

Changes in dietary preferences: new challenges for sustainability and innovation

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RESEARCH ARTICLE

Abstract

The transformations in dietary habits that have occurred over recent decades draw attention to important issues concerning the relationship between lifestyles, diet and health, and open up new challenges for operators in the agricultural and food sector. This study intends to analyse these evolutions, comparing the dietary preferences of generation X in 2001 with its dietary preferences in 2011, and those of the following generation, the so-called generation Y. The analysis was conducted by applying latent class clustering to the food spending of a representative sample of Italian consumers. It has enabled us to identify the prevalent food patterns in 2001 and 2011 and to analyse their transformations, interpreting them in the light of social, cultural and economic changes. The comparison of food pattern characteristics over this period highlights the emergence of trends that move in two different directions. The first of these is the rise of a new dietary sensitivity towards a healthy diet rich in fruits, vegetables and fish. The other concerns food patterns that are more vulnerable to diseases related to an unhealthy diet. These trends should draw the attention of public operators to the need for communication campaigns that target specific segments and aim to direct food habits towards healthier behaviours. A change in supply could also help improve the diet, especially if aimed at products with a high level of service provision and at establishments that serve food. Finally, the birth of a niche of consumers particularly drawn towards healthy eating opens the way for the industry to propose a series of innovative products.

Keywords: food trends, latent class clustering, Italy

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1. Introduction

The cultural, socioeconomic and technological transformations of the past decade have modified our way of living and of relating to others. This has resulted in a profound evolution in our food habits (Grunert, 2005; Siró, *et al.*, 2008). This study intends to analyse these evolutions with a view to formulating a reflection on trends in food consumptions and defining possible future scenarios.

In particular, we compare the dietary preferences of generation X in 2001 with its dietary preferences in 2011, and those of the following generation, the so-called generation Y. This analysis enables us to grasp the transformations of consumption models in two different historical periods marked by cultural, social and economic differences that have modified food choices. Furthermore, the analysis enables us to examine the transformations, distinguishing the effects of two principal drivers. The first one, within the same generation, is tied to ageing, the growth of families

and the birth of children. The second is tied to the different attitudes of two culturally different generations.

Literature has pointed out the effects of ageing, family structure and generational traits on food preferences. In particular, various authors have shown how age influences the time dedicated to food preparation, the consumption of convenience foods, meals consumed out of the home, and the healthy aspects of the diet. The factors that contribute to explaining these dynamics can be found in the differences concerning work activity, means of socialising, the pace of lifestyles and the different awareness of health-related issues (Deshmukh-Taskar *et al.*, 2007; Larson *et al.*, 2006; Olsen, 2003; Verbeke, 2005).

Likewise, the structure of the family represents an element that influences dietary choices. In this regard, the preference for healthier foods is associated with the birth of children and is explained by the parents' awareness of the importance a proper diet assumes in the future state

of health of their children (Gilbert, 2000; Mancino *et al.*, 2004; Ricciuto *et al.*, 2006).

Finally, as for the generational aspects, the studies underline the differences in the ambit of the values and priorities of the two generations under study. In particular, it is shown how generation X values family first and searches for a balance between the latter and his/her work sphere, while generation Y places his/her independence before everything else, placing great confidence in his/her capabilities (Williams and Page, 2010). These differences are reflected in consumptions in general and in food preferences in particular, which for generation Y are mostly inclined towards new consumption patterns to the detriment of traditional patterns (Casini *et al.*, 2013).

The study of how ageing, family structure and generational aspects have interacted with the cultural, socioeconomic and technological transformations of the past decade proves to be particularly important in view of understanding the future evolution of food consumption and providing operators of the agri-food system with insights to better respond to demands and orient food habits towards healthy patterns compatible with the new lifestyles.

2. Methods

The analysis was based on data from the National Statistics Institute (Istituto Nazionale di Statistica; ISTAT) on the consumptions of Italian families. The families are intended as *de facto* families, formed by individuals who cohabit without necessarily being joined by bonds of marriage or kinship.

Every year the ISTAT survey involves some 28,000 households and is carried out by having the families keep a diary in which they record their food spending over an entire week. This record is associated with a direct interview, which makes it possible to complete the information needed for the estimate of consumptions. Sampling is stratified in two stages: the communes are selected in the first stage, while the families are selected from the registers of the sample communes in the second stage. The spending of the entire population of Italy was estimated by attributing to each family a coefficient indicating the number of families it represents. The spending sampling error obtained in this manner is lower than 0.58% with probability $P=0.95$ (ISTAT, 2013).

