The Ideal Profile Analysis:

From the formulation to the optimization of skin creams

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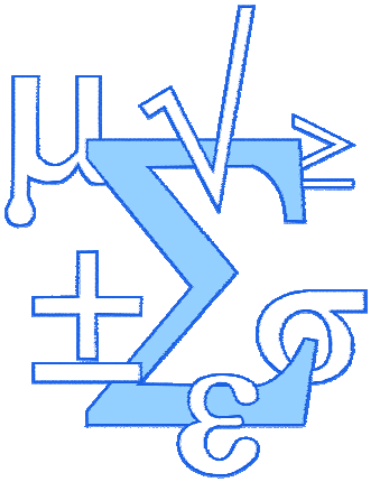

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Introduction

In sensory, it is common sense to ask experts/trained panels to describe the products of interest. This generates the so-called product profiles.

In parallel, consumers are asked to rate the same products on overall liking.

Alone, this information (sensory or hedonic) is not valuable: it has to be combined. This can be done statistically, using different methodologies.

Among these methodologies, we can mention:

- the external preference mapping (PrefMap);
- the Landscape Segmentation Analysis (LSA);
- etc.

Introduction

Since the consumers are the final decider of the marketplace success, could we ask them directly to do both tasks?

The consumer would then provide the sensory profiles and the liking scores of the products.

Such procedure would have the advantage that the perception and the liking information are directly linked.

Introduction

Actually, in practice, when consumers try products, for instance in supermarkets, or in the street, we could hear them commenting on the products by either saying…

- "that's pretty sweet" → sensory description
- "hmmm that's very good!" → hedonic score

or eventually…

- "I don't like it that much!!! It's too sweet for me!" → JAR scale

In the literature, many studies have shown that consumers are able to describe products according to these different tasks.

Still, another question could be asked to them…

The essence of the IPM

What is your ideal?

Introduction to the Ideal Profile Method

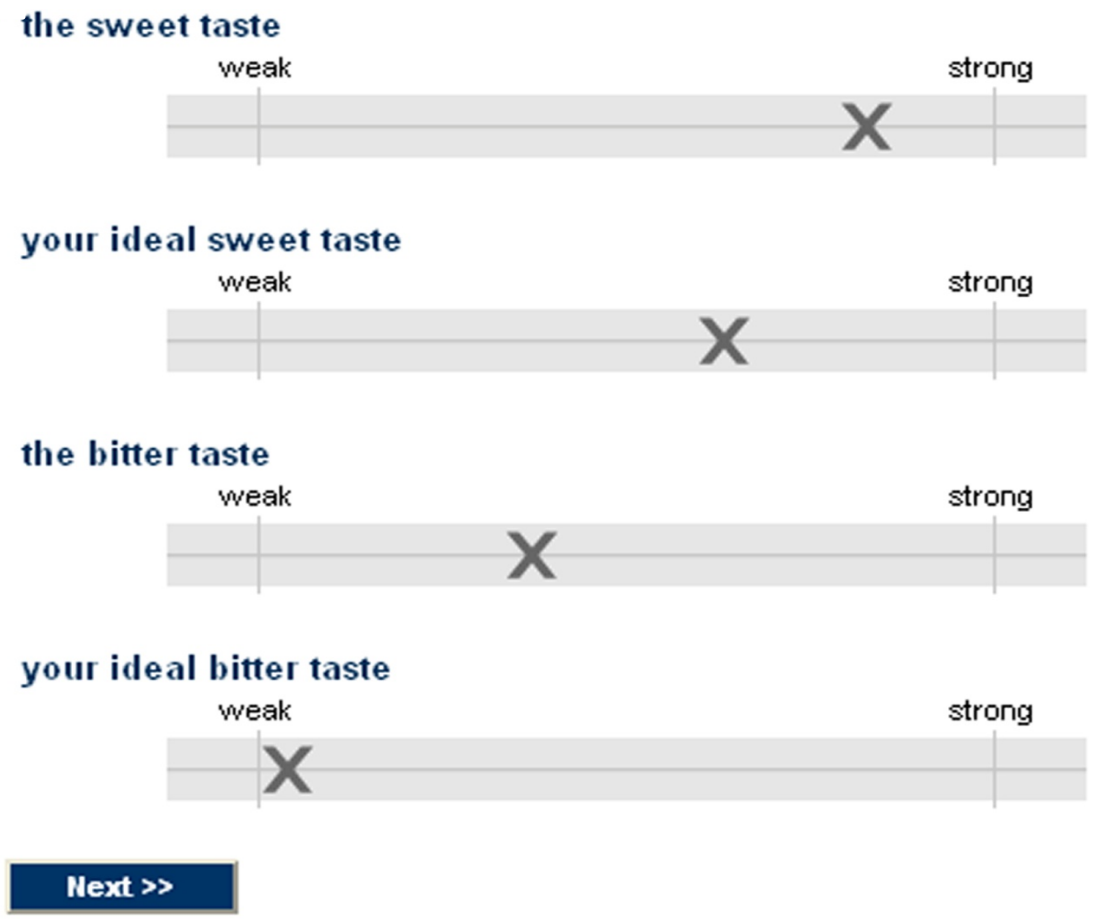
The IPM is a sensory methodology in which:

- consumers rate the products on both their perceived and ideal intensities alternatively for a list of attributes using the same scale;
- consumers rate the products on overall liking.

