The Relationship between the Concerns with Health and Image and the consumption of Dietary Products / Light: A Case Study in Portugal

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Abstract

Human behavior has undergone significant changes in recent years, motivated by a higher level of consumer awareness for health problems with genesis in poor eating habits, much due to the decrease in illiteracy and greater access to information. By opting for healthy eating habits, the consumer does not abdicate the organoleptic characteristics he appreciates most. Diet and light food products, before being considered food to obviate diseases of the food, are to maintain and promote a healthier body. An empirical study, carried out in Portugal, with 142 surveys and factor analysis, concludes by identifying a positive relationship between the consumption of diet / light products and the physical image and the maintenance of health levels associated to a higher quality life. In addition, there is a clear tendency of the population for a growing demand to be supplied with the replica of the traditional pastry, but elaborated with dietary and light substances.

Keywords*:* health, dietary, light, factor analysis, sugar.

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1. Introduction

Nowadays it is usual to face the difficulties of a large part of the population in losing weight. The concern with food is a constant. The World Health Organization (WHO) considers that obesity is one of the ten greatest threats to the health of the world, as it increases the risk of developing a non-communicable chronic disease and, therefore, the risk to health is considerable. Currently, the number of overweight or obese people exceeds the undernourished. According to WHO, there are over one billion overweight and 300 million obese adults in the world (Lemos, 2005). In Portugal, there are about one million Portuguese with obesity. According to data from the General Directorate of Health (DGS), regular consumption of foods and drinks with sugar are examples of daily practices with great influence on the appearance of obesity and other diseases. Human behavior in food consumption has undergone significant changes in recent years, motivated by a higher level of consumer awareness for health problems with genesis in poor eating habits, largely due to the decrease in illiteracy and greater access to information (Regmi & Gehlhar, 2005). Having healthy eating habits today does not mean restrictive or monotonous eating. On the contrary, one of the fundamental pillars for healthy eating is variety. When choosing healthy eating habits, the consumer does not abdicate the taste, smell or shape of food, in short, the organoleptic characteristics that he appreciates most. The paradigm has changed greatly. Diet and light food products, which, before being considered food to obviate food-borne diseases, are now in the market for maintaining and promoting a healthier body. The demand for these products has grown significantly due to the incremental improvement of their quality and at competitive prices.

In the market, we can find a wide variety of light or diet products, but cakes are practically non-existent. Diet and light products have different food characteristics when compared to conventional foods. These categories are part of a set of "healthy" foods, as well as low-fat, alcohol and sugar products. Dietary products are all those to which some nutrients, such as, for example, sugar, gluten, cholesterol, fat, etc. are withdrawn or reduced to a rate of 5% (Santos, 2016) and are developed to serve specific groups of people suffering from certain diseases, such as diabetes or hypertension. According to Sabin Clinical Laboratory (2005), foods considered light are those with low content of some of its components, such as: sodium, sugars, fats, cholesterol, and / or calories, that is, they are not totally "Exempt" (reduction up to 5%), such as diet (see Table 1). Therefore, these foods are not intended to meet dietary needs, nor are they indicated for a specific diet. Foods are classified as light when there is a reduction of at least 25% of the amount of a given nutrient and / or calories compared to the traditional food. In the case of solid foods, about calories, the total value of the reduction should be at least 40 calories per 100g of food and for liquid foods this value decreases to 20 calories (Sabin, 2005).

Table 1- Light and diet products

Food		Maximum Calorific value	Maximum of Sugar	Maximum of Total fat	Maximum of Saturated fat	Maximum of Cholesterol
Light	Solid	40 Kcal/100g	5 g/100g	3 g/100g	1,5 g/100g	20 mg/100g
	Liquids	20 Kcal/100ml	5 g/100ml	1,5 g/100ml	0,75 g/100ml	10 mg/100ml
Diet	Solid	4 Kcal/100g	0,5 g/100g	0,5 g/100g	0,1 g/100g	5 mg/100g
	Liquids	4 Kcal/100ml	0,5 g/100ml	0,5 g/100ml	0,1 g/100ml	5 mg/100ml

Source: Own elaboration

It was with the intention of replacing the sugar and creating a healthier alternative that the sweeteners were discovered (Table 2). These may be classified as: (i) artificial or synthetic, such as sodium saccharin, cyclamates, etc., which have no caloric value; (ii) Natural, such as fructose, sorbitol, etc., which have fewer calories than glucose present in sucrose. The discovery of saccharin occurred in the laboratory of Ira Remsen, a famous American chemist of the nineteenth century. The history of the discovery of the main sweeteners (Barone, 2016) is passionate, but of less interest in the scope of the present work, therefore we won't deepen this thematic. Some types of sweeteners can play an important role in a balanced and nutritious diet. Contrary to what happened a few years ago, sweeteners are no longer used only by obese and diabetic people and are also used by individuals who care about healthy eating.

