Evaluation of seafood product concepts by young adults and families with young children from Denmark, Norway and Iceland

Altintzoglou T.* 1, Sveinsdottir K. 2, Einarsdottir G. 2, Schelvis R. 3 and Luten J.B 1

1 Nofima Marine, Nofima, Tromsø, Norway;
2 MATÍS, Reykjavík, Iceland
3 IMARES, Wageningen UR, IJmuiden, the Netherlands;

*Corresponding author; Themistoklis Altintzoglou; Nofima Marine, Muninbakken 9-13, PoBox 6122, N-9291 Tromsø, Norway; tel: 004777629220, fax: 004777629100, email: themis.altintzoglou@nofima.no

Abstract

This paper describes the results of a study that tested fourteen seafood concepts among young adults and families with young children in Denmark, Norway and Iceland. This study aimed at gaining insight into the acceptance of new seafood product concepts by individuals with low seafood consumption. Based on consumer-reported values and previous concept-testing, fourteen seafood product concepts were tested by 296 consumers in a web-based experiment.

Consumers' preferences depended on the size of fish offered, the presence of information and fish species offered. Young adult consumers evaluated the product concepts differently than parents of young children. Three consumer clusters, based on attitudinal variables, were identified explaining the differences in the evaluation of the product concepts. The outcome of this study will be used to develop o product for realistic in-home test.

Keywords

Consumer attitudes; fish consumption; new-seafood-product-development; Nordic; product-concept-evaluation; seafood.

Introduction

Seafood has been an important source of protein and fatty acids in Nordic countries. The importance of seafood has been especially evident in coastal regions, resulting in significant occupation and expertise with respect to its acquisition and handling. The term seafood is used in this paper to describe wild and farmed, finfish, crustaceans and shellfish, both of marine and freshwater origin in fresh, frozen and processed product forms (Jaffry et al., 2004). Besides the established tradition with seafood in the specific region, seafood has been broadly known for its health benefits. A recent review (Undeland et al., 2009) described that regular seafood consumption lowers the risk for coronary heart disease.

Due to the benefits of seafood consumption on health, public health organisations in various countries recommend that fish should be consumed at least two times per week ("Advice on fish consumption: Benefits and Risks," 2004). However, the average fish consumption in Europe is considerably less frequent than recommended by the public health organisations. The average fish consumption in Europe was reported as 20.8 kg (live weight equivalent per capita) in 2005 (FAO, 2009), which means that fish consumption frequency was around once per week, estimated using average fish serving sizes (Einarsdottir et al., 2007). Even in Nordic countries with a significant fisheries sector, fish consumption is below the recommendations, especially for young adults and/or families with young children (Myrland et al., 2000; Similä et al., 2003; Steingrímsdóttir et al., 2002). These measured findings match what European consumers report about their seafood consumption (Honkanen et al., 2005).

Seafood consumption can be influenced by many factors. Factors reported are product quality (Verbeke et al., 2007), consumer attitudes towards choosing fish for a meal (Brunsø, 2003), involvement with seafood (Olsen, 2001), consumer food choice habits (Honkanen et al., 2005), beliefs about risks and benefits related to health (Verbeke et al., 2005), convenience (Olsen, 2003; Olsen et al., 2007; Rortveit and Olsen, 2007) and finally, available time and cooking skills (Altintzoglou et al., 2010; Shepherd et al., 2006). These factors can lead to barriers to seafood consumption. However, these are also the parameters one can improve in order to increase the acceptance of new products, including seafood products, by the consumers (Cooper, 1999; Morrissey, 2006). A recent study with consumer focus groups in Norway, Iceland and Denmark (Altintzoglou et al., 2010) resulted in nine consumer values

which are relevant for the development of new seafood products. These values were: healthiness, satiation, convenience, visibility & trust, freedom of choice, successful preparation, image improvement, availability and price. On basis of these results 33 new seafood product concepts were tested among young adults and families with young children to identify the most important factors relevant for further development of seafood concepts. Important attributes that represent these consumer values in a product appear to be naturalness and freshness, choice from one or two species, visibility of the product in the packaging and information available for the preparation as a meal (Altintzoglou et al., in press).

