

Consumers' Willingness to Pay for Sustainable Seafood Made in Europe

Katrin Zander & Yvonne Feucht

To cite this article: Katrin Zander & Yvonne Feucht (2018) Consumers' Willingness to Pay for Sustainable Seafood Made in Europe, Journal of International Food & Agribusiness Marketing, 30:3, 251-275, DOI: [10.1080/08974438.2017.1413611](https://doi.org/10.1080/08974438.2017.1413611)

To link to this article: <https://doi.org/10.1080/08974438.2017.1413611>



Published with license by Taylor & Francis Group, LLC© 2018 Katrin Zander and Yvonne Feucht



Published online: 22 Dec 2017.



Submit your article to this journal [↗](#)



Article views: 857



View Crossmark data [↗](#)

Consumers' Willingness to Pay for Sustainable Seafood Made in Europe

Katrin Zander and Yvonne Feucht

Thuenen Institute of Market Analysis, Braunschweig, Germany

ABSTRACT

Sustainability of increasing relevance also for seafood markets. The aim of this contribution is to analyze consumer preferences and their willingness to pay (WTP) for different sustainability claims, and to identify consumer segments according to their WTP. The contingent valuation method was applied to elicit consumers' WTP in eight European countries. The WTP varies between seven and almost 20%, depending on attribute and country. Three consumer groups become apparent: the largest group without any additional WTP, a smaller group with a moderate additional WTP of plus 17%, and a very small group with an additional WTP of more than 40%. Clear differences between countries are obvious regarding preferences for different sustainability attributes, particularly in the segment with the highest WTP. A fraction of the consumers is willing to pay significantly higher prices for sustainably produced fish from Europe: given that trustful standards are applied and well communicated.

KEYWORDS

Aquaculture; consumer preferences; contingent valuation; fisheries; seafood

Introduction

During the last decade, sustainability has become an important issue in the seafood sector. Many consumers are increasingly interested in additional product attributes such as ecofriendliness, organic production, and domestic/European origin, given that general expectations with respect to price and quality are met (e.g., Ankamah-Yeboah, Nielsen, & Nielsen, 2016; Bergleiter & Meisch, 2015; Brécard, Hlaimi, Lucas, Perraudeau, & Salladarre, 2009; Brunso et al., 2008; Carlucci et al., 2015; Claret et al., 2012; Olesen, Alfnes, Bense Rora, & Kolstad, 2010; Vanhonacker, Altintzoglou, Luten, & Verbeke, 2011; Whitmarsh & Palmieri, 2011).

In addition to sustainability issues, more recently concerns about animal welfare in animal husbandry are gaining weight in public opinion and also in consumers' food demand (Broom, 2010; Eurobarometer, 2005; Eurobarometer, 2015; Evans & Miele, 2008; Harper & Makatouni, 2002; Heid & Hamm, 2012; Weible, Christoph-Schulz, Salamon, & Zander, 2016). This

CONTACT Katrin Zander  katrin.zander@thuenen.de  Thuenen Institute of Market Analysis, Bundesallee 50, Braunschweig D-38116, Germany.

Published with license by Taylor & Francis Group, LLC © 2018 Katrin Zander and Yvonne Feucht
This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivatives License (<http://creativecommons.org/licenses/by-nc-nd/4.0/>), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is properly cited, and is not altered, transformed, or built upon in any way.

development has some spill-over effects on fisheries and aquaculture, and several studies have detected consumer interest in and preferences for fish welfare issues (Feucht & Zander, 2016; Kalshoven & Meijboom, 2013; Kupsala, Jokinen, & Vinnari, 2013; Pieniak, Vanhonacker, & Verbeke, 2013; Solgaard & Yang, 2011).

Consumers' preference for local or domestic produce over foreign products is another well-known trend for food in general (Feldmann & Hamm, 2015; Grebitus, Lusk, & Nayga, 2013; Zepeda & Deal 2009), which was also identified for seafood (Altintzoglou, Verbeke, Vanhonacker, & Luten, 2010; Claret et al., 2012; Risius, Janssen, & Hamm, 2017).

Despite the research presented above, European seafood production stagnates while exports from overseas grow. An important reason is competitive advantages of foreign producers caused by, e.g., lower labor costs, climate advantages, and sometimes lower environmental standards, which result in lower production costs.

In line with the EU strategy for blue growth, sustainable production is promoted as a strategy for growth of the European seafood sector. Seafood which is produced sustainably presumably will be more expensive and will have to be located in higher priced market segments. Therefore, at least, some of the consumers have to be convinced that European products are worth higher prices. Recent research shows that the promotion of sustainability in seafood bears potential for product differentiation and thereby higher premiums and market shares (Ankamah-Yeboah et al., 2016; Asche, Larsen, Smith, Sogn-Grundvåg, & Young, 2015; Jaffry, Pickering, Ghulam, Whitmarsh, & Wattage, 2004; Roheim, Asche, & Santos, 2011). Earlier research stressed that a particular consumer segment which appreciates additional ethical values of products and is willing to pay higher prices exists (Altintzoglou et al., 2010; Feucht & Zander, 2015; Kalshoven & Meijboom, 2013; Lasner & Hamm, 2014; Mauracher, Tempesta, & Vecchiato, 2013; Risius et al., 2017).

Against this background, the aim of this contribution is threefold: first, to analyze consumers' awareness, knowledge, and their preferences regarding different aspects of seafood; second, to elicit their willingness to pay (WTP) for seafood with different sustainability attributes; and third, to identify different consumer segments according to their additional WTP. To cover cultural differences across Europe, all analyses are conducted in eight European countries. By addressing these topics, this paper contributes to the discussion of how to best communicate sustainability aspects of fisheries and aquaculture to consumers to increase their demand for sustainable seafood from Europe.

The paper starts with the description of the methodological approaches used, followed by the presentation of the results. The result and discussion section begins with the consumers' expectation of sustainable seafood and of various geographical origins. It then shows consumers' WTP for different sustainability attributes, and identifies and describes different consumer

segments. The paper closes with the concluding section outlining the consequences of this research for the European fish industry.

Methodological approach

The present research is based on a survey which consisted of an experiment using the contingent valuation method (CVM) and a questionnaire. The CVM is applied to elicit consumers' preferences and their WTP for seafood with different attributes, all related to sustainable and local/European production. By means of a questionnaire accompanying the CVM, socio- and psychographic data of the respondents are examined. These data are used to explain consumers' WTP and to find out which consumer groups would be most responsive to sustainably produced European seafood.

Contingent valuation method

Several methods exist for analyzing consumers' preferences and their WTP—among them choice experiments (CE) and the CVM. During the last several years, choice experiments have become the state of the art in analyzing consumers' preferences for market goods with ethical properties such as environmental impacts. In contrast, the CVM has been widely used in environmental economics in analyzing preferences for public goods and less frequently in the analysis of preferences for private goods. Examples for its use for private goods are the broad topics of GMO-free food (Costa-Font, Gil, & Traill, 2008; Loureiro & Bugbee, 2005) or renewable energy, respectively, fuels (Akcura, 2015; Interis & Haab, 2014; Solomon & Johnson, 2009).

Compared with CE, results from CVM were presumed to be upward biased due to the fact that the design is less close to real market situations (List & Gallet, 2001). But methodological comparisons have shown that hypothetical bias in CVM, when analyzing WTP for private goods, is much lower than expected (Balistreri, McClelland, Poe, & Schulze, 2001; Grunert et al., 2009; List & Gallet, 2001; Lusk & Schroeder, 2004). In CVM, individuals are asked directly about their WTP, and consequently, the focus is more strongly directed toward the product value. This assumption is supported by the observation that the nonresponse rate in CVM studies is higher than in CE studies, indicating that the respondents consider their budget constraints seriously (Kallas & Gil, 2012). Nevertheless, the reliability and validity of CVM results highly depend on the design of the study and how individuals are asked about their WTP (Boccaletti & Nardella, 2000; Grunert et al., 2009).

To be as realistic as possible, the scenarios have to be easily understandable and simple. Complex designs might question the validity of the results.

CVM study design

In this research, a payment card format was chosen to elicit the consumers' WTP (Box 1). Participants were asked to state the amount of money they would spend for a fish to be prepared for an everyday occasion. To increase participants' involvement with the WTP exercise and to determine whether the amounts indicated were realistic, they were asked to state the number of people they would be preparing the fish for. Subsequently, participants were asked for their WTP for fish which was caught or produced according to the criteria: sustainably, organic, locally, by coastal fisheries, higher animal welfare standards, in Europe or discard free. The percentages indicated in Box 1 were recalculated to Euro amounts based on the expenses that the participants had indicated in the earlier question. In this manner, a higher proximity to real purchase situations was achieved.

Box 1. Payment scenario of the CVM exercise

Please imagine you are going to shop for fish for an everyday occasion. How much would you spend for this fish in total? Approx. _____ €.

For how many people would you prepare this fish? _____

Based on the price you just indicated for the fish. Imagine that all other properties of the fish (e.g., freshness, taste) which are not mentioned here are in line with what you expect: How much would you be willing to pay for a fish that is caught/produced...

	100%	105%	110%	...	140%	150%	175%	200%
... sustainably								
... according to organic standards								
... locally (within your region)								
... by coastal fisheries								
... with higher animal welfare standards								
... in Europe								
... discard free								

Note: Percentages were recalculated to total numbers depending on the answers in the first question.

