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## Understanding Consumer's Attitude on Fish Quality and Marketing Aspects in the Greek Market

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### Abstract

*During the last decade the Greek fish market experienced significant changes affecting both the supply and the demand of fish. Fisheries have faced significant problems, such as overfishing and low productivity. Similarly, the undoubtedly rapid development of the aquaculture sector was followed by an intense competition and low prices for fish. On the other hand, the traditional Greek consumer's attitude on fish products is rapidly changing mainly due to socio-economic factors. Within this framework, the consumers play a critical role that of being the link between supply and demand. Thus, the analysis of the consumer's attitude concerning basic quality and marketing aspects on marine captured and farmed fish market could be a useful tool towards a more rational organization of the distribution roots. For this purpose, research was carried out and a total of 395 consumers, randomly selected in terms of demographic and socio-economic dispersion criteria, were asked to fill in a questionnaire covering aspects of fish marketing and quality aspects, such as consumers' "sensitivity on fish freshness issues", "sensitivity on marketing issues" and "reasons for choosing fish as food" in their family. regarding Data were statistically analyzed using categorical regression in an effort to identify the effect of basic classification variables of consumers' origin and socio-economic status into their sensitivity on fish quality and marketing aspects.*

**Key words:** Fish market, consumer survey, fish marketing issues, categorical regression

### Introduction

During the last 15 years, the aquaculture sector in Greece showed rapid development and currently constitutes a dynamic sector of primary production. At the same time, fisheries have faced significant problems such as overfishing and low productivity (Greek Ministry of Agriculture, 2000).

Aquaculture sector was rapidly developed in Greece, satisfying the increased consumer demand for fisheries products, but was also followed by significant structural

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problems resulting in low prices received by the producers (Batzios et al., 2002a, b). This price compression for the basic varieties of Greek fish-farming on one hand and the subsequent increase in demand on the other, have pushed many Greek companies to reorganize their management plans concerning public health, food quality aspects, etc.

Moreover, the profiles that historically constituted the expression of Greek consumers are rapidly changing during the last decades, due to socio-economic changes, such as the spectacular improvement of the standards of living, the great expansion of media, the entry of woman in the labour market, the economic immigrants, the promotion of biological products, etc. (Tserveni-Gousi et al., 1997; Karassavoglou, 2002). Thus, in regard to fishery products, we could notice requirements for new ways of distribution, special packing, certificate of quality, etc (Batzios et al., 2002a).

The reasons for particular food choices are complex and diverse and food consumption, like any other complex human behaviour, is influenced by many interrelating factors, as food quality aspects (e.g. flavor, texture, odor), characteristics of the individual (e.g., personality, preferences, attitudes, perceptions, knowledge), etc (Furst et al., 1996; Olsen, 2001). The consumers' preferences and interests are always of the foremost importance for aquaculturists, leading to an improvement of aquacultural techniques and producing food, which is considered by the consumer as attractive and acceptable.

In this frame, the fish consumer constitutes an important link between supply and demand. The knowledge of his preferences might catalytically contribute in the improvement of the terms of production and fish distribution, and the quality of the cultivated species and their processed products (e.g. development of know-how and technical infrastructure, increase of production). Finally, the agricultural food industries, including fish farming and agricultural science, must not avoid the debate, since consumers are expected to be more involved in a dialogue concerning issues that affect their lives (Garnier et al. 2003).

Health is another issue, frequently mentioned as a reason for specific food choices. The emphasizing role of health is a growing trend. People differ in their interest in health issues. General health interest measures how important is the healthiness in food choices. Fish and seafood have been promoted as healthy eating by governments, marketing boards and private seafood companies for several decades in many countries all over the world (Olsen, 2003). The number of food poisoning cases in the developed world is growing rapidly and we have not yet reached the safety levels expected by consumers. Thus, farm hygiene must be a fundamental part of food safety (Garnier et al., 2003).

