ANALYSIS OF FOOD BUYING BEHAVIOR: A MULTINATIONAL STUDY FRAMEWORK

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Abstract

To make everyday food choices is a complex process, involving decisions which are influenced by distinct aspects associated with, among other factors, purchasing ease, competitiveness of the market, advertising campaigns and marketing strategies, to mention a few related with aspects linked to commercialization. Hence, the objective of this study, which is integrated in the EATMOT project, was to assess some factors that influence food buying and food choice, in particular related with aspects such as price,

convenience and marketing, as a function of some sociodemographic and geographic variables, namely, age, gender, marital status, level of education, living environment and country of residence.

This study involved a questionnaire survey undertaken on 11,960 participants from 16 countries. The instrument used in this study was validated and translated into the different languages of the participating countries, following double sided translation-checking methodology. The participants were from: Argentina, Brazil, Croatia, Egypt, Greece, Hungary, Italy, Latvia, Lithuania, Netherlands, Poland, Portugal, Romania, Serbia, Slovenia, and United States of America. The sample was selected by convenience and the participation in the study was voluntary, being the questionnaire applied only to adult citizens. Basic descriptive statistics were used for data analysis and the associations between variables were investigated by crosstabs and chi square tests. Additionally, a tree classification analysis was performed to assess the relative importance of each of the sociodemographic variables (gender, age group, level of education, country, living environment or marital status). The analysis followed the Classification and Regression Trees (CRT) algorithm with cross validation and the minimum number of cases considered for parent or child nodes was 100 and 50, respectively. For all data analysis, the software SPSS from IBM Inc. (version 25) was used and the level of significance considered was 5%.

Results showed statistically significant differences (p < 0.0005) between groups for all sociodemographic variables (gender, age, education, marital status, living environment, country) in terms of the value attributed to convenience, price and marketing when buying foods. In most cases, the associations between the variables were considered very weak, although with a little higher values for the associations between the country and variables "value convenience" (V = 0.179), "value price" (V = 0.158) and "value marketing" (V = 0.167). Tree classification analysis confirmed for all three dependent variables that the most influential factor was country.

This work highlighted that people in different countries and from different sociodemographic groups show different motivations for buying food products.

Key words: Food choice, Convenience, Price, Marketing, Buying intention.

1. Introduction

To make everyday food choices is a complex process, involving decisions which are influenced by distinct aspects associated with, among other factors, purchasing ease, competitiveness of the market, advertising campaigns and marketing strategies, to mention a few related with aspects linked to commercialization. An individual's food choice is related to environmental factors, individual history and personality, which in turn is reflected in personal values. Having in mind that food choice is a dynamic process and is built by several determinants, Jomori *et al.*, [1], discuss the variables related with food choice and the human eater.

The cost of food has been identified as one of the main determinants in food choice. However, this is very much dependent on other related variables, like income or socioeconomic status, since the price of a particular good can be perceived as prohibitive or accessible depending on the income, and assuming a particular importance for individuals with lower incomes [2, 3].

In addition to the price, convenience in accessing stores or food markets is another physical factor that influences food choices, as it depends on resources, such as transportation or geographic location. Also time and ability to cook food influence buying and eating behaviour. While many consumers claim the lack of time to shape their food choices, due to their schedules, professional responsibilities or family duties, leaving them with not enough available time to prepare meals at home, others opt for pre-prepared foods or ready to eat meals not due to lack of time, but because they do not like to cook or they live alone and do not want to cook for only one person [3 - 5].

Currently, there are numerous means of communication available which transmit messages aimed at influencing consumption and buying of all sorts of goods, and food items specifically. Food markets have a tremendous potential to influence purchasing because people need to plan for and eat food each and every day. In recent years, apart from the more traditional media, like television, radio or printed materials, the social networks have assumed a prominent place as a means of communication, also influencing food choices. Online advertising campaigns play an important role in communication between companies and their target audience, most especially specific target groups, having a significant impact on customers' attitudes motivating them towards certain food choices [3, 6, and 7]. Additionally, promotions, in-store marketing campaigns, packaging, labelling, health claims and brands themselves, strongly influence food choices. For example, retail outlets are designed to influence consumer choices to maximize food sales, and their organization is designed so that consumers have to cover the largest possible area of the store even when they had planned to buy only very basic food items. This leads to people often buying certain products that they had not previously planned and which they even did not need. Other techniques used include placing certain products at the level of consumers' eyes, at corridor ends or close to cash registers, thus making them

more available and augmenting the impulse purchase [3, 8].

In the scientific literature many segmentation variables have been used to analyse consumer food-buying behaviour in the food market. Among those, the most prominent are sociodemographic factors, motivations and attitudes, religious traits, culture and social background, geographical variability and psychographic segmentation (for example, lifestyles) [9 - 11].

