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The role of information in changing tourists behavioral preferences at the Humboldt penguin reserve in northern Chile.

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ABSTRACT

With considerable focus on ecotourism's potential to contribute to conservation, it is increasingly important to understand the implications of ecological information in triggering sustainability-relevant attitudes and actions. This study assesses whether people who have ecological information regarding the negative impact of their recreational behavior on penguins' stress will choose to remain farther away from the penguins to avoid that impact although this option will reduce the personal benefits of their tourism experience. To answer this question, we use a choice experiment with three attributes related to "Humboldt penguin watching": (1) price of the experience, (2) distance at which penguins could be observed, and (3) penguin density. In addition, we used two treatments: with and without ecological information. We used a pooled data (with and without information) mixed logit model to identify the effect of providing or not providing information. Using a chi-square test, we first tested whether people in the sample with information chose different alternatives than those individuals without information. Furthermore, we evaluate whether the coefficient associated with the attributes of the mixed logit model, and therefore people's behavioral preferences, differs among samples. Results show that, irrespective of socio-demographic differences, visitors with information were more prone to select alternatives that reduce penguin stress, despite more educated, wealthier, and older people tend to increase their welfare when they choose being closer to the penguins. People without information never choose the alternative which results in a reduction of penguin stress. Ecological information is shown to reverse this trend, in fact, tourists perceived (on average) a welfare loss of CL$1099 (US$1.9) if he/she is too close to the penguins once information has been granted. These results are encouraging because they support the claim that well-defined educational and informational campaigns can have important effects on the way in which people behave in areas of interest for conservation. Granting ecological information can become an important tool to encourage conservation behavior, particularly in areas where support for enforcement is weak.

1. Introduction

A popular approach to conservation is the development of nature tourism enterprises or ecotourism. The International Ecotourism Society defines ecotourism as 'responsible travel to natural areas that conserves the environment and sustains the

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well-being of local people' (Wood, 2002). Tourism can provide significant financial benefits to areas that support charismatic wildlife (Adams and Infield, 2003) and has therefore been proposed as a relatively cheap method of facilitating both development and conservation (Cater and Goodball, 1997). According to The International Ecotourism Society (http://www.ecotourism.org), in 2004, global ecotourism grew three times faster than the tourism industry as a whole, which is growing at approximately 10% per year. Despite successful cases, evidence increasingly suggests that ecotourism is not a panacea for solving conservation problems (Krüger, 2005), and many projects fail to achieve both conservation and development targets. In terms of assuring conservation, problems arise when nature-based tourism affects species' natural habitats or has physiological or reproductive consequences for protected species.

In these circumstances, educating visitors and creating positive attitudes towards conservation in tourists is likely to be particularly important (Lück, 2003; Masud et al., 2014). Educational and informational campaigns have become important as a means to promote an environmentally friendly tourism industry (Lück, 2003), and it is suggested as a fundamental tool to manage protected areas (Hockings, 1994) and to reduce the negative impacts of tourism (Newsome et al., 2012).

Increasing awareness is often considered as a prerequisite to changing attitudes (Gelcich et al., 2005) and can predict certain conservation behaviors (Gelcich et al., 2008). Thus, one wants to predict changes in behavior associated to information; information raises awareness of the impacts of ecotourism on the species or ecosystems that are visited. Consequently, this awareness could drive tourists' behavioral preferences towards more sustainable ecotourism practices.

In Chile, the "Pinguino de Humboldt" coastal reserve provides a unique opportunity to test the role of ecological information on the impacts of ecotourism on tourists' attitudes and behavioral valuation of marine wildlife. This coastal reserve protects marine biodiversity with special emphasis on the Humboldt penguin as a flagship species. Currently, Tourism Management in the reserve applies best practice visitor guidelines; however, research has shown that the Humboldt penguin is extremely sensitive to human presence, and ecotourism visitors would be required to remain out of sight from the penguins' breeding and molting areas; this makes it a difficult focal species for ecotourism (Ellenberg et al., 2006). Ellenberg et al. (2006) showed physiological and breeding impacts of tourism activities for the Humboldt penguins when distances of less than 100 m are allowed. These authors actually suggest a minimal distance of 150 m for visitors, which is a marked difference with respect to the other penguin species such as the Magellanic and Yellow-eyed penguins.

