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How Do Italian Consumers Value Sustainable Certifications on Fish?—An Explorative Analysis

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Abstract: Sustainable certifications communicate the environmental benefits of food products to consumers, and allow producers to differentiate their products from conventional ones. This study expands existing knowledge on fish consumers by assessing the importance of sustainable certifications in fish selection. A best–worst analysis was applied to a convenient sample of Italian household members responsible for food shopping, segmented with a latent class clustering model based on their socio-demographic characteristics, fish purchase behaviors, as well as attitudinal features. The results show that sustainable certifications were of interest to consumers, as more than 1 out of 10 respondents valued sustainable certifications in purchasing fish. Respondents interested in sustainable certifications on fish were medium-aged consumers, with high working status, well educated, as well as living in a medium-size household without children. These consumers were more interested in organic foods and had an interest in food nutritional information; they likely have a healthy holistic lifestyle, and may purchase organic food, including fish, to improve their health by increasing their physical well-being.

Keywords: fish attributes; sustainable attribute; consumer preferences; best-worst analysis; cluster analysis

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1. Introduction

Fish is a key component of a balanced and healthy diet due to its low fat content, high-quality proteins, as well as the micronutrients, such as vitamins and minerals, it contains. Furthermore, fish is a good source of long-chain polyunsaturated fatty acids (LCPUFAs or Omega-3) beneficial for human health, as their consumption lowers the risk of cardiovascular diseases [1,2]. Given its many nutritional properties, fish consumption is recommended twice a week, and has rapidly increased in the last decades across developed countries, although the recommended fish intake is not widely achieved among the western population [3–6].

The rising demand for fish has been mostly satisfied from wild captures, which has threatened fish stocks that are often overfished, with a negative impact on the ecosystem as well as on biodiversity. Thus, policymakers have promoted the development of the aquacultural sector to attempt to lower the pressure on the sea ecosystem and promote sustainable consumption. Indeed, the consumption of farmed fish jointly allows for maintaining sea fish stocks within biologically sustainable limits, as well as satisfying the rising consumer demand for fish, which sped up during the COVID-19 pandemic [7,8]. The new Green Deal of the Farm to Fork strategy amplifies the efforts to bring fish stocks to sustainable levels by strengthening the actions taken to control overfishing, and at the same time it

encourages and accelerates the transition to sustainable fish and seafood production [8]. Considering that the carbon footprint related to farmed fish and seafood is overall lower than that of animal production on land, the European Commission considered adopting EU guidelines to encourage Member States' sustainable aquaculture development, and in particular, to support primary producers over supply chain operators, with the aim of increasing primary producers' margins, which will help to provide a sustainable product.

Additionally, under the new organizational structure of the fishery and aquaculture product markets, emphasis has been placed on pursuing "sustainable consumption". This "sustainable consumption" has been promoted through informational campaigns aiming to increase the demand for and consumption of fishery and aquaculture products caught/farmed sustainably, with lower environmental impacts. Related to this point, several labeling schemes have been implemented to promote fish products obtained from "responsible fisheries", or aquaculture fish "farmed responsibly" (e.g., Marine Stewardship Council (MSC) and Aquaculture Stewardship Council (ASC) logos), as have organic certifications for aquaculture products. These certifications/logos signal to the consumer that the fish has been obtained from "responsible fisheries", or is an aquaculture fish "farmed responsibly" or organically, in an attempt to support the growing consumer demand for sustainable fish that has risen over the last few years [9,10]. Although studies have pointed out the importance of fish's sustainable attributes for consumers and the promotion of sustainable fish consumption as a policy goal, the food marketing literature has pointed out that several other fish attributes guide consumers' fish purchases (see the next subparagraph for a literature review of food marketing studies on consumer preferences for fish attributes).

Given the multitude of attributes related to fish (e.g., country of origin, price, taste, experience, fish species, production process, and storage process) that jointly affect consumers' preferences, researchers need to account jointly for all them in their research design if they want to assess the sustainable attribute relevance. This calls for a more complex research design, allowing researchers to rank consumers' preferences for the multitudes of product features related to the fish product, including the sustainability attribute. The best–worst methodology permits this by ranking consumers' preferences for the several features of a product.

Thus, this study aims to extend the existing literature on consumers of fish products by assessing the importance of sustainability-related certifications in selecting a fish product, using a best–worst analysis and a convenience sample of Italian consumers. Then, the study segments consumers based on their preferences for common product attributes by profiling the group interested in sustainability-related attributes via latent class clustering analysis. To the best of our knowledge, this is the first study that jointly assesses consumers' preferences for the many attributes potentially exhibited by fish (e.g., taste, country of origin, past experience, etc.) including the sustainability attribute, as well as attempting to identify the socio-demographic and behavioral characteristics of those interested in the sustainability dimension of fish, on which topic the literature gives scant evidence. The remainder of the paper is structured as follows: the next sub-section encloses a review of studies on consumer acceptance of and preferences for fish attributes; Section 2 outlines the data, and methods used to analyze the data; then, we discuss the empirical results in Section 3. We conclude by providing recommendations for producers and policymakers in Section 4.