Our analysis concerns food consumptions. It compares food expenditure in 2001 of families of generation X with a head of the family born between 1972 and 1981 with the food spending of two different family typologies in 2011:

the families of the same generation (with a head of the family born between 1972 and 1981) and the families of generation Y (with a head of the family born between 1982 and 1991). This sample structure enables us to analyse the evolution of the consumptions of generation X and, at the same time, to examine the transformations in consumptions of two different generations within the same age bracket (20-29). In 2001, the family units subjected to our study number 624 and represent 756,831 Italian families. In 2011, the sample families of generation X subjected to the study number 2,824 and represent 3,310,796 families. Finally, in 2011, the sample units of generation Y number 593 and represent 770,258 Italian families. Figure 1 reports the socio-demographic structure of the families concerned by our analysis. The indicators utilised are geographical area, the composition of the household, the head of the family's level of education and the total per capita spending, including all the goods and services the families purchased. The total per capita spending, expressed in real value compared to the year of reference 2011, was taken as proxy of the income.

The main transformation that emerges within the same generation concerns the family composition and, in particular, the increase in families with children, which in 2011 represent more than half of the population considered. On the other hand, the principal differences between the two different generations concern the greater proportion of families consisting of singles and the smaller presence of families with children. Furthermore, in 2011, the total per capita spending of families proves to be lower than in 2001, for both generation X and generation Y. This aspect reflects the national figure (-7%), shedding light on a lesser availability of economic resources in 2011, a consequence of the economic crisis of these years. Finally, we note a higher level of education in 2011 in generation Y, as well as in generation X.

Applying latent class (LC) clustering has enabled us to identify the various consumption patterns. This is a segmentation technique based on a statistical model built on a mixture of underlying probability distributions. One of the main advantages of using the statistical model is that it enables us to define the number of clusters into which we can divide the reference population by means of statistical information criteria that render the choice more rigorous compared to what occurs in the traditional cluster analysis. Furthermore, LC clustering is a more flexible method than the traditional techniques, as the model can be rendered more or less sparing by restricting the parameters that are verified by means of statistical tests. Finally, another advantage of the model consists of the fact that variables with different scales can

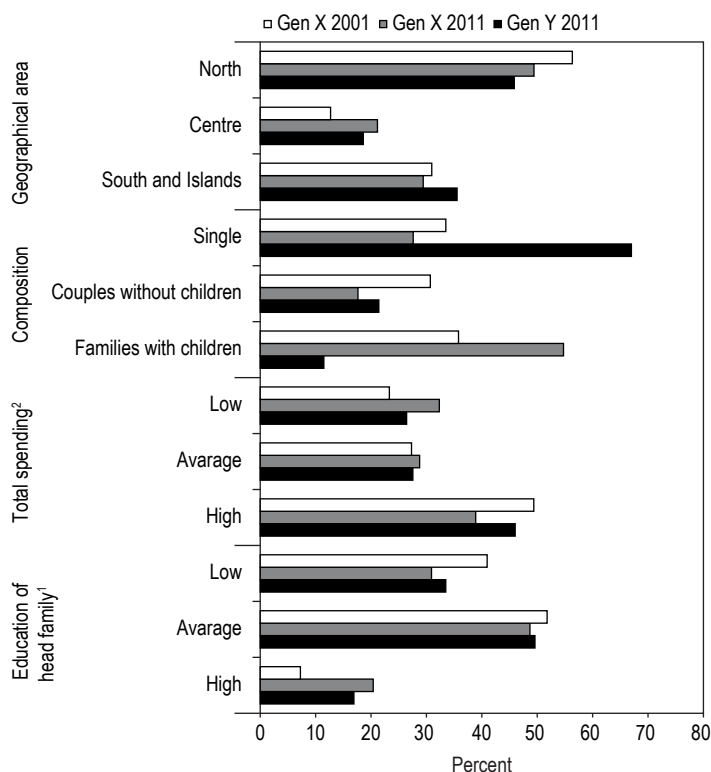


Figure 1. Socio-demographic structure of the families of generation X in 2001 and of generations X and Y in 2011. The principal changes that occurred in 2011 concern the increase in the number of single persons for generation Y and of families with children for generation X. Note also the marked decline in spending capabilities as a consequence of the economic crisis.

