Nutrition facts and claims: differences in consumer characteristics and information perception

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Abstract

The purpose of this paper is to analyse how individual health-orientation are related to the use of different kind of labelled information, namely nutritional facts, nutrition claims and health claims.
The data for our analysis were collected through a survey with face-to-face interviews, on a sample of 300 Italian consumers in charge of their grocery shopping. Data were then analysed performing three OLS models having different dependent variables, namely nutritional facts, nutrition claims, and health claims. The preliminary results of our analysis reveal that those consumers that mostly use nutritional facts are well educated, more health oriented compared to those using claims, and their food consumption is generally motivated by health-related concerns. On the other hand, the main results on claims are similar across the two models. In other words, the estimation results suggest that consumers using nutrition and health claims are elderly consumers showing lower attitudes towards healthy behaviours and beliefs.
This preliminary analysis on the relationship between the use of different food labelled information and consumers' health orientation suggests that there are important differences in consumers behaviours related to label use. The now mandatory nutritional facts is effective in terms of high market transparency, but it does not appear as an effective policy instrument to lead less health oriented consumers towards healthier food choices. On the other hand, claims seem to play an interesting role, particularly for elderly people, although they might represent misleading information. Policy interventions targeted on different consumer segments might be helpful to avoid misleading interpretation and perception of food labelled information, thus empowering individuals to make healthier diet choices.

1. Introduction

Unhealthy eating behaviours are well recognized as the main cause of several health problems and represent a major public concern. In fact, overweight, obesity and obesity-related diseases are constantly increasing worldwide and, currently, according to the World Health Organization ‘Most of the world's population lives in countries where overweight and obesity kill more people than underweight’ (WHO, 2015). The epidemic proportions of this phenomenon clearly highlight the urgency to find effective ways to tackle the problem. Over the last 10 years, many economists investigated the main factors guiding consumers’ food choices and found that the use of food labels can play a crucial role in leading consumers towards healthier food consumption (Barreiro-Hurlè et al., 2010; Drichoutis et al., 2005; Mazzocchi et al., 2009; Varyam, 2008). Particularly, these studies found evidence that nutritional label usage may increase consumers’ food-related consciousness, thereby improving the healthiness of their food choices (Barreiro-Hurlè et al., 2010; Drichoutis et al., 2005; Varyam, 2008).
Nutritional labels, which represent an effective way to reduce information asymmetry and increase market transparency, also represent an important and easy-to-access tool for consumers to collect information on food products. Labelled information allows consumers to know the main properties of foods, to compare among different product alternatives, and potentially to choose the healthier option.
A great body of literature in the past examined how different variables can affect nutritional label usage. Several studies, for example, analysed the role of socio-demographic and economic

characteristics such as age, gender, income, and education (Cavaliere et al., 2015; Drichoutis et al., 2006; Drichoutis et al., 2008; Grunert et al., 2010; Nayga, 2000). Other research focused on nutritional and health knowledge (Barreiro-Hurlè et al., 2010; Drichoutis et al., 2008; Grunert et al., 2010; Hess et al., 2012; Kim et al., 2001), time constraint (Drichoutis et al., 2006), and label design (Becker et al., 2015; Bialkova and van Trijp, 2010; Visschers et al., 2010).

Instead, only a considerably smaller number of studies examined how individual orientation to health can affect nutritional label use. Health-orientation is defined as the individual motivation to engage in healthy attitudes, beliefs and behaviours (Dutta et al., 2008; Moorman and Matulich, 1993). It can be also seen as the extent to which individuals are concerned about health-related issues and gives a measure of their willingness to take responsibility for their health (Dutta et al., 2008; Moorman and Matulich, 1993). The relationship between label usage and health-orientation has been analysed using different health-orientation proxies, such as health motivation (Visschers et al., 2010), health- and nutrition-related beliefs (Hess et al., 2012) and consumers' health-seeking orientation (Blitstein and Evans, 2006). Together, the results of these studies provided evidence that high orientation to health is positively associated with the use of nutritional labelling. However, only a few of these studies have explored the relationship between label use and health orientation making a distinction between different labelled information, namely mandatory and voluntary information.