Table2 - Sweetening power of Sweeteners

Sucrose sweetener for saccharine, calories in 1g of each sweetener and Acceptable Daily Intake (ADI) per kg of body weight			
Sweetener	**Sweetening power / cal relative to sucrose (saccharose)**	**cal/g**	**IDA per body Kg**
Sucralose	600 Times bigger	0	---
Saccharin	300 Times bigger	0	2,5mg
Stevioside	300 Times bigger	0	5,5mg
Aspartame	200 Times bigger	0	40,0mg
Acesulfame – k	200 Times bigger	0	15,0mg
Ciclamate	40 Times bigger	0	11,0mg
Fructose	2 Times bigger	0	---

SOURCE: Abiad (Associação Brasileira das Indústrias de Alimentos Dietéticos)

Nowadays, the demands are greater, and legislation has been keeping up with this need on the part of consumers. Establishments are also required to report allergen products. This work aimed to analyze the health and image concerns related to the consumption of dietary / light products as well as to verify how a pastry that presents traditional confectionery but with sugar substitutes could be well received by the market. The aim was to analyze the population's receptivity to diet / light cakes, not neglecting the examination of the healthy environment proposed by the adoption of a benign diet as well as to identify the most relevant dimensions extracted from the survey, through factor analysis methodology, by way of to conclude by the determinants associated with a healthy diet and the potential interest of opening a new niche of business - the provision of healthy pastry by replicating the existing typology, but without sugar, or at least with a significant reduction of this or its substitution by light products.

This is the reality of everyday life and so the emergence of a pastry with light or diet products, would certainly fill this market gap. It would be an alternative to offer customers healthy, low-calorie sweets. Thus, this work is divided into 5 sections: the introduction, presented in this section, followed by a review of the literature, related to the problem of behaviors in relation to diet and light products. In the following point the methodology is presented, and the sample and data used are defined. Finally, the main results and conclusions are offered.

2.Literature review

In terms of traditional beauty standards, society does not like traits or behaviors that are considered deviant (Duarte, S., 2014). Thus, the desire to improve physical appearance becomes an imperative to increase self-confidence and stop being a target (Foster et al., 1997 and Sparkes, 1997). The search for ways that help improve physical fitness is no longer "only" a need for physical health, but also for psychosocial health. The practice of physical exercise, drug use, surgical interventions, exaggerated diets, use of diuretics, laxatives, among others, have been evaluated from some investigations related to anxiety and body image for the perception of the body itself (Fisher, 1990, Morgan et al., 2002 cited by Alves et al., 2009). These studies have concluded that there is a relationship between dissatisfaction with body image and Physical and Social Anxiety (PSA). The desire to achieve an "ideal image" is greater. Cash and Brown (1989) had already argued that most investigations that were essentially focused on physical aspect, correlated objective attributes such as weight, size and attractiveness. It has been found in several studies that women are more susceptible to dissatisfaction with their bodies compared to men, sometimes leading to a decrease in self-esteem, personal devaluation and the development of trauma in relation to their own body (Shih and Kubo, 2002).

According to Blowers et al. (2003), Cattadn et al. (2000) and Pabst (2005), cited by Damasceno et al. (2011), the main objective of men in physical exercise is to gain hypertrophy (muscle mass) and that of women is to lose weight. Bellise (1999) and Delamaire & Gautier (2004) emphasize that the female gender shows concern and interest in the food-aesthetic relationship (utilitarian function), while the masculine gender is more influenced by the food-pleasure (hedonic), according to Lucchese et al. (2006).

But obesity has not always been synonymous with undesirable (either health or image or status). It was even the identity of prosperity and health. Even today, in some cultures, it means fertility in women and power in men (Cowley, 2006). The concept of beauty has varied over time. The earliest figures depicting the human body are quite rounded, such as the Venus de Willendorf (Klein, 1996) or even more recently Rubens's painting "three graces". The industrial revolution brought changes in the perception of the human body and its social role. It was only late in the XIX century (1873) that obesity and nervous anorexia began to be seen as medical problems (Gull, 1894, p.309). This helps to understand the complex attitude towards obesity that began to be observed in the last century. Only in the 20th century and in our day, the concept change, also anchored in powerful lobbies such as cosmetics, fashion and the media (Health Studies Companion). However, the medical community legitimated this movement with strong support and promotion of campaigns against overweight and obesity (Cowley, 2006). In any case, the simple concern for health is no longer an objective factual matter. There is a cultural and social contamination and, therefore, when one speaks of obesity, beyond the aspect of health in its stricto sensu, there is a huge quantity of moral, cultural and ideological questions that are interconnected. The human body is a region of personal but also social control. This dictates the norm and obesity has become a symbol of disruption of a stable society (Campos, 2004). Cultural changes produce physical variations and vice versa (Wright, 2005). To investigate consumer behavior, according to Lucchese et al. (2006), it must be understood that human food cannot be defined as a simple basic need, but as a tool for health, pleasure, aesthetics, etc. (Aurier & Sirieix, 2004).