Review of Studies on Consumer Acceptance of and Preferences for Fish Attributes

Consumer acceptance of, and preferences for, fish products are largely affected by the search, experience and credence attributes. Search attributes are product characteristics that can be assessed by consumers before purchasing or consuming a product [11], for example, price and fish species. Experience attributes are features of the product that consumers can accurately assess after the purchase and consumption [11], such as sensory features, which may generate a pleasant or unpleasant consumer experience. Lastly, credence attributes are

quality product dimensions that consumers cannot evaluate either ex-ante or ex-post the food consumption [12], such as product country of origin, production method (e.g., organic, farmed vs. captured), and other production specifics (e.g., whether the product is fresh, chilled, frozen, deep-frozen or blast chilled). Fish products encompass a wide range of the above-mentioned attributes, and food marketing scholars have closely explored the roles of such attributes in consumer acceptance of and preferences for a fish product, largely via choice-based conjoint analyses and experiments.

Several studies have investigated consumers' preferences for search and experience quality attributes. Scholars have consistently found that consumers perceive fish as a costly food compared to others, as well as an expensive source of proteins compared to meat, although it encompasses many products sold at very different market prices, and many fish species are available at low prices. The consumer's perception that fish is a pricy food often negatively affects its consumption [13–15]. Besides the relevance of product price to consumers' fish selection, consumers generally prefer fish species they are familiar with, as well as those that they know how to prepare and consume (e.g., pangasius, saithe, salmon, sea bream, sole, tuna, swordfish and monk fish). Additionally, consumers' preferences for fish species are largely affected by the taste/hedonic expectations related to future fish consumption and recalled past consumption experiences. Furthermore, the socio-demographic characteristics of consumers, as well as cultural traditions of seafood consumption, modulate preference for species in the marketplace [16–18]. Indeed, many studies found that fish taste, smell, and texture are pivotal determinants of consumption, as are relevant quality clues used to assess the product's freshness. A consumer's positive attitude to eating fish will be associated with higher consumption, as well as a higher appreciation of fish taste characteristics. Wild-caught fish is overall indicated by consumers as superior in terms of taste compared to farm-raised fish [14,17].

Credence attributes further shape consumers' preferences for fish. The literature has shown that the majority of consumers perceive fish as a healthy food due to its high nutritional content. Indeed, consumers consider fish to be healthier than meat and other protein sources, as it is easier to digest, has less fat, and is a source of many elements beneficial for human health (e.g., Omega-3, phosphorus, iodine, and vitamins). The average consumer feels that fish is a key component of a healthy diet, and the most suitable protein source for children [17,19]. However, besides the consumer belief that fish is a healthy food, their knowledge about the specific health and nutritional benefits is limited, except for that of older and better-educated consumers [17,18].

Additionally, production and storage processes affect consumer acceptance and preferences for fish products. Consumers show marginal interest in deciding between purchasing wild or farmed fish, as they consider the production method (farmed vs. captured) the least relevant product feature in the purchasing decision process, compared to other quality attributes potentially available in fish. However, wild fish is perceived to be superior to farmed fish in terms of taste, healthiness, and nutritional value. Such a perception is more marked in older consumers with traditional eating habits, as well as in those consumers living on the coast [17,20–23]. Consumers consistently prefer chilled fish over frozen, canned, or smoked. Chilled fish is largely perceived to be qualitatively superior to fish stored using other preserving/processing methods, as consumers consider chilled fish as tastier, safer, healthier, and more natural than frozen, canned, or smoked fish [17]. Additionally, few scholars identified a segment of consumers who were interested in buying eco-labeled, or organic, fish products also displaying other product attributes. The authors show that, on average, consumers associate an eco-label, or a sustainable logo, with environmental protection aspects rather than ethical ones, and the presence of an eco-label, or a sustainability logo, on fish products positively affects consumer choices. Consumers interested in sustainable fish attributes are mostly from Northern European countries, and are willing to pay a premium price to buy such products [17,18,24–27].

Lastly, the country of origin was indicated as one of the most important fish attributes for consumers during food purchasing [14,17,28–30]. The average consumer generally

prefers domestic fish compared to imported fish, and domestic fish benefits from a positive price premium—one of the highest premiums compared to other potential fish attributes. Consumers' preferences for domestic fish are associated to their beliefs that domestic or local fish is fresher, due to the shorter transport time, as well as being subject to stricter quality control measures from national authorities compared to fish from other countries [17,25].

