Does Consumer Time Preference Affect Label Use?

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1   Introduction

Diet-related chronic diseases, such as overweight and obesity, are worrisome not only from a medical point of view, but also in terms of monetary expenditures, these health problems are strictly linked to sizeable sanitary costs (Chou *et al.*, 2004; Yaniv *et al.*, 2009; Cawley and Meyerhoefer, 2012; Ruhm, 2012). These costs are mainly due to the purchase of medical care (direct costs), and to the loss of productivity caused by hill-health (indirect costs) (Rosin, 2008). To challenge these problems and improve public health it is of particular importance to study the determinants of food consumption, and understand the best way to effectively address consumers toward healthy eating.

To this purpose, one of the most investigated topics in the last decades has been the role of food-related information. Economists have found evidences that food information can exert a positive effect in increasing consumer nutrition knowledge and in promoting healthier consumption. Hence, policy makers have proposed different policy interventions to provide consumers with more, and more detailed, information. These information measures have included the diffusion of dietary guidelines, the promotion of nutritional education programs in the schools, and also specific campaigns to increase public awareness concerning fruit and vegetables consumption or the negative effects of some unhealthy food and drinks.

In this context, another and maybe more direct way to provide consumers with food-related information is represented by on-package food labels, which currently constitute the principal tool through which consumers can easily acquire information about food products. The key role of food labels in making individuals able to do more conscious diet choices has been well established by the main findings of the economic literature (Drichoutis *et al.*, 2006; Drichoutis *et al.*, 2008a; Drichoutis *et al.*, 2009; Norgaard and Brunso 2009; Barreiro-Hurlè *et al.*, 2010). Therefore, given the importance of on-packaging information, the EU has recently introduced the EU Regulation No. 1169/2011, published in October 2011, in order to make labels even more effective and boost their utility for consumers. This new low has established some rules concerning mandatory information, nutritional facts and also the graphical standards allowed on food labels in all the EU. Nonetheless, consumers are not always willing to make use of the information reported on labels, and this makes of crucial importance to investigate and understand which factors can be able to discourage consumers in using labels.

A very important but not extensively studied factor that can be able to affect consumer use of labels is represented by time preference. Time preference refers to the rate at which a person is willing to trade a current utility for a future benefit and reflects consumers' present or future orientation (Bishai, 2001; Komlos *et al.* 2004; Smith *et al.* 2005). An individual level of time preference is shown to have an influence on some health-affecting behaviors, including food related ones. Even though the role of time reference in relation to general healthy behaviors has been already demonstrated (Chapman *et al.*, 2001; Smith *et al.*, 2005; Zhang and Rashad, 2008; Rosin, 2008; Mazzocchi *et al.* 2009), there is still scant literature concerning time preference and specific food related behaviors.

Hence, to extend the current knowledge about the reasons that can affect consumers' use of food labels, we decided to examine which could be the role of time preference in affecting this specific consumer behavior. In detail, we examine if individual present or future orientation may lead to significant differences in the use of food-related information on labels. Moreover, as a following step, we try to characterize present or future oriented consumers.

In the next sections are described the economic and theoretical framework based on Grossman's approach on the demand for health; the methodological issues concerning the data collection; the variables definition and the analysis; finally, we provide the results followed by the discussion and conclusion.

2   Economic and theoretical framework

Grossman's model on the demand for health constitutes the most interesting, even though not very recent, approach to study health-affecting behaviors. According to Grossman's model, when consumers purchase medical cares they are, in fact, demanding the commodity good health. In his view, indeed, individuals demand health as it represents a source of utility, which reduces sick days and increases the productivity and the time available for enjoyable activities (Grossman, 1972 and 2000). An individual health capital, that is given at birth, is subject to a depreciation over time and hence, some efforts are required to restore it and maintain a good health status. These efforts are represented by the so defined 'health-investments' (Grossman, 1972) that is, all the actions and behaviors able to offset the health depletion (Gochman, 1997). Therefore, in this model health is at the same time demanded and produced by consumers, who are able to affect their own health level with the extent of their health-enhancing behaviors. As Grossman suggested (Grossman, 2006) one of the main variables that are predicted to affect consumers' willingness to make investments in health is represented by time preference.

