

# A Cluster Analysis of Senses Effects on Consumer Behavior. Lessons for Businesses

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## *Abstract*

*The paper tests the correlation between sensorial marketing and consumer behavior. Most of our buying decisions, in practice, are based on emotions, rather than rationality. Using an experimental design, we have tested the influence of human senses, under various stimuli, on purchasing behavior of selected customers.*

*We have also tested the features of chocolate related to the idea of tenderness, in the consumers' minds. The findings revealed that customers are less influenced by visual stimuli, reacting more to texture and packaging.*

**Keywords:** *sensorial marketing, consumer behavior, cluster analysis, experimental design.*

**JEL classification:** M30, M31

## **Introduction**

Many sociologists argue that emotions guide us in facing difficult situations and duties too important to be left to the intellect - danger, a family, the achievement of a well defined goal despite frustrations. Each and every emotion provides a distinct desire of acting.

Therefore, emotions have a great importance in reasoning. In this interplay between feelings and thoughts, the emotional ability guides our instant decisions, working in collaboration with the rational mind, helping or hindering human thinking. Similarly, thinking brain plays a leading role in the emotions - except at times when emotions get out of control and emotional brain goes haywire.

The "new Economics" has a great interest in the intrinsic factors, less conscious, that shape human behavior. This statement represents also the core idea of the paper belonging to Pine and Gilmore (1999) which have been cited in Tsai (2005, p 432). The authors do believe that companies are actually selling "more than just products, because the consumer experience has become the core element". Statistics reveal that as more as emotional attributes are being added as bigger the sensory memories will be (Lindstrom, 2009).

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Going through numerous scientific papers on sensory marketing, it could have been noted an increasingly involvement in researching this field with such a potential in gaining customer's hearts. In this respect sciences like psychology, neuroscience, economics, got together so as to be able to offer their support in the foundation of this new enhancing field – sensory marketing.

The experimental design on chocolate applied on a number of fifteen respondents confirmed the assumptions. On the one hand the results revealed an important linkage between the five senses and the purchasing intention and on the other hand the connection between chocolate attributes and *tenderness* concept. Hence, before starting the research there were elaborated a couple of hypothesis so as to see if the obtained results fit the original assumptions.

The paper ends with some conclusions drawn from the obtained results. Thus through the proposed experimental design it was confirmed that there are important connections between senses and human behavior in general, meaning that sensory marketing will gain more and more sympathy.

### **1. Sensorial marketing in consumer behaviour**

When making a choice, individuals link their preferences to available options, to the way in which information is structured and could be accessed and the cost of opportunity (Bettman et al, 2008). Both the complex process of depicting information available “through the stages of exposure, attention, and comprehension” (Yoon and Park, 2012) and the opportunity cost converge in the purchase intention. In this respect, there are more and more studies that describe the aversion to loss possessed by the economical actors. Tversky and Kahneman (1992) mentioned in The Royal Swedish Academy of Sciences (2002, p 16) “estimated that the attached to a moderate loss is about twice the value attached to an equally large gain”. Also people use to assume a high level in terms of risks in order to avoid the loosed than to obtain profitable gains (Hill, 2010).

In most of the cases consumers' choices are rational, intelligent, fit the context, but still, there are situations when a strong preference exceeds the “optimal parameters”. Bettman et al (2008, p 590) consider that this state happens because of the social – emotional nature of human beings; this is why people sometimes find difficult to transform into words their reactions (Hill, 2010), emotional reactions are ahead thinking process.

In terms of economical purpose people do have the same goal represented by the purchasing process, process that is expected to bring a maximum satisfaction. In this respect, it is not politically correct to generalize but is more than recommendable for producers to constantly adapt in order to walk on the same side of the road with their consumers.

Human senses collect information from the environment and facilitate the integration process of each individual. The same happens for consumers when they are part of different networks or have access to different networks that facilitate the information transfer (Roja, Năstase, 2012). The decision making process is based

