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ORIGINAL ARTICLE

Motives underlying food consumption in the Western Balkans: consumers' profiles and public health strategies

Julie Mardon · Elise Thiel · Martine Laniau · Siet Sijtsema · Karin Zimmermann · Dominique Barjolle

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Abstract
Objectives This study aims to identify subgroups of consumers based on the health motives underlying their food choice in Western Balkan Countries.
Methods The survey ($n = 2943$) was based on the Food Choice Questionnaire (FCQ) and elicited information on socio-demographic characteristics, consumption frequency of healthy food products, nutrition knowledge and impulsiveness. Analysis of the FCQ data focused on items of "health and natural content" and "weight control" factors to identify clusters.
Results The biggest group of the sample was weight control and health-concerned individuals (34 %), mainly urban women older than 50. The second group of respondents (31 %) was moderately motivated about health and weight. A third group was health concerned but paid less attention to weight control (21 %), mainly comprising men and people living with children. The last group consisted of unconcerned young men (14 %) eating less fruit and showing higher impulsiveness.
Conclusions Western Balkan consumers differ in the importance they attach to health and natural content and weight control. This insight is needed to target interventions.

Keywords Western Balkan Countries · Consumers' food choice · Health and weight control · Fruit · Products with nutrition and health claims

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Introduction

Following the demise of communism and the conflicts that affected the former Yugoslavia, Western Balkan Countries (WBC) underwent important changes, including a nutritional transition. This phenomenon affects both the structure and overall composition of the diet (Popkin 2001): as a consequence of the economic development, people tend to consume more energy-dense and processed foods (Drewnowski and Darmon 2005; Hawkes et al. 2009) rather than fresh fruit and vegetables, cereals and roots.

These modifications are partly responsible for the high rate of non-communicable diseases that the WBC is currently experiencing (Rechel et al. 2004). For example, the age-standardized mortality rate linked to cardiovascular disease and diabetes ranges from 179 to 284 per 100,000

population in Balkan countries (World Health Organization 2009) and obesity prevalence ranges from 20.3 to 27 (Branca et al. 2007). Thus, improving this situation for the population requires an urgent implementation of public health strategies in the region. However, it requires a good knowledge of consumers' health concerns and very little work has addressed this topic in WBC until now.

Consumer segmentation was suggested as a relevant first step in designing public health awareness campaigns: this involves targeting messages at particular groups of consumers (Moorman and Matulich 1993). In former times, socio-demographic variables were widely used to identify these groups. Nevertheless, people in similar demographic groups were shown to have different behaviour and attitudes to health (Slater and Flora 1991). Nowadays, other variables might be considered to constitute homogeneous groups such as behaviour, misinformation, beliefs and communication patterns (Snyder 2007; Onwezen et al. 2012).

Health motivation (Moorman and Matulich 1993) is indicative of the degree to which someone is willing to behave in a healthy manner. It was shown to significantly affect people's food behaviour as evidenced by the studies of Bhaskaran and Hardley (2002) on people with high blood cholesterol level and Steinhilper et al. (2013) on patients with breast cancer. The Food Choice Questionnaire (FCQ) (Steptoe et al. 1995) is an interesting tool to assess different motives underlying the selection of food, including health motivation and weight control (recognized as a factor to maintain healthiness). Carrillo et al. (2011) acknowledged its relevance to a better understanding of dietary behaviour and the search for a healthy food consumption. The authors focused their analysis on the items linked to "weight control" to explore the relationship between consumers' behaviour regarding this motive and the consumption frequency of low-calorie and functional ingredients-added food.

Consumption frequency and perception of different kinds of foods are widely used to characterise consumers' behaviour (Zandstra et al. 2001; Pohjanheimo and Sandell 2009). Among food products, fruit and products with nutritional and health claims, insofar as these claims can be substantiated, are two categories commonly considered as healthy and thus emblematic for persons keen to avoid chronic diseases. Fruit consumption is an important part of the recommendations of experts with regard to public health, given the associated health benefits reported in the literature (He et al. 2006; Vioque et al. 2008). The use of evidence-based claims for food products is fully relevant to the strategy on diet, physical activity and health of the WHO to encourage consumers to alter their dietary patterns towards healthy ones (World Health Organization 2004).