Time preference represents consumers' willingness to trade a current gratification for a delayed benefit and reflects an individual preference for present or future utility (Bishai, 2001; Komlos *et al*. 2004; Smith *et al*. 2005). Particularly, consumers characterized by high time preference, being more present oriented, tend to attach more value to the present satisfaction than to the long term utility; on the opposite, low time preference characterizes more future oriented individuals who give more importance to future benefits and are, therefore, more willing to invest in health. Hence, time preference has been shown to be an important predictor of health-affecting behaviors, including those related to food consumption and dietary patterns.

In this paper we consider consumers' label use as an active searching for food-related information, that in turn represents an investment in health as it is potentially able to exert positive effects on the health condition addressing consumers toward healthier diet choices (Drichoutis *et al.*, 2006; Drichoutis *et al.*, 2008a; Drichoutis *et al.*, 2009; Norgaard and Brunso, 2009; Barreiro-Hurlè *et al.,* 2010; Visschers *et al.*, 2013). In other words, label use can be seen as an effort made by consumers to offset their health depreciation.

Following Grossman's approach, we design our theoretical framework in order to specifically investigate if consumers' present or future orientation may affect label use. To this goal, we included in our analysis time preference together with other variables, which are demonstrated in the economics of information to have an effect on label use. Specifically, we take into account the socio-demographic variables, the nutritional knowledge, and the time spent choosing a new food product.
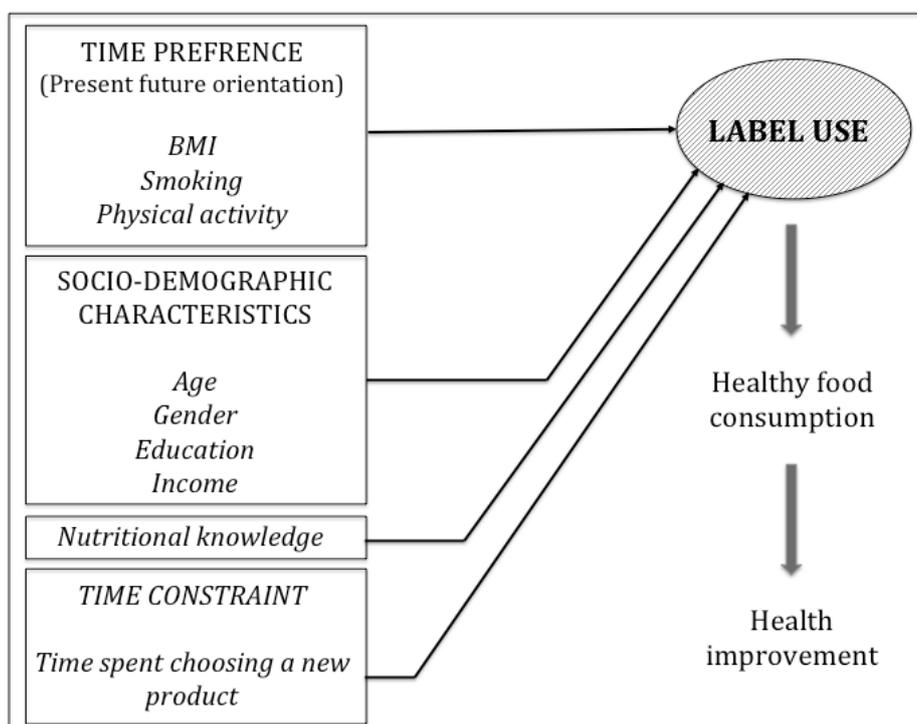

Figure 1. Drivers affecting food label use

Time preference. Time preference represents consumer willingness to subvert present for future utility and comes into play every time consumers have to face intertemporal decisions. This always occurs during food choices, representing trade-offs in which consumers have decide if to undertake a coast to get health improvements in the future, or to favour the present utility deriving from consumption (Chapman and Elstein, 1995; Huston and Finke, 2007). The main cost of food choices is represented by the active acquisition of food-related information, above all in terms of time necessary to read and elaborate the information reported on labels. In this context, the role of consumer time preference assumes great importance, as it is potentially able to determine the extent at which consumers will engage in the use of food labels: high time preference individuals are mainly present concerned and are expected to actively acquire food information less than those with low time preference.