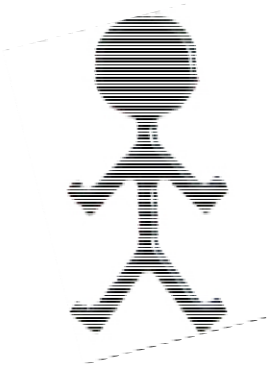
In this sense, it is a mix of quantitative descriptive analysis (such as QDA®) and JAR scaling except that:

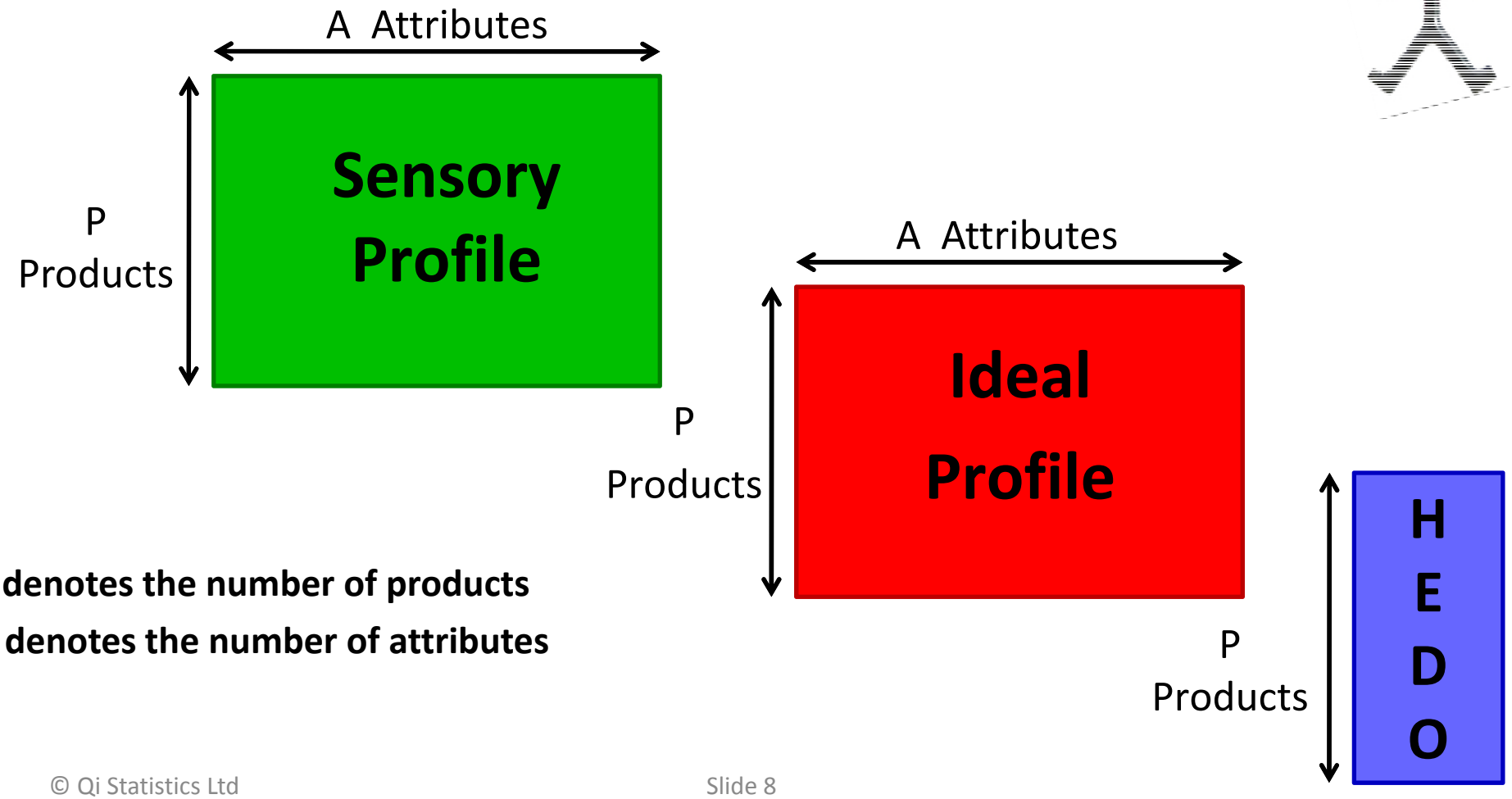
- compared to QDA®, the sensory profiles of the products are obtained from consumers;
- compared to JAR, the ideal scores are described explicitly.

The IPM in practice…right now!!!



IPM Data





P denotes the number of products

A denotes the number of attributes

Some *expectations* about the ideals

By definition, an ideal is:

"A conception of something in its absolute perfection."

"One that is regarded as a standard or model of perfection or excellence."

"An ultimate object of endeavor; a goal."

"Considered the best of its kind."

"Completely or highly satisfactory."

Source: www.thefreedictionary.com

Sensory definition of an ideal product

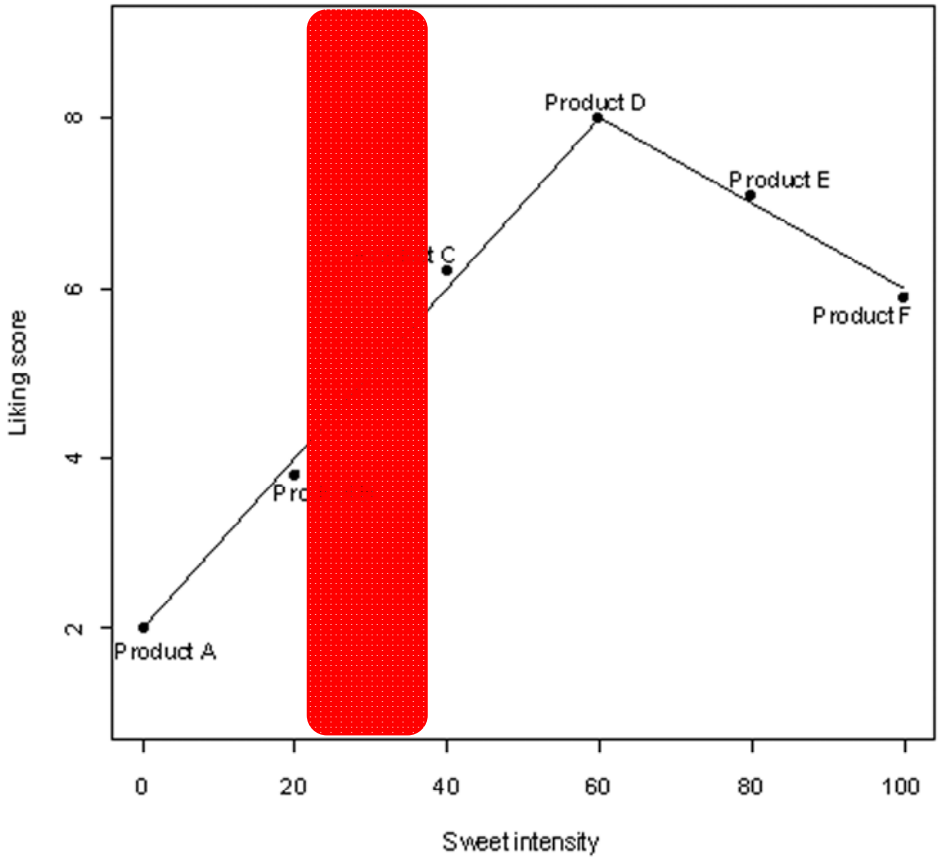
The sensory definition of an ideal product would be:

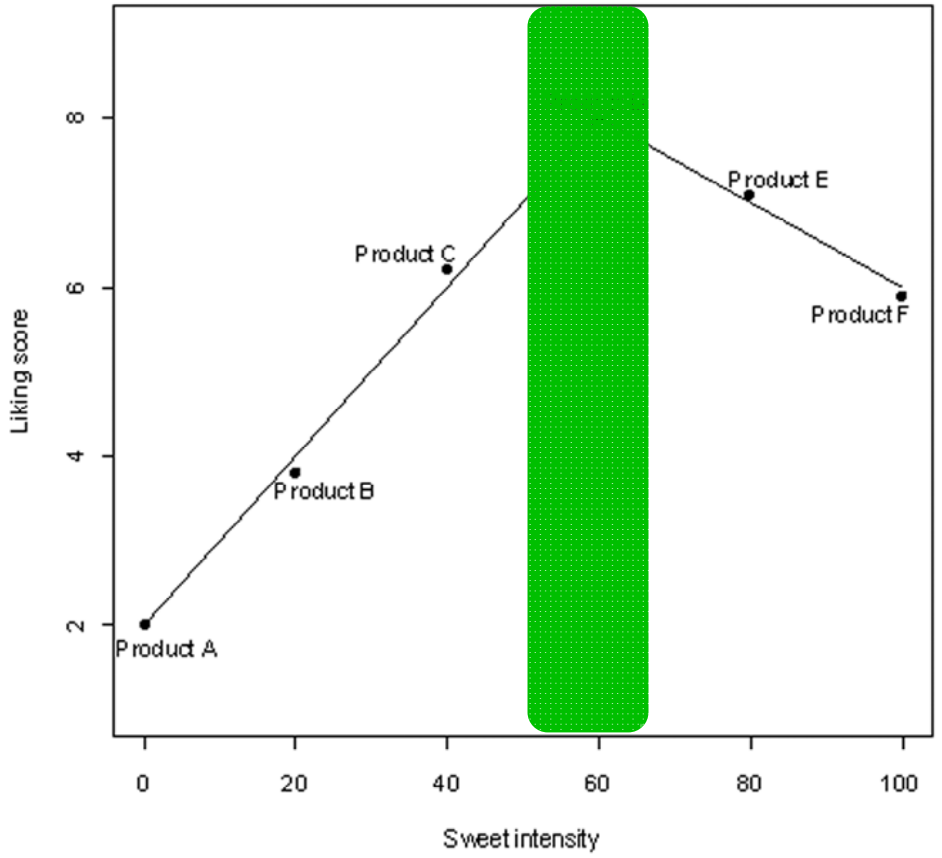
"It is a product with particular sensory characteristics, which would maximize liking."

In the ideal information, notions of sensory and hedonic are involved.

In some sense, the ideal is making the (sometime) missing junction between sensory and hedonic…

The ideal as link between sensory and liking





Sensory consistency

Sensory consistency:

The ideal data provided by a consumer is consistent if the sensory profile associated to this ideal has similar sensory characteristics as the most appreciated product.

From an attribute point of view, this means that consumers who said they have a higher appreciation for the products perceived as *sweeter* should also rate their ideals as rather *sweet*.

Hedonic consistency

Hedonic consistency:

The ideal data provided by the consumers should correspond to products which would be more appreciated than the products tested.

The ideal product of a consumer should hence be associated to a liking score (liking potential) which should be larger than the liking scores given to the products tested.

Tool for optimization

Optimisation:

The Ideal product should be used to improve the products. However, in practice, it cannot be considered as a recipe as it is.

The guidance provided should take into consideration whether attributes are drivers of liking or not, as well as the deviation between perceived and ideal intensities.

Tool for optimization (bis)

The procedure of optimisation only makes sense if the consumers associated the product set to one unique ideal. The consumers' variability in their ideal should also be considered (clustering).

Single vs. Multiple ideals:

During the test according to the IPM, consumers were asked to describe their ideals based on each product tested. For homogeneous product categories, the consumers should associate the set of products to one unique ideal. If different sub-categories exist, multiple ideals are found.

Tool for optimization (ter)

The ideal product used for the optimisation (ideal of reference) should be optimal for the largest possible group of consumers.

Ideal of Reference:

It is the best ideal product that could be considered to improve the products tested for an homogeneous group of consumers. These groups can be defined according to the classical clustering methodologies.