The objective of this study, which is integrated in the EATMOT project, was to assess some factors that influence food buying and food choice, in particular related with aspects such as price, convenience and marketing, as a function of some sociodemographic and geographic variables, namely: age, gender, marital status, level of education, living environment, and country of residence.

2. Materials and Methods

2.1 Instrument

The questionnaire used for the survey underlying this study was validated [9] and translated, following double sided translation-checking methodology, into the native languages of sixteen countries that participated in this framework. In this work the aspects related with price, convenience or marketing/advertisements as governing food choice were studied, through the following questions:

Price:

1. I usually choose food that has a good quality/price ratio.
2. The main reason for choosing a food is its low price.
3. I usually buy food that is on sale.
4. I try to schedule my food shopping for when I know there are promotions or discounts.

Convenience:

5. I choose the food I consume, because it is convenient to purchase.
6. I buy fresh vegetables to cook myself more often than frozen.
7. I usually buy food that is easy to prepare.
8. I prefer to buy food that is ready to eat or pre-cooked.
9. I usually buy food that spontaneously appeals to me (e.g. situated at eye level, appealing colours, pleasant packaging).

Marketing:

10. When I buy food I usually do not care about the marketing campaigns happening in the shop.

11. I eat what I eat, because I recognize it from advertisements or have seen it on TV.
12. When I go shopping I prefer to read food labels instead of believing in advertising campaigns.
13. Food advertising campaigns increase my desire to eat certain foods.
14. Brands are important to me when making food choices.

The respondents were asked to answer each of the previous 14 questions on a 5-point Likert agreement-scale, which was transformed to the following: 1 = totally disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree and 5 = totally agree.

2.2 Data collection

The methodological study was conducted through a survey by means of a questionnaire applied to a sample of nearly twelve thousand participants (N = 11,960), residents in sixteen countries spread along different parts of the globe, mostly Europe, but also America and Africa. The participating countries were: Argentina, Brazil, Croatia, Egypt, Greece, Hungary, Italy, Latvia, Lithuania, Netherlands, Poland, Portugal, Romania, Serbia, Slovenia and United States of America.

The participation in the study was voluntary, being the questionnaire applied only to adult citizens. All answers were kept anonymous and no personal data were collected to possibly relate to the answers, so as to protect the participants' anonymity. All ethical principles were strictly guaranteed when designing and applying the questionnaire, which was approved by the Ethical Committee (Reference Nº 04/2017) before application. The data were collected between September 2017 and June 2018.

2.3 Statistical analysis

The sets of questions were grouped according to price, convenience and marketing, as previously shown. Then, for each of the groups an average score was calculated, after reversing questions 6, 10 and 12. These variables accounting for value price (VP), value convenience (VC) and value marketing (VM) were coded in the following scale: [1, 1.5] = not at all valued, [1.5, 2.5] = not valued, [2.5, 3.5] = indifferent, [3.5, 4.5] = valued, [4.5,5] = much valued.

In the data analysis, basic descriptive statistics were used for an exploratory evaluation of the data. Furthermore, to investigate the associations between the variables defined and the sociodemographic variables, crosstabs and chi square tests were used. The coefficient Cramer's V was used to assess the strength of the associations between the tested variables. This varies from 0 to 1 and can be explained according to the following

standard values: if V ≈ 0.1 the association is considered weak, for V ≈ 0.3 the association is moderate and for V ≈ 0.5 or higher the association is strong [12].

The variables were subjected to a tree classification analysis to assess the relative importance of each of the sociodemographic variables (gender, age group, level of education, country, living environment or marital status). The analysis followed the Classification and Regression Trees (CRT) algorithm with cross validation and the minimum number of cases considered for parent or child nodes was 100 and 50, respectively.

For all data analysis, the software SPSS from IBM Inc. (version 25) was used and the level of significance considered was 5%.

3. Results and Discussion

3.1 Sample characterization

The distribution of the participants by country was: 5% from Argentina, 6% from Brazil, 13% from Croatia, 7% from Egypt, 4% from Greece, 4% from Hungary, 5% from Italy, 5% from Latvia, 4% from Lithuania, 4% from The Netherlands, 5% from Poland, 11% from Portugal, 7% from Romania, 4% from Serbia, 9% from Slovenia and 7% from the United States of America.

The majority of the participants were women, 71%, as opposed to a lower representation of men (38.6%). The age of the participants was on average 35 ± 14 years, ranging from 18 to 90 years. The average age of women was, however, lower than men (34 ± 14 and 36 ± 15 years, respectively). The participants' age was grouped into classes as follows: young adults (between 18 and 30 years) representing 50%, middle aged adults (between 31 and 50 years) representing 34%, senior adults (between 51 and 65 years), representing 13% and the remaining 3% were elderly (aged 66 or over).