This brief review of studies on consumers' preferences for the multiple attributes associated with fish products points to a growing consumer interest in the many features or quality dimensions of fish. The studies reviewed have assessed consumers' acceptance of and preferences for a few select product attributes, which are usually tested in choice- or conjoint-based studies. However, such a research approach fails to consider that such attributes may be jointly available within the fish product, and thus affect consumer's choices in combination. Therefore, the variations in results across studies may depend on the attributes included in the research design.

2. Materials and Methods

In order to reveal consumer preferences for fish attributes, a best–worst method (BWM) analysis was performed. The BWM was developed in 1990 by Louviere and Woodworth (1990) [31] and first published by Finn and Louviere (1992) [32]. The BWM has the advantage of being free from rating bias [22], and it involves iteratively asking the interviewees to choose their most preferred ("best") and least preferred ("worst") product attributes, or items, from a choice set. The number of items in a single choice set and the number of choice sets depend on the total number of items, and are determined by the experimental design. The BWM approach to discovering consumer preferences for food products has been widely applied in the food marketing literature, e.g., [24,32–36]. The current BWM experiment exhibits a balanced incomplete block design (12,4,3,1) (Note: the choice set contains 12 choices, there are 4 repetitions per level, 3 is the number of items in each choice set, and the pair frequency is 1), i.e., there are 9 items included in the analysis, and these are divided into 12 choice sets with 3 items each, and every attribute appears 4 times in the choice sets. The term "balanced" indicates that every item appears the same number of times. The 9 items are the selected fish attributes or features, and these are reported in Table 1 along their description.

Respondents were asked to assess different fish attributes, indicating which one is the most (and the least) important attribute in the purchasing action for each of the 12 choice set. The rankings for the fish attributes were calculated for each single respondent, and subsequently for the entire sample, by assigning +1 every time one attribute was mentioned as the best and −1 every time it was mentioned as the worst. By adding the +1 s and the −1 s, it is possible to obtain a score for each fish attribute (BW score), and this is used to form the final ranking after having divided it by the sample size (BW average score). Due to the specific experimental design here, every attribute has a score for each individual, from −4 to +4. While the BW average score indicates the attribute's importance, it is worth pointing out that an attribute having an average score below 0 does not indicate a dislike, but a preference level below the average [37].

Table 1. The 9 product attributes used in the survey (translated from Italian).

Attribute Property	Attribute	Attribute Description	References
Credence	Country of Origin	The country (e.g., Italy, Spain, Greece, etc.) where consumed the fish are bred/caught.	[14,17,25,28,29,38]
Search	Price	The average price (EUR/kg) paid for the seafood purchased (i.e., 14.00 EUR/kg; 24.00 EUR/kg).	[13–15]
Experience	Taste	The sensory features of the fish purchased (eg., flavor (umami), sweetness, etc.).	[16–18]

Table 1. *Cont.*

Attribute Property	Attribute	Attribute Description	References
Experience	Past Experience	Personal experience with a product already purchased in the past.	[16–18]
Search	Fish Species	The species of the fish purchased (e.g., sea bass or sea bass, sea bream, salmon, tuna).	[14–17]
Credence	Production Process	The fish purchased was caught in the sea or in inland waters, or was farmed.	[14,17,20–23]
Credence	Storage Process	The fish is fresh, chilled, frozen, deep-frozen or blast chilled.	[17]
Credence	Sustainability Certification	Certification with an associated logo certifying that all stages of the breeding process were carried out using environmentally friendly practices that do not make use of synthetic chemicals. In the case of caught fish, the fishing process minimizes the impact on the marine ecosystem (e.g., such as the choice of leaving enough individuals in the sea to allow reproduction, and fishing responsibly in compliance with national and international laws).	[17,18,24–26]
Credence	Nutritional Content	The high content of protein with a high biological value, as well as essential polyunsaturated fatty acids (Omega-3) vital for the proper functioning of the body.	[17–19]

An example of a choice set is reported in Table 2. Then, we used a latent class clustering model, or latent class analysis (LCA), to further analyze the heterogeneity within attribute importance among respondents [39], with clusters generated using attribute BW scores as the dependent variables. We used a latent class clustering model, or latent class analysis (LCA), to cluster the samples, and further analyzed the heterogeneity within attribute importance among respondents as LCA is a semi-parametric variant of the MNL, which does not require specific assumptions about the distributions of parameters across individuals, and performs better overall than the latter. Additionally, in the latent class clustering model, consumers are assumed to belong to different segments, each of which is characterized by unique class-specific utility parameters. In other words, within each segment, consumer preferences are homogeneous, but preferences vary between segments, allowing for a more in-depth understanding of consumer heterogeneity. The optimal numbers of classes were assessed using log-likelihood (LL), the Akaike information criterion (AIC) and the Bayesian information criterion (BIC).