The aim of the second concept test study presented in this paper was to test a smaller number of further developed new seafood product concepts among consumers with low seafood consumption in Denmark, Iceland and Norway in order to get closer to the final products accepted by the target groups.

Materials and Methods

Product concepts

The 14 product concepts to be tested in this study were defined based on the knowledge from the focus group study and the first concept test (CT1). Each concept was presented as an image (photo) looking as a product offered to the consumer would look. Figure 1 shows the product type and concept "Cod and salmon portions and wild berries" with information as an illustration.

Figure 1. The product type and concept "Cod and salmon portions and wild berries" with information, as presented on screen to the participants in this study.

The consumer values from the first concept test convenience, visibility & trust, freedom of choice, successful preparation and image improvement were used to define dependent and independent variables in this study. The main independent variables were , product type , product concept and fish species (table 1). The product type was presented with and without information about the product concept. This information was presented on a sleeve around the package. The sleeve contained a photo of a small fishing vessel in a fjord in Norid fjord, a short description of the product, a photo of the product after preparation, a made-up brand name 'Fresh!Fish' and a text that a recipe and preparation instructions was presented on the back of the package.

Table 1.
Description of the product type, product concepts and fish species used in the second concept test.

Product type	Product concept	Fish species
Natural fish fillets	Nordic fish fillets	Cod
Natural fish portions	Fish portions and wild berries	Cod
Natural fish portions	Fish portions and wild berries	Cod + Salmon
Natural fish bites	Fish bites for Mediterranean soup	Cod
Natural fish bites	Fish bites for Mediterranean soup	Cod + Salmon
Natural minced fish	Minced fish for Mexican wraps	Cod
Natural minced fish	Minced fish for Mexican wraps	Salmon

The value convenience was conceptualised by mentioning that a recipe and preparation instructions were available on the back of the packaging. The value visibility and trust was represented by using a transparent packaging with a sleeve which covers only a small part of the product. Freedom of choice was represented by offering cod and/or salmon. Successful preparation was represented by the indication for a preparation guide on the back of the packaging as well as by a photo of a successfully prepared dish on the sleeve.

The variable *information* varied by means of presenting the product with or without the product concept information on the sleeve as described above. Both products were presented in a plastic tray. However, the products with information had a sleeve. The information included was presented on the sleeve (figure 1).
The products without information were the first to be randomly presented to the participants. Thereafter the rest of the product concepts were presented to the participants in a random order. The grouping of the randomization code between control and experimental conditions was performed in order to avoid any carry-over effect of knowledge from the product concepts with information to those without.

The variable *product concept* varied by means of the presentation of the four product concepts. These product concepts were a) Nordic fish fillets, focusing on the simplicity and purity of Nordic cuisine, b) fish portions and wild berries, focusing on the use of local ingredients such as wild berries in an innovative recipe, c) fish bites for a Mediterranean soup, combining Nordic fish with Mediterranean spices in a soup recipe and finally, d) minced fish for Mexican wraps, combining minced Nordic fish with a Mexican wrap recipe. The size and form of the fish in the concepts decreased from fillets (approx. 400 gram), portion (approx. 150 gram each), bites (approx. 20 gram each) to minced. The variable *fish species* varied by presenting various product concepts based on cod (*Gadus morhua*), salmon (*Salmo salar*), or cod and salmon, as shown in table 1.