Most of the participants had a high level of education (62% had completed a university degree), while 36% had competed secondary school and only 2% had the lowest level of education (primary school). Most of the participants lived in urban environment (67%) while 16% lived in rural areas and 17% in sub-urban areas. As for marital status, 46% were single, 47% married, 5% divorced and 2% widowed.

3.2 Associations between sociodemographic variables and food buying motivations

Table 1 shows the frequencies of variable Value Price (VP) according to the sociodemographic variables' groups, and also the results of the chi-square tests to evaluate the associations between VP and the sociodemographic variables tested (gender, age, education and marital status). The result showed that, considering the whole sample, a very high percentage of participants fell into the class of indifferent, meaning that they do not value price as the most important determinant when buying food products. Those who valued price were 27.4% and price motivations for purchasing foods were much valued by only 2.6% of the participants. Interestingly, these trends were very similar for men and for women, for which price motivations were valid for 31.2% (28.4 + 2.8%) and 27.2% (25 + 2.2%), respectively. Although there were significant differences between gender groups (p < 0.0005), the association between variables VP and gender was very weak (V = 0.046).

Regarding the age groups, also statistical significant differences were found (p < 0.0005) but again the association was weak (V = 0.057) (Table 1). The young adults tend to attribute more importance to price (31.0% value and 2.6% value much aspects related to price), when compared with middle aged adults or senior adults. However, also the elderly tend to attribute high value to price (28.3% value and 7.1 value much).

Table 1. Associations between variable value price (VP) and the sociodemographic variables

Variable p-value[1] V[2]	Variable groups	Not at all valued (%)	Not valued (%)	Indifferent (%)	Valued (%)	Much Valued (%)	Total (%)
Gender **p < 0.0005** **V = 0.046**	Female	1.9	24.3	42.6	28.4	2.8	100
	Male	2.7	25.2	44.9	25.0	2.2	100
Age group **p < 0.0005** **V = 0.057**	Young adults	1.7	23.0	41.7	31.0	2.6	100
	Middle aged adults	2.5	26.9	45.1	23.0	2.5	100
	Senior adults	2.4	24.8	45.2	25.1	2.4	100
	Elderly	2.8	24.4	37.5	28.3	7.1	100
Education **p < 0.0005** **V = 0.079**	Primary school	2.4	17.3	33.9	33.8	12.6	100
	Secondary school	1.9	22.9	42.9	29.1	3.3	100
	University	2.2	25.8	43.8	26.2	1.9	100
Marital status **p < 0.0005** **V = 0.048**	Single	1.7	23.3	41.6	30.6	2.7	100
	Married	2.4	26.0	44.5	24.8	2.3	100
	Divorced	2.5	23.7	45.1	25.0	3.6	100
	Widowed	1.8	22.2	48.4	20.9	6.7	100
Whole sample		**2.1**	**24.6**	**43.3**	**27.4**	**2.6**	**100**

[1]Significance of chi-square test; [2]Cramer's V coefficient.

These differences may be related with the economic availability in these stages of life, considering that young adults (between 18 and 30 years) are still settling their lives and eventually receive lower wages for their work, when compared with other adults. Also the elderly, who are usually retired, also have a limited income, giving them reasons to try to spend less when buying food. Additionally, at this age people tend to have more health problems and that increases their expenditure in medicine or healthcare services. It has been observed that households with lower incomes consumed less expensive foods, in order to provide the energy intake at lower costs [13 - 16].

The level of education was found to statistically influence how people value price factors for buying food (p < 0.0005), although the association between variables was weak (V = 0.079) (Table 1). The participants with lower levels of education attribute much higher importance to price factors (33.8% value price and 12.6 value much) when compared to the other groups. Moreover, as education increases the importance attributed to price seems to decrease, indicating that literacy has an important role in the decisions that condition the purchase of food products. It is known that food choices and diet quality are influenced by food costs and sociodemographic factors, like education [17, 18].

Regarding marital status (Table 1), also significant differences were encountered between groups (p < 0.0005), although with weak association (V = 0.048). There are more single participants who value price (30.6%) than for the other groups, while for the widowed was observed a highest percentage of participants who value much price (6.7%) as compared with the other groups. These results are in accordance with those previously seen for age, since single people are typically young adults and widowed are, most frequent, older people.

