Chapter 12
Visual Dimensions of Conservation Landscapes: An Exploration of Patagonian Fjordic Landscapes from the Perspective of Prospective Chilean Tourists

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Abstract This chapter explores Chilean tourists' valuation of tourism experiences in and around the Chilean village of Puyuhuapi. In 2020, local stakeholders were concerned about the impacts that salmon aquaculture infrastructure within the fjords surrounding Puyuhuapi might have on tourism. Research was undertaken to examine how prospective national tourists might perceive visible salmon aquaculture infrastructure within Puyuhuapi's landscapes. Two hypothetical experience scenarios were designed, with short texts describing possible experiences and visual cues portraying typical destination landscapes. The scenarios were differentiated by the presence of movable floating sea cages. The scenarios were presented to potential tourists through an online survey (n = 804 responses). Results supported current nature-based tourism experience positioning, suggesting it was well received with and without the presence of salmon aquaculture infrastructure. The visible presence of the movable floating sea cages did not provoke significant differences in the valuation of the landscape for prospective tourists; nevertheless, several significant interactions occurred between

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tourism experience attributes and socio-demographic characteristics, including population density, level of education, and sex. Discussion focuses on defining a series of hypotheses to inform future research and the importance of expanding understanding of Chilean perspectives and imaginaries of Patagonia and its abundant natural settings and values.

Keywords Patagonia · Conservation landscapes · Nature-based tourism · Tourism experience · Viewsheds

12.1 Introduction

Landscape is a multidimensional concept; the European Landscape Convention of 2000 defined it as "an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors" (United Kingdom Secretary of State for Foreign and Commonwealth Affairs, 2012, p. 4); therefore, landscape can be identified as the set of interrelations derived from the interaction between geomorphology, climate, soil, vegetation cover, water, and anthropic modifications (Dunn, 1974). Over the past 20 years, the concept of landscape has acquired great relevance in Chile, based on an understanding that landscapes are natural resources that are easily depreciated and difficult to renew (Muñoz et al., 1993, 2000, 2012; Muñoz, 2004a, b). Landscapes represent complex systems composed of various interacting attributes and are therefore difficult to repair. Thus, authors have emphasized the importance of landscape preservation and conservation measures within land-use planning (Muñoz et al., 1993, 2012; Muñoz, 2004a, b). Landscape evaluation and planning contribute to the preservation and conservation of protected areas (PAs), as well as small localities that share the components characteristic of PAs, by applying a systemic approach to evaluating the appropriate management measures for the set of natural and human elements present in a place.

Landscape typologies include the *natural landscape*, which can be considered as one of the main elements for territories promoting nature-based tourism activities, as they play a central role in creating the destination image, or *positioning*, used to promote and sell tourism within the national and global markets (Aguilar et al., 2015). According to Saqib (2019), "destination image can be defined as a tourist's general impression of a destination, that is, the 'sum of beliefs, ideals, and impressions' that a visitor has toward a certain place" (p.133). Creating a tourism destination or experience image involves a strategic positioning process that associates a destination with certain characteristics (e.g., naturalness, sustainability, uniqueness) and certain uses (e.g., relaxation, adventure, learning). Landscape represents a fundamental component of destination positioning strategies because a high landscape value can contribute to an image that motivates visitation and destination choice and sets the stage for particular types of tourism experiences (Aguilar et al., 2015; Saqib, 2019). For example, a destination that

focuses on nature-based tourism is likely to position itself within the marketplace through advertising and imagery that features natural landscapes that will be attractive to potential visitors (Saqib, 2019). It will likely develop and emphasize products (e.g., tourism experiences) that allow these visitors to experience its natural landscapes in manners that they will consider appealing, unique, and personally relevant.

Environmental awareness is another core concept associated with landscape valuation. In Chile, the use of public PAs for recreation has become more widespread, as a result of increased free time and the rise in the standard of living for some segments of the population (Ednie et al., 2020; Gale et al., 2018). Muñoz (2004a) observed that, for a number of reasons, average Chilean citizens are increasingly internalizing a kind of *environmental awareness* that results in a new appreciation of natural spaces and their ecosystems, associating this appreciation with growing citizen resistance to the loss of spaces of high tourist, landscape, and recreational value. Gale and Ednie's (2019) study supported earlier work in this area, finding aesthetic and recreational value dimensions to be among the highest rated by national visitors to PAs in the Aysén region of Chile.

This chapter explored Chilean tourists' valuation of tourism experiences in and around the village of Puyuhuapi, in Chilean Patagonia, based on visual and descriptive product prompts. Puyuhuapi is considered a nature-based tourism destination, with a high natural landscape value that is important to conserve. In 2020, when this research was conducted, many tourism providers within this locality were concerned about the installation of salmon aquaculture infrastructure (movable floating sea cages) within the surrounding fjords and the impacts this might have for tourism (Rozas, 2021). Research was undertaken to help stakeholders understand how prospective national tourists might perceive visible salmon aquaculture infrastructure within Puyuhuapi's landscapes. Specifically, research explored (a) whether current nature-based tourism experience positioning was well received and relevant, with and without the presence of salmon aquaculture infrastructure (movable floating sea cages) in the Puyuhuapi bay, (b) whether the visible presence of the movable floating sea cages provoked significant differences in the valuation of the landscape for prospective tourists, and (c) whether there were socio-demographic characteristics that acted as determinants.

The study employed a *product concept testing* methodology, combining visual and descriptive cues, which comes from marketing research and is based on the development of an experiential tourist product (Dahan & Srinivasan, 2000). Two hypothetical experience scenarios were designed: both employing typical destination landscapes and differentiated by the presence (or not) of movable floating sea cages. The scenarios were presented to potential tourists (Chilean professionals) through an online survey. The results of the study will inform local tourism planning and contribute to local tourism policy and program development.

12.2 Theoretical Framework

12.2.1 Landscape from the Observer's Perspective

Scientific knowledge, and in particular geography, has approached the study of landscape as a way of integrating natural and social science (Arts et al., 2017). For example, Benson and Roe (2000) posed that the identification of landscapes, and needs related to landscapes, has arisen in response to the cultural emphasis that has been given to territorial studies in recent years. For scholars, landscape must be defined and protected to maintain the sustainability of the planet for future generations (Benson & Roe, 2000).

Landscape ecology has traditionally characterized landscapes as systems using the concept of *land units* (Campos-Campos et al., 2018; Zonneveld, 1989). A land unit is an ecologically homogeneous land tract that can be surveyed and characterized according to a series of attributes, which typically include soil, vegetation, and landform (Zonneveld, 1989). Landscape units are especially helpful in territorial planning and management as their delineation helps identify spatial patterns for the physical and social dynamics of territories (Campos-Campos et al., 2018).

Landscape is considered to be a polysemic concept that—historically—was viewed differently within the arts and academia (Klonk, 1993). During the Romantic Period, the idea of landscape arose as an object of artistic practice and was proposed from a perceptual standpoint. In contrast, academics of the period (e.g., Vidal de la Blache in France; Carl Sauer in the United States) used landscape to refer to the ways in which the surface of the earth integrates physical, geographic, and cultural elements (Jones, 2003).