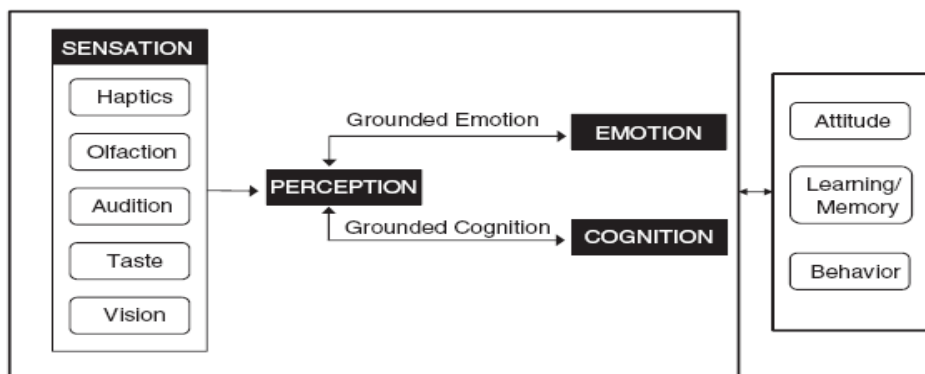
on recalling situations, reactions, feelings, memories of specific actions, caused in different contexts. Thus, nowadays more and more behavioral economists pursue this trend of knowing more about “sensory marketing” (Yoon and Park, 2012). The same authors (2012, p 1) highlighted the importance associated to this new concept; they believe that the changes in purchasing behavior are caused by a positive emotional response.

Even if individuals do not want to accept that they are not as rational as they believe, there is plenty of evidence that prove the contrary. Starting with the conservation instinct till the intention of purchasing which is based on previous experience, memories, satisfaction involved, it could be concluded that human nature is rather emotional than rational.

An outstanding representative of sensory marketing, Aradhna Krishna (2012, p 333), defines sensory marketing as “marketing that engages the consumers' senses and affects their behaviors.” The author goes further with the theory and believes that sensory marketing may offer clear information about the way in which the customers are able to quantify the quality level of some abstract attributes such as color, taste, smell, shape (Krishna, 2012).

Sensorial marketing can be seen as a tool of consumer behavior branch which invests an ongoing and sustained effort so as to understand what the customers feel and how do they perceive intangible attributes attached to products and services.

The following chart shows the linkage existing between sensation, perception, emotions and their outcomes.



**Figure 1. Sensory marketing mechanism**

**Source:** Krishna, Aradhna, 2012. *An integrative review of sensory marketing: Engaging the senses to affect perception, judgment and behavior*, p. 335

## 2. Methodology

This study looks at the correlations that may exist between the five human senses and the purchasing intention of goods, namely chocolate. We examine a multi-sensory brand concept – Milka– based experimental design applied to a focus

group. In general, groups consist of 8-10 people but for this study we used a number of 15 respondents for better exploring the different sensory reactions for a given marketing concept. This method has the advantage of managing significant data – attributes are independent either totally or partially – even when lowering the number of combinations.

We have chosen Milka chocolate product to determine which of its properties – tightly connected with all the human senses – push the customer to buy the product. Also it has been associated a *Concept* which refers to *tenderness*, idea taken from their campaign “Dare to be tender”. Thus there are specific *characteristics* for each of the five senses and the *tenderness concept* linked to Milka brand.

When preparing the qualitative part of the experimental design, we have chosen 15 subjects. The socio-demographic attributes of the questioned individuals refers to gender, age, education, net income, loyalty to Milka brand.

We have chosen different assortments of chocolate with features that could bring information concerning that specific sense about to be stimulated and observed. In most of the cases the stimulation action was realized through the presentation of different types of Milka chocolate.

- Color – white/brown chocolate – for stimulating the *view*;
- Texture – simple/luflee chocolate – for stimulating the *taste*;
- Aroma – caramel/hazelnut/yogurt & strawberry – for stimulating the *smell*;
- Packaging – 100g/200g – for stimulating the *touch*;
- Noise – noisy/silent pack – for stimulating the *hearing*.

We have tested the following assumptions:

1. The ideal chocolate is brown colored rather than white.
2. Most respondents associate the idea of tenderness with white chocolate.
3. People prefer chocolate with no additives (hazelnuts, filling, etc.).
4. Luflee texture does not link to the idea of tenderness.
5. Hazelnut chocolate is one of buyers’ favorite chocolate.

The qualitative research identified the levels and factors significant for buying decision and for the tenderness concept.

The study tests five attributes: color, texture in mouth, olfaction, packaging and sound when opening the package. We used a Likert nine point scale for both questions where 1 is represented by the lowest level and 9 the highest level of connection established between the product and the main goal of the question (Q1 – which attributes influence buying decision; Q2 – which attributes point to tenderness).

