Factors affecting use and understanding of nutrition information on food labels: evidences from consumers

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Abstract

In the past few years, Europe has experienced an increase in several chronic diseases linked to dietary and lifestyle factors. In particular obesity is increasing at an alarming rate all over Europe, while warnings about it have intensified. As result nutrition-related measures are ranking as first in the agenda of the EU political priorities. Particularly at the end of 2011 the EU introduced new rules on food labeling requirement by inserting a nutritional declaration. In this context the proposed paper aims to explore factors affecting use and understanding of nutrition information on food labels in Italy to provide useful guidance in the implementation of new nutrition labelling. The study presents some results of a direct survey on a sample of 400 consumers and provides a market segmentation identifying different profiles of consumers, through the use of PCA and Cluster Analysis. The results obtained from this analysis suggest the need to focus mainly on education campaigns and providing several indications for developers and marketers as well as government bodies that are interested in designing consumer communication strategies and effective health programs.

Keywords: *Food labelling; health; nutrition; consumer behaviour; cluster analysis.*

Introduction

In the past few years, Europe has experienced an increase in several chronic diseases linked to dietary and lifestyle factors. In particular obesity is increasing at an alarming rate all over Europe, while warnings about it have intensified. According to statistics from the World Health Organization (WHO), from 1990 to 2006, obesity levels in Europe tripled on the whole.

There is robust evidence that dietary factors are related to the development of chronic diseases such as heart disease, stroke and diabetes (Astrup, 2001; FAO/WHO 2003; Kromhout, Menotti, Kesteloot, & Sans, 2002).

To prevent and mitigate the prevalence of such illnesses, policies that have an impact on the type of food produced and may influence the types and quantities of foods consumed by Europeans may be helpful and pertinent (Gracia *et al.,* 2003). In this context the nutritional information on food labels are an indispensable tool to help consumers make informed choices aware and healthy, providing them essential information that otherwise could not find.

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   Despite the importance of the problems related to nutrition and food habits involving the European population, only at the end of last year the EU has reviewed the general rules on food labeling by Regulation (EU) No 1169/2011 on the provision of food information to consumers which provides new requirements aimed at improving the level of information and protection for European consumers provide the obligation to include a nutritional declaration on the labelling of foodstuffs[3]. From 13 December 2016, Regulation (EU) No 1169/2011 will make nutrition labelling obligatory, whether or not the foodstuff carries nutrition or health claims[4]. This regulation is the result of a long process of revision of the basic rules on nutrition labeling started more than ten years ago, during which the Commission launched two public consultations, in 2003 and 2006, and impact assessments[5] which have led in the January 2008 the Commission to adopt a proposal for a Regulation on the provision of food information to consumers to update and revise the Community legislation on general food labelling and nutrition labelling.

   Nutritional labelling has received considerable attention in the literature due to increasing consumer interest in health and diet issues. Food labels are a source of information and most often the first means for directly connecting with a consumer however its potential is not always well exploited. Labels may be an instrument for reinforcing generic claims and for establishing product differentiation, differentiation across food categories and within a specific category (Caswell and Mojduszka., 1996; Golan *et al.*, 2001). Moreover labels provide a source of health related information for comparing products and may, occasionally, be the consumer's first exposure to a health related issue. Nutrition labels are intended to help consumers choose more healthful foods (Banterle, 2009). Hartmann et al. (2009) point out that in the case of nutrition or health claims direct economic benefits emerge because truthful and correctly understood claims increase the efficiency of purchase decisions. Moreover providing nutrition information increases incentives for producers to create more healthful foods and aids consumers in choosing a healthier diet, which leads to lower costs from diet related illnesses.

   However, there have been indications that nutrition labels may not be used, even though consumers say that they do, and that they may be misunderstood. These are questions that can be investigated by conducting consumer research (Grunert and Wills, 2007). Economic studies on nutritional information have investigated the determinants of the consumers' use of this kind of information (Grunert, 2008; Grunert and Wills, 2007; Gracia *et al.,* 2007; Nayaga, 2000; Drichoutis *et al.*, 2005; Wang *et al.*, 1995;

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[3] The nutritional declaration must mention the following: the energy value; the quantity of certain nutrients in the composition, fat, saturates, carbohydrates, as well as a specific mention for sugar and salt.

[4] However, will remain in force until 2014, the previous legislation Directive 90/496/EEC, in accordance to which nutrition labelling is mandatory on products for which a nutritional claim and/or health claim is made, with the exception of generic advertising.

