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Sugarcoating Food Technologies and consumers' acceptance of long-life fish

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Abstract:

Fish consumers are increasingly looking for sustainable, safe and healthy products. The aim of this work is to evaluate the effect of informative messages on consumers' acceptance of shelf-life extension on fresh packaged fish. In order to examine the effect of informative messages on consumers' acceptance, an on-line survey on the acceptance of shelf life extension (SLE) technology by 10 days on fresh fish has been carried out. A sample of 530 consumers from Northern and Southern Italy was asked to evaluate a fictional portion of fresh Orata fillets presented as packaged by using SLE technology. The subsequent observation of the outcome of the survey highlights that different information strategies may moderate negative attitudes towards food technology applied to fish industry. The study presents a limitation that should be underlined. As the survey was conducted in the Italian context, results may lack of external validity. Thus, we expect to integrate the information obtained from this preliminary study with new surveys that could be focused on understanding the determinants of this attitudinal structure. Thus, studies investigating the interventions to increase food technology acceptance may help to reduce consumers' skepticism towards food innovation.

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Abstract

Fish consumers are increasingly looking for sustainable, safe and healthy products. The aim of this work is to evaluate the effect of informative messages on consumers' acceptance of shelf-life extension on fresh packaged fish. In order to examine the effect of informative messages on consumers' acceptance, an on-line survey on the acceptance of shelf life extension (SLE) technology by 10 days on fresh fish has been carried out. A sample of 530 consumers from Northern and Southern Italy was asked to evaluate a fictional portion of fresh Orata fillets presented as packaged by using SLE technology. The subsequent observation of the outcome of the survey highlights that different information strategies may moderate negative attitudes towards food technology applied to fish industry. The study presents a limitation that should be underlined. As the survey was conducted in the Italian context, results may lack of external validity. Thus, we expect to integrate the information obtained from this preliminary study with new surveys that could be focused on understanding the determinants of this attitudinal structure. Despite some research limitations, the research provides an adequate starting point in the study of food neophobia in fish sector and the study of the relation between the effect of different informative messages and consumers' acceptance of long-life fresh fish fillets. Thus, studies investigating the interventions to increase food technology acceptance may help to reduce consumers' skepticism towards food innovation.

Keywords: Food technologies, consumer perception, shelf-life extension, fish fillet, Italy

1. Introduction

Consumers are increasingly looking for sustainable, safe and healthy products (Fiore et al., 2017). In this sense, a shelf-life extension (SLE) that increases the global sustainability of food products with no loss in terms of sensory characteristics and nutritional value could be a positive attribute of food product. On the other hand, consumers often oppose new food technologies, due to natural aversion to novelties. In particular, fish consumers may not appreciate the innovation in fresh packaged fish, because of very traditional food purchasing habits.

However, innovations, above all technological ones, are the most efficient way for sustainable development (Esbjerg *et al.*, 2016). On one hand, the firms possess the knowledge and the resources to develop new products and services, on the other hand inventing is an expensive activity that presents many risks, especially to private companies.

The Eurostat report on Innovation statistics (Release, March 2017) affirms that during the period 2012-2014, less than a quarter of the surveyed European firms introduced a new product on the market (23.9%). The vast majority of non-innovators (83.0%) stated that they had no motivation to innovate and, when asked, the most frequent deterring factor was the low level of market demand (68.3% of

non-innovators), followed by the low level of market competition (63.0%), previous innovations (61.3%) and lack of ideas (56.8%). These data suggest that consumers' attitudes towards novel products prevent industry to invest on R&D department.

This opposition to novel products can be also explained by a natural consumers' aversion to the risk, and specifically the risk of buying something that may not satisfy their expectations (Faraji-Rad *et al.*, 2017; Steenkamp *et al.*, 1999; Shimp and Bearden, 1982). Sjöberg (2000) also highlights the importance to consider and to take into account the risk denial theory that refers to a cognitive way.

Due to this aversion to novelties, consumers often presents the so called food technology neophobia, i.e. they oppose food technologies. In the last two decades, a growing interest has been shown by agricultural economists and consumer analysts with regards to this consumers' aversion of new technologies applied to food products; indeed some authors highlight food innovation can increase social welfare in term of increased safety and security, better taste, more convenience at lower price and improvement of nutritional properties (Lusk *et al.*, 2014).