### 3. Results and interpretation

The frequencies of the scores obtained for the features appealing to various senses are presented in **Table 1**:

**Table 1. Descriptive Statistics**

Descriptive Statistics	N	Minimum	Maximum	Mean	Std. Deviation
White	15	1	9	5,60	3,019
Brown	15	1	9	5,60	3,019
Luflee	15	1	9	6,87	2,774
Simple	15	1	9	5,47	2,669
Caramel	15	2	9	7,00	2,330
Hazelnut	15	2	9	6,20	2,210
Yoghurt_strawberry	15	1	9	7,27	2,314
Hund_grams	15	1	9	5,67	2,469
Two_hund_grams	15	1	9	5,87	2,264
Noisy_pack	15	1	9	6,33	2,743
Silent_pack	15	1	9	4,40	3,203
Valid N (listwise)	15				

The table above reveals the level in which each and every attribute, through its number of variations, influence the consumer purchase without taking into consideration the sex differentiation. Compared to the other characteristics which have recorded values from 1 to 9, *caramel* and *hazelnut* have ranked from 2 to 9. The variable *color* does not influence the customer's purchase intention, fact suggested not only by obtaining the same value for each level but also the by the value achieved – around five.

It is to be said that in general the questioned subject are more willing to try the new and innovative chocolate samples. This idea is sustained both by *texture in mouth* and *olfaction* attributes. Thus in terms of *texture in mouth*, the subjects prefer *luflee* to *simple* whereas the high *olfaction* influence on buying intention is owned by *strawberry & yogurt* sample, then by *caramel* and last by *hazelnut* chocolate. A possible explanation for this ranking – *strawberry & yogurt*, *caramel* and then *hazelnut* – could be related to the feeling of freshness, light flavor, why not summer.

Regarding the *packaging* customers showed a higher interest on the bigger one – *two hundred grams* – because they have thought about the price perspective – big package cost less. Surprisingly or not the numbers obtained for the influence exercised by the *sound of the package* on purchase intention revealed that in general clients are more attracted by the *noisy package*. Two clusters resulted after running the analysis. Cluster 1 is represented by women and contains a number of 7 questioned subjects while cluster 2 reflects men collectivity with 8 respondents.

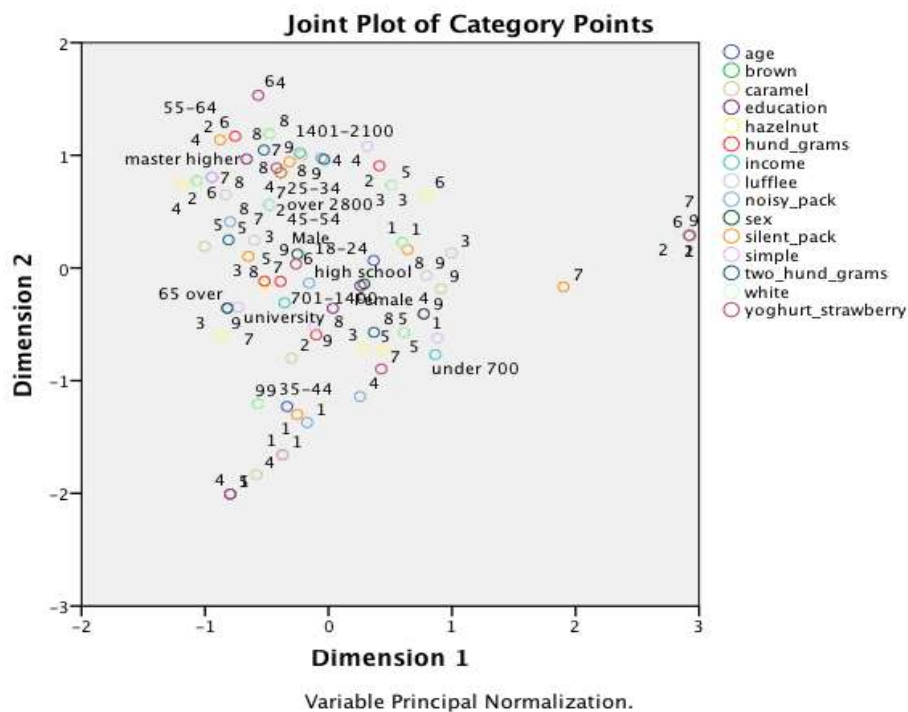
### **Cluster 1 (women)**

For the customers in this group the *color* has an equally impact on the purchase process. They prefer the *simple texture*, *hazelnut* version as well as the *strawberry & yogurt* one, a *noisy pack*, weighting *one hundred grams*, fitting into the category of 35-44 years old, university graduate, with an income between 701 and 1400 lei.