Source: Own compilation.

The subsequent questionnaire contained various questions related to seafood, including perception of European and local production, attitudes toward fish farming, and Schwartz values (Schwartz, 2012). In addition, subjective knowledge of fish, involvement with fish and perceived consumer effectiveness (PCE) as well as socio-demographic indicators were elicited.

Measuring values, knowledge, involvement, and perceived consumer effectiveness

This research attempts to identify consumer segments that are willing to ask for and to pay higher prices for sustainable seafood products. Explaining and predicting consumer behavior is one of the major challenges of consumer research, and several theoretical concepts exist. They all acknowledge that

individual internal processes, such as knowledge, involvement, perceptions, preferences, intentions, motivations, attitudes, values, and emotions, are decisive for consumer behavior (Kollmuss & Agyeman, 2002; Kroeber-Riel, Weinberg, & Gröppel-Klein, 2009; Solomon, Bamossy, Askegaard, & Hogg, 2010). In this research, the emphasis was placed on values, knowledge, involvement, and PCE, in addition to socio-demographic indicators.

With regard to values, the values “universalism nature,” “benevolence caring,” and “tradition” of the Schwartz value map (Schwartz, 2012) were used. Several studies have shown that, in particular, “universalism-nature,” but also “benevolence-caring,” are related to a more sustainable consumption behavior (De Boer, Hoogland, & Boersema, 2007; Krystallis, Vassallo, Chryssohoidis, & Perrea, 2008; Thøgersen & Ölander, 2002). These two values are closest to the social and ecological dimensions of sustainability and, hence, were included in this research. In addition, “tradition” was considered in this research because it was presumed that higher preferences for sustainable production can be found with people who have higher traditional values, following the idea that many production methods are perceived to be better in the past.

In accordance with the Schwartz value system, the following items were chosen to elicit participants value structures (Schwartz, 2012).

Universalism nature

- He/she strongly believes that he/she should care for nature
- It is important to him/her to work against threats to the world of nature
- Protecting the natural environment from destruction or pollution is important to him/her

Benevolence caring

- It is very important to him/her to help the people dear to him/her
- Caring for the well-being of people, whom he/she is close to is important to him/her

Tradition

- It is important to him/her to maintain traditional values or beliefs
- Following his/her family’s customs or the customs of a religion is important to him/her
- He/she strongly values the traditional practices of his/her culture.

Participants were asked to indicate to which degree a person with the named properties was like him/her on a 6-point scale from “not at all like me” (1) to “very much like me” (6). The Cronbach’s alpha showed a good internal reliability for all values: universalism nature 0.898, benevolence caring 0.864, and tradition 0.860. From earlier research, it is known that knowledge influences how consumers search for and use information and thereby influences consumers’ decision making for seafood purchases (Alba & Hutchinson, 1987; Brunsø et al., 2009; Kole, 2003; Pieniak, Aertsens, & Verbeke, 2010a; Pieniak, Vanhonacker, & Verbeke, 2013; Pieniak, Verbeke,

Vermeir, Brunsø, & Olsen, 2007). In this study, subjective knowledge was elicited. Subjective knowledge is the individual self-assessment of the knowledge which a person has about a topic (Altintzoglou et al., 2010). We included four statements to explore consumer's subjective knowledge:

- Compared with an average person, I know a lot about fish
- I have a lot of knowledge about how to evaluate the quality of fish
- People who know me consider me to be an expert in the field of fish
- I know a lot about the preparation of fish.

All items were measured on a 7-point Likert scale ranging from “do not agree at all” to “fully agree.” The Cronbach's alpha for the total sample yielded a value of 0.87, indicating good internal reliability of the subjective knowledge construct.

Involvement is the sustained concern, care, and significance which a person attaches to an issue, product, or activity (Olsen, 2001). Because different studies (Vanhonacker et al., 2011; Verbeke, Vermeir, & Brunsø, 2007b; Olsen, 2001) found a positive relationship between fish consumption and involvement with fish, we measured involvement with four statements (the degree of agreement with was measured on a 7-point Likert scale):

- I am interested in where the fish I eat comes from
- I enjoy cooking fish for others and myself
- Making the right choice of fish is important
- Fish is an important part of my diet.

The chosen statements were based on items of Birch & Lawley (2014), Olsen (2001), and Bell & Marshall (2003). Cronbach's alpha for the involvement scale indicated with a value of 0.83 good reliability.

Perceived consumer effectiveness is a concept for measuring a person's judgement in the ability of individual consumers to affect environmental issues (Roberts, 1996). A recent study by Verbeke, Vanhonacker, Sioen, Van Camp, and De Henauw (2007c) showed that PCE was positively correlated with the importance attached to sustainability and ethical issues related to fish. This means that consumers who perceive ethical and sustainability issues as important also think that they can contribute to improved fish welfare and sustainability in the seafood sector by acting appropriately. Therefore, we measured the PCE with four statements to which the participants indicated their level of agreement on a 7-point Likert scale:

- By purchasing sustainably produced fish products, I can support sustainable fisheries
- My consumption patterns influence the environmental friendliness of fish production
- Purchasing European fish supports the preservation of European fisheries
- Whenever I can, I chose sustainable fish
- My own choice of fish products has no impact on the sustainability of fisheries (inverted)
- I cannot do much about the depletion of natural fish stocks (inverted)

The five statements were constructed on the research of Scholder Ellen (1994) and Kim and Choi (2005) as well as Roberts (1996). The Cronbach's alpha over all six statements was 0.68, which is acceptable.

Data collection and sample description

The survey was performed online in March 2016 in eight European countries (Finland, France, Germany, Ireland, Italy, Poland, Spain, and the United Kingdom). An online panel run by a private market research agency was used for purposive quota sampling. Quotas were set for gender relations (two-thirds women and one-third men) considering the fact that even today more women than men are responsible for shopping. With regard to age, representativeness was required. All test persons had to be fish consumers.

The survey was developed in English and German and then translated into the other languages by professional translation services by means of the back-translation method. The content of the survey and the translations were discussed and reflected with the project partners in the respective countries. It was pretested with 15 participants in Germany. On average, participants spent about 20–25 min to complete the survey including questionnaire and CVM exercise.

In total, 4103 consumers participated in the survey. Across all countries people between the age of 55–70 were the most strongly (25%) represented in the sample, whereas the youngest age group (18–24 years) with 12% had the lowest share (Table 1). The participants in Poland were slightly younger than in the other countries. The Italian and German participants were somewhat older than in the other countries. In comparison with census data, people with higher education (college or university degree—tertiary level) were overrepresented in our data for FR, IR, IT, ES, PL, and UK. In contrast, in Finland and Germany, participants with a low to medium education (no formal education and up to 10 years of school attendance had a higher presence in the sample than in the census. The dominance of more highly educated people in the majority of the study countries studied might be due to the fact that only fish consumers were allowed to take part in the survey. Myrland, Trondsen, Johnston, and Lund (2000) and Hicks, Pivarnik, and McDermott (2008) found that people with a higher education level tend to have higher fish consumption.

The highest fish consumption frequency was found in Spain followed by Italy and the UK. Finnish, German, and Polish participants consumed often fish much less frequently. The consumption frequencies are in line with findings by DG Mare (2008) and Pieniak, Verbeke, Brunsø, Scholderer, and Olsen (2009), who point out that fish is most frequently consumed in Southern European countries, whereas Polish as well as Germans have a comparatively low fish consumption frequency.

Table 1. Summary statistics for the sample (%).

Variable/description	Country							
	Finland	France	Germany	Ireland	Italy	Poland	Spain	UK
Number of observations	500	517	530	500	513	502	534	507
Age of test persons								
18–24 years	12.2	11.6	11.1	12.2	9.6	13.9	9.9	12.8
25–34 years	18.0	19.7	18.3	26.0	17.3	23.9	24.3	19.9
35–44 years	21.2	20.7	24.0	22.0	23.8	18.1	23.4	21.3
45–54 years	23.2	21.7	20.4	19.2	22.8	18.7	19.1	20.3
55–70 years	25.4	26.3	26.2	20.6	26.5	25.3	23.2	25.6
Gender								
Female	65.2	66.7	65.7	64.2	65.3	64.7	64.6	66.1
Male	35.8	33.3	34.3	35.8	34.7	35.3	35.4	33.9
Education (years of schooling)								
No formal qualification	11.0	2.7	0.4	0.6	0.0	1.2	0.6	3.6
About 10 years of schooling	39.4	15.1	48.1	26.8	10.3	8.0	5.1	27.8
12 or 13 years of schooling	30.2	35.6	32.1	23.2	56.1	41.8	48.7	28.4
College or university degree	19.4	46.6	19.4	49.4	33.5	49.0	45.7	40.2
Fish consumption								
Occasional fish consumers	68.0	42.7	57.2	54.4	29.8	58.8	20.9	45.8
Less than once per month	13.2	8.5	8.3	13.8	3.5	9.6	3.7	10.1
Once per month	17.0	9.1	13.2	12.8	4.1	13.9	3.2	8.7
2–3 times per month	37.8	25.1	35.7	27.8	22.2	35.3	14.0	27.0
Regular fish consumers	32.0	57.2	42.8	45.6	70.1	41.3	79.0	66.8
About once per week	21.6	40.4	33.0	27.6	37.0	32.3	33.1	33.7
More than once per week	10.4	16.8	9.8	18.0	33.1	9.0	45.9	33.1

Statistical analyses

Statistical analyses were performed using the statistical software SPSS Version 24. Bivariate analyses including cross tabulation with chi-square statistics and one-way ANOVA comparison of means with Tukey's post hoc tests were used to analyze the data. For the values and attitudinal constructs, scales were calculated using the means of the corresponding items.