Nutritional knowledge may influence healthy food consumption (Grunert et al. 2010). For example, significant differences in willingness to try functional food were found among consumer groups with different levels of knowledge about the relationship between diet and diseases (Ares et al. 2008). Impulsiveness is another recognized important factor explaining food purchasing and consumption that could distinguish consumers (Verplanken and Herabadi 2001). It refers to rapid decision making with reduced inhibitory control of the consequences of the actions. Indeed, individuals having impulsive food behaviour would be more likely to consume unhealthy food (Jasinska et al. 2012).

The present work aims to determine health motivations of WBC consumers in food choice, since very few data are currently available on this topic. The research was part of the European Research program FOCUS-BALKANS. A large quantitative consumer survey was carried out in six WBCs to better understand consumers' behaviour and expectations. The purpose of this study is twofold:

- To identify different WBC consumer groups on the basis of their health motives underlying food consumption.
- To explain the health motives in food consumption through a characterisation of clusters by socio-demographic, consumption, nutrition knowledge and impulsiveness variables.

Methods

General description of the survey

A total of 3085 consumers from Bosnia-Herzegovina, Croatia, Former Yugoslav Republic of Macedonia, Montenegro, Serbia and Slovenia were included in the survey. Data were gathered via IPSOS country offices in the region. The sample was stratified to optimize geographical and cultural uniformity. Then, weighting procedures regarding age, sex and type of settlement classes were applied to the sample to correctly represent the population as described by Milošević et al. (2012). Interviews were carried out face-to-face at respondents' homes.

Questionnaire

A FCQ measuring the reported importance of various motivational factors underlying food choice was given to participants. It consists of 36 items related to nine factors likely to influence food choice (1: Health, 2: Mood, 3: Convenience, 4: Sensory appeal, 5: Natural content, 6: Price, 7: Weight control, 8: Familiarity, 9: Ethical

concern). In this study, the FCQ developed by Steptoe (Steptoe et al. 1995) in England did not prove totally invariant in the WBC. Therefore, an adaptation with 8 factors (1: Health and natural content, 2: Mood, 3: Preparation convenience, 4: Purchase convenience, 5: Sensory appeal, 6: Price, 7: Weight control, 8: Familiarity and ethical concern) was proposed (Milošević et al. 2012). Participants were asked to rate their level of agreement for each item by endorsing the statement: "It is important to me that the food I eat on a typical day…" using a five-category scale (scored from "I do not agree at all" to "I absolutely agree") (Table 1).

The survey also elicited information on socio-demographic characteristics of respondents.

Self-defined health status was reported by asking respondents to rate their overall current state of health. This measurement is a valuable indicator of people's health status (Eikemo et al. 2010).

Consumption frequency of two healthy food categories, fruits and products with health claims, was measured by self-reported questions. A portion of fruit was defined as approximately 80–100 g, for example, an apple, two spoons of fruit salad or one glass of freshly squeezed juice. Health claims were defined as "claims that link a nutrient to a normal functioning of the body or a specific disease" (e.g., "calcium helps build strong bones. Adequate calcium throughout life, as part of a well-balanced diet, may reduce the risk of osteoporosis") and presented by means of pictures. In the same way, intention to consume both targeted products was measured. Participants were asked the following question: "How often would you consume products with health claims if they were more available to you (e.g., cheaper, more accessible in stores… etc.)?"

Nutritional knowledge was measured: an "objective" scale (true/false) including five items was used for fruits ("A medium sized apple contains more calories than a medium sized banana"; "Eating fruit is only beneficial for the health when also vegetables are eaten daily"; "Adding an extra piece of fruit to the diet results in weight loss"; "It is generally recommended to eat at least 2 portions of fruit each day"; "It is generally recommended to eat not more than five portions of fruit each day") and for products with health claims ("Vitamin A helps absorb calcium"; "Vitamin C fights colds and has anticancer power"; "Carbohydrates convert to sugar and fuel the body"; "Polyunsaturated fats are more likely to raise people's blood cholesterol level than saturated fats"; "Risk of high blood pressure is most likely to be reduced by eating a diet with less salt").

An impulsive food consumption scale composed of nine items and adapted from Bosnjak et al. (2007) was used to assess perceived control of food behaviour. The questionnaire initially developed in English was submitted to steps of translation and back-translation to ensure correctness of the translation.

