

Factors Affecting Italian Consumer Attitudes Toward Functional Foods

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Healthier food products have entered the global markets with force in the past few years and have rapidly gained market shares. The food industry has reacted to this trend by developing a growing variety of new products with health-related claims and images. This article, applying factor and cluster analysis, elicited consumer behavior toward functional foods (FF). Data were gathered through a quantitative survey conducted on 400 Italian food shoppers. Principal components' analysis highlighted the key role played by the perception of healthiness in determining shoppers' attitudes toward FF. Cluster analysis revealed three groups of respondents with different levels of confidence, satisfaction, and perceived healthiness of FF. In addition, demographic characteristics appeared to be only partially correlated with the acceptance of these products, a fact that confirms previous literature. Findings bring to light interesting market opportunities for policy makers and food companies.

Key words: Italian consumers, functional foods, factor analysis, cluster analysis.

Introduction

In recent decades, consumer demands in the field of food production have changed considerably (Giannetti, Testani, & Recchia, 2009). In particular, functional foods are a relatively new concept that has emerged as a result of the recent increasing focus on—and awareness of—the influence of diet on overall health (Poulsen, 1999). Functional foods (FFs) represent one of the most interesting areas of research and innovation in the food industry (Doyon & Labrecque, 2008; Jones & Jew, 2007; Schaafsma & Kok, 2005; Sirò, Kapolna, Kapolna, & Lugasi, 2008).

In order to increase the chances of success in this market, a food firm cannot afford *not* to broaden its knowledge on FF consumer perception, and the cultural, psychological, and social motivations under which the consumer behaves (Sirò et al., 2008; Urala & Lähteenmäki, 2003). Undeniably, despite the vast interest of the food industry and the alleged prospect of a bright future for FFs, few empirical studies of European and Italian consumer acceptance based on primary data collection have been reported (e.g., Saba, 2001; Vassallo et al., 2009). In Europe, FF sales have increased significantly (Jago, 2009); Germany, France, the United Kingdom, and the Netherlands represent the most important countries within the FF market (Makinen-Aakula, 2006). However, many other European markets are experiencing high growth rates, such as the Netherlands (Makinen-Aakula, 2006) and Spain (Monar, 2007). In addition, the Euromonitor (2009) forecasted that sales of

FFs would rise moderately from 2005 to 2009 in the newly emerging markets of Hungary, Poland, and Russia (Benkouider, 2004). Bredahl (2001) showed that across European countries, the attitude toward genetic modification in food production was deeply embedded in more general attitudes held by consumers, and, in particular, toward nature and technology. Europeans are not only suspicious of the safety of novel foods, but are also critical of the whole process through which food production becomes increasingly anonymous and distanced from everyday life (Poppe & Kjærnes, 2003).

Furthermore, demand for FFs within the EU varies considerably from country to country, mainly due to food traditions and cultural heritage (Castellini, Canavari, & Pirazzoli, 2002), and in general the interest of consumers in FFs in central and northern Member States is higher than in Mediterranean countries (Van Trijp & van der Lans, 2007). Niva (2000), as well as Makela and Niva (2002) and Niva and Makela (2007), indicated that the need for FFs is increasingly questioned in Northern European countries, hence yielding the conclusion that consumer acceptance of functional foods cannot be taken for granted. By contrast, attitudes toward FFs were more positive in Finnish consumers compared to consumers in Denmark or the United States (Bech-Larsen & Grunert, 2003).

In Italy, although the FF market does not reach the size of other countries, the consumption of products in the functional foods category has increased considerably in recent years despite the fact that Italy represents a ref-

erence country for the Mediterranean food model (Sirò et al., 2008). Several nationwide surveys have also shown that Italian families—especially those with children—seek quality and healthiness of food products ahead of price (ACNielsen, 2007) in contrast with the general decrease in food purchases; at the end of 2007, 30% of families claimed to consume FFs (ISMEA, 2007; Nomisma, 2008).

Method

Consumer acceptance of FFs as part of the daily diet is widely recognized as a key variable to the success of these products (Lähteenmäki, Lyly, & Urala, 2007). Nevertheless, little research attention has been paid to the factors that influence consumers' acceptance of FFs (Bech-Larsen & Scholderer, 2007). Particularly for the Italian market, empirical studies of consumer attitudes based on primary data collection (Del Giudice & Pasucci, 2010; Saba, 2001) are few and far between.

Moreover, a common result emerging from a literature review is that FFs from the consumer's standpoint are not perceived as being one homogeneous group (Urala & Lähteenmäki, 2003). It has thus been concluded (de Jong, Ocke', Branderhorst, & Friele, 2003) that the characteristics of FF users cannot be legitimately generalized, given the clear differences between consumers of different FF products.

Based on the preceding considerations, this article explores the factors that influence consumer attitudes toward FFs and verifies the existence of market segments formed by consumers with similar preferences by presenting the results of a quantitative survey conducted on 400 Italian consumers responsible for household food shopping.

General attitudes¹ concerning food, nutrition, and health; consumer awareness and interest in functional foods; motivation to buy this type of food or to reject it; and knowledge and beliefs about specific benefits of foods are analyzed in depth.