Participants

The participants in this study were recruited through advertisements on public internet pages of the participating research institutes, open recruitment internet pages and social networking internet pages like Facebook. Additionally, participants were directed to this study by e-mails and by posters on university campuses. The emphasis of the invitation was on overall food

choices and preferences. No reference to the beneficial health effects of fish was made. A small incentive of a gift card was given to three participants by means of a random poll. The participants were selected for socio-demographic characteristics such as age and household situation. Young adults were defined as persons being younger than 30 years. Parents of young children were defined as those who have at least one child between the ages of three to thirteen years.

The questionnaire

The web based questionnaire (Dahan and Srinivasan, 2000) used in this study is described in detail in a previous study (Altintzoglou et al., in press). The English questionnaire was translated into Danish, Norwegian and Icelandic. Consistency of the contents of the three versions of the questionnaire was assured by following the process of back translation until the point of absolute agreement between them. Fieldwork started after editing, correcting, electronic programming and pre-testing of the electronic version of the questionnaire.

The questionnaire started with welcome instructions for filling in the questionnaire, questions about socio-demographic characteristics and fish consumption frequencies. The main part of the questionnaire included questions aimed at evaluating the product concepts on attractiveness, naturalness, trustworthiness, convenience, confidence about the preparation of a meal using the product and finally willingness to buy the product. All items were measured by means of self reported nine point Likert scales with one (1) denoting a low evaluation of the specific product characteristic and nine (9) a high one. After the evaluation of the product concepts, participants were exposed to questions about some of their attitudes and personality traits. Four questions were used to measure health interest (Ophuis, 1989), two to measure the perceived need to take action on improving their personal health (Schifferstein and Ophuis, 1998), three to measure food curiosity (Pliner and Hobden, 1992), two to measure convenience orientation and the perceived convenience of seafood (Olsen et al., 2007) and two to measure interest in naturalness of food (Grunert et al., 1993). All items were measured by means of self reported seven point Likert scales with one (1) denoting disagreement to a statement and seven (7) denoting agreement.

Statistical analysis

To compare the socio-demographic characteristics of the participants from different countries, target groups and clusters, cross tabulation and chi square tests were used. Analyses of variance (ANOVA) and least square differences (LSD) post-hoc tests were used to identify differences between groups on the attitudinal and fish consumption frequency variables.

The negative attitudinal data were transposed in order to reverse the direction and match with the positive ones. Following this procedure, the items that originated from the same scales were grouped and the estimated mean value of the grouped variables was used from then on. A cluster analysis was performed to identify different groups based on their attitudinal reports. A hierarchic cluster analysis based on Ward's method was performed first in order to identify the appropriate number of clusters. A large increase in agglomeration coefficient indicated a three-cluster solution as being the most appropriate. The hierarchic cluster analysis was followed by a K-means cluster analysis on the pooled sample from Denmark, Norway and Iceland.

Repeated measures ANOVA was used to compare within and between subjects effects of the independent variables information and product, across the two types of groups, i.e. target groups and clusters. Interactions between variables were tested in the same manner, after reporting the main effects of the previous analyses.

Differences in product evaluations between groups were tested by means of ANOVA tests. When the differences were significant, post-hoc LSD tests were performed to identify where the differences were.

Differences were considered statistically significant when $p < 0.05$.

Results

Participants and clusters

This study was performed on 296 participants, almost equally distributed across Iceland, Denmark and Norway (100, 97 and 99 respectively). There were no large differences between countries in most of the socio-demographic characteristics. The mean age was around 30 years, and around 65 percent of the participants were females. However, Norwegian

participants consumed more fish as a main meal (1.58 times per week) than the Icelanders (1.03 times per week) and the Danes 1.00 time per week). On the contrary, Icelanders consumed more fish as a warm lunch or as a snack. Finally, slightly more Norwegian participants had higher education than the Icelanders and the Danes.

Due to socio-demographic similarities between countries, the information was pooled and the focus was put on the target groups of this study, i.e. young adults and families with young children. Significant differences in fish consumption were found between the two groups. Parents reported higher fish consumption than young adults' for main meal (1.31 vs. 0.86 times per week), cold lunch (0.72 vs. 0.48 times per week) and warm lunch (0.39 vs. 0.23 times per week).

