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RESEARCH

The importance of local fisheries as a cultural attribute: insight from a discrete choice experiment of seafood consumers

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Abstract

The role of maritime heritage in providing benefits such as sense of place and identity has been well documented, but there is limited quantitative analysis (especially in monetary valuation) of its influence on people's preferences. In this paper, we present results from a choice experiment where we valued cultural and heritage aspects of fishing through the preferences of seafood consumption. We found a strong preference for some attributes of seafood such as "locality" (origin of the catches), freshness, and sustainability in harvesting, but also a significant role of tangible maritime cultural heritage, such as visible fishing operations. This analysis can be helpful in informing public policies aiming to enhance experiences of fisheries as a living heritage and to valorise local produce to increase income of local communities.

Keywords Maritime cultural heritage · Fisheries · Seafood · Relational values · Economic valuation · Choice experiment · Scotland

Introduction

Maritime cultural heritage is recognised as an important feature that shapes coastal regions and contributes to the identity (Khakzad et al., 2015; Khakzad & Griffiths, 2016) and to the sustainability of coastal rural communities (Brown, 2004). When we think of maritime cultural heritage, we often refer mainly to its physical attributes such as harbours, lighthouses, historic ships, coastal defences, and wrecks of ships and aircraft. Conversely, immaterial aspects provided by living maritime heritage are often overlooked partly because of the difficulty of disentangling the physical and intangible contributions to heritage. For example, fishing contributes to both aspects, e.g., where active, it shapes waterfront landscapes (Ford, 2011) or as a historical legacy through preserved vessels, artefacts, oral tradition, and music.

In addition to being a rich source of heritage (Howard & Pinder, 2003; Khakzad & Griffith, 2016; Urquhart & Acott, 2013a), fishing enables a way of life that generates deep-rooted practice-based place attachment and shapes individual and social identities (Khakzad and Griffiths, 2016) for both visitors and residents of coastal communities (Acott & Urquhart, 2017; Urquhart & Acott, 2013a, 2014). In so doing, it adds social and psychological value in addition to the economic value of fishing (Brown et al., 2003; Hausmann et al., 2015; Garcia-Quijano et al., 2015; Marsden and Hines, 2018; Nightingale, 2013). Residents of coastal communities continually develop place-attachment through practices surrounding fishing, either directly (Garavito-Bermúdez & Lundholm, 2017), or by maintaining historical, social, and cultural connections to the industry (Howard & Pinder, 2003; Reed et al., 2013).

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Fishing can also play a role in the process of place-making and the development of place-attachment for visitors, for example through purchasing local seafood, visiting maritime museums, or taking in the visual aesthetics of fishing activities (Claesson et al., 2005; Urquhart & Acott, 2013b).

The intense post WW II development, and the gentrification and globalization of the last years have tended to homogenise place identity and led to obscuring of "locality", including fishing culture (Khakzad & Griffith, 2016). Revitalizing visibility of fishing practice is an important element in sharing the culture and the manner of living of fishers (Ford, 2011; Ransely, 2011) and in maintaining coastal and maritime place identities. This can be achieved if the multiple values of fishing clearly emerge and are considered in public policies. In this paper, we explore the importance of fishing heritage in seafood consumption choices, valuing the contribution of fishing heritage to complementary industries, such as gastronomy or tourism (Brookfield et al., 2005; Urquhart & Acott, 2013b, 2014).

The full value of cultural elements given by the tangible and intangible heritage of fishing, whether as an existing practice or as a historical legacy, is not yet well recognised. This value is difficult, if not impossible, to monetise. Consequently, cultural elements have been undervalued or overlooked in utilitarian framework like the total economic value (Turner et al., 2003), expressed as monetary summation of tangible uses of the good/service and intangible benefits arising from the existence or bequest value, implemented in ecosystem services approaches like the economics of ecosystems and biodiversity (TEEB, 2010). This approach, which has dominated in policy decision making, has been demonstrated to lead to conflicts when social and cultural contexts around environmental issues are insufficiently acknowledged (Kenter, 2016; Martino et al., 2019). Although we recognise that the total value is higher than the total economic value, monetary-based approaches can still be used to demonstrate which culturally related elements of an object are valued most, in particular those relational values emanating from the interaction between natural and cultural heritage.

The aim of this study was to examine how some cultural and heritage aspects of fishing are valued by resident and non-resident of two Scottish coast towns. In particular, we were interested in exploring the cultural aspect of seafood choices, an issue which has not received sufficient attention (Daily et al., 2009) beyond the environmental issues, which have been approached through the development of certification as a tool to influence consumer choice (e.g., the Marine Stewardship Council scheme). We also examined the importance of living maritime heritage, such as the presence of a vibrant waterfront with visibly operating boats and working fish markets, in peoples' decisions to consume seafood (Khakzad et al., 2015; Symes and Phillipson, 2009). Our study goes beyond the importance of seafood as a provisioning product, as already recognized by local food policy for its capacity to generate direct income, to explore the diverse cultural and environmental attributes of seafood linked to consumer choices. These cultural aspects are well-recognized relational values (Chan et al., 2018) that do not directly emanate from nature, but are derived from our relationships with it (Pascual et al., 2017; Diaz et al., 2018; O'Connor and Kenter, 2019).

O'Connor and Kenter (2019) recognize relational values as non-instrumental, but still reflecting an anthropocentric perspective that can be tackled by the analysis of stated preference (Stale and Ready, 2002). This study promotes the exploration of these relational values, building around a questionnaire survey conducted in two Scottish west coast towns, which have both a historical and living fishing heritage (Bronnmann & Asche, 2017; Stead, 2005; Reed et al., 2013). Fishing heritage in fact holds an important role in the character of many rural coastal fishing communities in Scotland, particularly due to the prominence of the herring fishery in the eighteenth and nineteenth centuries (Berton-Charrière, 2017), and aids in the formation of place-attachment and individual and collectively held identities (Nadel-klein, 2000; Ross, 2013; Williams, 2014). The influences of fishing heritages also hold a crucial role in the tourism and recreation sectors of rural coastal communities (Khakzad, 2018; Khakzad et al., 2015; Reed et al., 2013). Many historical fishing communities in Scotland showcase fishing heritage as a draw for tourists, such as in the case of the Scottish Fisheries Museum (Anstruther) and the utilization of the "fisher lassie" image along the eastern coast of the country (Nadel-klein, 2000).

A stated preference analysis based on a choice experiment (Balogh et al. 2016; Verbeke et al., 2016) was carried out to identify those attributes that provide utility to consumers and to suggest the direction that fisheries and seafood-related policies should undertake to promote living fishing heritage and valorise locale produce.

Assessment of cultural heritage values based on utilitarian approaches

Relational values generated by fishing, as described in the previous section, can be assessed by stated preferences approaches that are commonly used in the environmental, health, transport, or marketing contexts (Bennett & Blamery, 2001; Bateman et al., 2002; Train, 2002). The contingent valuation method (CVM) has been applied for around 20 years in the field of cultural heritage (Noonan, 2003; Pearce et al., 2002; Provins et al., 2008), with a rapid increase in the use of discrete choice methods in recent years. The latter approach elicits the value of specific attributes of a good, compared to the CVM that attempts to value a policy change affecting the good in its entirety (Stale & Ready, 2002). This shift in methodology has followed the recognition of the complex and multidimensional nature of cultural heritage (Bennett, 2000; Mourato & Mazzanti, 2002), and the need for

public interventions in the cultural sphere to promote a more efficient allocation of resources (Gomes et al., 2013). For instance, the segmentation in several attributes has allowed the method to capture the preferences of tourists for heritage attractions and to provide for a better enjoyment of the touristic experience (Apostolakis & Jaffry, 2005). Similar considerations apply in relation to maritime cultural heritage (Oleson et al., 2015; Ropars-Collet et al., 2015) with Durán et al. (2015) being the first, to our knowledge, to use a discrete choice approach in the context of coastal cultural heritage. The authors focussed on different categories of fishing heritage, such as knowledge of the sea and fishing, folklore, entertainment and festivities, music, dances and food, and material heritage such as fishing architecture and traditional vessels, to elicit preferences for the design of economic incentives aimed at heritage preservation.

Despite such studies, applications of quantitative (monetary) analysis of maritime cultural benefits to inform policies valorising fisheries and tourism are limited (Khakzad et al., 2015; Symes and Phillipson, 2009), although Reed et al. (2013) demonstrated that harbours at seaside locations are a factor that encourages tourism, and inshore fishing allows tourists to gain access to fishing activities through the visual attribute of fishing vessels. Cerjak et al. (2014) also elicited positive attributes of traditional produce, such as its locality and the presence of environmental certification in harvesting, which promotes trust between consumers and producers.