Table 2 presents the results obtained for the chi-square tests and frequencies for variable Value Price (VP), according to some geographic variables studied, namely living environment and country of residence. In both cases significant differences were found (p < 0.0005), but the intensity of the associations was stronger than for the sociodemographic variables (V = 0.105 and V = 0.158, respectively for living environment and country). Price reasons for food choice are slightly more valued for people in rural areas and cities, while people

Table 2. Associations between variable value price (VP) and the geographic variables

Variable p-value[1] V[2]	Variable groups	Not at all valued (%)	Not valued (%)	Indifferent (%)	Valued (%)	Much Valued (%)	Total
Living environment *p < 0.0005* *V = 0.105*	Urban	1.8	22.1	42.4	30.1	3.6	100.0
	Sub-urban	2.1	25.3	44.5	25.6	2.4	100.0
	Rural	2.2	24.0	39.1	32.2	2.6	100.0
Country *p < 0.0005* *V = 0.158*	Argentina	2.5	21.8	41.4	30.8	3.4	100
	Brazil	1.1	25.0	47.1	25.1	1.8	100
	Croatia	1.9	30.2	43.1	22.7	2.1	100
	Egypt	1.3	19.4	45.1	31.9	2.4	100
	Greece	1.2	27.3	46.6	23.5	1.4	100
	Hungary	2.8	15.0	37.2	34.4	10.6	100
	Italy	2.0	23.8	49.2	23.1	1.8	100
	Latvia	0.3	10.4	35.5	48.7	5.0	100
	Lithuania	0.8	19.9	43.0	31.2	5.1	100
	Netherlands	1.3	11.7	29.4	52.6	5.0	100
	Poland	1.7	33.4	49.0	15.5	0.3	100
	Portugal	0.5	17.2	60.0	21.0	1.3	100
	Romania	6.3	37.4	34.5	21.3	0.5	100
	Serbia	4.8	38.2	40.2	15.9	1.0	100
	Slovenia	2.5	29.9	43.0	23.2	1.4	100
	United States	3.0	24.4	33.9	34.6	4.0	100

[1]Significance of chi-square test; [2]Cramer's V coefficient.

living in the suburbs are those who do not value price so much. This might be due to their overall quality of life, on one side, those living relatively near cities are probably working there with high incomes, but not paying so much for household expenses, like mortgage or rent, for example.

The differences between countries regarding the Value Price (VP) factors for food choice were clear in some cases (Table 2). While for the participants in most countries the highest fraction fell into the category of indifferent, in some countries that is not the case, like for example in the Netherlands, where 57.6% attribute importance to price factors when buying foods (52.6% value price + 5% much value), followed by Latvia (52.7% = 48.7% + 5%), by Hungary (45% = 34.4% + 10.6%), or United States (38.6% = 34.6% + 4%). Both, incomes and prices of foods tend to be different across countries, even for the same food products, produced and traded by big multinational companies [19].

Table 3 presents the results obtained for frequencies and chi-square tests for variable Value Convenience (VC) according to the sociodemographic variables tested. For all variables (gender, age group, level of education and marital status), most of the participants showed to be quite indifferent to convenience factors, with percentages ranging from 39.6% (for the widowed) to 57.4% (participants with primary school level of education), being the percentage of indifferent equal to 47.5% for the whole sample. Nevertheless, in this case, and contrarily to what was observed for variable Value Price (VP), the percentage of participants who do not value convenience factors (39.6%) is far higher than that of the participants who value them (8.8%).

For the variables tested, significant differences were found (p < 0.0005) but again the associations are weak (V ranging from 0.062 to 0.105). For variable gender, men value convenience factors more than women, being this possibly due to lower aptitude or availability, of men to prepare meals, in general. Also the young adults value convenience aspects when purchasing foods, when compared with the other age groups. Finally, convenience is more valued for single and for less educated people (Table 3). The complexities of consumer lifestyle allied to novel consumption trends in prosperous societies result in a greater demand for convenience food. How consumers perceive and appreciate convenience foods, and what are their marketing orientations towards ready-to-eat, easily prepared or immediately available food products are highly dependent on a number of factors [20]. A study undertaken by Mallinson et al., [21], with consumers in the United Kingdom categorized consumers as epicures, traditional consumers, casual consumers, food detached consumers and kitchen evaders, from which two groups (casual consumers and kitchen evaders) showed a higher dependency on convenience food. The demographic profiles of these two groups were identical, mostly women under 30 years, differing only in terms of education level: university degree for casual consumers against intermediate level of education for kitchen evaders.