### **Cluster 2 (men)**

As in the previous cluster, the *color* has an equally impact for this one too, on the purchase process. By difference men are more willing to buy the chocolate with a *luflee texture*, *caramel* version, *two hundred grams* package, whereas the *sound* does not affect their buying process. The questioned subjects fit into the category of 25-34 years old, university graduate, with an income between 701 and 1400 lei.

There are important differences in respect the variables that influence women and men intention of purchase. The color, education and net income variables seems to have the same impact on both category but the rest of tested attributes have ranked different levels. As for women *hazelnut* and *strawberry & yogurt* characteristics are important for men *caramel* version plays a significant role. Another distinction is that the subjects from the first cluster are buying *a hundred grams* packaging, the others purchase packages that weight *two hundred grams* and last but not least the age category does not converge as well – women between 35 and 44 in comparison with 25-34 years old men. Mature women prefer the classical samples, this result explaining their preferences for the *hazelnut* version and also the sensitivity indicated by *strawberry & yogurt* chocolate and the *one hundred grams* packaging. Perhaps a surprising result may lead to the fact that women are rather influenced by the *noisy pack* whereas men do not give importance to this aspect. Men's type reveals that for them the color and the sound made when opening the package do not influence their purchasing behavior. Since it is about young people included in the 25-34 age categories they have displayed a brand-new trend in terms of olfaction by electing mostly the *caramel* sample. Also we may link their orientation for the bigger package to the daily need of energy demanded at this age but also with their intention of gaining from the purchasing process – a bigger package may be perceived as being cheaper in comparison with a smaller one. The Cronbach's Alpha is greater than 0.9, meaning that there is an internal consistency given by the increasing intercorrelations among the tested items.



**Figure 2. Joint Plot of Category Points**

In order to interpret which are the attributes and with what intensity do they impact consumer decision making there has been chosen three different profiles.

*Profile 1: Subjects with a net income less than 700 lei*

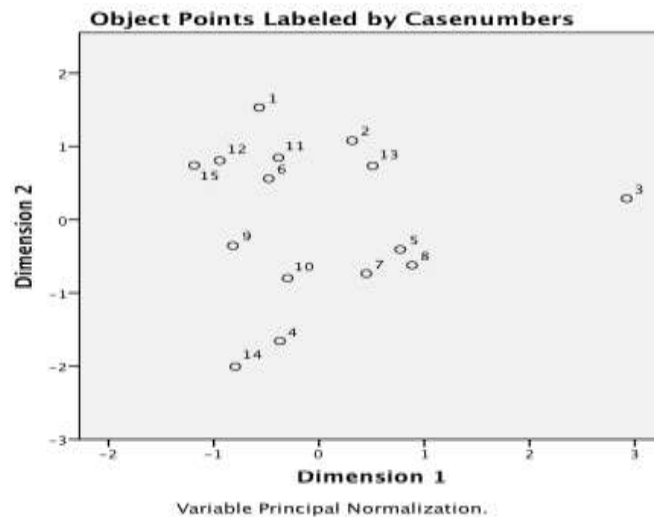
This type of customer prefers more or less *brown* chocolate, not *simple* but with *hazelnuts*, included in a *two hundred grams* package and has no intention to buy the *strawberry & yogurt* sample.

*Profile 2: Subjects with a master degree*

To this category fits those who are interested in *simple* and *brown* chocolate, without *hazelnuts* included in *one hundred grams*, *silent* package.

*Profile 3: Subjects with age between 25-34 years old*

It seems that this sort of consumers is comprised of those who have a great interest in the *noisy package*, *brown* colored, smelling of *caramel* or *strawberry & yogurt*. On the other hand they are not influenced by the *lufflee* texture and the *two hundred grams* package.



**Figure 3. Object Points Labeled by Case numbers**

Dimension 1 includes mainly omen between 18 and 24 years old, master graduates with a net income between 1401-2100. Dimension 2 comprises high school graduates, women between 18 and 24 years old gaining less than 700 lei. While for the subjects belonging to 1<sup>st</sup> Dimension the *color* attribute together with the *two hundred grams packages* are important, for those part of 2<sup>nd</sup> Dimension, the *caramel smell* and *sound of package weight* more.