Contemporary landscape studies have shifted towards the arts' conceptualization, focused on understanding the perceptions of a landscape rather than the evaluation of the natural elements and conditioning factors that compose it. This facilitates a differentiation between the landscape that is observed—which is subject to perception—and the environment that facilitates the perception (Fariña & Solana, 2007). With these elements in mind, it is possible to determine the *viewshed*, defined as "the part of the territory that is visible from a point in it" (Fariña & Solana, 2007, p. 263). As Ramírez and López (2015) indicated, "landscape is not a natural reality independent of who observes it, but rather it is the meaning that human beings give to materialized nature. It is the surface of the Earth, seen and interpreted" (p. 72). Therefore, landscape is subject to society's frameworks of understanding and in constant transformation.

Thus, landscape no longer comprises only the natural components of the earth's surface but also incorporates constructed, symbolic, and even abstract components derived from the viewer's lived experience, worldview, and cultural background. As Rodríguez (2021) indicated:

> Landscape presents the world as it is, but at the same time it is a construction, a composition of this world, a way of seeing and feeling. It represents the cultural projection of a society in a given space, admitting, however, that this is something dynamic (p. 176).

And Ramírez and López (2015) emphasized the importance of the symbolic aspect of landscapes, noting that individuals frequently symbolize spaces and objects by assigning meanings to them. Following the argument reflected by Nogué (2007), "landscape can be understood as a social product, resulting from the cultural projection of a society in a given space" (p. 12). These perspectives have helped evolve the study of landscape, incorporating a close relationship with human beings rather than an approach that is alien to them.

Ramírez and López (2015) posed that original landscapes have been modified by society, transitioning them from natural landscapes to cultural landscapes that assume societal or individual significance and symbolism. Consequently, landscapes express many different types of thoughts, ideas, and emotions; they are conceived through different ways of seeing and interpreting. They are cultural constructions that "reflect particular ideologies that convey particular ways of appropriating space" (Nogué, 2007, p.12). The visual, or perceived landscape, includes the aesthetics, the observer's sensory perception of the landscape, and the effect of a given landscape on the observer. Although all five senses are involved, the visual sense is considered to be the most relevant. As such, landscape is a physical reality that is experienced according to the perceptive capacity and cultural background of the observer (Center for Environmental Agrarian Studies—CEA, 2022; Zube et al., 1982).

12.2.2 Natural Landscapes

The research presented in this chapter focused on the natural landscape. The *naturalness* of a landscape can be defined by measuring the number of natural landscape units (without human intervention) within a territory, as compared to the number of landscape units with anthropic (human caused) modification. Natural landscapes have very little human construction, and if it exists, it is dispersed and does not monopolize the landscape. Natural landscapes can be subdivided into two main categories: *undisturbed* and *intervened*. Undisturbed natural landscapes include continuous land units with no, or very little, human intervention (e.g., pristine desert landscapes, scrublands, steppe, forests, ocean, rivers, lakes, glaciers). Intervened natural landscapes have a natural background that is fragmented by landscape units that have been, or are currently, subjected to anthropogenic activities (e.g., residential settlements, agricultural valleys, aquacultural installations, or transportation and communication elements such as roads, highways, bridges, power lines or antennas).

12.2.3 Chilean Legislation and Environmental Awareness

In Chile, the landscape is considered to be a component of the environment and is an object of protection within the Chilean Environmental Impact Assessment System (SEIA), when it is located in an area with unique natural or cultural

landscape value (Chilean National Commission on the Environment 1993, 1994; Chilean Environmental Evaluation Service, 2019). As such, possible impacts for landscape uniqueness are included within Chile's environmental impact studies, as instructed within the General Environmental Law (Chilean Law No. 19,300). Nevertheless, landscape regulation in Chile is vague. For example, Chile has ratified some international treaties, including the Ramsar Convention and the Convention on the Protection of Heritage, that imply landscape protection but do not establish a definition or set clear parameters for protection (Sandoval, 2021). Chile's current constitution makes no reference to landscape, and analysis of related constitutional guarantees and obligations (e.g., the right to live in an environment free of pollution, the duty of the State to protect the preservation of nature) have concluded that landscape protection is currently limited and restricted, observing that the constitution regulates the environment as a guarantee granted to people and, therefore, its notion is directly anthropocentric (Bermúdez, 2014; Femenías, 2017; Sandoval, 2021).

Chile does, however, have more clearly articulated strategies for promoting environmental awareness regarding natural landscape protection. For example, the National Biodiversity Strategy (2017–2030) is based on achieving the following vision:

> Chilean society understands, values, respects and integrates biodiversity and the country's ecosystem services as a source of its own well-being, stopping their loss and degradation, restoring them, protecting them, using them in a sustainable way and distributing the benefits of biodiversity in a fair and equitable manner, maintaining the possibilities of satisfying the needs of future generations. (Chilean Ministry of the Environment, 2016, p.49)

The strategy's objectives include developing awareness, participation, and information about biodiversity and ecosystem services, as a basis for human welfare and Chile's sustainable development (Chilean Ministry of the Environment, 2016).

12.2.4 Evaluating Perceptions of Landscape Naturalness

Bernáldez (1985) and Bourassa (1990) established that landscapes contain and emit a series of signs through which they communicate their identity. Understanding human reactions to landscapes is complex, especially when it comes to understanding the components of their appreciation and/or preferences. Landscape preferences are understood as the valuation of the perceived scenic quality of the visual environment and landscape. They are the result of a complex system of innate and acquired factors, based on biological, social, and personal reactions to the figurative or symbolic character of particular scenic elements (De Fuente de Val et al., 2004).

In the past, measurement of the visual landscape (Calvin et al., 1972; Daniel & Vining, 1983; Dunn, 1974; Fines, 1968; Zube et al., 1982) did not employ a standardized methodology. Studies, generally undertaken by experts, concentrated on descriptions and subsequent classification within categories. Contemporary research has evolved a range of methods for visual landscape measurement, including the

direct valuation of the visual landscape, through measures of quality, fragility, and use capacity (Muñoz et al., 2000; Muñoz, 2004a). Other methods have focused on the landscape value of a locality or territorial unit, considering landscape as an environmental component that humans perceive through the visual sense, and models that reflect all the *visual* landscape qualities of a territory (Zambrano & González, 2002). In Chile, landscape preferences have been evaluated through PA visitor surveys and mixed methods approaches that included direct assessment of representative subjectivity and subsequent indirect analysis of characteristics and components (De Fuente de Val & De Lucio, 2003; Muñoz et al., 2012).

12.3 Materials and Methods

12.3.1 Study Area

This study focused on the territory in and around Puerto Puyuhuapi, a small village located in the Cisnes Commune, in the Aysén region of Chilean Patagonia. Puyuhuapi is one of the gateway communities for Queulat National Park, Magdalena Island National Park, and the Patagonian fjords (Fig. 12.1). Located at the northern end of the Puyuhuapi Fjord, the village is set against a backdrop of calm waters,