Consumer time preference cannot be measured directly and adequate proxies are needed to estimate it. In this paper time preference is estimated through an index, created using three different variables, namely consumer BMI, smoking behaviour and physical activity.

Socio-demographic variables. The economic literature is reach in studies that explore the role of the socio-demographic characteristics in affecting consumer label use. In this paper we take into account age, gender, education and income, all predicted to have an influence on the process of acquisition of food-related information. Age seems to be positively related to label use that is that older people are more likely to use on-packaging food information. This may be attributable to their higher perceived disease-risk that increases with ageing due to the physiological health-depletion. With regard to gender, females are shown to be more engaged in food label use (Kim *et al.*, 2001; Dichoutis *et al.*, 2006) and also to be more interested in healthy eating than men (Roinnen *et al.*, 1999). Indeed, females are generally more interested and aware about diet issues and health. Education is one of the most important individual characteristics in affecting label use. Specially, more educated individuals are more likely to make use of labels because they find less difficulties in processing the information given, and because they are in general more conscious about the relationship between diet and health (Drichoutis *et al.*, 2008b). Hence, they are predicted to use labels more than non-educated individuals. Also consumer income can have an influence on the acquisition of food-information. There are evidences that high incomes are associated with a high use of food labels (Kim *et al.*, 2001; Barreiro-Hurlè 2010).

Nutritional knowledge. Nutritional knowledge is generally recognized as a facilitating factor in the comprehension of the different information reported on packaging, thus consumers with high nutrition knowledge have been found to be more likely to use labels (Barreiro-Hurlè *et al.*, 2010). Moreover, high levels of nutrition knowledge may raise the perceived value of food information, leading consumers to increase their use of labels. However, some studies have not found evidences supporting this positive relationship between high nutritional knowledge and food label use (Nayga, 2000).

Time constraint. Label use is costly in terms of time necessary to acquire, read and process the information and some studies highlight that time constraint can discourage consumers in using it. Particularly, when the cost of the information is higher than the perceived benefit individuals generally renounce to engage in label use (Berning *et al.*, 2010).

3   Methodological issues

The data for our analysis were collected through a consumer survey with *vis-à-vis* interviews on a sample of 540 consumers in charge of their grocery shopping. A specific questionnaire was designed and the survey was carried out in Milan, in northern Italy. Consumers were approached at random outside the grocery stores covering different time bands. Starting from the address list of all the supermarkets and hypermarket in Milan, we made a systematic sampling that allowed us to select totally 40 stores: 26 supermarket and 14 ipermarkets. The selection was made with respect to the postal code, in order to cover both the central areas of the city and the suburbs. According to the different dimension of the two stores categories, we interviewed 10 consumers for each supermarket and 20

consumers for each ipermarket, totally collecting 540 observations. Only consumers younger than 18 year old and those who refused to answer some questions were *a-priori* excluded from the sample.

The questionnaire questions were formulated to catch all the variables required to follow the conceptual framework depicted in figure 1.

Consumer time preference –present/future orientation- was analyzed through a composite measure using three different variables, specifically consumer BMI, smoking behavior and physical activity. Individuals' BMI was estimated using self-reported measures of height and weight, and was calculated as the weight in kilograms divided by height in meters squared. Consumers were also asked about their smoking behavior and their habit to practice physical activity regularly. These three variables were coded so that high scores correspond to consumers' high time preference (present orientation), and low scores to (low time preference (future orientation). Then, the variables' values were standardized and used to create an index that constitutes our proxy for consumer time preference (TP). Consumers characterized by high time preference, due to the scarce value that they attach to the future consequences on health are expected to have high BMI, to smoke and to not practice physical activity. On the opposite, those with low time preference, being more concerned in future wellbeing, are expected to show normal body weight, to not smoke, and to exercise regularly.

With regard to the socio-demographic conditions, we took into account age, gender, education level, and monthly income. As illustrated in table 1 the age variable (AGE) can assume 6 values, according to the age category of the consumers, whilst gender (GEN) is represented by a dichotomous variable. Consumer education (EDU) can assume 5 values, from 1 corresponding to the lowest education level, to 5 corresponding to the highest. In the same way, consumer income (INC) scores range between 1 (low income) and 5 (high income).

Consumer nutritional knowledge (NK) was, instead, measured making a factor analysis on a set of questions concerning nutritional issues, and particularly the protein, fats, and carbohydrates content of some food products. When consumers give the correct answer their score was 1, otherwise their score was 0.