[5] In January 2003, the Commission launched a first consultation among Member States and stakeholders. In November 2004, the Commission has published an Impact Assessment on the introduction of mandatory nutrition labelling for pre-packaged food products across the European Union. This study is focussed on the potential impact of the introduction of mandatory nutrition labelling on consumers, on the food industry, and on the control authorities who have the responsibility for enforcing legislation. In March 2006 the Commission launched a broad consultation on food labelling, including nutrition labelling.

Guthrie *et al.*, 1995) and the relationship between diet and health, analysing, in particular, the use of nutritional labels and the orientation of consumer behaviour towards healthy diet (Teils *et al.*, 2001; Kim *et al.*, 2000; Nayga, 1999; Weaver and Finke, 2003; Variyam and Cawley, 2006). This available evidence suggests that consumers who do look at nutrition labels can understand some of the terms used but are confused by other types of information. Most appear able to retrieve simple information and make simple calculations and comparisons between products using numerical information, but their ability to interpret the nutrition label accurately reduces as the complexity of the task increases.

In this context the main intention of the current paper is to investigate consumers' perceptions of nutritional labels so as to check the effectiveness of this crucial information tool in favouring healthier food choices.

Consumers' perception and use of labels: some empirical evidences

Questionnaire design and Methodology

In order to explore Italian consumers' perceptions and use of nutritional labels a questionnaire was developed and administered to a sample of consumers living in the three cities of Bologna, Rome and Naples, respectively located in the north, centre and south of Italy. To determine the final sample a two stage procedure was adopted. Firstly a simple sampling technique was used; setting 0.95 as the level of confidence, for an infinity population, 400 personal interviews were carried out fixing the sample error at 5%.

Subsequently, interviews were conducted using two criteria: the city of residence and place of purchase. Therefore this sample is not strictly statistically representative, but it includes respondents with a wide variety of socio-demographic backgrounds.

The questionnaire included 30 questions, mainly with closed answers, sub-divided into five specific sections. The first part of the questionnaire was designed to assess respondents' attitude towards nutrition issues. In this section respondents' food habits and life styles were also investigated.

In the second section consumers' attitude toward food labels was tested. Specifically the aim was to highlight how often consumers read these labels and the motivations underlying the use/not use of the information included in the label. The questions included in the third section of the questionnaire were aimed at assessing consumers' familiarity with the details written in the label and identifying which information was valued as more important, clearer and truthful. The fourth section analyzed consumers' capability of interpreting and using specific data included in the label. The final section collected socio-demographic information.

A pilot questionnaire (administrated to 40 consumers, 10% of the total sample) allowed to redefine the questions and identify the information included in the label perceived by consumers as the most important ones.

Face to face interviews were conducted between January and March 2010, at different selling points based in central and peripheral areas, in different days of the week to prevent any distortion effects.

Around 50% of total interviews were conducted in supermarkets; 30% in hypermarkets; 10% in discount stores and 8% in traditional stores. All respondents were responsible for food purchasing within their household.

The data generated in this way were processed and analysed through a uni-variate statistical analysis to provide a synthetic description of the sample; subsequently Factorial and Cluster Analysis were applied to break down the sample and group the different profiles of respondents.

Analyzing social-demographic data, the sample included 60,3% women, married in the 56,4% of cases. As to age 36-50 year old respondents prevailed, but also younger individuals (21-35) were well represented (30%). With reference to the education respondents had a medium-high level; 53,3% had a diploma and 26,5% bachelors degree. As to occupation, employees and housewives accounted for 32,6% and 18,3% of the sample respectively, while entrepreneurs accounted for 26,4%; students for 13.2%, retired people 6,2% and doctors for 3,3%.

Main Results

Consumers' propensity towards nutrition issues and label advices

Respondents were particularly sensitive to nutritional issues indeed 82% of interviews preferred the healthier food option although more expensive, while 10% were not interested in the nutritional properties of food products consumed and were 8% not interested in consumption implications for health.

Analysis of the criteria guiding consumers purchasing choices[6] highlights that 28% of respondents considered nutritional properties as key attributes in influencing their purchasing decisions, although a higher importance is given to other attributes of the product such as freshness (32,2%), origin (28,4%) and brand (26,3%).