According recent research (Guinè *et al.*, 2016), the latest progresses and its significant outcomes are registered in the processing technologies and packaging systems that represent two relevant and crucial areas of innovation in the food industry. Food technology neophobia has several facets either relate to consumers' reluctance to try novel food products either to accept new production and processing technologies (De Steur *et al.*, 2016; Cox & Evans, 2008). Nonetheless, personal value systems and issues of trust characterizing lay consumer risk perception and attitudes may change according to different treatments, such as information (Contò *et al.*, 2016; Ueland *et al.*, 2012; Evans & Cox, 2006). For instance, Chen *et al.* (2013) demonstrate that information about the positive and negative potential properties of a vacuum packaging of beef steaks can play an important role in positively shaping consumers' attitudes towards the new packaging by also increasing the willingness to pay.

Nonetheless, consumers demonstrate negative attitudes towards the most relevant innovation introduced in the food sector. For instance, considering few items in the list provided by Lusk *et al.* (2014), it is likely that the people that consider fast food as the unhealthiest food choice are more than those that think that it is a revolutionary restaurant that serve cheap menus in all part of the world invented in 1940 by Mc Donald's Corporation. A similar paradox applies to genetically modified food, that are part of the daily diet in US and enter in the European food supply chain as feed for animals, but still recall uncertainties in consumers' mind (Costa-Font *et al.*, 2008). The same reasoning can be extended to functional food (Siro *et al.*, 2008), nano-technologies (Siegrist *et al.*, 2007) or irradiation (Cardello *et al.*, 2007).

Mainly for humans' risk aversion, despite the expected social benefits deriving from new technologies, firms propose less new products than they could because they cannot be sure that their products will be accepted by consumers. It is to be noticed food technology neophobia can also depend on personality trait of people and context in terms of their tendency to accept or avoid new foods: indeed some authors (Schnettler et al., 2017) highlight the relationship among food technology neophobia, satisfaction with life, food-related life because technologies may be rejected outright, without regard to the product in which they are embodied. Then, factors, such as natural content, ethical, environmental, political issues, and surroundings and suitability of foods in given experimental situations seem to be relevant when people are considering novel food technologies (Damsbo-Svendsen et al., 2017; Evans & Cox, 2006). Therefore, food technology neophobia is a really tricky issue especially in the fish industry where there is a huge heterogeneity of fish products (Gaviglio et al., 2014) that possibly make fish consumers more and more aware and worried about safety, nutritional and healthy issues.

The public and private interest for innovation, encouraged researchers to analyze the determinants of consumers' skepticisms of foods containing new technology. By the opposite point of view, their works share the objective of finding an efficient strategy to increase consumers' acceptance of new products. Part of the literature in this field is devoted to the effect of information on the attitudes towards new food technologies or specific products made with a new food technology. Stiff (1986) demonstrate, by making use of the Kahneman's Elastic Capacity Model, there is a positive linear relationship between the level of message recipient involvement and the effect of central message cues on attitudes. If an informative message releases positive thoughts, an increasing confidence in those thoughts increases persuasion to buying (Petty & Cacioppo 1986; Petty et al., 2002).

Furthermore, a recent work (Barsics et al., 2017) shows how the presentation of a breadth of information about ecological, health, and gastronomic aspects could surely modify consumer attitudes so by affecting the acceptability of novel food as the entomophagy products.

Then, Jaeger et al. (2014) conducted some focus groups and measured that information increase positive attitudes and decreased negative attitudes towards pasteurization, pulsed electric field technology, high-pressure and micro-pulse treatment. These results are in line with the study by Olsen et al. (2010) that find that attitudes increase with the provision of persuasive message and information on technologies applied to food. In another study on US consumers, Cardello et al. (2007) focus on the information framing and found that the introducing a new food as 'cold preserved' or 'minimally processed' had a different impact on attitudes, with consumers preferring the cold preserved over minimally processed product. Nonetheless, probably depending on type of products, message provided and sample the

information may be not effective in changing attitudes. In a recent study by Barsic et al. (2017) the effect information had on the evaluation of a new bread made with an insect-based flour versus a standard bread and found that information affected the overall liking, the perceived flavor and the appearance of the breads, but did not affect its perceived odor. By studying Chinese consumers' attitudes, Lee et al. (2016) find that technology information has a positive impact on consumers' preferences for untreated and high hydrostatic pressure processed apple juice, while information did not improve the acceptance of the pulsed-electric field treated product.