To date, quantitative analysis of maritime cultural benefits carried out by discrete choice experiments have mainly targeted fishers (Oleson et al., 2015), although they represent a limited set of beneficiaries from effective cultural heritage management (Choi & Fielding, 2016). Some studies have investigated relational aspects of the marine seascape with recreationists, for example with divers, anglers (Jobstvogt et al., 2014), and walkers (Ropars-Collet et al., 2015). Other studies have explored the preferences of tourists for the local character of a place, such as restaurants serving local cuisine, suggesting that tourists are likely to have a considerable desire for the attribute "locality" when choosing coastal vacations (Lacher et al., 2013). Among general consumers, the importance of traditional food produce has also been shown (Verbeke et al., 2016). The latter paper, in particular, has recognized food as a cultural heritage that, if valorised by specific policies, can be a vehicle for adding value to the local economy (Verbeke et al., 2016).

As far as we are aware, the link between food consumption and cultural heritage, in other terms the wider, non-direct use benefits of the produce (Balogh et al., 2016; Bronnmann & Asche, 2017) has not been investigated. In our study, we contribute to the literature from a different angle, focussing on different attributes of seafood as a leverage to provide which tangible and intangible culturally related aspects are mostly valued by consumers, in order to provide suggestions to fisheries and tourism policies and contribute to create added value for coastal communities.

Methods

The geographic-cultural context

The Scottish west coast port towns of Oban and Mallaig (Fig. 1) act as hubs for both inshore fisheries, mainly carried out by small vessels operating within 12 nm (The Scottish Government, 2017), and tourism (Visit Scotland, 2016). Oban is also known as the "gateway" for the Inner and Outer Hebrides being the main ferry terminus for these routes, whilst Mallaig has an active fishing harbour which attracts tourists especially during the summer months. Both towns extensively market seafood through fish-based restaurants and harbour-side outlets. Although both towns have a long history of fishing, its development in Mallaig was historically hampered by poor transport links and fluctuated with the strength of the herring stocks[1]. In Oban, other industries, such as distilling were more important, so that fishing remained a relatively small-scale and seasonal enterprise, although completion of a rail link in 1880 meant catches could be sent rapidly to the cities of the Scottish Central Belt[2]. The types of seafood landed at these ports have also changed dramatically over time. Originally, the main landings were herring (*Clupea harengus*), but this shifted to mixed whitefish in the mid twentieth century. Since then, the inshore stocks of whitefish, such as cod (*Gadus morhua*), have declined and the focus of the fisheries has moved to shellfish, principally prawns (*Nephrops norvegicus*), brown crab (*Cancer pagurus*), and scallops (*Pecten maximus*) (Billing et al., 2018). Although some of this shellfish is marketed locally, the bulk is exported, mainly to Europe (Billing et al., 2018; The Scottish Government, 2019). Seafood sold in the takeaway and local restaurants will thus not necessarily be "local" with whitefish being mainly sourced from outside the area and even imported from countries such as Iceland and Norway (The Scottish Government, 2017).

[1] http://www.mallaigheritage.org.uk/exhibit/fishing.php, accessed 09/12/2020

[2] Oban — A historical perspective, drawn from the Ordnance Gazetteer of Scotland: A Survey of Scottish Topography, Statistical, Biographical and Historical, edited by Francis H. Groome and originally published in parts by Thomas C. Jack, Grange Publishing Works, Edinburgh between 1882 and 1885. https://www.scottish-places.info/towns/townhistory552.html, accessed 09/12/2020.

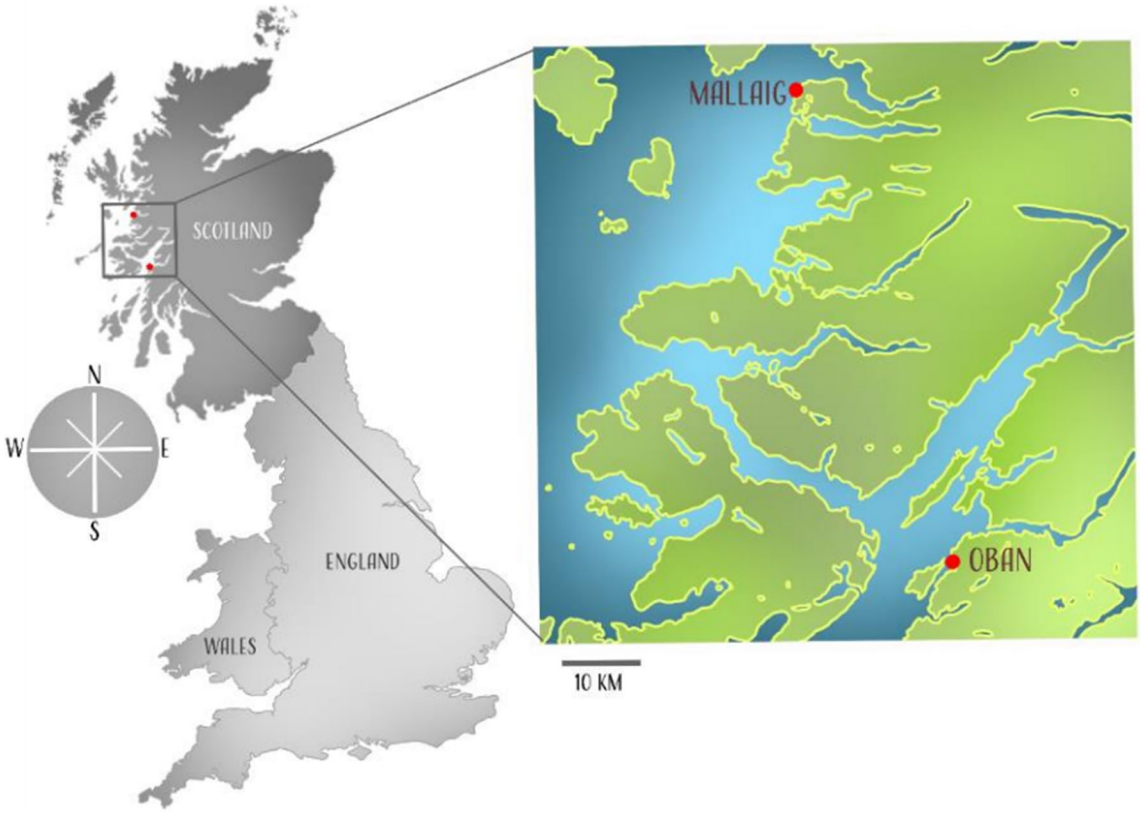

Fig. 1 A map indicating the study areas of Oban and Mallaig in the Scottish Highlands; source: Chiaroni (2020)

Survey design

Survey design is reported in the Appendix and consisted of a questionnaire for locals and visitors who were randomly selected and interviewed in the streets, or at piers and promenades. The survey was divided into four sections: (1) Background information on the respondent. (2) Connection with fishing and knowledge of fishing as cultural heritage. (3) The choice experiment and (4) socio-demographic information.

Section 1 collected background information about the origin of the person interviewed, if they were locals or visitors ("local" included residents of the town where the interview was carried out or persons visiting the town several times in a year because of working or family relationships). Section 2 investigated the reason for living or travelling to the coastal location where the interview was carried out, focussing on a series of natural, environmental, and socio-cultural aspects. This was followed by questions related to whether the individual had a connection with the area, and finally by a series of scale-based questions (5-point Likert scale) in order to elicit an individual's prior knowledge of local fishing as a source of cultural heritage. Section 3 comprised the choice experiment itself designed to elicit their seafood attribute preferences. Interviewees were introduced to the choice experiment, explaining the set of attributes and levels, describing them as the variables that characterise seafood consumption, and the differences between the alternatives provided (A, B) and the baseline C in the choice set (see Fig. 2). Respondees were asked to express their preferences for a portion of seafood characterised by all the attributes of the preferred alternative (A, B, or C). When making the choice, respondees were asked to take into consideration the trade-offs between non-monetary and monetary attributes, as if the choice were being made in a real market. At the end of the choice experiment, respondees were asked if they ignored one or more attributes in making their choice, avoided trading off monetary against non-monetary attribute or even replied randomly. Those who replied affirmatively were excluded by the final analysis.

It was explained to the interviewees that the baseline or status quo (option C) does not reflect the current cultural heritage related to fish consumption in the towns where interviews were carried out, but was a hypothetical situation chosen by the authors. The choice was made according to the findings of the literature reported in section 2; thus, this baseline should represent the least preferred combinations of seafood levels both for locals and visitors. Our expectation is for the alternative levels of the attributes to have positive and significant values compared to the baseline.