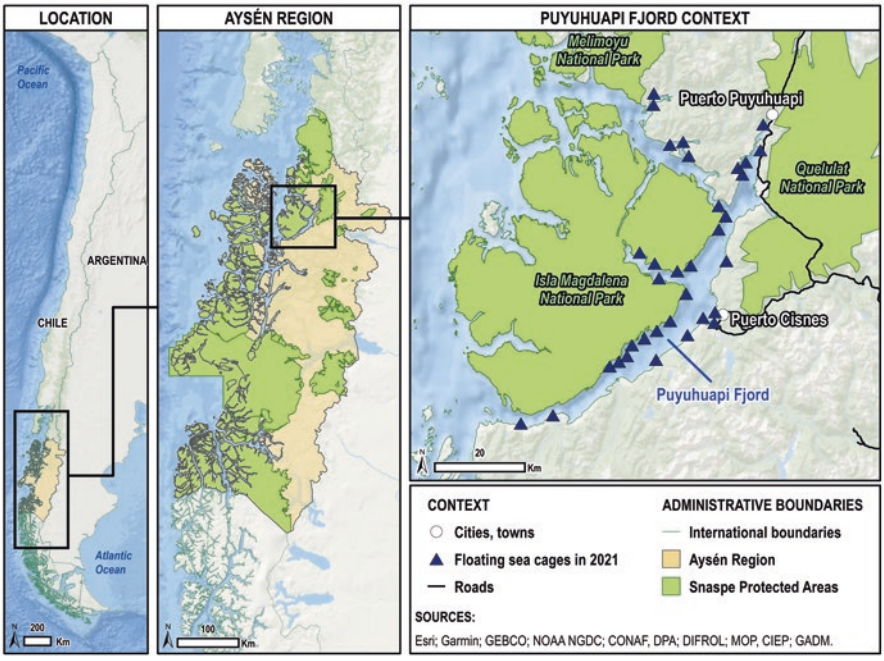

Fig. 12.1 Study area and territorial context, within the Aysén Region and Chile

surrounded by mountains with abundant vegetation. Puyuhuapi was settled in 1935 by four German families that relocated to the area before the arrival of war in Europe. Taking advantage of Chilean land grants, the families founded a settlement based on farming, livestock, fishing, and other pursuits, including the manufacture of fine fabrics and rugs (Ludwig Winkler, 2013). The German settlers employed carpenters and other trades from the Island of Chiloe, who brought their culture and traditions, resulting in a unique heritage and cultural mix, reflected in the local architecture, gastronomy, and craftsmanship.

According to the Cisnes Commune Development Plan (Municipality of Cisnes, 2018), Puerto Puyuhuapi has a population of around 1,000 persons. The area's most important economic activity is tourism, followed by artisan fishing, and commerce. The plan notes a growth in private investment in the area, noting a high correlation between these investments and tourism. Other, less integral economic activities include small-scale ranching and the extraction of forest resources.

According to the popular press, in 1999 the Chilean Marine Subsecretary granted the Salmones de Chile company aquaculture concessions within the Puyuhuapi Bay area, located in the viewshed directly in front of the town (Rozas, 2021). The company operated the concession with salmon infrastructure present between 2001 and 2008, and again between 2012 and 2013, but had not operated in the location since. In 2020, the company faced losing the concession if it did not reactivate use, and as such, planned to reinitiate activities amidst the complications of the COVID-19 pandemic. Without communicating to the community in advance, they installed a series of movable floating sea cages in the Puyuhuapi Bay at the end of August 2020 with the intention of installing 64,000 rainbow trout fingerlings. These interventions in the viewshed provoked immediate reaction with the community, which has since protested the company's tactics, both within the community and within the Chilean court system, calling for the removal of the infrastructure and the termination of the concession (Rozas, 2021), citing its negative impacts on tourism, due to a loss of naturalness within the landscape (Cooperativa.cl, 2021; Greenpeace, 2022).

12.3.2 Product Concept Testing

This research explored how prospective Chilean tourists valued Puyuhuapi landscapes within a tourism experience context, using a marketing-based method for evaluating the perception of the natural landscape, as an alternative to the traditional methods employed for land planning. Specifically, the study employed a methodology known as *proof of concept*, or concept testing, which combines visual depictions and textual descriptions (Dahan & Srinivasan, 2000) and exposes them to potential "customers" using an A/B (or split testing) experiment. A/B concept testing typically accompanies a product's development process by periodically exploring the feasibility of a product or service from the perspective of the target audience. This approach incorporates feedback gained along the way to maximize a product's

utility and chances of success (Dahan & Srinivasan, 2000; Wang, 2007). In this study, A/B product concept testing was used to test the visual impact of the floatable sea cages in the Puyuhuapi fjord. Participants included prospective Chilean tourists, with a focus on professionals. Two hypothetical "products" were created (Product A, Product B), using scenes and experiential descriptors typically found in current tourism materials and websites for Puerto Puyuhuapi (e.g., Ruta de los Parques, Chile es Tuyo, Go Chile, Trip Advisor). Next, A/B testing employed online surveying to expose the products to two homogeneous groups of potential tourists, who were asked to evaluate different aspects (attributes) of the hypothetical products, including visual aspects.

12.3.3 Survey Procedures

A closed (online) A/B test survey was conducted between September and November 2021. The target population included potential national visitors to the Puyuhuapi area. Participant recruitment was conducted using a database of emails of Chilean professionals containing over 100,000 records. An algorithm built in the Qualtrics platform was used to assign prospective participants to survey group 1 or 2, and then sent an invitation email with a differentiated link (described in detail below). Finally, a sample of 402 responses was obtained for each of the two product surveys (Product A, Product B), for a total sample of 804 surveys.

12.3.4 Questionnaire Design

Each survey instrument was divided into three parts. The first part consisted of the tourism experience analysis, where participants were presented with narrative and visual cues, and asked to respond to six questions. The textual description included the following positioning statement and a bullet-point list of *don't miss* experiences:

> Visit Puyuhuapi, the portal community for Queulat National Park, Magdalena Island National Park and the Patagonian fjords. Located at the northern end of the Puyuhuapi fjord, surrounded by mountains of incredible beauty with abundant vegetation, in this quiet town you can still breathe the traditions of the first settlers of German and Chiloé origin.
>
> - Relax in the hot springs near Puyuhuapi
> - Explore Queulat National Park
> - Tour the village plaza to learn about the history of Puyuhuapi through illustrative panels.
> - Guided kayaking in the fjord (boat and bike excursions are also available)
> - Follow an interpretative trail from the tourist information kiosk, passing by buildings that represent the German architectural heritage of the village.
> - Photograph the heritage of Puyuhuapi, represented through the houses located on the waterfront of the fjord.
> - Hike the Los Canelos trail on the edge of the town.

The photo montages represented typical landscapes of the area that were frequently shown in tourism promotional literature. The background of the photos within the montage were the same for Product A (No aquaculture interventions) and Product B (Visible aquaculture interventions). The only difference between the two montages was that in Product A, the natural landscapes did not include aquaculture interventions, while in Product B, the photos included the movable floating sea cages (see Fig. 12.2). Study participants only saw one of the photo montages, according to which product group they were randomly assigned.

Following the descriptive and visual product prompts, participants were asked to respond to the following six questions (they were able to return to the description and photo montage throughout the survey if desired). The Likert-scale questions were identical for participants in Group 1, who were exposed to Product A (No Aquaculture interventions), and Group 2, who were exposed to Product B (Visible aquaculture interventions):

- Initial reaction: What is your initial reaction to this proposed tourism experience?
- Uniqueness: How unique is this proposed tourism experience compared to other products currently available?
- Attractiveness: How attractive is this proposed tourism experience compared to other products currently available?
- Appeal: How much do you like or dislike this proposed tourism experience?
- Sustainability: How sustainable is this proposed experience?
- Personal Relevance: How relevant is this proposed tourism experience for you personally?

The second part of the questionnaire sought clarification and context about participants' responses to the tourist experience presented, by asking them to write down the proposed visual and experiential aspects they liked most and least. The final section asked participants to share socio-demographic characteristics, including sex, age, income, education, place of residence, belonging to an Indigenous people, marital status, and professional situation in the last 3 months.