For this purpose, factor analysis (maximum likelihood, varimax rotation) was used to group different variables that affect consumer attitudes toward FFs into independent subsets (Beardsworth, Haslam, Keil, Goode, & Sherrat, 1999). Furthermore, in order to iden-

tify groups of consumers with similar attitudes toward FFs and nutrition, a hierarchical cluster analysis was performed on factor analysis results.

The current study was conducted in four Italian cities: Milan, Rome, Bologna, and Naples. For the data collection, a specific questionnaire was developed and administered to participants randomly recruited in shopping areas.²

Data generated in this way were submitted to exploratory, factor, and cluster analysis. Exploratory analysis provided a description of the sample interviewed through frequency analysis, the use of synthetic indicators (trend, means), and the cross tabulation of specific variables so as to identify the main differences amongst the consumer groups. Factor analysis verified the existence of latent factors that summarized consumer attitudes toward FFs, while cluster analysis was applied to develop a profile of consumers based on their higher or lower propensity toward FFs.

All analyses were conducted in the SPSS 15.0 statistical analysis program. All respondents were responsible for food purchasing within their household. This choice is reflected in the gender distribution with approximately 34% male and 66% female (see Table 1). Although this sample is not strictly statistically representative, it includes respondents with a wide variety of socio-demographic backgrounds. Moreover, the distribution of age and education closely match the distribution in the national population. Analysis of the main socio-economic variables shows that respondents are predominantly women (66.6%) and mostly in the 36-45 age group (22.5%). As for the educational level of respondents, a large number of consumers have a high school diploma (56.8%) or a bachelor's degree (30.2%). The data reveal that most interviewees are married or cohabit (60.4%), 31.6% of interviewees have children under the age of 12, and 26.6% have ill family members. Finally, with regard to occupation, 23% of respondents are employees, 21% are independent professionals, and 18% are housewives.

1. Attitude can be defined as a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor (Eagly & Chaiken, 1993). Since attitudes strongly affect food choice behavior, they can be used to explain consumers' food choices (Tuorila, 1997).

2. To determine the sample, a technique of simple random sampling for intermediate proportion was used. Setting 95.5% ($K=2$) as a confidence level and fixing the sample error at 5%, 400 personal interviews were carried out (100 per city).

Table 1. Socio-demographic profile of respondents.

	Sample	Population*
Gender		
Male	33.4	48.0
Female	66.6	52.0
Age		
18-25	9.8	8.5
26-35	17.7	17.0
36-45	22.5	19.8
46-55	19.2	17.8
56-65	17.9	16.2
66-75	8.7	9.6
Marital status		
Single	27.6	27.8
Married/cohabiting	60.4	62.5**
Separated/divorced	6.9	6.2
Widow(er)	5.1	3.5
Education		
Masters degree	9.6	
Bachelors degree	30.2	31.9***
High school diploma	56.8	57.0***
Middle school diploma	1.9	n/a
Other	1.5	n/a
Profession		
Employee	23.0	n/a
Self-employed	21.0	n/a
Doctor/paramedic	3.9	n/a
Housewife	18.5	n/a
Retired	4.8	n/a
Student	12.5	n/a
Trader	4.5	n/a
Unemployed	3.9	n/a
Other	8.7	n/a
Children <12		
Yes	31.6	
No	68.4	
Ill family member		
Yes	26.6	
No	74.4	

* Italian National Institute of Statistics data (ISTAT, 2007)

** Italian total married population

*** Eurostat and OECD data (2009) for the population of 25-64 year olds in 2007

Results

General Attitudes Concerning Food, Nutrition, and Health

The first part of the questionnaire was designed to assess the health awareness of respondents and observe whether and how this is reflected in their food purchasing and consumption habits. In order to analyze the existence of possible motivations behind possible food choices, we also ascertained the existence of any specific needs related to health problems and/or ethical reasons which might lead to greater attention to healthy living and food safety. About 51% of respondents claimed to be influenced in their food choice by specific requirements related primarily to specific medical disorders (overweight: 22%; allergies/intolerances: 8%; heart problems: 8%; diabetes: 5%), but additional respondents cited ethical reasons (vegetarian diet: 3%) and sports (5%). Through a series of specific questions, we sought to provide an assessment of the degree of healthy eating habits by asking consumers to indicate the frequency with which they consume fruits and vegetables, legumes and cereals, fried foods, soft drinks, snack meals, high-fat products, white meat, and fish and other seafood. Similarly, lifestyle was analyzed by asking respondents how often they watch television and do physical exercise, control their health, whether they consult a nutritionist or if they attend health centers, and if they have a job that forces them to stay seated for a long time. Outcomes were analyzed and summarized in an indicator of health ranging from 1 (very unhealthy) to 5 (very healthy).