	A	B	C
Origin	 LOCAL PRODUCE	 IMPORTED	 IMPORTED
Processing	 FRESH	 FROZEN	 FROZEN
Harvesting	 INDUSTRIAL VESSEL	 SMALL VESSEL	 INDUSTRIAL VESSEL
Environmental Certification	No sustainable certified capture	Sustainable certified capture	No sustainable certified capture
Consumption	 RESTAURANT	 TAKEAWAY	 TAKEAWAY
Heritage	 WATERFRONT DEVELOPMENT	 FISHING HERITAGE	 WATERFRONT DEVELOPMENT
Cost in STERLING (£)	21	15	6
My choice			

Fig. 2 Example of choice cards, with two alternatives (**A**, **B**) and a status quo option (**C**). Interviewees were asked to choose the option preferred by ticking only one of the "My choice" cells reported below the monetary attribute

Table 1 attributes and levels used in the formulation of the choice cards for alternative options and status quo. In bracket, the code used in the regression model

Attribute	Levels in the options A–B	Levels in the status quo — C
Origin	Local fish (1); imported (0)	Imported fish (0)
Processing	Fresh fish (1); frozen (0)	Frozen fish (0)
Harvesting	Small-scale vessels operating inshore within 12nm (1); larger vessels operating offshore (0)	Larger vessels operating offshore (0)
Environmental certification	Certified catches (1); non-certified catches (0)	Non-certified catches (0)
Consumption	Restaurant (1); takeaway (0)	Takeaway (0)
Heritage	Visibility of fishing heritage such as docks, harbours, vessels) (1); visibility of a redeveloped waterfront and access to it for residential and commercial purposes (0)	Waterfront redevelopment (0)
Cost	£ 10, 15, 21	£6

The choice design comprised 24 cards grouped into 12 blocks, with each card presenting two hypothetical options (A and B) and a status quo option (C) (an example of one card is shown in Fig. 2). Each respondent was asked to reply only to one randomly chosen block containing two choice cards[3]. The full set of cards was prepared by Stata v.16 according to a D-efficient design that minimises the information matrix of the multinomial logit model (Campbell et al., 2007) using the levels reported in Table 1. No restrictions were applied to create the design. All attributes are independent. There are no dominated solutions in the choice design, as for instance the presence of all levels reported at the baseline but at higher cost (that used in the alternative A and B). In the alternative A and B, it is possible to find the option consuming seafood in takeaways accompanied by a high price, a combination that seems implausible, considering that consumers are expected to pay more for eating in a restaurant. However, the choice set contains one or more alternative options such as fresh seafood, fished locally and by environmentally certified fisheries that may justify the higher price.

The choice cards contained six different categorical non-monetary attributes, each characterized by two levels (Table 1). The attributes and levels of the choice cards were selected from studies reported in section 2, referring to the importance of locality (Lacher et al., 2013), traditional food produce (Verbeke et al., 2016), maritime heritage (Ropars-Collet et al., 2015 and Duràn et al., 2015), and sustainability certification (Cerjak et al., 2014). Our choice design merges some of these attributes found in the literature with others considered by us important for consumers in addressing their preferences (consumption in local restaurant) to better emphasise the link between food consumption and cultural heritage.

Looking at Fig. 2, we can observe that the first four are specific attributes of seafood: *origin*, the locality of produce (we mean product of Scotland, not necessarily of Oban and Mallaig, compared to imported food); *processing*, related to the freshness of produce versus frozen; *harvesting*, the practice that relates catching with small-scale vessels operating inshore as a proxy for old-traditional fishing practice versus large industrial vessels operating offshore; and *certification* which refers to the sustainable fishing label as a measure of environmental protection (Cerjak et al., 2014; Bronnmann & Asche, 2017; Reed et al., 2013) versus non-certified fisheries. Food *consumption*, the fifth attribute, refers to the modality of consumptions (in fish-based restaurants vs. harbour-side outlet/takeaway). The sixth, *heritage*, is the visual attribute of inshore fishing that relates to the possibility to enjoy cultural aspects such as access to visibly active fishing boats operating at docks compared to a situation where access to the waterfront is restricted to areas redeveloped for residential and non-fishing commercial uses. Finally, the seventh attribute is the *payment vehicle* used to calculate monetary trade-off with the specific characteristics of the good. This is a four-level integer where GBP £6 is the cost of seafood at the baseline (option C), while £10, £15, and £21 are the costs of the alternatives (A, B). The upper limit of the cost attribute was chosen by interviewing a sample of 50 people in Oban asking for the maximum willingness to pay for a portion of seafood.

Finally, the last section of the questionnaire explored some socio-economic dimensions of the person interviewed (age, gender, level of education, and income).

[3] Although replying to only 2 choice set may result in a limited number of observations, the authors decided to design such a CE to reduce the burden of interviewees and limit the possibility of random replies. On street interviews generate a sense of nuisance as experienced by the authors in other research especially when asking people to reply to 4 or more choice sets.

Data collection and analysis

The data were collected by questionnaire survey conducted in person during 6 weeks between August and September 2019 by the UK research marketing company ACORN Tourism Limited. Respondents were not offered any financial inducement to take part. In total, 220 people (50 for the pilot test and 170 for the final survey) were selected randomly in strategic points such as piers, docks, outside restaurants and supermarkets, and anonymously stopped when they passed in the proximity of the interviewer. A balance between gender, age group, and origin of the interviews (locals vs. visitors) was aimed for. The first 50 people interviewed in Oban were used to pilot test the questionnaire and the choice experiment. Estimates of "priors" (econometric coefficients provided by the analysis of the pilot test) were used to refine the final design of the choice experiment. Overall, no major changes were needed with the exception of the levels chosen for the attribute cost that were expanded from three to four to capture higher variability and derive meaningful trade-offs with non-monetary attributes.

Answers from the pilot test sample (50) were excluded from the regression analysis because of the reduced variability shown by the restricted vector of cost; thus, only observations from the final survey were used in the final analysis ($n = 170$). Fifty of these had to be excluded because interviewees replied randomly to the choice cards and avoided trading off non-monetary versus cost attribute, contrary to the rules explained when the choice experiment was introduced. Although this reduced the number of observations, we are confident this removed any sample bias potentially given by randomness of the choice made. The final dataset comprised responses from 120 interviewees.

Variables of the choice experiment are dummies or categorical variables (1 if the level alternative to the baseline is present, 0 in case the baseline level is present — see Table 1) with the exclusion of the monetary attributes. These attributes were interacted with the dummy variable showing the geographic origin of the interviewees to test for differences between locals and visitors. The choice experiment was tested including the effect of the alternative specific constant (ASC) (the constant of the regression model). In addition, the ASC was interacted with socio-demographic variables, and other variables capturing: (1) links to the fishing industry; (2) the origin of the interviewee (locals vs. non-locals), and (3) the agreement to the statements that local fishing influences the character of the place through maritime heritage buildings and traditions, and that local fishing is seen as a practice that makes a place unique. Finally, the latter two statements, interacted with the locals vs. visitors dummy variable, investigated any shift in preferences that might be generated by the different motivations and knowledge locals have of the places and their assets compared to visitors. Regression analyses were carried our using NLogit version 5.

The econometric approach

Responses to the choice experiment were analysed by the random utility theory (McFadden, 1974). In this model, the utility U for the choice made by the respondent is decomposed in a deterministic part (v) that is assumed to be a linear function of the attributes of the environmental good, and a random component (ε) that is not observable.

$$U_j = v_j + \varepsilon; v_j = \beta_1 + \beta_2 x_{j2} + \cdots + \beta_m x_{jm} - \alpha p_j \quad (1)$$

where j is the kth choice made, x is a vector of attributes (characteristics of seafood, including cost), β are the coefficients associated to these attributes, p_j is the cost of the choice made and α its related coefficient. Variance of ε is visitor specific and depends on the parameter of scale μ, typical of each individual ($Var(\varepsilon) = \mu\frac{\pi^2}{6}$). McFadden (1974) has shown that if the error component (ε) is assumed to be independently and identically Gumbel distributed (iid), the probability of the multinomial (MNL) or conditional logit of choosing the alternative j from a set of k alternatives can be estimated by:

$$\pi(j) = \frac{\exp^{vj}}{\sum_{k\epsilon C} \exp^{vk}} \quad (2)$$

To overcome the restriction imposed by the independence of irrelevant alternative (IIA) (Train, 2002), we adopted a mixed logit model (MXL) that allows beta coefficients to vary between individuals, by taking into account their preferences and tastes (McFadden and Train, 2010). It is possible to estimate the heterogeneity across respondents by allowing the coefficients in Eq. (1) to deviate from the population means following a random distribution (Hensher et al., 2005; Hensher and Greene, 2003). In our model, only the variable processing was random modelled using a normal distribution, drawing from quasi-random Halton sequences (2000 draws). No heterogeneity effects in the other non-monetary attributes were observed. Under this model, the marginal willingness to pay (WTP) is estimated by the ratio between non-monetary (βnm) and monetary coefficient (α) (Eq 3).

$$WTP = -\frac{\beta nm}{\alpha} \quad (3)$$

In this study, the variable cost is assumed constant, characterised by a mean without standard deviation (not following a parametric distribution as proposed for the variable processing). This avoids the possibility of identification issues of the moments in Eq. (3) caused by likely division by zero, a problem that may arise in modelling taste of

coefficients with tractable continuous parametric distributions (Sillano and Ortuzar, 2005), or untenably long upper tail (Scarpa, Thiene, and Train, 2008) that cause this ratio to be exceedingly large.