To identify different consumer segments, a two-step cluster analysis was conducted. Because for marketing and communication of sustainable seafood, the participants with a medium to high additional WTP are of particular interest, participants were clustered according to their WTP for all sustainability attributes used in the CVM exercise. It was assumed that people with, e.g., a higher WTP for organic production also have a higher WTP for sustainability and so on. And, indeed, the participants' WTP for the different attributes tested was highly correlated and significant (correlation coefficients between 0.6 and 0.77).

To characterize the group members of the clusters identified by the cluster analysis, a multinomial linear regression analysis was performed. The dependent variable was the membership in one of the clusters. Values, attitudinal constructs, as well as socio-demographic indicators are used to explain the affiliation to one or the other clusters.

Results and discussion

Awareness of sustainability in aquaculture and fisheries

Sustainability is a very complex issue not only from the technical perspective. Consumers' perception and understanding of sustainability may widely vary from expert definitions, primarily for two reasons: First, the term “sustainability” is frequently used in many different contexts, and consumers associate it with a multitude of issues and, and second, because of their limited knowledge with regard to technical issues of seafood production. When attempting to improve the communication with consumers on sustainability, it is essential to know what consumers think and expect. In this regard, test persons were asked by means of a closed question for the three most decisive elements of sustainability in aquaculture and fisheries.

In aquaculture, the minimal use of hormones and drugs ranks highest, which supposedly has a strong egoistic component because people do not want to consume fish containing residues of either or both substances due to potential health risks (Figure 1). Nevertheless, the use of hormones and drugs poses an actual threat to the environment in open aquaculture systems (Jennings et al., 2016). The protection of endangered species ranks lower, followed by the pollution of the environment and minimizing the impact on wild stocks. Fish welfare is also an important issue for consumers. Social criteria are less important.

Similar results were found in a qualitative study by Feucht and Zander (2015), where minimal use of drugs, naturalness, and fish welfare turned out to be important elements of sustainability in aquaculture. The increasing concern of fish welfare issues has some common features with the ongoing

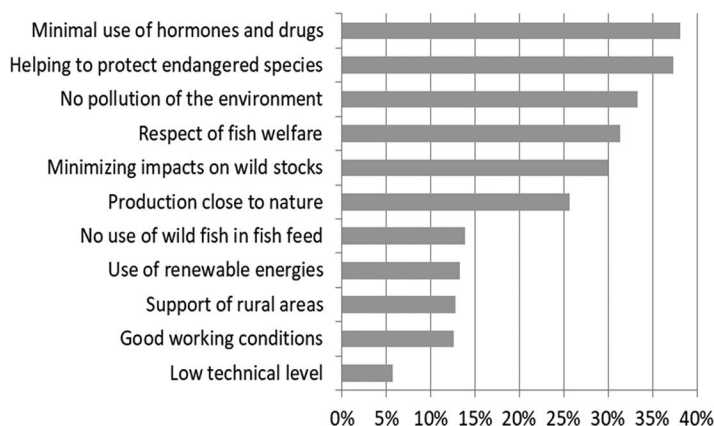


Figure 1. Important aspects of sustainability in aquaculture from the consumers' perspective. Question asked: Please indicate the three most decisive elements of sustainable aquaculture from your point of view.

public debate and research regarding farm animal welfare (Di Pasquale et al., 2014; Janssen, Rödiger, & Hamm, 2016; Prickett, Norwood, & Lusk, 2010; Vanhonacker & Verbeke, 2014; Weible et al., 2016).

With regard to fishing, consumers primarily align ecological aspects with sustainability, most important is the protection of endangered species, followed by no overfishing, recovery of depleted stocks, and protection of juvenile fish—all of them related to the protection of aquatic ecosystems (Figure 2). Social/cultural aspects such as good working conditions for fishermen, or support of small scale coastal fisheries are much less relevant. The same applies for the energy consumption of fishing vessels. These results confirm the outcome of earlier qualitative research on German consumers' understanding of sustainable fisheries: similar ecological issues were discussed, whereas social aspects were completely neglected (Zander, Bürgelt, Christoph-Schulz, Salamon, & Weible, 2015). Apparently, Europeans are highly concerned about the danger to aquatic habitats when thinking about topics related to the use of the world's oceans (see also Gelcich et al., 2014; Jefferson, Bailey, Laffoley, Richards, & Attrill, 2014). The low importance of social aspects, e.g., employment with respect to sustainability in fisheries has been previously reported (Potts, Pita, O'Higgins, & Mee, 2016).

Relevance of the geographic origin of seafood

As summarized above, the product's geographic origin and mainly local production are important issues in many food markets. In this research, test persons were asked for the relevance of European, domestic and local origin when buying fish (Table 2). Looking at all countries studied, domestic production was important to the largest fraction of the participants, followed

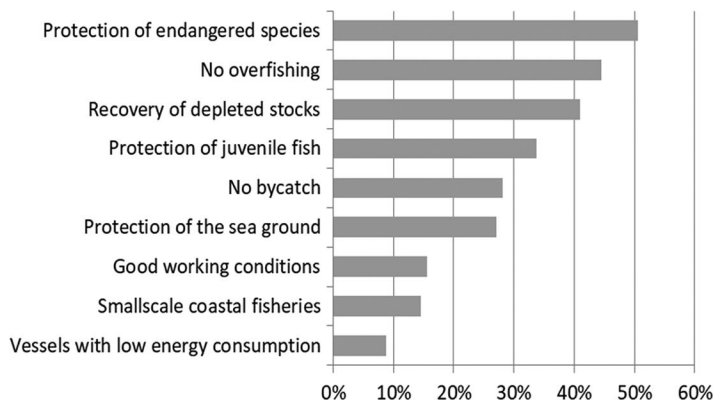


Figure 2. Important aspects of sustainability in fisheries from the consumers' perspective. Question asked: Please indicate the three most decisive elements of sustainable fisheries from your point of view.

Table 2. Preferences for the origin of fish (% of participants).

... Production	Finland	France	Germany	Ireland	Italy	Poland	Spain	UK
European...	53.4	60.3	53.6	48.4	61.2	63.1	58.8	42.2
Domestic...	50.2	76.4	45.3	71.0	82.8	63.9	76.6	51.1
Local...	58.2	55.5	45.7	72.2	73.3	46.4	72.3	60.6
N	500	517	530	500	513	502	534	507

Note: Question: Is it important to you that the fish you buy originates from

by local and European production. Domestic production was particularly important in the Mediterranean countries (Italy, France, and Spain). Compared with European and domestic production, local production was most important in Finland and in the UK. Polish and Germans considered European production to be particularly important.

These results are consistent with earlier research on the general relevance of the geographical origin of seafood and the preference for local and domestic fish products over foreign products (Brécard, Hlaimi, Lucas, Perraudieu, & Salladarre, 2009; Claret et al., 2012; Jaffry et al., 2004; Mauracher et al., 2013). With respect to European origin, Pieniak et al. (2013) found low interest in such an indication compared with mandatory indications (e.g., nutritional information) and indications of sustainability and fish welfare. They argued that European origin might be too broad and therefore meaningless.

The participants who indicated that European and/or local production were important in their buying decision were asked for the reasons. They had to select three out of 12 possible reasons. Greater freshness of the fish turned out to be the most important reason for any geographical preference (Figure 3). Shorter transport distances were very important for both origins. Further reasons for preferences of European production were higher food safety, higher environmental standards, and better regulations. Hence, consumers obviously realize and appreciate the effect of the common EU regulation and standard setting regarding food safety and environment. Local production was looked for because it supports the local economy (e.g., by generating jobs) and for preservation of traditions and higher transparency. This last aspect is quite similar to the findings of Brécard, Hlaimi, Lucas, Perraudieu, and Salladarre (2009) and Claret et al. (2012), who identified “ethnocentrism”¹ and higher familiarity with local conditions as reasons for preferring local seafood.

Consumers’ willingness to pay for different sustainability attributes

This section focuses on consumers’ WTP for different sustainability attributes. Because communication of this complex issue is difficult for various reasons (as explained above), different attributes were tested in a comparative manner. We used the CVM and asked test persons directly for their WTP. This section

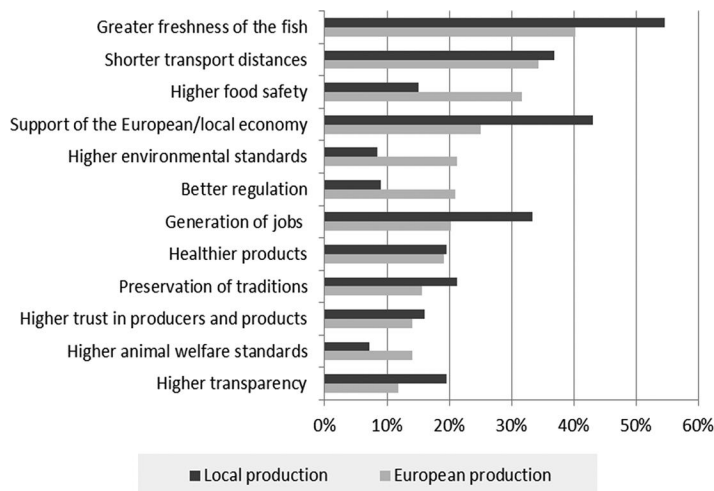


Figure 3. Reasons for the purchase relevance of European and local production. *Note:* Fraction of test persons indicating that European and/or local production is important within the purchase decision. Question: Why is local production important to you?/Why is European production important to you?

begins by showing the average numbers of participants' WTP, followed by clustering test persons according to their WTP, and closes with a tentative description of consumers with medium and high WTP.