The analysis shows that in most cases (36.4%) the eating habits of the respondents may be considered fairly healthy. As for lifestyle, although on average a healthy style of life prevails (40.7%), a higher incidence (26.6%) of unhealthy habits is recorded. Overall, respondents appear aware of the essential role played by their food choices in determining their health status: more than 48% strongly agreed with this statement while only about 2% of respondents did not agree (see Table 2); in 50% of cases are aware that the consumption of certain foods can result in beneficial effects on their health. In addition, the interviewees stated they did not agree at all (14.6%) or slightly agreed (20.6%) with the statement that it is possible to control their health status despite their food choices. In contrast, approximately 10% of respondents stated they controlled their own health regardless of dietary choices. As shown by Table 2, in many cases the respondents stated they

Table 2. Health awareness of the respondents.

Degree of agreement	None	A little	Middle	Good	Strong
My food choices are important in affecting my health.	0.3	1.79	19.7	30.15	48.06
I always choose the healthiest option, although it is more expensive.	5.0	13.2	31.8	20	30.0
Some foods have a beneficial effect on my health.	0.3	2.99	12.8	35.5	48.4
I have control over my health no matter what I eat.	14.6	20.6	31.04	23.8	9.8
I don't want to give up the foods that I like.	5.4	18	24.2	24.2	28

always preferred the healthier alternative regardless of price: they preferred the healthiest option always (30%) and often (20%) compared to conventional products. Only 5% of consumers said they always chose the conventional food product rather than the healthiest option. Although respondents revealed a preference for healthy products (50%), they were not always willing to give up their favorite foods to improve their health status. In particular, 28% of consumers were never willing to forgo their favorite food, compared to 5.4% who often went without and 18% that claimed to refrain often from favorite food products. Hence, despite being aware of the close connection between diet and health, the respondents are not willing to forgo the pleasure of what they eat.

Consumer Awareness and Interest in FFs

Taking into account consumer familiarity with FFs, the research tested the respondents' level of knowledge of such products and their purchasing frequency. Data analysis shows that consumers are not greatly informed on the concept of FFs. In many cases respondents created confusion with light and dietary products (20%), or FFs were incorrectly associated with food for those who have specific health problems (16%). Moreover, 24% of respondents were unable to provide a definition of FFs.

With respect to consumption frequency, 21% of respondents stated that they had never consumed these products, while 28% were occasional consumers, followed by those reporting a higher frequency of consumption (24%) and those reporting daily consumption (15%). The lowest absolute incidence (12%) is of those who stated they had tasted FFs only once. The respondents stated that they had never tasted these products, mainly because they did not know their properties (32%) but also because they were doubtful about their potential benefits (17%) or considered FFs only suitable for the sick (15%) or simply because they were not interested in this kind of product (15%).

In order to highlight the influence of socio-demographic characteristics on frequencies of FF consumption, a cross analysis was performed with the chi-square

test. Consistent with other studies (Verbeke, 2005), gender and age were not significantly associated with the degree of knowledge and frequencies of FF consumption. Conversely, education, presence of children under 12 years of age, and existence of an ill family member are variable that were significantly associated with knowledge (all $p < 0.05$); only presence of an ill family member was significantly associated with consumption frequency ($p < 0.01$). With regard to the latter, cross analysis shows that consumers who have an ill family member report a daily consumption of FFs in 68% of cases. Results show that the main sources from which respondents obtain information are through advertising (28%) and doctors/nutritionists (20%), followed by word of mouth (18%), product labels (12%), and television programs (10%). At the end of the ranking there is the Internet and the specialized press (7%), while only 5% of the information is acquired through public information campaigns. The sources in which respondents have most confidence are doctors and public entities, trusted by 42% and 39% of consumers, respectively, while a lesser degree of confidence is given to producers (trusted by 32% of consumers) and product labels (34%). As the respondents place greater inherent trust in the sources from which they receive the least amount of information, this would indicate that such sources need to be strengthened. Finally, we asked interviewees to express their opinion on the need to improve the current level of information and also indicate possible ways to do so by giving them several options. Almost all of the consumers (94.6%) would like more information; some consumers consider it necessary to implement information campaigns and increase public education (23%) and improve descriptions on nutritional labels (25.5%). In addition, some consumers (22.2%) would find it beneficial to introduce a logo or symbol that might draw attention to the health benefits of the food product.

Subsequently, the analysis focused on consumers who eat FFs and assessed their degree of familiarity with several products. To this end, respondents were shown eight different functional products and were asked to express their opinion on a five-point scale: 1= I do not recognize this product and 5= I use this product