12.3.5 Statistical Analysis

Descriptive statistical analysis was performed to determine means and standard deviations for quantitative variables, frequencies, and percentages for categorical variables. Comparative analysis employed hypothesis tests for mean differences, using the Likert scale in quantitative form. Although we would have preferred to conduct multiple A/B experiments within the original list of over 100,000 records, the available project resources allowed us to conduct a single A/B experiment from the larger database. Thus, *bootstrapping* was performed. Bootstrapping is a statistical procedure used to approximate characteristics of the distribution in a sample through simulation. It generates a large number of samples by

Fig. 12.2 Supporting photo montages, representing landscapes that are frequently pictured within tourism promotional messages, without (Product A—top) and with (Product B—bottom) aquaculture interventions

resampling the original sample (with replacement). Each of these new samples are used to calculate estimates of a parameter, which are then combined to form a sampling distribution (Kung et al., 2020). Based on these distributions, parametric and non-parametric hypothesis tests were used to determine the difference in means or medians between the two groups (Product A, Product B) for each question associated with the experience. In addition, an analysis of variance and/or Friedman's test was performed to test for interaction between socio-demographic characteristic variables and the experience ratings. For the interactions that were significant, Tukey's multiple comparisons tests were performed. To determine the effect of socio-demographic characteristic variables on the alternatives (Product A, Product B), a bivariate analysis of variance was performed between the assigned *tourism experience alternatives* factor (Product A—No aquaculture interventions, and Product B—Visible aquaculture interventions) and the following socio-demographic characteristic variables: sex, education, income, age, and population density. Population density was obtained according to the population and surface area of the region of origin of the respondents, which was categorized as low (<40 persons/km^2), medium (40–99 persons/km^2), medium high (100–400 persons/km^2), or high (>400 persons/km^2). Data analysis was performed with RStudio statistical software.

12.4 Results

12.4.1 Study Sample

As shown in Table 12.1, the sample characteristics for Group 1 and Group 2 were homogeneous, as sought within A/B testing, with a majority of participants living in Chile's central zone (74.0 and 67.4%, respectively). This zone includes the Metropolitan, Valparaiso, and O'Higgins regions, together representing 56% of the general population of Chile (Chilean National Institute of Statistics (INE), 2019). The next highest concentration of participants resided in Chile's southern zone (20.0% and 19.2%, respectively), which includes the regions of Maule, Ñuble, Bío Bío, Araucanía, Los Ríos, and Los Lagos, representing 29.9% of Chile's total population (INE, 2019). Much lower percentages of study participants resided in the northern (Arica-Parinacota, Tarapacá, Antofagasta, Atacama, and Coquimbo Regions) and southernmost (Aysén and Magallanes Regions) zones of Chile, which together account for 14.1% of the Chilean population (12.6 and 1.5%, respectively). For both groups, the participants skewed slightly more female than the national average (53.5 versus the national average of 51%), with the majority of participants (87.4%) between 25 and 54 years old. Approximately 50% of the combined sample reported a family income above 1.5 million pesos, which seems accurate considering the study focused on Chilean

Table 12.1 Sample distribution

Variables	Categories	Percentages	
		Group 1 Product A	Group 2 Product B
Zone of Chile	North	3.9	9.1
	Central	74.0	67.4
	South	20.0	19.2
	Austral	2.1	4.3
Population density in place of residence	Low density (<40 persons/km^2)	20.6	28.4
	Medium-low density (40–99 persons/km^2)	15.2	11.4
	Medium-high density (100–400 persons/km^2)	10.2	10.7
	High density (>400 persons/km^2)	54.0	49.5
Sex	Male	46.5	47.5
	Female	53.5	52.9
Age	18–24	0.3	0.3
	25–34	19.2	20.5
	35–44	38.3	39.8
	45–54	29.9	23.2
	55–64	8.7	10.1
	65 or more	3.6	6.1
Civil status	Married	44.9	43.7
	Living with a partner	23.5	24.8
	Widowed	1.2	1.6
	Divorced/separated	10.5	7.9
	Other	2.5	3.8
Children at home	No	47.3	50.6
	Yes	52.7	49.4
Highest level of education attained	High School (or lower)	6.3	5.4
	Technical associate degree	18.8	16.4
	University bachelor's degree or higher	75.0	78.2
Monthly Income	<$CLP300,000	5.1	4.0
	$CLP301,000–600,000	7.9	6.9
	$CLP601,000–900,000	13.7	8.9
	$CLP901,000–1,500,000	24.8	26.1
	>$CLP1,500,000	48.6	54.1

professionals and that 68.5% of the participants were either married or living with a partner. According to the INE (2022), in 2021, the average monthly salary for employed workers in Chile was $681.039 CLP, and 16% received an income equal or greater than 1.0 million pesos per month.

12.4.2 Responses to Current Nature-Based Tourism Experience Positioning with and without the Presence of Aquaculture Infrastructure

In general, study participants in both groups 1 and 2 found the tourism experiences they were presented in Puyuhuapi to be highly attractive, appealing, and relevant. Approximately 66% of the respondents indicated an extremely positive initial reaction to the experience they viewed, and another 29% indicated a somewhat positive first reaction to the proposed experience (Fig. 12.3a). Similarly, more than 60% indicated they found the offering extremely appealing, and another 33.8% agreed to finding it moderately or somewhat appealing (Fig. 12.3b). And the majority of study respondents indicated that the product they were exposed to in Puyuhuapi was very attractive (56.7%), followed by 28% who indicated that it was somewhat attractive (Fig. 12.3c). More than 90% expressed that the Puyuhuapi tourism offerings were personally relevant at some level, with more than 71.6% expressing moderate or extreme levels of personal relevance (Fig. 12.4a). Participants expressed less enthusiasm about the uniqueness of their proposed experience; for example, less than half of participants (43%) found the Puyuhuapi experience they viewed to be very or extremely unique (Fig. 12.4b). And, while slightly more than a quarter of participants (26.1%) evaluated their experience as being extremely sustainable; the majority of participants perceived at least some level of risk regarding the sustainability of the tourism experience they were provided (66.1%), with 1.1% evaluating their experience as having some degree of unsustainability (Fig. 12.4c).

12.4.3 Comparative Analysis Between Tourism Experience Alternatives with and without the Presence of Visible Aquaculture Infrastructure

Figure 12.5 shows the results of the hypothesis tests (T-tests) to see if there were differences between Group 1 and Group 2 mean ratings for the tourism product experience attributes (Initial reaction, Uniqueness, Attractiveness, Appeal, Sustainability, Personal relevance). Surprisingly, the mean values and confidence intervals for the two groups were very similar, suggesting high levels of agreement around the product experience attributes, regardless of which product was evaluated (see also Table 12.2).