We decided to estimate consumers' time constraint (TIME) taking into account the time spent for choosing a new food product. Indeed, when consumers feel more time pressure, the time spent in acquiring information about new products is generally very limited. On the contrary, when individuals are less subject to time constraint they are expected to devote more time to the information. This variable can assume 2 values, from 0 (less than a minute) to 1 (more than a minute).

Finally, the 'label use' (LABEL) variable, that represents the main focus of this paper, was constructed to reflect the an individual food label use frequency and can assume 5 values: from 1 corresponding to never, to 5 corresponding to always.

To investigate the role of consumer present/future orientation in affecting label use, the data were analyzed through an Ordinary Least Square Regression analysis. In detail, we computed three separate regressions: the first has consumer label use as the dependent variable and all the variables described above were included among the regressors; the second has label use as dependent variable but the TP was not included among the explanatory variables, *ceteris paribus*; the third equation was performed replacing label use with time preference as the dependent variable and holding the explanatory variables unvaried. This method allows first to estimate the role of individuals' levels of present or future orientation on label use, and second to characterize individuals with high and low time preference.

Table 1.
Variables description

Variable name	Scale	Description	Obs	Mean	Std. Dev
Label use	scale (1-5)	Consumer use labels from never =1, to always =5	540	3,267	1,383
Age	scale (1-6)	Consumer age group (18-24; 25-34; 35-44; 45-54; 55-64; >64)	540	3,672	1,692
Gender	dummy (0-1)	1 female, 0 male	540	0,543	0,499
Education	scale (1-5)	Education level (primary school, secondary school, higher education, degree, post degree)	540	3,054	0,913
Income	scale (1-5)	Income level from 1 (less than 800€ per month) to 5 (more than 5000€ per month)	540	2,981	1,023
Nutritional knowledge *(carbohidrates content)*	dummy (0-1)	What contains more carbohydrates: pasta, eggs or fish? Correct answer=1, otherwise =0	540	0,787	0,410
Nutritional knowledge *(fats)*	dummy (0-1)	Which type of fats should be reduced between saturated monounsaturated and polyunsaturated fats? Correct answer=1, otherwise =0	540	0,604	0,490
Nutritional knowledge *(proteins content)*	dummy (0-1)	What contains more proteins: an average serving of egges or an average serving of milk? Correct answer=1, otherwise =0	540	0,785	0,411
Time spent for choosing a new food product	dummy (0-1)	From 0 (less than 1 minute) to 1 (more than one minute)	540	0,757	0,429
BMI	scale (1-3)	Body Mass Index (Kg/m2) from normalweight=1, to obese =3	540	1,394	0,583
Smoking behavior	dummy (0-1)	Smoking consumer =1, Non-smoking consumer =2	540	0,707	0,455
Physical activity	dummy (0-1)	Consumer practices physical activity at least once a week 1, otherwise 0	540	0,439	0,497

4   Results

The OLS results are shown in table 2. The first equation shows the results taking into account consumers' time preference and suggests that this variable has an influence on the extent at which consumers engage in food label use. As we expected, the relation between consumer TP and label use is negative and significant (-0.101), that is, that more present oriented individuals are less likely to make use of the information reported on labels. This result confirms our initial hypothesis.

Interesting findings emerge also with regard to the socio-demographic characteristics. Age seems to not affect label use, both in the first equation that includes TP and in the second, in which consumer present and future orientation is excluded. Interestingly, looking at the last column of table 2 it is possible to note that age has a positive and significant relationship with TP (0.057), meaning that getting older may lead consumers to become more present oriented. Nonetheless, the effect of ageing seems to be not associated with label use. Gender, instead, has an influence on label use. Particularly, in line with the main findings of the economic literature, females are more likely to use food labels than males and this is observable with and without considering the effect of TP. This result becomes even stronger when looking at the third equation having TP as the dependent variable. Indeed, the relationship between gender and TP is negative and significant (-0.202), suggesting that men are more present oriented and this may lead them to give little value to the benefits deriving from label use and to the future health events. With regard to consumer level of education, our results confirm previous findings showing that high education is generally associated with an increased use of food labels. Education is significant in regression 1 and 2, therefore his role in influencing label use is not affected by the presence of the TP variable. Nonetheless, the results of the third equation interestingly reveal a negative and significant relationship between the education level and individual present and future orientation (-0.176). This suggests that when consumers are more future oriented and give more importance to future outcomes, they are more likely to improve their education. The last socio-demographic variable considered in the analysis is income. The results highlight that individuals with high incomes are more likely to use food labels. Moreover, the relationship between income and label use is positive and significant in both equation 1 and 2 (0.156, 0.169) meaning that the effect of income on label use is independent from consumer TP.

