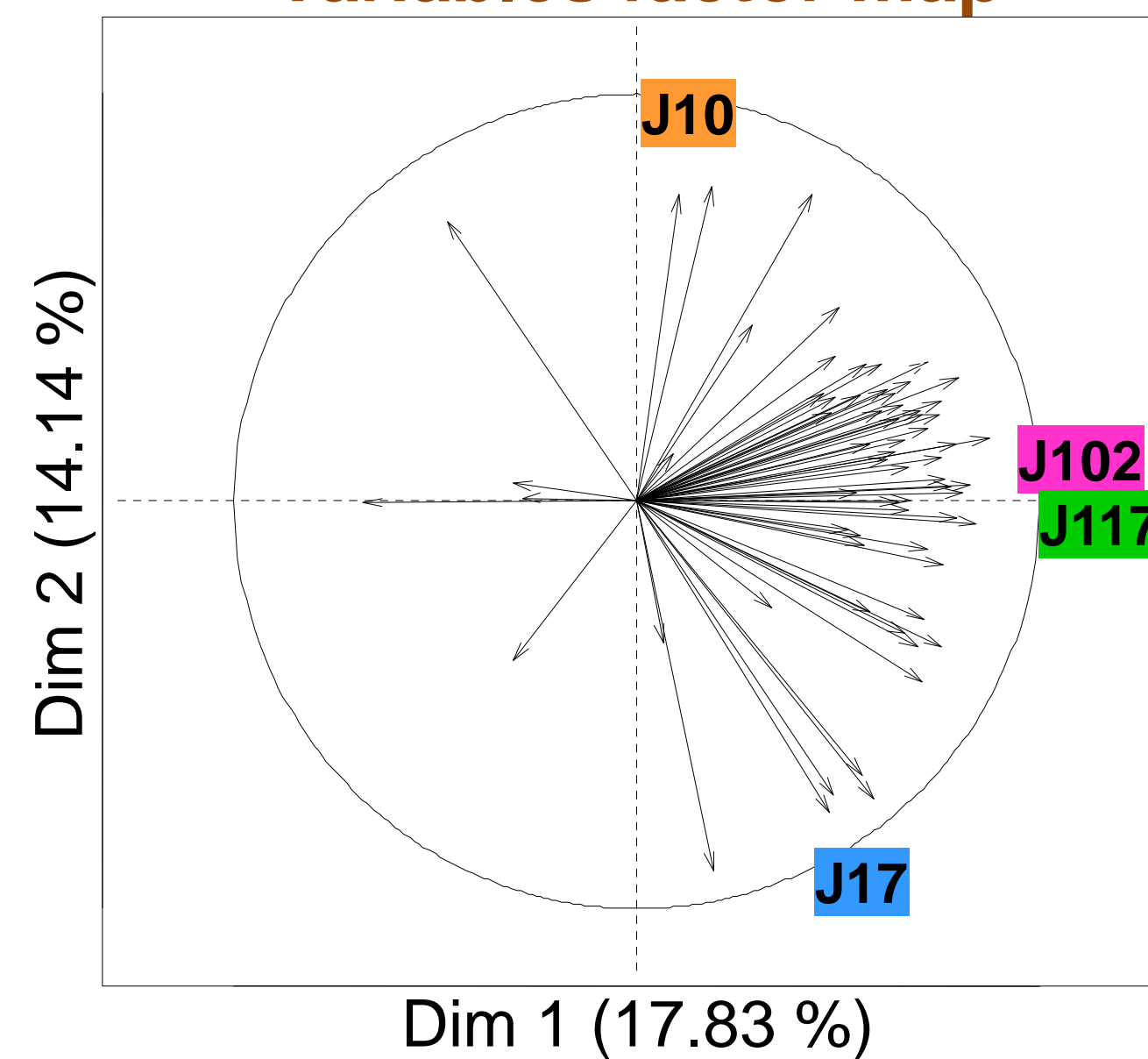
	Contributions of each groups to MFA factorial axes				
	Dim 1	Dim 2	Dim 3	Dim 4	Dim 5
Preference	0,95	0,31	0,28	0,28	0,33
Sorting	0,68	0,99	0,77	0,64	0,51
MFA eigenvalues	1,63	1,30	1,05	0,91	0,84

Regarding to first eigenvalues of separate analyses, it is impossible to mix directly the two types of variables. Contributions of the two active groups to the MFA axes shows how the MFA balanced their influence.