With reference to respondents' food habits variables data analysis highlighted that 57% of respondents follow a sufficiently healthy diet, characterised by a limited consumption of fried food or fat food, a daily consumption of fruit and vegetables and a propensity to eat white meat instead of red meat. 38% of respondents indicated that in choosing food products they were mainly conditioned by their wish of being in good physical shape or by specific health problems, such as cardiovascular diseases (18%), diabetes (14%) and food intolerance (9%); while 6% of respondents are vegetarian.

Data related to lifestyle pointed out that 38% of respondents verifies their health regularly; 32% spends time to prepare her/his own meal, and about 30% state to have changed food habits over time due to health concerns. On the other hand, it is worth stressing that around 26% of respondents lead a sedentary lifestyle; not practicing any sport activities, not spending much time in preparing meals and spending most of their leisure time watching TV.

Subsequently the role of labelling in providing nutritional information to consumers was analyzed asking respondents to mention the source they use to get nutritional

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[6] Consumers were asked to specify the degree of importance attached by them to a set of 10 attributes in influencing their purchasing and consumption choices, according to a scale ranking from 1 (not important at all) to 4 (very important).

information on food products they buy. 31% of respondents mentioned personal physician or nutrition expert advices as the most important information sources, followed by newspapers/magazines 22% and TV 19%; only 18% mentioned nutrition labelling while 10% indicated family members or friends.

The analysis of consumers' attitude towards nutrition labelling highlighted that most respondents paid attention to this labelling occasionally (32%) or only when purchasing a new product (28%). 26% of respondents read regularly nutrition labelling, while 14% did not read them at all.

Most respondents (56%) declared to read labels at the sales point during food purchasing. This behavior can be explained tracing the main motivations driving consumers to read labels, namely the need to get information (mentioned by 37%), and the need for assessing quality features before purchasing and consumption (34%).

Moreover it is interesting to note that the level of attention devoted to the labels varies according to the type of products purchased. Consumers read nutritional labels more frequently when buying children foods (34,2%), cookies and snacks (31,6%), fruit juices or soft drinks (22,4%) and cereals (26%).

The low propensity to read and use nutritional information on labels is probably due to the way they are perceived by consumers (see chart 1). The survey highlighted that around 62% of respondents think that is not easy to understand the information include in the nutritional label; 72% of respondents view nutritional information as too technical and difficult to understand, while 86% complained that the letters of the nutritional table are too small and scarcely visible. Around 73% of respondents did not understand the actual nutritional values related to a single serving (indeed often information refers to a 100 grams serving). It is also interesting to remark that 52% of respondents thought that nutrition claims are not very reliable.

In summary, findings show that, despite the high interest of consumers in the nutritional properties of food products, they do not find in the nutritional labels a source of information consistent with their needs.
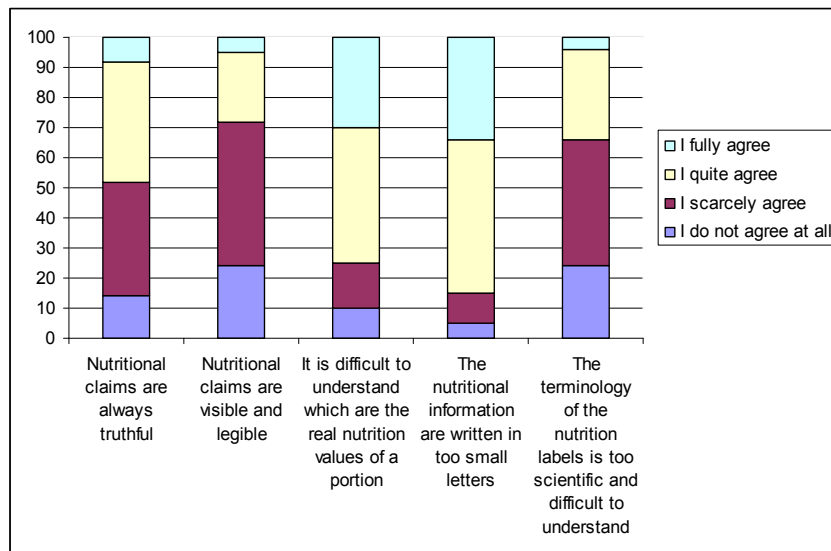

