

Evaluation of food labelling usefulness for consumers

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Abstract

Food labelling is a means of communication between food business operators and consumers, representing an important factor in consumer purchasing decisions. The enforcement of the new food labelling policy is aimed to improve food safety and public health through the mandatory indication of information and nutritional values. To understand the usefulness of the information provided for consumers, a survey was carried out to assess the efficacy of the information presented in food labelling. Principal component analysis was performed to obtain a smaller number of uncorrelated factors regarding the usefulness of food labelling. Results showed consumers usually do not read food labels due to lack of time and excessive information. Additionally, food labelling was observed to be more useful for specific consumer groups, such as, athletes, consumers with health conditions or consumers concerned with a healthy lifestyle. The results of the present study highlight the need of information campaigns by public health authorities to show the importance and advantages of reading food labels as well as the development of essential information which should be quickly and clearly seen and understood by consumers.

KEYWORDS

behaviour, consumer, food labelling, food purchase, principal component analysis

1 | INTRODUCTION

Food labelling is the main means of communicating between food business operators and consumers and this may often influence the consumer's option to purchasing (Wandel, 1997). Since food labelling provides information about the characteristics of the product, the correct interpretation of all mentions is essential when the appropriate food is chosen according to consumer preference, lifestyle and health conditions (Cecchini & Warin, 2016). In the last few years, consumers are concerned about the type of food they consume so demand more transparent labelling mentions such as full ingredients list which includes additives, nutritional values or real health benefits among others (Röhr, Lüddecke, Drusch, Müller, & Alvensleben, 2005; Weaver et al., 2014).

Improve consumer rights regarding proper use of foods and choosing appropriately according to their dietary needs, the publication of Regulation (EU) n° 1169/2011 (2011) on the provision of food

information to consumers has harmonized the information displayed in the food labelling across Europe. Although this regulation aim at transparency and confidence of consumers and public health, however, all these efforts are useless if consumers do not have the habit of reading it. Consumers usually do not read food labels due to a lack of confidence, education or lifestyle. Thus, increasing consumer perception associated to the new mandatory mentions displayed on food labels should be assessed since it depends on factors, such as literacy and/or lifestyle (Himmelsbach, Allen, & Francas, 2014). Most studies on food labelling assess consumer perception of specific food labelling characteristics, such as nutritional composition, design and/or label layout, indication of premium products or local products, among others (Feldmann & Hamm, 2015; Gregori et al., 2014; Pettigrew et al., 2016). However, the usefulness of the information provided to consumers is scarcely assessed (Grunert & Wills, 2007). Therefore, the current study assesses the usefulness of consumer perceptions about food labelling.

2 | MATERIAL AND METHODS

2.1 | Survey design and data collection

To assess the usefulness of food labelling information for consumers, a specific online questionnaire was designed on google forms and it comprised of 37 questions divided into 6 groups based on the European food safety policy and scientific literature reviews regarding food labelling and food product choices. The survey distribution was mainly performed by email invitation and social media for a period of 12 months (September, 2016–October, 2017). Appropriate information was provided to survey participants, allowing them to decide their participation in this research study. All questions were measured on a 5-point Likert scale (1 = never; 2 = rarely, 3 = sometimes, 4 = frequently 5 = always). Questions concerning socio-demographic characteristics, such as sex, age, civil status, economic status, lifestyle and health of respondents were also included.

2.2 | Data analysis

Once data were collected, registered into a SPSS 22.0 database (SPSS, IBM, New York, USA) and carefully checked, it was immediately available as an SPSS data set. Cronbach's alpha coefficient was calculated to assess the consistency of the survey. The influence of the socio-demographic characteristics on the use and understanding of the information displayed in food product labelling was assessed by the Kruskal–Wallis test. Socio-demographic characteristics with $p < 0.05$ were considered as statistically significant and further subjected to Principal Component Analysis (PCA). The appropriateness to perform PCA was confirmed by Bartlett's sphericity test ($p < 0.001$). The number of components retained in the final solution was based on the Kaiser–Meyer–Olkin criterion (>0.8) for the analysis of eigenvalues (>1) and the proportion of variance retained ($>65\%$), usually seen as the minimum required to make the model suitable for explaining the original data (Polyak & Khlebnikov, 2017). The statistical analysis was done using IBM® SPSS® version 22.