**Table 2. Discrimination Measures (1)**

	Discrimination Measures		Mean
	Dimension 1	Dimension 2	
White	,968	,768	,868
Brown	,968	,768	,868
Lufflee	,566	,718	,642
Simple	,493	,294	,394
Caramel	,476	,839	,658
Hazelnut	,498	,333	,415
Yoghurt_strawberry	,732	,749	,741
Hund_grams	,793	,567	,680
Two_hund_grams	,899	,662	,781
Noisy_pack	,715	,721	,718
Silent_pack	,736	,798	,767
Sex <sup>a</sup>	,073	,018	,045
Age <sup>a</sup>	,225	,324	,275
Education <sup>a</sup>	,120	,241	,180



Discrimination Measures			
	Dimension		Mean
	1	2	
Income <sup>a</sup>	,275	,522	,398
Active Total	7,844	7,219	7,532
% of Variance	71,313	65,629	68,471

a. Supplementary variable.

The table shows that *lufflee* texture is rather preferred than *simple* with an overwhelming value for men; then in terms of olfaction it may be observed that overall, *strawberry and yoghurt* is the most discriminated between the three attributes elected whereas on cluster category, men discriminates more the *caramel* smell while women *strawberry and yoghurt* aroma.

The media for both clusters shows that *two hundred grams package* is more discriminated that the other one, but women are those who discriminates more.

In terms of the sound made when opening the pack the numbers obtained are very close meaning that there are not significant differences between the *noisy* pack and the *silent* one.

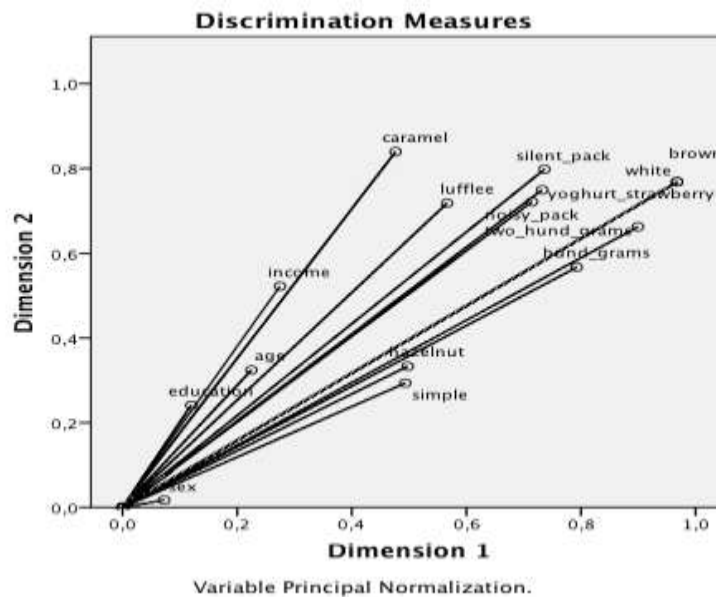


Figure 4. Discrimination Measures (2)

Sex, education and age do not have a noticeable power when making the purchasing decision, but it is the income that influences the buying process.

**Table 3. Descriptive Statistics**

Descriptive Statistics						
	N	Minimum	Maximum	Mean	Std. Deviation	
White	15	1	9	6,33	2,498	
Brown	15	2	9	5,00	2,646	
Lufflee	15	1	9	4,47	3,137	
Simple	15	2	9	7,07	2,344	
Caramel	15	1	9	6,33	2,554	
Hazelnut	15	1	9	4,93	2,815	
Yoghurt_strawberry	15	2	9	6,20	2,484	
Hund_grams	15	3	9	6,40	2,165	
Two_hund_grams	15	1	9	4,60	3,043	
Noisy_pack	15	1	9	3,20	2,651	
Silent_pack	15	1	9	7,80	2,366	
Valid N (listwise)	15					

The table reveals the amount in which each attribute may indicate a possible relationship between chocolate characteristics and the idea of tenderness.

Compared to the other characteristics which have recorded values from 1 to 9, there are some that has started from second or third degree of intensity meaning that they are producing a more powerful linkage in customer's mind with the idea of tenderness. It is the case of *brown* color, *simple* texture, *yogurt & strawberry* smell – which started from 2 – and *one hundred grams* package – that begins from stage 3.

Taking into consideration the values obtained for color variable it could be said that *white* chocolate has a stronger impact. Customers explained their choices in terms of the image associated with white color namely the brides' dresses; brides are sensitive and tender.