The Ideal Profile Analysis

Finally, the procedure to analyse ideal data (called Ideal Profile Analysis) is done in four steps:

1. Checking for the consistency of the ideal data
   a) Sensory consistency
   b) Hedonic consistency
2. Determining homogeneous subgroups of…
   a) Consumers by clustering
   b) Products via the “Single vs. Multiple ideal” procedure
3. Defining the ideal of reference
4. Guide on improvement

Illustration and validation

Formulation of skin creams

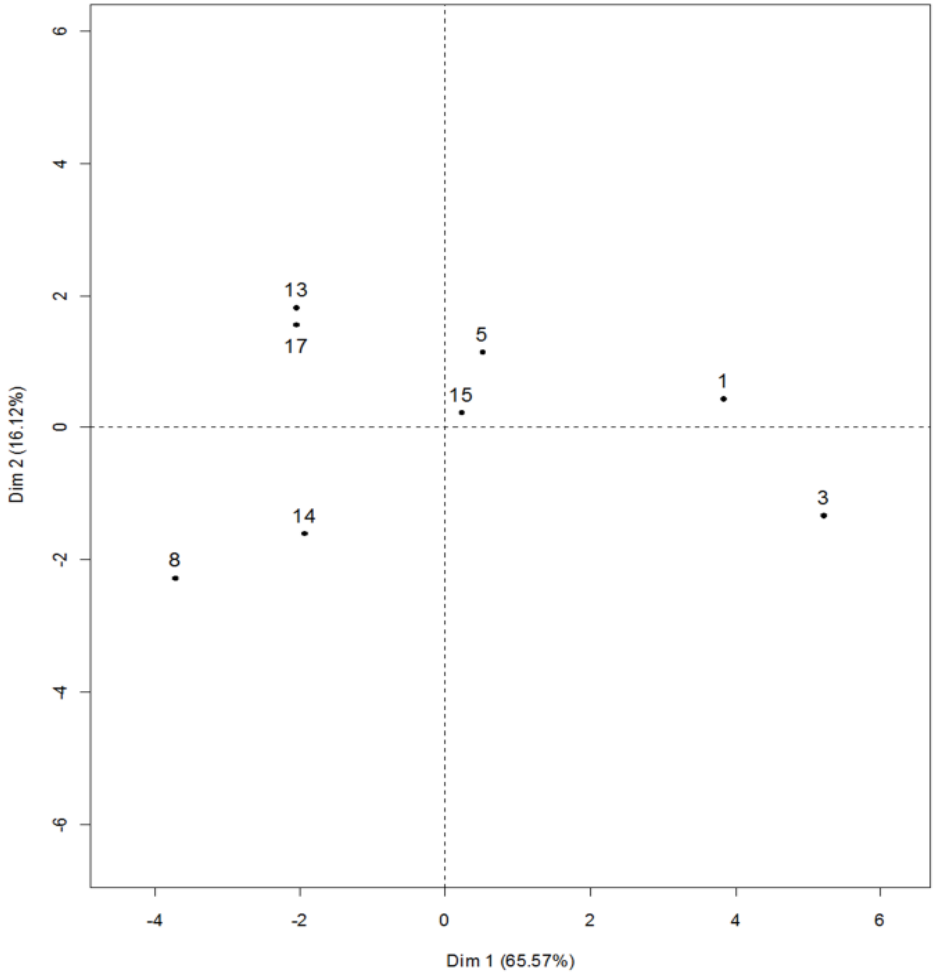
Skin Creams

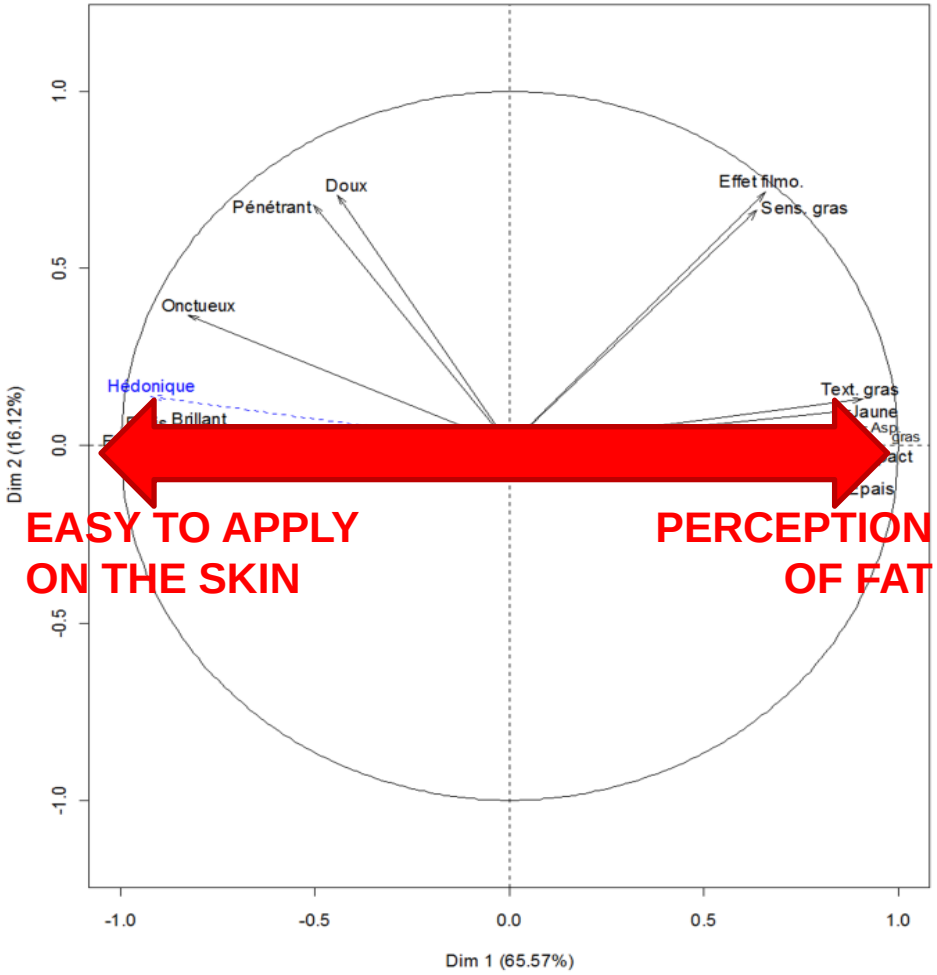
18 skin creams have been created according to an experimental design involving 4 factors:

- quantity of coemulser MF (ranging from 0,5% to 10%);
- quantity of coemulser VE (ranging from 0,5% to 10%);
- quantity of vegetal oil (ranging from 10% to 30%);
- type of vegetal oil (sesame or macadamia).