The attitudinal information was analyzed in order to create clusters and explain the differences in fish consumption. In the first step of the clustering procedure three clusters were defined (stage 293-295 of the Agglomeration Schedule). The results (table 2) indicated the cluster membership of each participant. The clusters found were different on all the attitudinal variables and in the reported fish consumption. The members of the first cluster reported the most positive attitudes towards health, food in general and seafood ("the total positive health oriented consumers") and the highest consumption of seafood as a warm lunch. The second cluster reported health and convenience orientation and a high interest in seafood and food, ("the non health-action fish consumers") and the highest consumption of seafood as a main meal. Finally, the third cluster reported the highest interest in fast meal preparation and the lowest interest in food, seafood and health ("the fast-convenient non-fish consumers"). This group reported the lowest seafood consumption. The three clusters were not significantly different in any of the socio-demographic characteristics.

Table 2.
Description of participants by cluster defined by their attitudes

	clusters				
variable	**total positive health oriented consumers**	**non health-action fish consumers**	**fast-convenient non-fish consumers**	**total**	**p-value**
n	87	95	114	296	
age	31	32	30	30	0.167
*attitudes (used in clustering)**					

health action	6.69a	2.84c	4.89b	4.76	<0.001
occupied with health	6.46a	5.37b	5.01b	5.55	<0.001
health status	6.61a	5.28b	5.19b	5.64	<0.001
convenience = quick	6.20b	5.29c	7.04a	6.23	<0.001
seafood is convenient	6.46a	6.62a	2.85b	5.12	<0.001
food curiosity	5.71a	5.52a	4.95b	5.35	<0.001
natural food	6.69a	5.88b	5.47b	5.96	<0.001
*fish consumption frequency**					
overall	1.41ab	1.54a	1.15b	1.35	0.026
main meal	1.14ab	1.26a	0.88b	1.08	0.010
cold lunch	0.71	0.61	0.50	0.60	0.247
warm lunch	0.43a	0.22b	0.29ab	0.31	0.033
snack	0.18	0.16	0.13	0.15	0.420
*target groups***					
young adults	48	47	55	51	0.455
parents	52	53	45	49	
*country***					
Iceland	34	27	39	34	0.530
Denmark	38	27	33	33	
Norway	28	46	28	33	
*gender***					
female	72	58	63	64	0.119
male	28	42	37	36	
*education category***					
primary school	7	6	11	8	0.338
high school	30	37	36	34	
technical education	7	7	5	6	
further technical education	8	1	4	4	
BSc	23	22	26	24	
MSc	25	27	18	24	
*parenthood***					
no children	48	47	55	51	0.455
children	52	53	45	49	
*relationship***					
single	33	36	35	35	0.938
couple	67	64	65	65	
*household situation***					
single living with parents	8	7	7	7	0.911
single living alone	17	21	24	21	
couples without children	23	19	25	24	
couples with children	44	46	40	43	
single parent	8	7	4	5	
*age groups***					
18-29	52	55	66	58	0.306
30-39	24	21	16	20	
40+	24	24	18	22	

* mean values tested based on analysis of variance (ANOVA) tests; a, b, c denote significant ($p<0.05$) differences between means based on LSD post-hoc tests; ** % per cluster and chi-square tests

Product concepts

Testing the concept and information on the product evaluations showed significant differences (table 3). These results showed that providing information on the package of the product has a positive effect on how attractive and trustworthy a product is perceived to be. Eventually, this result was also supported by an effect of information on consumers' willingness to buy the products.