In fact, the EU recently revised the labelling system making nutrition facts panel mandatory for all pre-packaged foods through the enactment of the EU Regulation N. 1169/2011. Instead, nutritional and health claims (respectively regulated by the EU Regulation N. 1924/2006 and EU Regulation N. 432/2012) still remain voluntary indications. Mandatory and voluntary information differ substantially in many respects (e.g., positioning on the food product, length, complexity, etc.) and mixed results were found concerning their impact on consumers' healthy food choices.

Indeed, a number of evidence show that nutrition facts panel usage is associated with lower intake of fat and sugar and with higher intake of Vitamin C, iron, and fiber (Guthrie et al., 1995; Post et al., 2010; Varyam, 2008). On the other hand, the results concerning consumers' use of claims are diverse. Some literature suggested that the use of claims might have positive effects on consumers food choices, whereas other studies suggested that such information (concise and only focused on one nutrient content or health benefit) might be misinterpreted by consumers (Svedberg, 2002) and might lead to a misleading positive judgement about the overall quality of the product (Drichoutis et al., 2008).

In this paper we try to further explore the role of health-orientation on consumers' use of different labelled information. In detail, we created an index of health-orientation based on the three main components mentioned in its definition and investigated its relationship with consumers' food label usage, distinguishing between facts and claims.

Thus, this paper contributes to the literature by extending the knowledge concerning the role of orientation to health in consumers' food label usage. Moreover, the specific distinction between mandatory and voluntary labelled information can be of primary importance to redesign the policy measures related to the food sector and public health.

This paper is structured as follows: section two describes the empirical analysis made through a set of equations; the following section analyses and discusses the results. Finally, section four provides the conclusion of our study and discusses the main policy implications of the study.

2. Methods

2.1 Data collection and variables description

Data for the analysis were collected in Milan (Italy) through vis-à-vis interviews on a sample of consumers in charge of their household grocery shopping. A geographically stratified systematic sampling was used for the selection of the retailers. Specifically, starting from the postal code, we listed all the super- and hypermarket of Milan area. The first store was selected by means of a randomly extracted number between 1 and the sampling fraction. The remaining stores were chosen adding to this number the sampling fraction. The different size of the selected retailers was used as criterion to establish the number of consumers to be recruited in each store: 10 consumers were interviewed in each supermarket (totally 14) and 20 in each hypermarket (totally 8). Consumers were randomly approached outside the grocery stores covering different time bands in order to reach different types of consumers.

We totally collected 300 interviews. Taking into account that Milan population exceeds 1.3 million people, this sample size allows us to incur a relative error of about 6% (Mazzocchi, 2008). Data were gathered using a questionnaire previously validated on a small sample of 40 consumers.

According to the purpose of the paper, the first part of the analysis was meant to investigate consumers' use of different food label formats, namely the nutrition facts panel (mandatory) and nutritional and health claims (voluntary).

As for the nutrition facts panel (NFP), we asked consumers how frequently they use it. Answer to this question ranged from 'Never' to 'Always' (from 0 to 10) on a graphic continuous scale (consumers were asked to make a sign on a bar).

As for nutritional claims (NC), consumers were asked to state their interest in different claims, namely those referring to fat, energy, sugar, light, and salt, permitted by the Reg. n. 1924/2006. Answers to such questions ranged from 'Not at all interested' to 'Very interested' (0 to 10) on a graphic continuous scale. Similarly, consumers were asked about their interest in the presence of health claims (HC) on food products[1].

We referred to 'use' in the question about nutritional label since NFP, being generally placed on the back side of the packaging, requires consumers to make an active process of information searching. On the other hand, claims represent very short and concise messages displayed on the front of the food pack. This implies that consumers might be exposed to such information even though they do not actively look for it, thus the use of claims might be involuntary and the term 'interest' is more appropriate.

The second part of the survey aimed at measuring consumers' orientation to health and a detailed description of the variables used to construct the health-orientation index is provided in paragraph 2.2.