¹ Low (middle school certificate, elementary school certificate, no school certificate), average (high school diploma), high (university degree and PhD).

² The thresholds for the per capita spending levels were identified based on cumulative frequency distribution: low $\leq q0.33$, $q0.33 < \text{average} \leq q0.66$, high $> q0.66$, referring to the entire Italian population in the years under study.

be used without the analyst making a decision about their distribution (Vermunt and Magidson, 2002).

In this study, the LC model is applied utilising the statistical software Latent Gold Choice 4.5 (Statistical Innovation Inc., Belmont, MA, USA). The variables the analysis concerns are the food spending shares for consumptions in the home of 13 categories of food (bread, pasta and grains; white meat; red meat; cold cuts; fish; milk and yoghurt; cheese and eggs; oil and fats; fruit and vegetables; ready-to-eat foods; sweets; alcoholic beverages; non-alcoholic beverages).

The data concerning the food spending composition for consumptions made at home have been integrated with those of spending outside the home at restaurants, bars and cafeterias. This information has permitted us to complete the picture of family consumptions for the different consumption patterns identified.

3. Results

From 2001 to 2011, the per capita spending (expressed in real value) for food consumed in the home of Italian generation X families decreases by approximately 13%, while the spending of generation Y families increases by approximately 10%. These two different trends also differ from the figure recorded for the entire Italian population, which instead indicates an increase of about 6% in food consumptions in the home (ISTAT, 2013). The discrepancies can be interpreted in the light of the different makeup of households. Indeed, on one hand, there are the generation X families in which the increase in number of the family unit leads to something of an 'economy of scale' in food expenditure, decreasing the value of per capita spending. On the other hand, the increase in households formed by singles within generation Y may determine an increase in per capita spending.

The trends we have observed for food consumption out of the home also differ from the national figure that records an appreciable increase in this listing (+23%). Out of the home consumption remains constant in generation X, which is a probable consequence of the evolution of family structure with the reduction in the number of singles and the increase in the number of couples with children. On the other hand, comparing generation X with generation Y, we also note a marked increase (+10%) in this listing, which, however, is less important than the national figure. This difference can be explained by the fact that the increase in meals consumed out of the home mostly concerned age brackets different from that of our study.

Moving on to consider consumption models, the choice of the best segmentation model was made by analysing the structure of the information criteria resulting from applying the LC cluster analysis. This analysis led to selecting the 4-class model for generation X in 2001, the 5-class model for generation X in 2011 and the 3-class model for generation Y in 2011 (Table 1).

In particular, in generation X in 2001, the results point out the presence of the following 4 patterns of consumption: traditionals; red meat consumers; out of the home consumers; convenience seekers (Table 2, Table 3 and Figure 2).

The first pattern is that of the 'traditionals', characterised by food choices that reflect the balance of the Mediterranean diet. In this pattern, there is a prevalence of families with children, residing in Southern Italy, with scarcer economic resources and a head of the family with a lower level of education.

The second pattern is characterised by an expenditure on red meat equal to 29% of total spending for foods consumed at home and has therefore been labelled 'red meat consumers'. The pattern is made up mostly of couples without children, residing in Northern Italy, with good economic resources and a good level of education.

The third pattern is characterised by limited consumption in the home and with a preference for foods that do not require

Table 1. Information criteria resulting from applying the latent class analysis are shown for models with a progressive number of classes. The structure of the information criteria values led to selecting the 4-class model for generation X in 2001, the 5-class model for generation X in 2011 and the 3-class model for generation Y in 2011.¹

	LL	BIC(LL)	AIC(LL)	AIC3(LL)	Class.Err.
Generation X 2001					
1-Cluster model	-9,167	18,577	18,409	18,447	0.00
2-Cluster model	-9,103	18,521	18,304	18,353	0.06
3-Cluster model	-9,050	18,485	18,219	18,279	0.10
4-Cluster model	-9,012	18,480	18,166	18,237	0.09
5-Cluster model	-8,987	18,500	18,137	18,219	0.09
Generation X 2011					
1-Cluster model	-55,494	111,385	111,088	111,138	0.00
2-Cluster model	-55,273	111,055	110,675	110,739	0.03
3-Cluster model	-55,061	110,742	110,279	110,357	0.04
4-Cluster model	-54,925	110,581	110,035	110,127	0.09
5-Cluster model	-54,828	110,497	109,868	109,974	0.11
6-Cluster model	-54,785	110,525	109,811	109,931	0.10
Generation Y 2011					
1-Cluster model	-11,618	23,555	23,336	23,386	0.00
2-Cluster model	-11,558	23,524	23,243	23,307	0.01
3-Cluster model	-11,498	23,494	23,152	23,230	0.05
4-Cluster model	-11,460	23,507	23,104	23,196	0.06