Based on a Napping® study, 8 out of the 18 skin creams were selected. These 8 products were presented to 72 women from Agrocampus Ouest who were asked to rate both perceived and ideal intensity on 13 attributes. They also rated the products on 4 liking questions.

Product Space





Ideal Profile Analysis

- Consistency

  The ideal from consumers are consistent both from a sensory and hedonic point of view.

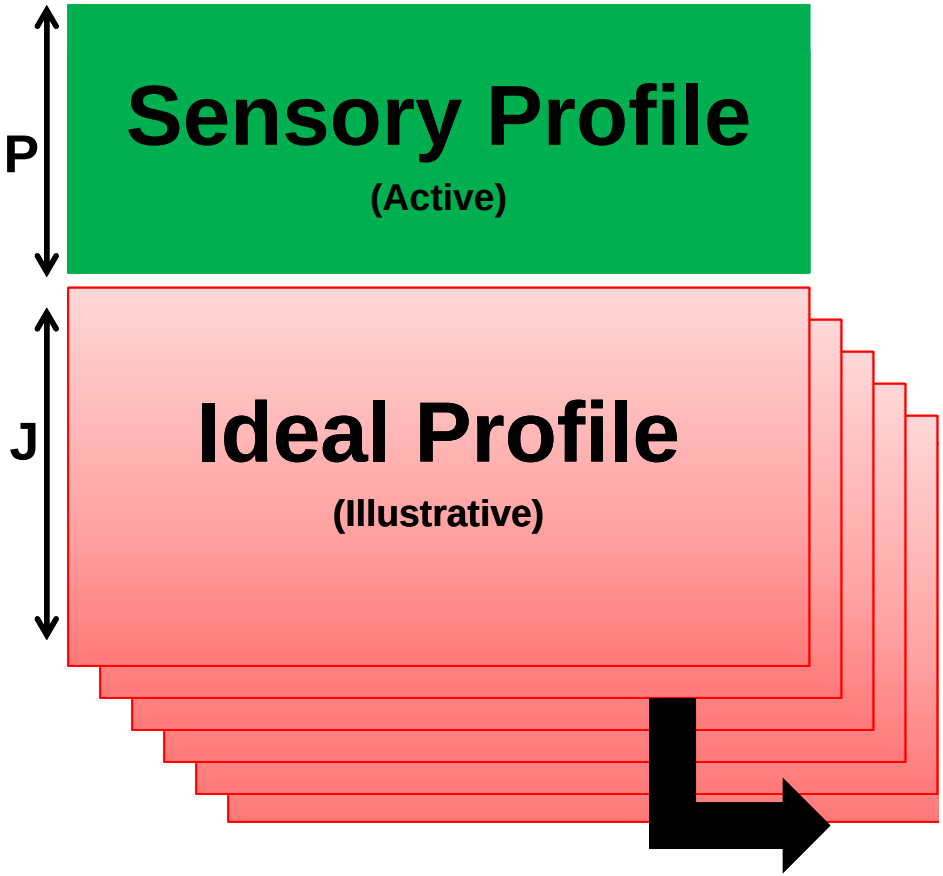
- Segmentation

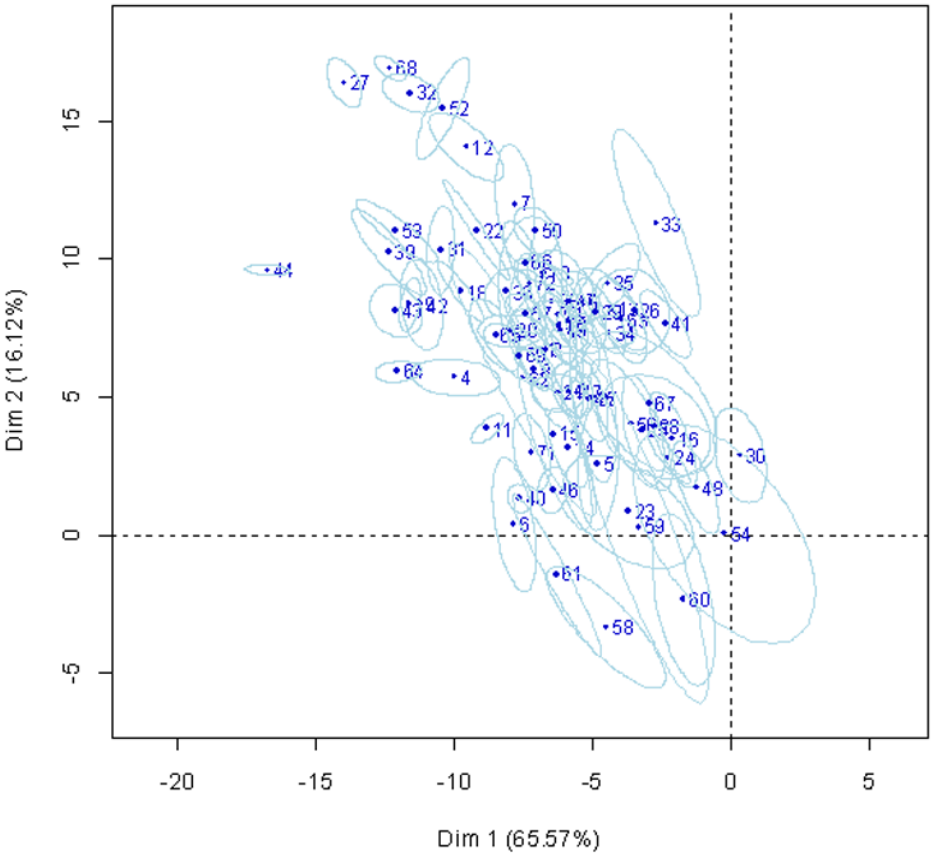
  The consumers were in strong agreement in terms of liking: no segmentation is observed.