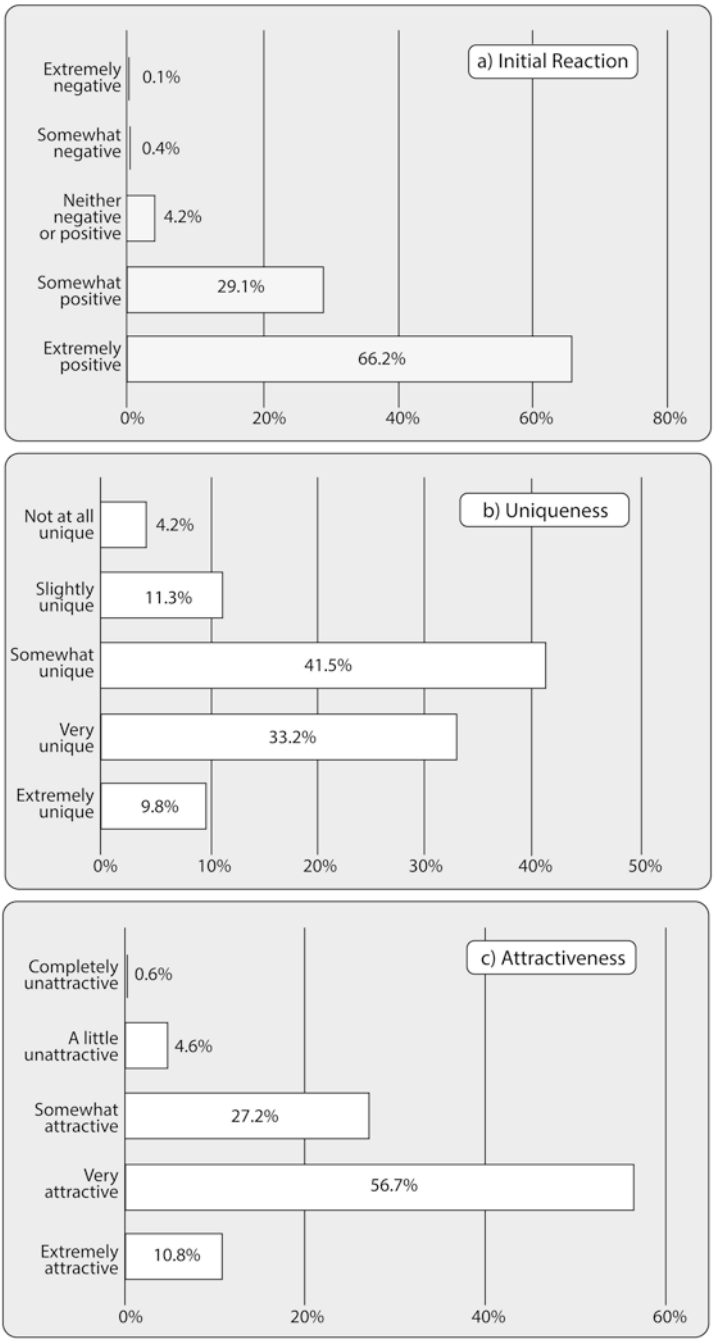

Fig. 12.3 Frequency distributions showing participant perceptions of the tourism experience described within the survey [(**a**) Initial Reaction; (**b**) Uniqueness; (**c**) Attractiveness]

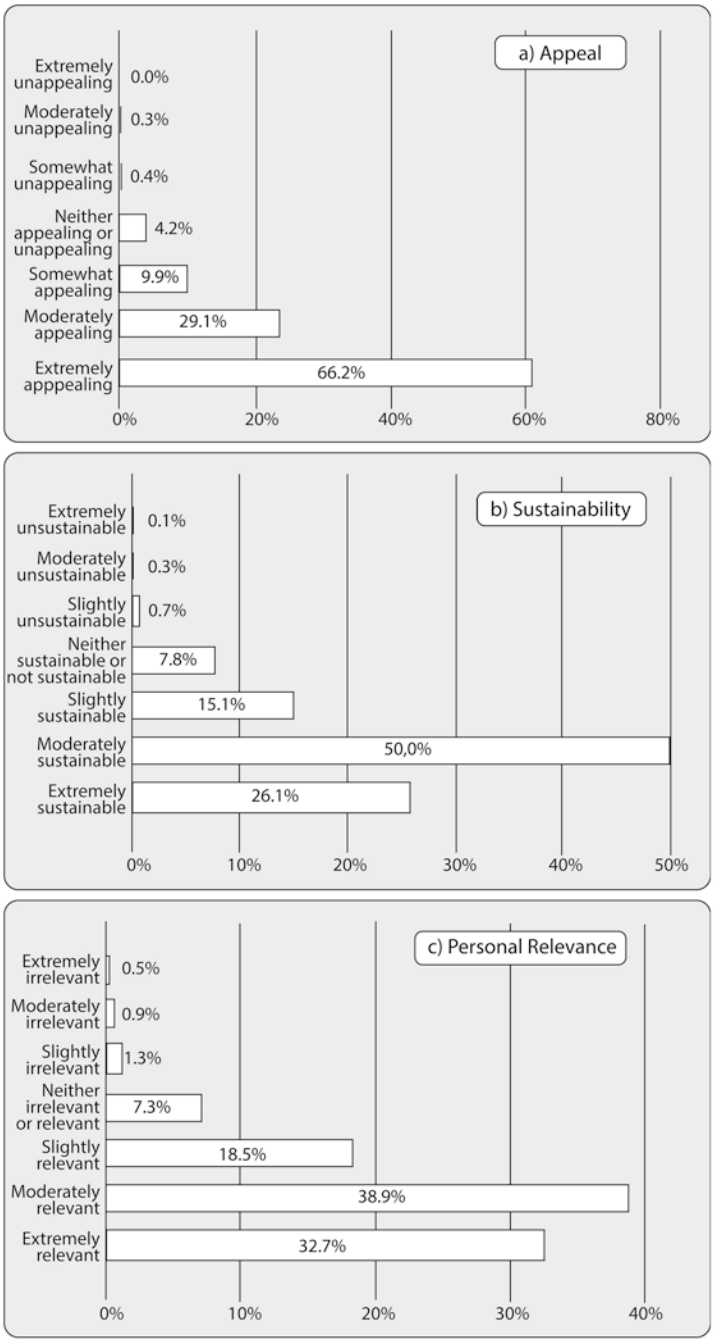

Fig. 12.4 Frequency distributions showing participant perceptions of the tourism experience described within the survey [(**a**) Appeal; (**b**) Sustainability; (**c**) Personal Relevance]

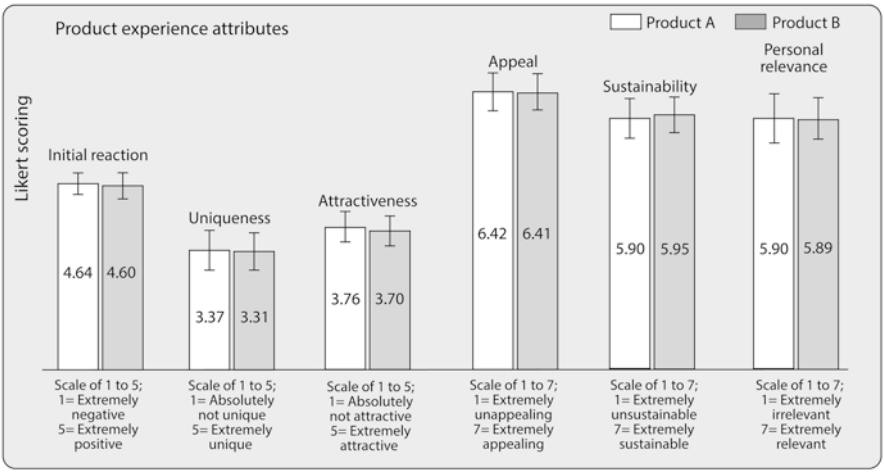

Fig. 12.5 Mean scores and confidence intervals of the groups for Product A (Group 1) and Product B (Group 2) experience attribute ratings