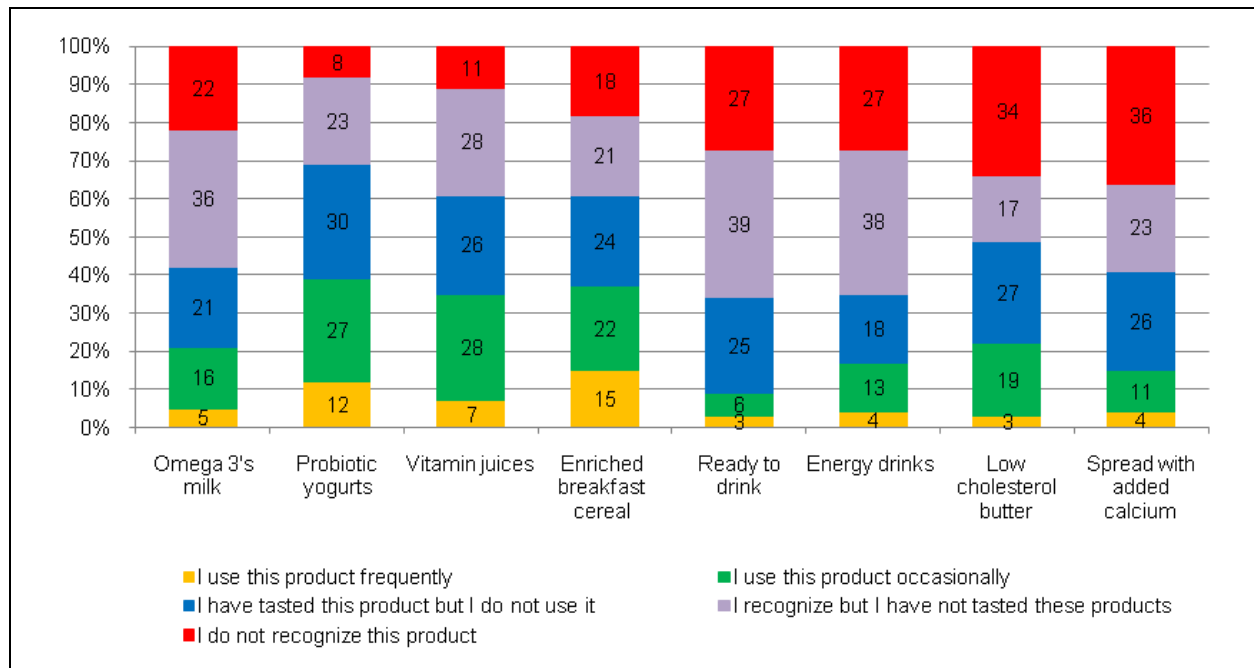


Figure 1. Degree of familiarity toward different FFs.

frequently (Figure 1). Our analysis highlighted that the least recognized FFs were a spread with added calcium (36%) and low-cholesterol butter (28%); the vast majority of respondents stated that they knew the energy drink, ready-to-drink beverage, and enriched milk but never tried these products. Conversely, we found that the most commonly consumed products were enriched cereals, probiotic yogurts, and vitamin juices.

Consumer Attitudes Toward FFs

Besides socio-demographics, attitude or beliefs have been demonstrated to explain many of the variations in consumer decision-making toward FFs (Verbeke, 2005). Through principal components analysis, we sought to verify the existence of latent factors that summarized consumer attitudes toward FFs in a smaller set of underlying dimensions that explain the inter-relations amongst an original, large set of metric variables. For this purpose, 24 FF-related statements were formulated based on the aspects found in previous FF studies: taste, pleasure, security, and familiarity (Del Giudice & Pascucci, 2010; Poulsen, 1999; Urala & Lähteenmäki, 2003, 2007; Verbeke, 2005, 2006). For each statement, respondents expressed their level of agreement on a five-point scale in which 1 = I strongly disagree and 5 = I strongly agree.

The variables to submit to factorial reduction were chosen on the basis of the analysis of the correlations existing among the original variables (verified using Bartlett’s test for sphericity), while the factors were chosen on the basis of the eigenvalue criterion, as well as consideration of the cumulative variance explained by the factors taken together. Principal components analysis with the varimax rotation method³ revealed the existence of three factors, which together explain 64.7% of the original variance. Table 3 presents the matrix of rotated components.

The first factor summarizes eight variables related to the perception of *healthiness of FFs* and explains 27.8% of the variance after varimax rotation. As shown in Table 3, this factor includes several statements that verify the respondents’ opinions about the potential benefits associated with the consumption of FFs. Upon analyzing the mean scores in Table 3, it is clear that the main focus of this dimension is that using FFs improves one’s health and promotes personal well-being. Therefore, respondents consider these products as foods that

3. *Varimax rotation (Kaiser, 1958) is an orthogonal rotation and tries to change the factor loadings in order to maximize the variance between the factor loadings for each factor. This type of rotation transforms the axes so that, for each factor, there are a few variables with high factor loadings, and several variables have factor loadings near zero or negligible.*

Table 3. Matrix of rotated components.