Customers tend to prefer the *simple* to *lufflee* in mouth texture. *Caramel* and *strawberry & yogurt* aromas ranked the highest values. *Caramel* drives the consumer to the childhood period whereas *strawberries* make them think about passion. Other possible explanation for this ranking –*caramel* and *strawberry & yogurt* – could be related to the summer holidays. Regarding the packaging, customers showed that they do believe that a smaller package is more appropriate to describe the tenderness posture. Moreover there is no surprise that they have chosen as an appropriate sound of pack to describe tenderness the *silent package*.

**Table 4. Number of Cases in each Cluster**

Number of Cases in each Cluster		
Cluster	1	6,000
	2	9,000
Valid		15,000
Missing		,000

Two clusters resulted, which are used to see if some attributes of the product create the idea of tenderness.

**Table 7. Final Cluster Centers**

Final Cluster Centers		
	Cluster	
	1	2
White	7	6
Brown	3	6
Lufflee	2	6
Simple	8	7
Caramel	7	6
Hazelnut	2	7
Yoghurt_strawberry	8	5
Hund_grams	7	6
Two_hund_grams	2	7
Noisy_pack	1	5
Silent_pack	9	7
Sex	2	1
Age	2	2
Education	2	2
Income	2	3

**Cluster 1**

For the customers in this group the *white* color is more likely to be linked with the idea of tenderness. An important number of respondents explained that their choice is based on the idea of purity, white color is associated with brides, angels, all these being some kind of tender characters. Characteristics like *simple* texture, *strawberry & yogurt* smell, a *silent pack*, weighting *one hundred grams*, determine in customers' mind the association of these attributes with the tenderness attitude. The respondent belonging to Cluster 1 fit into the category of 25-34 years old, university graduate, with an income between 701 and 1400 lei.

**Cluster 2**

For the subjects in this cluster it seems that the color of the sample does not have an important meaning when speaking about tenderness. As the results from the previous cluster, the *simple* texture and the *silent pack* are the ones that have the power to induce the concept of tenderness. Surprisingly or not men have ranked *hazelnut* to the highest level throughout the three aromas together with a package of *two hundred grams*. A plausible explanation in this respect may lead to the fact that, in general, men are less tender, at least in comparison with women. The questioned subjects fit into the category of 25-34 years old, university graduate, with an income between 1401 and 2100 lei.

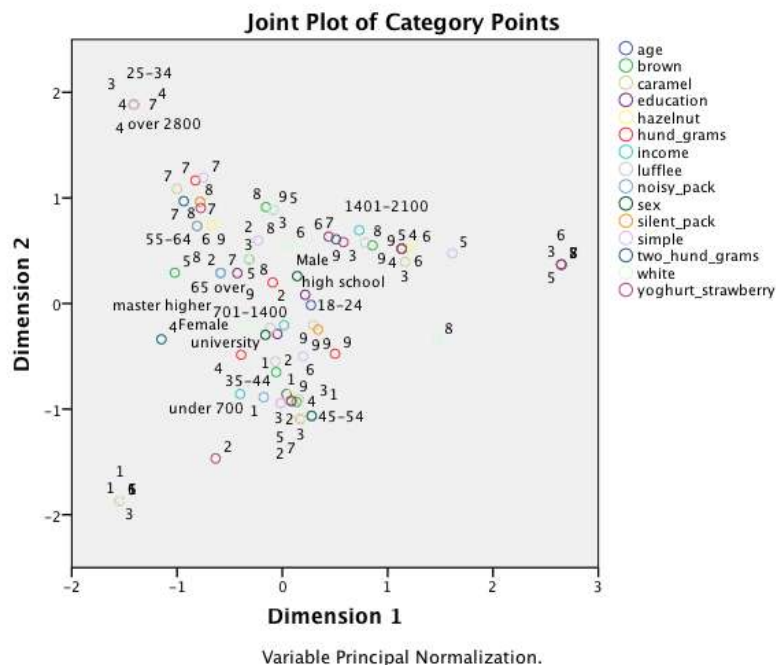


Figure 5. Joint Plot of Category Points

So as to be able to interpret which are the attributes and with what intensity do they ensure the association with tenderness characteristics there has been realized three different consumer profiles.

*Profile 1: Subjects with a net income between 700-1400 lei*

This type of customer perceives both *caramel* and *strawberry & yogurt* samples as being appropriate to be linked with the tenderness idea. Moreover it seems that the majority of the respondents are females and the fact that the chocolate should be included in a package of *one hundred grams* also creates a connection with tenderness – perhaps because it is smaller and could be gentle.