Table 3. Associations between variable value convenience (VC) and the sociodemographic variables

Variable p-value[1] V[2]	Variable groups	Not at all valued (%)	Not valued (%)	Indifferent (%)	Valued (%)	Much Valued (%)	Total (%)
Gender **p < 0.0005** **V = 0.093**	Female	4.0	42.0	46.0	7.7	0.3	100
	Male	3.1	33.6	51.3	11.5	0.5	100
Age group **p < 0.0005** **V = 0.094**	Young adults	2.9	33.4	51.7	11.5	0.5	100
	Middle aged adults	4.9	44.8	43.4	6.7	0.2	100
	Senior adults	4.0	49.0	42.0	4.7	0.3	100
	Elderly	5.3	41.3	48.8	4.6	0.0	100
Education **p < 0.0005** **V = 0.062**	Primary school	2.4	29.1	57.4	13.8	0.0	100
	Secondary school	3.3	36.0	49.6	10.5	0.6	100
	University	4.1	42.1	46.0	7.6	0.2	100
Marital status **p < 0.0005** **V = 0.105**	Single	2.8	32.1	52.4	12.2	0.6	100
	Married	4.9	46.2	42.8	5.8	0.2	100
	Divorced	2.3	40.1	49.8	7.7	0.0	100
	Widowed	2.7	54.2	39.6	3.6	0.0	100
Whole sample		**3.8**	**39.6**	**47.5**	**8.8**	**0.3**	**100**

[1]Significance of chi-square test; [2]Cramer's V coefficient.

Table 4 presents the relations between variable Value Convenience (VC) and the geographic variables tested, together with the results of the chi-square tests.

Although for both variables significant differences were found between groups, the association between VC and country is stronger that for living environment (Cramer's coefficient, V, of 0.179 and 0.057, respectively). The results for living environment show that for all areas tested (urban, suburban and rural), the participants who expressed an opinion tend to attribute low value to convenience matters when making their food choices. Similar results were found for variable country, just mentioning that in some cases a non-negligible percentage of participants expressed attributing value to convenience when making food choices, mostly in the United States (24.4%), followed by Egypt (16.1%), Latvia (15.9%), Serbia (10.6%) and Argentina (10.2%) (Table 4).

These results contrast with the modern consumer trend to increase the demand for ready-to-eat and easily prepared foods, most especially in urban environments, considering the modern rushing lifestyles, that limit the time available for a numerous set of tasks, including buying and preparing food [22, 23]. Although convenience food refers not only to the product itself but also to the attached service of saving time, being easier to and faster to prepare, sometimes consumers are faced with the dilemma of having to choose between convenience and other aspects often associated with this type of product, such as higher environmental impact or lower nutritional quality [24 - 26]. Food choices are influenced by food environment and geographical factors, among others, which contribute to different levels of access to variable types of foods. This spatial disparity allied to individual causality, often related to country and regional environments, helps shaping consumer´s food choices [27, 28].

Table 5 presents the frequencies and the results of the chi-square tests for variable Value Marketing (VM) according to the sociodemographic variables. Although for a relevant percentage of participants, marketing aspects do not seem to be very conditioning of their buying intentions, for some groups a non-negligible part admitted valuing marketing considerations when making their food choices, like for example men (10% = 9.8 + 0.2%) more than women, young adults (13.3%) and elderly (12.7%) more than the other age groups, people with lower level of education (primary school, 23.2%), and finally single (13.2%) and widowed (10.2%) participants. These differences between groups are statistically significant (p < 0.0005), although the as-

Table 4. Associations between variable value convenience (VC) and the geographic variables

Variable p-value[1] V[2]	Variable groups	Not at all valued (%)	Not valued (%)	Indifferent (%)	Valued (%)	Much Valued (%)	Total
Living environment **p < 0.0005** **V = 0.057**	Urban	3.2	34.5	52.6	9.5	0.2	100
	Sub-urban	4.0	41.5	46.3	7.8	0.4	100
	Rural	3.4	36.9	47.0	12.1	0.5	100
Country **p < 0.0005** **V = 0.179**	Argentina	2.1	36.0	51.0	10.2	0.0	100
	Brazil	7.5	41.8	43.0	7.4	0.3	100
	Croatia	1.2	30.3	58.9	9.0	0.6	100
	Egypt	0.5	20.5	62.8	16.1	0.1	100
	Greece	9.6	45.6	37.6	7.0	0.2	100
	Hungary	5.0	38.0	47.8	9.2	0.0	100
	Italy	6.1	49.4	38.4	5.5	0.6	100
	Latvia	1.4	24.5	57.7	15.9	0.6	100
	Lithuania	0.8	29.8	20.2	8.7	0.2	100
	Netherlands	5.0	51.8	41.1	2.1	0.0	100
	Poland	5.8	53.9	36.9	3.2	0.2	100
	Portugal	3.6	64.5	28.2	3.5	0.2	100
	Romania	5.9	33.9	55.7	5.0	0.1	100
	Serbia	2.8	36.3	49.8	10.6	0.4	100
	Slovenia	5.6	48.7	42.2	3.5	0.0	100
	United States	2.0	23.5	48.3	24.4	1.8	100

[1]Significance of chi-square test; [2]Cramer's V coefficient.

sociations are weak, as indicated by the low values of Cramer's coefficients (Table 5).