Therefore, the objective of the present study is to analyze the relationship of psychological variables, such as consumers' attitudes and preferences toward eating fish on the base of socio-economic and demographic dispersion criteria. Attitudes are expected to influence the behaviour of fish consumers (i.e. the more positive the consumer's attitudes to eating fish, the more likely they would consume them) and it is an important psychological construct that influences and predicts other behaviours. More specifically, the study focuses on the investigation of the consumers' preferences concerning basic quality and marketing aspects of marine captured and farmed fish market, where there is relatively limited information on how fish consumers' attitudes are influenced by demographic and/or socio-economic dispersion criteria. The research is considered as particularly topical, in the frames of the intense competition and the continuously expanding fish market. Useful information could be extracted about the structure of the

consumers' attitude on fish, which might help decision makers for a better planning of production and improvement of distributing roots.

### Materials and methods

Greek consumer's attitudes towards fish consumption were investigated with the application of a formal questionnaire (Arabatzis and Anagnos, 2002). The methodology used is described in detail in Batzios et al. (2002a & 2002b) and can be summarised as follows. A total of 395 consumers, randomly selected in terms of socio-economic and demographic dispersion, were asked to fill in a questionnaire that was addressed to the householder of each interviewed family.

The survey incorporated, among else, three key questions covering basic fish «quality and marketing» aspects, such as consumers' "sensitivity on fish freshness issues", "sensitivity on marketing issues" and "reasons for choosing fish as a food in their family". The first key question ("sensitivity on fish freshness issues") basically comprises a "multi-thematic" variable that covers basic items that characterise fish as fresh. More specifically, the consumers were asked to declare which of the following criteria of freshness they examine, when buying fish, in general: "eyes", "gills", "odour", "body stiffness", "body secretions", "belly swelling", "body cohesion" and "skin condition". All the above items were of dichotomous scale and the respective scores were attributed: "no"=1 and "yes"=2.

Regarding the second key question ("sensitivity on marketing issues"), subjects were asked to declare the level of importance they give to the following themes/items: "freshness", "conservation conditions", "meat taste", "packaging", "price", "quality assurance certification", "availability" and "fish origin", when buying farmed fish, and "freshness", "hygienic conditions of the fish shop", "package", "price" and "fish origin", when buying marine captured fish. Three levels of importance were used and the respective scores were attributed: "not important"=1, "important"=2 and "very important"=3.

Furthermore, regarding the third key question ("reasons for choosing fish as a food in the family"), consumers were asked to answer the following dichotomous items: "tradition", "fish is considered as healthy food", "taste" and "high nutritional value of fish", with the respective scores attributed: "no"=1 and "yes"=2.

Data was statistically analysed using the categorical regression method and addressing criteria of respondent's origin and socio-economic status, such as "place of residence", "net monthly family disposable income", "age", "sex", "education level of the householder", "profession of the householder", "marital status" and "number of children in the family". In particular, regarding the respondent's origin, data was split into three groups, namely 1=urban, 2=semi-urban and 3=rural areas of residence. With respect to the disposable net monthly disposable family income (converted from Greek Drachmas), data was split into five groups: 1=< € 1028, 2= € 1028-1320, 3= € 1321-1760, 4= € 1761-2348 and 5=> € 2348, while with respect to the level of the householder's age, data was split into four groups; 1=<36 years old, 2=36-50 years old, 3=51-65 years old and 4=>65 years old. Furthermore, data was split into four groups according to the householder's level of education, 1=elementary education, 2=secondary education, 3=higher education and 4=postgraduate, while according to the householder's marital status, data was split into two groups: 1=married and 2=single. Finally, with respect to householder's profession, data was split into seven groups: 1=agriculturists,

2=technicians, 3=industrial and construction workers, 4=freelance professionals (doctors, lawyers etc.), 5=civil servants, 6=private employees and 7=other professions.