*Profile 2: Subjects who graduated high – school*

In this category we may include in general *males* between *18 and 24 years old* who associates tenderness mostly with *strawberry & yogurt* aroma, included in *two hundred grams* package.

*Profile 3: Subjects with age between 45-54 years old*

It is not a surprise for anyone the results obtained by people in this interval. The attributes chosen by them not only are in accordance to their age and inspire sophistication but also activate in customers' mind the idea of tenderness. Thus this class of subjects has elected the *brown* colored sample with a *simple* texture in mouth and a smell of *caramel*.

**Table 5. Discrimination Measures (1)**

Discrimination Measures	Dimension		Mean
	1	2	
White	,485	,542	,513
Brown	,850	,412	,631
Lufflee	,869	,780	,825
Simple	,703	,825	,764
Caramel	,668	,728	,698
Hazelnut	,794	,969	,882
Yoghurt_strawberry	,844	,863	,853
Hund_grams	,699	,476	,588
Two_hund_grams	,953	,593	,773
Noisy_pack	,781	,803	,792
Silent_pack	,535	,652	,594
Sex <sup>a</sup>	,023	,077	,050
Age <sup>a</sup>	,249	,451	,350
Education <sup>a</sup>	,059	,048	,053
Income <sup>a</sup>	,317	,577	,447
Active Total	8,183	7,643	7,913
% of Variance	74,387	69,485	71,936

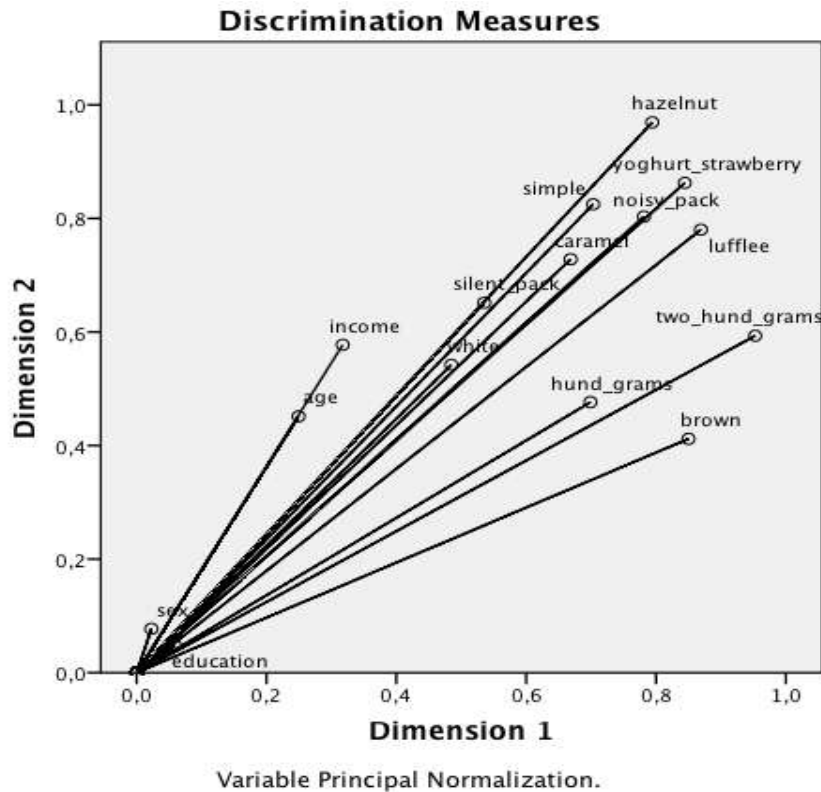
a. Supplementary variable.

The table reveals that *brown* color is rather preferred than *white* with an overwhelming value for men, then in terms of olfaction, in general, *strawberry & yoghurt* is the most discriminated between the three attributes but on cluster category, men discriminates more the *caramel* smell while women *caramel* aroma.

About the texture in mouth it could be noticed that whereas men discriminate more the *lufflee* version, women intend to discriminate the *simple* type of chocolate.

The media for both clusters shows that *two hundred grams package* is more discriminated that the other one, but women are those who discriminates more.

In terms of the sound made when opening the pack the numbers obtained showed that both dimensions are discriminating the *noisy* pack.