Results

Descriptive statistics

Fifty-five percent of the sample were male; the most represented age class was 40–59 (48%), while the youngest (18–39) were 23% of interviewees, and the over 60 were represented by 27% of the sample. To the questions related to income and level of education, 85% of the sample refused to reply, and therefore, these covariates were not used in the regression analysis.

Locals (residents and those living in the surrounding areas but spending important time in the towns of Oban and Mallaig) represented 49% of the sample. The remaining were visitors from Scotland (20.5% of the total), other regions of the UK (21.5% of the total) or international visitors (9% of the total). Locals stated their main reasons for living in the area as the availability of working opportunities (44%), proximity to family/friends (37%), and access to recreational activities (6.6%), landscape/nature (5.2%), and cultural heritage enjoyment, including seafood (6.6%). The main attractions for visitors to the area were landscape and nature (24%), cultural heritage (19%), and watching wildlife (17%). There was a noticeable difference between the two towns in the percentage of visitors choosing cultural heritage (30% in Oban compared to 10% in Mallaig). The minority (22%) of interviewees stated that they had connection with fishing or fishing related activities. Splitting this result between locals and visitors, it emerges that only 10% of visitors have connection with fishing, while this percentage increased to 35% in case of locals.

The majority of interviewees (71% of locals and 79% of visitors) agreed with the statement that local fishing is an activity that influences the character of a place through Maritime Cultural Heritage, such a tangible (buildings, museum, docks) and intangible traditions (festival, food and drink testing, etc.), although a relevant 25% showed uncertainty or disagreement with it (out of these, 81% were in the age group 40–59 and over 60). In addition, 70% of interviewees agreed or strongly agreed to the question whether local fishing was able to evoke the old small-scale fishing practice and to make the place unique, fostering a sense of human attachment or belonging, while 30% were uncertain or disagreed. Splitting this result by the origin of respondees, to agree to the statement was 68% of the locals, while a slightly higher percentage was found for visitors (72%). Amongst the 30% that showed uncertainty or disagreement, the majority (83%) were in the age group 40–59 and over 60.

From the questionnaire survey, it also emerged that inshore fisheries are not just a vector for provisioning (96% of participants agreed that fishing was important from an economic perspective) but are essential for the creation of place identities. In particular, 84% agreed that fishing evokes social connection with the sea and 78% that fosters a way to shape the community. Conversely, the touristic importance of fishing was less recognised; in fact, nearly half sample showed uncertainty or disagreed to the statement that considers fishing as a tourist attraction.

Choice experiment results

A total of 120 interviews were used for the choice experiments and each participant responded to two choice cards. As regards the preferred choice, among the 12 blocks, 9% preferred the status quo (option C), the remaining the alternative options A and B. The blocks were uniformly presented and nearly 10 responses per block were used (although the total number of answers received is higher and nearly 18 responses per block were received).

We modelled data using a MXL approach after testing for a latent class model (LCM)[4].

The random variables were selected using a stepwise approach in which the MXL model was run using 200 Halton draws, and each variable was added one by one according to their significance. The final model was run using 2000 Halton draws. Amongst the non-monetary attributes only the variable processing showed a heterogeneous pattern and was modelled following a normal distribution. To avoid problem of sign, the monetary attribute that measures the marginal utility of income (in other terms, the incremental benefit in consumption provided by an additional unit of income) is modelled as a fixed (e.g., non-random) parameter. Because of statistical differences in the marginal utility of income between the age classes 18–39 and 40–59, two cost attributes

[4] A latent class model (LCM) (available on request) using the full dataset (170 observations) was used to test if respondees formulated their choice avoiding some attributes. We employed two models, one testing for non-attendance of heritage attribute, the second also considering the non-attendance of the monetary attribute. The choice was made considering the less familiarity of the heritage attribute compared to the most traditional seafood properties (e.g., locality, freshness). Both models showed that there is a high probability (40%) that people made choices without taking into considerations the attribute heritage; the second model also showed the non-attendance of the variable cost. The LCM showed the attribute cost to be barely significant, producing estimates of WTP with a poor confidence interval, while coefficients of the non-monetary attributes were not so different from the MXL model proposed in this section. We decided to present the result of a MXL model with the subset of respondents who stated to have made choices trading-off all the attributes.

Table 2 mixed logit regression (MXL) reporting coefficients of attributes, ASC, interaction between cost with age groups and interaction between the attribute heritage and the origin of the interviewees (locals vs. visitors). The cost attribute is fixed. Only the attribute processing shows heterogeneous preferences and is modelled assuming a normal distribution

Regressors	Coefficient (robust standard error)
Mean	
Origin	2.51058*** (.31732)
Processing	0.92827*** (.27763)
Harvesting	1.03687*** (.21831)
Environmental certification	1.81648*** (.26086)
Consumption	.85892*** (.20357)
Heritage *locals	1.21341*** (.30244)
Heritage*visitors	0.39673 (.31097)
Cost_age39	−0.09857** (.04039)
Cost_age59	−0.05811** (.02884)
ASC	−1.60561*** (.45561)
Standard deviation	
Processing	1.07896** (.43276)

Sample=120; number of obs = 720; number of cases = 240; integration sequence: Halton, 2000 draws;

Log likelihood function: −157.58094; Restricted log likelihood: −263.66695

Chi squared [11 d.f.] = 212.17202; Significance level 0.00000; McFadden pseudo *R*-squared 0.4023485 (Std. Err. adjusted for 120 clusters)

****p* level <0.01; ***p* level<0.05;**p* level<0.1

were used[5]; in addition, differences in preferences in all seafood attributes between locals and visitors were tested. The only statistical difference is for the attribute heritage[6], showing that cultural background of locals provides a relevant contribution to address the consumption preferences of seafood.

The mixed logit model results are shown in Table 2. The overall regression is significant at the 1% confidence level [Chi squared [11 d.f.]=212.17202; Prob > chi^2 = 0.000]. The non-monetary attributes are highly significant (1% confidence level) and positive. Cost is negative, as expected (additional income must be given up to achieve higher satisfaction under the options A and B (compared to the status quo); therefore, the marginal level of utility must decrease).[7]

It is relevant to see how the cost coefficient is related to age, showing that the marginal utility of income is decreasing with age. The middle age class group (40–59) shows lower reduction in utility than the youngest class for each unit of income spent[8]. We found also that the group of elderly (age over 60) did not show a marginal utility of income different from zero (this is counter intuitive from an economic perspective, and this result cannot be generalised; we suspect that this outcome can be the consequence of the limited sample). Thus, we calculated different WTP for all the attributes only for the 18–39 and 40–59 age groups.

The attribute origin showed the highest coefficient, while the second most influential attribute was environmental certification. Processing and harvesting also provided high utility. The ASC is a shifter (intercept) that elicits the utility provided by the options A or B when the levels for the non-monetary attributes proposed in the options A and B are set to zero as at the baseline. As expected, ASC is negative suggesting preferences for the status quo when non-monetary attributes measured at the baseline are offered at the high price proposed in the alternative A and B. The positive values for all the non-monetary attributes suggest an incremental benefit from consuming seafood characterised by levels alterative to the status quo. Although we could expect some divergence in the preferences of the attributes according to the different socioeconomic attributes of the sample, this was not proved by the econometric model. Furthermore, we tested for shift in the ASC after interaction with the statements that fishing is as an activity able to evoke the old small scale fishing practice and to make the place unique, fostering a sense of human attachment or belonging, and with the statement that fishing influences the character of the place through Maritime Cultural Heritage such as tangible (buildings, museum, docks) and intangible traditions (festival, food and drink testing, etc.). Both variables were not significant. Finally, splitting the last two interactions between locals and visitors does not contribute to any significant shift in the ASC. The final model is proposed below in Table 2.

Marginal WTPs are calculated by the ratio between the non-monetary and cost coefficients. These results are presented in Table 3 for two age groups (18–39 and 40–59 age class). Standard error in both tables is provided by the delta method. No result for the over 60s is provided, because of the insignificance of the monetary attribute for this age class. We observe smaller values with a tighter 95% confidence

[5] The difference between cost attribute in the age group 18-39 and cost attribute in the age group 40-59 has average −2.41366 and standard error of .02884 (Chi square (1) = 6792.62, significant at *p* level <0.000).