Table 3.
Matrix of the p-values from the General Linear Model repeated measures analysis for the effect of information, product concepts, target groups and clusters.

	within-subjects		between subjects	
measurements	information	product concepts	target groups	clusters
attractive	<0.001	<0.001	ns	0.029
natural	ns	<0.001	ns	ns
trustworthy	0.001	<0.001	ns	ns
convenient	ns	<0.001	ns	ns
sure to prepare	ns	<0.001	ns	ns
willing to buy	0.015	<0.001	ns	0.007

ns indicates non-significant effects based on p-values>0.05

Additionally, it is shown that the differences between the product concepts influenced the way consumers evaluated the products (figure 2). "Cod fillets" were evaluated the highest, in all evaluative parameters. The product concept "cod portions" followed in second place in all evaluative parameters. In third place, was the product concept "cod and salmon portions", equally in all evaluative parameters. The product concept "cod bites" was in fourth place. However, "cod bites" was not perceived as less natural than "cod and salmon portions". In fifth place, the product concept "cod and salmon bites" was evaluated lower than "cod bites" only on attractiveness, convenience and sureness about its preparation. Finally, the last two product concepts were "minced cod" and "minced salmon". They were both evaluated low on all parameters with the salmon product being lower than the cod one.

The two target groups differed in their evaluations of the product type. The participants who were in the groups of parents with young children evaluated most product concepts higher than the young adults. These differences were significant for “cod filets”, “cod portions “, “cod and salmon portions”, “cod bites” and “cod and salmon bites” with or without information. These differences were significant for the parameters; sure to prepare and willingness to buy, leading to an applicable distinction between the products.