Table 1 Mean scores and standard deviations of Food Choice Questionnaire items loading onto health and natural content and weight control factors for the four clusters of consumers identified in Western Balkan Countries in 2010

Factors and items	Total sample ($n = 2943$; 100 %)		Cluster 1 ($n = 990$; 33.6 %)		Cluster 2 ($n = 928$; 31.5 %)		Cluster 3 ($n = 605$; 20.6 %)		Cluster 4 ($n = 420$; 14.3 %)		Statistical significance
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	(ANOVA)
Health and natural content											
Keeps me healthy	4.44	0.76	4.87^{a}	0.36	4.15^{b}	0.67	4.81^{a}	0.43	3.54^{c}	0.94	0.000***
Contains natural ingredients	4.40	0.79	4.84^{a}	0.40	4.28^{c}	0.65	4.50^{b}	0.74	3.45^{d}	0.95	0.000***
Is nutritious	4.34	0.78	4.70^{a}	0.59	4.02^{b}	0.69	4.66^{a}	0.59	3.73^{c}	0.92	0.000***
Contains a lot of vitamins and minerals	4.29	0.86	4.82^{a}	0.46	4.04^{c}	0.69	4.59^{b}	0.57	3.16^{d}	1.00	0.000***
Makes me feel good	4.21	0.89	4.73^{a}	0.55	3.82^{c}	0.75	4.60^{b}	0.61	3.26^{d}	1.00	0.000***
Good for my skin/teeth/hair…	4.17	0.98	4.77^{a}	0.57	3.85^{c}	0.78	4.56^{b}	0.72	2.94^{d}	1.04	0.000***
Contains no artificial ingredients	4.15	0.99	4.77^{a}	0.53	3.93^{c}	0.84	4.34^{b}	0.86	2.93^{d}	1.00	0.000***
Keeps me awake/alert	4.10	0.96	4.73^{a}	0.53	3.79^{c}	0.78	4.38^{b}	0.76	2.90^{d}	0.98	0.000***
Is high in protein	3.87	1.00	4.43^{a}	0.79	3.58^{c}	0.85	4.05^{b}	0.84	2.87^{d}	1.02	0.000***
Is high in fibre and roughage	3.81	1.01	4.47^{a}	0.71	3.70^{b}	0.78	3.63^{b}	0.98	2.75^{c}	1.02	0.000***
Weight control											
Contains no additives	3.90	1.07	4.55^{a}	0.72	3.84^{b}	0.88	3.58^{c}	1.15	2.93^{d}	1.03	0.000***
Is low in fat	3.87	1.04	4.66^{a}	0.56	3.93^{b}	0.75	3.10^{c}	1.01	2.95^{d}	1.01	0.000***
Helps me control my weight	3.64	1.18	4.45^{a}	0.81	3.57^{b}	0.97	3.15^{c}	1.19	2.62^{d}	1.06	0.000***
Is low in calories	3.47	1.18	4.31^{a}	0.87	3.65^{b}	0.86	2.44^{c}	0.92	2.55^{c}	0.99	0.000***

^{a,b,c,d} Values with same letters on the same line do not differ significantly ($P < 0.05$) according to ANOVA and Tukey's multiple range test

Data analysis

Data analysis was performed with two statistical software packages: SPSS (19.0) and R (2.15.2). Starting from the adapted factors of Milosevic et al. (2012), data from the 14 items for "Health and natural content" and "Weight control" factors were submitted to a Principal Component Analysis (PCA). The database was filtered beforehand to work only on respondents without missing or aberrant values for those 14 variables (2943 individuals). PCA was used as a preliminary step before the clustering stage to keep only the most informative components but also to allow further visual representation on factorial maps. To gather within a cluster consumers who answered the most similarly to the 14 items studied, an Agglomerative Hierarchical Clustering (AHC) using Ward's criterion (i.e., minimization of within-cluster variance) and Euclidean distance was applied to the individuals' coordinates on the kept components from the PCA. The results of this clustering was the construction of a hierarchical tree of proximities for individuals, a clear cut in this tree gave individual affectation into one of the four clusters identified. A consolidation to stabilize the clusters was added by combination of a k-means algorithm using AHC clusters' centroids to initiate iterations. The value of the consolidation is to combine the advantages of the two complementary clustering methods whilst limiting their respective drawbacks.