[6] The difference between the heritage attribute coefficients of locals and visitors is 0.73936 with standard error 0.37186 (Chi square (1) = 4.395, significant at *p* level<0.05).

[7] The satisfaction in consumption decreases when increasing the cost of the good or services consumed. Thus, the sign of the monetary cost must be negative.

[8] It is intuitive to think that this age group has income higher than the youngest class (although we cannot confirm it from the descriptive statistics of the sample having most people refused to state their household income), thus the marginal weight attributed to the last monetary unit is lower (one pound in the pocket of a rich person values less than one pound possessed by a low-income consumer).

Table 3 Willingness to pay from the MXL regression model for the age groups 18–39 and 40–59

Regressors	Age group <39 WTP (standard error) [95% confidence interval]	Age group 40–59 WTP (standard error) [95% confidence interval]
Origin	25.47** (10.34) [5.20 45.74]	43.20** (21.22) [1.61 84.80]
Processing	9.41** (4.61) [.37 18.46]	15.97* (8.75) [−1.17 33.12]
Harvesting	10.51** (4.42) [1.86 19.18]	17.84* (9.28) [−0.35 36.04]
Environmental certification	18.43** (7.59) [3.54 33.31]	31.26** (15.60) [0.67 61.85]
Seafood consumption	8.71** (3.90) [1.06 16.36]	14.78* (8.32) [−1.53 31.09]
Heritage_locals	12.31** (5.44) [1.63 22.98]	20.88* (10.86) [−0.41 42.18]
Heritage_visitors	4.02 (3.49) [−2.81 10.86]	0.83 (6.33) [−5.59 19.24]

***p level <0.01; **p level<0.05;*p level<0.1; standard error measured by Delta method

interval and a stronger significance of WTPs for the youngest age class, given by the small heterogeneity of the marginal utility of income. In both classes, only locals have a positive WTP for the heritage attribute, showing a more solid position on the preference of cultural related aspects of local fishing and seafood consumption, probably reflecting the higher number in the sample of locals having a stronger connection with the fishing industry.

Discussion

This discussion is structured in two sections. The first is centred around the results of the econometric model, highlighting similarities with findings in the literature, and some of the limits of the approach used, while the second focuses on the policy implications of the findings.

Considerations on the findings

The results of the choice experiment showed that cultural aspects associated with seafood increased the utility associated with consumption and that they were not affected by the socio-demographics parameters of the respondees that we were able to measure (age and gender). The latter result is not uncommon as changes in utility were also not related to age, location, and gender as shown in studies carried out by Choi and Fielding (2016), Durán et al. (2015), Campbell (2007), Grebitus et al. (2013) and Bronnmann and Asche (2017). However, the latter authors suggested that demographics do not sufficiently capture the consumer heterogeneity. Factors explaining choice preferences in the literature are generally income and educational attainment. However, these two variables could not be tested in our model due to the high number of respondees who opted out of these questions. Considering the high number of variables in a model with reduced degrees of freedom, it is possible that the lack of significance of some of the socio-economic variables interacted with the ASC is due to the reduced sample size. Further research would be needed to confirm if our results are stable, although the lack of significance of sociodemographic variables as found in related published studies encourages us to think that this result from our analysis is likely correct. Further research is also needed to confirm our results by using a bigger sample taking possibly account of the effect of non-attendance attributes, as stated by the respondees, to test for their impact on the robustness of the econometric model and the final willingness to pay estimation (Carlsson et al., 2010; Scarpa et al., 2010; Balcombe et al., 2011).

We did not find a difference in attributes' preferences between locals and visitors, but only for heritage, a result matching with the literature (Reed et al., 2013; Ropars-Collet et al., 2015). In addition, we found statistically significant the relationship between the monetary attribute and age, although this is not much evidenced in the literature where it is more likely explored the interaction between non-monetary attributes and socio-demographic variables (Mogas et al., 2006). Our results show a decrease in the marginal utility of income with age, but no significance of the attribute cost was found for the over 60-age class, probably determined by the choice of alternatives characterized by the highest cost attribute. This is counterintuitive, as we would have expected the alternative choices characterised by lower costs to be the most selected. We do not know if this is given by a specific set of preferences or was only the effect of the small sample.

Our results show other similarities with the literature, for instance with Ropars-Collet et al. (2015), who revealed the

importance of 'connection to fishing' in shaping people's preferences. In our study, we found connection to fishing as better experienced by locals than visitors, although the majority of respondees (both locals and visitors) did support the statement that cultural traditions (tangible and intangible) are important in shaping the character of the place. This seems to be reflected in the positive coefficient of the heritage attribute for locals in the choice experiment. Thus, the results of the choice experiment support the hypothesis that inshore fisheries are not just directly economically important, but also encompass cultural values, which are in turn essential for the creation of place identities. Similar conclusions have been reached by Nightingale (2013), Ruddle (2000), Urquhart, Acott and Zhao (2013a, b), Noonan (2003), and Durán et al. (2015), the latter authors reporting that recognition of cultural values informed people's preferences in relation to policies protecting maritime cultural heritage.

The four most important attributes in order of ranking were origin, environmental certification, food processing, and harvesting. Verbeke et al. (2016), Cerjak et al. (2014), and Reed et al. (2013) have stated that produce values can be emphasized due to a variety of factors, one of which is locality (origin). Our results support those findings, as the WTP for the attribute origin (local seafood) was the highest ranked, highlighting the importance of strengthening the ties between catches and locality.

The fact that environmental certification was ranked second is particularly interesting. Globally, the role of sustainable certification for seafood is becoming increasingly important (Swartz, 2019), but its uptake by fisheries tends to be driven by access to large-scale markets, such as supermarket chains, rather than by price differentials. Although some local seafood outlets in Oban and Mallaig publicise their use of sustainability certified products, this is by no means widespread.

The attribute processing, referring to the freshness of the seafood, received the third highest preference. Although not in magnitude, this value can be compared with Bronnmann and Asche's (2017) results who found a negative WTP for frozen salmon (compared to fresh products). Finally, harvesting by a small vessel size increases the WTP as proposed by Ropars-Collet et al. (2015). Durán et al. (2015) also provided a positive WTP for the latter attribute estimated at € 8.47 (equivalent to £ 6.27 in 2015 GBP), a value that is aligned with our findings (£ 10.51 for the 18–39 age class). The modality of seafood consumption (in restaurants) showed the lowest level of appreciation among the several attributes considered. However, WTP was still quite high (between £ 8.71 and £ 14.74 between the two age groups) and supports the results of Ranyard et al. (2001), and Bronnmann and Asche (2017) who showed that WTP increases when dining at local restaurants, and the findings from Lacher et al. (2013) who found a considerable desire for regional character in tourist coastal vacations. The final attribute, related to the visual aspects of fishing heritage, shows a relevant value between £ 12.31 and £ 20.88 between the two age classes, aligned with the findings from Durán et al. (2015) (€ 18, equivalent to £ 13.32 in 2015 GBP). It should be noted that the WTP in Durán et al. (2015) was elicited as marginal value to protect the maritime heritage by donation to a trust, and the vector of prices used in the choice experiment was much higher than the one used in our study. The WTPs in our model are compatible with the ones proposed by Durán et al. (2015), showing that the result is not affected by the vector price. This is an important aspect considering that there is evidence that similar attributes assessed under different cost vectors can be valued differently, and the greater the cost vector, the higher is the WTP (Glenk et al., 2019 and reference therein). Finally, the reply made to the 5-point Likert scale question about the cultural value of fishing supports the findings of Reed et al. (2013) and Kaltenborn (1998) in which both visitors and locals highly valued visible cultural heritage such as harbours and inshore fishing boats. However, this cannot be confirmed by our regression model where it seems to emerge that the predetermined attitude of locals alone to the maritime context determined higher appreciation for the heritage cultural component attached to seafood consumption.

Implications for local and national government policies

Oban and Mallaig have a specific and diverse maritime cultural heritage, recognized locally and internationally. However, the risk of inappropriate policies can put them at risk despite their importance as demonstrated by the results of this research. The analysis of consumer preferences for "locally" produced seafood shows the importance of policies to rejuvenate the small-scale fishing practices and diversify products for the tourist sector.