Regarding the fish sector, Altintzoglou et al. (2014) demonstrate that information regarding thawed cod fillet products should be carefully communicated. Fresh fish remains at the top of consumers' aspirations, regarding fish; however, a label that defines times related to freezing (after catch) and defrosting directly may surely lead to an improvement of the image of previously frozen cod fillet products.

The present paper contributes to the literature by testing the impact of persuasive messages on the acceptance of a shelf-life extension technology applied to a fresh fish product. An on-line survey on the acceptance of shelf life extension (SLE) technology by 10 days on fresh fish has been conducted. Specifically, participants valued a fictional portion of 400g of fresh Orata fillets (Sea Bream – *Sparus aurata*) that was presented as packaged using SLE. Two information treatments randomized between subjects have been introduced in order to evaluate the effect of an informative message on consumers' acceptance of SLE. Further specifications on material and methods are discussed in the following paragraph. Then the results are presented and a final section is dedicated to the conclusions of the main findings in relationship with the recent literature.

2. Materials and Methods

2.1. Experimental design

The investigation was conducted in Italy from January to June 2017 using the Qualtrics® platform. It is based on two consecutive steps. The first step was a pilot study where both experts of fish products (34) and lay people (52) responded to a qualitative questionnaire describing the perceived gains and losses of the proposed food technology in order to select the items for the product evaluation in the questionnaire¹. The second step is the main study described in the present paper and involved an on-

¹ For sake of brevity, the methods and results of the pilot study are not described here, for those interested, information is available upon request.

line survey distributed in North and South of Italy. At the end of the survey, out of 530 participants engaged, 418 (78.9%) filled in the questionnaire acceptably.

Participants to the survey valued a fictional portion of 400gr of fresh sea bream fillets (*Sparus aurata*) that was presented as packaged using SLE. A specifically created picture of the product was presented during the survey with a claim indicating the “10 extra-days” of shelf-life guaranteed by the new technology. Furthermore, each respondent was randomly assigned to an experimental group characterized by a specific message aimed at persuading consumers of the goodness of the technology. According to the objective of the research, the information treatment has been introduced in order to test the effect of message on consumers’ acceptance of SLE. As described in Table 1, people who has been randomly assigned to the first treatment represent the *Control* group, in fact they received no additional information a part of the description of the product. The second treatment informed consumers that SLE guarantees 10 extra-days of shelf life with no change in terms of product, this group of consumer has been coded as *Info_Q*. The third treatment informed readers that SLE helps in decreasing food waste, which involves gains in term of economic, social and environmental impact. People assigned to this treatment composed *Info_W* group. Finally, the fourth treatment contains both the information provided by the second and third treatment, thus, these participants are coded as *Info_Q+Info_W* group. It is worth noting that this experimental design allows to estimates the effect of informative message in term of type of information provided (*Info_Q* vs *Info_W*) and in term of quantity of information provided (*Control* vs *Info_Q*; *Control* vs *Info_W*; *Control* vs *Info_Q+Info_W*). The measure of consumers’ acceptance of fresh sea bream fillets packaged using SLE followed the information treatment. Consumers stated his/her perception of the product on three dimensions that have been decided according to the pilot study’s results and estimated as follows:

1. Overall liking of the technology. This dimension is measured by a 10-point semantic differential scale, that describes the perception of convenience of the SLE (disadvantage vs advantage);
2. Overall linking of the product. This dimension is measured by the mean of the stated agreement with 7-point Likert scales on four statements referring to the fresh sea bream fillets. Specifically, the items used are: ‘The product is attractive’, ‘I would recommend it to my friends and relatives’, ‘I would buy it’ and ‘It looks good’;
3. Perception of specific characteristics of the product. Seven semantic differential scales that captures the perception of different attributes of the product measure this dimension. These

scales refer to: ‘taste and smell’, ‘environmental friendliness’, ‘healthiness’, ‘easy of cooking’, ‘easy of storing’, ‘naturalness’ and ‘freshness’. These seven items are used separately in the analysis to accounts for the perception of the different characteristics that make up the product.

The questionnaire contains three more section. The first one is devoted to the analysis of the acceptance of new food technologies, estimated via the Food Technology neophobia Scale (FTNS - Cox & Evans, 2008), the measure of food technology knowledge and the determinants of food choice, estimated using the Food Values (FV - Lusk and Briggeman, 2009). Two final sections devoted to socio-demographics and fish consumption habits information of each respondent completed the survey.