Table 2.
OLS results

	(1)	(2)	(3)
	Label use (with TP)	Label use (without TP)	Time preference
Time preference	-0.101*		
	(0.060)		
Age	0.024	0.018	0.057**
	(0.039)	(0.039)	(0.028)
Gender	0.285**	0.305***	-0.202**
	(0.118)	(0.117)	(0.083)
Education	0.155*	0.172**	-0.176***
	(0.080)	(0.079)	(0.057)
Income	0.156**	0.169***	-0.125***
	(0.062)	(0.061)	(0.044)
Nutritional knowledge	-0.116*	-0.120**	0.041
	(0.059)	(0.059)	(0.042)
Time spent for choosing a new food product	0.582***	0.561***	0.202**
	(0.136)	(0.135)	(0.096)
_cons	1.645***	1.578***	0.656**
	(0.363)	(0.362)	(0.258)
N	540	540	540
R-sq	0.078	0.073	0.096

Standard errors in parentheses
* $p<0.1$, ** $p<0.05$, *** $p<0.01$

Regarding nutritional knowledge, the results show that it is negatively related to label use, that is, that low nutritional knowledge is associated to a high use of food labels. This result may be due to the fact that, consumers with lower knowledge concerning food issues may be more motivated than others in acquiring information to fill their gaps. Even in this case the relationship between label use and consumer knowledge seems to be not affected by the presence of the TP variable.

Finally, the results highlight that the more is the time spent for choosing a new product, the more consumers are likely to engage in food label use, both in regression 1 and 2. This indicates that this relationship is not affected by the TP variable. Nonetheless, equation 3 reveals that, as expected, more future oriented consumers are more likely to devote their time to food information.

Hence, our results highlight that consumer time preference can affect label use, but this variable does not influence the effect of the other variables considered in the analysis in relation to the process of acquisition of food-related information. Moreover, this approach allowed us to make a consumer profile on the basis of their time preference level. Indeed, present oriented consumers seem to be mainly older men with low education levels and low monthly incomes.

5 Discussion and conclusions

This paper aims at investigating the role of consumer time preference in affecting label use. To this purpose, collecting the data through a consumer survey, we performed three OLS: the first with label use as the dependent variable and the time preference variable included among the regressors; the second was performed holding label use as dependent variable but without the time preference in the explanatory variables; the third had time preference as the dependent variable.

The results confirm our hypothesis that more future oriented consumers are more prone to use food labels and the effect of time preference on label use seems to be independent from the other variables included in the models. Moreover, the results reveal that older men, less educated and with low level of income tend to favor present utility.

Other interesting findings regard consumer education, nutritional knowledge, and income. Indeed, a positive relation is revealed between label use and education, showing that better educated individuals are more likely to acquire food-related information on labels. This tendency may be probably due to their high consciousness about the relation existing between diet and health. On the other hand, a negative relation is found concerning label use and nutritional knowledge highlighting that consumers who know more about food are not particularly interested in using labels. The results on income confirm, in some ways, the findings on education, as individuals with higher incomes are generally more educated, and thus tend to have more awareness concerning the relationship between diet and health. Finally, the positive relation between label use and the time spent for choosing a new food product shows that consumers who use labels are more prone to devote their non-working time to diet matters.

These findings suggest that policy interventions should be addressed to make consumers more concerned about future events and should also be tailored on a specific population target. Particularly, label use may be improved through making consumers more aware about the strong relationship between diet and health, as on-packaging information may be perceived as a tool to improve diet. Moreover, due to the profile of high time preference consumers that emerges from our analysis, these interventions should be oriented to catch the attention of the most disadvantaged social classes, with a specific focus on men that, indeed, are shown to be generally less interested in health issues and healthy eating.

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