Table 2. Example of choice set.

Attributes	Most Important	Least Important
Country of Origin		
Price		
Nutritional content		

Data were collected through an online survey created on Google forms, the link for which was shared via social media (e.g., WhatsApp, Facebook, LinkedIn), providing a convenience sample of 312 Italian household fish shoppers. For those who agreed to participate, written informed consent according to the national ethical requirement "Italian Personal Data Protection Code" (L.D. 196/2003) was collected. Data collection ran from

March 2021 to May 2021. We opted to use a convenience sample since data collection from a convenience consumer sample is less expensive and requires less time compared to data collection performed using other sampling methods. Additionally, a web-based questionnaire designed in Google forms is easily accessible by a broader audience of consumers, and is suitable to the explorative aim of the analysis.

The questionnaire is structured in three parts: the first part collects information on respondents' fish and seafood purchasing patterns; the second section includes the best–worst scaling questions; the third and last sections collect data on individuals' socio-demographic characteristics, such as age, gender, number of household members, average monthly income and level of education completed. In this part of the survey information on personal health conditions, body mass index, personal illness, family illness, and whether respondents follow special diets was collected. In addition, the last questionnaire section collected information on respondent's interest in food label information, including ingredients and calories, as well as the respondents' purchasing frequencies of organic and local products. The list of information collected from consumers is reported in Table 3 along with the variables' descriptions.

Table 3. Variables' descriptions and summary statistics.

Variables	Mean	St.Dev.	Min	Max
Average household seafood consumption (fish, crustaceans and mollusks) (0 = never–4 = more than once a week)	3.05	0.90	0	4
The average price paid for the fish product consumed the most (EUR/kilo)	14.61	6.86	2	40
The average household monthly expenditure on fish products (EUR) (0 = less than EUR 20–4 = more than EUR 100)	2.44	0.86	0	4
Share of fish from aquacultural systems consumed (0 = I do not know; 1 $\leq$ 20%; 2 = 20–50%; 3 = 51–80%; 4 = 100%)	1.34	1.37	0	4
Willingness to pay a premium price to purchase organic fish products (0 = 0%; 1 $\leq$ 5% more; 2 = 5–10% more; 3 = 11–20% more; 4= 21–30% more; 5 $\geq$ 30% more)	1.81	1.15	0	5
Organic fish product consumption frequency (0 = never–3 = often)	1.21	0.71	0	3
Gender (1 = female)	0.55	0.50	0	1
Age (years)	41.46	11.58	22	80
Household members (number)	3.09	1.18	1	7
Children below 12 years old (number)	0.29	0.45	0	1
Education level (0 = elementary school, 4 = Ph.D.)	3.12	0.79	0	4
Working status (0 = student; 1 = unemployed; 2 = housewife; 3 = retired; 4 = employed part-time; 5 = employed full time)	3.96	1.73	0	5
Resident in coastal areas (1 = yes)	0.31	0.46	0	1
Inhabitants of the municipality (0 $\leq$ 20,000 inhabitants; 1 = 20,000–100,000 inhabitants; 2 $\geq$ 100,000 inhabitants)	0.97	0.81	0	2
Household economic resources (0 = worst–3 = excellent)	1.96	0.46	0	3
Self-declared health status (1 = bad–7 = excellent)	5.74	0.94	3	7
Chronic diseases (diabetes, cardiovascular disease, hypertension, high cholesterol, etc.)? (1 = yes)	0.17	0.38	0	1
Chronic disease among relatives (diabetes, cardiovascular disease, hypertension, high cholesterol, etc.)? (1 = yes)	0.54	0.50	0	1
Special diet (1 = yes)	0.15	0.36	0	1
Daily diet prescribed by doctor/dietician (1 = yes)	0.20	0.40	0	1
Portions of fruit and vegetable daily consumed	3.39	1.50	0	12
Use of nutritional label on food products (0 = never–3 = often)	2.47	0.76	0	3
Use of fish-related information (0 = never—3 = usually)	2.11	0.94	0	3
Count of daily calories intake (0 = never–3 = often)	1.62	0.99	0	3
Organic foods purchased (0 = never–3 = often)	1.62	0.89	0	3
Zero-miles foods purchased (0 = never–3 = often)	2.24	0.79	0	3

3. Results and Discussion

The BW average scores for the whole sample are reported in Table 4, and show that consumers, on average, place a large emphasis on fish taste (with the highest BW average score of 1.50), which is the most relevant feature driving fish purchases.

Table 4. Sample-level best, worst, best–worst (BW) and average BW scores.