Variables	Mean	Factors			
		Perceived healthiness	Confidence	Satisfaction	Com*
FFs are likely to have a beneficial impact on my personal health.	3.6	0.835	-0.038	-0.134	0.740
FFs can repair the damage caused by an unhealthy diet.	3.2	0.777	-0.045	-0.134	0.590
FFs are intended only for those who have health problems.	2.1	-0.472	0.044	-0.143	0.696
FFs promote my well-being.	4.1	0.893	0.113	0.584	0.665
Consuming FFs improves my state of health.	3.8	0.653	0.231	0.598	0.767
I can prevent disease by eating FFs regularly.	3.2	0.384	0.166	-0.069	0.757
Functional foods make it easier to follow a healthy lifestyle.	3.3	0.301	0.251	-0.014	0.625
FFs contain unnatural substances.	2.4	-0.289	0.057	0.231	
FFs are more expensive than conventional.	4.2	-0.259	0.291	0.840	0.686
It is not easy to find these products.	3.8	0.179	0.239	0.534	0.652
The range of FFs on the market is limited.	4.1	0.204	-0.143	0.508	0.711
It's difficult to distinguish functional from conventional foods.	3.6	0.162	0.107	0.421	0.709
I enjoy eating FFs.	3.4	0.231	0.037	0.281	0.643
FFs taste worse than conventional foods.	2.8	0.332	0.204	-0.130	0.790
The information on the label is difficult to understand.	4.2	0.214	0.012	0.322	
FFs are simply a passing fad.	2.6	0.125	0.133	-0.131	0.810
FFs are completely unnecessary.	2.0	-0.374	0.173	-0.143	0.851
The safety of FFs has been very thoroughly studied.	3.4	-0.184	0.809	0.139	0.854
For a healthy person it is pointless to use FFs.	2.4	-0.288	-0.596	0.006	0.832
FFs are top science-based products.	3.8	0.847	-0.311	0.004	0.534
I fear that FFs may have side effects.	3.2	0.203	0.535	-0.102	0.722
I'm cautious about the consumption of FFs.	2.8	0.018	-0.133	0.069	0.697
I do not believe FF properties.	2.3	0.042	-0.104	0.067	0.668
FFs are completely safe.	3.2	0.062	0.566	0.432	0.526
If used in excess, FFs can be harmful to health.	3.7	-0.111	-0.265	0.389	0.762
I trust the information given about health effects.	2.4	-0.152	0.633	0.209	0.645
Eigenvalue		4.574	2.970	1.3900	0.646
Variance %		27.800	21.400	15.500	
Total variance %		27.800	49.200	64.700	

* Extraction communalities are estimates of the variance in each variable accounted for by the factors (or components) in the factor solution.

make it easier to follow a healthy lifestyle and prevent diseases. An interesting aspect to highlight is the negative correlation with statements such as 'FFs are intended only for those who have health problems' and 'FFs contain unnatural substances,' which probably indicates that respondents perceive these products as part of their daily diet.

The second factor contains nine items that describe consumers' *confidence* in FFs and explains 21.4% of the

variance. This factor describes individuals' trust in the safety of FFs and how far they believe the scientific basis of the information related to the health effects. What emerges from this factor is that respondents, while considering FFs to be top science-based products and safe, are suspicious toward possible harmful effects of FFs, mostly if they are extensively used. It is also worth pointing out that from analyzing the average scores assigned to the variables included in this factor, it is

Table 4. Factor mean scores between clusters.

	Cluster1 34%	Cluster2 26%	Cluster3 40%	F tests
Perceived healthiness	0.726	0.218	-0.349	72.230
Confidence	0.326	-0.632	-0.135	56.328
Satisfaction	0.521	0.298	-0.232	37.547

apparent that consumers are wary of the information provided on their health effects.

The third factor contains nine statements and describes the degree of consumers' satisfaction of FFs. This factor, which explains 15.5% of the original variance, includes statements that specifically reflect strictly personal feelings and judgments of the consumer with particular reference to the taste, price, and market availability of FFs. Interesting aspects that also emerge from the analysis of the mean scores of the statements included in this factor are that the respondents do not consider FF products completely useless or a passing fad, and they do not perceive these products less tasty than conventional. Nevertheless, they consider FFs as more expensive than conventional products, consider FFs not easy to find in the main food shopping outlets, and consider the current available product range quite limited. Moreover, respondents state that there are some difficulties in distinguishing functional from conventional products, noting the complexity of the information contained on the label. Consequently, high cost, scant availability, and limited range can be considered the main obstacles to purchasing these products. Based on the previously described three factors, a cluster analysis was created to verify the existence of homogeneous groups of consumers with different propensities toward FFs (Ares & Gambaro, 2007; Cox, Evans, & Lease, 2008; Hailu, Boecker, Henson, & Cranfield, 2009; Herath, Cranfield, & Henson, 2008). Anova analysis was performed to compare means between factors and several different variables, as well as personal motivations and socio-demographic aspects. The existence of differences between the clusters was evaluated using the chi-square statistical test. Using Euclidean distances and Ward's aggregation method, three clusters were identified. The results of the hierarchical cluster analysis performed on the factor are shown in Table 4.

Cluster 1 is composed of 136 consumers (34% of the sample); Cluster 2 groups 104 individuals (26%), and Cluster 3 includes 160 respondents (40%). Highly significant differences were found between cluster ratings and the three factors; the highest difference was found related to the perceived healthiness of FFs.