However, this problem is not entirely new. Aristotle remarked that "fat people age earlier and therefore die earlier" while Hippocrates wrote that "people who by nature are more corpulent are more susceptible to sudden death" (Gard & Wright, 2005, p. 71.). The discourses on fat from the pathological point of view have existed for centuries, but only recently the medical community has reinforced and intensified this connection between fat and various diseases like diabetes, hypertension, heart disease, etc. The following citations are merely examples of this reflection: "... Epidemic that threatens the foundations of our society ...". To avoid an imminent calamity, public health must have a prevalence over general profit, action must be to replace apathy and passivity should give way to the protection of our children "(Yale Medical School, quoted in Campos, 2004, p. 7) and "... being overweight or obese puts you at risk of developing a variety of diseases, especially heart disease, heart attacks, diabetes, and cancer" (National Institutes of Health (NIH) cited in Campos, 2004, p.6).

But the medical community and researchers have not always conducted this process properly, as entrenched interests and some lobbies have the strength and ability to guide studies toward interpretations that claim to be dominant. In the 1950s, there was an abnormally high rate of mortality from coronary heart disease in the United States. This event led to the study of the role of some dietary factors that could influence coronary diseases (CHD). According to ongoing research, the then Sugar Research Foundation (SRF) has campaigned for a low-fat diet to prevent CHD. To do so, it implemented a strategy that was used by the sugar industry to increase the sugar quota by inducing Americans to eat a low-fat diet (Kearns, et al., 2016).

According to documents found (correspondence in medical library archives, reports, symposium notes and other documents), Kearns, et al. (2016) found SRF some seizures regarding the effect of big sugar consumption on human body specifically when existed historic coronary problems in the early 1960s. In 1964 the Sugar Association was discussing internally a campaign to deal with less positive attitudes towards sugar after the appearance of some studies linking the abusive consumption and heart diseases. The following year, "Project 226" was approved, which included the request to Harvard researchers (Kearns, et al, 2016) for an article based on scientific literature on sugar consumption, from materials chosen by the group, which would serve to find evidences to answer the findings that called into question the consumption of it. In any case, according to Kearns et al. (2016) this link was merely circumstantial and so, not exhaustive or in other words inconclusive.

An article dating from 1967, published in The New England Journal of Medicine (NEJM), McGandy's (1967), pointed to fat and cholesterol as being responsible for heart disease, diverting evidence that sugar would also contribute to the onset of coronary heart disease, according to Yudkin, (1957). According to the current report, this review article was sponsored by SRF, which today is the Sugar Association, although its role was not disclosed at the time. The publication (NEJM) only required the disclosure of this information from 1984. The resulting article, published in 1967, concludes "there is no doubt" that the only intervention in eating habits necessary to avoid heart problems would be to reduce cholesterol and the consumption of saturated fats. The researchers focused on the literature on the role of cholesterol and fat, not valuing the effects of sugar. In recent years, the concern of scientists seeking to understand the link between food consumption and heart disease has turned more to sugar and less to the fats situation hard to find in the 1980s.

The American Heart Association reports, based on an April 2014 publication of JAMA-Internal Medicine, that the addition of high amounts of free sugars in our diet can significantly increase the risk of death from cardiovascular disease. This study is an additional step in strengthening the AHA (American Heart Association) set of recommendations. The FDA itself has been closely following this issue. As an example of this, it has recently (May 2016) required a change in the labeling of foodstuffs in relation to one of the ingredients because it does not properly describe the food as well as does not characterize its properties properly (Guidance for Industry: Ingredients Declared as Evaporated Cane Juice). This guidance was prepared by the Food Labeling and Standards Staff of the Nutrition and Food Labeling department at the Center for Food Safety and Applied Nutrition of the U.S. Food and Drug Administration (2016).