¹ LL: Log-likelihood; BIC(LL): Bayesian Information Criterion based on the log-likelihood; AIC(LL): Akaike Information Criterion based on the log-likelihood; AIC3(LL): Akaike information criterion with 3 as penalizing factor, based on the log-likelihood; Class Err.: classification errors.

Table 2. Weight of consumption patterns in the population under study and composition of food spending among the different patterns. A decline emerges among the traditionals, while we record an increase in red-meat consumers. Furthermore, the convenience seekers lose importance, and even disappear in generation Y.

	Traditionals			Red meat consumers			Out of homers			Convenience seekers		Healthier consumers
	X 2001	X 2011	Y 2011	X 2001	X 2011	Y 2011	X 2001	X 2011	Y 2011	X 2001	X 2011	X 2011
Pattern weight	74%	64%	72%	7%	19%	18%	7%	4%	9%	13%	9%	5%
Pattern make-up												
Bread and grains	12%	13%	14%	16%	11%	12%	16%	12%	20%	18%	15%	21%
White meat	5%	6%	6%	1%	4%	3%	0%	7%	5%	2%	2%	5%
Red meat	11%	10%	9%	29%	29%	29%	0%	0%	0%	3%	4%	2%
Cold cuts	5%	5%	5%	6%	4%	4%	0%	0%	7%	12%	16%	4%
Fish	9%	9%	8%	0%	6%	6%	5%	0%	2%	3%	3%	6%
Milk and yoghurt	7%	8%	8%	4%	7%	6%	10%	12%	12%	7%	8%	9%
Chees and eggs	6%	6%	7%	8%	5%	5%	6%	7%	11%	11%	11%	9%
Oil and fats	4%	3%	3%	1%	2%	3%	0%	0%	0%	1%	1%	1%
Fruits and vegetables	16%	17%	16%	15%	13%	15%	17%	13%	12%	16%	10%	26%
Ready-to-eat foods	3%	4%	4%	4%	2%	2%	7%	6%	2%	5%	6%	4%
Sweets	7%	7%	7%	8%	5%	4%	14%	8%	14%	10%	10%	7%
Alcoholic beverages	4%	5%	4%	1%	4%	4%	7%	19%	5%	3%	5%	1%
Non-alcoholic beverages	6%	5%	5%	5%	4%	4%	10%	13%	5%	7%	6%	2%
Other	4%	3%	4%	2%	3%	3%	10%	3%	4%	3%	3%	3%

Table 3. Total per capita spending (€/month) on food consumed in the home and out of the home, expressed in real value compared to the year of reference 2011. The patterns differ for the importance of out-of-the-home spending with respect to the total. In particular, for the out-of-homers of both generations, consumptions outside of the home represent at least half of total food spending.

	Gen X 2001			Gen X 2011			Gen Y 2011		
	At home	Out of home	Total	At home	Out of home	Total	At home	Out of home	Total
Traditionals	272	64	336	228	66	294	287	75	362
Red meat consumers	149	46	195	200	62	262	241	49	290
Out-of-homers	107	127	234	137	142	279	127	126	253
Convenience seekers	161	74	235	154	78	232			
Healthier consumers			0	129	65	194			
Average figures of all the consumption models	239	68	307	208	69	277	264	75	339

preparation, which is confirmed by the insignificant weight of ingredients indispensable to cooking, such as oil and fats, and the strong importance of beverages, both alcoholic and non-alcoholic. In this context, food expenditure for consumption in the home is lower than out of the home spending. This pattern has therefore been labelled 'out-

of-homers', and is made up mostly of singles who live in Central-Northern Italy, have good economic resources and a good level of education.