Fisheries policies in the European Union have tended to focus on stock sustainability, ecosystem impacts or the direct socio-economic aspects of the industry (for example in the EU, see Art. 2 of Regulation [EU] No. 1380/2013, while in UK see Clause 1 of the 2020 Fisheries Act). Although the role of seafood is well recognised within the tourism sector (Scotland Food and Drink, 2018), fishing cultural heritage in the UK has tended to be interpreted through a historical lens, i.e., via fisheries museums and preservation of old fishing vessels. Good examples of this are to be seen in Anstruther, home of the Scottish Fisheries Museum; Hull, which was formerly an important deep-water fisheries port (home of the Hull Maritime Museum), and Great Yarmouth, which was a historically important herring fishing town (home of Time and Tide Museum). In contrast, in this study, we wanted to explore whether the cultural importance of living fisheries

has been under-valued, particularly, inshore fishing activities which can be seen in harbours such as Oban and Mallaig, on the Scottish west coast.

Our regression model highlights the importance of strengthening the ties between catch and locality, as proposed by Cerjak et al. (2014). In particular, the origin of food can motivate individuals to purchase fish products (Reed et al., 2013), but the presence of living fisheries creates a link between the customer and the fishers themselves. However, it must be recognised that the strength of this link can be relatively weak, as what is sold locally may not have been sourced locally. It has already been commented that because of the decline in mixed fisheries on the Scottish west coast, whitefish, in particular, is sourced from other parts of Scotland, or further afield (in particular Iceland and Norway). Moreover, although our results suggest that consumers state a preference for 'local' products, supplying this would only be possible across a wider range of seafood if the west coast inshore finfish stocks can be rebuilt.

A final aspect which could be strengthened is the interpretation of the modern fishing industry. In both Oban and Mallaig, there is a noticeable lack of information on how the modern fishing industry functions. Whilst only locals appear to value the experience of seeing such activities around the harbour, according to the results of our regression model, they may have still limited understanding of what they are seeing. We suggest that a renewed focus on explaining the living aspects of fishing cultural heritage could play an important role in ensuring the future of the inshore industry in Oban, Mallaig and other similar localities.

Conclusions

Our results have highlighted the importance of ties between fish offered for sale and origin as also proposed by Cerjak et al. (2014). In particular, we found higher willingness to pay for 'local' versus 'imported' seafood, that if further investigated could probably suggest how locality of food might increase individual's motivation to consume more seafood, as already proposed by Reed et al. (2013), with likely positive effects on the supply chain (local restaurants or food processors demanding more products to local fishers). We also found that customers are sensitive to the sustainability of catches, as the environmental attribute was the second highest in the ranking. Our results suggest that enhancing the cultural dimension of fisheries, in terms of both fishing and consumption is a further important element in valorising fisheries policy. These elements make us believe that policies on food and fisheries and heritage should converge on the importance of enhancing the seafood consumption experience through considering all the factors; provenance, environmental, cultural, and heritage, in order to boost the local economy and promote sustainable harvesting as a leverage for enhancing the economic viability of small-scale fisheries and coastal communities. A pathway to this direction would be the creation of a marketing strategy, based on the formulation of a food and drink label that reflects the cultural dimension of fishing, processing and consuming, as well as emphasizing the importance of sustaining the small-scale inshore fisheries, the latter being not only a livelihood, but an important resource in the formation of individual and collective identities within communities (Reed et al., 2013; Urquhart & Acott, 2013a; Williams, 2014).

In Scotland, the current marketing strategy "Taste our Best" (Scotland Food and Drink, 2018) already recognises and celebrates businesses providing locally sourced and quality produce such as restaurants, cafés, bars, and takeaways. Such labels could be extended to include the further dimensions mentioned above, such as stories related to its origin and its transformation and thus be better embedded in the cultural background of the Scottish maritime communities informing consumers about local fishing history and small-scale fisheries specific to each town.

Appendix

Questionnaire on West of Scotland fisheries as cultural heritage

To be completed by interviewer

ID of questionnaire:
ID of choice task set:
Sub-region where data are collected:
Argyll (Oban) – West Highlands (Mallaig)
Date:
Duration of interview:

Introduction

My name is [say your name], working at [name of the company], and I am doing a research survey on behalf of the University of York as part of a project called PERICLES. PERICLES is an EU project exploring the way to govern sustainably cultural heritage in coastal regions.

We would like to interview you on the importance of fishing as cultural heritage in this locality and on your preferences for local, fresh seafood vs imported products

The survey will take around 10 minutes of your time. The questions are anonymous and you can refuse to answer any question and end your participation at any time. Would you like to participate? If yes, you know that your information

will be analysed to inform policy makers planning to help manage fishing heritage.

Section 1: your background

1.1. 1 Are you?

a. Local, I mean resident in Oban/Mallaig or resident in a town/ village of the West Coast practicing a periodic (for example weekly) trip to the town (Oban/Mallaig)?
b. a visitor/tourist spending here part of your holidays?

1.1.2 If you are not a local but a visitor, are you coming from?

a. Elsewhere in Scotland (e.g. Highlands or other regions)
b. Rest of UK
c. Rest of Europe
d. Rest of the world

Section 2: Connection with fishing and knowledge of fishing as cultural heritage

Only for locals

1.2 Have any of the following influenced your choice to live or continue to live here? Please choose those answers that are the most important for you

	Your choice
Working in the area	
Family/friends	
Cultural heritage such as museums, castles, etc.	
Maritime cultural heritage (ports, harbours, fish house, etc.)	
Local traditions, music, dances, festivals	
Local food, seafood, etc.	
Nature in general/ landscape	
Wildlife watching	
Walking/relaxing	
Recreational activities in water (swimming, canoeing, kayaking, sea angling, diving)	
Other___	

Only for visitors

1.2 Have any of the following influenced your choice to visit this place? Please choose the those answers that are the most important for you

	Your choice
Family/friends	
Cultural heritage such as museums, castles, lighthouse, etc.	
general dockside activities such as loading/unloading	
Fishing boat in the harbour	
Local traditions, music, dances, festivals	
Local food, seafood, etc.	
Nature in general/landscape	
Wildlife watching	
Walking	
Recreational activities in water (swimming, canoeing, kayaking, sea angling, diving)	
Other___	

1.3 Do you have any direct or indirect connection with fishing?

a. I have no connection
b. I have connection, please specify_____

1.4 What is the level of agreement on the following statements regarding **local fishing**? 1 (strongly disagree), 2 (disagree), 3 (I am uncertain), 4 (I agree), 5 (I strongly agree).

a. it is economically important for the fishers (*economic/ social dimension*)

1 – strongly disagree	2- disagree	3 – I am uncertain	4 – I agree	5 – I strongly agree

b. it is a tourist attraction, i.e. instrument for local economic development (*economic dimension*)

1 – strongly disagree	2- disagree	3 – I am uncertain	4 – I agree	5 – I strongly agree

iii. it reminds me about the connection with the sea/environment (*social dimension*)

1 – strongly disagree	2- disagree	3 – I am uncertain	4 – I agree	5 – I strongly agree

iv. it is not just an occupation but a way to shape the community and satisfying way of life (*social dimension*)

1 – strongly disagree	2- disagree	3 – I am uncertain	4 – I agree	5 – I strongly agree

e. fishing influences the character of the place through buildings, symbols, traditions, etc. It is part of the cultural heritage (*cultural dimension*)

1 – strongly disagree	2- disagree	3 – I am uncertain	4 – I agree	5 – I strongly agree

f. fishing is important to be done sustainably respecting living and non-living resources in the sea (*environmental dimension*)

1 – strongly disagree	2- disagree	3 – I am uncertain	4 – I agree	5 – I strongly agree

g. fishing reminds past traditional fishing and makes the place unique fostering a sense of human attachment or belonging (*cultural dimension*)

1 – strongly disagree	2- disagree	3 – I am uncertain	4 – I agree	5 – I strongly agree

Section 3: choice experiment

Now I am going to show you a number of cards related to seafood and fishing as cultural heritage. I would like you to choose only one between three options: card A, card B, and card C (*status quo*). Cards A and B differ in terms of how shellfish and fishing is described, and the monetary attribute (e.g. the amount of money spent for a portion of seafood). If you choose card C, you pay for a seafood portion that is characterised by these peculiarities: imported, frozen, not certified and without any relationship to the local fishing heritage (lost and replaced by urban development). If you chose card A and B, you opt for a produce that can be locally sourced, fresh, environmentally sustainable and better linked to the local fishing heritage, but the price can be higher than card C.