According to the WHO (World Health Organization), more than 80% of heart disease, heart attacks and type 2 diabetes and one third of cancers can be prevented by eliminating common risk factors, mainly tobacco use, unhealthy diets, physical inactivity and harmful alcohol consumption (Bonnet and Réquillart, 2012, p.2). Healthier diets can be achieved by reducing the salt level by eliminating or reducing the level of fatty acids, lowering the level of saturated fats and limiting the amount of free sugars. In this sense, taxation has been used, which must be understood as one more way of combating obesity. There are negative externalities due to higher health costs when these costs are distributed to all taxpayers. One of the arguments for the taxation of specific products (soft drinks, etc.) is related to the long-term impact of excessive consumption of such products.

We are currently debating "fat taxes", but for example tobacco taxes are not recent. Empirical studies on that product suggest that ad valorem taxation is transmitted less successfully to consumers than a direct tax on consumption (Bonnet and Réquillart, 2012). This controversy now begins to be developed also with regard to combating overweight. Several countries in Europe have decided in this decade to introduce a supplementary levy on less healthy products. This is the case of Hungary and Finland in 2011, in France in 2012, in Britain in 2016 andtoke place in Portugal in2017 (for soft drinks). Soft drinks are considered to have a high weigh of sugar and are a concern mainly on youth due to its obese connection. Otaibi (2017) finds that 40% of students reported consuming sugar sweetened beverages once daily, and almost one third of them (27.5%) two or more daily. Most of them consumed soft drinks weekly (69.6%) then energy drinks (40.6%).

What is certain is that the number of people who care about being overweight or who are already part of this group increases rapidly as well as the market for food / nutrients that serve to control weight. There is a movement in the direction of the change in the diet and for the assumption of foods less caloric. The food industry has been investing in the diversification and expansion of its production lines of light and / or diet products. For this reason, several categories of these products currently have substitutes with different nutritional compositions. Among the segments of products for weight loss are the traditional diet (complete diet and diet pills) and the balance of diet with special-purpose foods (reduced sugar, reduced fat, among others). The reduction of calories from carbohydrates can be achieved with the use of sugar substituent agents. These include fiber, low-calorie sweeteners, and intense sweeteners. Low-calorie sweeteners include maltitol, xylitol, sorbitol, erythritol, mannitol, isomalt, lactitol and tagatose. Even in the area of baking, where it is not easy to modify the formulation of its products, the reduction of caloric value is a technological challenge (Benassi et al, 2001).

In the pastry area, sugar plays a fundamental role in the structural formation of cakes because it governs related phenomena such as delayed gelatinization of the starch due to its ability to bind with water, forming bridges between the starch chains (Baevaet al., 2003). Thus, a substantial reduction of sugar can affect its structural and sensorial properties (Barbosa & Silva, 2014). Substitution is possible provided there is incorporation of a low-calorie thickener (Bennion & Banford, 1997).

3. Methodology, sample and data

The methodology used to carry out the present study was based on a review of the literature on the public health and individual concerns of overweight and ingestion of products that can strongly impair physical and psychological well-being. In order to better understand the current behavior of people in relation to this subject, an empirical study was carried out, through an inquiry, to a universe constituted by the population of Viseu. Viseu is located in the Central Region of Portugal, which is in the 3rd place in relation to the Municipality with more population, in this region. The relative weight of the Central region in the whole of the Portuguese territory has been decreasing in a systematic way, as explained in Table 3.

Table3: Resident Population at the Time of Censuses

Year	Portugal	Center Region	Relative Weight of Central Region (%)
2011	10.555.853	2.327.026	22,00%
2001	10.356.117	2.348.397	22,70%
1991	9.867.147	2.258.768	22,90%
1981	9.833.014	2.301.514	23,40%

SOURCE: http://datacentro.ccdrc.pt/Uploads/Docs/RC_Censos2011_Prelim.pdf

As in the rest of the country, in the Central region the female gender represents 52% of the population and did not change during the first decade of the century. The evolution of the population by NUTS III (Territorial Units for Statistical Purposes) reveals dynamics that accentuate the tendency of depopulation of the interior. Nine of the twelve NUTS III of the Central Region suffered population losses, with the most significant reductions occurring in Serra da Estrela, which lost 12.4% of its population in the last decade, in Beira Interior Norte (-9.5%) and Pinhal South (-9.1%). The most populous municipalities of the region in 2011 were, in order of importance, Coimbra, Leiria, Viseu, Torres Vedras and Aveiro, concentrating around 23% of the regional population. In view of the hierarchy of 2001, Aveiro was overtaken by Torres Vedras. The Viseu district, very well located geographically, considering the entire continental territory, had a peak of inhabitants in the 50s and soon declined, due to the waves of emigration and lack of work that were happening during the following decades. About 150 years later, the district of Viseu again has roughly the same population size. As in many other regions of the country, in the last 5 decades, the district has seen the exit of almost 1 in 5 of its inhabitants. In 2011 it had about 378 thousand inhabitants. In terms of municipalities, Viseu stands out as the only municipality that maintains a sustained population growth (100 thousand inhabitants in 2011). Of the 24 municipalities that make up the district, only Viseu manages not only to maintain, but to grow, in terms of inhabitants. This means that the region is concentrating on its larger housing poles (visible in the data of the various municipalities) and, above all, in its capital.