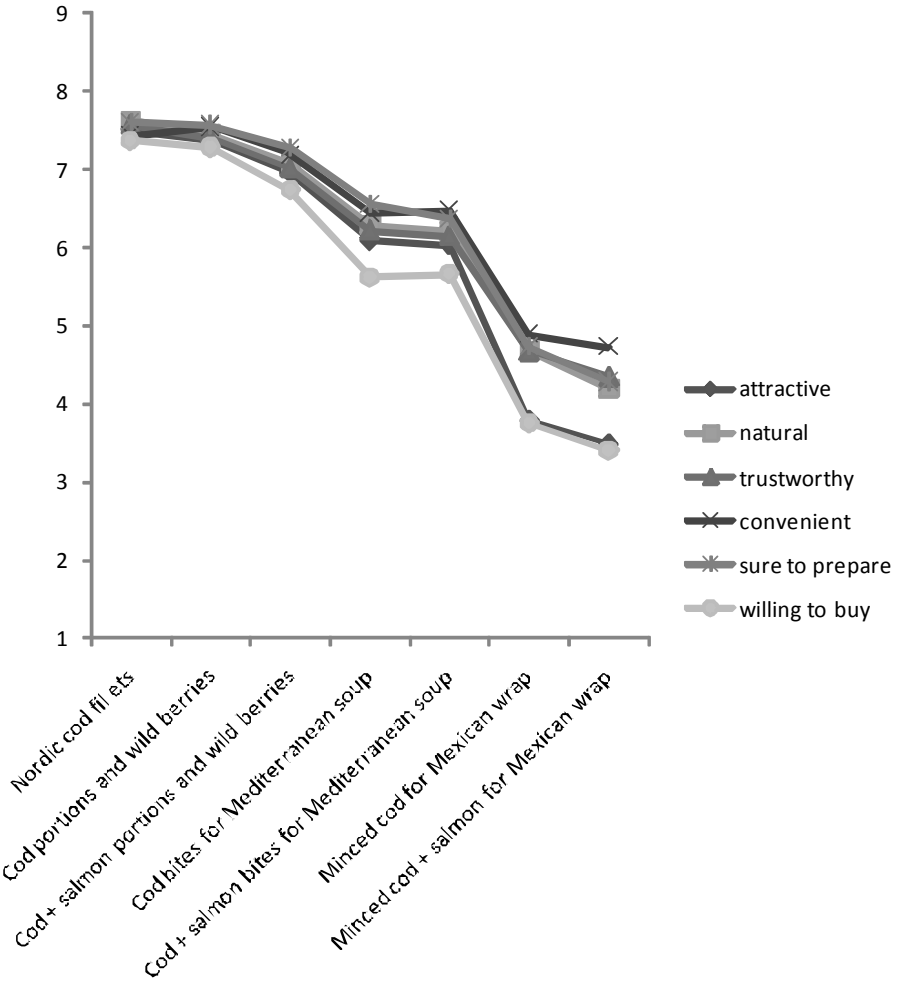

Figure 2. Product concepts evaluated by the consumers on six variables on nine-point Likert scales with one (1) denoting a low evaluation of the specific product characteristic and nine (9) a high one.

Finally, product concepts evaluations were compared between clusters. The differences between clusters were significant in the case of “cod fillets” (table 4), “cod portions”, “cod

and salmon portions" (table 5), "cod bites" and "cod and salmon bites" with or without information (table 6). The overall tendency in these differences was that "total positive health oriented consumers" evaluated most product concepts higher than "non health-action fish consumers". The cluster "fast-convenient non-fish consumers" evaluated most of the product concepts the lowest. However, almost all evaluations of the three highest rated products ("cod filets", "cod portions" and "cod and salmon portions") were above seven, on an nine-point scale.

Table 4.
Comparisons of the "Cod fillet" product concept evaluations* between clusters

	clusters				
variable	**total positive health oriented consumers**	**non health-action fish consumers**	**fast-convenient non-fish consumers**	**total**	**p-value**
n	87	95	114	296	
fillets cod					
attractive	7.44	7.23	6.88	7.16	0.107
natural	7.77	7.55	7.54	7.61	0.560
trustworthy	7.44	7.37	7.44	7.42	0.942
convenient	7.70a	7.45ab	7.13b	7.40	0.037
sure to prepare	7.78a	7.80a	7.26b	7.59	0.040
willing to buy	7.86a	7.20b	7.08b	7.35	0.012
Nordic cod fillets					
attractive	7.77	7.52	7.28	7.50	0.162
natural	7.87	7.54	7.50	7.62	0.219
trustworthy	7.79	7.51	7.44	7.56	0.267
convenient	7.67	7.54	7.16	7.43	0.068
sure to prepare	7.92a	7.82a	7.18b	7.60	0.003
willing to buy	7.80a	7.51a	6.93b	7.37	0.007

* mean values based on seven point Likert scales with one (1) denoting disagreement to a statement and seven (7) denoting agreement, tested based on analysis of variance (ANOVA) tests; a, b, c denote significant ($p<0.05$) differences between means based on LSD post-hoc tests

Table 5.
Comparisons of "fish portions" product concept evaluations* between clusters

	clusters				
variable	**total positive health oriented consumers**	**non health-action fish consumers**	**fast-convenient non-fish consumers**	**total**	**p-value**

n	87	95	114	296	
portions cod					
attractive	7.54	7.02	6.97	7.16	0.091
natural	7.68	7.24	7.51	7.47	0.220
trustworthy	7.53	7.35	7.42	7.43	0.746
convenient	7.76	7.56	7.44	7.57	0.362
sure to prepare	7.80	7.80	7.32	7.61	0.056
willing to buy	7.75	7.36	7.09	7.37	0.054
portions cod + salmon					
attractive	7.49a	6.87b	6.81b	7.03	0.047
natural	7.71a	6.76b	6.96b	7.11	0.002
trustworthy	7.43a	6.68b	6.86b	6.97	0.022
convenient	7.67a	7.18ab	6.93b	7.23	0.020
sure to prepare	7.56a	7.66a	6.89b	7.34	0.007
willing to buy	7.47a	6.79ab	6.48b	6.87	0.012
portions cod and wild berries					
attractive	7.78	7.29	7.16	7.39	0.053
natural	7.71	7.35	7.35	7.46	0.264
trustworthy	7.69	7.29	7.25	7.40	0.162
convenient	7.84	7.52	7.32	7.54	0.099
sure to prepare	7.97a	7.76a	7.10b	7.56	0.001
willing to buy	7.78a	7.32a	6.87b	7.28	0.006
portions cod + salmon and wild berries					
attractive	7.45a	6.81b	6.68b	6.95	0.025
natural	7.49	6.91	6.91	7.08	0.053
trustworthy	7.45a	6.84b	6.82b	7.01	0.044
convenient	7.48	7.15	6.98	7.18	0.161
sure to prepare	7.64a	7.39ab	6.89b	7.27	0.019
willing to buy	7.31a	6.66ab	6.35b	6.73	0.013