Product Attribute	Best	Worst	B-W	Avg. B-W
Taste	678.00	211.00	467.00	1.50 (a)
Country of origin	580.00	387.00	193.00	0.62 (b)
Fish species	466.00	418.00	48.00	0.15 (c)
Sustainability certification	322.00	306.00	16.00	0.05 (c)
Storage process	395.00	403.00	-8.00	−0.03 (d)
Production process	397.00	406.00	−9.00	−0.03 (d)
Nutritional content	337.00	456.00	−119.00	−0.38 (e)
Past Experience	261.00	531.00	−270.00	−0.87 (f)
Price	308.00	626.00	−318.00	−1.02 (f)

Note: BW scores for attributes bearing the same letter do not statistically differ according to the *t*-test ($p < 0.05$) for pairwise comparisons of means.

The results confirm the importance of sensory features in consumer fish selection, as reported in previous studies [17,18,36,38,40]. The country of origin of fish products was ranked in second place in terms of importance (0.62) for consumers during their fish purchasing process. This result is consistent with other studies indicating that individuals place great importance on the location where the fish is harvested or captured, preferring domestic fish species over foreign ones, as domestic fish is perceived to be of higher quality, safer, and fresher than imported fish [17,25,40,41]. The attributes fish species (0.15) and sustainability certification (0.05) jointly ranked third among those tested in driving consumer fish purchase preferences. The importance of the fish species in orienting consumers' preferences is likely related to the fact that the consumers in our sample purchase species with which they are familiar, and with which they have some expectation in terms of taste and sensory properties. The latter attribute scored first among the fish features tested, and this may partially explain the importance of fish species for the sampled consumers. Additionally, the individuals in our sample placed relatively high emphasis on the sustainability fish attribute, likely due to the increasing awareness among fish consumers about the environmental, ethical, and health-benefiting impacts of the consumption of sustainable fish [42,43].

Negative BW scores were found for the production process (−0.03) and storage conditions (−0.03). Such a result potentially suggests that the consumers in our sample are willing to trade the guarantee of domestic products, for which they have certain expectations regarding taste, for product features, such as storage and production process, on which they place lower emphasis. This result partially supports previous findings, according to which the production method (farmed vs. captured) is less relevant to fish purchasing decisions compared to other quality attributes [17,18,44,45].

Here, the nutritional value of fish (−0.38), the consumer's previous experiences with the fish (−0.87), as well as the fish price (−1.02) were the least important attributes to the sampled consumers' purchasing process. The limited importance of nutritional value and past experience can be explained by the fact that the average consumers consider fish products to be intrinsically healthy, thus placing a marginal interest in fish nutritional properties. Similarly, the limited consumer interest in past experiences with the product may be associated with the high importance that consumers place on fish taste and species, which suggests that the previous experience may not guide consumers' fish choices; instead, the species available in the store as well as the taste expectations guide the average consumer [23]. Lastly, among the attributes tested, price was considered by far the least important attribute when purchasing fish.

Consumer heterogeneity was explored using the average BW score and a latent class cluster analysis to identify homogeneous consumer groups having similar preferences for fish attributes, in which each individual belongs to one k cluster, the size and number of which are unknown a priori. The larger the average BW score of an attribute, the more important the attribute is for the consumer group. We identified five homogeneous consumer groups, reported in Table 5, using the Bayesian information criterion (BIC), Akaike information criterion (AIC) and log-likelihoods (LL) to select the optimal number of segments. Here, all the indicators were improved as more clusters were added, suggesting the presence of multiple segments in the sample (values reported in Table A1 in Appendix A). Although the indicators were further improved as more cluster were added, the changes were much smaller in the shift from the five- to the six-cluster model compared to the move from the four- to the five-cluster model. Additionally, the five-cluster model provided the best interpretability compared to the six-cluster model. Thus, as the model's interpretability is as important as the statistical tests, the five-cluster model was selected for our analysis. Additionally, all segments differed significantly (p-value < 0.01) from each other with respect to the nine quality attributes tested (country of origin, price, taste, past experience, fish species, production process, storage process, sustainability certification and nutritional content).

Table 5. Heterogeneity of preferences for product attributes according to average BW scores.