Table 12.2 Means, bootstrap confidence intervals, and T-tests for Product A (Group 1) and Product B (Group 2) experience attribute ratings

Product experience attributes[c]	Product concept		Bootstrap[a] 95% confidence interval				T-test for equality of means[b]
			Inferior		Superior		
Product:	A	B	A	B	A	B	*P*-value
Initial reaction	4.64	4.60	4.58	4.54	4.69	4.66	0.36 ns
Uniqueness	3.37	3.31	3.26	3.22	3.46	3.40	0.40 ns
Attractiveness	3.76	3.70	3.69	3.62	3.83	3.77	0.25 ns
Appeal	6.42	6.41	6.32	6.32	6.51	6.50	0.96 ns
Sustainability	5.90	5.95	5.80	5.86	5.99	6.04	0.40 ns
Personal relevance	5.90	5.89	5.79	5.78	6.00	6.00	0.85 ns

[a]Unless otherwise stated, results are based on 1000 bootstrap samples
[b]ns p-value > 0.05
[c]The Initial Reaction, Uniqueness, and Attractiveness variables used a 5-point Likert scale. The Appeal, Sustainability, and Personal relevance variables used a 7-point Likert Scale

12.4.4 The Effect of Socio-demographic Characteristic Variables on Experience Attribute Ratings with and without the Presence of Visible Aquaculture Infrastructure

Table 12.3 presents the p-value and significance of mean product experience attributes ratings across socio-demographic characteristic variable groupings. Several statistically significant differences were found between the *initial*

Table 12.3 Summary of interactions between experience attributes and demographic variables using analysis of variance

	Demographic variables				
Product experience attributes	Sex	Education	Income	Age	Density
Initial Reaction	0.820 ns	0.539 ns	0.444 ns	0.747 ns	0.066†
Uniqueness	0.435 ns	0.023*	0.909 ns	0.268 ns	0.021*
Attractiveness	0.610 ns	0.609 ns	0.649 ns	0.935 ns	0.118 ns
Appeal	0.092†	0.778 ns	0.984 ns	0.849 ns	0.886 ns
Sustainability	0.705 ns	0.294 ns	0.125 ns	0.973 ns	0.682 ns
Personal Relevance	0.310 ns	0.294 ns	0.638 ns	0.589 ns	0.516 ns

Note: ns p-value >0.05; $^{\dagger}p$-value<0.10; $^{*}p$-value <0.05; $^{**}p$-value <0.01

reaction experience attribute and the participants' *population density* demographic variable (p-value <0.10); between the *uniqueness* experience attribute and both the *level of studies* (p-value <0.05) and *population density* demographic variables (p-value <0.05); and between the *appeal* experience attribute and the *sex* demographic variable (p-value <0.10). There were no significant differences observed between any of the socio-demographic characteristic variables and the questions about tourism experience attractiveness, sustainability, and relevance.

To determine where the interaction occurred as a function of population density, Tukey's a posteriori multiple comparisons analysis (DHS) was performed. Graphs of significant interactions between experience attributes and demographic variables are shown in Figs. 12.6 and 12.7. For example, people residing in a high-density region of Chile (>400 persons/km^2) did not present significant differences in the mean score for their *initial reactions* (Product A = 4.61; Product B = 4.62); however, for persons residing in areas with low population density (<40 persons/km^2), there was a significant difference in the mean score (Product A = 4.65; Product B = 4.49; $p \leq 0.10$). For *uniqueness*, the mean scores were significantly different across all four population density levels ($p \leq 0.05$), with similar interactions to the *initial reaction* results; persons living in areas of lower density perceived Product A as being more unique (Product A = 3.45; Product B = 3.27), and persons in living in high density areas perceived them as less unique (Product A = 3.35; Product B = 3.29). There were also significant differences in the mean values for *uniqueness* and *levels of education*, in that participants with lower level of education perceived Product B to be significantly more unique than Product A, while persons with undergraduate degrees or higher evaluated Product A to be significantly more unique than Product B. Finally, significant differences were observed between the mean ratings of women and men for the *appeal* experience attribute, with women rating both of the products with significantly higher *appeal* (Product A = 6.58; Product B = 6.46) than men (Product A = 6.23; Product B = 6.33). Nevertheless, it is interesting to note that women rated Product A more appealing than Product B, whereas men found Product B to be more appealing.

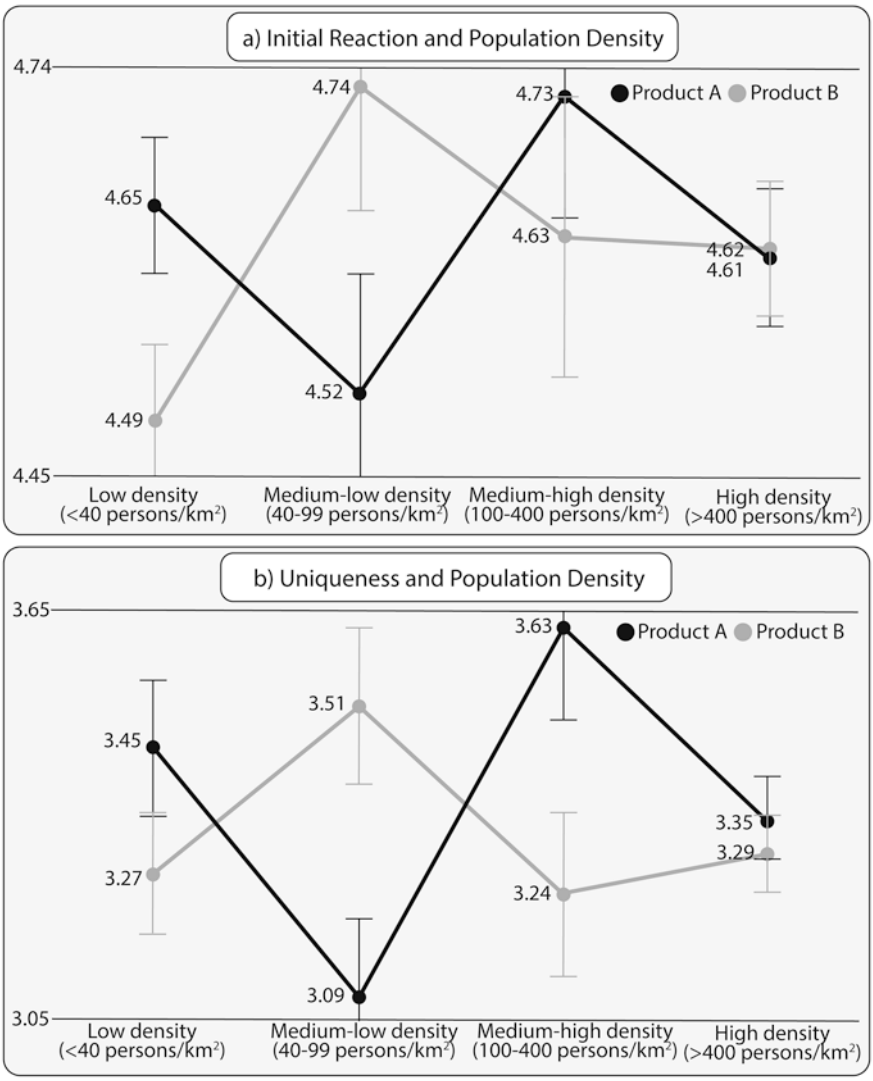

Fig. 12.6 Graphs of significant interactions between experience attributes and demographic variables [(**a**) Initial Reaction and Population Density; (**b**) Uniqueness and Population Density]