[1] Contrary to what we did for nutritional claims, we did not ask consumers about their interest in specific health-related claims, because at the time of the survey (January-February 2012) the EU had not yet enacted the Regulation N. 432/2012 providing the list of all permitted health claims. Moreover, the question was formulated giving concrete examples.

Another section included the questions necessary to estimate consumers' level of knowledge concerning nutritional aspects. Previous studies showed that high levels of nutritional knowledge are able to encourage consumers in using labels (Hess et al., 2012; Kim et al., 2001; Petrovici and Ritson, 2006), thus suggesting that this is a key variable to consider when studying label use. In line with the different measures of knowledge applied in the literature (Barreiro-Hurlé et al., 2008 and 2010; Drichoutis et al., 2005), we estimated consumers' level of knowledge through 5 items. Two items aimed at estimating consumers' knowledge concerning nutritional recommendations, respectively regarding fruit and vegetable consumption, and the type of fats that must be reduced. The other three items regarded specific knowledge on energy, carbohydrate, and protein content of several food products.

Moreover, some studies found a positive link between healthy diets and the use of food labels (Coulson, 2000; Graham and Laska, 2012; Guthrie et al., 1995; Kristal et al., 2001; Ollberding et al., 2010). In line with these results we decided to include one question assessing consumers' self-perceived healthiness of the diet. We chose a self-reported measure because we were interested in estimating how consumers actually perceive their diet as healthy, instead of having evidence-based information. Answers to such question ranged from 'Unhealthy' to 'Very healthy' (0 to 10) on a graphic continuous scale.

The final section was about socio-economic and demographic variables and included gender, age, education level (secondary school, high school, and university degree) and income (<800€, 800-1500€, 1500-3000€, 3000-5000€, >5000€). A detailed description of the variables is provided in table 1.

2.2 Construction of the health-orientation index

Several studies analysed how different health-related aspects and attitudes can affect food behaviours. Geeroms et al. (2008), for instance, used multiple health-related questions included in their survey to estimate individual health-related motive orientation and its effect on ready meals consumption. Visschers et al. (2013) in their study on food consumption behaviour investigated the role of individual health consciousness, measuring it through a modified version of the health-consciousness scale previously developed by Schifferstein and Oude Ophius (1998). Pieniak et al. (2010), instead, in their study on fish consumption measured health-involvement through a 4-items scale based on the Zaichkowsky involvement scale (1985). However, as already mentioned in the introduction, only a few studies have specifically explored the role of health-related aspects on food label use. Visschers et al. (2010) used an eye-tracking experiment to analyse how health-motivation affects visual attention to nutritional information and Hess et al. (2011) used multiple questions to assess how health-related aspects predict consumers' use of food labels. However, until now, there is no standard procedure to estimate consumers' orientation to health.

In this paper we made an attempt to develop a health-orientation index (HOI) starting from the definition of health-orientation reported in the introduction and using some questions that are specifically related to food consumption behaviour (Dutta et al., 2008; Moorman and Matulich, 1993). In detail, the HOI was constructed by means of 7 questions aimed at capturing three different elements, namely individuals' health-related attitudes, beliefs, and behaviours, respectively corresponding to the three components mentioned in the definition of health-orientation.

Health-related attitudes can be explained as the way an individual views health, or tends to behave towards it. To capture this aspect we asked consumers which is the most important factor among health, taste, and price when they choose a food product.