In social terms, considering a study carried out by Amaral et al. (2007) in the district of Viseu to obesity in adolescents confirmed that there was an excess of weight at the time. In this study, a prevalence of overweight was found to be higher in males (16% vs. 11.6%), as was the prevalence of obesity (4.2% vs. 2.8%).

It was interesting to note that the municipalities north of Viseu have, as a rule, higher prevalence (15.9% vs. 13.0%). The Viseu's people purchasing power index has been growing steadily and is approaching the reference value (100). The sample used for the present study consisted of 142 validated surveys, of which 82 were female and 60 were male. Statistical data were of the qualitative and quantitative continuous type. The maximum error of the sample was 8.223%, for a 95% probability degree. The sampling method applied was simple random. In the first approach, a descriptive analysis was carried out on the personal data of respondents (gender, age, qualifications, occupational status, place of residence and number of persons per household). A summary analysis was then made of all the questions raised in the Inquiry.

In a second approach, using the statistical tools available, independent variables (gender, age and educational attainment) were analyzed for their influence with other questions (dependent variables). Subsequently, it was necessary to verify if the variables indicated produced dimensions / factors or constructs relevant to our analysis. For this purpose, a factor analysis was carried out with the extraction of factors with eigenvalue greater than 1 by the matrix rotated by the Varimax method. We verified the suitability of the sample by the Kaiser-Meyer-Olkin statistic and determined the Cronbach's Alpha for each factor, in the sense of its reasonableness. This work was performed using the IBM SPSS Statistics 21.0 software feature.

4. Results

The analysis of results will be subdivided into two points: a descriptive analysis is performed through Pearson's Chi-Square statistic, where associations between the variables "gender, age group and educational level" are tested and a set of related variables with the behavior of people in relation to the concern with health and image. Then, a factor analysis is performed on a set of items in order to identify factors that represent latent variables.

a. Descriptive statistics

Three variables (gender, age bracket and educational level) are identified, from which we will test their association with the other variables. In a first selection, we will list the values of the Pearson Chi-Square Statistic and the p-value relative to the variables associated with each variable identified above. All pairs of variables that do not meet any of the following assumptions will not be the subject of further analysis from this point: i) Any of the theoretical assumptions for applying the χ2Test (*condition sine-qua-non*); and ii) p-value < α, for $\alpha = 0{,}05$.

Table 4: Relationship between Gender and the remaining variables

	Likert					
Gender vs Variables	None / few		Some		Quite / Always	
	M	F	M	F	M	F
Sugars	32,2%	13,6%	35,6%	49,4%	32,2%	37,0%
Body weight	28,3%	8,5%	33,3%	48,8%	38,3%	42,7%
Restraint in consumption	40,7%	18,5%	23,7%	44,4%	35,6%	37,0%
	Never / barely		Some		Quite / Always	
	M	F	M	F	M	F
Buy Low Calorie Products	72,9%	46,9%	16,9%	33,3%	10,2%	19,8%
Selection criteria - Interior comfort	7,8%	12,7%	37,3%	18,3%	54,9%	69,0%
Selection criteria - Friends / Family	9,3%	9,3%	35,2%	16,0%	55,6%	74,7%
	Between 0 and 1		1 to 3		>= 3	
	M	F	M	F	M	F
Frequency Weekly consumption	40,7%	56,3%	37,3%	37,5%	22,0%	6,3%
	For sure / possibly		Maybe		Hardly / Never	
	M	F	M	F	M	F
Product Loyalty	57,6%	75,3%	16,9%	18,5%	25,4%	6,2%
	Never / Rarely				Some / Quite / Always	
	M	F			M	F
Diets	68,4%	48,1%			31,6%	51,9%
	Yes				No	
	M	F			M	F
Follow-up drink - Natural juices	26,7%	45,1%			73,3%	54,9%

Table 5: Pearson's χ2 (Gender vs variables)