3 | RESULTS

3.1 | Socio-demographic characteristics of consumers

A total of 308 consumers answered the online survey. The sample set consisted of 83 men (26.9%) and 225 women (73.1%). 195 respondents (63.3%) were single, 21 (6.8%) married and 92 (29.9%) divorced. According to age, 23.4% were under 25, 62.0% ranged from 25 to 45 and 14.3% were older than 45. Respondent salary was under 500€ (31.2%), 500€–900€ (33.4%), 900€–1,500€ (21.1%) and over 1,500€ (14.4%). Regarding respondent education and lifestyle, 81.2% were graduates, 95.8% of whom declared having a healthy lifestyle and 41.3% practised sport regularly. Additionally, 116

(37.7%) respondents declared some dietary restriction and only 9 (2.9%) were vegetarians.

3.2 | Evaluation of usefulness and perceptions food labelling

Result from the internal consistency test based on the Cronbach alpha coefficient was 0.802, indicating a good internal reliability. The results (Table 1) of the online survey indicated that consumers do not usually read food labels. However, an increase in the frequency of reading was observed when a new product is present at the time of purchase or if it has a new preparation condition or intended use. Moreover, consumers scarcely read the allergenic ingredients or the suitability of food products for vegetarians.

The reasons why consumers mentioned not reading food labels showed that over 50% declared "lack of time", almost 45% considered they have excessive information and about 50% trusted the brand name. The factors which influenced consumers at the time of purchase were price, presentation, product shelf-life and ingredients. Curiously, only 20% of consumers indicated the brand name as an important factor when purchasing, 75% considered the food label information important, although the name of the food manufacturer was not relevant for 40% of consumers.

Moreover, the perception of mislabelling showed that 85% of consumers did not consider this practice as a risk for public health and about 75% indicated that mislabelling is not associated to an economic income for food business operators.

3.3 | Influence factors of usefulness and perceptions of food labelling

The study of the factors which influence food labelling usefulness and the perceptions (Table 2) of mislabelling revealed that consumers who regularly practice sports and those who declared a healthy lifestyle considered the information displayed on food labels helpful. Regarding the reasons of reading food labels, consumers with dietary restrictions paid more attention to the food composition. Consumers with more schooling and healthy habits had greater perception of healthy products. In addition, the verification of the usefulness of instructions was related to age, education and sports practitioners. It was observed that age, practising sports and/or the existence of food restrictions influenced the evaluation at the time of purchase, in respect to appearance, product origin or the list of ingredients. Moreover, there were no differences in the usefulness and perceptions of compulsory mentions of food labelling among the different socio-demographic characteristics of the consumers surveyed.

3.4 | Principal component analysis

Loadings of each principal components (PC) after varimax normalized rotation and communalities from the PCs are represented in Table 3. Figure 1 shows the projection of the 27 original variables

TABLE 1 Consumer perceptions and usefulness about food labelling (results expressed as %)