Chart n.1- consumers' propensity to NL

Understanding and use of information included in the labels

In order to verify the familiarity and the ability of consumers to interpret nutritional advices included on the label two criteria were used. Firstly the non stimulated knowledge was tested; to understand how many and which nutritional advices the respondents remembered mostly (consumers were asked to list the information included in the nutritional label without providing any suggestion). Then the degree of stimulated knowledge was checked, suggesting the various nutritional advices on the label and asking respondents to mention those remembered[7]. On average the non-stimulated knowledge was not very high. Chart 2 shows that 42% of respondents remembered only 3 elements, while 35% remembered less than two[8]. A similar result was recorded with respect to the stimulated knowledge; the number of respondents who was familiar with 3 elements was 40%. However, in this case there is also a percentage of respondents who declared to be familiar with 6-8 elements (21%).
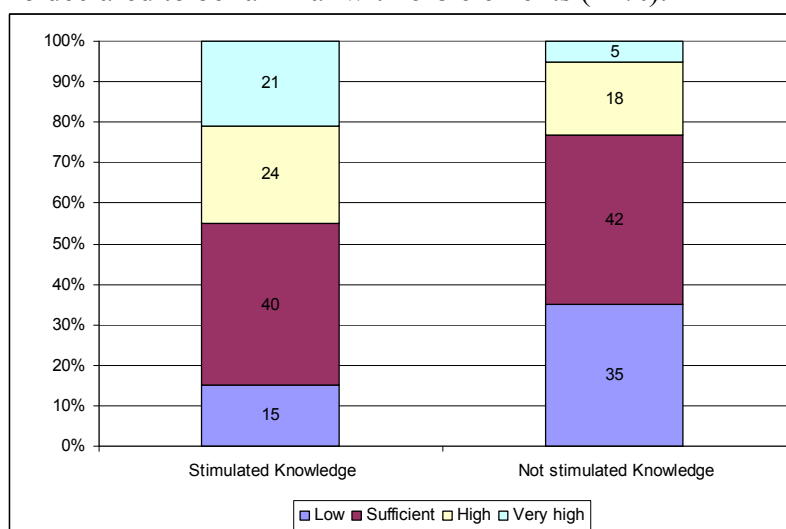

Chart n.2- Stimulated and not stimulated knowledge

It is interesting to underline that in relation to specific nutritional advices, in both the stimulated and non-stimulated knowledge the most known information were percentage of fats, indicated by 83% of respondents, energy value expressed in Kcal (76%), vitamins and mineral salts (63%) and carbohydrates (58%). Testing the importance assigned to different nutritional information on the label, results showed that the percentage of Kcal was viewed by 52% of the sample as crucial, followed by vitamins (38%) and cholesterol (24,2%). Saturated fats and carbohydrates, instead, were

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[8] It is not possible guarantee that this knowledge measure actually measures respondents' knowledge because we don't check for the reliability of the answers. However this method to test the nutrional information knowledge was used in other studies (Food Standards Australia and New Zealand "Food Labelling Issues: Quantitative Research With Consumers" Evaluation Report Series No. 4, 2004; European Food Information Council. Nutrition information & food labelling-results of the EUFIC consumer research, 2005).

considered as less important, likely because consumers are less familiar with these ingredients.

In order to prove consumers' ability to understand and use a variety of nutritional information on the label, different labels of specific products were shown to the interviews asking to compare nutritional values. Firstly two packages of cookies were shown asking which one had the lowest Kcal content. In this case 58,3% of respondents were able to identify the correct option. Subsequently interviews had to choose between two yogurts, one more suitable to a fat-free diet and 62% of respondents identified the correct option.

To evaluate consumers ability to interpret the fibre and vitamin content two boxes of breakfast cereals and two different fruit juices labels were used. In both cases this assessment was difficult for consumers as most of them, 38% and 46% respectively, chose the wrong option or were unable to answer. Data reveals that also recommended daily serving is an issue not easy to understand for respondents; specifically 53,5% of respondents did not know the exact meaning of it.

Summarizing these results, it can be stated that the average level of respondents' ability to understand nutritional information is average. As broadly only 40% were able to provide correct answers to 3 questions out of 5. However there is also a high percentage of respondents with a low level of understanding ability; indeed 24% of the sample is capable to correctly interpret less than 2 information. In light of these result it is possible to state that the difficulty to understand nutritional advices may have a clear impact on labelling role in favouring healthier purchasing choices.