Variables	Pearson Qui-square stats	p-Value
Concern with Sugars	7,242	0,027
Body Weight Concern	10,151	0,006
Preoccupation with Diets	5,595	0,018
Purchase of Low Calorie Products	9,441	0,009
Frequency of Weekly Consumption	8,192	0,017
Containment in Consumption	10,138	0,006
Product Loyalty (cakes)	10,475	0,005
Pastry Selection Criteria - Interior Comfort	6,774	0,034
Pastry Selection Criteria - Friends / Family	6,529	0,038
Weekly expenditure on pastries (*)	6,516	0,038
Favorite drink to accompany the cake - Natural juices	5,045	0,025

(*) <20% of observations are less than 5%, but greater than 0.0%

It is noted that in the association of gender with the concern with sugars, a greater tendency for the feminine gender (86.4% vs 67.8%) is verified. The same happens with Body Weight (91.5% vs 71.6%) and concern about diet (51.9% vs 48.1%). Regarding the custom of buying low calorie products, the female gender shows a behavior quite different from the male. About 53.1% of women showed interest in this type of products, compared to only 27.1%, which means practically half in percentage terms.

As for the weekly frequency of consumption of pastry products, the results seem to infer a higher frequency of consumption (> 1 time / week) by men (57.3%) than women (43.8%). The female gender shows a majority (56.3%), when the frequency of consumption turns out to be between 0 and 1 time per week. As regards the variable "containment in the consumption of pastry products", once again the recorded data indicate a greater restraint by the female gender (81.4%) versus the male (59.3%).

In addition to the hypothetical option of a low-calorie pastry product to the detriment of the usual product, the female gender is more receptive to the exchange than the male gender. Women who would not hesitate to opt for a low-calorie product are 75.3%, against only 57.6% of men. If we add the set of individuals that would be willing to experiment, then the difference would increase and tend, more and more, to the female gender (93.8% vs 74.5%). About the drink that accompanies the consumption of pastries, it can be inferred that the female gender (45.1%) preferentially choose natural juices, compared with the male sex (26.7%).

Finally, regarding the reason for consuming pastry products, the company of friends and / or family, men and women are equated, although the feminine gender is safer in its response, which unbalances the balance because it responds that the reason weighs quite a few times / always (74.7% vs. 55.6% of males). Now, the same type of analysis is used, but considering the age group as variable, an identical list was constructed, where the Pearson Chi-Square Statistics and the respective p-Values are positioned (Table 6 and 7).

Table 6: Relationship between the age group and the remaining variables analyzed

	items Likert								
Age group vs. the remaining variables analyzed	None / few			Some			Quite / Always		
	< 29	30 a 44	> 45	< 29	30 a 44	> 45	< 29	30 a 44	> 45
Concern about Salt	48,0%	19,3%	13,0%	24,0%	28,1%	40,7%	28,0%	52,6%	46,3%
Containment in consumption	44,4%	28,8%	18,5%	40,7%	30,5%	38,9%	14,8%	40,7%	42,6%
Body weight	29,6%	20,3%	7,1%	44,4%	33,9%	50,0%	25,9%	45,8%	42,9%
	None / few						Some/Quite / Always		
	< 29	30 a 44	> 45				< 29	30 a 44	> 45
Concern about Physical Exercise	18,5%	19,6%	44,6%				81,5%	80,4%	55,4%
	Yes						No		
	< 29	30 a 44	> 45				< 29	30 a 44	> 45
Ideal period to consume cakes - snack	70,4%	39,7%	53,8%				29,6%	60,3%	46,2%

Table 7: Pearson's χ2 (Age range vs analyzed variables.)

Analyzed variables	Pearson's Chi-Square Statistics	p-Value
Concern about Salt	14,208	0,007
Body Weight Concern (*)	9,833	0,043
Concern with Physical Exercise	10,357	0,006
Containment in Consumption	9,486	0,050
Ideal period to consume cakes - snack	7,210	0,027

(*) < 20% of observations are less than 5%, but greater than 0.0%

From the list obtained, all pairs of variables that did not comply with the assumptions identified in the previous point were rejected. Thus, some relation of the linear type between the alimentary preoccupation with the salt and the increase of the age is identified. In fact, the response of no / little concern to salt decreases sharply when one moves from the under-29 age group to the 30-44 age group and decreases again when it reaches the age of 45 years.