	Never	Rarely	Sometimes	Frequently	Always
Reasons why consumers do not read food labels					
Food product brand confidence	31.8	20.5	22.1	19.5	5.8
Lack of time	20.8	18.5	33.1	23.7	3.8
Information displayed in the food product labelling is difficult to understand	24.7	28.2	35.1	10.7	1.3
Food product labelling provided excessive information	23.1	27.3	33.8	13.0	2.9
Lack of consumer confidence on information displayed on the food product labelling	27.3	34.1	28.2	7.5	2.9
Reasons why consumers read food labels					
New food product	0	0	100	0	0
Consumer presented some food intolerance or allergies	62.0	17.2	7.5	6.8	6.2
It is aware of existence of healthy products	2.6	6.8	23.1	36.4	31.2
Interest of country of manufacture/origin of the foodstuff	2.9	14.0	29.2	29.5	24.4
Comparison to similar products	3.2	7.8	29.5	44.8	14.6
Interest on the instructions for use	2.3	12.3	26.3	39.9	19.2
Appropriate for vegetarians	62.0	17.2	10.7	3.9	6.2
Verification of organic food product	20.8	24.4	28.9	15.9	10.1
Existence of certification	10.7	19.8	31.5	22.7	15.3
Factors affecting consumer buying decision					
Brand	6.5	27.3	44.8	19.5	1.6
Price	–	4.2	25.6	39.3	30.5
Appearance	1.6	10.4	25.3	39.9	22.4
Country of origin	14.0	21.1	26.9	28.2	9.4
Shelf life	1.6	4.9	19.5	19.5	54.2
Nutritional value	6.8	15.6	28.2	29.9	19.2
Ingredients	4.9	11.7	29.5	32.1	21.4
Usefulness of food labelling					
Product constitution	1.9	7.1	19.2	40.9	30.8
Nutritional value	1.9	10.7	21.4	34.4	31.2
Shelf life	0.3	6.8	10.7	25.3	56.8
Presence of preservatives/additives	2.6	12.0	18.8	34.1	32.5
Weight or volume	3.2	13.6	29.5	34.1	19.5
Product name	2.3	15.9	33.4	33.1	15.3
How to use	2.3	11.7	30.5	37.0	18.5
Name or business name and address	13.0	27.9	28.9	18.8	11.4
Place/country of production	6.8	16.6	26.6	26.3	23.4
Reading frequency of food labels					
Meat and meat products	11.4	21.1	22.4	30.5	14.6
Fish and fish products	11.7	19.5	22.1	30.8	15.9
Milk and dairy products	5.2	13.6	27.9	34.1	19.2
Frozen products	3.9	12.3	22.4	35.7	25.6
Perception of food mislabeling					
Risk to public health	61.4	23.1	13.3	2.3	0
Loss of consumer confidence	33.1	39.9	24.4	0.6	1.9
Benefit for the food business operator	41.9	33.1	20.1	2.6	2.3

TABLE 3 Factor loadings and communalities of variables in the first two components (PC1 and PC2) after varimax normalized rotation

Bartlett's test of sphericity	$p < 0.001$; $df = 231$; $X^2 = 2,939.14$		
KMO measure	0.845		
	Factor loading		
Variable	PC1	PC2	CM
Country of origin	-0.014	0.547	0.299
Shelf life	0.021	0.501	0.251
Nutritional value	-0.079	0.837	0.707
Ingredients	-0.069	0.863	0.749
It is aware of the existence of healthy products	0.612	-0.086	0.382
Interest of the country of manufacture/origin of the food products	0.643	-0.051	0.416
Comparison to similar products	0.643	-0.055	0.417
Interest on the instructions for use	0.471	-0.115	0.235
Verification of organic food products	0.572	-0.029	0.328
Existence of certification	0.557	-0.091	0.318
Product constitution	0.751	-0.002	0.564
Nutritional value	0.733	-0.012	0.537
Shelf life	0.608	-0.067	0.374
Presence of preservatives/additives	0.764	0.004	0.583
Weight or volume	0.576	-0.001	0.332
Product name	0.687	0.160	0.497
How to use	0.648	-0.029	0.421
Name or business name and address	0.581	0.238	0.394
Place/country of production	0.706	0.167	0.527
Risk to public health	-0.448	0.031	0.202
Loss of consumer confidence	-0.441	0.032	0.196
Benefit for the food business operator	-0.442	0.052	0.198

Abbreviations: CM—communality; PC—principal component; KMO—Kaiser-Meyer-Olkin.

on the two-dimensional space defined by two PCs. The first and second principal components together (PC1-PC2) accounted for 40.57% of data variance. The first component specified the reasons why consumers read food labels, usefulness of food labelling and perception of food mislabelling variables. The second component is characterized by factors affecting variables related to consumers buying decision. A significant association between shelf-life, certification, product constitution and place/country origin of production could be observed. The variables with the greatest partial contributions for the variability were, in decreasing order, shelf life (FL = 0.76), existence of certification (FL = 0.75), product constitution (FL = 0.72), place/country origin of production (FL = 0.70), awareness of the existence of healthy products (FL = 0.61) and nutritional value (FL = 0.61) for the positive dimension PC1. Contrarily, the variables, risk to public health (FL = -0.44), loss of consumer confidence (FL = -0.44) and benefit for food business operators (FL = -0.44) were presented in the negative dimension. PC2 showed that ingredients are associated

with nutritional value. In decreasing order and in positive dimension of PC2, the variables, ingredients (FL = 0.86), nutritional value (FL = 0.83), country of origin (FL = 0.547) and shelf-life (FL = 0.501) were observed.