[INSERT TABLE 1 AROUND HERE]

2.2. Research hypothesis and data processing

The present research starts from the formulation of the hypothesis that a positive persuasive message would increase consumer’s attitudes towards the product. According to this reasoning, table 2 presents a first group of hypothesis that can be generalized as follows:

[H1] Consumers’ attitudes towards the product increase with information and, specifically, the more the information, the better the evaluation of the product.

A second hypothesis has been proposed on the moderating role of individuals’ food technology neophobia on the effect of information on attitudes. This hypothesis is:

[H2] The individual’s FTN scale moderates the effect of the informative message in changing consumers’ attitudes towards the product

[INSERT TABLE 2 AROUND HERE]

No hypothesis are formulated *a priori* on the different impact between different types of information provided in the case of *H1*, nor on the sign of the moderation effect of the FTN scale on the effect of informative message in *H2*. Similarly, according to the focus of the present study, authors did not articulate any hypothesis on other consumers’ demographics; rather, they are used as control variables in the estimation.

All data processing has been performed using IBM SPSS software. In order to test *H1*, a generalized linear model (GLM) has been run for each attitude measure considered. In addition to the information treatment, individual’s FTN scale and the demographics, the Food Values are used in the models. As

described in the following paragraphs, they enter the estimation as individual factor scores of the two factors obtained by a principal component analysis (PCA) run on the scale whose results are presented in Appendix A. A part of testing *H1*, this step of the estimation explores the determinants of consumers' attitudes towards the innovative products. A moderation analysis of the individual's FTNS on the impact of information on consumers' attitudes follows the GLM estimation in order to test *H2*. In this step, the Model 1 of the PROCESS package (Hayes, 2012) has been used to calculate the significance and sign of the interaction of treatments and NFTN on attitudes.

3. Results

3.1. Descriptive statistics

The final characteristics of the sample are shown in Table 3. It consists in 418 respondents aged between 18 and 81 years (Mean= 37.22; SD=12.91), 221 of whom are female, representing the 52.9% of the total. The family counts primarily 3-4 members (224; 53.6% of the total) with mainly with children between 13-18 years (48.3%). Most of the respondents are resident in Inland flat area (258; 61.7%) and Internal mountain/hills (92; 22.0%), Coastal sea areas (68; 16.3%) are the less represented in the sample. The vast majority of the sample has a monthly household's income of 4.000€ at maximum (336; 87.6%) and, finally, 216 respondents possess a Bachelor degree or higher (51.7% of the total). Compared to the consumers that reasonably represent the target for the innovative fish product, the sample seems adequately representative in terms of age, gender, residence and composition of the households. Nonetheless, as for the majority of internet surveys, the education level does not reflect the distribution of the variable in the Italian population. Possibly due to self-selection and non-response bias, this characteristic of the sample causes a decrease in term of expected generalization to the whole population (Hudson et al, 2004; Schonlau *et al.*, 2009) and reproducibility of the results (Aarts *et al.*, 2015). On the other hand, as suggested in a study on fish perception by Gaviglio *et al.* (2014), the use of control variables in the models helps in isolate the effect of the information treatment excluding accounting separately for the education characteristics of respondents.

[INSERT TABLE 3 AROUND HERE]

3.2. Impact of information on consumers' attitudes towards the innovative product

The results of the estimation of the effect of different informative messages on consumers' attitudes towards the innovative fish product are reported in table 4. As briefly described in paragraph 2.2, each

item used for the evaluation of the SLE technology, the product and its characteristics enters one generalized linear model as dependent variable. According to the questionnaire's sections, the independent variables are presented in four blocks. The information treatments compose the first block of variables and are the fixed factors of the models. A second block of covariates gathers the individual FTNS score, the stated previous knowledge of the technology and the factor scores of the components extracted by PCA analysis on the Food Values.

The results show that the majority of the hypothesis formulated in *H1* can not be accepted. In fact the informative messages did not affect the evaluation of the technology, the overall liking of the product and the perception of its 'environmental friendliness', 'healthiness', 'easy of cooking', 'easy of storing', nor 'freshness'. All control variables considered the information possesses a significant impact only the measure of perceived 'taste and smell' and 'naturalness'. Specifically, looking at the parameter estimates, the message provided increased the evaluation of "taste and smell" in the *Info_Q* and *Info_Q + Info_W* groups, while *Info_W* group's evaluation was the same of Control's one, while, with regard to the evaluation of naturalness, the only group that shows a significant increase was the *Info_Q + Info_W*. These results indicate that the informative messages tested are on the average not effective in changing consumers' attitudes. Furthermore, the fact that two of three significant effects are measured in the *Info_Q + Info_W* condition suggests that giving the variation depends on quantity rather than type of information provided.