Respondents profiles

Traditionally sample segmentation includes the breaking-down of the statistical units identified based on the social-demographic features; however to develop a profile of the consumers that takes into account higher or lower propensity towards nutritional labels, we used variables that the description analysis highlighted as crucial in influencing consumers' behaviour. Breaking down of respondents was made by using two multivariate statistical analysis techniques: principal components analysis (PCA) and cluster analysis (CA). PCA enables to carry out a simultaneous analysis of the complex information provided by a large number of variables and turns the initial variable into a reduced number of artificial variables or factors explaining a high percentage of the information included in the original variables. After extracting the main components the statistical units can be aggregated through the CA aimed at classifying the statistical units identified in a set of "exclusive and exhaustive" clusters so as to maximise the internal homogeneous nature and the external heterogeneous nature (Chatfield and Collins, 2000). The selection of the variables to submit to factorial reduction was made on the basis of the correlations existing amongst the original variables, verified using Bartlett's test for sphericity while the choice of the factors was made on the basis of the eigenvalue criterion, as well as considering the cumulated variance explained by the factors taken together (see Tab. 1). A correlation matrix by pairs of variables was built using Pearson's correlation coefficient. Based upon the cross-tabulation outcomes variables that were mostly and more significantly inter-related and used in the factorial

analysis were selected[9]. For factors extraction the principal components methods (Hotelling, 1993) was used with the varimax rotation. The ideal number of factors was determined through the Kaiser's method (1960), keeping the factors with self-values greater than one, i.e. with an information content higher than the individual variable observed. Analysis of the factorial scores allowed to extract and interpret four different factors that accounted for around 60% of the original variables.

Table 1. Matrix of the rotated principal components

Variables[10]	**Factors**				comunality[11]
	perception	*awareness*	*motivations*	*Interest in nutritional attributes*	
Sometimes I chose the healthier option: it depends on price	-,061	-,140	-,004	,778	,523
I always choose the healthiest option although it is more expensive.	,005	,143	,148	,689	,693
I am not interested in the nutritional attributes of the food products I eat	,067	-,160	-,280	,234	,649
It is usually easy to interpret nutritional information	,707	,325	,039	,111	,773
The terminology used to provide nutritional advices is too scientific.	-,802	,027	,105	-,074	,620
Nutritional information are written in too small letters	-,752	,068	,030	,256	,660
It is usually difficult to identify the nutritional values related to a portion	-,816	,068	,037	,170	,636
Nutritional information are always well visible and legible	,711	,161	,013	-,003	,701
Nutritional information are always truthful	,542	,190	,235	,090	,532
Not stimulated knowledge level	-,008	,711	,267	-,322	,593
Stimulated knowledge level	,116	,773	,199	-,310	,680
Evaluation of the importance of the advices in the NL	,699	,226	,068	,149	,747
Ability to understand the information	,060	,801	,223	-,162	,566
Healthy dietary habits	,067	,305	,811	,128	,722
Motivation affecting diet choices	-,011	-,109	,871	-,047	,772
%Variance	**26,032**	**22,102**	**6,924**	**5,177**	
% Cumulated Variance	**26,032**	**48,134**	**55,058**	**60,235**	

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[9] Before the factorial rotation of variables Bartlett's sphericity test was set up that allows to check the assumption of correlation amongst the variables selected, to confirm that the correlation matrix is not an identity matrix. Then the variables selected are inter-related.

[10] All variables are expressed according to a Likert scale ranging from 1 to 4.

[11] Communality denotes the amount of variance of each variable explained by the factorial solution.

The first factor can be interpreted as respondents' *perception* of the nutritional information on the label, in terms of clear vocabulary, suitable format and overall reliability. Undoubtedly this is a factor playing a crucial role in determining respondents' propensity towards nutritional labels, as it accounts for almost 26% of the total variance. The second factor, accounting for nearly 22% of the total variance, can instead be interpreted as respondents' *awareness* degree with the various information on the label, as it denotes level of knowledge and ability to understand and use the information. The third factor, accounting for 7% of total variance, denotes the *motivations* that can determine a higher propensity to read nutritional labels, it sums the variables linked to the evaluation of respondents' dietary habits and specific needs connected with consumption choices. Lastly, the fourth factor, accounting approximately 5% of total variance, is *consumers' interest to nutritional attributes*, it synthetically represents variables related to the degree of importance attached by respondents to nutritional properties when choosing food products.