The obtained results seem to indicate the market segments most influenced by food marketing and advertising campaigns or promotions and special offers to be males, less educated, single or widowed with a straight correspondence to younger adults or elderly people. In fact, these particular characteristics justify the possibly lower intrinsic emotional or educational strategies to make independent and rational food

choices, eventually contradicting the strong marketing and advertising influences [29, 30].

The results for variable Value Marketing (VM) tested as a function of the geographic variables are shown in Table 6.

Again significant differences (p < 0.0005) were found for both variables, but the association was less weak for variable country (V = 0.167) as compared with living environment (V = 0.079). Marketing factors ap-

Table 5. Associations between variable value marketing (VM) and the sociodemographic variables

Variable p-value[1] V[2]	Variable groups	Not at all valued (%)	Not valued (%)	Indifferent (%)	Valued (%)	Much Valued (%)	Total (%)
Gender **p < 0.0005** **V = 0.054**	Female	4.1	32.2	53.6	9.8	0.2	100
	Male	5.3	34.2	48.6	11.5	0.4	100
Age group **p < 0.0005** **V = 0.089**	Young adults	3.0	27.9	55.8	12.9	0.4	100
	Middle aged adults	6.0	36.7	49.3	7.8	0.2	100
	Senior adults	5.8	39.7	48.0	6.5	0.0	100
	Elderly	5.7	41.0	40.6	12.7	0.0	100
Education **p < 0.0005** **V = 0.069**	Primary school	1.2	17.7	57.9	23.2	0.0	100
	Secondary school	3.6	31.0	53.4	11.8	0.3	100
	University	5.1	34.4	51.3	9.0	0.3	100
Marital status **p < 0.0005** **V = 0.083**	Single	3.3	27.3	56.2	12.8	0.4	100
	Married	5.4	36.8	49.4	8.2	0.2	100
	Divorced	5.6	41.0	46.6	6.8	0.0	100
	Widowed	6.2	47.1	36.4	10.2	0.0	100
Whole sample		**4.4**	**32.8**	**52.2**	**10.3**	**0.3**	**100**

[1]Significance of chi-square test; [2]Cramer's V coefficient.

Table 6. Associations between variable Value Marketing (VM) and the geographic variables

Variable p-value[1] V[2]	Variable groups	Not at all valued (%)	Not valued (%)	Indifferent (%)	Valued (%)	Much Valued (%)	Total
Living environment **p < 0.0005** **V = 0.079**	Urban	3.0	26.9	57.3	12.5	0.2	100
	Sub-urban	5.3	35.3	49.9	9.3	0.2	100
	Rural	2.6	28.5	56.0	12.3	0.6	100
Country **p < 0.0005** **V = 0.167**	Argentina	2.7	32.4	51.5	13.2	0.2	100
	Brazil	4.8	36.2	50.5	8.3	0.2	100
	Croatia	1.8	23.0	60.7	14.2	0.3	100
	Egypt	0.5	19.7	61.5	18.0	0.3	100
	Greece	6.6	34.7	47.0	11.2	0.4	100
	Hungary	7.2	37.2	50.4	5.2	0.0	100
	Italy	6.5	41.4	48.2	3.9	0.0	100
	Latvia	1.3	25.8	63.5	9.3	0.2	100
	Lithuania	3.4	23.7	57.0	16.0	0.0	100
	Netherlands	1.2	23.4	59.1	16.1	0.2	100
	Poland	3.4	45.9	45.1	5.6	0.0	100
	Portugal	12.2	50.4	27.4	6.8	0.2	100
	Romania	4.0	41.5	50.3	3.9	0.2	100
	Serbia	2.6	35.5	53.8	7.6	0.4	100
	Slovenia	2.7	29.1	60.3	7.9	0.1	100
	United States	2.9	26.1	54.0	15.5	1.5	100

[1]Significance of chi-square test; [2]Cramer's V coefficient.

pear less recognized as important determinants for food choices in the case of participants living in suburban environments (the participants who do not value them represent 40.6% = 5.3 + 35.3%). Regarding country differences, participants who admit valuing to some extent marketing and advertising campaigns or special offers are from Egypt (18.3% value or value much), United States (17.0%), the Netherlands (16.3%), Lithuania (16.0%), Croatia (14.5%), Argentina (13.4%) and Greece (11.6%). Still, in all these cases they represent a minor faction of the overall sample surveyed, because the majority revealed not to attribute value to marketing aspects when making food choices and buying foods, and most especially in Portugal (12.2% do not value at all and 50.4% do not value the marketing influences) (Table 6). Some aspects that contribute to this might be related to literacy, empowerment, brand trust or suspicion towards advertising campaigns [31 - 34].