- Multiple Ideal

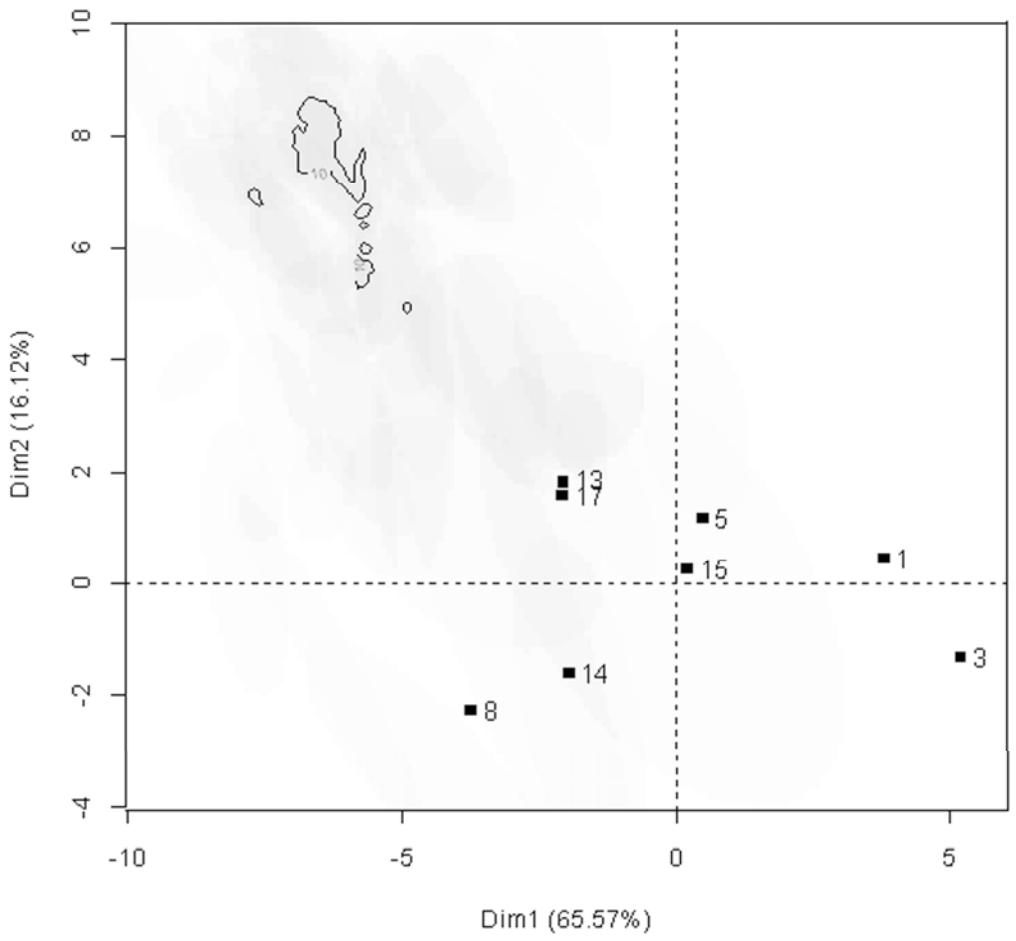
  The consumers are associating the cream to one unique ideal.