Table 1. Definitions of variables

Variable name	Description	Obs	SD	Freq	Min	Max
DEPENDENT VARIABLES						
Nutrition Facts Panel use	Rating of use of nutrition facts (never=0, always=10)	300	2.60		0	10
Interest in Nutrition claims						
Low energy	Rating of interest of claims on energy like 'low energy, energy-reduced, energy free' (never=0, always=10)	300	3.24		0	10
Low fat	Rating of interest of claims on fat like 'low fat, fat-free, low saturated fat, saturated fat-free' (never=0, always=10)	300	3.18		0	10
Low sugar	Rating of interest of claims on sugar like 'low sugars, sugars-free, with no added sugars' (never=0, always=10)	300	3.28		0	10
Low sodium	Rating of interest of claims on sodium like 'low sodium, low sodium, sodium- free' (never=0, always=10)	300	3.15		0	10
Light	Rating of interest of claims 'light ' (never=0, always=10)	300	2.86		0	10
Interest in Health claims	Rating of interest of health claims in general (never=0, always=10)	300	2.88		0	10
INDEPENDENT VARIABLES						
Health Orientation Index						
Choice	Which is the most important thing that you think about when purchasing a food product, health=1, taste and price=0	300	0.41	66	0	1
Junk food	Limit the consumption of junk food because you believe that excessive consumption of such foods might be unhealthy =1, other reasons=0	300	0.50	168	0	1
F&V promotion	Eat fruits and vegetables thinking that this is beneficial for the health=1, for other reasons=0	300	0.46	207	0	1
Fruit consumption	Frequency of consumption more than once a day=1, otherwise=0	300	0.50	143	0	1
Vegetable consumption	Frequency of consumption more than once a day=1, otherwise=0	300	0.50	135	0	1
Fitness activity	Respondent practices sport regularly =1, otherwise=0	300	0.50	144	0	1
Smoking behaviour	Respondent does not smoke=1, otherwise=0	300	0.50	157	0	1
Nutritional Knowledge						
Recommended F&V	Respondents' Knowledge on F&V recommended to consume (uninformed=0, informed=1)	300	0.49	113	0	1
Recommended Fat	Respondents' Knowledge on types of fats that must be reduced among monounsaturated, polyunsaturated and satured (uninformed=0, informed=1)	300	0.46	206	0	1
Energy content	Respondents' Knowledge on major source of energy among fat, protein, and carbohydrate(uninformed=0, informed=1)	300	0.47	200	0	1
Carbohydrate source	Respondents' Knowledge on major content of carbohydrate among pasta, fish and eggs (uninformed=0, informed=1)	300	0.35	256	0	1
Protein content	Respondents' Knowledge on protein content of different dairy products (uninformed=0, informed=1)	300	0.43	227	0	1
Self-judgment of diet	Self-perceived healthiness of the diet (very unhealthy=0, very healthy=10)	300	1.81		0	10
BMI	Body Mass Index (kg/m^2)	300	3.46		16	33
Gender	1 female, 0 male	300	0.50	162	0	1
Age	The interviewee's age group	300	18.18		19	91
Education	Education levels (secondary school, higher education, degree and post degree)	300	0.75		1	3
Income	Household Income (<800€, 800-1500€, 1500-3000€, 3000-5000€, >5000€)	300	1.06		0	4

Healthy beliefs can be described as health-related ideas that individuals accept as true. They were elicited by means of two questions. The first one assessed if respondents limit their consumption of junk food[2] (snacks, sugary beverages, and fried food) because they believe that excessive consumption of such foods might be unhealthy; similarly, the second question assessed if respondents eat fruit and vegetable thinking that this is beneficial for their health. Junk foods were chosen for the former question due to the fact that they are generally considered less healthy than other foods. On the contrary, fruit and vegetable consumption is acknowledged to be associated with positive effects on health (Anderson, 1999; Liu, 2003; Radnitz et al., 2015).
Healthy behaviours represent a manner of behaving that is clearly oriented to health. In this case we used four questions: two of them were specifically related to healthy food behaviours (fruit consumption and vegetable consumption following nutritional recommendations - more than once a day). The other two questions were about smoking behaviour and physical activity.