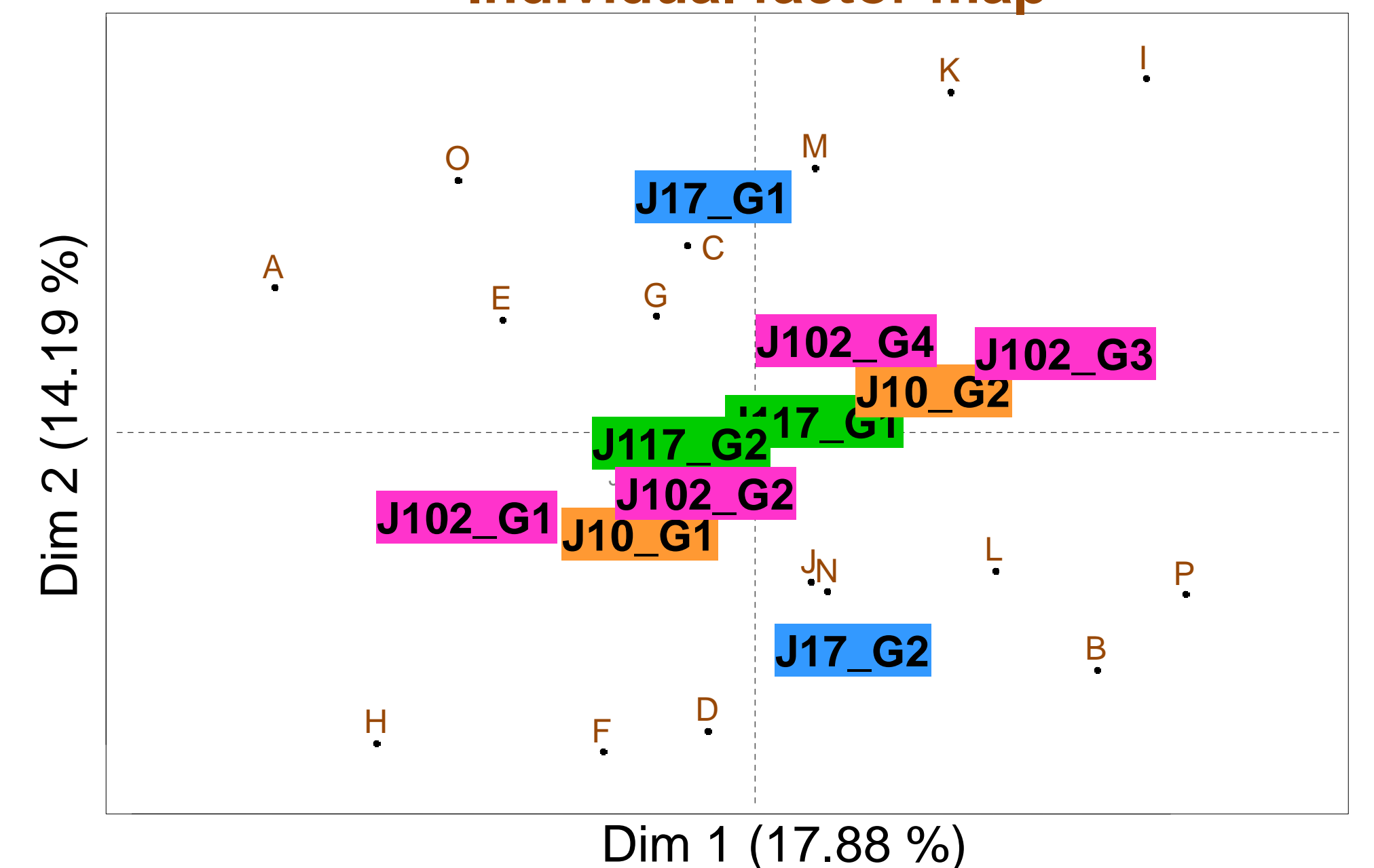
Individual factor map



Variables factor map



Individual factor map



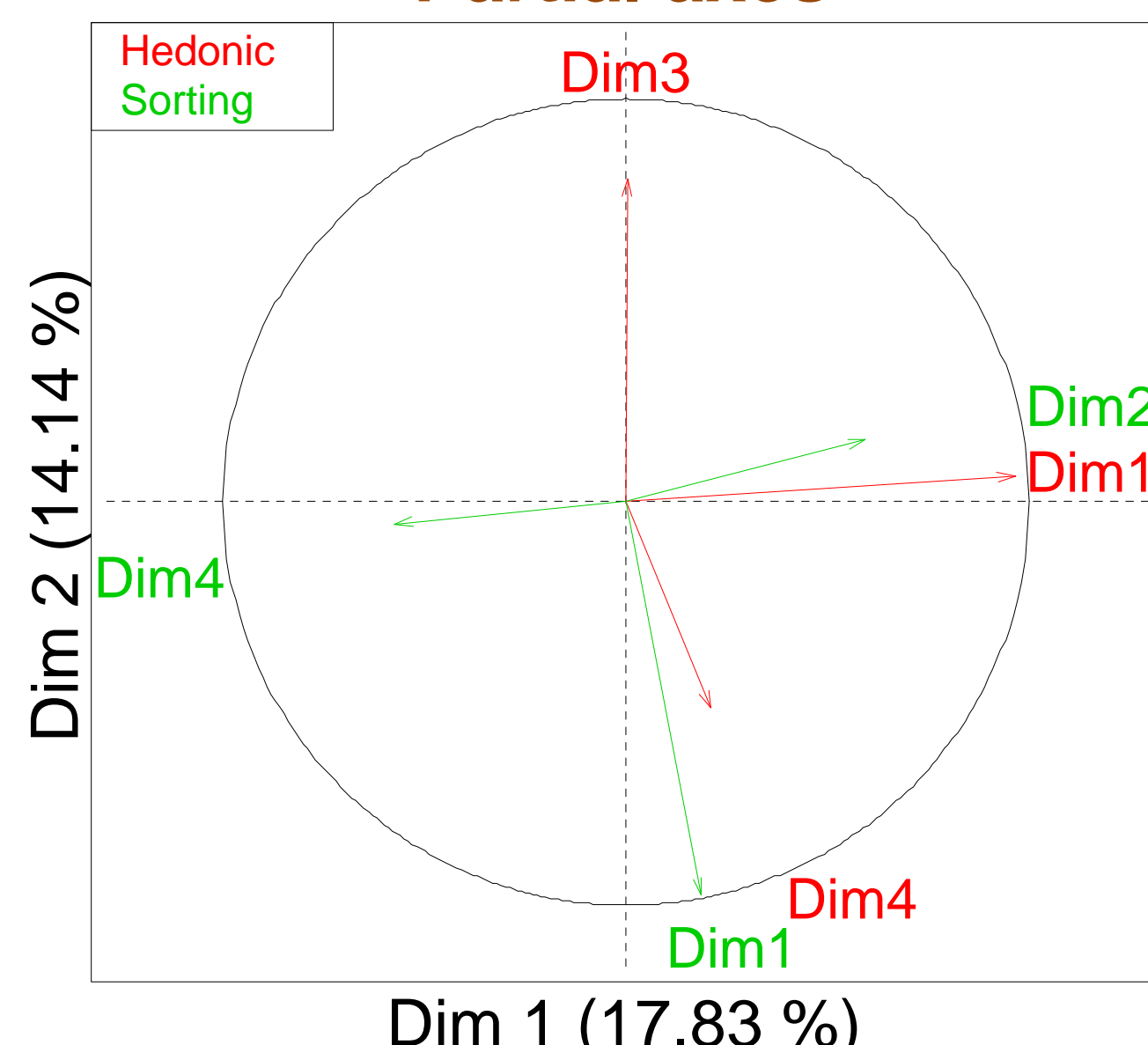
Two close labels are similar according to the hedonism (they are liked by the same person) and globally sorted in the same groups.

Labels characteristics are in the centre of gravity of the labels containing it. The first dimension separate labels according to the Designation and the presence of a Medal; the second dimension separates the 2 different Design.