Tourism that is focused on Humboldt penguins usually occurs in isolated areas with minimal enforcement; therefore, tourists' behavior and support of regulations becomes a key factor to achieve success. In this context, there is a pressing need to assess the consequences that information on the potential ecological impacts of ecotourism may have on tourists' attitudes; there is also a need to determine the bundles of attributes they value from the ecotourism experience and, eventually, their behavioral preferences. Within the context of contemplating regulations that require minimum distances for the observation of the Humboldt penguin, this paper's objective is to explore eco-tourists' minimal distance preferences for visiting Humboldt penguins and determine how those preferences are influenced by attitudes, socio-economic factors, and information regarding the ecological impacts of visitors on the natural populations of Humboldt penguins.

To assess tourists' behavioral preferences when confronted with ecological information from the possible impacts of their visitor experience, our study is based on the theoretical and methodological underpinnings used in the non-market valuation method of choice experiments (CEs) (Alpizar et al., 2003; Bateman et al., 2002). CEs allow the estimation of people's willingness to pay (WTP) for environmental protection and allow the decomposition of the total WTP among different attributes that determine a tourism experience (Hearne and Salinas, 2002).

Evaluating the impact of information is not new in the literature of nonmarket valuation (Bateman and Mawby, 2004). In the case of CEs, the evaluation of information has been implemented particularly in the area of food and nutrition in which labeling is the main mechanism to provide information to individuals. These studies evaluate the behavior of consumers when they are informed of food attributes by the use of nutritional labels or eco-labels on different product types and whether this information is used by consumers to make their decisions (Balcombe et al., 2010; Barreiro-Hurlé et al., 2010; Gracia et al., 2009; Shen and Saijo, 2009). In marketing research, there have also been several efforts to evaluate the impact of information on people's behavior, particularly regarding the provision of excessive or minimal quantities of information (Sasaki et al., 2011).

This study focuses on assessing the impacts of ecological scientific information on visitor choices. It assesses whether people with more ecological information will choose to remain farther away from the penguins although this behavior will reduce their enjoyment of the tourism experience. The results are replicable to other areas in which there is a need to promote stewardship behavior among visitors to ecologically vulnerable sites. If people are in fact receptive to ecological scientific information and are willing to change their behavior to achieve environmental goals, making these types of tradeoffs explicit and available to tourists could become a strategy to integrate tourism activities within nature reserves, particularly in cases in which there are limited resources for enforcement.

2. Materials and methods

2.1. Study area

The "National Reserve for the Humboldt Penguin" is located in northern Chile, specifically along regions III and IV, named Atacama and Coquimbo, respectively. This reserve includes three specific islands, Damas, Choros and Chañaral (see Fig. 1). The Humboldt penguin is considered a flagship species in this area and attracts national and international tourists as well as allows the development of nature-based tourism. At the time this study was performed, two of these three islands had restricted public access (Choros and Chañaral), whereas Damas Island could be visited frequently by tourists. Tourists who visit these areas are mainly from Chile; nevertheless, the infrastructure to receive international tourists is being developed. In 1990, when this reserve was established, the number of tourists ranged from 600 to 900. By 2014, 51,050 visitors had visited the area surrounding the nature reserve, according to the national statistics of the National Forestry Corporation in Chile (CONAF, 2013), which manages the area. Punta de Choros is the only artisanal landing port in the vicinity; therefore, this is the place that tourists use as a base camp to visit Isla Damas. In addition, tourists use this port for marine wildlife watching. These boat trips have high chances for watching penguins and dolphins. The boat trip costs approximately US$14, which includes the entry cost to the protected area.

According to the 2013 census, CONAF estimated a population of 21,000 penguins in the Chañaral Island and Choros Damas, which represents 70% of the world population of the Humboldt penguins (http://www.conaf.cl/mas-de-21-mil-pinguinos-de-humboldt-habitan-la-reserva-nacional).