3.3 Tree classification for the variables studied

The present investigation was complemented with a multivariate analysis procedure called the decision tree through the algorithm Classification and Regression Trees (CRT). This is a stepwise method that evaluates the influence of the independent variables on the model and verifies the level of significance of the contribution, among the predictor variables. It was aimed to decompose the dependent variables (VP, VC and VM), to obtain the most likely determinants (among the independent variables). These independent variables used to construct the decision tree were: gender, age, education, marital status, living environment and country residence.

Figure 1 shows the decision tree for variable VP, for which the explanatory variables were country, marital status and age. The tree was constituted by 12 nodes, from which seven were terminal, and four levels of depth. Variable VP constitutes the root, or node zero, and the box in Figure S1 (supplementary material) shows that the highest probability is 43.3%, for indifferent, i.e., those who did not manifest an opinion about valuing price factors when making food choices. The probability for valued is 27.4% and for much valued is 2.6%, indicating that less than one third of the participants admitted valuing price factors. The first depth level of the tree was obtained by the discriminating variable country of origin, which indicates that this is the variable that best predicts the dependent variable VP. The sample was segmented into two distinct groups of countries, with the set constituted by Egypt, Hungary, Argentina, Netherlands, Latvia, Lithuania and United States, presenting a higher probability of attributing value or much value to price 83.74% and 4.8%, respectively. For these countries, the next best
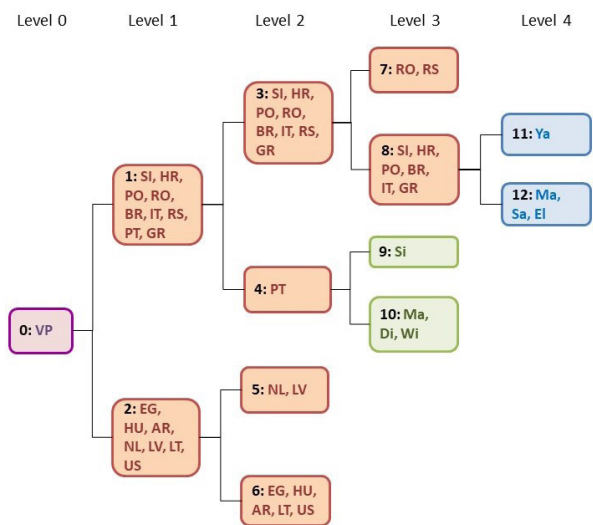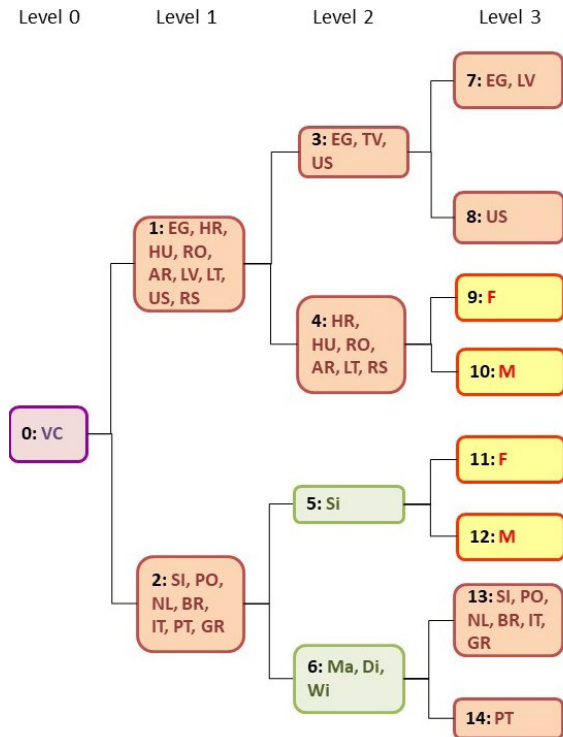

Figure 1. Tree classification for variable value price (VP) according to the independent variables tested (gender, age, education, marital status, living environment and country).
[Legend: VP - Value Price; AR - Argentina, BR - Brazil, HR - Croatia, EG - Egypt, GR - Greece, HU - Hungary, IT - Italy, LV - Latvia, LT - Lithuania, NL - Netherlands, PL - Poland, PT - Portugal, RO - Romania, RS - Serbia, SI - Slovenia and US - United States of America; Si - Single, Ma - Married, Di - Divorced, Wi - Widowed; Ya - Young adults, Ma - Middle aged adults, Sa - senior adults, El - Elderly]

predictor was again country, separating Netherlands and Latvia, as those where the probability for valuing price was higher.

For Portugal, marital status was the predictor variable for level three, being the single participants those with the highest probability of attributing more value to price factors. On the other hand, for Slovenia, Croatia, Poland, Brazil, Italy, and Greece, the predictor for level four was age, separating the young adults (who attribute higher value to price) from the remaining groups.