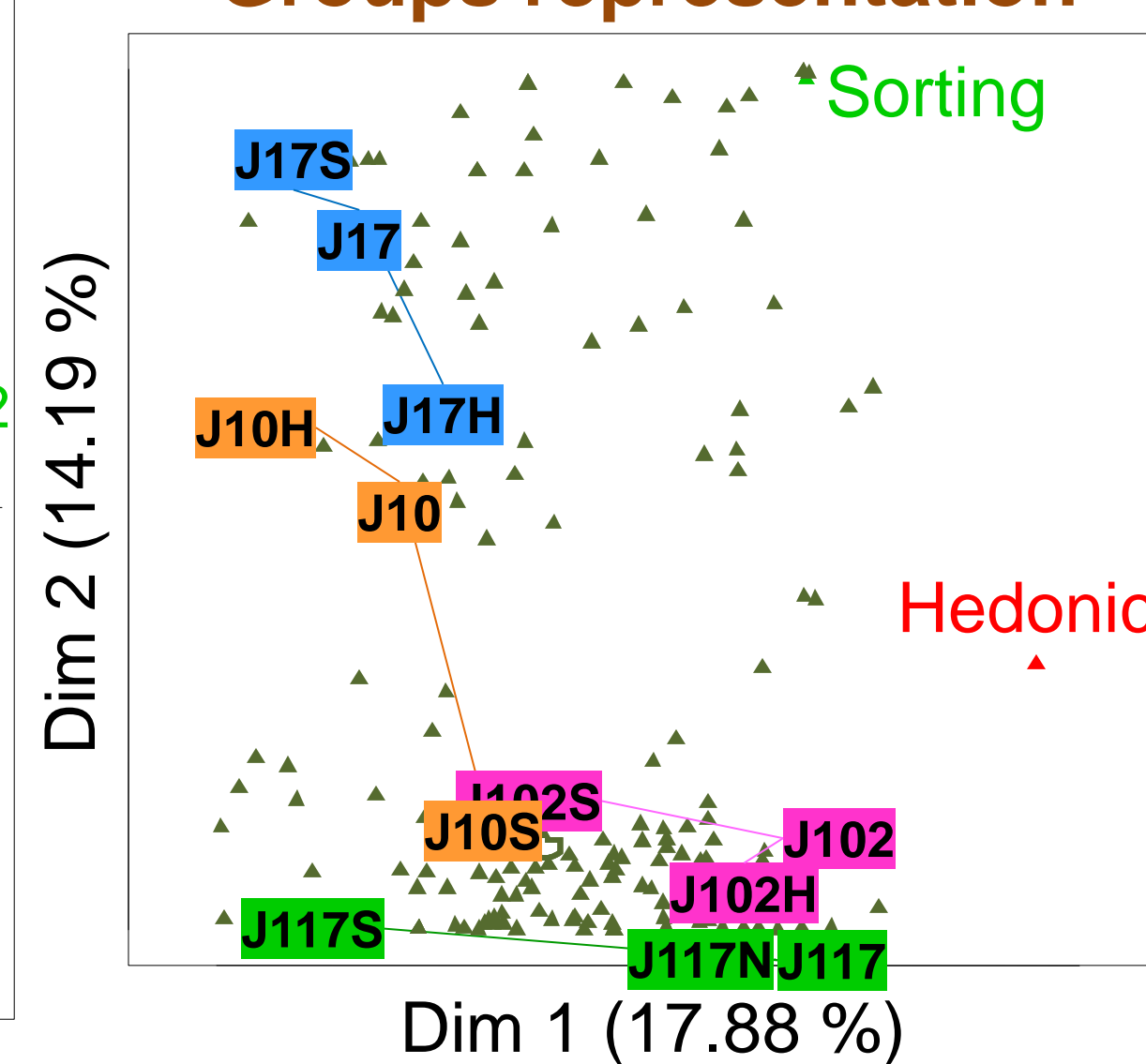
Interpretation as in PCA: There is a consensus between judges: hedonic rates lay in the same direction. According to most of the judges the expected quality is linked to the Designation and the Medal (e.g. J102 and J117); as regards others, J17 and J10, the expected quality depends first to Design (both do not like the same Design).

Interpretation as in MCA: Each groups made by one judge is represented in the centre of gravity of the labels it contains. J17 and J10 rate according to the second dimension but only the J17 makes his groups in the same way. Like J17, the J102 has both hedonic rates and groups linked with the same dimension but for J102 it is the first one.

Partial axes



Groups representation



J17H: Hedonic rates for the judge 17 (quantitative variable); J17S: Judge's partition for the sorting task (categorical variable); J17: Both hedonic rates and partition of the judge (group with categorical and quantitative variables).

The factorial coordinate on the dimension s of a point j is the measure Lg of the link between s and j. Lg=R² if j is one quantitative variable (e.g. J17H); Lg=η² if j is one categorical variable (e.g. J17S). Hedonic group is highly correlated with the first dimension. Sorting is more correlated with the second dimension than the first one.

J17 and J10 are similar according to the hedonic aspect but the J17's sorting is very linked to the second dimension and J10's sorting is not.

CONCLUSION

This example illustrates how MFA analyses simultaneously one categorical and one quantitative group in order to compare them. It provides a representation of quantitative variables as in PCA and a representation of categorical variables as in MCA. It also provides a representation of the groups of variables including the two types of variables.

For approximately one third of judges there is a link between sorting task and hedonic rates. Most of the judges agree with each other concerning the hedonic aspect but not concerning the sorting task, so the diversity of the sorting task can not be explain by hedonic rates.