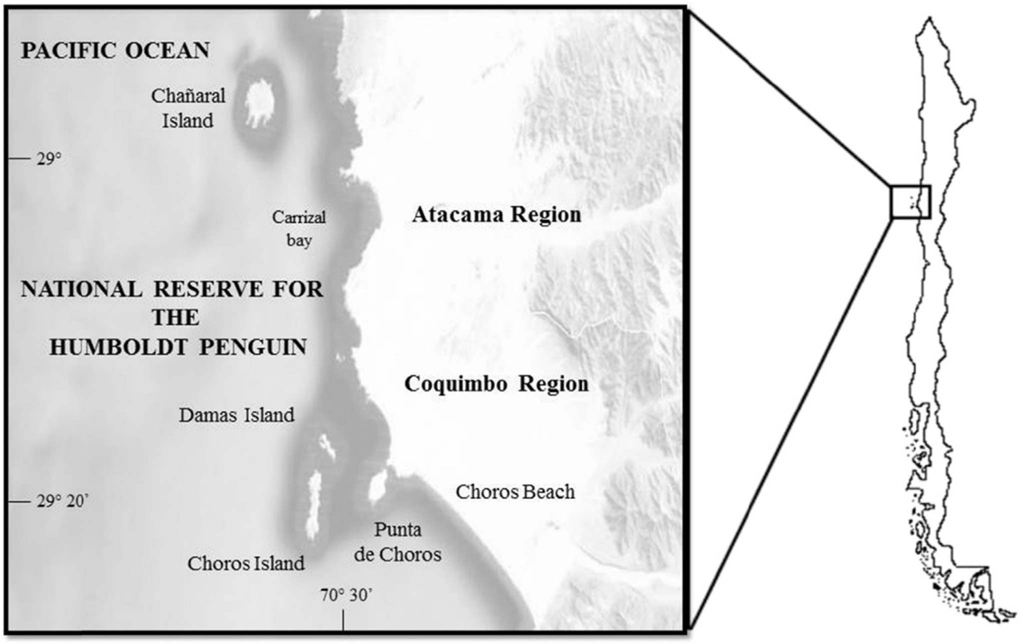

Fig. 1. Map of Damas, Choros and Chañaral Islands in Chile.

2.2. Experimental design

Choice Experiment models have been widely used in the fields of environmental economics research and tourism studies (Adamowicz et al., 1998; Louviere et al., 2000). CEs create hypothetical choice situations in which individuals must choose between two or more alternatives described by a group of attributes (Carlsson et al., 2003). Based on the choice of the preferred alternatives, it is possible to obtain the underlying preference structure using statistical tools. The main advantage of CE over other methods, such as contingent valuation, is its ability to characterize an asset or service as a function of its attributes and their levels. Thus, it is possible to assess the relative relevance of each attribute for the consumer (Louviere et al., 2000).

In this study, a choice experiment was designed to estimate differences in values provided by respondents regarding the following three specific attributes concerning "Humboldt penguin watching": (1) price of the experience, (2) distance at which penguins could be observed, and (3) penguin density (Table 1). We established and categorized three levels of distance at which penguins could be watched by tourists. Considering that the distance varies depending on whether the penguins are observed from land or boat, the following three categories were defined: (1) within 51 and 150 m of distance while watching from land, (2) more than 150 m of distance to watch penguins from land, and finally, (3) more than 150 m of distance from a boat. Density was characterized as the amount of penguins that use two categories (low and high); the price includes three values (US$14, US$18, and US$21). We used a fractional factorial design using the SAS program to assure there was balance, no dominance and orthogonality of our design (Kuhfeld, 2005).

During February 2009, we applied an onsite survey to tourists who visited the "Humboldt National Reserve". The experimental design included a sample in which we provide ecological information regarding the penguins. This information explained the detrimental effects of human proximity to the penguins, specifically that the proximity affects their reproductive efficiency. Another sample obtained no ecological information. Six choice elections were shown to each respondent with three elections each; therefore, we have 1200 observations in sample 1 and 522 observations in sample 2 (an example of a choice set is presented in Table 2). Deliberately, we made the latter sample smaller because this was a control group with a simpler survey design, and we decided to expend more effort on the treatment group. These sample sizes are appropriate for our simple choice experiment according to the sample size tables provided by Kanninen (2002) and Orme (1998). An appropriate means to determine the minimum sample size for choice surveys, suggested by these authors, is

Table 1
Attributes and levels.

Attribute	Description	Levels
Distance	Distance to look at the Humboldt penguins	Mn150: Less than 150 m, but no lower than 50 m. Ms150: More than 150 m. From the boat, (larger distance).
Density	Amount of penguins	High: More than 10 Low: Less than 10
Price (cost)	Cost of the activity	US$14 US$18 US$21

Source: authors' own elaboration.