When choosing your preferred card, please take into consideration the *trade-offs* between seafood processing, origin, fishing practices etc. **and the money you would be willing to spend**. **Please try to be as realistic as possible and carefully *consider your household budget.***

Task 1:

a. Card A
b. Card B
c. Card C (status quo)

Task 2:

a. Card A
b. Card B
c. Card C (status quo)

Which statement best describes how you made your choices? (Choose one)

1. I chose randomly
2. I usually or always chose 'option C' because I have a limited budget
3. I usually or always chose 'option C' because the alternatives were not appealing
4. I picked one or two characteristics and based my choices on those
5. I chose the options that I liked most independent of the cost
6. I chose the options that offered the best value for money

Section 4: Socio-demographic information

3.1 What is your age?

1. 18-39
2. 40-64
3. 65 and over
4. Prefer not to say

3.2 Gender:

1. Male
2. Female
3. Other

3.3 What is your level of education amongst those reported below?

1. Pre university qualification
2. Undergraduate degree
3. Postgraduate degree
4. Prefer not to say

3.4 What is your household income before tax in £/ year?

1. Up to £20,000
2. £20,000 to £40,000
3. £40,000 to £60,000
4. Over £60,000
5. Prefer not to say

I would like to thank you for taking part to this survey

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Data Availability Database will be provided upon request.

Declarations

Conflict of interest The authors declare no competing interests.

References

Acott, T.G., and J. Urquhart. 2017. Exploring CES and wellbeing through a place based approach: the case of SSF along the English Channel. In *Social wellbeing and the values of small-scale fisheries*, ed. D.S. Johnson, T.G. Acott, N. Stacey, and J. Urquhart, 23–45. Springer International Publishing AG.

Apostolakis, A., and S. Jaffry. 2005. A choice modelling application to Greek heritage attraction. *Journal of Travel Research* 43: 309–318.

Balcombe, K., M. Burton, and D. Rigby. 2011. Skew and attribute non-attendance within the Bayesian mixed logit model. *Journal of Environmental Economics and Management* 62 (3): 446–461.

Balogh, P., D. Bekesi, M. Gorton, J. Popp, and P. Lengyel. 2016. Consumer willingness to pay for traditional food products. *Food Policy* 61: 176–184.

Bateman, I.J., R.T. Carson, B. Day, M. Hanemann, N. Hanley, T. Hett, et al. 2002. *Economic valuation with stated preferences techniques: a manual*. Cheltenham, UK: Edward Elgar.

Bennett, J. 2000. Natural heritage valuation methods: application to cultural heritage. Paper presented to the ISEE 2000 Pre-conference workshop, heritage economics: challenges for heritage conservation and sustainable development in 21st century.

Bennett, J., and T. Blamery. 2001. *The choice modelling approach to environmental valuation*. Cheltenham, UK: Edward Elgar.

Berton-Charrière, D. 2017. The silver darlings: an emblem of the Scottish Sea and History. Études Écossaises, (19). Retrieved from http://journals.openedition.org/etudesecossaises/1175 ISSN: 1969-6337%0APublisher UGA Éditions/Université Grenoble Alpes%0APrinted version ISBN: 978-2-37747-001-3 ISSN: 1240-1439%0AElectronic

Billing, S.-L., S. Anderson, A. Parker, M. Eichhorn, L.L. Vare, and E. Thomson. 2018. *Scottish Inshore Fisheries Integrated Data System (SIFIDS): assessment of socio-economic and cultural characteristics of Scottish inshore fisheries*, 206. Published by MASTS.

Bronnmann, J., and F. Asche. 2017. Sustainable seafood from aquaculture and wild fisheries: insights from a discrete choice experiment in Germany. *Ecological Economics* 142: 113–119.

Brookfield, K., T. Gray, and J. Hatchard. 2005. The concept of fisheries-dependent communities: a comparative analysis of four UK case studies: Shetland, Peterhead, North Shields and Lowestoft. *Fisheries Research* 72 (1): 55–69. https://doi.org/10.1016/j.fishres.2004.10.010.

Brown, J.E. 2004. *Economic values and cultural heritage conservation: assessing the use of stated preferences techniques for measuring changes in visitor welfare (PhD)*. Imperial College London.

Brown, J.E., D. Perkins, and G. Brown. 2003. Place attachment in a revitalising neighbourhood: individual and block levels of analysis. *Journal of Environmental Psychology* 23 (3): 259–271.

Campbell, D. 2007. Willingness to pay for rural landscape improvements: combining mixed logit and random-effects models. *Journal of Agricultural Economics* 58 (3): 467–483.

Carlsson, F., M. Kataria, and E. Lampi. 2010. Dealing with ignored attributes in choice experiments on valuation of Sweden's environmental quality objectives. *Environmental Resource Economics* 47 (1): 65–89.

Cerjak, M., R. Haas, F. Brunner, and M. Tomić. 2014. What motivates consumers to buy TFPs? Evidence from Croatia and Austria using word association and laddering interviews. *British Food Journal* 116 (11): 1726–1747.

Chan, K.M., R.K. Gould, and U. Pascual. 2018. Relational values: what are they, and what's the fuss about? *Current Opinion on Environmental Sustainability* 35: A1–A7.

Chiaroni, K.E. 2020. Cultural ecosystem services in relation to Scottish small scale fisheries. In *Dissertation project for the European Master Science in Marine Evironment and Resources (MER+)*. Researched at the Scottish Association for Marine Science (UK).

Choi, A., and K. Fielding. 2016. Cultural attitudes as WTP determinants: a revised cultural worldview scale. *Sustainability* 8 (6): 570.

Claesson, S., Robertson, R. A., & Hall-Arber, M. 2005. Fishing heritage festivals, tourism, and community development in the Gulf of Maine. Proceedings of the 2005 Northeastern Recreation Research Symposium, 341(GoMOOS 2003), 420–428.

Daily, G., S. Polasky, J. Goldstein, P. Kareiva, H. Mooney, L. Pejchar, T. Ricketts, J. Salzman, and R. Shallenberger. 2009. Ecosystem services in decision making: time to deliver. *Frontiers in Ecology and the Environment* 7 (1): 21–28.

Diaz, S., U. Pascual, M. Stenseke, et al. 2018. Assessing nature's contribution to people. *Science* 359: 270–272.

Durán, R., B. Farizo, and M. Vázquez. 2015. Conservation of maritime cultural heritage: a discrete choice experiment in a European Atlantic Region. *Marine Policy* 51: 356–365.

Ford, B. 2011. Introduction. In Ford (eds.): *The archaeology of maritime landscape*. Springer, pp.1-9.

Garavito-Bermúdez, D., and C. Lundholm. 2017. Exploring interconnections between local ecological knowledge, professional identity and sense of place among Swedish fishers. *Environmental Education Research* 23 (5): 627–655. https://doi.org/10.1080/13504622.2016.1146662.

Garcia-Quijano, C., J. Poggie, A. Pitchon, and M. Del Pozzo. 2015. Coastal resource foraging, life satisfaction and wellbeing in southeastern Puerto Rico. *Journal of Anthropological Resources* 71 (20): 145–167.

Glenk, K., J. Meyernhoff, F. Akaichi, and J. Martin-Ortega. 2019. Revisiting cost vector effects in discrete choice experiments. *Resource and Energy Economics* 57: 135–155.

Gomes, L.L., L.M. Costa Pinto, and J. Rebelo. 2013. Using choice experiments to value a world cultural heritage site: reflections on the experimental design. *Journal of Applied Economics* XVI (2): 303–332.

Grebitus, C., H. Jensen, and J. Roosen. 2013. US and German consumer preferences for ground beef packaged under a modified atmosphere – different regulations, different behaviour? *Food Policy* 40: 109–118.

Hausmann, A., R. Slotow, J. Burns, and E. Di Minin. 2015. The ecosystem service of sence of place: benefits for human wellbeing and biodiversity observation. *Environmental Conservation* 42 (2): 1–11.

Hensher, D.A., and W.H. Greene. 2003. The mixed logit model: the state of practice. *Transportation* 30: 133–176.

Hensher, D.A., Rose, J.M., Greene, W.H. 2005. Applied choice analysis. A primer. Cambridge.

Howard, P., and D. Pinder. 2003. Cultural heritage and sustainability in the coastal zone: experiences in south west England. *Journal of Cultural Heritage* 4 (1): 57–68. https://doi.org/10.1016/S1296-2074(03)00008-6.

Jobstvogt, N., V. Watson, and J. Kenter. 2014. Looking below the surface: the cultural ecosystem service values of UK marine protected areas (MPAs). *Ecosystem Services* 10: 97–110.

Kaltenborn, B. 1998. Effects of sense of place on responses to environmental impacts. *Applied Geography* 18 (2): 169–189.

Kenter, J.O. 2016. Editorial: shared, plural and cultural values. *Ecosystem Services* 21: 175–183.

Khakzad, S. 2018. Promoting coastal communities through cultural tourism: the case of fishing communities in Brunswick County, North Carolina. *Journal of Heritage Tourism* 13 (5): 455–471. https://doi.org/10.1080/1743873X.2017.1391272.

Khakzad, S., and D. Griffith. 2016. The role of fishing material culture in communities' sense of place as an added-value in management of coastal areas. *Journal of Marine and Island Cultures* 5 (2): 95–117.