	Organic Foods Consumers		**Health-Conscious Consumer**		**Careless Consumer**		**Traditional Fish Consumer**		**Budget-Limited Consumer**	
	(11.22%)		**(16.99%)**		**(15.71%)**		**(17.95%)**		**(38.13%)**	
Product Attribute	**Avg. B-W**		**Avg. B-W**		**Avg. B-W**		**Avg. B-W**		**Avg. B-W**	
Taste	0.314	(d)	0.651	(c)	1.405	(b)	2.083	(a)	1.267	(b)
Country of origin	1.629	(a)	1.012	(b)	0.147	(d)	0.583	(c)	0.400	(c)
Fish species	−0.457	(d)	−0.233	(c)	−0.353	(c,d)	0.917	(a)	0.400	(b)
Sustainability certification	1.029	(a)	−0.186	(d)	0.194	(c)	−0.083	(d)	−0.467	(b)
Storage process	0.343	(a)	0.093	(b)	−0.735	(d)	0.167	(b)	−0.400	(c)
Production process	0.343	(a)	0.349	(a)	0.088	(b,c)	0.000	(c)	0.133	(b)
Nutritional content	−0.229	(c)	1.130	(a)	−0.324	(c)	−0.194	(c)	0.433	(b)
Past Experience	−0.857	(b)	−1.049	(b)	−2.029	(a)	−0.417	(c)	−1.300	(b)
Price	−2.114	(c)	−1.767	(c)	1.606	(a)	−3.056	(d)	−0.467	(b)

Note: Average BW scores bearing the same letter on the same row were not significantly different according to pairwise Tukey test ($p < 0.05$). The share of consumers in each group is reported in parentheses below the group name.

Additionally, the consumer groups' profiles in term of fish consumption habits and socio-demographic characteristics are reported in Table 6.

The first consumer group, organic foods consumers (11.22% of the sample), valued country of origin of fish first (1.629), followed by the sustainability certification (1.029), while they were less interested in price (−2.114) and past experience (−0.857). This consumer group encompasses medium-aged consumers with high working status, who are well educated and living in a medium-size household without children. Such consumers have medium–low fish consumption and average monthly expenditure, but pay the highest price among the groups to purchase the fish products they prefer, and also show a higher willingness to pay for organic fish. Organic food consumers are highly interested in the food having a nutritional label, as they claim to use this regularly, and they show the highest consumption of organic products, besides fish, among the groups. These consumers, who both prefer organic foods and are interested in food's nutritional information, likely have a healthy holistic lifestyle, and may purchase organic food to improve their health by increasing their physical well-being.

Thus, the selection of fish with sustainable attributes is likely guided by consumer interest in health, rather than an interest in lowering the environmental impacts of fish

capture/production. The preference for this product attribute is not isolated, but correlated with other [46–49].

Table 6. Cluster differences in terms of respondent socio-demographics, fish consumption habits, and health-related behaviors.

Variable	Organic Foods Consumers		Health-Conscious Consumer		Careless Consumer		Traditional Fish Consumer		Budget-Limited Consumer	
Average household seafood consumption	2.86	(b)	3.40	(a)	2.62	(b)	3.25	(a)	3.27	(a)
The average price paid for the fish product consumed the most	17.16	(a)	16.33	(a)	12.40	(c,b)	14.33	(b)	10.13	(c)
The average household monthly expenditure on fish products	2.60	(b)	2.79	(a)	2.12	(b,c)	2.83	(a)	1.87	(c)
Share of fish consumed from aquacultural systems	1.41	(a)	1.49	(a)	0.77	(c)	1.11	(b)	1.20	(a,b)
Willingness to pay a premium price to purchase organic fish products	2.23	(a)	1.91	(a,b)	1.50	(c,b)	1.67	(b)	1.73	(b)
Organic product consumption frequencies	1.97	(a)	1.49	(b,c)	1.15	(c)	1.36	(b)	1.13	(b)
Gender	0.54	(a)	0.60	(a,b)	0.47	(a)	0.69	(b)	0.67	(b)
Age	41.43	(b)	42.07	(b)	36.85	(a)	47.39	(c)	37.00	(a)
Household members	3.26	(b)	3.19	(b)	3.85	(a)	3.11	(b)	3.53	(a)
Children below 12 years old	0.10	(a)	0.37	(b)	0.15	(a)	0.31	(b)	0.40	(b)
Education level	3.23	(a)	3.07	(a)	2.68	(b)	3.33	(a)	3.13	(a)
Working status	3.86	(b)	4.14	(b)	3.00	(c)	4.64	(a)	3.80	(b)
Resident in coastal areas	0.46	(a)	0.19	(b)	0.15	(c)	0.42	(a)	0.27	(b)
Inhabitants of the municipality	1.51	(a)	0.88	(b)	0.59	(c)	1.08	(b)	0.93	(b)
Household economic resources	2.09	(a)	2.12	(a)	1.82	(a)	2.22	(a)	2.00	(a)
Self-declared health status	6.06	(a)	5.86	(a,b)	5.53	(b)	5.92	(a)	6.07	(a)
Chronic disease	0.20	(b)	0.14	(a,b)	0.15	(a,b)	0.25	(b)	0.00	(a)
Chronic disease among relatives	0.54	(a)	0.53	(a)	0.59	(a)	0.53	(a)	0.60	(a)
Special diet	0.17	(a)	0.30	(b)	0.06	(a)	0.17	(a)	0.13	(a)
Daily diet from doctor/dieticians	0.14	(b)	0.28	(b)	0.03	(a)	0.22	(b,c)	0.27	(b)
Portions of fruit and vegetable consumed daily	3.46	(b)	3.98	(a)	3.06	(c)	3.44	(b)	3.33	(b)
The use of nutritional label on food products	2.97	(a)	2.79	(a)	2.59	(b)	2.36	(b)	2.73	(a)
The use of fish-related information	2.69	(a)	2.56	(a)	2.09	(b)	1.92	(b)	2.13	(b)
Daily calories intake	1.86	(b)	2.80	(a)	1.71	(b)	1.75	(b)	1.27	(c)
Organic foods purchased	2.79	(a)	2.00	(b)	1.53	(c)	1.67	(c)	1.47	(c)
Zero-miles foods purchased	2.77	(a)	2.53	(a)	2.09	(b)	2.22	(b)	2.33	(b)