In a way, the conclusion may be similar when analyzing the relation of the age groups with the concern of the respondents with their body weight. For those over 45 years of age, 92.9% showed some or even concern even against 79.7% of the age group between 30 and 44 years and 70.3% of those under 29 years of age. And, similarly to the above analysis, those who exhibit no or little concern about this aspect decrease in a sustained way as we go up in age (29.6% for the youngest step, 20.3% for the step between the ages of 30 and 44 and only 7.1% of those over 45 responded affirmatively). Still regarding physical exercise, those who answered affirmatively that they did some exercise, or even a lot, is higher in the age group of those under 29 years old (81.5%), compared to 55.4% of those over 45 years of age. The behavior, with respect to physical exercise, is very similar in the two younger grades. In an analysis equivalent to the one made for the two previous variables, we can infer from the results obtained that the concern with physical exercise, although similar in the first two age groups, is lower in the 30 to 44 age group (19.6% vs. 18.5%) and declined sharply in those over 45 (44.6%). About containment of pastry products, there is a real convergence of responses which are congruent with the results obtained above. Consumption of pastry products does not seem to be very worrying at the youngest age group. However, this concern increases with age. It can be seen that, for the answer no or little restraint in consumption, the results go from 44.4% in the under-29 age group to 28.8% in the intermediate level and to 18.5% in the Older. In summary, the concern about the reduction in consumption of pastry products increases with age, which is in line with results already obtained for other variables.

It seems reasonable and sustainable to argue that as we age, priorities change, as do the kinds of health concerns and our bodies. The ideal period for consuming pastry products (snacks) was more pointed out by the age group of those under 29 with 70.4%. There was, on the other hand, most respondents from another class (53.8%) who pointed out the same period, which was the rank of those over 45 years old. The same procedure occurred, too, with the variable educational level, which will relate to all others. Thus, the Pearson Chi-Square Statistics, once again, were listed as the associated p-values.

Table 8: Relationship between the educational level and the other dependent variables

	items Likert					
Educational level and the other dependent variables	None / Few		Some		Quite / Always	
	Basic / High school	University	Basic / High school	University	Basic / High school	University
Concern with Physical Exercise	35,2%	19,1%	50,7%	51,5%	14,1%	29,4%
	Between 0 e 1		1 and 3		>= 3	
	Basic / High school	University	Basic / High school	University	Basic / High school	University
Frequency Weekly consumption	47,9%	51,5%	31,5%	43,9%	20,5%	4,5%
	Never / Hardly / Maybe				Probably / Surely	
	Basic / High school	University			Basic / High school	University
Store Loyalty	43,1%	28,4%			56,9%	71,6%
	Yes				No	
	Basic / High school	University			Basic / High school	University
Follow-up drink - Natural juices	26,0%	49,3%			74,0%	50,7%

Table 9: Pearson's χ2 (Educational level vs analyzed variables)

Analyzed variables	Pearson's Chi-Square Statistics	p-Value
Concern with Physical Exercise	7,075	0,029
Frequency of Weekly Consumption	8,376	0,015
Store loyalty (Pastry)	3,255	0,071
Favorite drink to accompany - natural juices	8,195	0,004

Regarding physical exercise, a trend can be inferred, since 64.8% of the respondents with the basic / secondary (high school) educational level show some or quite a need for physical exercise, compared to 80.9% of those with educational level. Regarding the weekly frequency of pastry products consumption, although it is not so noticeable, 52% of people with the basic / secondary level show a consumption frequency higher than once per week, against 48.4 % of people with the upper level. Another conclusion may be drawn: for a frequency of consumption less than or equal to three times a week, consumption is higher for the group with higher education (95.4% vs. 79.4%). Conversely, for a frequency higher than three times a week, consumption is higher in the group with basic / secondary education. Regarding store loyalty (pastry), there was a need to redo the classes in order to comply with the assumptions that support the chi-square test (χ2). In this way, and for a p-value (0.071) slightly higher than α =(0,05) we opted to analyze the results obtained. It is verified that there is a more robust answer regarding the hypothetical exchange of baked goods by the group with higher education (71.6%). Finally, one of the favorite beverages that accompany the consumption of these products are natural juices. This drink is the majority preferred by respondents with the highest educational level (49.3%), which is much higher than the value found in the other group analyzed (26.0%).

b. Outcome from Factor Analysis

Regarding the statistical methodology, in addition to the descriptive statistics with analysis of the correlation between variables, we used Factor Analysis. Previously, it began by testing its suitability. For this purpose, the Kaiser-Meyer-Olkin statistic was used, obtaining a value of 0.652. This value obtained is considered acceptable by the literature for this type of analysis (Hair et al., 1998). We also used the Bartlett sphericity test that led us to reject the null hypothesis, that is, the correlation matrix used moves away from the identity matrix. Given these results, the analysis of factor extraction was continued. For this purpose, the main components method, with the varimax rotation, was used to extract the relevant factors (Table 10).