2.3 Data analysis

To analyse the relationship between consumers' health-orientation and the use of different label formats, we performed a set of three equations differing only with regard to the dependent variables used: *i)* use of nutrition facts panel; *ii)* interest in nutritional claims; *iii)* interest in health claims.
The equations were specified as follows:

$$NFP = \beta_0 + \beta_1 HOI + \beta_2 KNOW + \beta_3 DIET + \beta_4 GEN + \beta_5 AGE + \beta_6 EDU + \beta_7 INC + \varepsilon_1 \quad (1)$$

$$NC = \beta_0 + \beta_1 HOI + \beta_2 KNOW + \beta_3 DIET + \beta_4 GEN + \beta_5 AGE + \beta_6 EDU + \beta_7 INC + \varepsilon_2 \quad (2)$$

$$HC = \beta_0 + \beta_1 HOI + \beta_2 KNOW + \beta_3 DIET + \beta_4 GEN + \beta_5 AGE + \beta_6 EDU + \beta_7 INC + \varepsilon_3 \quad (3)$$

where NFP in eq. 1 is consumers' stated frequency of use of nutrition facts panel. NC is the dependent variable referred to consumers' interest in nutritional claims. Such variable is the result of a factor analysis performed using the five questions on nutritional claims mentioned in the previous section. Such analysis allowed simplifying the final interpretation of the results. The factor loadings are reported in table 2.

Table 2. Factor loadings

Interest in Nutrition Claims (NC)	
Low Fat	0.916
Low energy	0.930
Low sugar	0.922
Low sodium	0.808
Light	0.807
Total Variance explained	77.14%
Kaiser-Meyer-Olkin	0.822
Bartlett Test	1414.02 ***
Cronbach α	0.925

Significance *** $p < 0.01$

[2] There is no clear definition on what junk food is exactly, but studies consistently refer to food items that are high in fat, sugar and salt (HFSS) such as soft drinks, confectionaries, crisps/savory snacks, fast food, pre-sugared breakfast cereals, and pre-prepared convenience foods (Capacci, 2012).

Finally, the dependent variable of the eq. 3 is related to consumers' level of interest in health claims (HC). As for the regressors, HOI constitutes our measure of health-orientation. Four of the seven questions used to create the index were binary, the other three were in a multiple choice format always including 'Health' among the response options together with other alternatives. In this latter case, the questions were transformed into dummy variables following this criterion: when health was chosen as the answer, the dummy assumed value 1, otherwise value 0. A health-orientation score was then assigned to each respondent based on the summation of the single scores obtained for such question. The index values ranged from '0' meaning 'Not at all health-oriented' to 7, 'Very health-oriented'. The index was then normalized[3].

As for the nutritional knowledge (KNOW) we constructed a normalized index using the summation of the scores obtained by each respondent in the related five questions. Correct answers to such questions were assigned value 1, otherwise value 0. This way, the KNOW index assumed value 5 when the respondent gave correct answer to all questions.

With regard to the other regressors in the equations, DIET is self-perceived healthiness of the diet; GEN (gender), AGE, EDU (education level) and INC (income) represent the set of socio-demographic and economic variables in the models.

To verify the absence of multi-collinearity among the independent variables included we computed the variance inflation factor (VIF) test.

3. Results

3.1 Sample characteristics

Sample characteristics are illustrated in table 3.With regard to gender, women were slightly more represented (54%) compared to men and the average age was around 47 years old, with a majority of consumers (39.7%) aged between 41 and 65 years old. The education level of the sample population was distributed as follows: 30.7% had bachelor or master degree, 43.7% had high school diploma, while 25.7% had a lower levels of education. 39.3% of the sample stated to have a household monthly income between 1500-3000€.

To better characterize our sample, we also considered consumers' body mass index (BMI). Indeed, a number of previous studies showed that BMI may affect food behaviours, including food label usage (Blitstein and Evans, 2006; Liu et al., 2015). However, we decided not to include it as a regressor in our models due to multicollinearity problems with the variables included in the HOI and with nutritional knowledge. Moreover, someone might argue that BMI could represent a source of endogeneity with the three dependent variables of our equations.