Khakzad, S., M. Pieters, and K. Van Balen. 2015. Coastal cultural heritage: a resource to be included in integrated coastal zone management. *Ocean & Coastal Management* 118: 110–128.

Lacher, R.G., C. Oh, L.W. Jodice, and W.C. Norman. 2013. The role of heritage and cultural elements in coastal tourism destination preferences: a choice modelling-based analysis. *Journal of Travel Research* 52 (4): 534–546.

Marsden, T., and F. Hines. 2018. Unpacking the quest community: some conceptual parameters. In *Sustainable communities: new spaces for planning, participation and engagement*, ed. T. Marsden. Oxford: Elsevier.

Martino, S., P. Tett, and J. Kenter. 2019. The interplay between economics, legislative power and social influence examined through a social-ecological framework for marine ecosystems services. *Science of the Total Environment* 651 (1): 1388–1404. https://doi.org/10.1016/j.scitotenv.2018.09.181.

McFadden, D., and K. Train. 2010. Mixed MNL models for discrete response. *Journal of Applied Econometrics* 15: 447–470.

McFadden, D., Zarembka, P. 1974. Frontiers in econometrics. Conditional logit analysis of qualitative choice behavior, pp.105-142.

Mogas, J., P. Riera, and J. Bennett. 2006. A comparison of contingent valuation and choice modelling with second-order interactions. *Journal of Forest Economics* 12: 5–30.

Mourato, S., and M. Mazzanti. 2002. Economic valuation of cultural heritage: evidence and prospects. In *Assessing the value of cultural heritage, research report*, ed. M. de la Torre, 51–76. Los Angeles: The Getty Conservation Institute.

Nadel-klein, J. 2000. Granny baited the lines: perpetual crisis and the changing role of women in Scottish fishing communities. *Women's Studies International Forum* 23 (3): 363–372.

Nightingale, A. 2013. Fishing for nature: the politics of subjectivity and emotion in Scottish inshore fisheries management. *Environment and Planning A* 45 (10): 2362–2378. https://doi.org/10.1068/a45340.

Noonan, D. 2003. Contingent valuation and cultural resources: a meta-analytic review of the literature. *Journal of Cultural Economics* 27 (3/4): 159–176.

O'Connor, S., and J.O. Kenter. 2019. Making intrinsic values work; integrating intrinsic values of the more-than-human world through the life framework of values. *Sustainability Science* 14: 1247–1265.

Oleson, K., M. Barnes, L. Brander, T. Oliver, I. van Beek, B. Zafindrasilivonona, and P. van Beukering. 2015. Cultural bequest values for ecosystem service flows among indigenous fishers: a discrete choice experiment validated with mixed methods. *Ecological Economics* 114: 104–116.

Pascual, U., P. Balanera, S. Diaz, et al. 2017. Valuing nature's contributions to people: the IPBES approach. *Current Opinion in Environmental Sustainability* 26-27: 7–16.

Pearce, D.W., S. Mourato, S. Navrud, and R. Ready. 2002. Review of existing studies, their policy use and future research needs. In *Valuing Cultural Heritage: Applying Environmental Valution Techniques to Historic Buildings, monument sand Artefacts*, ed. S. Navrud and R. Ready. Cheltenham, UK: Edward Elgar.

Provins, A., D. Pearce, E. Ozdemiroglu, S. Mourato, and S. Morse-Jones. 2008. Valuation of the hystoric environment: the scope for using economic valuation evidence in the appraisal of heritage-related projects. *Progress in Planning* 69: 131–175.

Ransely, J. 2011. Maritime communities and traditions. In *Oxford Handbook of maritime archaeology*, ed. A. Catsambis, B. Ford, and D. Hamilton. New York, NY: Oxford University Press.

Ranyard, R., J.P. Charlton, and J. Williamson. 2001. The role of internal reference prices in consumers' willingness to pay judgments: Thaler's Beer Pricing Task revisited. *Acta Psychologica* 106 (3): 265–283.

Reed, M., P. Courtney, J. Urquhart, and N. Ross. 2013. Beyond fish as commodities: understanding the socio-cultural role of inshore fisheries in England. *Marine Policy* 37: 62–68.

Ropars-Collet, C., Leplat, M., Le Goffe, P. and Lesueur, M. 2015. Commercial fishery as an asset for recreational demand on the coastline: evidence from a choice experiment in France, United Kingdom and Belgium. In: XXII *Conference of the European Association of Fisheries Economist*. Salerno, Italy: EAFE 2015.

Ross, N. 2013. Exploring concepts of fisheries "dependency" and "community" in Scotland. *Marine Policy* 37 (1): 55–61. https://doi.org/10.1016/j.marpol.2012.04.003.

Ruddle, K. 2000. Systems of knowledge: dialogue, relationships and process. *Environment, Development and Sustainability* 2 (3–4): 277–304. https://doi.org/10.1023/A:1011470209408.

Scarpa, R., M. Thiene, and D.A. Hensher. 2010. Monitoring choice task attribute attendance in nonmarket valuation of multiple park management services: Does it matter? *Land Economics* 86 (4): 817–839.

Scarpa, R., M. Thiene, and K. Train. 2008. Utility in willingness to pay space: a tool to address confounding random scale effects in destination choice to the Alps. *American Journal of Agricultural Economics* 90 (4): 994–1010.

Scotland Food and Drink 2018. Food tourism Scotland. Scotland: Sector strategies. Available at: https://www.foodanddrink.scot/resources/publications/foodtourism-scotland/ [Accessed 15 May 2020].

Sillano, M., and J. de Dios Ontuzar. 2005. Willingness-to-pay estimation with mixed logit models: some new evidence. *Environment and Planning A* 37: 525–550.

Stale, N., and R. Ready. 2002. Why value cultural heritage? In *Valuing cultural heritage. Applying environmental valuation techniques to historic buildings, monuments and artifacts*, ed. N. Stale and R. Ready. Cheltenham: Edward Elgar Publishing.

Stead, S.M. 2005. Changes in Scottish coastal fishing communities—understanding socio-economic dynamics to aid management, planning and policy. *Ocean & Coastal Management* 48 (9-10): 670–692.

Swartz, W. 2019. The emergence of corporate social responsibility in the global seafood industry: potentials and limitations. In *Predicting Future Oceans*, ed. Andrés M. Cisneros-Montemayor, William W.L. Cheung, and Yoshitaka Ota, 335–343. Elsevier.

Symes, D., and J. Phillipson. 2009. Whatever became of social objectives in fisheries policy? *Fisheries Research* 95 (1): 1–5.

TEEB. 2010. *The economics of ecosystem and biodiversity. The ecological and economic foundations*. London: Earthscan.

The Scottish Government 2017. Sea fisheries. Retrieved April 26, 2017, from http://www.gov.scot/Topics/marine/Sea-Fisheries.

The Scottish Government. 2019. *Identifying options for developing the transport infrastructure for the food and drink supply to strengthen its resilience*, 59. Edinburgh.

Train, K. 2002. Discrete choice methods with simulation. Available at https://eml.berkeley.edu/books/train1201.pdf. Consulted in June 2021.

Turner, K., J. Paavola, P. Cooper, V. Jessamy, S. Rosendo, and S. Georgiou. 2003. Valuing nature: lessons learned and future research directions. *Ecological Economics* 46: 493–510.

Urquhart, J., and T. Acott. 2013a. Constructing "The Stade": Fishers' and non-fishers' identity and place attachment in Hastings, south-east England. *Marine Policy* 37 (1): 45–54. https://doi.org/10.1016/j.marpol.2012.04.004.

Urquhart, J., and T. Acott. 2013b. Re-connecting and embedding food in place: rural development and inshore fisheries in Cornwall, UK. *Journal of Rural Studies 32*: 357–364. https://doi.org/10.1016/j.jrurstud.2013.09.004.

Urquhart, J., and T. Acott. 2014. Articles A sense of place in cultural ecosystem services: the case of cornish fishing communities. *Society and Natural Resources 27*: 3–19. https://doi.org/10.1080/08941920.2013.820811.

Verbeke, W., L. Guerrero, V.L. Almli, F. Vanhonacker, and M. Hersleth. 2016. European consumers' definition and perception of traditional foods. In *Traditional foods*, 3–16. Boston, MA: Springer.

Visit Scotland 2016. Scotland visitor survey; food and drink. Retrieved July 2017, from http://www.visitscotland.org/PDF/Food%20and%20Drink%20Extract%20SVS%201516.pdf.

Williams, R. 2014. The socio-cultural impact of industry restructuring: fishing identities in Northeast Scotland. In *Social Issues in Sustainable Fisheries Management*, ed. J. Urquhart, T.G. Acott, D. Symes, and M. Zhao, 301–317. Netherlands: Springer.