Table 2
Example of choice set.

Option	Status quo	Option a	Option B
Density	Low	Low	High
Distance	From the Boat	On land less than 150 m	On land more than 150 m
Price	US$14	US$18	US$21
Choice			

given in equation (1):

$$N = 500*\frac{NLEV}{NALT*NREP} \tag{1}$$

where N is the minimum sample size, NLEV is the largest number of levels in any attribute, NALT is the number of alternatives per choice set, and NREP is the number of choice questions in the survey. In our case, NLEV = 2, NALT = 3 and NREP = 6; therefore, N = 83 individuals who provide a minimum of 498 useful responses (we have 522, a few more useful observations). The survey included a section on interviewees' socio-demographic information.

2.3. Model estimation

In the context of a choice experiment in which people encounter several decision occasions, the utility level ($\boldsymbol{U_{njt}}$) obtained by an individual is shown in equation (2):

$$\boldsymbol{U_{njt}} = \boldsymbol{V_{njt}} + \boldsymbol{\varepsilon_{njt}} \tag{2}$$

where V_{njt} represents the deterministic component of the utility function for individual n selecting alternative j in the choice occasion t. The variable ε_{njt} is the analyst-unobserved random component that varies among individuals, alternatives and decision occasions.

The individual will choose the alternative that provides the maximum utility, this decision process is summarized in equation (3), so that (Train, 2009):

$$\boldsymbol{U_{njt}} \geq \boldsymbol{U_{nkt}} \Leftrightarrow \boldsymbol{V_{njt}} - \boldsymbol{V_{nkt}} \geq \boldsymbol{\varepsilon_{nkt}} - \boldsymbol{\varepsilon_{njt}} \quad \forall \boldsymbol{k} \neq \boldsymbol{j} \tag{3}$$

The observed decision reveals the alternative that provides the largest utility but not its utility level because the random component is unknown. Although we cannot determine whether inequality [2] is met with certainty, we can describe the probabilistic structure of the problem by specifying a distribution function for the random component. The probability that individual n chooses alternative i in occasion decision t is represented in equation (4) by:

$$\boldsymbol{P_{nit}} = \boldsymbol{Prob}(\boldsymbol{\varepsilon_{nit}} \geq \boldsymbol{\varepsilon_{nkt}} + (\boldsymbol{V_{nkt}} - \boldsymbol{V_{nit}}))\,\forall \boldsymbol{k} \neq \boldsymbol{i} \tag{4}$$

The assumptions on the random component distribution determine the probabilistic models that area adopted. CE applications commonly use the conditional logit model specification, which assumes an identical and independent Gumbel-distributed stochastic component, among individuals and alternatives (Train, 2009). The conditional Logit model does not allow the random error to be correlated among alternatives and observations. This lack of correlation prevents the consideration of different substitution patterns among pairs of alternatives, and the common effect of unobserved individual factors in a sequence of independent decisions. The mixed Logit model can overcome both limitations. The probability that an individual makes a sequence of independent choices conditioned to coefficients α_{ni} and β_n is the product of the logit expressions established by equation (5):

$$\mathrm{L}_{\boldsymbol{n}\mathrm{i}}(\boldsymbol{\alpha_{ni}}, \boldsymbol{\beta_n}) = \prod_{\boldsymbol{t}=1}^{\boldsymbol{T}} \left[\frac{\boldsymbol{e}^{\alpha_{ni}+\beta_n' \boldsymbol{x}_{ni_t}}}{\sum_{\boldsymbol{j}} \boldsymbol{e}^{\alpha_{nj}+\beta_n' \boldsymbol{x}_{nj_t}}} \right] \tag{5}$$

where x_{njt} are the observed variables that are included in the CE, which correspond to attribute levels and the characteristics of individuals; α_{ni} is a coefficient independent of the attribute levels that varies among alternatives; and β is a vector of coefficients associated with the attribute levels and characteristics of individuals. To determine the unconditional probability, it is necessary to know the distribution function for those coefficients considered random among individuals. Most mixed Logit model applications consider this distribution, called the mixing distribution, to be continuous and normal (Train, 2009 p. 136). We can represent the normal mixing distribution as $f(\beta|b,W)$, where β is a vector that contains all the coefficients assumed to be random including those of alternative intercepts, b corresponds to the vector of the means, and W indicates the covariance matrix. Because an analytical expression for the choice probability (unconditional) cannot be obtained, simulations methods have been developed that allow the assessment of the integral of the probability for given values of β and W. Values for β are generated from the distribution $f(\beta|b,W)$ called β^r, which in turn allows the calculation of the value according to the expression of the logit probability $L_{ni}(\beta^r)$. The simulated unconditional probability of choosing alternative iP_{ni}, is obtained as the average of the results obtained in R simulations. Because Mixed Logit models are more general than Conditional Logit models and now dominate the literature, we estimated the latter.