Finally, the fourth pattern is represented by 'convenience seekers' who prefer to consume foods at home that are time-

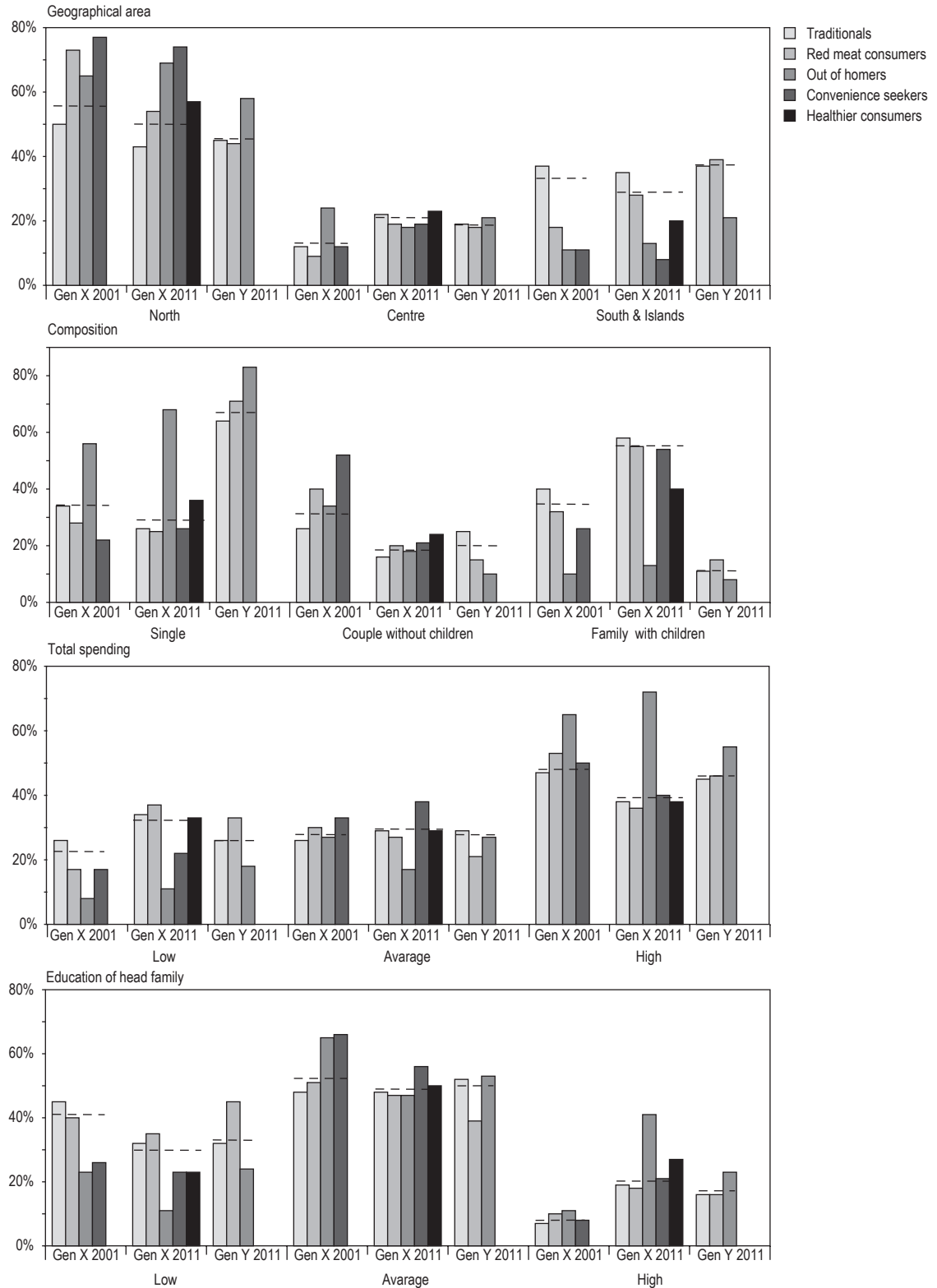


Figure 2. Socio-demographic structure of families by different consumption patterns. The hatched line indicates the average national figure concerning Generation X families in 2001 and Generation X and Y families in 2011. The number of traditionals decrease especially in the South and the Islands, where we note an increase in red-meat consumers. The out-of-homers continue to prevail among single persons. The convenience seekers increase among families with children. The healthier consumers prevail among the singles with a high level of education.

saving and easily adaptable to many occasions, in response to the need for quick, destructured meals. This group is made up mostly of couples without children, residing in the North, with good economic resources and a middle-high level of education.