The categorical regression method with optimal scaling constitutes an improvement and extension of the classic linear regression method. As a multivariate statistical method, it quantifies data of categorical variables by attributing numerical values to the categories, resulting to an optimal linear regression equation of converted variables. Thus, it is possible to make forecasts of the values of a dependent variable for any combination of a set of independent (classification) variables (Young et al., 1976; Kooij and Meulman, 1997; Siardos, 2000: ch. 15). The effect of each of the classification variables on the dependent variable is described with the corresponding regression coefficient. For testing the colinearity into the model, the Pratt's measures of relative importance and tolerance were used. A variable with very low tolerance contributes little information to a model, and can cause computational problems.

For handling the multi-thematic variables, a reliability analysis of the items/themes involved in each of them was first conducted. Reliability analysis refers to the property of a measurement instrument that causes it to give similar results for similar inputs. Cronbach's alpha coefficients is a measure of reliability, which is defined as the proportion of variability in the responses to the survey that is the result of differences in the respondents (Cronbach, 1951). All analyses were carried out using the statistical package SPSS 8.0 (SPSS, 1999).

## Results

The analysis of the collected data shows that there is a quite good distribution of the respondents regarding the criteria of origin and socio-economic dispersion (place of residence, sex, marital status, profession, education level, age and income level). Table 1 presents the structure of the sample based on the above classification variables.

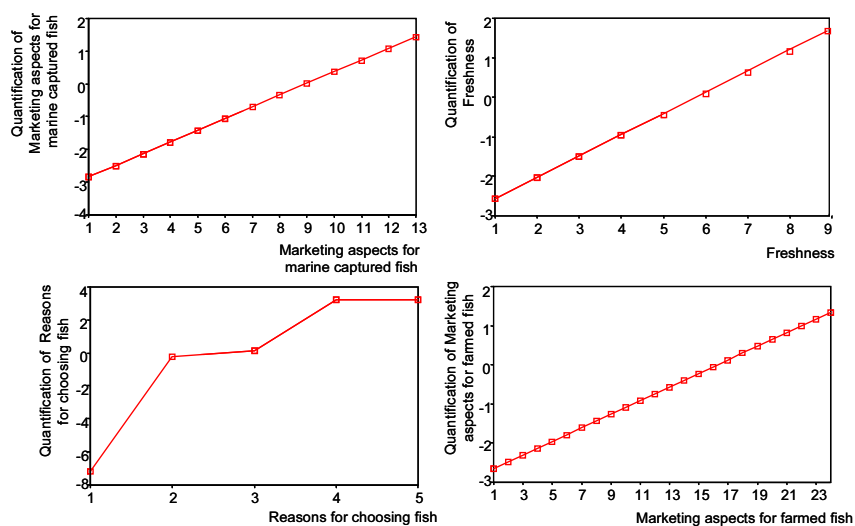
The internal reliability, measured by Cronbach's alpha coefficient, for the key question "sensitivity on marketing issues" was relatively low (0.40) for marine captured fish, indicating a weak internal consistency, while for the farmed fish was quite high (0.66), signifying a strong internal consistency. Regarding the key questions "sensitivity on fish freshness issues" and "reasons for choosing fish as a food", the measured Cronbach's alpha coefficients indicated a quite good internal consistency (0.68 and 0.94, respectively).

The statistical indices, calculated for the overall evaluation and validity of the applied categorical regression models, resulted in relatively moderate values of multiple R and statistically significant F values of the ANOVA tests (level of significance:  $\alpha=0.05$ ). More specifically, a value of 0.44 was estimated for the model of the key question "sensitivity on marketing issues" regarding the marine captured fish, while for marine farmed fish the respective model resulted in a 0.38 value of multiple R. Furthermore, regarding the models of the key questions "sensitivity on fish freshness issues" and "reasons for choosing fish as a food", the estimated values of multiple R were 0.31 and 0.36, respectively.