These key factors was used for the segmentation of the sample with the application of CA by comparing the outcomes attained applying both a hierarchical and a non hierarchical clustering. Firstly Ward's method was applied, that is an hierarchical techniques, and the various segmentation possibilities were explored. Afterwards the k-mean method was applied to make a quick analysis and interpretation of the different groups. The ideal solution selected was a segmentation into three groups, as a further breaking-down would lead to a less accurate identification of the clusters.

Table 2. Centres of the final clusters

	Cluster 1	Cluster 2	Cluster 3	
Cluster size	36%	44%	20%	Sig.
Perception of the nutritional information	,1282	-,7883	,1236	,015
Awareness degree with the various information on the label	-,8910	-,2801	,2890	,000
Motivations	-,6682	,8121	-,1337	,000
Interest in nutritional attributes	-,5234	,7868	-,1562	,000

To better understand the attributes that characterise the different clusters, cross-analyses were made of clusters and variables linked to the above mentioned factors and to social-demographic factors. With respect to nominal variables cross-tabulations were made using the $\chi 2$ statistics, while as to quantitative variables a comparison was made by building ANOVA tables.

The first cluster (36% of respondents) includes the disinterested consumers that are not particularly interested in nutritional information on the label. 48% of this segment declared to pay attention to labels only when buying a new product, while the percentage of regularly readers is just 4,3%. Moreover 44% of this consumers state that they never changed purchasing habits due to nutritional information on the label. These consumers attach a lower level of importance to the nutritional properties of the food they consume and they are not willing to give up tasty food products even if unhealthy, or choose the healthiest option only if it is cheaper. With reference to the variables denoting lifestyle and food habits, this cluster includes the highest number of sedentary individuals (46%) who do not perform any sport activity and spend most of their free

time watching TV. Moreover this cluster includes the highest number of individuals with unhealthy dietary habits (42,4%). Analyzing the degree of familiarity with nutritional information it is clear that in this cluster it is considerably lower than the sample average; indeed these consumers show low degree of both stimulated and non-stimulated knowledge level and also a low degree of interpretation ability.

The second cluster includes 44% of consumers that are very interested in the nutritional properties of food products and consider labels essential in their purchasing and consumption decisions. These consumers are particularly sensitive to healthy food choices, they have a higher propensity to choose the healthiest option, although it might be more expensive and are willing to give up unhealthy products even if they like them. Their specific attention to nutritional properties is confirmed by dietary habits (64% of the respondents have very healthy habits). However also these consumers are not regular label readers and do not have a particular ability to use labels. Their degree of interpreting ability of label advices is higher than in the previous cluster but, nevertheless it hardly reaches a sufficient level answered correctly to two questions out of five. This is the cluster that mostly complains about the too technical/scientific vocabulary of the nutritional label and small size of the letters. We can then assume that this cluster summarize the potential readers of nutritional labels.

Table 3. Comparison amongst average values within the clusters

Variables*	Cluster 1	Cluster 2	Cluster 3	Tot	Sig
It is usually easy to interpret nutritional information	2,00	1,89	2,65	2,18	.000
The terminology used to provide nutritional advices is too scientific	2,80	3,33	2,51	2,88	.000
Nutritional information are written in too small letters	2,43	3,52	3,00	2,98	.000
It is usually difficult to identify the nutritional values related to a portion	2,67	3,25	2,63	2,81	.000
Nutritional information are always well visible and legible	1,56	1,95	2,15	2,00	.000
Sometimes I chose the healthier option: it depends on price	3,62	2,25	2,59	2,86	.000
I always prefer the healthier option although more expensive	1,74	3,57	3,31	2,87	.000
I'm not interested in the nutritional properties of the food products and in their implications for health	2,67	1,08	1,33	1,72	.000

Variables showing significant differences with a probability degree equal to 95% (test F)

The third cluster includes consumers that have a high propensity towards nutritional labels; 46% read the labels regularly and have the highest level of familiarity with and ability to use them. However this cluster includes the lowest number of individuals (20% of the original sample). Moreover these consumers have a good health awareness of their food choices; they pay specific attention to nutritional properties when choosing food products, follow a specific diet and care about their overall well-being. These consumers are familiar with the highest number of elements included in the nutritional table, paying attention also to the less common ones, such as the percentage of saturated

fats, sodium content and cholesterol. Their interpreting ability is the best one in absolute terms; providing on average 4 correct answers out of 5.

Finally it should be noted that the three clusters identified do not exhibit any significant differences with respect to the social-demographic variables.