4 | DISCUSSION

Food labelling laws ensure consumers get vital information about the food they consume. In the EU, the introduction of Regulation n° 1169/2011 (2011) set standards to create common ground for diffusing food information across member states and aimed to provide consumers more safety, clarity and transparency of information, thus, also improving food safety and public health. Studies about consumer perceptions concerning food labelling are mainly aimed at assessing the perceptions regarding nutritional composition and the way information is presented (Huang & Lu, 2016). Despite efforts developed by the authorities to improve a healthy lifestyle

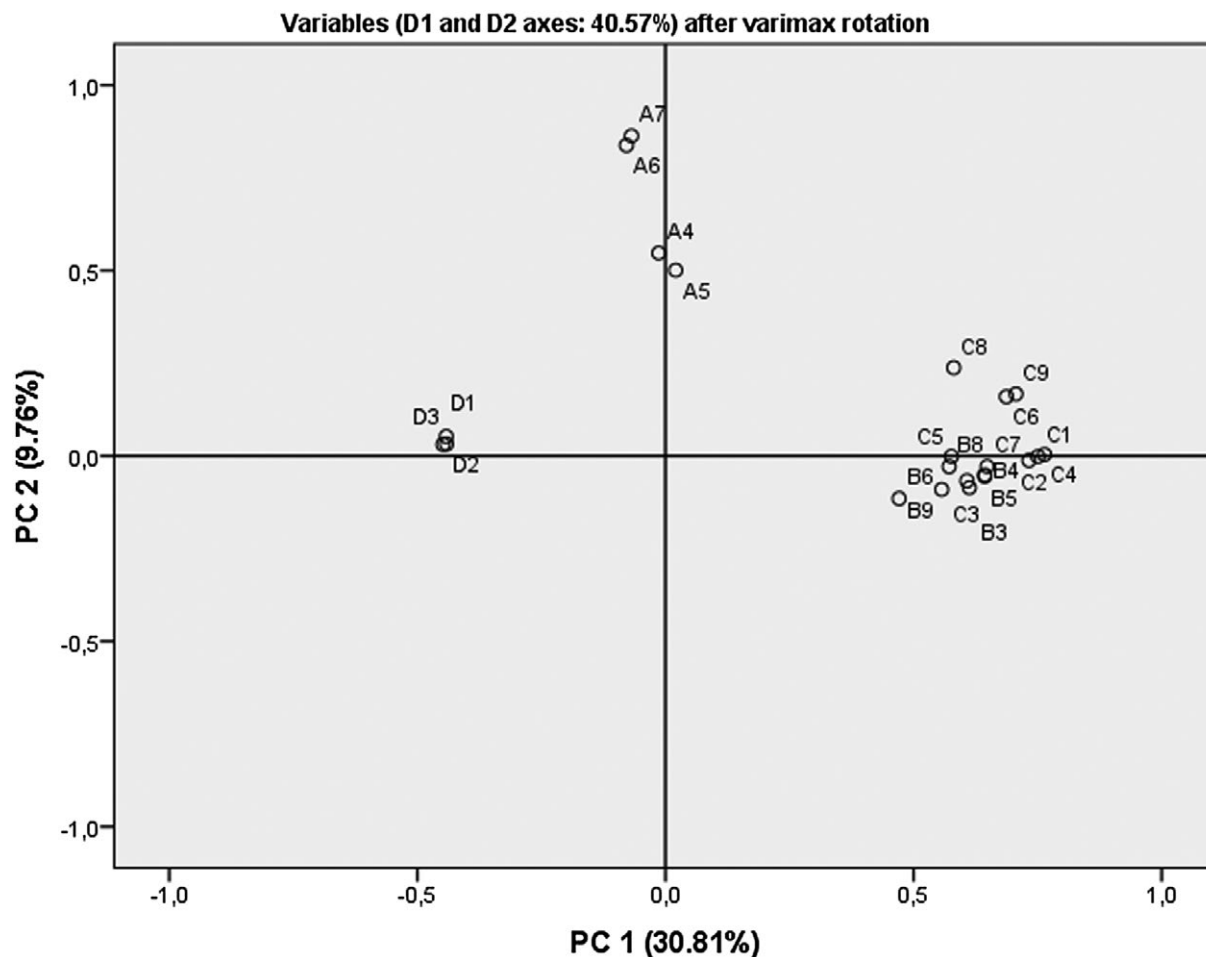


FIGURE 1 Loadings for the PC1–PC2 dimensions, after varimax normalized rotation. Notes. A4—Country of origin; A5—Shelf life; A6—Nutritional value; A7—Ingredients; B3—It is aware of the existence of healthy products; B4—Interest of the country of manufacture/origin of the food products; B5—Comparison to similar products; B6—Interest on the instructions for use; B8—Verification of organic food products; B9—Existence of certification; C1—Product constitution; C2—Nutritional value; C3—Shelf life; C4—Weight or volume; C5—Product name; C6—Product name; C7—How to use; C8—Name or business name and address; C9—Place/country of production; D1—Risk to public health; D2—Loss of consumer confidence; D3—Benefit for the food business operator

and further food safety and public health, the current study showed most consumers do not read food labels (Food Safety Authority of Ireland, 2009). Consequently, lack of time and excess of information have been referred as the most important factors answered by respondents. This behaviour may explain the higher frequency of reading the product shelf-life (Vemula, Gavaravarapu, Mendu, Mathur, & Avula, 2014).

In general, respondents considered all the compulsory mentions of food labelling important. Since no studies assess consumer perception of compulsory food labelling information, hence the results can be associated to the literacy of the respondents.

Nutritional value has been referred as an important factor at the time of purchase (Volkova & Mhurchu, 2015), however, our results indicated that price and/or appearance showed the same importance, indicating that the usefulness of nutrition labels in food purchasing is currently low (Gomes, Nogueira, Ferreira, & Gregório, 2017). Despite brand name and country of origin are also described as a purchase factor (Berry, Mukherjee, Burton, & Howlett, 2015),