Regarding the F values of the ANOVA tests, a value of 8.385 (df:  $v_1=6$ ,  $v_2=212$ ) was estimated for the model of the key question "sensitivity on marketing issues" regarding the marine captured fish, while for marine farmed fish the respective model resulted to a 5.987 value of F (df:  $v_1=5$ ,  $v_2=181$ ). Moreover, regarding the models of the key ques-

**Table 1.** Sample structure based on the respondents' origin and socio-economic dispersion criteria

<i>Classification variable</i>	<i>%</i>	<i>Classification variable</i>	<i>%</i>
<b>Sex</b>		<b>Marital status</b>	
Male	43.4	Married	74.7
Female	56.6	Single	25.3
<b>Age</b>		<b>Education level</b>	
< 36	32.7	Elementary	14.8
36-50	44.4	Secondary	38.1
51-65	17.8	Higher	42.4
> 65	5.1	Postgraduate	4.8
<b>Profession</b>		<b>Income (in €)</b>	
Agriculturists	6.6	< 1028	25.7
Technicians	7.4	1028-1320	21.0
Workers	4.8	1321-1760	21.8
Freelance professionals/scientists	23.8	1761-2348	17.9
Civil servants	14.6	> 2349	13.6
Private employees	29.7	<b>Place of residence</b>	
Others	13.1	Urban	76.2
		Semi-urban	8.6
		Rural	15.2

**Figure 1.** Quantification plots of the key question “sensitivity on marketing issues” estimated for marine captured and farmed fish and of the key questions “sensitivity on fish freshness issues” and “reasons for choosing fish as a food”

tions "sensitivity on fish freshness issues" and "reasons for choosing fish as a food", the estimated values of F were 3.231 (df:  $v_1=7$ ,  $v_2=207$ ) and 6.679 (df:  $v_1=5$ ,  $v_2=230$ ), respectively. All F values indicate that the categorical regression models are acceptable (Fig. 1).

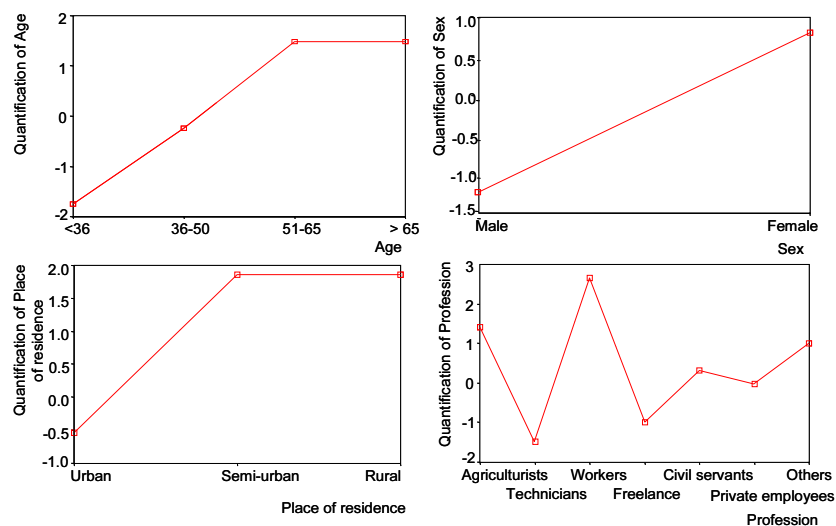
Table 2 presents the most important results of the methodology applied, regarding the key question "sensitivity on marketing issues" for the marine captured fish. The estimated categorical regression model showed that the beta coefficient of each of the independent variables was in accordance with the presence of the remaining independent variables. The deletion of an independent variable from the regression model, together with the presence of the remaining independent variables, reduces the predictability of the model. Consumers' age, profession and place of residence are the classification/independent variables with the highest significant beta values in the model and the largest importance to the predictability of the model (47.4%, 22.5% and 21.5%, respectively). Sex education and income exhibited lower importance to the predictability of the above model (5.5%, 1,6% and 1,5%, respectively). The tolerance values of the regression model were very high indicating lack of multicollinearity (Table 2).