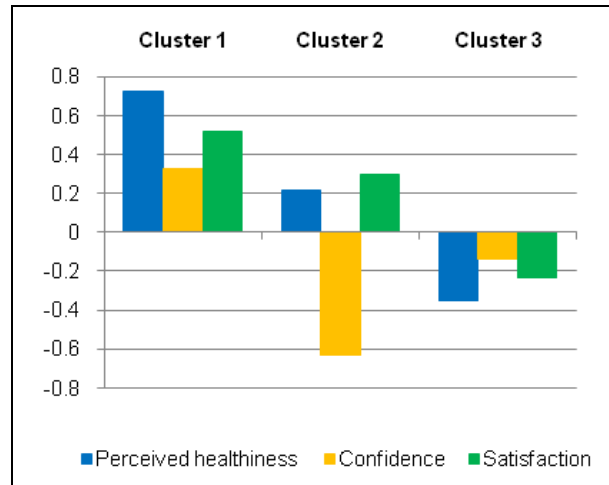


Figure 2. Cluster centers.

Individuals of Cluster 1 showed the highest level of perceived healthiness of FFs and confidence; consumers in Cluster 2 showed the lowest level of confidence in FFs but the highest level of satisfaction in these foods (Figure 2). Respondents in Cluster 3 showed a negative relationship with all of the three factors, particularly with the perceived healthiness. Therefore, the Cluster 1 includes consumers with a greater propensity toward FFs, as this group considers FFs useful for their health and trust the potential benefits and safety of these products. Cluster 2 groups individuals particularly doubtful on the effects of FFs, even if they deem these products as potentially useful for their wellness. Cluster 3 contains respondents with a negative perception of FFs concerning their utility, safety, and prospective benefits on health. Moreover, this cluster also shows a negative relationship with the variables that reveal the degree of satisfaction toward FFs. As a consequence, it is possible to hypothesize that this cluster has a minor overall knowledge of these foods.

These considerations are sustained by comparing in each cluster the percentages of individuals with a high degree of knowledge of enriched breakfast cereals (the most recognized product in our analysis). Figure 3 reveals that Cluster 3 is the one with the highest amount of individuals that do not recognize the product, while Cluster 1 groups a relevant percentage of respondents that consume it frequently.

No significant differences were found in the gender and age distribution of the clusters. Significant differences ($p < 0.05$) between clusters were found for the educational level. Cluster 1 showed a higher level of education, as there is a greater concentration of university graduates or individuals with a master's degree

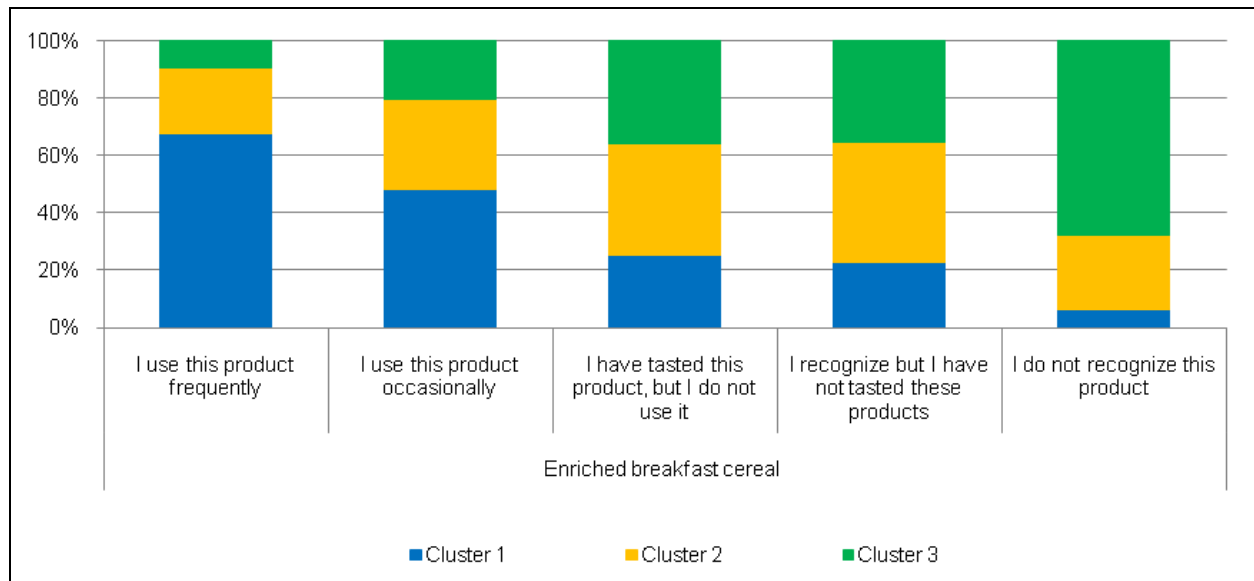


Figure 3. Enriched breakfast cereals consumption in clusters.

(respectively 27% and 22%), while Cluster 3 mainly includes respondents with a middle school diploma (43%).

Significant differences between clusters ($p < 0.01$) were also found for the variable related to the presence of an ill family member or a child under 12. Cluster 1 showed a great concentration of individuals with an ill family member (35%) and children under 12 (38.3%), while these percentages are lower in Clusters 2 and 3.