Clusters were characterised in terms of socio-demographic data, consumption frequencies, knowledge of fruit or products with health claims and impulsiveness scores. Anova F tests with Tukey multiple comparisons and Chi-square tests were used to identify significant differences between clusters. The use of test values (Lebart et al. 1995) was useful to better understand each resulting cluster compared to global sample characteristics.

Results

Among items linked to "health and natural content" and "weight control" factors, "keeps me healthy" and "contains natural ingredients" were considered as the most important (Table 1). Conversely, "is low in calories" and "is high in protein" registered the lowest scores.

The two first principal components from PCA explained 38 and 10 % of the total variance, respectively, in the data set (Fig. 1). All studied items were positively correlated to the first principal component. Concerning the second one, the main contributions were those of the 4 items related to weight control, which were positively correlated to axis 2 but also the contributions of 3 items about health and natural content ("keeps me healthy", "is nutritious" and "makes me feel good") which were negatively correlated to axis 2. Overall, the first axis conveyed the gradual importance accorded to health and natural content and weight control (from left to right) whereas axis 2 separated items linked to weight control (at the top) from those linked to health and natural content (standing lower).

The clustering identified four groups of consumers with distinctive motivational profiles. Cluster 1 clearly appeared highly attentive to both health and natural content and weight control, they allocated the highest scores to all items (Table 1) compared to other groups. Conversely, cluster 4 showed very poor attention to both factors, attributing the lowest scores to almost all items. Two other clusters (2 and 3) exhibited an intermediate attention to both factors. Cluster 3 gave higher ratings to items linked to the health and natural content factor than those linked to weight control. Cluster 2 paid more attention to items linked to weight control. The four clusters are described below and characterised by additional variables (Tables 2, 3).

Cluster 1 included 34 % of consumers that were highly attentive to weight control and health and natural content. It comprised a higher proportion of females (59 %), more urban people (62 %) than average and people older than 55 were overrepresented (36 %). Their reported consumption frequencies of fruit and products with health claims were higher than the other consumers. The consumption frequency of fruit that respondents declared they would attain if it was more available to them would rise to 50 portions of fruit a month on average (+28.2 % of current consumption). Furthermore their consumption of products with health claims would rise by 75 % if more were available. No significant difference in knowledge or impulsiveness stood out for this cluster.

Cluster 2 consisted of 31 % of respondents. These consumers were less attentive to weight control and health and natural content than average but still considered these two factors to be important for them (mean scores above 3). This group contained a higher proportion of females (56 %) but also slightly more people with a high level of education than clusters 3 and 4. Their consumption frequency of products with health claims was a bit lower than in the sample but their expected frequency did not differ from average. There was no difference in knowledge or of impulsiveness in this cluster compared to average values in the sample.

Cluster 3 comprised approximately 21 % of the total sample. This group placed greater emphasis on its health and was less preoccupied by weight control. Cluster 3 contained a significantly higher proportion of males (57 %), of people between 35 and 54 years old (39 %), of people with children (43 %) and slightly fewer people with a high level of education compared to clusters 1 and 2. In this cluster, consumption frequencies of fruit and products