**Table 2.** Categorical regression model of the key question "sensitivity on marketing issues" estimated for marine captured fish

<i>Independent variables</i>	<b>Standardized coefficients</b>		<i>F values</i>	<i>Importance</i>	<i>Tolerance</i>
	<i>Beta</i>	<i>S.E.</i>			
Sex	0.078	0.064	1.499	0.055	0.930
<b>Age</b>	-0.300	0.063	22.801	<b>0.474</b>	0.965
<b>Place of residence</b>	0.228	0.068	11.333	<b>0.215</b>	0.834
Education level	0.108	0.070	2.386	0.016	0.777
Income	0.103	0.068	2.296	0.015	0.817
<b>Profession</b>	0.231	0.064	13.226	<b>0.225</b>	0.941

From the quantitative categorical values of the independent variables and the signs of beta values (Table 2), it is concluded that these variables have negative or positive impact to the «marketing aspects» tension (Fig. 2). In particular, the young consumers are more sensitive than the older ones (> 51 years old). Consumers of the rural and semi-urban places exhibited a similar pattern. Moreover, female consumers are more sensitive to "marketing aspects" issues compared to male consumers. Furthermore, agriculturists, industrial and construction workers and civil servants are more sensitive than the technicians, the freelance or the private employees.

The results of the categorical model for the key question "sensitivity on marketing issues", estimated for the marine farmed fish, showed that the beta coefficients of each of the independent variables was in accordance with the presence of the remaining independent variables and its deletion from the model reduces the predictability of the model significantly. The "sensitivity on marketing issues" is highly depended on four independent variables, those of sex, age, profession and place of residence and less depended on marital status (Table 3). Sex seems to have the largest importance to the model's predictability (35.4%) followed by age, profession and place of residence



**Figure 2.** Category quantification plots of the key question “sensitivity on marketing issues” estimated for marine captured fish against the independent variables of age, place of residence and profession

**Table 3.** Categorical regression model of the key question “sensitivity on marketing issues” estimated for the marine farmed fish

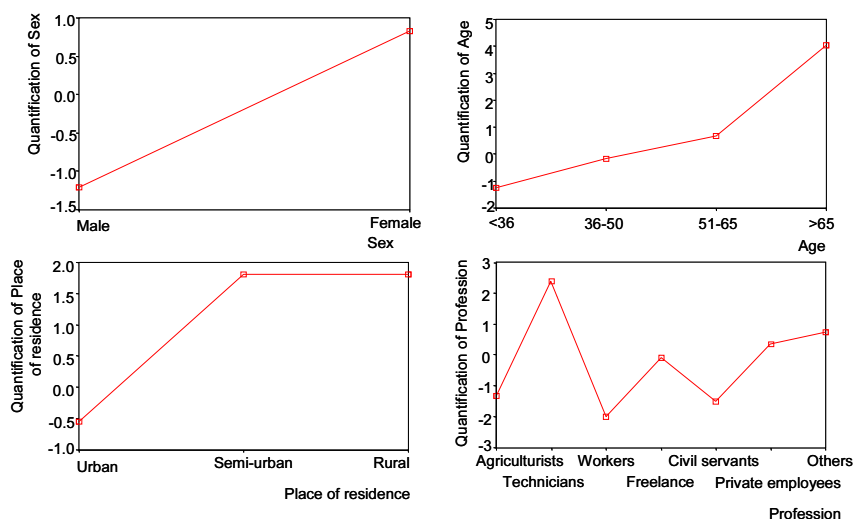
<i>Independent variables</i>	<i>Standardized coefficients</i>		<i>F values</i>	<i>Importance</i>	<i>Tolerance</i>
	<i>Beta</i>	<i>S.E.</i>			
<b>Sex</b>	0.201	0.070	8.136	<b>0.354</b>	0.954
<b>Age</b>	-0.177	0.070	6.403	<b>0.253</b>	0.970
Marital status	0.030	0.070	0.180	0.015	0.973
<b>Place of residence</b>	0.124	0.071	3.025	<b>0.144</b>	0.939
<b>Profession</b>	-0.169	0.069	5.926	<b>0.234</b>	0.989

(25.3%, 23.4% and 14.4%, respectively). The tolerance values of the regression model are extremely high, indicating lack of multicollinearity.