Test persons were asked for their additional WTP for seven different product attributes, all related to sustainability, i.e., “sustainably produced,” “organically produced,” “locally produced,” “produced according to higher animal welfare standards,” “produced by coastal fisheries (no deep sea-fishing),” “produced without causing discards” and “produced in Europe.” “Sustainably produced” was included because it can be taken as umbrella term for all the other issues or inclined attributes asked for and, thus, might be preferred by consumers over isolated sustainability issues.

The analyses show that the average WTP differed largely between attributes. On average of all countries, additional WTP was highest for organic production (+14.8%), followed by sustainably produced (+14%), produced with higher animal welfare (+14%), locally produced (+12.6%), by coastal fisheries (+11.7%), without discards (+10.3%), and produced in Europe (+9.4%). Thus, organic and sustainable production as well as higher animal welfare standards appear to be the most promising attributes with respect to product differentiation in European fish markets.

The results by country, which result in a quite diverse picture, are more interesting than averages (Figure 4). The highest overall level of additional WTP was observed in Germany followed by Italy, whereas in Finland, Germany, Spain, and the UK, WTP was highest for higher animal welfare standards; organic production was the most important attribute in France,

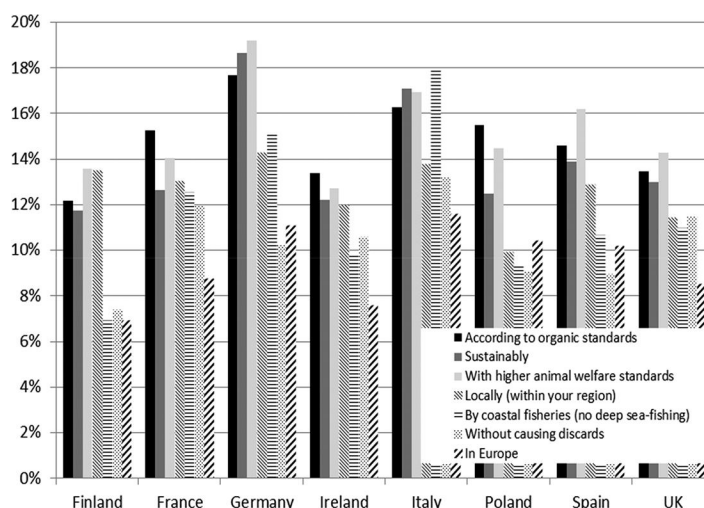


Figure 4. Average additional WTP for different sustainability attributes (in %). Question: How much would you be willing to pay for a fish that is produced ... ? *Note:* WTP, willingness to pay.

Ireland, and Poland. Whereas in almost all countries, caught “by coastal fisheries” was of minor relevance, in Italy, it resulted in the highest WTP on average. Local origin was particularly important in Finland; in all other countries, it was beaten by production practices, such as sustainably, organic, or animal welfare aspects. Although European origin was associated with higher environmental standards, higher safety, and better regulation (Figure 3), in this analysis, it resulted in the lowest additional WTP. This shows that consumers appreciate European origin and are even prepared to pay a price premium for the potentially higher production costs. But this result also highlights the fact that consumers attach higher values to more concise sustainability attributes, which are only partly reflected in the associations connected to European origin. Given this, European origin might be perceived by European consumers as kind of a minimum baseline for sustainable production.

Discard-free fishing was perceived to be of minor importance in this survey. This is interesting in light of the high consumer concern for the conservation of marine ecosystems found in this research and by Gelcich et al. (2014) and Jefferson et al. (2014), and the fact that discards can result in substantial overfishing of other fish stocks. Therefore, it would have been expected that consumers would attach higher values to discard-free fishing. One reason for the low WTP might be the limited knowledge of many consumers about fisheries; another reason might be that consumers feel that “sustainability” covers more relevant issues including discard-free fishing. In this light, the higher WTP for sustainable production is reasonable.

Our results confirm earlier research, which stressed the importance of animal welfare considerations in consumer demand (Feucht & Zander, 2016; Kupsala, Jokinen, & Vinnari, 2013). With regard to the relevance of local or domestic production, these results are only partly in line with earlier research in which consumers preferred local over sustainable production (Claret et al., 2012; McClenachan, Dissanayake, & Chen, 2016; Risius et al., 2017), which in this research is only the case for Finland and France. The low additional WTP of European origin is in line with Pieniak et al. 2013 but contradicts Altintzoglou et al. (2010), who found that the indication of European origin enhanced the image of fish.

WTP in different consumer segments

These average numbers only provide a first impression of relative WTP and preferences between countries and attributes because it merges the WTP of people without any WTP and those with a high WTP. For marketing and communication of sustainable seafood, the participants with a medium to high additional WTP are of particular interest. Therefore, a (two-step) cluster analysis was conducted on the WTP for all sustainability attributes to identify various consumer segments. Three clusters were found: The first “No WTP” with an additional WTP of almost zero (+2%), the second cluster “medium WTP” with an additional WTP of 17% on average, and a third cluster “high WTP” with an additional WTP of 43% on average.

On average of all countries, the fraction of participants in the cluster “no WTP” was 47%, in cluster “medium WTP,” 44%, and in cluster “high WTP,” 9%. There are some differences between countries (Figure 5). The size

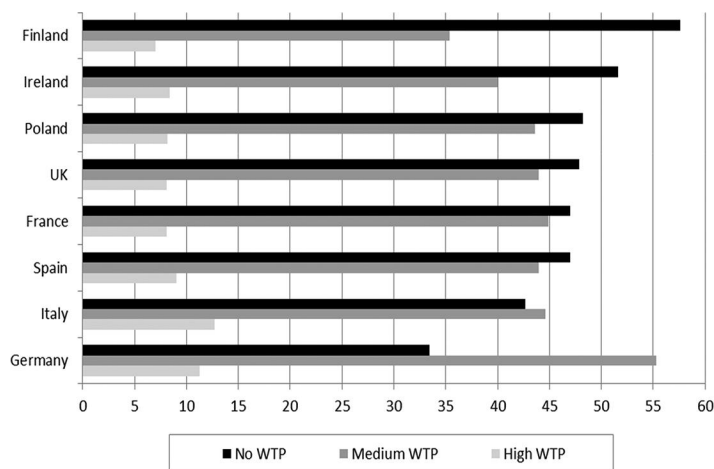


Figure 5. Size of consumer segments based on their WTP on average of all sustainability attributes by country (share of respondents per cluster). *Note:* WTP, willingness to pay.

of the cluster “no WTP” is between 43 and 58% in all countries with the exception of Germany, where this share is only 33%. With the exception of Germany, the share of respondents without any additional WTP decreases from Northern to Southern countries. Interestingly, the fraction of people with high additional WTP is highest in Italy with 12.7%, followed by Germany (11.3%) and Spain (9.0%). Due to higher general income level, it could have been expected that the highest share of people with “high WTP” would have been found in Germany. Instead the cluster size of the “medium WTP” is by far highest in Germany.

To better understand consumers and to address them in a well-targeted manner based on their values, psychographic and sociodemographic characteristics, various impact factors on their WTP are identified by conducting a multinomial logistic regression for the entire sample (Table 3).

Although the pseudo- R^2 is rather low (McFadden- $R^2 = 0.057$), indicating that only a small part of all factors which impact on the membership in the “medium WTP” or “high WTP” cluster are considered, some interesting results are obtained (Table 3). The B coefficients indicate the change in the

Table 3. Impact factors on the probability of belonging to the clusters “medium” and “high WTP” (parameter estimates: Coefficients B and exponentiated coefficients Exp(B)).

	Medium WTP			High WTP		
	B		Exp(B)	B		Exp(B)
Schwartz values						
Tradition	-0.011		0.989	-0.135	**	0.847
Benevolence caring	-0.125	***	0.882	0.051		1.094
Universalism nature	0.118	**	1.125	0.259	***	1.094
Psychographics						
Perceived consumer effectiveness	0.397	***	1.487	0.550	***	1.733
Involvement	0.092	**	1.096	0.248	***	1.282
Subjective knowledge	-0.060	*	0.941	-0.093		0.809
Sociodemographics						
Education						
12–13 years of school visit	0.093		1.098	-0.160		0.852
University degree	0.198	*	1.219	-0.163		0.850
Household Income	0.051	***	1.053	0.017		1.017
Age (years)	-0.022	***	0.978	-0.031	***	0.969
Gender (women)	0.045		1.046	0.069		1.072
Country ¹						
Finland	-0.482	***	0.618	-0.560	**	0.571
Germany	0.635	***	1.888	0.840	***	2.316
Ireland	-0.404	***	0.668	-0.163		0.850
Italy	0.102		1.107	0.492	**	1.635
Poland	0.028		1.029	0.328		1.389
Spain	0.014		1.014	0.094		1.099
UK	-0.027		0.974	-0.039		0.963
Constant term	-1.377	***		-4.800	***	

Note: Reference category: No WTP.