Discussion

Labelling is a very important tool for transferring information on product characteristics to consumers but its potential is not always well exploited. Findings emerged from the current research reveal that, despite high consumer interest in the nutritional properties of foods, nutritional labels are not a useful source of information . This results are consistent with earlier researches on information on food labels in Europe (Cowburn and Stockley, 2005; Drichoutis et al., 2006; Grunert and Wills, 2007) that reported nutrition labeling particularly confusing for consumers, especially due to the use of technical/scientific and numerical information.

Moreover, outcomes of this study indicate that consumers' use of food label varies enormously depending on their motivation, personal ability and shopping behaviour.

Particularly, consumers' use of label elements depends on how important they value the labelled information. In fact, a specific analysis of consumers' attitude towards nutrition labelling highlighted that most respondents pay attention to this source only occasionally and only 20% read information and advices included on the label regularly.

Similar results are reported in the AC Nielsen (2005) study, conducted in 38 countries, in which 18% of European respondents claimed that they "always" check the nutrition information on the package, with highest rates reported for Portugal (44%), Italy (31%) and Denmark (30%). However, other studies show that the percentages of consumers reporting to check nutrition information always or occasionally are correspondingly high, in others e.g. UK, Ireland, and Sweden study (Grunert and Wills, 2007). Moreover, other similar studies in literature demonstrate that generally European consumers' interest in nutritional labeling was often linked to situations where a product is bought for the first time, and where information need is highest (A.C. Nielsen, 2005; EUFIC, 2005; 2006).

In addition our results reveal that label use is positively linked to buying new products and negatively to time constraints, and that substantial differences exist connected to product category, confirming findings of previous studies (e.g. Higginson et al., 2002; Drichoutis et al., 2006).

Results of our study allow to assert that low propensity to read and use nutritional labels is due to the way consumers perceive it. Most of respondents view these labels as too scientific and difficult to understand, complaining that the letters of the nutritional table are too small and scarcely visible and that the actual nutritional values related to a single serving are not easily comprehensible. It is also important to underline that a high percentage of consumers believe that nutrition claims are not very reliable.

These results are in sound with other European studies that show consumers trouble in understanding the role played in their diet by different nutrients mentioned on labels;

and in converting information from 100 grams to serving size information (Cowburn and Stockley, 2005; Louriero et al., 2006).

Another interesting result is the difficulty in interpreting and using nutrition information on labels , particularly identifying specific nutrients and the recommended daily amount. However research on perceived understanding of existing nutrition labels is somewhat equivocal. Specifically, Grunert and Wills (2007) point out that in quantitative surveys the majority of respondents usually affirm to understand labels and at the same time ask for improvements of these labels.

Cluster analysis distinguishes three groups of consumers with different attitudes towards nutritional labels. . In particular, comparing clusters we can highlight that only the smallest group contains a remarkable amount of consumers who read the labels regularly and have the highest level of familiarity and ability to use. Moreover e analyzing the 3 clusters it appears that there is a positive effect of current diet status and search for nutrition information (Drichoutis et al., 2005; Kim et al., 2001).

Conclusion and limitations

Current findings suggest a number of useful indications for both policy makers, in defining future development of nutritional labeling legislation, and for private companies interested in implementing marketing strategies focused in exploiting health features of products. In particular, our results reveal that consumers need an understandable nutritional vocabulary prefer a limited, and selected, amount of information concentrated on few important aspects; demand clear references that allow to link information to their everyday diet and useful to transform information into practical actions. Information that considers buyer's perspective can help all food and nutrition communicators better connect with consumers and guide them towards informed and healthful food choices. Moreover, information and public education campaigns should be implemented to drive consumers to read labels more frequently, providing the necessary tools for a better understanding.

Nutritional labelling alone is likely to offer a limited success as a mean to improve the nutritional health of a population and should be adequately supplemented by other education strategies (such as public campaigns and school projects).

The study has a number of limitations. First of all, as mentioned before, the final sample is not strictly statistically representative of the Italian population, however it includes respondents with a wide variety of socio-demographic backgrounds.

Furthermore outcomes are based on self-reported use of labeling, which is believed to lead to considerable over-reporting (Cowburn and Stockley, 2005; Grunert and Wills, 2007). Moreover, our results do not prove that the label information actually changes consumers' choices, compared to a situation where such information is not available or is not read by consumers. Therefore new research avenues should focus on this topic based, for example, on direct observation of consumer behavior during food shopping.

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