From the quantitative categorical values of the independent variables and the beta values (Table 3) it is concluded that these variables had negative or positive impact to «marketing aspects» tension (Fig. 3). In particular, female consumers are more sensitive than male ones. The relatively elder consumers (< 50 years old) are less sensitive compared to younger consumers. In addition, consumers from semi-urban and rural places are more sensitive than the urban ones. Regarding consumers' profession, the agriculturists, industrial and construction workers and civil servants are more sensitive than the technicians, freelance, private and other employees.

Regarding the categorical regression model for the key question "sensitivity on fish freshness issues", the beta coefficient for each of the independent variables was in





**Figure 3.** Category quantification plots of the key question “sensitivity on marketing issues” estimated for the marine farmed fish against the independent variables age, sex, place of residence and profession

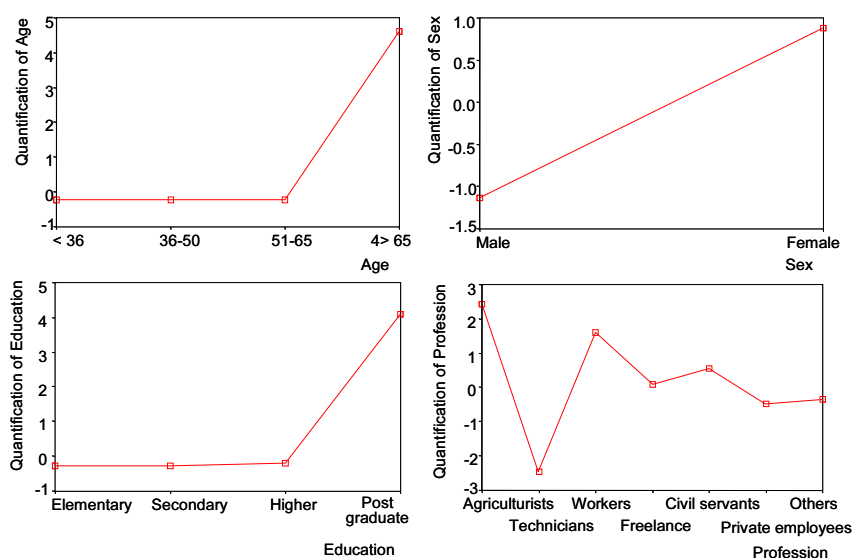
accordance with the presence of the remaining independent variables. The deletion of any of those variables from the model reduces the predictability of the model. Profession, age, education level and sex are the variables with the higher beta values (Table 4) and with the higher importance to the model’s predictability (37.3%, 22.7%, 17.3% and 17.2%, respectively). The tolerance values of the model were very high, indicating lack of multicollinearity.

**Table 4.** Categorical regression model of the key question “sensitivity on fish freshness issues”

<i>Independent variables</i>	<i>Standardized coefficients</i>		<i>F values</i>	<i>Importance</i>	<i>Tolerance</i>
	<i>Beta</i>	<i>S.E.</i>			
<b>Sex</b>	-0.134	0.067	3.999	<b>0.172</b>	0.965
<b>Age</b>	0.164	0.068	5.834	<b>0.227</b>	0.950
Place of residence	0.081	0.070	1.315	0.026	0.893
Number of children	0.025	0.067	0.136	0.008	0.975
<b>Education level</b>	-0.161	0.071	5.076	<b>0.173</b>	0.857
Income	0.094	0.074	1.628	0.021	0.805
<b>Profession</b>	-0.210	0.067	9.707	<b>0.373</b>	0.957

From the quantitative categorical values of the independent variables and the beta values, it is concluded that the impact of those variables to «quality aspects» tension

(e.g. freshness) is negative or positive (Fig. 4). More specifically, male consumers are more sensitive than the female ones. The elder consumers are also more sensitive to «quality aspects» than the younger ones. Similarly, technicians, freelance and private employees show higher sensitivity in «quality aspects» than other consumers. Furthermore, the consumers of elementary, secondary or of higher education show quite similar behaviour.