B, parameter estimates, Exp(B), odds.

¹Reference country France.

WTP, willingness to pay.

odds ratios. Because they are expressed in logarithms, the numbers themselves are difficult to interpret, but they indicate the direction of change of the dependent variable resulting from changes in the independent variable. In contrast, the exponentiated coefficients ($\text{Exp}(B)$) reflect the percentage change in the odds (probability event/1-probability event). Numbers greater than 1 indicate an increase in the odds, and numbers smaller than 1 a decrease of the odds (Hair et al. 2014).

Schwartz values were found to have an impact on consumers' probability of belonging to the cluster of "medium" or "high WTP". People rating high on "tradition" value had a significantly lower probability to be in the cluster "high WTP". In contrast, people who scored high on the "universalism nature" value were significantly more frequently in the "medium WTP" cluster as well as in the "high WTP" cluster. Interestingly, test persons with higher scores on "benevolence caring" were equally frequently represented in the no and high WTP clusters but less often in the medium WTP cluster. A reason for the low presence of more tradition-oriented people in the segment "high WTP" might be that they are less open to new sustainability concepts, such as organic practices and animal welfare, because they tend to emphasize the conservation of the *status quo*. In addition, more tradition-oriented consumers might perceive the *status quo* as sustainable enough and, thus, show a lower WTP for the tested sustainability attributes. The frequent presence of consumers showing high "universalism nature" values in the "medium WTP" and "high WTP" cluster are in line with studies from other study areas, which show that the value "universalism nature" is related to a more sustainable consumption behavior (De Boer et al., 2007; Krystallis et al., 2008; Thøgersen & Ölander, 2002). The negative probability of consumers attaching high importance to the "benevolence Caring" value in the "medium WTP" cluster is surprising and difficult to interpret: it indicates that consumers with high scores on the "benevolence caring" value, can be found more frequently in the "no WTP" or in the "high WTP" cluster.

Higher PCE and higher involvement increased the probability of belonging to the cluster with a "medium" or "high WTP", as expected. Higher subjective knowledge reduced the probability of belonging to the cluster with a "medium WTP". This result is surprising because the lack of knowledge was frequently purported to be a reason for the lack of interest and preference for sustainable fish (Feucht & Zander, 2015) because consumers might underestimate the consequences of their purchase decisions for or against sustainable products due to their lack of knowledge (Brécard, Hlaimi, Lucas, Perraudau, & Salladarre, 2009). Different studies highlight the fact that knowledge about seafood seems to be frequently limited even though a generic understanding of sustainability in seafood exists (Altintzoglou et al., 2011; Arvanitoyannis, Krystallis, Panagiotaki, & Theodorou, 2004; Feucht & Zander, 2015; Gutierrez & Thornton, 2014; Schlag & Ystgaard, 2013; Verbeke et al., 2007a). Almeida,

Altintzoglou, Cabral, & Vaz (2015) and Honkanen, Olsen, & Verplanken (2005) highlighted that higher knowledge is not necessarily related to more sustainable seafood choices. Consumption behavior was found to be significantly driven by habits, past experiences and cultural factors; thus, even highly knowledgeable people do not necessarily make sustainable seafood choices (Almeida et al., 2015).

Regarding sociodemographic indicators, highest education, and higher household income resulted in significantly higher probabilities of belonging to the cluster of medium WTP but not to the cluster of high WTP. To the authors' knowledge, there are no comparable results regarding fish purchasing behavior to be found in the recent literature. From organic food, it is known that consumers with higher income and better education often have a higher WTP for more expensive organic food (Aertsens, Verbeke, Mondelaers, & Van Huylenbroeck, 2009; Hjelmar, 2011). The results presented here also indicate that WTP decreases with age. Regarding the differences by country, the results confirm that Germans have a significantly higher probability to belong to the clusters "medium" and "high" WTP, whereas for Finns, these probabilities are significantly lower than for the reference France. Regarding the cluster "medium" WTP this holds also true for Irish participants.

Consumers in both groups with additional WTP, they feel to have at least part of the responsibility for change, are higher involved and are younger. The main difference between both consumer segments consists in some of the values: benevolence caring is significantly less in the "medium WTP" whereas tradition is significant less in the high WTP cluster. This means that the people in the "high WTP" segment are more modern oriented. Members of this segment are even younger than in the "medium WTP" cluster. In the "medium WTP" segment household income and education are significantly higher which is in line with that its members are not as young as in the "high WTP" cluster.²

To address consumers in a well-targeted manner, specific consumer preferences in the "medium WTP" and "high WTP" clusters are of particular interest. Because cultural differences were expected, this analysis was conducted at the country level. Figure 6 shows that the consumers' WTP in the "medium WTP" cluster is less than 20% in almost all cases and countries. In this cluster, the differences between country regarding the most relevant sustainability attributes are small, and in almost all countries higher animal welfare standards, organic, sustainable, and local production are most important from the consumer perspective. In France, Italy, and Germany production/fishing by coastal fisheries causes rather high additional WTP in this segment.

In the "high WTP" cluster, the differences between attributes are larger (Figure 7). In Finland, in Spain, and in the UK, the attribute "with higher animal welfare standards" accompanies the highest WTP. In France and in

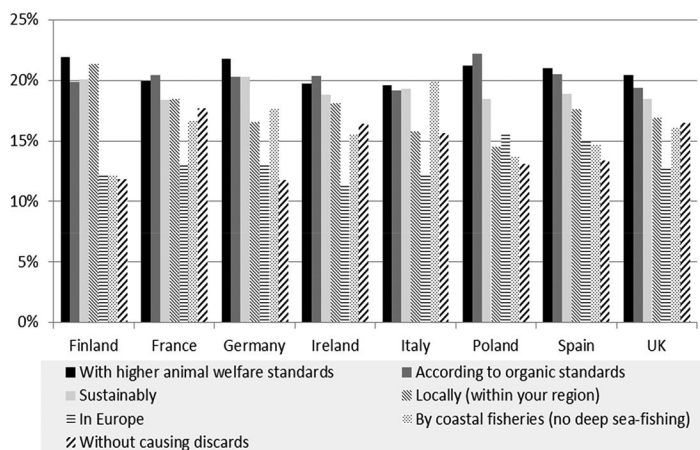


Figure 6. Additional WTP for the different attributes in the “Medium WTP” cluster. Question: How much would you be willing to pay for a fish that is produced ... ? Note: WTP, willingness to pay.

Poland, it is “according to organic standards,” whereas in Germany and in Italy the results are not as clear cut: “with higher animal welfare standards” and “sustainably produced” are the attributes with the highest additional WTP. In Italy “coastal fisheries” causes a very high WTP. For Ireland no clear ranking is possible because four out of seven attributes are at the same level of WTP.

The pronounced differences between the WTP in this cluster might be due to higher involvement or higher environmental awareness of the members of this cluster. Accordingly, when attempting to address the members of the “high WTP” group, emphasis should be placed on animal welfare aspects, sustainable and/or organic production considering country differences. For

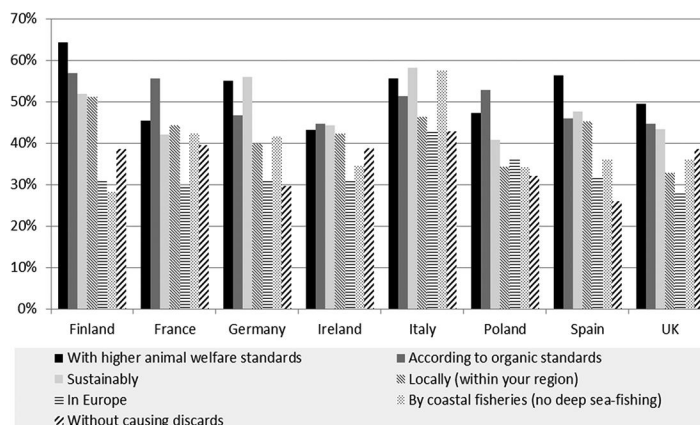


Figure 7. Additional WTP for the different attributes in the “High WTP” cluster. Question: How much would you be willing to pay for a fish that is produced ... ? Note: WTP, willingness to pay.

example, in Finland, Germany, Spain and UK, communication should particularly focus on animal welfare aspects.

Conclusion

The results of the survey reveal that in all study countries participants had a rather positive attitude toward sustainability in aquaculture and fisheries. Protection of endangered species, no pollution, and absence of drugs and hormones in production and fishing were the most important issues from the consumer perspective. Considering the high sensitivity for the use of drugs in aquaculture, the industry should ensure the production of safe and healthy food and should try to highlight its capacities in this respect.