[INSERT TABLE 4 AROUND HERE]

Interesting results are highlighted by the analysis of the other determinants of consumers' attitudes considered in the model. Firstly, FTN scale is always significantly and negatively linked to measures of attitudes. Conversely, the first component extracted by the PCA on Food Values items (FV_FAC1), is significantly positively related to the dependent variables, but 'ease of cooking', 'naturalness' and 'freshness'. The second component of the Food Values (FV_FAC2) and the previous knowledge of the technology are not as relevant as these covariates. In fact, FV_FAC2 significantly contributes to the explanation of the overall linking of the product, and its perception of 'taste and smell' and 'environmental friendliness', while previous knowledge contributes to the explanation of the perception of 'environmental friendliness' of the product.

A second remarkable trend is shown by the role of socio-demographic characteristics of respondents. Looking at Table 4, they show no relationships with any of the attitudinal measures studied, with the exception of the geographic area of residence, that is significantly related to the overall liking of the

technology showing differences between inland and coastal or mountain/hill residents. Consumption habits show a similar fashion. They do not show a clear contribute in explaining differences in consumers' attitudes towards the fresh fillets. The majority of the significant determinants are found in the explanation of the overall liking of technology, that is negatively related to purchasing at traditional fish shops and the consumption of whole fresh fish and codfish, while it is positively related to purchasing at supermarket and consumption of fresh fish fillets. Overall liking of the product is explained positively by the consumption of frozen fish recipes and salmon. Perception of 'environmental friendliness' and 'ease of cooking' negatively relate to the consumption of frozen fillets or whole fish respectively. Finally, positive significant relationships are measured between the perception of 'taste and smell' and consumption of fresh fillets; 'healthiness' and 'ease of cooking' and consumption of anchovies and sardines; and 'naturalness' and consumption of fresh fillets.

[INSERT TABLE 4 AROUND HERE]

3.3. Moderating role of Food Technology Neophobia on the impact of information on consumers' attitudes

Considering the relevance of neophobia in food choices, a second hypothesis was formulated at the beginning of the study on the its moderating role on information treatment. Building on the previous evidences, the moderation analysis has been performed exclusively on those attitudinal measures that was explicated by information treatment and FTN scale, i.e. the perception of 'taste and smell' and 'naturalness'.

The results of the test of *H2* are expressed in Table 5. The hypothesis must be rejected because the interaction between the two independent variables is not significant. According to the statistical analysis, informative messages increase the attitudes and individual neophobia decrease the acceptance of the fresh fillets packaged with SLE technology, but there is no additive or subtractive action of FTN on information treatments. This trend is evident in Figure 1; here the average measures of perception of 'taste and smell' and 'naturalness' in the four experimental groups are presented considering a median-split of the sample based on FTN scale individual score. The growing shapes of the figures demonstrate that attitudes increase with messages, while the differences between 'not neophobic' and 'neophobic' respondents represent graphically the relevance of FTN with regard to consumers' attitudes towards innovative products, at least in the present case study. The fact that in

both graphs the ‘not neophobic’ and ‘neophobic’ lines growth approximately in parallel shows that the interaction between the two terms is not to be considered significant.

[INSERT TABLE 5 AROUND HERE]

[INSERT FIGURE 1 AROUND HERE]

4. Discussion and conclusions

These results confirm the differences found in previous literature on Italian consumption of fish (see Cosmina *et al.*, 2012; Gaviglio *et al.*, 2014) and suggests that different consumption patterns may moderate attitudes towards technology applied to fish industry. Thus, different marketing strategy and industry policy should be considered in different territories. Interestingly, the same effect is found in the overall liking of the fictional product presented, but it is not found in the explicit evaluation of its specific characteristics. This could be due to fact that simple information may act in increasing simple overall positive attitude towards foods, while if consumers are told to express their ideas about rationale features such as “how much the product is fresh or preserved” the information impact is diluted by deeper reasoning. Therefore, marketing and policy intervention should not target specific characteristics of the product, but take advantage of intuitive and easy reasoning of consumers.