In choice modeling, it is not possible to simply compare parameters from different choice models as in any ordinary least square estimation (OLS) because each regression has an implicit scale parameter associated to the Gumbel distribution (denoted by λ) that cannot be identified in a single sample (therefore, it is assumed to be equal to 1 without loss of generality). Hence, when we compare two or more samples, we need to consider both the differences in people's characteristics and in the scale of the distribution. To do so, we pooled the data and estimate only one regression that considers the impact of socio-demographic differences and that allows us to estimate the ratio of the two scale parameters. Equation (6) presents the likelihood function for this case:

$$\boldsymbol{L}(\boldsymbol{\theta}) = \sum_{\boldsymbol{n}\varepsilon \boldsymbol{S}_1} \sum_{\boldsymbol{P}_i \varepsilon \boldsymbol{C}_{S_1}} \boldsymbol{y_{in}} \boldsymbol{ln} \boldsymbol{P}_{\boldsymbol{in}}^{\boldsymbol{S}_1}\left(\boldsymbol{x_{int}}, \boldsymbol{z_{int}}|\beta^1\right) + \sum_{\boldsymbol{n}\varepsilon \boldsymbol{S}_2} \times \sum_{\boldsymbol{P}_i \varepsilon \boldsymbol{C}_{S_2}} \boldsymbol{y_{in}} \boldsymbol{ln} \boldsymbol{P}_{\boldsymbol{in}}^{\boldsymbol{S}_2}\left(\boldsymbol{x_{int}}, \boldsymbol{z_{int}}|\beta^2\right) \tag{6}$$

$\boldsymbol{P}_{\boldsymbol{in}}^{\boldsymbol{S}_1}$ and $\boldsymbol{P}_{\boldsymbol{in}}^{\boldsymbol{S}_2}$, are the probability of choosing alternative i by individual n in sample 1 (S_1) and sample 2 (S_2), respectively, and are defined in equation (7):

$$P_{in}^{S_1} = \frac{e^{\lambda_1\left(\alpha_{in}+\beta_{n1}^{1}x_{int}+w_{n1}Z_{int}\right)}}{\sum_{j=1}^{J} e^{\lambda_1\left(\alpha_{in}+\beta_{n1}^{1}x_{int}+w_{n1}Z_{int}\right)}},\ P_{in}^{S_2} = \frac{e^{\lambda_2\left(\alpha_{in}+\beta_{n1}^{2}x_{int}+w_{n1}Z_{int}\right)}}{\sum_{j=1}^{J} e^{\lambda_2\left(\alpha_{in}+\beta_{n1}^{2}x_{int}+w_{n1}Z_{int}\right)}} \tag{7}$$

x_{in}, z_{in} are the attributes of the alternatives and sociodemographic vectors, respectively, λ_1, λ_2 are the scale parameters of each choice model, β^1 is a vector of coefficients estimated from the mixed logit model using sample 1 (S_1), and β^2 is the vector of coefficients of the mixed logit model using sample 2 (S_2). This likelihood function allows us to estimate a coefficient that represents the relative scale parameter (see Louviere et al., 2000, chapter 8; for more details).

2.4. Model specification

We assume that the welfare obtained by an individual n by a trip q is given for the utility function shown in equation [8]:

$$\begin{aligned} U_{qi} = {} & \beta_1 D_i + \beta_2 P_i + \beta_3 Mn150_i + \beta_4 Ms150_i + \beta_6 EdadNSQ_i \\ & + \beta_7 EscNSQ_i + \beta_8 IngNSQ_i + \beta_9 INF{*}NSQ_i + \beta_{10} DenINF_i \\ & + \beta_{11} Mn150INF_i + \beta_{12} Ms150INF_i + \mu_i \end{aligned} \tag{8}$$

In this equation, we have a parameter for the variable density (D) and price (P) for each level, whereas we define different parameters for the levels for distance, Mn150 and Ms150. Additionally, we created a dummy variable associated to the choices other than the status quo situation (NSQ) and interactions with the sociodemographic variables, AGE, EDUCATION and INCOME with this dummy variable (NSQ). This creation is because we are interested in knowing whether people who are older, more educated and richer may have different preferences for the alternatives that imply disturbing the penguins by proximity.