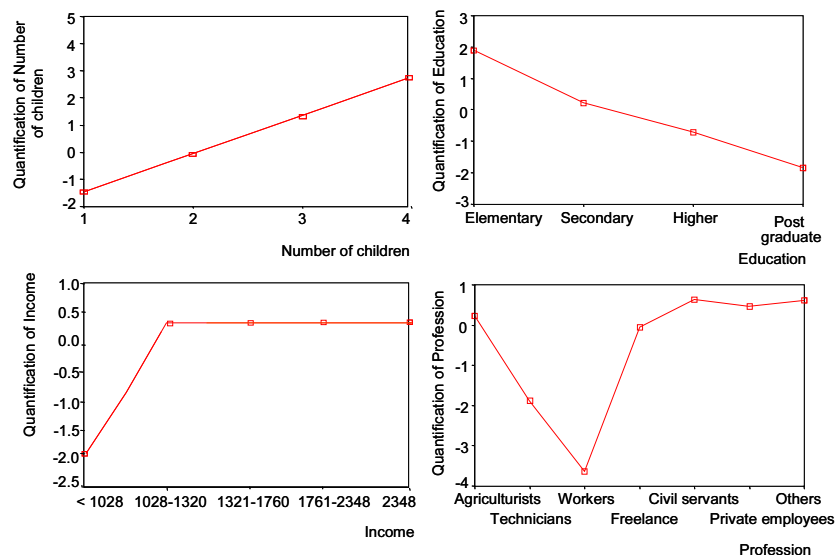


**Figure 4.** Category quantification plots of the key question “sensitivity on fish freshness issues” against the independent variables of marital status, place of residence, education and profession

Regarding the last key question studied (“reasons for choosing fish as a food in the family”), the results of the categorical regression model show that consumers’ attitude is highly depended on profession, education level and number of children in the family, but less on income or sex (Table 5). The number of children is evaluated as the classifi-

**Table 5.** Categorical regression model of the key question “reasons for choosing fish as a food” estimated for marine captured and farmed fish

<i>Independent variables</i>	<i>Standardized coefficients</i>		<i>F values</i>	<i>Importance</i>	<i>Tolerance</i>
	<i>Beta</i>	<i>S.E.</i>			
Sex	0.028	0.063	0.199	0.016	0.959
<b>Number of children</b>	0.246	0.063	15.444	<b>0.415</b>	0.966
<b>Education level</b>	-0.147	0.069	4.538	<b>0.186</b>	0.800
Income	0.075	0.067	1.231	0.079	0.835
<b>Profession</b>	0.184	0.062	8.700	<b>0.304</b>	0.979



**Figure 5.** Category quantification plots of the key question “reasons for choosing fish as a food” against the independent variables number of children, education, income and profession.

cation variable with the largest importance to the model’s predictability (41.5%), followed by profession (30.4%) and education level (18.6%). The tolerance values of the model were very high confirming lack of multicollinearity.

From the quantitative categorical values of the independent variables and the beta values (Table 5) it is concluded that the above classification variables have negative or positive impact on the key question studied (Fig. 5). More specifically, consumers with a relatively high number of children in the family or consumers of higher or post graduate educational level consider items such as “tradition”, “fish is considered as healthy food”, “taste” and “high nutritional value of fish” as reasons for choosing fish as a food in their family, contrary to consumers of lower family size or educational level.

## Discussion

This study provides quite interesting information about the consumers’ attitude on fish market, revealing the effects of various socioeconomic and demographic criteria. In general, consumers’ sensitivity on fish freshness issues or on marketing issues as well as their attitude on basic reasons for choosing fish as a food in their family are significantly affected by criteria such as sex, marital status, age, profession, education level, place of residence etc.