* mean values based on seven point Likert scales with one (1) denoting disagreement to a statement and seven (7) denoting agreement, tested based on analysis of variance (ANOVA) tests; a, b, c denote significant ($p<0.05$) differences between means based on LSD post-hoc tests

Table 6.
Comparisons of " fish bites" product concepts evaluations* between clusters

	clusters				
variable	**total positive health oriented consumers**	**non health-action fish consumers**	**fast-convenient non-fish consumers**	**total**	**p-value**
n	87	95	114	296	
bites cod					
attractive	6.06a	5.27b	5.15b	5.46	0.014
natural	6.54	5.97	6.25	6.25	0.210

trustworthy	6.31	5.65	6.17	6.04	0.091
convenient	6.99a	6.07b	6.29b	6.43	0.011
sure to prepare	6.87	6.53	6.11	6.47	0.075
willing to buy	6.42a	5.13b	5.03b	5.47	<0.001
bites cod + salmon					
attractive	6.11	5.55	5.53	5.71	0.156
natural	6.49	5.80	6.08	6.11	0.094
trustworthy	6.28	5.74	6.07	6.02	0.228
convenient	6.56	6.47	6.44	6.49	0.922
sure to prepare	6.53	6.47	5.89	6.27	0.110
willing to buy	5.98	5.49	5.10	5.48	0.055
bites cod for Mediterranean soup					
attractive	6.56	5.95	5.83	6.08	0.058
natural	6.70	6.05	6.18	6.29	0.103
trustworthy	6.61	6.14	5.99	6.22	0.126
convenient	6.82	6.34	6.25	6.45	0.153
sure to prepare	6.93	6.64	6.18	6.55	0.061
willing to buy	6.24a	5.48b	5.26b	5.62	0.017
bites cod + salmon for Mediterranean soup					
attractive	6.63a	5.83b	5.74b	6.03	0.018
natural	6.52	5.92	6.21	6.21	0.204
trustworthy	6.53	5.83	6.11	6.14	0.109
convenient	6.86	6.23	6.38	6.47	0.134
sure to prepare	6.69	6.41	6.08	6.36	0.202
willing to buy	6.10	5.51	5.44	5.66	0.149

* mean values based on seven point Likert scales with one (1) denoting disagreement to a statement and seven (7) denoting agreement, tested based on analysis of variance (ANOVA) tests; a, b, c denote significant ($p<0.05$) differences between means based on LSD post-hoc tests

Discussion

This study shows that there are differences in the evaluations of the product concepts on all variables evaluated by young adults and families with young children. Significant and corresponding differences were found between the various product concepts with and without information. These differences showed that the Nordic cod fillet concept was the most preferred, followed by the fish portion concept. Lower on the evaluations were the fish bites and finally the minced fish. The consumers involved found product concepts less attractive , natural, trustworthy or convenient when they were offered in small pieces or minced. Small

portions of fish, not deviating too much from fillet size were evaluated as almost as good as the fillet concept.