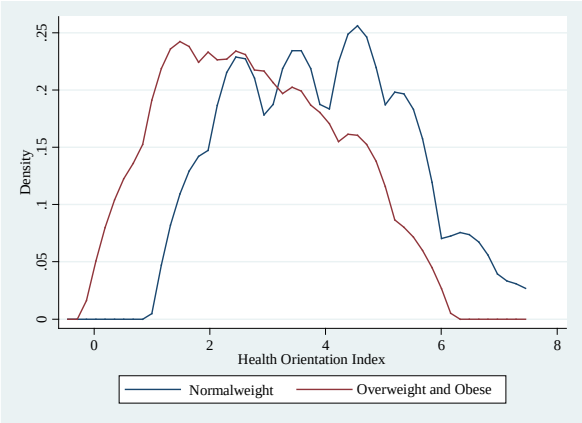
However, given the health-orientation definition and the variables used in this paper to construct the HOI index, it is reasonable to expect the existence of a link between consumers' orientation to health and their BMI. Indeed, comparing respectively the distribution of the HOI in the sub-sample of normal weight consumers and the sub-sample of overweight and obese consumers, it is possible to notice a remarkable difference (Figure 1).

[3]The normalization is based on the following formula: $x_i = \frac{x_i - x_{min}}{x_{max} - x_{min}}$

Table 3. Sample characteristics

Gender		**Household Income**	
Male	46.00	<800€	6.67
Female	54.00	800-1500€	26.33
Age		1500-3000€	39.33
18-25	17.33	3000-5000€	17.33
26-40	24.67	>5000€	10.33
41-65	39.67	**Education**	
>65	18.33	Secondary school	25.67
BMI		High school	43.67
Normalweight	55.33	University degree	30.67
Overweight and obese	44.67		

Figure 1. Distribution of the health-orientation index across BMI



The distribution of the HOI in the normal weight category is much more shifted towards right relative to the distribution of the HOI in consumers with higher BMI. In other words, overweight and obese consumers have lower probability to have high HOI scores, meaning that they have lower orientation to health.

3.2 OLS

The results of our analysis are displayed in table 4. Looking at the results of the first equation having NFP as dependent variable, we observe a positive and significant relationship with HOI (0.575). On the contrary, when moving to the results concerning consumers' interest in nutritional and health claims, the relationship with HOI becomes negative (-0.170 and -0.700 respectively). This change in the pattern of signs indicates that consumers with higher orientation to health are more prone to use NFP compared to consumers scoring lower on the HOI. These latter consumers, instead, seem to be more likely to refer to NC and HC when choosing food products.
Concerning consumers' nutritional knowledge, the coefficient estimates show that higher levels of KNOW are associated with higher frequency of use of the NFP (0.304). When moving to consumers' interest in NC and HC, instead, the relationship with nutritional knowledge becomes negative (-0.087, -0.282 respectively). This suggests that consumers with higher knowledge are

more likely to use more complex information sources, namely the NFP, whilst less knowledgeable consumers might feel more confident in using the concise and easier information of claims. Results of equation 2 and 3 highlight that consumers who are more likely to use NC and HC perceive their diets to be on average very healthy. The variable estimating the self-perceived healthiness of the diet is not significant in the first equation, having NFP as dependent variable.

Table 4. OLS regression

	NFP	NC	HC
Health Orientation Index	0.575 ***	-0.170 ***	-0.700 ***
	(0.144)	*(0.049)*	*(0.158)*
Nutritional Knowledge	0.304 *	-0.087 **	-0.282 *
	(0.145)	*(0.050)*	*(0.158)*
Self-perceived healthiness diet	0.080	0.113 ***	0.250 **
	(0.081)	*(0.027)*	*(0.088)*
Gender - Female	0.267	0.687 ***	0.761 **
	(0.289)	*(0.100)*	*(0.317)*
Age	0.007	0.008 **	0.037 ***
	(0.009)	*(0.004)*	*(0.012)*
Education	0.450 *	0.060	0.329
	(0.247)	*(0.085)*	*(0.271)*
Income	0.297 *	-0.050	-0.233
	(0.148)	*(0.051)*	*(0.162)*
N	300	300	300
R^2	0.140	0.225	0.150
F	6.770 ***	14.080 ***	7.860 ***
VIF	1.010	1.010	1.010

Significance: *** p < 0.01; ** p < 0.05; * p < 0.10

As for the socio demographics, the model estimates are in line with previous findings in the economic literature. In detail, elderly consumers and women are more likely to use claims compared to other population categories. Education is significant in the first equation and is positively related to the use of NFP. This result stresses the idea that the NFP is a complex information and that consumers may face difficulties in using it. Moreover, this strengthens the relationship found between nutritional knowledge and nutrition facts panel usage.
Finally, with regard to income, results indicate a positive relationship with the use of NFP. Although the income variable is not significant in equations having NC and HC as dependent variables, it is possible to notice a shift in the coefficient sign.