The resulting fish choice process model seeks to portray consumers’ conceptualisation underlying their food choices. Independently of marine captured or marine farmed fish, the consumers’ sensitivity on marketing issues significantly depends mostly on age, profession and place of residence, while for farmed fish consumers’ sex is considered also to play an important role. Consumers from semi-urban and rural or relatively younger consumers or workers and civil servants are more sensitive on marketing as-

pects, than other consumers, independently of marine captured or farmed fish, but with different levels of importance attributed to each type of fish.

Female consumers are more sensitive to marketing issues for farmed fish compared to males, probably because women usually act as householders responsible to buy and prepare the fish meal for the family. Households provide the most important sets of interpersonal relationships influencing food choice. The householders' "role" is to interact and negotiate with the larger food system, to acquire food that would meet the needs and desires of the members of the households, even if they sometimes discount their own preferences (Furst et al., 2001). Therefore, having one shared meal, family members are more or less "forced" to eat what the householder buys. This situation gives reasons for the householders not only to listen to their family, but also take them seriously and incorporate their attitudes into their motivational aspects.

Younger consumers exhibit higher sensitivity on marketing aspects, probably because they are usually better informed about marketing issues. This fact might contribute to an increasing demand for the so called healthy and nutritious seafood products. Moreover, the experience of making food choices over the course of life led to consumers developing personal profiles for food choice. Thus, the nature of fish choice decisions is subject to fluctuation over the life course, depending upon the consumers' changing life roles, capabilities, income level, state of health and level of independence (Furst et al., 2001). In addition, the consumers' sensitivity on fish marketing aspects is negatively affected by age, with elder consumers being less sensitive, probably due to the fact that the shopping and food preparation of a fish meal demands more time than other types of food. Time is an important component of convenience and consumers often consider time as a commodity to be spent or saved (Furst et al., 2001).

Furthermore, the fact that consumers of rural and semi-urban areas are sensitive to marketing aspects could be explained by their relatively greater proximity to fish availability, especially in coastal areas or islands. Finally, the consumers' profession found to significantly affect their sensitivity on marketing aspects, with the agriculturists, industrial and construction workers, as well as civil servants being more sensitive, probably because they consider "price" as a marketing aspect of high importance.

With respect to the key question "reasons for choosing fish as a food in the family", both individual (i.e. moral obligations) and social factors are involved in food choice. Specifically, the results revealed that consumers with a relatively high number of children in the family or consumers of higher or post graduate education consider the items such as "tradition", "fish is considered as healthy food", "taste" and "high nutritional value of fish" as reasons for choosing fish as food for their family. The presence or absence of children in the family differentiates the social constructs of the householder within the restricted conceptual framework of seafood consumption behaviour. Social norms force people not to perform a particular task, like cooking seafood as a family dinner, but the moral obligation of a person may have another motivation to perform a behaviour for other reasons, like giving to the family a "healthy food" of a food of "high nutritional value" (Furst et al., 1996, Olsen, 2001). Also, higher educated consumers (or post graduate) are better informed about concepts of nutrition and health issues than those of lower education and they link their attitude in deliberating with their food choices.

Regarding consumers' attitude on fish "quality aspects", as it is expressed by their "sensitivity on fish freshness issues", profession, age, education level and sex are the

variables of higher importance. Male consumers and/or elder consumers are more sensitive than others. This can be attributed to the fact that quality, apart from other key questions, carries a different meaning for different individuals. Similarly, technicians, freelance and private employees show higher sensitivity in «quality aspects» than other consumers, while the consumers of elementary, secondary or of higher education show quite similar behaviour.

The findings of this study could help policy makers interested in nutrition aspects, educators and clinicians improve dietary behaviour and consumers seek greater understanding of their own food choices. They could also be useful tool for a more rational organization of the distribution roots, which in turn would promote fish consumption.

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