Discussion

Consistent with other studies (Bech-Larsen & Grunert, 2003; Cox, Koster, & Russell, 2004; Urala & Lähteenmäki, 2004; Verbeke, 2005), our research shows that cognitive, motivational, and attitudinal factors are potential determinants for consumer acceptance of functional foods. Our research, consistent with previous findings (e.g., Dagevos, 2005; Urala, 2005; Verbeke, 2005), proved the existence of homogenous groups of consumers with different perceptions of FFs and also confirmed that consumer demographic characteristics are only partially correlated with the acceptance of FFs (e.g., Verbeke, 2005).

Results of the explorative analysis reveal that Italian consumers are confused due to the ambiguity of what FF products are, despite having a marked awareness of the link between diet and health and a high level of interest in the nutritional and health aspects of their food choices. Similar findings were found in other studies conducted in other European countries. For instance,

Hilliam (1998) revealed that in the United Kingdom, France, and Germany, up to 75% of consumers had not heard of the term “functional food,” but more than 50% of them agreed to fortify functional ingredients in specific food products. Krygier (2007) found that while 49% of consumers were familiar with the term ‘functional food’ in Belgium, the same was true only for 4% of consumers in Poland. In addition, Szakaly, Szente, and Szigeti (2004) showed that in Hungary the expression ‘functional’ proved unknown for about 70% of respondents. In Italy, a recent study also demonstrated that most of the young consumers included in the sample stated that they had never heard of FFs (Del Giudice & Pascucci, 2010).

Moreover, previous studies have suggested that the acceptance of FFs also depends on the basic product that serves as a carrier for the functional ingredient. Our results indicate that Italian consumers are more familiar with fortified cereals, probiotic yogurt, and vitamin juice, showing less interest in spreads with added calcium and low-cholesterol butter. These findings confirm that consumers see products that are intrinsically healthy—such as yogurt, cereals, and juice—as preferable and credible carriers of FFs (Sirò et al., 2008). Similar outcomes are also shown by Poulsen (1999), who found that attitudes toward enrichment were generally more positive when the base product already contained the enriched substance, such as calcium in milk. Kahkonen, Tuorila, and Lawless (1997) and Bech-Larsen and Grunert (2003) reported that consumers perceive yogurt and orange juice as inherently healthy.

With regard to consumer demographic characteristics, our results highlight that gender and age are not significantly associated with the degree of knowledge and consumption frequency of FFs. In addition, the identified clusters do not significantly differ in their gender and age distribution. Conversely, other studies have shown that female consumers are a more promising target group for FFs than men (e.g., Urala & Lähteenmäki, 2007), partly due to their higher interest in health in general (Bogue & Ryan, 2000; Childs & Poryzees, 1997). Concerning age, Poulsen (1999) mentions that older participants in his research showed a greater intention to buy FFs; furthermore, Bhaskaran and Hardley (2002) suggest that older individuals show different attitudes with regard to health claims and the type of “functionality” compared to younger consumers. Therefore, these contradictory findings suggest that profiling FF consumers should not be generalized demographically. However, in unison with other studies (Anttolainen et al., 2001; de Jong et al., 2003), our results confirm that FF users are often more educated; significant differences between clusters were found regarding this variable. The existence of a family member with a specific health problem also positively affected the acceptance of FFs, as in Verbeke (2005).

Focusing on information about FFs, an interesting aspect that emerges from our analysis is that consumers would like more detailed news about these products, and they consider it necessary to implement information campaigns and public education activities, improve nutritional claims on labels, and also introduce a logo or symbol that might draw attention to the health benefits of the food product. Our results also show that consumer confidence in the information provided on FFs may vary according to source; that respondents had a high degree of confidence in information from doctors and public authorities, while a lower degree of confidence is afforded to producers. These results are consistent with the studies of Urala and Lähteenmäki (2003), who showed that Finnish consumers are very confident with health-related information coming from the authorities and quite confident with information from newspapers, retailers, and food manufacturers. Our findings also agree with those of Cox et al. (2008), who investigated the impact of information sources on novel products considered by Australian consumers; their findings suggest that the ‘information source’ attribute was fourth in relative importance for the sample. Our results support the idea that information sourced from a trusted, credible, and recognizable agency may have a positive impact on the valuation and the likelihood of acceptance

of FFs (Cox et al., 2008; Hansen, Holm, Frewer, Robinson, & Sandoe, 2003; Roe, Levy, & Derby, 1999). Therefore, one of the most important aspects for FF manufacturers is to communicate the health effects reliably to the final consumer (Jonas & Beckmann, 1998; Nicolay, 2003; Poulsen, 1999; Vieira, 2003). The consumers’ demand to include a specific logo on the label is particularly important to note, since at the moment in Europe the term “functional food” does not appear on food packaging,⁴ whereas in Japan there is a specific logo that identifies Foshu (Foods for Specified Health Use).