Notice that we pooled the two data sets (with and without information) to identify the effect of providing and not providing information to the tourists. We included an information variable (INF), which is a dummy variable that takes the value 1 if ecological information was provided and 0 otherwise. In choice modeling, the parameters are identified as long as the explanatory variables vary among alternatives. Because this provision is not the case for sociodemographic and information, these types of variables must be included in the model that interacts with the attributes of each alternative. Therefore, the interactions are INF with density (DEN) and INF with Distance (Mn150 and Ms150). If these variables are significant, that means that providing information changes the preferences of the individuals after controlling for sociodemographic information. For example, the coefficient for a distance of less than 150 m ($Mn150_i$) and without information (INF = 0) is given by β_3; in contrast, the impact of the same variable $Mn150_i$ but now with information (INF = 1) is $\beta_3 + \beta_{11}$. Therefore, the impact of information is the latter parameter.

For the variable density and distance, we use code effect (−1, 0, 1) (Hensher et al., 2005). This coding alternative is similar to dummy coding; however, instead of having a zero for the lowest level, it uses a −1. This coding has a few implications for the interpretation of the parameters; it allows no linear impact of the attribute, and it separates the baseline utility from the utility provided by the lowest level of the attribute (Louviere et al., 2000).

2.5. Hypothesis testing

We tested a nonparametric and a parametric hypothesis. In the former, using a chi-square test, we assess responses to test whether people in sample 1 (with information) chose different alternatives than those in sample 2 (without information).

Our second hypothesis is that providing information will change the coefficient associated with the attributes of the model and therefore people's behavioral preferences. In other words, let β^1 be a vector of coefficients estimated from the mixed logit model that is estimated using sample 1 and β^2 be the vector of coefficients of the mixed logit model using sample 2. Then, if the ecological information does not change people's behavior, our hypothesis would be $H_0 : \beta^1 = \beta^2$.

However, observing that $\beta^1 \neq \beta^2$ is not sufficient to conclude that the increased information (treatment) changes people's behavior. Two conditions need to be satisfied before such a conclusion is achieved. First, we need to control for sociodemographic differences in the two samples that could be driving the differences in preferences. Second, we need to control for possible differences in the scale parameter (associated with the variance) of the distribution function in each sample. Therefore, to test our main hypothesis, we estimated a mixed logit model using the pooled data, controlling for scale in the two distributions; in addition, the model includes the attributes price, distance and density. Furthermore, the model includes a set of sociodemographic variables (age, education and income) that interact with a dummy variable for the no SQ alternatives (NSQ = 1 for alternatives A and B).

3. Results and discussion

Using the chi-square test, we reject the hypothesis that both distributions are equal among these two sample ($p < 0.01$; see Table 3). More importantly, people without information never choose the SQ alternative, which is the most “environmentally friendly” choice.

Table 4 presents the mixed logit estimation. After controlling for scale differences in the estimation, we can conclude the following: First, prices and density have the expected sign and are statistically significant. Second, we found a negative sign for the two alternatives of being close to the penguins, that is, being closer reduces the utility in comparison with the SQ situation. Notice that in a simpler model with only attributes as explanatory (available upon request) and using the sample without information, we found that the sign of these parameters was positive (the closer the better), which is what we would have expected. However, when we pooled the data, we found that providing information outweighs this effect and reverses the sign of the parameters, thus ecological information shifts preferences towards larger observation distances.

In the model, three sociodemographic variables are significant, with a positive sign that shows that more educated, wealthier, and

Table 3
Choices for each group.

Alternatives	INF = 1	INF = 0	Total
S.Q.	191	0	191
	16%	0%	11%
A	476	262	738
	40%	50%	43%
B	533	260	793
	44%	50%	46%
Total	1.200	522	1.722
$Chi^2 = 94.7836$ Pr = 0.000			

Table 4
Estimation model conditional logit and mixed logit.