4. Discussion and concluding remarks

This study represents an attempt to further explore which is the role of health-orientation in affecting consumers' food behaviours. In particular, we investigated whether health-orientation

plays a role in consumers' use of labels, making a distinction between mandatory and voluntary nutritional information.

As expected, the main results of our analysis overall suggest that health-orientation can be a key driver in consumers' use of labelled information. Moreover, different levels of health-orientation seem to be related to the use of different label formats.

In detail, results indicate that more health-oriented consumers, namely those that already engage in healthy attitudes, beliefs, and behaviours, are more likely to make use of the nutrition facts panel. On the other hand, lower health-orientation is related to a greater interest in nutritional and health claims of food products. These findings together suggest that health might be a motivator of consumers' choice of the nutrition facts panel as a main source of information on food. Health-oriented consumers can recognize in the NFP a more exhaustive information source with respect to claims. Such source could empower them in making healthier choices.

Another important evidence emerging from our results regards the role of nutritional knowledge: when consumers are more knowledgeable about nutritional issues, they are more likely to use nutrition facts panel. On the contrary, the interest for claims increases when nutritional knowledge is low. This might be explained by the different degree of complexity of these two labels formats. Indeed, the concise and brief messages of claims might seem much easier to understand compared to the complex format of nutrition facts.

Consumers who use nutrition facts panel also have high education and income. Claims, instead, are of main interest for elderly and women. Moreover, claims users stated to have very healthy dietary habits. This seems to indicate that claims are perceived as guarantee of the healthiness of food products and that such idea of healthiness is then easily and generally extended to the diet itself.

The results of our analysis offer some cues for reflection. Food labelling is well acknowledged as an effective intervention to solve the market failure due to information asymmetry and to increase market transparency. However, its effectiveness as a public health policy seems to suffer from some criticisms. The fact that NFP became mandatory through the EU Regulation N. 1169/2011 has represented a key step to improve information accessibility. Actually, our analysis underlines that this tool is only used by a specific segment of the population made of consumers highly motivated to engage in healthy activities. On the other hand, there is still part of the population which does not access such information tool. This category is represented by less health-oriented consumers and those with low levels of nutritional knowledge. They could suffer from lack of proper capabilities to understand the NFP contents. Thus, the effectiveness of mandatory labelling to promote healthier food choices is limited and this is the main criticism of such policy.

Claims are mainly considered by a weaker part of the population. In this direction, the market regulation in EU is fundamental to avoid opportunistic behaviours. Nonetheless, one of the main criticisms related to claims is that information is limited. Indeed, claims are by definition very concise front-of-pack messages focused on one nutrient only and the use of such indications should constitute only the first step in consumers' process of information searching.

In light of these considerations, we might argue that policy interventions should not be only focused on improving labelling design or contents, but should also aim at making consumers more oriented to health and more knowledgeable about nutritional characteristics of food products. Indeed, to succeed in increasing consumers' nutritional knowledge and their motivation to behave healthily might have significant implications also on their decision to increase their use of NFP. For this

purpose, food policies should be specifically targeted to reach the segment of the population represented by less health-concerned and by less knowledgeable individuals.
In this context, information campaigns aimed at making consumers more aware about the health risks related to unhealthy food consumption might lead them to become more health concerned. This might result in a higher motivation to engage in healthy behaviours. On the other hand, acting on education with specific nutritional program in the school would be an effective policy to significantly increase individuals' knowledge concerning nutritional aspects, although it requires long time.
The main limitation of our study is that the analysis is based on self-reported data and, therefore, the results might be affected by social desirability bias. Further investigations on this topic might consider a greater number and variety of variables that could be able to give a better understanding of consumers' orientation to health.

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