Moving on to compare 2001 and 2011, we note an increase in the number of consumption patterns for generation X and a reduction for generation Y. These differences can be attributed to various motives. In particular, for generation X, they can be explained by the large number of families in this group and an evolution in food preferences that imply a diversification of choices, while for generation Y, the phenomenon can be linked to the scarce economic resources of the new generations and a standardisation of tastes.

One of the first elements that emerges from comparing the importance of consumption models in the two years is the reduction of 'traditionals', which is more pronounced in generation X and in Southern Italy. This pattern is characterised by several significant changes concerning its composition, some of which may be related to the tendency towards a healthy diet, such as the reduction in red meat consumption. Other changes indicate riskier dietary behaviours, such as the reduction in fish consumption and the increase in ready-to-eat foods, which literature defines as having scarce nutritional quality (Drewnowski and Darmon, 2005; Jabs and Devine, 2006).

Another trend that merits particular attention from the viewpoint of a healthy diet is the definite increase in 'consumers of red meat' (+12%) in generations X and Y. In particular, this model is mainly established in the South among generation X families with children, but also among the singles of generation Y. Both these typologies are characterised by a low level of education, while they differ for availability of economic resources, which is low for the former and high for the latter.

A different trend in the two generations emerges for the 'out-of-homers' whose weight drops among the generation X families, and increases among those of generation Y. We observe, however, that for the generation X 'out-of-homers', consumptions in bars, restaurants and cafeterias increase, while for generation Y, they remain substantially constant. As in 2001, for both of these generations, this pattern is mostly represented by singles with a good level of education and high spending capability.

The 'convenience seekers' model loses importance, decreasing in generation X and disappearing in generation Y. This decline among generation X families can be attributed

to ageing and the evolution of the family structure, which sees an increase in the presence of children. The presence of children, indeed, often implicates a change towards greater attention to the diet and assumes the form of greater care in preparing meals (Mancino *et al.*, 2004; Ricciuto *et al.*, 2006). The increase in 'convenience seekers' among generation X families with children in 2011, however, indicates that a significant proportion of the couples of only adults of 2001 whose preference went to convenience foods, has maintained this pattern even after the birth of children. In generation X, we also observe a change in food composition in the diet of families who consume readily useable foods in the home. We observe, in particular, an increase in the importance of ready-to-eat foods, which indicates a growing popularity of these products.

On the other hand, the disappearance of 'convenience seekers' from generation Y can be interpreted by the fact that a good portion of young people with a lifestyle requiring quick food preparation have modified their preferences, reducing the consumption of ready-to-eat foods, probably due to a scarcer availability of economic resources in this period of crisis.

A new consumption model emerges in generation X, which is characterised by a healthy diet rich in fruits, vegetables, bread, grains and fish and by a low percentage of alcoholic beverages in expenditures for foods consumed in the home. The model mainly concerns singles with considerable economic resources and a high level of education who choose this food style because they are particularly mindful of the benefits of a healthy diet. A very different family typology adheres to this model alongside singles, and that is families with children, with scarce economic resources and a middle-low level of education, for whom income probably becomes a barrier in purchasing foods.

Finally, a homologation of food habits appears on the territorial level, which seems attributable to the differences in lifestyle between Northern and Southern Italy (Rosina and Caltabiano, 2011). This trend, quite evident in generation X, is even more pronounced among young people of generation Y. Indeed, while in the past, Southern Italy and the Islands were characterised by the presence of the 'traditional' pattern, today this consumption typology has been replaced by other consumption patterns.

4. Discussions

The results of the analyses conducted on the evolution of food consumptions allow us to draw a few conclusions

on the principal existing trends and come up with a few possible considerations on future scenarios.

The general picture in which comparisons were made is firstly characterised by the global economic crisis that has led to a consistent drop in the purchasing power of the Italians, which is evident also in the decline of total spending by the families examined in this study.

Another phenomenon of general importance concerns the composition of autonomous households, which in the decade examined has seen the households formed by a single individual increase. This phenomenon confirms a trend also found in other countries, which concerns young people striving for greater autonomy regardless of forming a 'real family', especially among individuals with high levels of education.