Figure 2 presents the decision tree obtained for variable VC, and in this case the explanatory variables were country, marital status and gender. In this case the tree had 14 nodes and eight of them were terminal, for a tree with three levels of depth. Unlike the value attributed to price, the value attributed to convenience was lower, so that in node zero, i.e., for the whole sample, the probabilities for value and much value are very low (8.8% and 0.4%, respectively). Again the first predictor among the independent variables tested was country, and for the set constituted by Slovenia, Poland, the Netherlands, Brazil, Italy, Portugal and Greece the next predictor was marital status, separating the single for valuing slightly more the convenience aspects, and among these, the next level of depth was obtained by differences in gender, for which women had a higher probability of not valuing convenience.

Figure 2. Tree classification for variable value convenience (VC) according to the independent variables tested (gender, age, education, marital status, living environment and country).
[Legend: VC - Value Convenience; AR - Argentina, BR - Brazil, HR - Croatia, EG - Egypt, GR - Greece, HU - Hungary, IT - Italy, LV - Latvia, LT - Lithuania, NL - Netherlands, PL - Poland, PT - Portugal, RO - Romania, RS - Serbia, SI - Slovenia and US - United States of America; Si - Single, Ma - Married, Di - Divorced, Wi - Widowed; F - Female, M - Male]
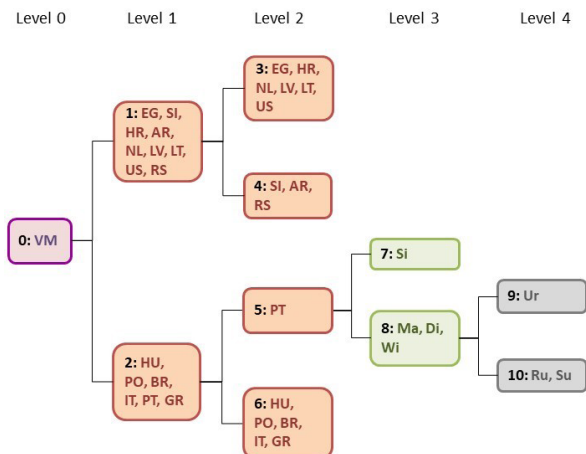
Figure 3. Tree classification for variable value marketing (VM) according to the independent variables tested (gender, age, education, marital status, living environment and country).
[Legend: VM - Value Marketing; AR - Argentina, BR - Brazil, HR - Croatia, EG - Egypt, GR - Greece, HU - Hungary, IT - Italy, LV - Latvia, LT - Lithuania, NL - Netherlands, PL - Poland, PT - Portugal, RO - Romania, RS - Serbia, SI - Slovenia and US - United States of America; Si - Single, Ma - Married, Di - Divorced, Wi - Widowed; Ur - Urban, Su - Suburban, Ru - Rural]

For Croatia, Hungary, Romania, Argentina, Lithuania and Serbia, the discriminating variable for level three was gender, and once again women evidenced a low value to convenience as compared with men.

In a similar way to what happened in the two previous cases, also for variable VM the first predictor was country, as it can be seen in Figures 3 and S3 (supplementary material), but in this case the other explanatory variables were marital status and living environment. In this case the tree had only 10 nodes from which six were terminal, in four levels of depth. Also for marketing the participants revealed to attribute a low value to marketing when deciding which foods to buy (4.5% and 32.8% for not at all valued and not valued, respectively in node zero).

For variable VM, the second discriminating variable was country in both cases, leading to 3 terminal nodes (nodes 3, 4 and 6). For Portugal, marital status appeared as predictor for level three, so that being single showed a higher probability of valuing marketing aspects, as compared with the remaining groups (married, divorced and widowed). For these last living environment came as the next predictor for level four, separating urban as the group for which the value of marketing was lowest.

4. Conclusions

- For all the sociodemographic variables tested significant differences were found between groups (divided according to gender, age, level of education, marital status, living environment and country) regarding the value attributed to elements associated with convenience, price and marketing, when making food choices related to food buying.

- Although in most cases, the associations between the variables were considered very weak, they were slightly higher in the case of associations between country and the three groups of aspects evaluated: value convenience, value price and value marketing.

- Furthermore, in order to complement the analysis, a tree classification was performed to evaluate the relative importance of the influential variables considered (all six sociodemographic variables were taken as independent variables) on the measured values for buying food (dependent variables: value convenience, value price and value marketing). The results of this classification confirmed for all three dependent variables that the most influential factor was country, highlighting that people in the different countries included in the study show different motivations for buying food products.

- Nevertheless, the results of the present study must be interpreted with some caution, because the sample

was not homogeneous in terms of the different groups of the sociodemographic variables studied, including country participation. Still, and because the number of participants was high, some valuable conclusions could be deduced.

Acknowledgment

5. References

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