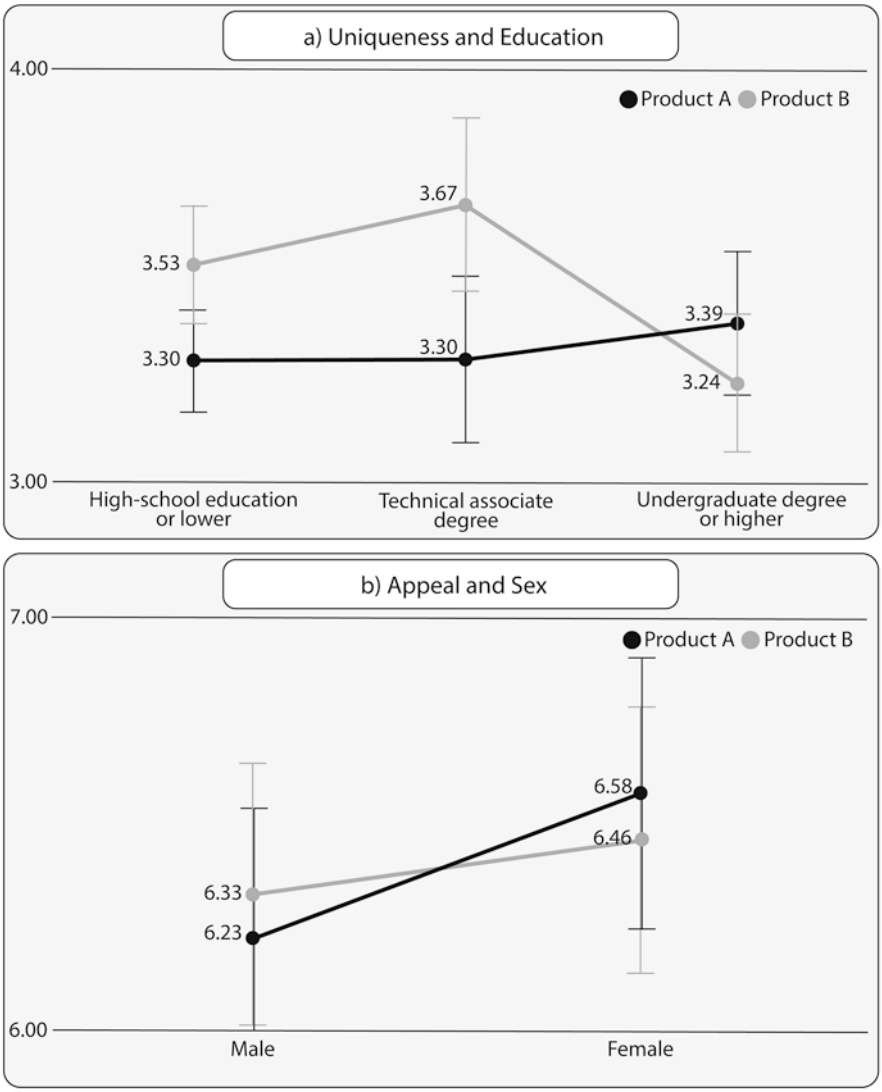

Fig. 12.7 Graphs of significant interactions between experience attributes and demographic variables [(**a**) Uniqueness and Education; (**b**) Appeal and Sex]

12.5 Discussion

This research sought to understand the perceptions and preferences of Chilean professionals with respect to tourism experiences being offered in and around Puyuhuapi, Chile, and the potential impacts of the aquaculture infrastructure within the natural and cultural landscapes. To understand the potential of the current study,

it is helpful to contextualize the sample characteristics with recent Chilean internal tourism tendencies. For example, longitudinal studies realized by the Chilean Subsecretary of Tourism (2022) indicated that in 2019, Chileans made more than 22-million overnight tourism trips and another 17-million full-day excursions within national territory. More than 40% of the trips taken by Chilean national tourists originated from the Metropolitan region of Chile, and specifically, the Maipú Commune (Chilean Subsecretary of Tourism, 2022). The principal Chilean regional destinations for national tourism included Valparaíso, the Metropolitan region, Biobio, the Araucanía, and O'Higgins, which received a combined total of 13.6 million national tourists in 2019, which was slightly lower than the prior year (Chilean National Tourism Service, 2020). For these regions, around a quarter of visitors were from the same region, while the other three-quarters lived in other regions. In contrast, the Aysén region of Chile received 180,381 national tourists in 2019, down 36.5% from the prior year (Chilean National Tourism Service, 2020). While less information has been documented about national tourism tendencies and behaviors in Aysén, a recent search of Trip advisor emphasized all terrain tours along the Carretera Austral and nature tours as being the most popular experiences in Aysén. And 5 of the top 25 regional excursions, according to tripadvisor.cl, focused on the area of Puyuhuapi, and especially, visits to Queulat National Park.

The recent tourism context within Chile and the Aysén Region supports the importance of understanding the perceptions and preferences of the national tourism sector for choosing tourism experiences and landscapes. And, the demographic profile of the current study, with its high incidence of participants from Chile's more developed, urban zones, and of participants with higher levels of education and income, provides informative input for the local tourism sector, in and around Puyuhuapi, as they seek to understand the potential of their current tourism experience positioning and possible impacts resulting from the presence of aquaculture infrastructure in their landscapes.

12.5.1 Understanding the Potential for Current Tourism Experience Positioning with Prospective Chilean Tourists

Participant responses to current nature-based tourism experience positioning were extremely positive, regardless of which product they viewed. They expressed positive initial reactions to the descriptions and photography of the destination and its natural and cultural landscapes, finding them to be attractive, appealing, and personally relevant, with or without the presence of movable floating sea cages. On one hand, these results should encourage the tourism sector about the viability of its current tourism positioning and experiences and reassure them that all is not lost if the salmon infrastructure remains in the landscape. However, tendencies with respect to some of the other experience variables (e.g., Uniqueness, Sustainability)

suggest some underlying concerns that should be addressed through further research and planning.

For example, less than 10% of the combined sample perceived the tourism experience they were presented to be *extremely unique*. Rather, more than half of the participants (57%) found the proposed experience and its associated landscapes, to be *somewhat, slightly or not at all unique*. This should be concerning to destination managers, who are seeking to differentiate their positioning within marketing and promotional materials, especially considering the remote and hard-to-reach nature of the Puyuhuapi destination. Further, Chilean legislation protected landscapes that have unique natural or cultural landscape values. Study results do not support building this argument for the landscapes of Puyuhuapi, based on the perceptions of prospective Chilean tourists. Future research, focused on defining unique aspects of the Puyuhuapi destination and landscapes, from the vantagepoint of prospective and actual tourists, could help improve both destination positioning and experience offerings, and perhaps, contribute to defining strategies for protecting territory landscapes.

Future research should also be oriented toward understanding how prospective Chilean tourists define the concept of sustainability for tourism landscapes. The majority of study participants (73.9%) responded that the Puyuhuapi landscapes included in the tourism experiences (both with and without salmon aquaculture infrastructure) were not *extremely sustainable*. One possible explanation for these scores could be that participants perceived the landscapes within the experiences as vulnerable. Maybe they would prefer to visit the destination if protections could ensure their permanence over time. These outcomes would certainly correlate with the apprehension that residents have expressed regarding the threats coming from the development and the impact they could have on the conservation of the natural landscapes, and the ecosystems of the area. Nevertheless, this hypothesis must be validated through future research before a tourism-based justification for landscape protection can be developed.