The variations found in food consumptions therefore depended on these economic and social changes, as well as on some other main elements. In making comparisons within the same generation, they can be attributed mostly to the natural evolution of families, while in the case of young people of the two different generations, they derive from factors tied to new lifestyles and new social trends.

Examining the evolution of generation X, we observe that ageing is linked to an absolute increase in the number of autonomous groups and of their size. The two factors doubtlessly influence the differentiation of food spending models. In particular, a new consumption model emerges, one formed by families attentive to the healthiness of their diet. The growth of a health-oriented attitude is confirmed in the literature by various authors who associate health consciousness with attention for the indications on labels (Grunert and Wills, 2007; Verbeke *et al.*, 2009) and with products obtained without the use of pesticides or additives (Aertsens *et al.*, 2009).

Among the other important phenomena in the evolution of generation X, we find the increase in 'red meat consumers' and a decline in the 'out-of-homers' segment. Both of these phenomena can be explained by the consistent increase in families with children compared to the previous decade. Indeed, the presence of children may have resulted in greater attention to the diet's content of animal proteins. Furthermore, combined with economic difficulties, it may have led to a decline in the accessibility to establishments that serve food.

In making comparisons between generations, what emerges first of all is the simplification of consumption models,

which can be explained by two trends. On one hand, there has been a standardisation of consumptions that has reduced the regional differences. On the other hand, the scarcer economic resources of the young people of generation Y are inevitably interpreted as a barrier to purchasing certain types of foods. In fact, we feel the disappearance of the convenience food seekers can be explained by the need to contain spending and abstain from purchasing foods with high levels of services (foods of the fourth and fifth ranges). This connection between a decline in living standards and reduction in convenience food has also been observed in other studies (Hunter and Worsley, 2009). It is significant that it has occurred despite the fact that current lifestyles would suggest consumers' desire for a reduction in meal preparation time (Buckley *et al.*, 2007; Carrigan *et al.*, 2006; De Boer *et al.*, 2004).

Finally, an element that emerges clearly in both generations X and Y is the stability of spending for meals consumed outside of the home, despite scarce economic resources. This phenomenon shows how this consumption model is now a structural component of the lifestyle of these generations.

In a future perspective, if we hypothesise an improvement in the economic conditions of the new generations and an intensification of their need for 'independence', the main trends suggest the establishment of a complex scenario characterised by several fundamental elements.

One of the first elements is a growing importance of consumptions outside the home, which has evident implications for the agri-food system, as far as the production of foods for this segment is concerned, as well as for the public sector and its health-oriented policies. In particular, the scarce nutritional value and high energy intake of the foods consumed out of the home represent an important issue for health policies, as also pointed out in the literature (Buscemi *et al.*, 2011; Gillis and Bar-Ort, 2003). It thus seems necessary to intervene with communication and control policies in order to make the public aware of the importance of greater attention to food quality and food preparation techniques, also in the bar and restaurant sector.

Another element concerns the establishment of a global food model that will replace traditional models of a regional type, and will likely see growing levels of red meat consumption. As already witnessed in other countries (Gracia and Albisu, 1999), this trend could result in negative effects on health, by simplifying balanced diets such as the Mediterranean one.

Finally, a third element consists of the development of new niche models in segments of the population with higher levels of education and income, whose consumptions are inspired by health-oriented behaviours or by the search to minimise meal preparation time. This scenario is conditioned clearly by an improvement in economic standing that would permit greater possibilities of choice to a consistent number of families. If these conditions were to come about, the stimuli for the agriculture and food system would be evident in the case of both the health-oriented and convenience food models. These two models would pose new challenges in terms of communication and product quality control also from the viewpoint of food and health policies. As far as health-oriented products are concerned, they can represent an important market outlet for agriculture with a low environmental impact and agriculture practised on territories particularly suited in terms of quality, such as hilly and mountain areas, especially if accompanied by adequate policies of certification and traceability.

As for convenience foods, the growing commercial space they would acquire first of all introduces the theme of the control of quality and the healthiness of their ingredients, as well as the preparation techniques (Drewnowski and Darmon, 2005; Jabs and Devine, 2006). Greater communication and information on these aspects appears indispensable, starting from labelling. In a scenario that witnesses the expansion of the demand for convenience foods, there is probably also room for products of high quality and sustainability, which could represent one of the greatest challenges for the future of the market and of food research. In this scenario, the public and private sectors could cooperate in defining new production standards, healthy food models and sustainable agri-food systems.

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