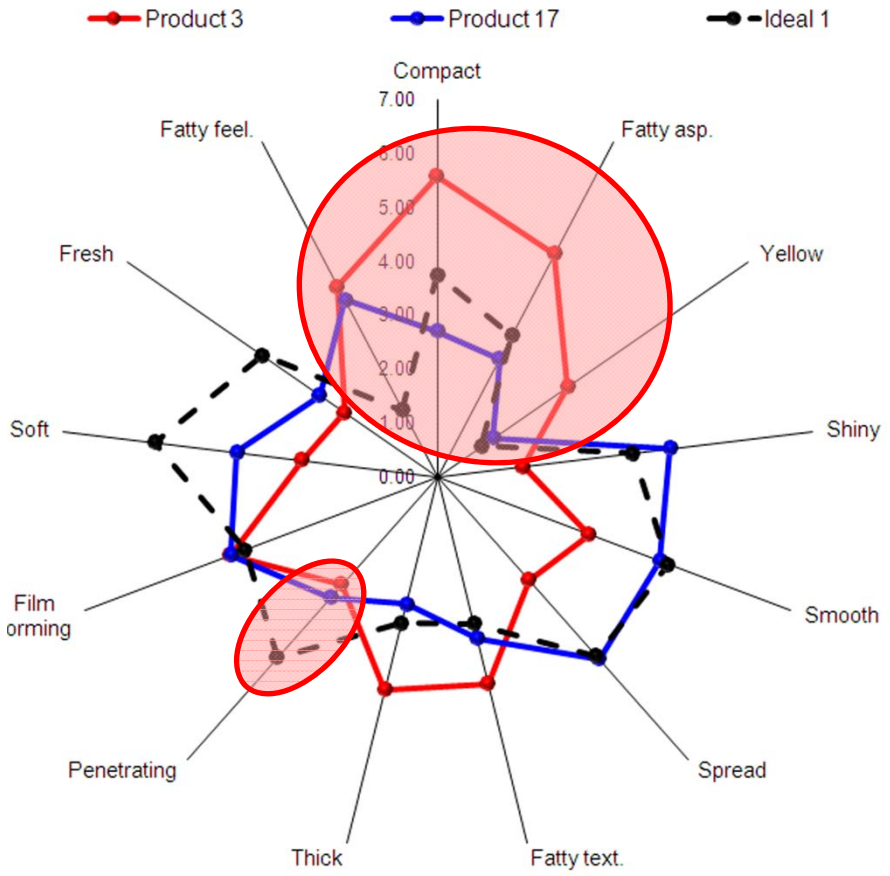
Ideal of Reference





Ideal of Reference



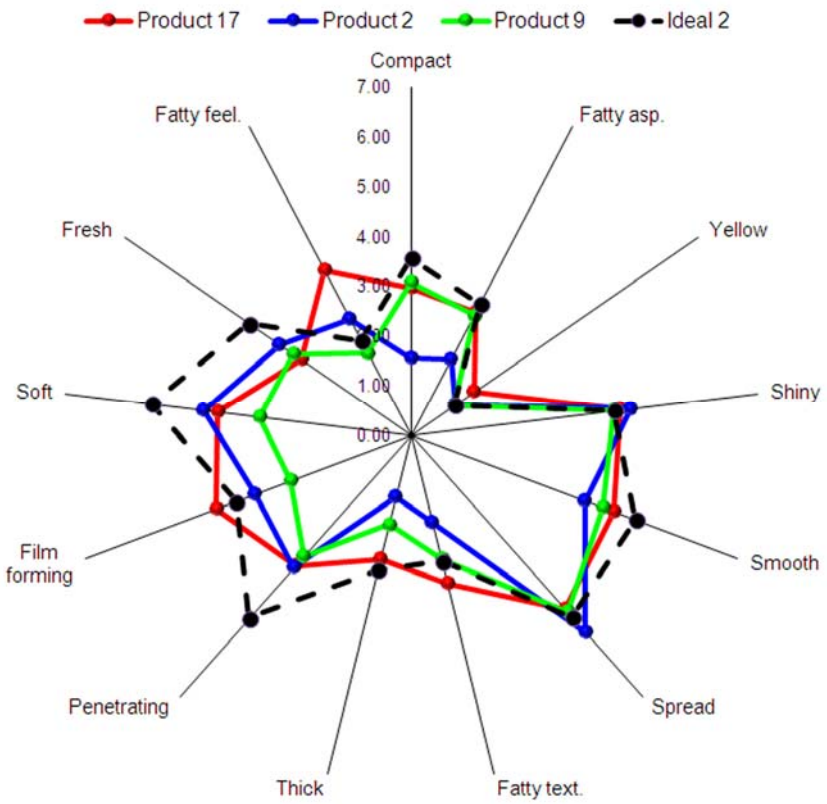


Formulation of improved products

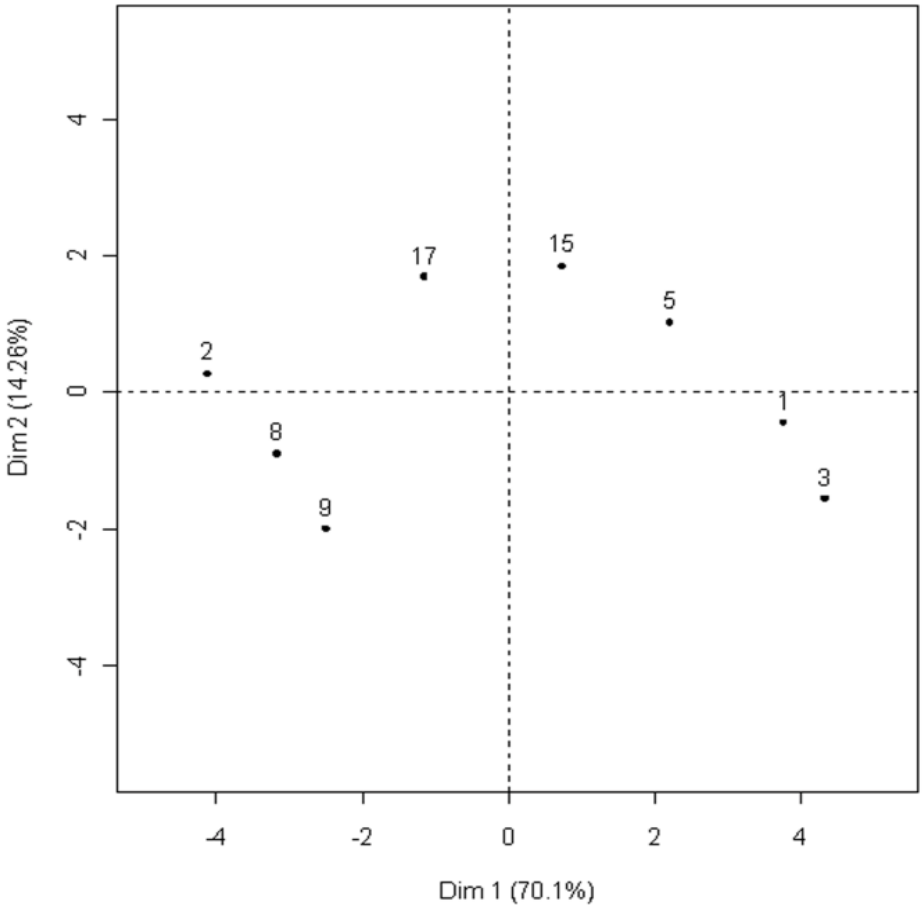
Among the 18 original products, two products have the characteristics of the ideal products. These are the products *2* and *9*.