	Mixed logit		
	Beta	S.E.	T-value
PRICE	−0.6043*	0.0854	−7.075
MN150	−0.2087	0.3543	−0.589
MS150	−0.6717*	0.2049	−3.278
DENSITY	0.4357**	0.208	2.095
AGENSQ	8.2429*	2.427	3.396
ESCNSQ	83.6768*	17.1184	4.888
INCNSQ	0.0404**	0.0231	1.746
INFNSQ	−5.9688*	1.2604	−4.735
DENINF	0.3033	0.2658	1.141
MN150INF	−0.5116	0.4297	−1.19
MS150INF	0.7571*	0.2493	3.037
SD MN150	2.012*	0.331	6.079
SD MS150	1.2933*	0.2217	5.833
SD DENS	1.1394*	0.1796	6.343
lamda(λ)	0.7168*	0.1274	5.6257
Log likelihood	−1178.14418		
N	5166		

$^{*}\alpha = 1\%$. $^{**}\alpha = 5\%$. $^{***}\alpha = 10\%$.

older people tend to increase their welfare when they choose the NSQ alternatives (being closer to the penguins). These results suggest that our results regarding the impact of information on choices are robust and not confounded by socio-demographic characteristics. One could have expected more educated, wealthier and older people to also be more environmentally friendly either because they have more environmental education or they are exposed to more information regarding animal stressors. If these assumptions were true, these individuals (with or without information) would have chosen the SQ more often. However, the results show exactly the opposite and are consistent with the sign and significance of the interaction between information and the NSQ alternatives; people with information significantly dislike the NSQ alternatives.

Notice also that the coefficient on MN150 is not statistically significant, whereas the coefficient on MS150 is statistically significant. At the same time, both variances are statistically significant (SD MN150 and SD MS150), which suggests that there is an important heterogeneity of individuals' preferences. In other words, although the coefficients associated with these variables are, on average, negative, there is a significant variance of these coefficients across individuals. Given our results, we can state that approximately 40% of the population has a positive coefficient for these two variables, whereas the remaining 60% of the sample has a negative coefficient.

Estimations allowed us to calculate the willingness to pay for the different attributes. For instance, the average tourist is willing to pay CL$591 (US $ 0.99) for a high density of penguins; however, the tourists perceived (on average) a welfare loss of CL$1099 (US$1.9) if he/she is too close to the penguins.

In essence, the provision of ecological information regarding the effects of stressors on the Humboldt penguins has the potential for changing people's behavioral preferences. Importantly, after controlling for socio-demographic and scale differences in samples, we found that people with information were more prone to select alternatives that reduce penguin stress. Our results are similar to other studies that have found that ecological information can generate greater awareness of the conservation of other natural resources (Ballantyne et al., 2011; Bertellotti et al., 2013; Jacobson and Robles, 1992; Packer et al., 2014).

As noted by Masud et al. (2014) and Lück (2003), educating visitors and creating positive attitudes towards conservation in tourists can turn into a cost effective means to promote an environmentally friendly tourism industry. Our results are optimistic in the sense that increasing awareness may contribute to changing attitudes (Gelcich et al., 2005) and can encourage conservation behaviors.

Biodiversity conservation in Chile is underfunded (Castilla, 2008; Waldron et al., 2013). Chile is one of the four countries that can be found in both the bottom quartile of relative funding and the top quartile of threatened biodiversity globally (Waldron et al., 2013). Therefore, the possibility of using tourist experiences, particularly those that focus on impacts, to activate or change sustainability-relevant values, beliefs, attitudes and actions is an important area for further research as a means to bridge the financing gaps and to encourage self-enforcement of the conservation areas that allow ecotourism.

4. Conclusion

This paper contributes to the literature on the management and conservation of marine systems because it examines the role of ecological information over people's choices. The results are encouraging for the purpose of conservation because they state that well-defined educational and informational campaigns can have important effects on the manner in which people behave in areas of conservation interest. In our case, people were more willing to sacrifice their own desire for closeness to the penguins to increase the survival rate of this species.

From a policy perspective, results suggest that the management of protected areas and reserves should be accompanied by well developed information plans which make explicit the tradeoffs between the visitor experience and the conservation impacts of that experience. Our results provide hope that granting ecological information can become an important tool to encourage conservation, particularly in areas where support for enforcement is weak.

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