The majority of the consumers stated that they preferred fish from local, domestic or European production. This shows the potential of European seafood in the markets. When looking at consumers' WTP, it becomes apparent that local production activated an additional WTP, whereas European production had a much smaller effect. Other sustainability attributes resulted in even higher additional WTP among consumers, which indicate that sustainable production made in Europe might be a promising approach in European seafood markets.

The results clearly demonstrate that there is a very small consumer segment with a high WTP and a larger segment with a medium WTP for fish produced according to sustainable production methods and from European origin. About 9% of the consumers belong to the high WTP segment with a WTP of 40–50%. Another 44% has a marked additional WTP of about 20%.

By emphasizing animal welfare, organic and/or sustainable production, these consumer segments can be successfully addressed and their additional WTP can be activated. Regarding the attribute causing the highest WTP, differences between study countries exist: In Finland, Spain, and the UK it was “higher animal welfare standards,” and in France and Poland it was “according to organic standards.” In Germany and in Italy “higher animal welfare standards” and “sustainably” were at about the same whereas in Italy “by coastal fisheries” was very important too. The indication of European origin will strengthen the positive perception of a fish produce because consumers recognise the European Union as a credible controlling agent in all countries.

In this research, seafood fishing and aquaculture were tackled simultaneously. So, the answers of the participants might also depend on their familiarity with “fish production methods” such as fishing from wild stocks or aquaculture. The high relevance of animal welfare issues poses a challenge for the aquaculture sector because intensive aquaculture systems are frequently compared with modern, industrial animal husbandry which are blamed for not respecting the well-being of animals (Feucht and Zander, 2015).

Sound communication, considering specific consumer interests and focusing on animal welfare, specific sustainability issues and/or organic production are necessary and promising. With respect to sustainability issues, communication should focus more on environmental sustainability than on economic and social sustainability. For the fisheries, as well as the aquaculture sector, the conservation of biodiversity is an important issue. A major important issue when communicating with consumers on sustainable production is to offer them a real “plus” over common production standards. When asked to pay significantly higher prices, even less informed consumers have to be able to make out the differences.

The limitations of this research refer, as with almost all studies on consumers’ WTP, to the gap between stated and revealed or real WTP. This so-called attitude behavior gap is frequently cited when observing that consumers state high WTP in surveys but behave quite differently on the market place. But, consumers’ WTP in the market place depends to a very large degree on the way that specific product attributes are communicated and on the credibility of the communicator and the content. This also holds true for sustainability issues. Irrespective of absolute numbers, our results demonstrate relative consumer preferences which indicate on which issues to concentrate in sustainable production and its communication to consumers. Further research should investigate issues of sustainable production in different fish species as well as promising specific communication messages.

Notes

1. In this context, ethnocentrism refers to people’s perception of their own culture/country as superior to others.
2. Country-specific multinomial logistic regression models did not render significant additional insights because about the same independent variables had significant impacts on participants’ probability to be member of the clusters of “medium” and “high” WTP.

Funding

We are grateful for the funding of the SUCCESS project by the European Union’s Horizon 2020 research and innovation program under grant agreement No 635188.

References

- Aertsens, J., Verbeke, W., Mondelaers, K., & Van Huylenbroeck, G. (2009). Personal determinants of organic food consumption: A review. *British Food Journal*, 111, 1140–1167. doi:[10.1108/00070700910992961](https://doi.org/10.1108/00070700910992961).
- Akcura, E. (2015). Mandatory versus voluntary payment for green electricity. *Ecological Economics*, 116, 84–94. doi:[10.1016/j.ecolecon.2015.02.027](https://doi.org/10.1016/j.ecolecon.2015.02.027).
- Alba, J., & Hutchinson, J. (1987). Dimensions of consumer expertise. *Journal of Consumer Research*, 13, 411–454. doi:[10.1086/209080](https://doi.org/10.1086/209080).

- Almeida, C., Altintzoglou, T., Cabral, H., & Vaz, S. (2015). Does seafood knowledge relate to more sustainable consumption? *British Food Journal*, 117, 894–914. doi:10.1108/bfj-04-2014-0156.
- Altintzoglou, T., Vanhonacker, F., Verbeke, W., & Luten, J. (2011). Association of health involvement and attitudes towards eating fish on farmed and wild fish consumption in Belgium, Norway and Spain. *Aquaculture International*, 19, 475–488. doi:10.1007/s10499-010-9363-2.
- Altintzoglou, T., Verbeke, W., Vanhonacker, F., & Luten, J. (2010). The image of fish from aquaculture among Europeans: Impact of exposure to balanced information. *Journal of Aquatic Food Production Technology*, 19, 103–119. doi:10.1080/10498850.2010.492093.
- Ankamah-Yeboah, I., Nielsen, M., & Nielsen, R. (2016). Price premium of organic salmon in Danish retail sale. *Ecological Economics*, 122, 54–60. doi:10.1016/j.ecolecon.2015.11.028.
- Arvanitoyannis, I. S., Krystallis, A., Panagiotaki, P., & Theodorou, A. J. (2004). A marketing survey on Greek consumers' attitudes towards fish. *Aquaculture International*, 12, 259–279. doi:10.1023/b:aqui.0000036137.29397.12.
- Asche, F., Larsen, T. A., Smith, M. D., Sogn-Grundvåg, G., & Young, J. A. (2015). Pricing of eco-labels with retailer heterogeneity. *Food Policy*, 53, 82–93. doi:10.1016/j.foodpol.2015.04.004.
- Balistreri, E., McClelland, B., Poe, G. & Schulze, W. (2001). Can hypothetical questions reveal true Values? A laboratory comparison of dichotomous choice and open-ended contingent values with auction values. *Environmental and Resource Economics*, 18, 275–292.
- Bell, R., & Marshall, D. (2003). The construct of food involvement in behavioral research: Scale development and validation. *Appetite*, 40, 235–244. doi:10.1016/s0195-6663(03)00009-6.
- Bergleiter, S., & Meisch, S. (2015). Certification standards for aquaculture products: Bringing together the values of producers and consumers in globalised organic food markets. *Journal of Agricultural and Environmental Ethics*, 28, 553–569. doi:10.1007/s10806-015-9531-5.
- Birch, D., & Lawley, M. (2014). *The influence of food involvement on fish consumption. An Australien case study*. Academy of Marketing Conference, Marketing Dimensions: People, places and spaces, 07–09 July 2014, Bournemouth, England. Available at: <http://eprints.bournemouth.ac.uk/21348/>.
- Boccaletti, S., & Nardella, M. (2000). Consumer willingness to pay for pesticide-free fresh fruit and vegetables in Italy. *International Food and Agribusiness Management Review*, 3, 297–310. doi:10.1016/s1096-7508(01)00049-0.
- Brécard, D., Hlaimi, B., Lucas, S., Perraudeau, Y., & Salladarre, F. (2009). Determinants of demand for green products: An application to eco-label demand for fish in Europe. *Ecological Economics*, 69, 115–125. doi:10.1016/j.ecolecon.2009.07.017.
- Broom, D. M. (2010). Animal welfare: An aspect of care, sustainability, and food quality required by the public. *Journal of Veterinary Medical Education*, 37(1), 83–88. doi:10.3138/jvme.37.1.83.
- Brunso, K., Hansen, K. B., Scholderer, J., Honkanen, P., Olsen, S. O., Verbeke, W., & Børresen, T. (2008). Consumer attitudes and seafood consumption in Europe. In T. Børresen (Ed.), *Improving seafood products for the consumer* (pp. 16–39). Boca Raton, Boston, New York, Cambridge, Washington DC: Woodhead Publishing Limited.
- Brunso, K., Verbeke, W., Olsen, S. O., Jeppesen, L. F., (2009). Motives, barriers and quality evaluation in fish consumption situations. *British Food Journal*, 111(7), 699–716.
- Carlucci, D., Nocella, G., De Devitiis, B., Viscecchia, R., Bimbo, F., & Nardone, G. (2015). Research review: Consumer purchasing behaviour towards fish and seafood products.