According to the reported product concept evaluations, the participants in this study showed a higher preference for the product concepts with additional textual information about the product including a recipe as well as a photo illustration emphasising the naturalness and attractiveness of the final prepared dish. This effect was significant for the variables: perceived attractiveness, trustworthiness and willingness to buy the product concept. However, the positive effect on the preference for products with information was not as high as expected. The limited information effect in case of naturalness was probably due to the fact that the fresh product was so visible in the packaging that the participants perceived both versions of the product concept to be very natural. Convenience and sureness about the successful preparation of a meal using this product may not have been significantly affected by the packaging label because the information about the preparation of the meal was only described on the back of the package, without actually being presented to the consumers in the test.

Looking at the differences between fish species (cod and salmon), we can conclude that the combination of cod and salmon was well accepted. It was shown that the evaluations between the cod and cod & salmon product concepts were either equal or sometimes in favour of either one. The cod product concepts were slightly more appreciated in the case of fish portions. However, when the evaluations for the product concept "Fish bites for Mediterranean soup" were analysed, it was shown that cod & salmon bites were preferred. Finally, the use of cod or salmon for the minced fish product did not lead to any significantly positive change in consumers' preference for this product. Minced fish was not appreciated regardless of the species or the accompanying information and the expected added value as a healthy replacement for popular minced meat in convenient dishes.

Young adult consumers evaluated the product concepts differently than parents of young children. Parents of young children rated most products higher than young adults did. The differences between the groups were significant for the product concepts that were rated the highest, showing that both groups agreed on the low scores of fish bites and minced fish. However, when they rated the more appreciated fish fillets and portions, parents of young children were more willing to buy them. This higher willingness to buy was mainly due to

their sureness about being able to prepare the product in a convenient way. This finding verified the results of the focus groups study reported previously in which consumers discussed the changes in meal preparation and food choices that come along with the presence of a child in the household (Altintzoglou et al., 2010).

An interesting outcome of this study was the definition of three consumer clusters, based on attitudinal variables. This analysis revealed the existence of the groups "totally positive health oriented consumers", "non health-action fish consumers" and "fast-convenient non-fish consumers" who were equally spread across young adults and parents of young children. There was a non significant tendency for young adults to belong to the "fast-convenient non-fish consumers" cluster. The results suggested that there was an overall trend that "totally positive health oriented consumers" rated the product concepts higher than "non health-action fish consumers". The lowest product concept evaluations were reported by the "fast-convenient non-fish consumers". These differences were comparable to the differences between the two target groups in this study. Again, the low evaluations were not significantly different but the highly rated products were different between groups on willingness to buy and sureness about preparation.

Combining the differences found between target groups and between clusters, it is suggested that parents and individuals with an interest in health who already hold a positive opinion about fish are, in general, the consumers who evaluated the product concepts of this study the highest. This result is not surprising, taking into account that health involvement and attitudes towards fish are factors that influence fish consumption (Pieniak et al., 2006; Pieniak et al., 2008a; Pieniak et al., 2007, 2008b). However, this study suggested that the opinions of consumers in cluster three with low interest in health and a high convenience orientation gave some of the product concepts a highly positive evaluation. The high acceptance of the cod portions and wild berries concept and the cod & salmon portions with wild berries concept by all consumer segments at a comparable level of the traditional cod fillet product concept indicated an interesting opportunity for development and testing in that direction. This study is based on the results of a web-based product concept test. This test did not expose the participants to the actual products. Nevertheless, the value of this approach is in its convenience with testing various products in order to clarify which is the most successful one to be used in further testing (Dahan and Srinivasan, 2000). A follow-up test with real products can be performed with more security/confidence about the appropriateness of a product

selected by the consumers and not by the product developers. The pre selection of product concepts reported in this paper enables us to perform an in-home consumer test. We aim to develop and test products based on the cod and salmon portions with wild berries concept.

This product seems to fit perfectly to the consumer values by means of variation of species, freedom of choice between species and its attractive, innovative image which is created by pure, fresh and traditional ingredients. This product will is expected to be rated trustworthy and convenient and will include a recipe to assist the consumers towards its successful preparation.

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