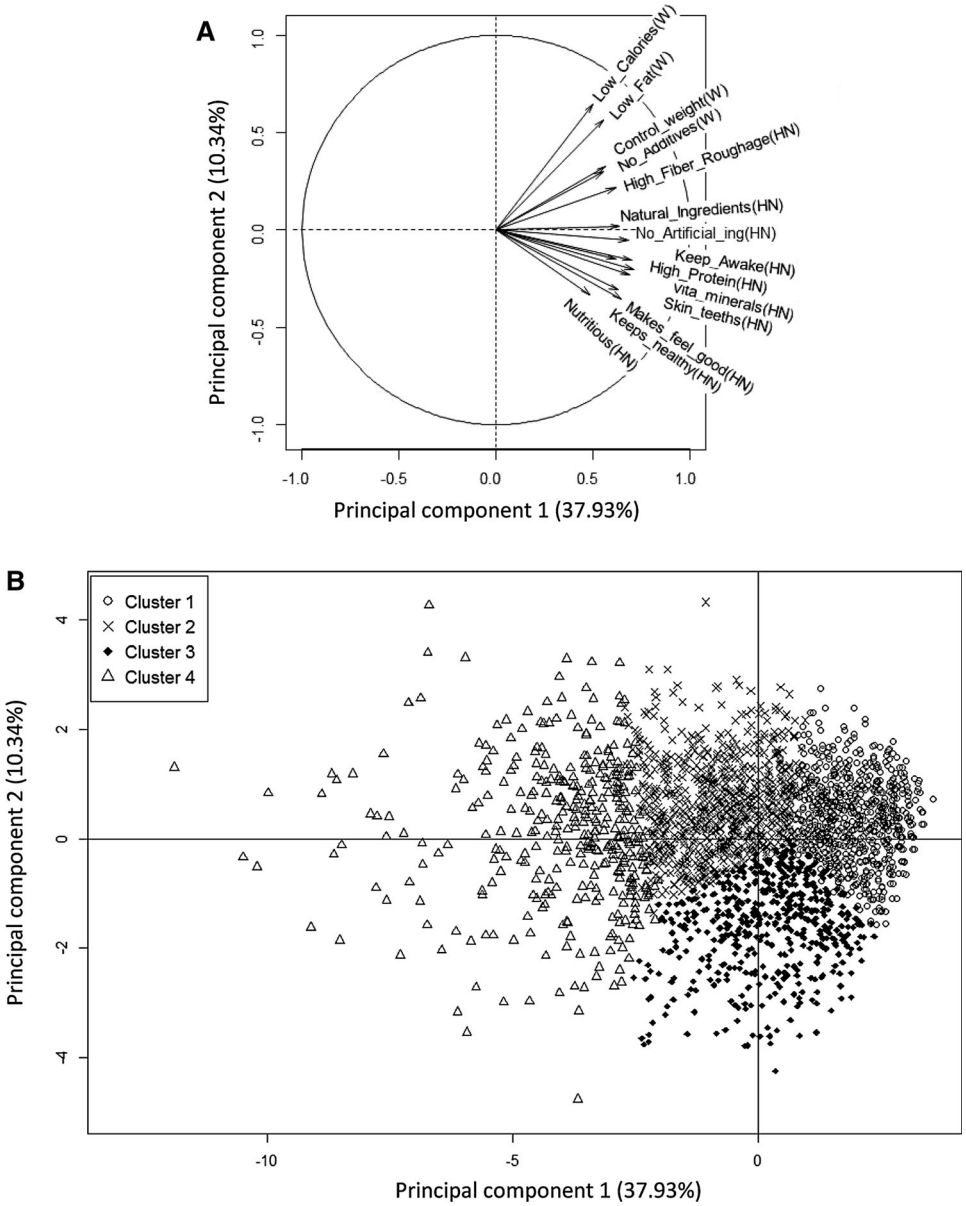


Fig. 1 Principal component analysis on the 14 Food Choice Questionnaire items related to "Health and natural content" and "Weight control" factors (Western Balkan Countries in 2010). **a** Plot of variables on the correlation *circle*; *W* stands for weight control and *HN* for health and natural content. **b** Plot of individuals (identified into clusters) on the factorial map

with health claims were lower than in the whole sample, so as their expected ones, but they would consume more if more available (potential increase of 37.5 % for fruit and 83.3 % for functional food). Their knowledge about functional food was slightly higher than average and they were a bit less impulsive people.

Cluster 4 (14 % of respondents) contained people completely inattentive to their weight and even less to health. Compared with the whole sample, males (61 %), single people (35 %), 18- to 34-year-olds (42 %) and people without children (68 %) were overrepresented. Their consumption frequencies of fruit were significantly lower than in the whole sample (29 portions a month) as well as the expected consumption of fruit (although it could potentially rise by 37.9 %) and the same was true for products with health claims with a potential consumption below the average, although better availability would lead to an increase of 66.7 % above current consumption. Their knowledge about products with health claims was slightly lower than average in the sample and they showed an impulsiveness which scored higher.