- Patterns and insights from a sample of international studies. *Appetite*, 84, 212–227. doi:10.1016/j.appet.2014.10.008.
- Claret, A., Guerrero, L., Aguirre, E., Rincón, L., Hernández, M. D., Martínez, I., ... Rodríguez-Rodríguez, C. (2012). Consumer preferences for sea fish using conjoint analysis: Exploratory study of the importance of country of origin, obtaining method, storage conditions and purchasing price. *Food Quality and Preference*, 26, 259–266. doi:10.1016/j.foodqual.2012.05.006.
- Costa-Font, M., Gil, J. M., & Traill, W. B. (2008). Consumer acceptance, valuation of and attitudes towards genetically modified food: Review and implications for food policy. *Food Policy*, 33, 99–111. doi:10.1016/j.foodpol.2007.07.002.
- De Boer, J., Hoogland, C. T., & Boersema, J. J. (2007). Towards more sustainable food choices: Value priorities and motivational orientations. *Food Quality and Preference*, 18, 985–996. doi:10.1016/j.foodqual.2007.04.002.
- Di Pasquale, J., Nannoni, E., Del Duca, I., Adinolfi, F., Capitanio, F., & Sardi, L. (2014). What foods are identified as animal friendly by Italian consumers? *Italian Journal of Animal Science*, 13(4), 782–789. doi:10.4081/ijas.2014.3582.
- DG Mare (2008). *Enquête d'image sur la perception des produits de la pêche et de l'aquaculture - Etude 1 dans le cadre du contrat cadre Lot 3 - études relatives à la mise en oeuvre du FEP - Rapport final*. Retrieved from http://ec.europa.eu/fisheries/documentation/studies/study_market/fap_exec_summary_en.pdf.
- Eurobarometer. (2005). *Attitudes of consumers towards the welfare of farmed animals. Special Eurobarometer*. Brussels, 229. European Commission. Online at: ec.europa.eu/public_opinion/archives/ebs/ebs_229_en.pdf
- Eurobarometer. (2015). *Attitudes of Europeans towards animal welfare. Special Eurobarometer*. Brussels, 442. Publisher European Commission. Online at: <https://ec.europa.eu/commfrontoffice/publicopinion/index.cfm/ResultDoc/download/DocumentKy/71349>.
- Evans, A., & Miele, M. (2008). *Consumers' view about farm animal welfare. Part II European comparative report based on Focus Group research*. Cardiff: Welfare Quality report.
- Feldmann, C., & Hamm, U. (2015). Consumers' perceptions and preferences for local food: A review. *Food Quality and Preference*, 40, 152–164. doi:10.1016/j.foodqual.2014.09.014.
- Feucht, Y., & Zander, K. (2015). Of earth ponds, flow-through and closed recirculation systems — German consumers' understanding of sustainable aquaculture and its communication. *Aquaculture*, 438, 151–158. doi:10.1016/j.aquaculture.2015.01.005.
- Feucht, Y., & Zander, K. (2016). Aquaculture in the German print media. *Aquaculture International*, 25, 1–19. doi:10.1007/s10499-016-0021-1.
- Gelcich, S., Buckley, P., Pinnegar, J. K., Chilvers, J., Lorenzoni, I., Terry, G., ... Duarte, C. M. (2014). Public awareness, concerns, and priorities about anthropogenic impacts on marine environments. *Proceedings of the National Academy of Sciences*, 111, 15042–15047. doi:10.1073/pnas.1417344111.
- Grebitus, C., Lusk, J. L., & Nayga, R. M. (2013). Effect of distance of transportation on willingness to pay for food. *Ecological Economics*, 88, 67–75. doi:10.1016/j.ecolecon.2013.01.006.
- Grunert, K. G., Juhl, H. J., Esbjerg, L., Boutrup Jensen, B., Bech-Larsen, T., Brunsø, K., & Øland Madsen, C. (2009). Comparing methods for measuring consumer willingness to pay for a basic and an improved ready made soup product. *Food Quality and Preference*, 20, 607–619. doi:10.1016/j.foodqual.2009.07.006.
- Gutierrez, A., & Thornton, T. F. (2014). Can consumers understand sustainability through seafood eco-labels? A U.S. and UK case study. *Sustainability*, 6(11), 8195–8127. doi:10.3390/su6118195.
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2014). *Multivariate data analysis* (7th ed.). Edinburg: Pearson Education Limited.

- Harper G. C., & Makatouni, A. (2002). Consumer perception of organic food production and farm animal welfare. *British Food Journal*, 104(3/4/5), 287–299. doi:[10.1108/00070700210425723](https://doi.org/10.1108/00070700210425723).
- Heid, A., & Hamm, U. (2012). Consumer attitudes towards alternatives to piglet castration without pain relief in organic farming: qualitative results from Germany. *Journal of Agricultural and Environmental Ethics*, 25(5), 687–706. doi:[10.1007/s10806-011-9350-2](https://doi.org/10.1007/s10806-011-9350-2).
- Hicks, D., Pivarnik, L., & McDermott, R. (2008). Consumer perceptions about seafood - an internet survey. *Journal of Foodservice*, 19(4), 213–226. doi:[10.1111/j.1748-0159.2008.00107.x](https://doi.org/10.1111/j.1748-0159.2008.00107.x)
- Hjelmar, U. (2011). Consumers' purchase of organic food products. A matter of convenience and reflexive practices. *Appetite*, 56, 336–344. doi:[10.1016/j.appet.2010.12.019](https://doi.org/10.1016/j.appet.2010.12.019)
- Honkanen, P., Olsen, S. O., & Verplanken, B. (2005). Intention to consume seafood—the importance of habit. *Appetite*, 45, 161–168. doi:[10.1016/j.appet.2005.04.005](https://doi.org/10.1016/j.appet.2005.04.005).
- Interis, M. G., & Haab, T. C. (2014). Overheating willingness to pay: Who gets warm glow and what it means for valuation. *Agricultural and Resource Economics Review*, 43(2), 266–278. doi:[10.1017/s1068280500004317](https://doi.org/10.1017/s1068280500004317).
- Jaffry, S., Pickering, H., Ghulam, Y., Whitmarsh, D., & Wattage, P. (2004). Consumer choices for quality and sustainability labelled seafood products in the UK. *Food Policy*, 29, 215–228. doi:[10.1016/j.foodpol.2004.04.001](https://doi.org/10.1016/j.foodpol.2004.04.001).
- Janssen, M., Rödiger, M., & Hamm, U. (2016). Labels for animal husbandry systems meet consumer preferences: Results from a meta-analysis of consumer studies. *Journal of Agricultural and Environmental Ethics*, 29(6), 1071–1100. doi:[10.1007/s10806-016-9647-2](https://doi.org/10.1007/s10806-016-9647-2).
- Jefferson, R. L., Bailey, I., Laffoley, D., Richards, J. P., & Attrill, M. J. (2014). Public perceptions of the UK marine environment. *Marine Policy*, 43, 327–337. doi:[10.1016/j.marpol.2013.07.004](https://doi.org/10.1016/j.marpol.2013.07.004).
- Jennings, S., Stentiford, G. D., Leocadio, A. M., Jeffery, K. R., Metcalfe, J. D., Katsiadaki, I., & Verner-Jeffreys, D. W. (2016). Aquatic food security: insights into challenges and solutions from an analysis of interactions between fisheries, aquaculture, food safety, human health, fish and human welfare, economy and environment. *Fish and Fisheries*, 17, 893–938. doi:[10.1111/faf.12152](https://doi.org/10.1111/faf.12152).
- Kallas, Z., & Gil, J. M. (2012). Combining contingent valuation with the analytical hierarchy process to decompose the value of rabbit meat. *Food Quality and Preference*, 24, 251–259. doi:[10.1016/j.foodqual.2011.11.006](https://doi.org/10.1016/j.foodqual.2011.11.006).
- Kalshoven, K., & Meijboom, F. B. (2013). Sustainability at the crossroads of fish consumption and production. Ethical dilemmas of fish buyers at retail organizations in The Netherlands. *Journal of Agriculture and Environmental Ethics*, 26, 101–117.
- Kim, Y., & Choi, S. M. (2005). Antecedents of green purchase behavior: An examination of collectivism, environmental concern, and PCE. *Advances in Consumer Research*, 32, 592–599.
- Kole, A. P. W. (2003). Consumer opinions towards farmed fish, accounting for relevance and individual knowledge. In J. Luten, J. Oehlenschläger, & G. Olafsdóttir (Eds.), *Quality of fish from catch to consumer: Labelling, monitoring and traceability* (pp. 393–400). Wageningen: Wageningen Academic Publisher.
- Kollmuss, A., & Agyeman, J. (2002). Mind the gap: why do people act environmentally and what are the barriers to pro-environmental behaviour? *Environmental Education Research*, 8(3), 239–260. doi:[10.1080/13504620220145401](https://doi.org/10.1080/13504620220145401).
- Kroeber-Riel, W., Weinberg, P., & Gröppel-Klein, A. (2009). *Konsumentenverhalten* (9th ed.). München: Vahlen.
- Krystallis, A., Vassallo, M., Chrysoschoidis, G., & Perrea, T. (2008). Societal and individualistic drivers as predictors of organic purchasing revealed through a portrait value questionnaire (PVQ)-based inventory. *Journal of Consumer Behaviour*, 7, 164–187. doi:[10.1002/cb.244](https://doi.org/10.1002/cb.244).