**Figure 6. Discrimination Measures (2)**

The figure helps us understand that sex and education do not influence whether the customer is able to connect the presented attributes of the chocolate with the tenderness characteristic. In respect the case of influencing the purchase intention, one could have been expected that from all the attributes, the level of income to be to one that mostly influences the buying process. But surprisingly the level of income has a major impact through this characteristic too.

*Validity of the assumptions*

The first assumption that has been made was that the ideal chocolate is brown colored rather than white and the results showed that there is no difference between them. Customers seem not to be influenced in their purchase behavior by this attribute meaning that the first hypothesis is rejected.

The second assumption says that “Most respondents associate the idea of tenderness with white chocolate.” The hypothesis is accepted due to the fact that white colored chocolate “recall images with brides” claim most of the consumers.

The idea according to which in general simple chocolate is mostly preferred seemed to be not true. The results have detected that on average lufflee

texture is rather preferred than simple one. Therefore the assumption “People prefer most simple chocolate” has been rejected.

As far as that goes the subjects’ answers fit with the assumption according to which “Luflee sample does not activate in consumer’s mind the idea of tenderness.” They motivated their choice by sustaining that tenderness is related to a soft sensation not “something that sparkles your mouth”. Then it can be concluded that the hypothesis is accepted.

It has been assumed that “Hazelnut chocolate is one of buyer’s favorite chocolate”. The data collected have demonstrated this category of chocolate is not what consumers prefer most, moreover this assortment found its place on the last position in customer’s list of preferences.

### **Conclusions and discussions**

Subjects have shown interest for the innovative luflee texture, but most of them do not associate it with tenderness. Moreover, we may believe that subjects do not prefer a noisy packaging but results prove the contrary. Even when someone else opens a chocolate package, this will increase the interest for the other people to experiment the sensations too.

Although the study revealed that fact that customers are not influenced in their purchasing intention by the color of the product, it seems that with an overwhelming majority they agree that white colored chocolate makes them think about the tenderness. The motivation for their choice has its roots on previous life experiences, more precisely the questioned subjects sustained that white color inspires purity, being also associated with angels, brides, etc.

Regarding the smell, results obtained for both questions – purchasing intention and tenderness association – were quite similar. Thus subjects claim that high olfaction influence on buying intention is owned by strawberry & yogurt sample, then by caramel and last by hazelnut chocolate whereas the most associated aromas with the tenderness feeling are caramel and strawberry & yogurt.

For the packaging, customers showed a higher interest on the bigger one – two hundred grams – because they have thought about the price perspective – big package cost less but at the same time they do believe that a smaller package is more appropriate to describe the tenderness posture. Therefore people tend to create their own system of connections meaning producers should pay much more attention when they intend to propose a new concept for their products. Sometimes human being acts in a surprising manner.

Beside the effort of gaining competitive advantage and personality attached to the brand, its owners should also pay attention to the story behind the image, as they have to tell a tale based on a rigorous set of mental associations. In this respect, Milka, the brand elected to be observed throughout the case study, realized a campaign named “Dare to be tender”. Their story behind the brand is a sustainable one and there are a lot of people who not only knows the campaign and ad but also are trying to create a connection between them and the idea. Their

slogan, “The softest pleasure”, is full of sensory elements. They induce to their customers the idea according to which if having a Milka they could experience great pleasure through its soft texture. Thus there are at least two senses that have been taken into consideration when creating the slogan – taste, touch and possibly olfaction.

Moving further, even though over the time, sight sense was one of the most “overworked” human senses, the study reveals that there is no connection between chocolate color and customer’s intention of purchasing.

There were significant differences between genders on the purchasing behavior. Therefore while women prefer the *simple* texture, men are interested in *lufee* version, also females are influenced by *hazelnut* and *strawberry & yogurt* sample, whereas men search for *caramel* aroma. A *noisy pack*, weighting *one hundred grams* – chosen by women –, is rather preferred to a package of *two hundred grams* by males. The other attributes taken into consideration, such as graduated school and net income are perfectly fitting; university graduate, with an income between 701 and 1400 lei. The main finding drawn from the second question on the possible correlation between chocolate attributes and tenderness is the color impact. Most respondents associate *white* chocolate with tenderness even though in their daily decision making process there is no noticeable color impact on purchasing intention. Consumers believe that the most appropriate texture in mouth that defines the tenderness concept is the *simple* one together with aroma attributes like *caramel*, *strawberry & yogurt* samples and *silent one hundred packages*.

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