Investigating consumer attitudes toward FFs through the principal components analysis, we found three dimensions that recall some aspects found in previous FF studies (Poulsen, 1999; Urala & Lähteenmäki, 2003, 2007). In particular, our analysis showed the key role played by the perception of healthiness in determining the shoppers’ attitudes toward FFs. This means, in accordance with previous studies, that approval of FFs has a strong utilitarian connotation, as their usage should entail expectations of consequences (Batra & Ahtola, 1990). Many authors have stressed this component of FFs as their capacity to fulfill a more complex state of consumer wellbeing, which also implies psychological and mental aspects (Menrad, 2003; Niva, 2007; Roberfroid, 2002; Sirò et al., 2008). This view shows, once again, the key role of available information for the consumer in order to truly assess the healthiness of the products. This particularly holds for newly developed functional ingredients for which there are strong needs for specific consumer information and communication activities (Salminen, 2007; Van Kleef, van Trijp, & Luning, 2005).

The second factor found in our analysis concerns consumer confidence in FFs; it describes whether individuals feel these products are safe and to what extent they believe in the scientific basis underlying the information about their health effects. Also, Urala’s and Lähteenmäki’s (2004, 2006) research in Finland found that confidence in FFs seems to be the most crucial factor in consumers’ willingness to use these foods. Moreover, respondents were suspicious of possible harmful effects of FFs. We can thus state, in line with Frewer, Scholderer, and Lambert (2003), that from the consum-

4. *In Europe, the only step forward in legislation in this area was made in 2006 with the approval of EC Regulation No. 1924/2006 concerning nutrition and health claims on food products.*

ers' point of view, the perceived risks of FFs can be a strong barrier to the consumption of such products.

As for the satisfaction factor, our findings show that consumers do not perceive FFs less tasty than conventional products. This is an interesting outcome given that other consumer studies showed that one of the main conditions for acceptance of FFs is taste (Childs & Poryzees, 1997; Gilbert, 2000; Poulsen, 1999; Tuorila & Cardello, 2002; Verbeke, 2006). Urala and Lähteenmäki (2004) showed that the dimension describing consumer attitudes toward taste is strongly dependent on the dimension describing the reward from using functional products. Also, Del Giudice and Pascucci (2010) stated that in the "world of young consumers," hedonic characteristics of food—such as taste—still play a fundamental role. Our results also show that high price, difficult availability, and limited range can be considered the main obstacles to purchasing these products. With reference to high FF prices, examples of recently launched products indicate that consumers are only willing to accept limited price premiums for such products⁵ (Sirò et al., 2008). Therefore, relatively high price premiums can be regarded as one reason for the limited market success of several FF products introduced in recent years in Europe. Krystallis, Maglaras, and Mamalis (2008) also state that the demand for fairly-priced FFs by young adults could be an indication for companies to develop more tailor-made pricing policies for functional product types, targeting different consumer segments.

Cluster analysis based on the three factors revealed the existence of three groups of individuals with different degrees of interest in FFs. Therefore, to capture the best opportunities offered by the market, it would be necessary for FF producers to build targeted communication strategies. Particularly, only the consumers in Cluster 1 (34% of respondents) demonstrated a high propensity to consume FFs; conversely, Cluster 2 (26% of respondents) had a concentration of individuals who appeared dubious about these products, while Cluster 3 (the biggest cluster, with 40% of respondents) is characterized by individuals with a low propensity and interest in FFs. Since existing literature suggests that differences in preferences between individuals may relate to differences in nutritional knowledge (Bech-Larsen, Grunert, & Poulsen, 2001; Frewer et al., 2003), FF firms should

try to reach this cluster more effectively, providing more information on the health properties and usefulness of their products.

Conclusions

Consumer acceptance of the concept of FFs—and better understanding of its determinants—are widely recognized by the economic literature as key success factors for market orientation, development, and successfully negotiating market opportunities. Our findings reveal that respondents are confused due to the ambiguity of what FF products are, and that consumers perceive products that are intrinsically healthy (such as yogurt, cereals, and juice) as preferable and credible carriers of FFs. Through factor analysis we identified the existence of latent factors that summarize consumer attitudes toward FFs. Subsequently, cluster analysis highlighted significant differences between groups of consumers. These findings may be useful for government bodies interested in designing public health programs. In terms of marketing strategies, FFs need to be promoted with the aim of making them much more visible and recognizable to final consumers in order to avoid confusion with other generic health foods (such as light or diet products). Since the present analysis highlighted that the perception of healthiness is the main factor affecting consumer attitudes toward FFs, firms should focus their marketing strategies on reinforcing FF properties and trying to communicate them clearly and less scientifically. In this regard, and in line with findings elsewhere, the role of labelling should be strengthened; the introduction of a specific logo to signify these FFs could better distinguish such products on the market. Furthermore, taking into account the importance of consumer trust in health claims, more clearly defined policies need to be developed for FFs to avoid false health claims during the marketing process. In terms of public interventions, the results of our analysis suggest the need to focus mainly on education campaigns and communication since consumers have a high degree of confidence in the information conveyed by public authorities. However, such information is still scarce on a nationwide basis.

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5. In general, price premiums of 30-50% are observed in high-volume FF segments like functional dairy products or ACE drinks (beverages that are high in Vitamins A, C, and E; Menrad, 2003). However, for some products they can be as high as 500% (Kotilainen et al., 2006).

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