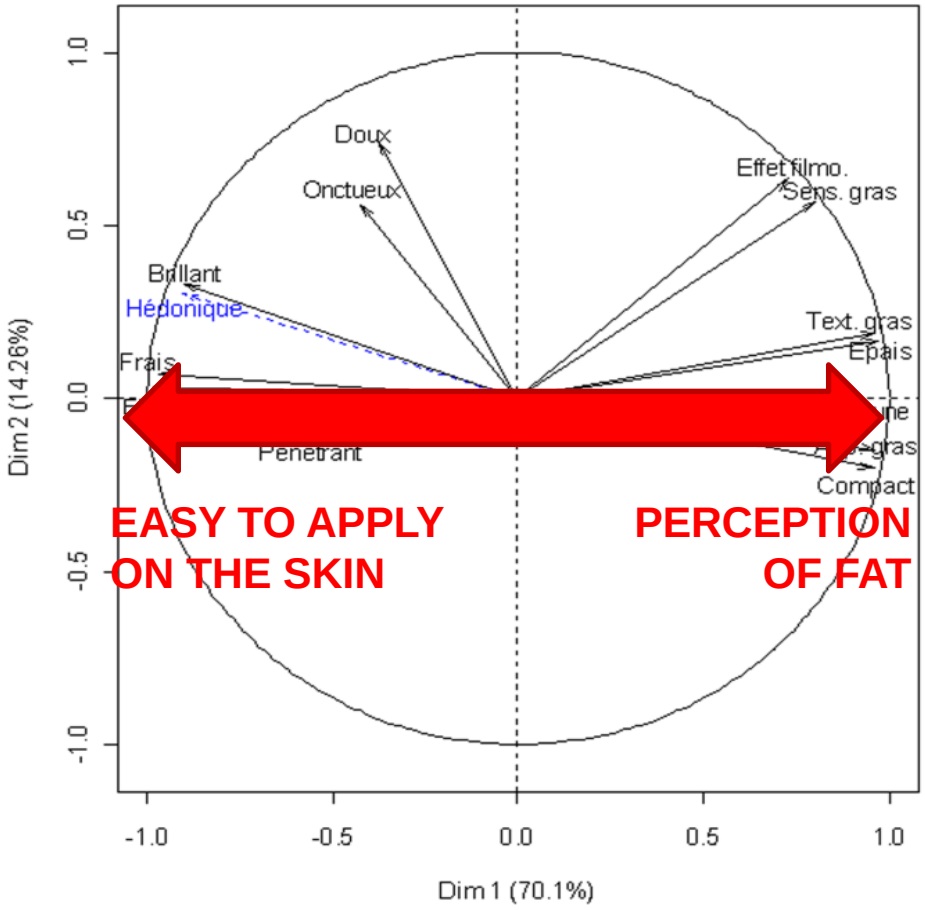
These two new products are added in a second test including 6 of the 8 previous products.

The test was performed on the new set of 8 products by 65 out of the 72 previous consumers following the same methodology.



New Product Space





So, improvements??

	1	2	3	5	8	9	15	17
Compact	4.94^{B}	1.55^{F}	5.57^{A}	4.55^{C}	2.06^{E}	3.08^{D}	3.06^{D}	2.97^{D}
Fatty Asp.	4.58^{AB}	1.73^{D}	4.77^{A}	4.31^{B}	2.06^{D}	2.73^{C}	2.80^{C}	2.81^{C}
Yellow	3.97^{A}	1.08^{E}	3.54^{B}	3.16^{C}	0.99^{E}	1.04^{E}	1.59^{D}	1.54^{D}
Shiny	2.45^{C}	4.44^{A}	1.22^{D}	2.89^{B}	4.44^{A}	4.09^{A}	4.09^{A}	4.23^{A}
Smooth	3.35^{C}	3.73^{BC}	3.48^{C}	4.17^{AB}	4.02^{AB}	4.12^{AB}	4.37^{A}	4.35^{A}
Spread	2.51^{D}	5.30^{A}	2.44^{D}	3.44^{C}	5.01^{AB}	4.75^{B}	3.37^{C}	4.66^{B}
Fatty Text.	4.18^{A}	1.81^{D}	4.17^{A}	4.11^{A}	2.31^{C}	2.56^{C}	3.94^{A}	3.06^{B}
Thick	4.25^{A}	1.29^{E}	4.32^{A}	3.78^{B}	1.65^{DE}	1.85^{D}	3.91^{AB}	2.57^{C}
Penetrating	3.20^{AB}	3.55^{A}	3.26^{AB}	3.14^{AB}	3.32^{AB}	3.26^{AB}	2.95^{B}	3.5^{AB}
Film forming	4.12^{A}	3.34^{B}	4.06^{A}	4.10^{A}	2.94^{BC}	2.58^{C}	4.15^{A}	4.18^{A}
Soft	3.53^{BC}	4.20^{A}	3.01^{D}	3.80^{AB}	3.46^{BCD}	3.07^{CD}	3.61^{B}	3.91^{AB}
Fresh	2.27^{D}	3.22^{A}	2.15^{D}	2.48^{CD}	2.89^{AB}	2.88^{AB}	2.64^{BC}	2.67^{BC}
Fatty feel.	3.99^{A}	2.65^{B}	3.83^{A}	3.85^{A}	2.22^{BC}	1.87^{C}	3.97^{A}	3.75^{A}
Liking	2.75^{C}	**3.74^{A}**	2.34^{C}	3.23^{B}	3.66^{AB}	**3.46^{AB}**	3.44^{AB}	3.34^{AB}

So, improvements??

	Visual		Texture during application		Texture after application		Overall liking	
	Coeff	P-value	Coeff	P-value	Coeff	P-value	Coeff	P-value
Product 1	-0,829	0,000	-0,599	0,000	-0,199	0,204	-0,495	0,001
Product 2	-0,012	0,935	-0,187	0,239	**0,670**	**0,000**	**0,492**	**0,001**
Product 3	-1,194	0,000	-0,503	0,002	-0,664	0,000	-0,904	0,000
Product 5	-0,111	0,470	0,004	0,979	-0,018	0,910	-0,019	0,900
Product 8	0,377	0,014	0,363	0,022	0,430	0,006	0,415	0,007
Product 9	**0,620**	**0,000**	**0,415**	**0,009**	-0,015	0,926	0,219	0,151
Product 15	0,471	0,002	0,013	0,932	-0,215	0,171	0,193	0,205
Product 17	**0,680**	**0,000**	**0,493**	**0,002**	0,010	0,949	0,099	0,515

Conclusions

To fully appreciate the richness of this information, we had to define concepts around the ideals to better understand it.

Through IPA, we also provide the corresponding tools!

When should I use IPM/IPA?

- when I'm interested in the consumers opinion;
- when I want to optimise my products;
- when I'm interested in developing a new products.

Why using IPM/IPA over other methodologies?

- all information provided directly from the same consumers;
- the data collected is rich;
- the quality of the data can be verified;
- check for multiple ideals;
- extrapolation outside the product space.

Thank YOU!!

Questions?

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