12.5.2 Comparative Analysis Between Tourism Experience Alternatives with and without the Presence of Visible Aquaculture Infrastructure

The lack of significant differences between the tourism experience alternatives (Product A, Product B) were surprising. Nevertheless, it is important to remember that participants were only exposed to one or the other alternatives, without the possibility to compare between the two. Returning to the landscape studies research provides several possible explanations that serve as hypotheses for future work (Nogué, 2007; Ramírez & López, 2015; Rodríguez, 2021).

For example, Nogúe (2007), and later Rodríguez (2021), proposed that landscapes represent the cultural projection of societies. Moreover, as multiple

landscape researchers have observed, landscape experiences reflect observers' perceptive capacities and cultural backgrounds (Center for Environmental Agrarian Studies—CEA, 2022; Zube et al., 1982). The majority of Chileans live and work in a very urban cultural setting dominated by urban and industrial landscapes (Gale et al., 2021; Janubová & Grešš, 2016). This may help explain why participants who were exposed to Product B were so accepting of the industrial components within otherwise largely natural landscapes. For them, the natural components of the landscape may have sufficiently dominated the overall visual aspect of the product experience; thus, the viewsheds presented in Product B (Visible aquaculture interventions), aligned with the nature-based tourism description provided.

Alternatively, perhaps their responses to Product B reflected a complacency about the presence of salmon aquaculture infrastructure. Results from Ednie and Gale (2021) identified similar complacency tendencies with respect to urban dwellers and natural sounds. Urban dwellers were exposed to anthropogenic sounds within the natural settings with which they felt most connected and those who reported hearing them more often, found them as more acceptable within a natural setting. Ednie and Gale (2021) warned that this type of urban complacency about anthropogenic components in nature created risks with respect to the reliability of social norm data for the conservation of natural areas. Results of the current study seem to align with these findings, reinforcing the authors' call for continued research around urban frames of reference and perceived naturalness (e.g., Groulx et al., 2017).

Ramírez and López's (2015) research, which proposed that modified landscapes may hold cultural significance and symbolism for observers, also seems relevant for this discussion of our results. Perhaps the largely urban sample of our study assigned a positive significance to the industrial development portrayed through the salmon aquaculture infrastructure. Chile is the second largest salmon producer in the world, with a reported 26% of the production worldwide, and an average reported annual growth of more than 10% over the past 3 years (Cuéllar, 2022; Riedemann Fuentes et al., 2021). According to Cuéllar (2022), 99% of Chile's salmon is produced within the three Patagonian regions of Los Lagos (42.2%), Aysén (40.5%), and Magallanes (17%). Chilean salmon is sold throughout the country and exported around the world. Given the importance of salmon production within the Chilean economy and the professional, urban nature of our sample population, it seems plausible that a natural landscape that has been modified with the presence of floatable sea cages, may be perceived as *interesting*, *appealing*, *attractive*, *personally relevant*, and even *sustainable*.

Although Muñoz (2004a) observed increasing levels of environmental awareness among Chilean citizens, it is also plausible that the majority of participants in this study were not aware or knowledgeable, or perhaps, were apathetic about the value and importance of the natural ecosystems in and around Puyuhuapi. They may also lack awareness or knowledge about the difficulties (e.g., the impacts of the ISA virus between 2007 and 2009; red tide events after massive dead salmon dumping in 2016; the sinking of the Seikongen well boat, with its toxic cargo of oil and decomposed salmon in 2017; numerous large-scale salmon escapes, and an

increased presence of industrial trash along the coast) associated with salmon aquaculture production in Patagonia (Riedemann Fuentes et al., 2021). Thus, the focus on building environmental awareness within Chile's National Biodiversity Strategy (2017–2030) seems both appropriate, and vitally important for communities like Puyuhuapi, who hope to build a tourism offering based on natural landscape valuation.

12.5.3 Determination of the Effect of Socio-demographic Characteristic Variables on the Product Alternatives with and without the Presence of Visible Aquaculture Infrastructure

Understanding the interactions that occurred between product experience attributes and socio-demographic characteristic variables adds important context that may inform future research needs and strategies for building environmental awareness as well as destination experience positioning. For example, earlier we discussed landscape studies research that has drawn out the importance of cultural backgrounds, projections, and observers' perceptive capacities (Center for Environmental Agrarian Studies—CEA, 2022; Nogué, 2007; Rodríguez, 2021; Zube et al., 1982). While the current study was exploratory, with a limited scope, our analysis showed significant interactions between several of the tourism experience attributes (i.e., *initial reaction*, *uniqueness*, *appeal*), and demographic variables (*population density*, *levels of education*, *sex*) that can orient future cultural and landscape perception research. Focused future research to understand the frames of reference for people living in distinct population density situations in Chile may help illuminate the impacts of living within heavily industrialized settings, and the types of environmental awareness efforts that are required for reaching an urban society that is often concentrated far away from the remote areas where natural environments are conserved.

The interactions between *uniqueness* and *level of education* were also interesting, suggesting the need for differentiation strategies, both in environmental awareness building efforts, and for tourism positioning and experience design. It seems possible that the differences in preferences associated with education may be related to career possibilities and options. For example, the salmon aquaculture sector in Chile has provided important sources of work through a range of jobs for persons with technical degrees, or with high-school degrees or less, within the hatchery, farming, and processing phases, specifically in roles that are associated more directly with infrastructure sites and installations (Riedemann Fuentes et al., 2021). Perhaps, these groups of participants rated *uniqueness* higher for the natural landscapes that were modified with the presence of floatable sea cages, because they represented innovations that could lead to jobs and increased economic opportunities. More research is warranted to understand these differences and their implications for environmental awareness and tourism.

12.6 Conclusions

This chapter explored some of the tensions that can arise for conservation-based development in Chilean Patagonia, responding to 2020 concerns from Puyuhuapi tourism providers about potentially negative impacts for viewsheds affected by the installation of salmon aquaculture infrastructure within the surrounding fjords. Our research sought to help these stakeholders understand the potential impact of this salmon aquaculture infrastructure on potential tourists, by exploring whether current nature-based tourism experience positioning was well received and relevant, with and without the presence of salmon aquaculture infrastructure (movable floating sea cages) in the Puyuhuapi bay. Our results suggested that the current destination and experience positioning used in Puyuhuapi were relevant to participants. Moreover, the visible presence of the movable floating sea cages did not provoke significant differences in the valuation of the landscape for these prospective tourists. Nevertheless, there were socio-demographic characteristics (i.e., population density, level of education, sex) that acted as determinants for respondents' characterization of the initial reaction, uniqueness, and appeal of the two hypothetical products.

Results provided interesting initial insights around the complex challenge of balancing conservation and development in a way that permits sustainability and quality of life for the long-term. It raised a number of interesting hypotheses and research questions that warrant future research to inform conservation-based development strategies and outcomes. Specifically, the lack of significant differences between participants perceptions of the landscapes, with and without the presence of salmon aquaculture infrastructure (movable floating sea cages) in the Puyuhuapi bay, suggests the importance of expanding understanding of Chilean perspectives and imaginaries of Patagonia, and its abundant natural settings and values.

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