Note: Units of measurement of variables are the same as in Table 3. Average values bearing the same letter on the same row were not significantly different according to pairwise Tukey test ($p < 0.05$).

The second consumer group, health-conscious consumers (16.99% of the sample), place value on the fish nutritional content, which was the most important product characteristic (1.130) directing the food choices of the consumer group, followed by the country of origin (1.012) and product taste (0.651). Instead, health-conscious consumers were less interested in price (−1.767) and product past experience (−1.049), similarly to the organic foods consumers. This consumer group includes consumers with medium age and medium income working status, living in a household with children below 12 years old. This group shows the highest fish consumption, but a moderate willingness to pay for the sustainable fish attribute, in which they place marginal interest. Consumers in this group are highly interested in nutrition labels, which may justify the emphasis they place on fish nutritional content, and the presence of children below 12 years old may guide parents' interest in selecting healthy products for all family members [17,50,51]. The sustainability certification is the fifth attribute in terms of importance for the health-conscious consumer, as this consumer, although interested in the health benefits of fish consumption, does not identify a potential beneficial effect of the sustainability attribute on their own health.

The third consumer group, the careless consumer (15.71% of the sample), values fish taste (1.405) and its price (1.606) the most, with less interest in other product features. Such a result partially confirms previous studies pointing out the existence of a consumer

group that selects products solely based on price, as long as the product is acceptable for them in terms of taste [52,53]. Such a consumer group includes young consumers, with lower incomes and education levels compared to consumers belonging to other groups. Additionally, careless consumers are less interested in nutritional labels and their own diet, and show the lowest consumption levels of organic products. Sustainability certification is the third attribute in terms of importance for the careless consumer, whose interest in fish is based on fish price and taste, while marginal importance is placed on sustainability certification, which scores 0.194; this is far below 1, indicating attribute relevance in the consumer decision-making process.

Next is the traditional fish consumer, representing the fourth consumer group (17.95% of the sample). The consumers belonging to this group greatly value fish taste, which ranks in the first place (2.083), followed by fish species (0.917) and country of origin (0.583), while they are less interested in product price (−3.056). This consumer group encompasses consumers older than those belonging to other groups, who exhibit a high level of household seafood consumption, as well as having a high income and belonging to a household of average size, with children below 12 years old. Traditional fish consumers have high levels of education and live in small coastal municipalities, and are barely interested in fish labels and information, since they have more knowledge about fish products given that they are older and live in coastal cities, where the culture of fish consumption is stronger than in the countryside or towns [17,18,46]. Sustainability certification is the sixth attribute in terms of importance for the traditional fish consumer, making it one of the least relevant characteristics when purchasing fish in this group; they are mainly interested in fish organoleptic properties and origin.

The fifth and last consumer group is the budget-limited consumers (38.13% of the sample), which encompasses consumers that value fish taste (1.267), followed by country of origin of fish (0.400) and fish species (0.400), and who are less interested in sustainable certification and price (−0.467). This consumer group overall showed interest in multiple fish attributes, and is composed of young consumers with medium incomes, large families with children, and one of the highest average household consumption levels, along with being health-conscious and traditional fish consumers. Differently from the last group, they pay the lowest price for the quantity consumed, a result that is comparable to the hard-to-please consumer group addressed in many studies [5,54]. This group is interested in multiple product attributes, and what they can get for the price they pay. Sustainability certification is the seventh attribute in terms of relevance to the budget-limited consumer, and is the second least important attribute for the largest consumer group in our sample, whose fish choices are mainly driven by the product's taste.