Discussion

This study adds insights into motives of Western Balkan consumers, based on a large quantitative consumer survey undertaken in six WBCs in which different groups of consumers were segmented based on health-related motives. As previously undertaken in a quite similar approach (Carrillo et al. 2011), consumers were partitioned through a

Table 2 Demographic and socio-economic characteristics and declared state of health of the whole sample and of the four clusters of consumers identified in Western Balkan Countries in 2010

	Total sample (%) ($n = 2943$)	Cluster 1 (%) ($n = 990$)	Cluster 2 (%) ($n = 928$)	Cluster 3 (%) ($n = 605$)	Cluster 4 (%) ($n = 420$)	Statistical significance (Chi square tests on numbers)
Gender						
Male	48.0	41.0[b]	43.9[b]	56.5[a]	61.1[a]	0.000***
Female	52.0	59.0[a]	56.1[a]	43.5[b]	38.9[b]	
Marital status						
Single, not living with a partner	25.5	23.4[b]	24.7[b]	23.6[b]	34.8[a]	0.001***
Cohabiting/married	60.3	61.9[a]	61.8[a]	61.2[a]	52.0[b]	
Previously married (divorced, widowed)	14.2	14.6[a]	13.5[a]	15.2[a]	13.2[a]	
Age						
18–34	32.4	30.5[b]	31.3[b]	30.9[b]	41.5[a]	0.000***
35–54	34.2	33.2[b]	33.5[b]	39.0[a]	30.7[b]	
55+	33.4	36.2[a]	35.2[a]	30.1[b]	27.9[b]	
Child						
Yes	37.2	37.0[b]	35.8[b]	42.9[a]	32.5[b]	0.005***
No	62.8	63.0[a]	64.2[a]	57.1[b]	67.5[a]	
Settlement type						
Urban	58.5	61.5[a]	57.7[a,b]	55.5[b]	57.5[a,b]	0.097*
Rural	41.5	38.5[b]	42.3[a,b]	44.5[a]	42.5[a,b]	
Last finished education						
Elementary or less	32.6	31.0[a]	32.6[a]	35.0[a]	33.1[a]	0.074*
Secondary	51.1	51.8[a]	49.0[a]	51.5[a]	53.5[a]	
Higher or university	16.3	17.2[a,b]	18.4[a]	13.4[c]	13.5[b,c]	
Declared standard of the household						
Bad	16.4	13.9[b]	16.8[a,b]	16.9[a,b]	20.5[a]	0.055*
Moderate	50.1	51.0[a,b]	51.7[a]	49.5[a,b]	45.6[b]	
Good	33.5	35.1[a]	31.5[a]	33.5[a]	33.9[a]	
Current occupation						
Employed in a company	33.3	33.9	34.0	31.1	33.4	0.131 (ns)
Self-employed	9.1	7.8	8.2	10.5	12.0	
Unemployed	57.7	58.4	57.8	58.4	54.7	
Income						
Low	24.3	22.2	26.5	22.9	26.4	0.251 (ns)
Medium	30.0	29.3	31.6	31.7	25.7	
High	11.3	11.9	10.4	11.4	11.4	
NA	34.4	36.6	31.4	34.0	36.5	
Declared current state of health						
Bad	9.7	9.0	10.2	8.6	11.8	0.353 (ns)
Moderate	30.0	30.7	30.8	27.8	29.7	
Good	60.3	60.4	59.0	63.6	58.5	
BMI						
Underweight (<18.4)	2.2	2.2	2.3	1.6	2.8	0.255 (ns)
Normal (18.4–24.9)	46.6	44.7	48.0	48.3	45.7	
Overweight (25.0–29.9)	36.9	38.3	35.1	38.5	35.1	
Obese (≥30)	12.3	12.9	12.9	9.3	13.9	
NA	2.0	2.0	1.7	2.3	2.5	

NA not available, *ns* non significant

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$

[a,b,c,d] Values with same letters on the same line do not differ significantly ($p < 0.05$) according to ANOVA and Chi square test)

Table 3 Characterisation of clusters of consumers by variables of interest related to fruits and products with health claims as well as impulsiveness (data collected in Western Balkan Countries in 2010)

	Total sample mean (SD)	Cluster 1 mean (SD)	Cluster 2 mean (SD)	Cluster 3 mean (SD)	Cluster 4 mean (SD)	Statistical significance (ANOVA)
Consumption frequency (number of portions/month)						
Fruits	35 (23)	39[a] (23)	36[a] (23)	32[b] (23)	29[c] (23)	0.000***
Products with health claims	13 (17)	16[a] (19)	12[b] (15)	12[b] (16)	12[b] (16)	0.000***
Intention to consume (number of portions/month)						
Fruits	47 (22)	50[a] (21)	47[a,b] (21)	44[b] (22)	40[c] (24)	0.000***
Products with health claims	24 (23)	28[a] (24)	23[b] (22)	22[b] (23)	20[b] (21)	0.000***
Knowledge						
Fruits	2.81 (1.08)	2.77 (1.07)	2.83 (1.10)	2.81 (1.10)	2.86 (1.04)	0.410 (ns)
Products with health claims	3.33 (0.85)	3.35[a,b] (0.79)	3.30[a,b] (0.92)	3.40[a] (0.76)	3.24[b] (0.96)	0.019**
Impulsiveness score	26.43 (5.20)	26.19[b] (5.50)	26.49[b] (4.81)	26.04[b] (5.51)	27.39[a] (4.73)	0.000***