- Kupsala, S., Jokinen, P., & Vinnari, M. (2013). Who cares about farmed fish? Citizen perceptions of the welfare and the mental abilities of fish. *Journal of Agricultural and Environmental Ethics*, 26, 119–135. doi:[10.1007/s10806-011-9369-4](https://doi.org/10.1007/s10806-011-9369-4).
- Lasner, T., & Hamm, U. (2014). Exploring ecopreneurship in the blue growth: A grounded theory approach. *Annals of Marine Sociology*, 23, 4–20.
- List, J. A., & Gallet, C. A. (2001). What experimental protocol influence disparities between actual and hypothetical stated values? *Environmental and Resource Economics*, 20, 241–254.
- Loureiro, M. L., & Bugbee, M. (2005). Enhanced GM foods: Are consumers ready to pay for the potential benefits of biotechnology? *The Journal of Consumer Affairs*, 39(1), 52–70. doi:[10.1111/j.1745-6606.2005.00003.x](https://doi.org/10.1111/j.1745-6606.2005.00003.x).
- Lusk, J. L., & Schroeder, T. C. (2004). Are choice experiments incentive compatible? A test with quality differentiated beef steaks. *American Journal of Agricultural Economics*, 86, 467–482. doi:[10.1111/j.0092-5853.2004.00592.x](https://doi.org/10.1111/j.0092-5853.2004.00592.x).
- Mauracher, C., Tempesta, T., & Vecchiato, D. (2013). Consumer preferences regarding the introduction of new organic products. The case of the Mediterranean sea bass (*Dicentrarchus labrax*) in Italy. *Appetite*, 63, 84–91. doi:[10.1016/j.appet.2012.12.009](https://doi.org/10.1016/j.appet.2012.12.009).
- McClenachan, L., Dissanayake, S. T. M., & Chen, X. (2016). Fair trade fish: Consumer support for broader seafood sustainability. *Fish and Fisheries*, 17(3), 825–838. doi:[10.1111/faf.12148](https://doi.org/10.1111/faf.12148).
- Myrland, O., Trondsen, T., Johnston, R. S., & Lund, E. (2000). Determinants of seafood consumption in Norway: Lifestyle, revealed preferences, and barriers to consumption. *Food Quality and Preference*, 11, 169–188. doi:[10.1016/s0950-3293\(99\)00034-8](https://doi.org/10.1016/s0950-3293(99)00034-8).
- Olesen, I., Alfnes, F., Bensze Rora, M., & Kolstad, K. (2010). Eliciting consumers' willingness to pay for organic and welfare-labelled salmon in a non-hypothetical choice experiment. *Livestock Science*, 127, 218–226. doi:[10.1016/j.livsci.2009.10.001](https://doi.org/10.1016/j.livsci.2009.10.001).
- Olsen, S. (2001). Consumer involvement in seafood as family meals in Norway: An application of the expectancy-value approach. *Appetite*, 36, 173–186. doi:[10.1006/appe.2001.0393](https://doi.org/10.1006/appe.2001.0393).
- Pieniak, Z., Aertsens, J., & Verbeke, W. (2010a). Subjective and objective knowledge as determinants of organic vegetables consumption. *Food Quality and Preference*, 21, 581–588. doi:[10.1016/j.foodqual.2010.03.004](https://doi.org/10.1016/j.foodqual.2010.03.004).
- Pieniak, Z., Vanhonacker, F., & Verbeke, W. (2013). Consumer knowledge and use of information about fish and aquaculture. *Food Policy*, 40, 25–30. doi:[10.1016/j.foodpol.2013.01.005](https://doi.org/10.1016/j.foodpol.2013.01.005).
- Pieniak, Z., Verbeke, W., Brunsø, K., Scholderer, J., & Olsen, S. (2009). Comparison between Polish and Western European fish consumers in their attitudinal and behavioural patterns. *Acta Alimentaria*, 38, 179–192. doi:[10.1556/aalim.38.2009.2.5](https://doi.org/10.1556/aalim.38.2009.2.5).
- Pieniak, Z., Verbeke, W., Vermeir, I., Brunsø, K., & Olsen, S. (2007). Consumer interest in fish information and labelling: Exploratory insights. *Journal of International Food and Agribusiness Marketing*, 19, 117–141. doi:[10.1300/j047v19n02_07](https://doi.org/10.1300/j047v19n02_07).
- Potts, T., Pita, C., O'Higgins, T., & Mee, L. (2016). Who cares? European attitudes towards marine and coastal environments. *Marine Policy*, 72, 59–66. doi:[10.1016/j.marpol.2016.06.012](https://doi.org/10.1016/j.marpol.2016.06.012).
- Prickett, R. W., Norwood, F. B., & Lusk, J. L. (2010). Consumer preferences for farm animal welfare: Results from a telephone survey of US households. *Animal Welfare*, 19, 335–347.
- Risius, A., Janssen, M., & Hamm, U. (2017). Consumer preferences for sustainable aquaculture products: Evidence from in-depth interviews, think aloud protocols and choice experiments. *Appetite*, 113, 246–254. doi:[10.1016/j.appet.2017.02.021](https://doi.org/10.1016/j.appet.2017.02.021).
- Roberts, J. A. (1996). Green consumers in the 1990s: Profile and implications for advertising. *Journal of Business Research*, 36, 217–231. doi:[10.1016/0148-2963\(95\)00150-6](https://doi.org/10.1016/0148-2963(95)00150-6).

- Roheim, C. A., Asche, F., & Santos, J. I. (2011). The elusive price premium for ecolabelled products: Evidence from seafood in the UK market. *Journal of Agricultural Economics*, 62, 655–668. doi:[10.1111/j.1477-9552.2011.00299.x](https://doi.org/10.1111/j.1477-9552.2011.00299.x).
- Schlag, A. K., & Ystgaard, K. (2013). Europeans and aquaculture: Perceived differences between wild and farmed fish. *British Food Journal*, 115, 209–222. doi:[10.1108/00070701311302195](https://doi.org/10.1108/00070701311302195).
- Scholder Ellen, P. (1994). Do we know what we need to know? Objective and subjective knowledge effects on pro-ecological behaviors. *Journal of Business Research*, 30, 43–52. doi:[10.1016/0148-2963\(94\)90067-1](https://doi.org/10.1016/0148-2963(94)90067-1).
- Schwartz, S. H. (2012). An overview of the Schwartz theory of basic values. *Online Readings in Psychology and Culture*, 2(1), 1–20. doi:[10.9707/2307-0919.1116](https://doi.org/10.9707/2307-0919.1116).
- Solgaard, H. S., & Yang, Y. (2011). Consumers' perception of farmed fish and willingness to pay for fish welfare. *British Food Journal*, 113, 997–1010. doi:[10.1108/00070701111153751](https://doi.org/10.1108/00070701111153751).
- Solomon, B. D., & Johnson, N. H. (2009). Valuing climate protection through willingness to pay for biomass ethanol. *Ecological Economics*, 68, 2137–2144. doi:[10.1016/j.ecolecon.2009.02.010](https://doi.org/10.1016/j.ecolecon.2009.02.010).
- Solomon, M. R., Bamossy, G., Askegaard, S., & Hogg, M. (2010). *Consumer behaviour. A European perspective*. New York: Prentice Hall Europe.
- Thøgersen, J., & Ölander F. (2002). Human values and the emergence of a sustainable consumption pattern: A panel study. *Journal of Economic Psychology*, 23, 605–630. doi:[10.1016/s0167-4870\(02\)00120-4](https://doi.org/10.1016/s0167-4870(02)00120-4).
- Vanhonacker, F., Altintzoglou, T., Luten, J., & Verbeke, W. (2011). Does fish origin matter to European consumers? Insights from a consumer survey in Belgium, Norway and Spain. *British Food Journal*, 113, 535–549. doi:[10.1108/00070701111124005](https://doi.org/10.1108/00070701111124005).
- Vanhonacker, F., & Verbeke, W. (2014). Public and consumer policies for higher welfare food products: Challenges and opportunities. *Journal of Agricultural and Environmental Ethics*, 27, 153–171. doi:[10.1007/s10806-013-9479-2](https://doi.org/10.1007/s10806-013-9479-2).
- Verbeke, W., Sioen, I., Brunsø, K., De Henauw, S., & Van Camp, J. (2007a). Consumer perception versus scientific evidence of farmed and wild fish: Exploratory insights from Belgium. *Aquaculture International*, 15, 121–136. doi:[10.1007/s10499-007-9072-7](https://doi.org/10.1007/s10499-007-9072-7).
- Verbeke, W., Vanhonacker, F., Sioen, I., Van Camp, J., & De Henauw, S. (2007c). Perceived importance of sustainability and ethics related to fish: A consumer behavior perspective. *Ambio*, 36, 580–585. doi:[10.1579/0044-7447\(2007\)36\[580:piosae\]2.0.co;2](https://doi.org/10.1579/0044-7447(2007)36[580:piosae]2.0.co;2).
- Verbeke, W., Vermeir, I., & Brunsø, K. (2007b). Consumer evaluation of fish quality as basis for fish market segmentation. *Food Quality and Preference*, 18, 651–661. doi:[10.1016/j.foodqual.2006.09.005](https://doi.org/10.1016/j.foodqual.2006.09.005).
- Weible, D., Christoph-Schulz, I., Salamon, P., & Zander, K. (2016). Citizens' perception of modern pig production in Germany: A mixed-method research approach. *British Food Journal*, 118(8), 2014–2032. doi:[10.1108/bfj-12-2015-0458](https://doi.org/10.1108/bfj-12-2015-0458).
- Whitmarsh, D., & Palmieri, M. G. (2011). Consumer behaviour and environmental preferences: A case study of Scottish salmon aquaculture. *Aquaculture Research*, 42, 142–147. doi:[10.1111/j.1365-2109.2010.02672.x](https://doi.org/10.1111/j.1365-2109.2010.02672.x).
- Zander, K., Bürgelt, D., Christoph-Schulz, I., Salamon, P., & Weible, D. (2015). *Consumers' response to sustainability labelling in wild caught fish*. XXII Conference of the European Association of Fisheries Economist, Salerno (Italy), 28th - 30th April 2015. Retrieved from http://www.unisa.it/uploads/13606/katrin_zander.pdf.
- Zepeda, L., & Deal, D. (2009). Organic and local food consumer behaviour: Alphabet theory. *International Journal of Consumer Studies*, 33, 697–705. doi:[10.1111/j.1470-6431.2009.00814.x](https://doi.org/10.1111/j.1470-6431.2009.00814.x).