4. Conclusions, Limitations and Future Research

Overall, the BW scores derived from the current study show that consumers, in choosing fish that may exhibit a set of attributes, place more importance on search and experience attributes. In detail, experience and search features, such as fish taste and species, are highly valued by the average consumer, as well as among the sub-sample of traditional fish consumers (oldest, mostly living in coastal areas and with the highest level of consumption of and expenditure on fish foods). The country of origin of fish was the main credence attribute, on which the average consumer places emphasis when purchasing fish. Additionally, the latter product characteristic is relevant among organic food consumers, as well as health-conscious consumers, while marginal interest in the fish country of origin was recorded by careless, traditional fish and budget-limited consumers. Storage and production process are credence attributes, which were, on average, less influential of fish purchase decisions among the sampled consumers; although the organic food consumers and health-conscious consumers recorded slightly higher interest in those attributes compared to other groups. This result suggests that the average consumer takes for granted the high nutritional value of fish, showing interest in other features, such as taste, origin and species. Instead, fish's nutritional value is of relevance only for health-

conscious consumers. Past experience and fish price were, overall, barely considered during purchasing by the consumers sampled. A potential reason for this may be that consumers perceive fish as a highly nutritional food, and thus accept that it has a high price, and past experiences may not affect consumer fish purchasing decisions, as the consumers show a higher interest in the species than in recalling past sensorial experiences when selecting fish. The results of the current study pointed out that the average consumer is partially interested in the sustainability certification of fish, likely due to the limited knowledge of sustainability certification schemes. Consumer interest in sustainable fish attributes is found among the group of organic buyers who are willing to trade fish taste for environmental (or health) benefits. In addition, this group is willing to pay a higher premium price to purchase sustainable fish. Informational campaigns can be employed to inform consumers of the advantages of consuming fish derived from sustainable production methods, and to increase their acceptance of, and preference for, sustainable fish, as well as their willingness to pay for it.

First, policymakers and producers may promote the knowledge, adoption, and use of labeling certifications for sustainable fish that meet strict rules in terms of environmental impact and animal welfare among the consumers. Concerning this point, specialized sellers and retailers play a fundamental role in promoting sustainable products by offering and encouraging certified products over conventional ones, since fish products are mainly purchased from fishmongers and supermarkets. Second, informational campaigns can be aimed at improving the public perception of sustainable professional aquaculture, as well as sustainable capture practices, using communication tools (traditional and through social media) that vary according to the geographical context, the species farmed, and the market. Specialized sellers and retailers play a key role in this activity, since consumers trust their advice in purchasing fish, and thus they must be able to correctly communicate information about production methods or capture techniques to the final consumer, increasing the product's acceptance and consumption among the latter. Third, an additional strategy to promote sustainable fish consumption can be aimed at increasing the sector's visibility, for example, by opening companies (e.g., aquacultural sites) to visitors, including schools and other educational institutions. This would promote the direct knowledge of professional sustainable aquaculture, or sustainable capture practices, as well as the benefits it generates for society and local communities, by increasing the acceptance of these products among consumers. Forth, we should promote collaboration between authorities, activities, and sector associations, including non-profit organizations, in order to develop strategies for promoting the use of quality labels and brands (subject to third party control to ensure their credibility). Such actors could promote geographical indications for sustainable fish products that also feature sustainability aspects. Fifth, and lastly, the promotion of sustainable fish consumption may also occur in short supply chains, promoting the product as "local, healthy, fresh and sustainable" [55]. The promotion of this form of supply chain will at the same time ensure an increase in the profitability of producers, promote territorial relations by promoting the level of trust between those taking part in the market, and guarantee the consumption of products with a lower environmental impact.

The current study is not free from limitations. One shortcoming is related to the limited number of respondents in our study, which lowers the external validity of our results, along with the use of the BW method that employs choice card experiments with a low level of realism. Lastly, the descriptions of the attributes used for the BW experiment could have been interpreted differently by different consumers recruited for the choice experiments. Thus, future research will employ a larger and more representative sample of Italian consumers, and will analyze consumer attitudes towards and preferences for selected fish attributes in more detail; we can thus consider the willingness to pay for sustainability attribute across heterogeneous consumer groups. Furthermore, a more realistic research design, granting a higher external validity of the results, will be employed. The latter can be obtained by using virtual shelf techniques that more closely simulate the complexity of

a "real" food choice environment, with respect to survey-based choice, and can potentially capture the consumer's variety-seeking behavior.

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Appendix A

Table A1. Criteria for selecting the optimal number of clusters.

Groups	Log-Likelihood	AIC	BIC
Two-clusters	−1831.16	3743.15	3671.15
Three-clusters	−1576.18	3488.15	3419.15
Four-clusters	−1379.22	3291.15	3226.15
Five-clusters	−1214.32	3126.15	3066.15
Six-clusters	−1184.65	3094.15	3041.15

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