ns non significant

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$

[a,b,c,d] Values with same letters on the same line do not differ significantly ($p < 0.05$) according to ANOVA and Tukey's multiple range test

cluster analysis based on the scores they attributed to items linked to both "health and natural content" and "weight control" factors in the FCQ. Results describe different profiles of consumers identified as a function of their health motives, interesting information that was missing until now in the WBC. Health-concerned WBC consumers generally consumed more fruit and products with health claims than unconcerned respondents. The group comprising more parents than others was not preoccupied that much by weight control. Low motivated consumers exhibited a higher impulsiveness in food consumption than other groups. Consumers' nutrition knowledge poorly differed among groups.

As underlined by Milosevic et al. (2012), in WBC "health and natural content" is one of the strongest motivations underlying food choice after "sensory appeal" and "purchase convenience". Thus, in this region the ranking of motives is quite similar to those encountered in western European countries. One of the peculiarities of the region is the association made by the consumers between "health" and "natural content". This distinctive characteristic was previously reported in Belgian and Italian consumers (Eertmans et al. 2006). The authors suggested that this merging showed that a food's natural content was viewed as essential to ensure its healthfulness.

Cluster 1 is "the hard core" of health-concerned consumers. In this group the link between food choice, weight control and health seems obvious. In this cluster, women, people over 50 and cohabiting or married people are overrepresented. This result is in line with previous findings reported in other European countries (Hoefkens et al. 2011). Given the age of these consumers, it can be hypothesized that their high health motivation may be due to a higher perceived susceptibility to disease or being diagnosed with a disease (Dutta and Feng 2007), although they do not declare a different state of health from others. As expected for health-concerned people, their consumption of fruit is quite high and their consumption of products with nutrition and health claims is greater than in other groups. This may be explained by a higher awareness of functional food ingredients, associated with health motivation (Bornkessel et al. 2014). The willingness to consume more fruit and products with health claims is also higher. Logically, groups that greatly value health benefits in their food choices usually perceive fruit relatively more positively on a broader range of aspects (Onwezen et al. 2012). Although the objective level of knowledge regarding nutrition issues is not very different from the average in the sample, we may suppose that such consumers will try harder to understand food labeling. Socio-demographic profiles from clusters 1 and 2 do not really differ; consumers moderately concerned about weight and health (cluster 2) only show a lower consumption of functional foods. In terms of health concerns, cluster 3 is not so different from cluster 2, but the concern for weight control is significantly lower. In the current study, the declared BMI distribution in this group did not differ from others. Cluster 3 includes more families with children. Given the impact that parents have on their children's behaviour (Antonogeorgos et al. 2013), their disinterest in health may be a risk of young and teenage children becoming overweight in the medium- to long-term future. Cluster 4 appears to be the

least motivated consumer group. In this smaller cluster, young single males are overrepresented. Fruit consumption is lower than in other groups. This low consumption might be caused by price, availability, and a lack of awareness about health benefits (Trienekens et al. 2008). Nutrition knowledge on fruits of unconcerned consumers did not differ from that of the other groups. These individuals exhibited greater impulsiveness in their food consumptions. Our results confirm those of Verplanken and Herabadi (2001) who suggested that impulsiveness measurement would be an interesting criterion to distinguish consumers. In contrast with other groups, it seems that the link between health and a well-balanced diet is largely underestimated by these young men.