respondents curiously did not consider the food manufacturer or its location as relevant factors.

Regarding consumer characteristics which may affect the choice of food at the time of purchase, the current study showed that respondents who lead a healthy life, practised sports or declared some health condition, that is, food allergies, more attention to nutritional value, product appearance, allergens, intended use or knowledge of healthy food.

Although the present study does not show differences among gender, Lassen et al. (2016), showed that women are more concerned about nutritional value while men considered the price as the principal factor at purchase.

Regarding mislabelling, the low perception of risk to public health or the economic benefit of food fraud displayed by respondents is difficult to explain but it can be associated to the belief that popular brands of food are made from recognized food business operators selling food products with accurate labels (Drescher, Jonge, Goddard, & Herzfeld, 2012).

5 | CONCLUSION

Food labelling is how food business operators and consumers communicate and interact. Also, it may influence the consumer's buying decision. The enforcing of the food labelling policy by the implementation of new policy was aimed to improve guarantee the food safety and public health with new mandatory information and nutritional values concerning each product. However, the effort undertaken by food and health authorities can be compromised since consumers do not read the food label as observed in the present study. Thus, lack of time and excessive information was referred as the main factors of absence of food labelling reading. Furthermore, it was observed that food labelling is more useful for specific consumers groups, such as athletes, consumers with health conditions or consumers concerned with a healthy lifestyle. The results of the present study highlight the need of information campaigns by public health authorities to show the importance and advantages of reading food labels as well as ensuring food labels with essential information which are not only quickly and clearly seen but also understood by consumers.

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