Table 10: Component Matrix with Varimax Rotation

Variables	**Factors**				
	1	2	3	4	5
Concern about food - Salt	,878				
Concern about food - Fats	,799				
Concern about food - Sugars	,798				
Criteria for choosing a pastry - Service		,798			
Criteria for choosing a pastry - Interior comfort		,692			
Criteria for choosing a pastry - Friends / Family		,676			
Criteria for choosing a pastry shop - Product quality		,617			
Do you currently do some type of diet?			,828		
Purchase of low calorie, light or diet products			,772		
Worry about body weight			,561		
Do you currently do any kind of physical exercise?					
Reasons to consume - To celebrate and / or celebrate				,686	
Average weekly expenditure on pastries				,596	
Reasons to consume - At the end of a meal				,594	
Criteria for Choosing a Pastry - Routine					,619
Reasons to consume - When I'm hungry					,563
Reasons to consume - To have more energy					,524
Reasons to consume - When I feel depressed					,512
Cronbach's Alpha	**0.874**	**0.696**	**0.704**	**0.407**	**0.41**

Thus, 5 factors were identified with eigenvalues greater than 1. These 5 factors retain 58% of the variance of the original variables. All factors with a loading greater than or equal to 0.5 are reported. The extracted factors may represent the following latent variables:

- 1st factor: Criteria for selection of dietary / light products for health reasons
- 2nd factor: Criteria for selecting a light pastry
- 3rd factor: Criteria for selection of dietary / light products for reasons of personal image
- 4th factor: Consumption reasons (financial / status quo / happiness)
- 5th factor: Consumption reasons (physical and psychological).

The Cronbach's alpha for each factor varies between 0.7-0.8 for the first three factors and 0.41 for the last two that by the small number of variables that compose them may distort this analysis. The internal consistency of the data is acceptable and the inter-correlation between the variables of each construct is maximized. These factors may be useful in defining the supply of products by this business sector companies.

5. Conclusions

Caring for food is a frequent concern in the population, seeking to maintain a healthy life. Thus, according to the results obtained in this study, we can conclude that the feminine gender manifests the greatest preoccupations at the level of health and image, and that concern can be positioned more in the higher age groups. In fact, women are more susceptible to dissatisfaction with their bodies, compared to men, sometimes leading to a decrease in self-esteem, personal devaluation, the development of traumas in relation to their own bodies, as witnessed Shih and Kubo (2002), supporting our conclusions.

According to Blowers et al. (2003), Cattadn et al., (2000) and Pabst, (2005), cited by Damasceno et al. (2011), the main objective for men is, in the practice of physical exercise, gain hypertrophy (muscle mass) while that of women is to lose weight. In this study, physical exercise does not appear to be gender-significant. However, that one acquires relevance before the age group and the educational level. Also concern about body weight is manifestly important where there may be an induced relationship. The most basic educational level already reveals enough knowledge that allows us to conclude by a level of information about healthy behaviors followed (physical exercise).

As for the age group, it is observed that those who exhibit none or little concern about healthy eating, decrease in a sustained way as we go up in age (29.6% for the youngest step, 20.3% for the step of the 30 to 44 years and only 7.1% of those over 45 answered affirmatively). It seems reasonable and sustainable to argue that as we grow older, priorities change, as do the kinds of health concerns and our bodies.

From the work performed it is also possible to deduce certain dimensions that indicate a concern with the good image and physical structure along with the concern with health. Also, Bellise (1999) and Delamaire & Gautier (2004) emphasize that the feminine gender shows concern (Lucchese et al., 2006) and interest in the food-aesthetic relationship (utilitarian function), while the masculine gender declares more influenced by the relation food-pleasure (hedonic function). The human body is a region of personal but also social control. This dictates the norm and obesity has become a symbol of disruption of a stable society, according to Campos (2004). Cultural changes produce physical variations and vice versa (Wright, 2005). To investigate consumer behavior, according to Lucchese et al (2006), it must be understood that human food cannot be defined as a simple basic need, but as a tool for health, pleasure, aesthetics, etc. In this line of thought (Aurier & Sirieix, 2004) describe the consumption of food as a subtle and complex phenomenon, becoming an essential factor in the structuring of social life.

We conclude by the good opportunity of opening a bakery of light products through the motivations of psychological consumption, status and personal happiness. There is in fact an appetite for alternative consumption as well as receptivity to the change to an unconventional pastry. Factors 2, 4 and 5 combined testify to this fact. Respondents demonstrate consumer motivation, change of pastry. The motivations are, besides physical health and beauty, financial, status and happiness and conviviality (reasons of physical and psychological consumption).

Thus, as a practical contribution, this study demonstrates that there is a market in Viseu, Portugal for the incorporation of an alternative business of replicating traditional pastries, but replacing harmful substances with more suitable substances for preservation of human life and health, with a consequent increase quality of life.

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