Mean scores of knowledge remain both quite low for the whole sample (3.33 for products with nutrition and health claims and 2.81 for fruits). In this survey, knowledge regarding specific nutritional value for each category of products cannot be identified as one of the main drivers of consumption. Indeed, individuals from cluster 1 eat more fruits and products with claims without appearing to have better knowledge of these products than other groups. However, we did not investigate the level of usage of food labels. It was previously suggested that usage is mainly related to interest in healthy eating, whereas understanding of nutrition information on food labels is mainly related to nutrition knowledge (Grunert et al. 2010). Our results run counter to the view that understanding of nutrition information is affected by differences in interest in healthy eating and nutrition knowledge and by social status. The same authors demonstrated that lack of use of nutrition information is a question of not only understanding, but also motivation. The present work is in agreement with this finding since it seems that the level of consumption of products with claims is linked with the level of health motives in our sample.

From a public health perspective, particular attention should be paid to specific groups of WBC consumers:

- First, it could be interesting to rely on cluster 1 (urban women) which can be considered as ahead in healthy food consumption awareness. Health motivation was shown to influence consumers' information strategies (Bornkessel et al. 2014). In particular, people having strong health motives in food choices are likely to search the World Wide Web for health information. Indeed, intrinsic health concern is a positive predictor of participation in an online health community (Dutta and Feng 2007). Thus, women with high health motivation and a good level of education could be sensitive to messages on health websites.
- Parents with young children (cluster 3) may influence the future food behaviour of their offspring. This group was found to have a slightly lower educational level and to be less concerned about weight control than clusters 1 and 2. However, high parental education status was found to offer protection against childhood obesity and to be positively associated with adherence to the Mediterranean diet (Antonogeorgos et al. 2013). In a region already characterised by excessive obesity, it is important to communicate on weight control, since after a period of food shortage the population is liable to increase its food intake as their countries develop (European Environment Agency 2010). Thus, when attempting to prevent childhood obesity, health professionals should take into account parents' views on diet since these views are likely to affect the way they raise their children (Lopez-Dicastillo et al. 2010). Another strategy proposed by Olafsdottir et al. (2014) could be to influence children's dietary patterns by means of TV, which has been shown to influence children's behaviour independently of parental norms.
- Finally, a specific focus should be made on cluster 4 (single young men), totally unconcerned by weight and health. The challenge is specifically to raise young people's awareness of the impact of food choice and eating habits on their health. Since this group is more impulsive and possibly more governed by emotions it might be more efficient to target them by "appealing to emotion rather than intellect" (Fitzgibbon et al. 2006). It would also be interesting to determine whether these consumers are internet users or not. If they are, the internet, and more specifically social networks, might be useful for targeting them, since social networks were reported to influence healthy eating (Nam et al. 2015). Other ways have been suggested to reach unconcerned consumers, such as increasing shelf-space in supermarkets or increasing the variety of products (Visschers et al. 2013).

Thus, this exploratory work provides new data to improve understanding of consumers' health motives in food choice in the WBC. Particularly, it provides information on the different profiles of consumers and recommendations to create suitable public health messages.

Some limitations of the study have to be mentioned. In particular, declared overweight (36.9 %) and obesity (12.3 %) rates do not match WHO data (Branca et al. 2007). In fact, the use of self-reported weight and height data is subject to well-known biases due to a trend to under-report their weight which results in an underestimation of the true prevalence of obesity in the studied population (Gil and Mora 2011). Hence it would have been interesting to combine health motivation data with measured BMI data.

Further advice can be given to implement specific strategies: an approach involving policy makers, producers,

the food industry and consumers can be suggested (Fitzgibbon et al. 2006). Involvement of a broad set of stakeholders has previously been suggested as a key factor regarding nutritional communication to promote messages that everyone embraces and supports (Fernández-Celemín et al. 2011). This may also be an efficient way to promote fruit availability and accessibility (Lucan and Mitra 2012), which currently do not seem to meet consumers' expectations and have previously been identified as a major problem with fruit marketing to meet consumption recommendations (Onwezen and Bartels 2011). Moreover, since the diet is a complex concept and that habits are hard to change, campaigns might adopt an entire lifestyle approach, instead of trying to make people change a bad habit (Dutta-Bergman 2005). Lessons from marketing such as the use of a brand, transposed to public health strategies by conveying an "enviable and fun lifestyle" (Fitzgibbon et al. 2006) and "develop a culture of wellness" (Fernstrom et al. 2012) could be an interesting direction with the promotion of enviable subjective social norms and family models. Another perspective highlighted by this work is the need for future research regarding nutrition knowledge and use of nutritional information in WBC. Nevertheless, it can already be suggested that the improvement of knowledge on healthy foods among the population should be a goal.

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