Providing information surely affects the evaluation of consumers by reducing the information gap (Barsics *et al.*, 2017; Contò *et al.*, 2016): self-validation effects are most likely in situations that foster high amounts of information processing activity (Petty & Cacioppo 1986; Petty *et al.*, 2002). According the previous literature, promotion that is made suitable for the specific product and the product’s consumer can be a key element in fostering and improving the level of acceptance (Fiore *et al.*, 2017). Thus, exploring how consumers reason and perceive the different food innovations, by providing exposure to visual product characteristics, can be a topic to be further addressed (Evans & Cox, 2006; Grunert, 2002). Food products innovation success in the market depends on consumers’ perception and acceptance and finally on easy reasoning. Hence, the inclusion of the consumers in the innovations development process becomes crucial in order to minimize failure probabilities (Guinè *et al.*, 2016).

Regarding some possible implications, in accordance with a relevant study on the topic (Evans & Cox, 2006), manufacturers may be wise to pre-empt any “discovery” of novel technologies use and create adequate marketing strategies to communicate products’ innovation by preventing consumers’ reluctance. Indeed, research on the image of fish, the processing and the risk of low trust in some information sources highlights that communication about fish products should be carefully designed (Altintzoglou et al., 2014).

Finally, it is necessary to underline some limitations of the study depending on Italian context of the survey that does not allow an expansion of external validity. Nevertheless, this paper represents a good starting point in investigating food neophobia in fish sector and in analyzing the relation between the effect of different informative messages and consumers’ acceptance of long-life fresh fish fillets.

Finally, even if the research findings must be confirmed by deeper statistical analysis, the trends suggest further studies. Specifically, attitude towards the new technology are not simply affected by the informative messages. It is at least interesting to notice that a list positive or irrelevant changes on products’ attributes perception does not sum up in a positive change in the overall liking of the product. Further studies can deal with a subsequent survey based on understanding the determinants of this reasoning structure.

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Tables

Table 1. Informative message and number of subjects per experimental group

<i>Experimental group</i>		<i>Information treatment</i>	<i>Collected</i>		<i>Valid</i>	
			<i>n.</i>	<i>%</i>	<i>n.</i>	<i>%</i>
1	Control	No info	133	25.1	103	24.6
2	Info_Q	The interest in this technology is that it enables to lengthen the product's conservation with no loss in term of qualitative properties	139	26.2	111	26.6
3	Info_W	The interest in this technology is that it reduces product waste with a good impact in economic, environmental and social terms	128	24.2	97	23.2
4	Info_Q+Info_W	The interest in this technology is that it enables to lengthen the product's conservation with no loss in term of qualitative properties and reduce product waste with a good impact in economic, environmental and social terms	130	24.5	107	25.6
Total			530	100.0	418	100.0

Table 2. Hypothesis on the effect of the informative message on the evaluation of the product on the different dimensions considered

		Control		Info_Q		Info_W		Info_Q+InfoW
Overall liking	Technology	<		Technology	=	Technology	<	Technology
	Product	<		Product	=	Product	<	Product
Attributes evaluation	Taste and smell	<		Taste and smell	=	Taste and smell	<	Taste and smell
	Environment	<		Environment	=	Environment	<	Environment
	Health	<		Health	=	Health	<	Health
	Easy cooking	<		Easy cooking	=	Easy cooking	<	Easy cooking
	Easy storing	<		Easy storing	=	Easy storing	<	Easy storing
	Naturalness	<		Naturalness	=	Naturalness	<	Naturalness
	Freshness	<		Freshness	=	Freshness	<	Freshness

Table 3. Characteristics of the sample.

	<i>n.</i>	<i>%</i>		<i>n.</i>	<i>%</i>
			Age	Household income (€ per month)	
18-25 years	95	0.23	< 1.000	60	0.14
26-35 years	117	0.28	1.000-2.000	143	0.34
36-45 years	87	0.21	2.001-4.000	163	0.39
46-55 years	79	0.19	4.001-6.000	29	0.07
over 56 years	40	0.10	> 6.000	23	0.06
			Gender	Household size	
Male	197	0.47	1	46	0.11
Female	221	0.53	2	90	0.22
			Education	3	0.23
First and secondary school	20	0.05	4	129	0.31
High school	182	0.44	5+	58	0.14
Bachelor degree	46	0.11			
Master Degree or higher	170	0.41	No	Children in the household 0–12 years	0.74
			Yes	109	0.26
			Residence Area	Children in the household 13–18 years	
Coastal	68	0.16		No	0.52
Inland flat	258	0.62		Yes	0.48
Inland hilly/mountainous	92	0.22			

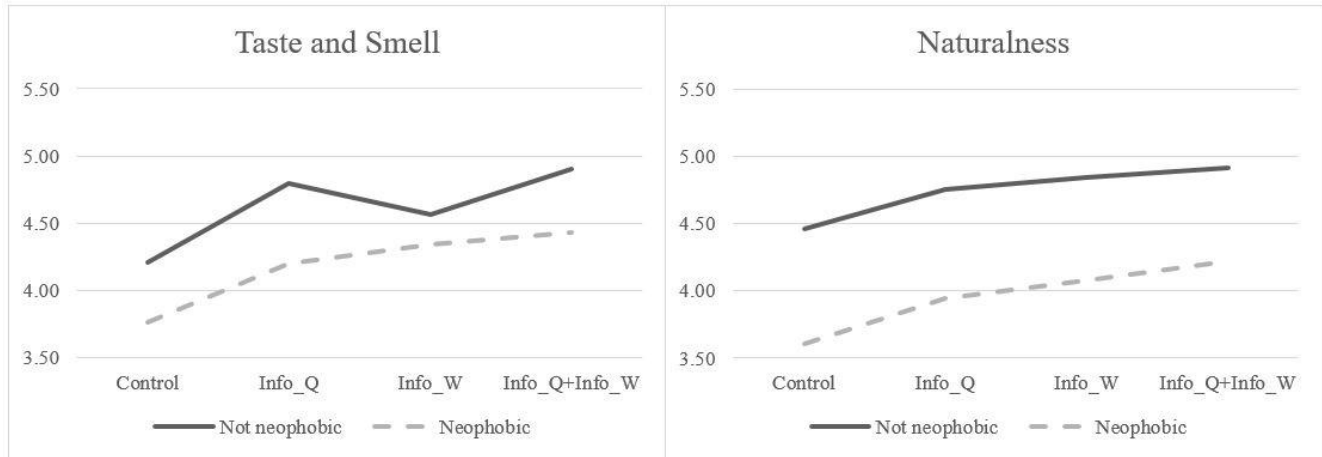
Number of subjects in the survey= 418

Table 5. Results of the moderation analysis of the role of food technology neophobia scale on the impact of the information treatment on consumers' attitudes

	<i>Information treatment</i>		<i>Food technologies neophobia scale</i>		<i>Info*FTN</i>	
	<i>t</i>	<i>Sig.</i>	<i>t</i>	<i>Sig.</i>	<i>t</i>	<i>Sig.</i>
Taste and smell	3.134	0.002	-4.939	0.000	0.110	0.913
Naturalness	2.154	0.032	-6.433	0.000	-0.286	0.775

Figure

Figure 1. Mean of the evaluation of Taste and Smell and Naturalness depending on informative treatment and neophobia



Appendix A - Results of Principal Component analysis on Food Values items

Table A1. Total Variance Explained by Principal Component Analysis

<i>Component</i>	<i>Initial Eigenvalues</i>			<i>Extraction Sums of Squared Loadings</i>		
	<i>Total</i>	<i>% of Variance</i>	<i>Cumulative %</i>	<i>Total</i>	<i>% of Variance</i>	<i>Cumulative %</i>
1	5.19	47.21	47.21	5.19	47.21	47.21
2	1.37	12.41	59.63	1.37	12.41	59.63
3	0.87	7.87	67.49			
4	0.61	5.51	73.00			
5	0.58	5.28	78.28			
6	0.57	5.19	83.47			
7	0.43	3.93	87.40			
8	0.41	3.71	91.11			
9	0.36	3.30	94.41			
10	0.34	3.05	97.45			
11	0.28	2.55	100.00			

Table A2. Component Matrix

	<i>Component</i>	
	<i>1</i>	<i>2</i>
Naturalness	0.819	-0.176
Taste	0.773	0.137
Price	0.542	0.509
Safety	0.816	0.096
Convenience	0.437	0.590
Nutrition	0.725	-0.153
Tradition	0.677	-0.282
Origin	0.788	-0.217
Fairness	0.506	-0.434
Appearance	0.592	0.538
Environment	0.750	-0.266

Note: Based on responses on 7-point Likert scale to the answer "How important are to the following characteristics of a food when making your diet choices?" - from 1: Not important at all, to 7: Absolutely Essential